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Birds of the Kanab Area  
and Adjacent High Plateaus  
of Southern Utah

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## INTRODUCTION

The gateway to central southern Utah is the town of Kanab, located in Kane County just a few miles north of the Utah-Arizona line. At an elevation of 4973 feet it nestles in an indenture in the Vermillion Cliffs where Kanab Canyon emerges. North of these Vermillion Cliffs, rising like two additional great steps, are the White Cliffs and the Pink Cliffs. These lead to two tablelands, the Paunsagunt Plateau of the Bryce Canyon National Park area with its highest point 9105 feet, and to the west, the Markagunt Plateau of the Zion National Park-Cedar Breaks National Monument area. The latter in its higher northern portion is referred to locally as either Cedar Mountain or the Parowan Mountains. The highest point is Brian Head at 11,315 feet, just north of the Cedar Breaks National Monument. North of the Paunsagunt Plateau is the Table Cliff Plateau and then comes the mightiest of all, the Aquarius Plateau.

These plateaus are the highest and most extensive in North America. They were the subject of a classic study by Dutton (1880). With reference to the last named he referred to the entire broadly L-shaped tableland which is about 35 miles in length and from 10 to 18 miles in width simply as the Aquarius Plateau. However, the U.S. Forest Service refers to the southwest portion as Escalante Mountain, the mid section as the Aquarius Plateau and the northeastern part as Boulder Mountain. The latter has an average elevation of 11,000 feet. The highest point, Bluebell Knoll, on the northern part of the mountain, is 11,263 feet in elevation. Thus, from the lowlands at Kanab to the top of Brian Head or Bluebell Knoll there is, in the distance of a few miles, an altitudinal range of about 6000 feet with several vegetative belts represented and many ecologic formations.

Surrounding this general area are several important topographical features. To the west lie the Pine Valley Mountains in southwestern Utah and north of these the Great Basin. To the south of Kanab lies the Kaibab Plateau of the Grand Canyon area. To the east is the extensive, broken, canyon-land of the Colorado River and its tributaries with Navajo Mountain, the Henry Mountains, Elk Ridge, the Abajo and La Sal mountains rising up as prominent features of the landscape. North of the Aquarius Plateau are additional plateaus in Utah's Middle Plateau Province.

In studying the birds of Utah the senior author many years ago undertook as a long-range plan, a series of avifaunal projects, the first of which dealt with the Pine Valley Mountains and Virgin River Valley of southwestern Utah (Behle, 1943). Attention then turned to the Deep Creek Mountains in the Great Basin of central western Utah (Behle, 1955). This was followed by field work in the Raft River Mountains of northwestern Utah (Behle, 1958). The present report, the fourth of the series, is concerned with the central southern part of the state including the western part of Kane County, extreme southeastern Iron County, north central Garfield County and southwestern Wayne County. The area does not include central or eastern Kane County, the principal feature of which is the Kaiparowits Plateau. The only data pertaining to the birds of the Kaiparowits Plateau to our knowledge is that of A. M. Woodbury. On the Rainbow Bridge-Monument Valley expedition of 1937 he descended the San Juan and Colorado rivers by boat to Rock Canyon and then was able to spend about two weeks on the east end of the Kaiparowits Plateau from July 27 through August 13. The few specimens taken and the data for these as well as



FIG. 1. Looking upstream (north) along Kanab Creek with the town of Kanab, 4973 feet elevation, on the right at the base of the  
rock formations shown are aquatic cliff and earthbank desert

the observations made are included in the report on the birds of the Navajo Country by Woodbury and Russell (1945).

In the course of our field work on the present project, a trip was made down the Colorado River from Hite, Utah, to Lee's Ferry, Arizona. Thus the eastern end of Kane County was touched upon. However, since the observations of that trip pertained mostly to migrant birds along the river, and the data have already been published (Behle, 1948*b*), they are not again included in this report.

The avifauna of the area embracing Kanab and adjacent plateaus was not entirely unknown at the outset of this project. Clifton Greenhalgh, whose home originally was Kanab, made his early observations available to Clyde C. Searl, acting Park Naturalist of Grand Canyon National Park, who placed a few data on record in an article entitled "Some Interesting Bird Records" which appeared in the mimeographed Grand Canyon Nature Notes, 5(4) February, 1931, pp. 37-38. The list is of those birds recorded at Kanab that had not up to that time been reported in the Grand Canyon region nor in the area southeast of Grand Canyon as far as the San Francisco Mountains and Mormon Lake in northern Arizona. Greenhalgh also gave his data to A. M. Woodbury who published some noteworthy items (1939) in the Condor. The latter publication also placed on record the data for several species from the Escalante area taken by Woodbury and students. Greenhalgh's subsequent findings on barn owls were reported by Behle (1941).

A list of the birds of Bryce Canyon National Park appeared in an article by C. C. Presnall entitled "Animals and Birds of Bryce Canyon National Park" in the Zion and Bryce Nature Notes, 6, 1934, pp. 52-57. This material was later included in twelve pages of a mimeographed "Check-list of the Birds of the National Parks" issued by the National Park Service, December, 1937. A summary of observations for Bryce Canyon National Park up to April 1, 1946, was given by Grater (1947). Other records for the Bryce area are given by Presnall (1936 and 1937) and Long (1937). As pertaining to the Cedar Breaks and Escalante Mountain areas Miller (1934) recorded some pertinent observations made in 1931 and the data of the National Park Service for Cedar Breaks were summarized up to April 1, 1946, by Grater (1947). Tanner (1940), in a biotic study of what he termed the Kaiparowits region but mostly pertaining to the Escalante Valley, found forty-two species. However he does not give specific locality data for all specimens.

There are a number of reports touching on the birds of surrounding regions. Woodbury and Russell (1945) reported on the birds of the Navajo Country and as previously noted they have some records for the lower portion of Glen Canyon and the Kaiparowits Plateau. Benson (1935) noted a few birds in his reconnaissance of Navajo Mountain. Rasmussen (1941) included birds in his study of the biotic communities of the Kaibab Plateau and Grater (1937) compiled a check list of the birds of Grand Canyon National Park. Huey (1939) made a brief study of the birds of the Mount Trumbull area of northwestern Arizona. Our study of the birds of Kanab and the adjacent plateaus based on extensive collecting rounds out the picture of the bird life of the whole area, but especially that of southern Utah. The birds of the Aquarius Plateau have been the special concern of John Bushman while working for his Master's degree. A number of his findings in the nature of new records and extensions of range have been reported by Porter and Bushman (1956).

## FIELD WORK

As previously noted Greenhalgh studied birds at Kanab in 1931 and from February to May, 1935, recording the dates of occurrence of all the kinds observed. On June 20, 1935, he visited the Duck Creek area on Cedar Mountain. After attending the University in 1937 and learning to prepare study skins, he collected, on various trips home, several specimens up to the time he entered the armed services in 1942. These were deposited in the University of Utah Museum of Zoology.

The senior author in the spring of 1946 made a trip to Kanab from March 2 to 7. Members of the party were George Todd and Behle working with birds, I. B. McNulty and Rudy Glauser, botanists, and E. Jack Roscoe whose interest was molluscs. Camp was established at the Hamblin Ranch in Cave Lakes Canyon, 5 miles north of Kanab and sorties were made to Kanab, Johnson, the Paria Country, and Pipe Springs. A reconnaissance trip on which few birds were secured was made shortly thereafter by Behle with Milton T. Rees from March 16-19, 1946. This took us out of the area of study as a circuit was made from Salt Lake City to Kanab, then Lee's Ferry, Tuba City, Kayenta, Monument Valley, Mexican Hat, Bluff, Blanding, Monticello, and Moab. Greenhalgh visited Kanab on May 1, 1946, collecting a few specimens. The most intensive collecting in the Kanab area was done on a third trip that year from May 11 to 18, 1946, devoted exclusively to birds. In addition to the three authors, members of the party were George Todd and Larry Hill. Camp was again made in Cave Lakes Canyon where most of the field work was done. Greenhalgh made observations at Kanab and vicinity from September 21 to 24, 1946. To obtain representatives of the wintering population Greenhalgh visited Kanab on December 23, 1946, and was joined by Behle and Bushman on December 26. Collecting was done until the 31st.

From April 12 to 18, 1947, a 165-mile boat trip was made down the Colorado River through Glen Canyon from Hite to Lee's Ferry. Members of the boating party were the senior author, Milton T. Rees, Alf Olson, and Emil Johnson. It was not possible to collect many specimens on the river trip but the observations made have been reported by Behle (1948). Greenhalgh and Bushman drove the car with the trailer from Hite to Lee's Ferry via Kanab, collecting at Kanab on April 14 to 16 and at Lee's Ferry on April 17.

Field work was continued in the Kanab area from May 17 to 23, 1947, when a party of five again established camp at Cave Lakes Canyon. The party consisted of Behle, Greenhalgh, Todd, Hill, and John Downey. Collecting was done in the canyon and at Kanab. On June 17 Kanab was again visited by Behle, Greenhalgh, and Robert Gehring. The lowlands were worked from the 18th to the morning of June 20. In the afternoon we moved to the high country, establishing camp at the Duck Creek Forest Service Camp. The coniferous forest was worked as far as the border of Cedar Breaks National Monument until June 25. This essentially finished the Kanab-Cedar Mountain phase of the trip although Behle spent March 21-22, 1953, in the Kanab area making a few additional observations and later the same year collected at Navajo Lake from July 1 to 3. En route home a visit was made to the top of Brian Head on July 3.

The first trip to the Aquarius Plateau region was a reconnaissance of the area from June 8 to June 14, 1952. Camps were made at three localities, namely Posy Lake, June 8-10, 2 miles east of Jacob's Reservoir, June 11-12,



FIG. 2. Kanab Creek and Wash about 3 miles south of Kanab showing an erosional cavern utilized as a roosting site by barn owls. Photographed by William H. Behle. June 18, 1947.

and Deer Lake, June 12-14. Members of the party were Behle, Bushman, Howard Behle, and Richard M. Hansen. During July 4-6, 1952, Behle and Bushman camped 5 miles north of Boulder collecting in the camp area as well as the creek bottom and pond-marsh in Boulder. Bushman spent two days at Deer Lake on July 25-26, 1952, and two weeks on the top of the high plateau during early August, 1952, with M. Raymond Lee (mammalogist). From August 7 to 11 collections were made at Spectacle Lake on the southeastern top of the plateau. The following week, August 12-16, was spent in the Beef Meadows area on the north-central part of Boulder Mountain. Short visits were made on August 17 to Green Lake, Blind Lake, Pear Lake and Fish Creek Reservoir, all of which are at the base of the lava cap on the northeast end of the high plateau. Bushman and Norman Chamberlain spent three days collecting fall birds at Spectacle Lake again on October 25 to 27, 1952.

Bushman was in Loa from February 21 to 23, 1953, and made collecting sorties to Carcass Creek, three miles south of Grover, to Teasdale and seven miles south of Boulder on the west side of the mountain. A productive trip was from June 7 to 14, 1953. The party consisted of Behle, and his son Howard, Bushman and Chamberlain. Base camp was again made 5 miles north of Boulder. From here collecting trips were made north as far as eight miles and south to the pond-marsh and creek bottom in Boulder. En route home the area from Boulder to Escalante was traversed, and birds were collected at the confluence of Calf Creek and the Escalante River. We then drove north from Escalante and collected several birds along Hungry Creek, near Posy Lake and at Big Lake.

During late August, 1953 further work was done by Bushman on the northwest side of the plateau. Camp was made at the Aquarius Ranger Station during August 25 to 27. Specimens were taken not only at the camp area, but also at Pine Creek Reservoir and Dark Valley. On the 28th the top of the plateau was crossed and collections made on Bluebell Knoll, Willow Draw and Chokeycherry Point. The Wildcat Ranger Station area was visited on August 29 to 30, 1953.

Heber H. Hall collected several birds in Kings Pasture, nine miles north of Boulder, during August 20-25, 1953. He also collected several specimens in the vicinity of Boulder during the spring of 1953.

Another trip was taken on May 7 to 9, 1954, to the confluence of Calf Creek and the Escalante River. Members on the trip were William and Howard Behle, Bushman, Gail Brown, Grant Miller, Don Christensen, and Jon Ghiselin. In addition to collecting along the Escalante River gorge we obtained some birds about ten miles south of Escalante and in the fields surrounding the town of Escalante.

Behle and Chamberlain collected in the vicinity of Bicknell from May 18, to 20, 1956 and made some observations of birds at Fruita in the Capitol Reef National Monument. The last trip of the project was made by Jon Ghiselin who collected at both Bicknell and Fruita from June 23 to 27, 1956.

In addition to the specimens collected on these several field trips, we have also included in our report a few birds from the area found in the ornithological collection of the Museum of Zoology, University of Utah.

The data for all the 1425 skins collected are reported herewith together with significant sight records, ecological data and occasional systematic comment. A few systematic items have been previously reported (Behle, 1948*a*) as well as a note on the starling in Kanab (Behle, 1954:50).

#### ACKNOWLEDGMENTS

Appreciation is expressed to our many companions in the field for their help. We are indebted to Mark and Beverly Hamblin of Cave Lakes Canyon and the Greenhalgh family of Kanab for their hospitality. Mrs. George M. Shields has aided through gathering records of rare birds for Kanab and has stimulated interest in birds among the residents of the town. George N. Adams kindly made available a list of birds taken by various people in the vicinity of Kanab between 1923 and 1927 that were brought to him for identification because of his taxidermy work. We are indebted to M. V. Walker, Park Naturalist of Zion and Bryce Canyon National Parks for a copy of the check-lists of the birds of the Bryce Canyon National Park and Cedar Breaks National Monument. The Union Pacific Railroad Company graciously furnished photographs of Bryce Canyon National Park, Navajo Lake and Cedar Breaks National Monument. We are indebted to Riley R. Osborn, Utah State Fish and Game Warden at Teasdale and Reid Thompson, U.S. Forest Service Ranger at Escalante for information on the Aquarius Plateau region. Charles Kelly, Superintendent of Capitol Reef National Park helped us in the area under his jurisdiction. We are also indebted to A. M. Woodbury for allowing us to extract certain data on rare species in the area from his unpublished manuscript on the birds of Utah. These are for the most part observations of D. Elden Beck to whom we also express our thanks.



FIG. 3. Sagebrush and desert shrub formation south of Kanab.  
Photographed by William H. Behle, June 18, 1947.



Travel expenses for some of the early trips were paid by the Biology Department of the University of Utah, at that time under the chairmanship of Ralph V. Chamberlin. A grant from the University Research Fund made possible most of the subsequent trips. The terminal field work in 1956 was supported by a grant from the National Science Foundation and funds from this same grant were used to help defray publication costs of this report.

## PLANT BELTS

There are several vegetative belts represented in the region, each being well defined and extensive. A brief description of each follows. The distribution or occurrence in these belts during the nesting season of the terrestrial birds of the region that are either summer residents or permanent residents is indicated in Table 1.

*Desert Shrub.*—In the lower, flatter areas as seen around Johnson and Kanab, in the Arizona Strip, and at Boulder and Escalante one finds a desert shrub association or belt. The principal components are sagebrush (*Artemisia*) on well drained, non-alkaline soil, rabbit brush (*Chrysothamnus*) and greasewood (*Sarcobatus*) on poorly drained soil, black brush (*Coleogyne*) on rocky slopes and benches, *Yucca* and *Ephedra* in sandy soil and shadscale (*Atriplex*) on alkaline or saline soils. Interspersed between the shrubs may be some sparse grasses and annuals but due to heavy grazing one is more likely to encounter forms less palatable to livestock like Russian thistle (*Salsola*) and matchweed (*Gutierrezia*). This is a northern desert shrub vegetation. Occurring in this desert shrub belt along the waterways are stands of willows (*Salix*), box elder (*Acer interior*) and narrow leafed cottonwoods (*Populus angustifolia*) while in and around towns are numerous cultivated shrubs and non-native trees. In terms of life zones this desert shrub belt occurs in the Upper Sonoran Zone. Altitudinally this belt lies between 4500 and 5000 feet. It receives about 8 to 12 inches precipitation per year and hence is one of the more xeric zones in the study area.

*Pinon-Juniper Forest.*—The pygmy forest or piñon-juniper woodland is made up of open stands of *Pinus edulis* and *Juniperus utahensis*. It occurs in the Kanab region between the elevations of approximately 6000 to 7500 feet. Since the trees are scattered in their distribution there occur in the intervening areas extensive growths of sagebrush, principally *Artemisia tridentata*. Other conspicuous components of this belt are cliff rose (*Cowania stansburiana*) and serviceberry (*Amelanchier alnifolia*). The permanent streams in this belt are often fringed merely with more luxuriant sagebrush and rabbit brush although the willow, cottonwood and river birch (*Betula fontinalis*) are the typical streamside species. This belt receives annually ten to fifteen inches of precipitation and also occurs in the Upper Sonoran Life Zone.

*Sagebrush Belt.*—This is especially well developed in the Aquarius Plateau region where almost the entire area west of the north-south fault escarpment and the Awapa Plateau is covered by the sagebrush association. This large, extensive area extends from about four miles south of Bicknell south to the Big Lake area and from the Boulder Mountain fault scarp west ten to fifteen miles. In many areas of this belt there are practically pure stands of sagebrush (*Arte-*



FIG. 4. Lower Reservoir about 3 miles south of Kanab with marsh area along the northwest shore. Here most of the transient water and shore birds were seen. Photographed by William H. Behle, June 18, 1947.

*misia tridentata*). In some areas where the soil factors are suitable the spineless horsebrush (*Tetradymia canescens inermis*) becomes dominant along with the sagebrush. This belt ranges in elevation from about 7200 feet to 9500 feet.

*Ponderosa Pine and Submontane Shrub.* — At the upper edge of the piñon-juniper belt is the ponderosa or yellow pine forest (*Pinus ponderosa*). Along with this occur chaparral tracts of scrub oak (*Quercus gambelii*), mountain mahogany (*Cercocarpus*) and other associated submontane shrub types. The oak patches are discontinuously distributed but fairly extensive and are most abundant where the pygmy forest and ponderosa pine belts merge from about 6800 to 7200 feet elevation. The extent and altitudinal range of this belt is dependent upon slope and exposure of the terrain but generally extends from 7200 to 9000 feet in elevation. The ponderosa pine often occurs in pure stands. At the upper portions in cooler areas, quaking aspens (*Populus tremuloides*) occur along with the ponderosa pine. There is relatively little in the nature of an understory of vegetation in the mature ponderosa pine forest although a few shrubs are scattered about in clearings. Examples are manzanita (*Arctostaphylos*), mountain balm (*Ceanothus*), antelope brush (*Purshia*), snowberry (*Symphoricarpos*), mountain red juniper (*Juniperus scopulorum*), serviceberry (*Amalanchier alnifolia*) and wild rose (*Rosa* sp.). Along the streams at these mid elevations are broad-leaved deciduous shrubs like chokecherry (*Prunus*), big toothed maple (*Acer*), birch (*Betula*), willows (*Salix*), elderberry (*Sambucus*) and currant (*Ribes*). Under the life zone system this belt would occur in the Transition Zone. It receives approximately fifteen to twenty inches of precipitation annually (Dixon, 1935:275).

*Aspen Belt.*—The aspen (*Populus tremuloides*) belt is best exhibited on north and east facing slopes in a zone extending from 8500 to 9500 feet in altitude. In these areas, the aspen forms extensive groves. Also, in other areas on the plateau are pure stands of aspen, the trunks often reaching eighteen inches in diameter. In some groves the trees are very close together and the canopy is so extensive that direct sunlight does not reach the ground. Some of the common shrubs of the understory in the aspen forests are serviceberry (*Ame-lanchier alnifolia*), currant (*Ribes*), elderberry (*Sambucus*), snowberry (*Symphoricarpos*), bearberry (*Arctostaphylos*) and mountain lover (*Pachystima*). On the upper limits of the aspen are Douglas fir (*Pseudotsuga taxifolia*) which seems to be restricted to the steeper, more exposed slopes, rocky ridges and talus slides. White fir (*Abies concolor*), blue spruce (*Picea pungens*) and scattered alpine fir (*Abies lasiocarpa*) are found at the higher elevations of the aspen belt. Blue spruces are common along the streams extending down into the yellow pine belt and especially common in the wet meadows from 7000 to 9000 feet in elevation. The aspen have not reached the top of Boulder Mountain, but extend up to the base of the top lava cap. Dixon (1935:275) states that this belt is the wettest on the plateau; it receives twenty-five to twenty-nine inches of precipitation annually. This belt occurs in the Canadian and Hudsonian life zones.

*Spruce-Fir Forest.*—Occurring in the higher portions of the region is a dense spruce-fir forest. It overlaps the upper 500 to 1000 feet of the aspen belt and thus extends from about 9500 feet up to timber line on Brian Head and the Aquarius Plateau at about 11,000 feet. It is a mixed forest consisting of several conifers, namely blue spruce (*Picea pungens*), Englemann spruce (*P. englemanni*), white fir (*Abies concolor*), alpine fir (*A. lasiocarpa*) and Douglas fir (*Pseudotsuga taxifolia*). This zone is characterized by low annual temperatures, a moderate amount of moisture, a short growing season and high winds. Within the coniferous forest occur extensive clearings where the vegetation consists mostly of sage but with some interspersed grasses and herbs. Shrubs found in the spruce-fir-aspen forest are snowberry (*Symphoricarpus*) and dwarf juniper (*Juniperus communis*) among others. Annuals are abundant in the more open areas of the forest floor especially in aspen stands. This belt would include the Canadian and Hudsonian life zones or be part of just one Boreal zone.

*Subalpine and Alpine Grasslands.*—This classification includes all of the large areas that are dominantly covered with grasses. Therefore any fairly continuous ground cover of essentially vertically-stemmed, narrow-bladed plants is classed as grassland. The grass may form a sod or there may be bare ground about the bases of plants. The grasses may be either annual or of perennial type and are often mixed with low annual herbs or sedges in damp meadows. Zonal limitations are lacking. Grassland ranges from Transition to Hudsonian life zone (6500 to 10,500 feet). In the arctic-alpine region on the top of Boulder Mountain, 11,000 feet, it is replaced by alpine savanna meadow. The savanna is dominated by *Festuca ovina* while its meadows support a variety of grassland sedge.

On top of the plateau the low depressions usually give rise to meadows. The ecological conditions of these low depressions differ from those of the higher ridges and crests adjoining them because the late-lying snows shorten

the growing season. Because of protection from wind, the evaporation is less. The moisture content of the soil is therefore greater due to protection from the wind and the temperatures are lower because of a cold air drainage into them.

### ECOLOGIC FORMATIONS

The concept of ecologic formations as employed by Miller (1951:540) in his analysis of the California avifauna is a useful tool since it enables one to present on the one hand a more refined picture of the ecological relationships and distribution of the birds of an area than in terms of broad vegetative belts, and on the other hand to avoid the complications of attempting fine distinctions based on plant associations. The latter is not very fruitful since birds are wide-ranging and it is more the plant life-form than the actual plant association that determines the presence of a species of bird. The ecologic formation is similar to a habitat in that both serve as an indication of the broad environmental situation. If we were dealing with more than one class of vertebrates, perhaps a designation of habitats would be better. However, since this analysis pertains only to birds, a grouping in terms of ecological formations seems to best portray the distributional picture.

Ecologic formations are based on either geological features or on the plant cover. The majority depend on the latter. When this is the case the ecologic formation represents a subdivision of a plant belt. When the formation is based on physical features there is little relation to the plant belts or zonation. A classification of ecologic formations as applied to the Kanab-high plateau area follows. They are with some exceptions arranged in sequence from low to high elevations. The species of resident birds, either permanent or summer, occurring in each formation based on the plant life form are listed in Table 1. For those based on physical features, namely, the aquatic, marsh and cliff-earth bank formations, the species regardless of seasonal status are included along with the description of the formation.

*Aquatic.*—There are in the region a few permanent bodies of water of lacustrine nature where the surface is free of vegetation, the water is a foot or more deep and the surface expanse is 50 feet or more. Examples are several man-made reservoirs like the upper and lower reservoirs south of Kanab, the one along Kanab Creek north of town, the reservoir at Johnson, two near Alton, the Duck Creek Reservoir. Naturally occurring bodies of water of similar nature are Three Lakes, Hidden Lake and Navajo Lake and many lakes and reservoirs on the Aquarius Plateau. Several of the latter, however, have been enlarged by means of a dam. In addition there are several streams and rivers in the region. They vary from 5 to 30 feet across except at flood stage. The principle examples are Johnson, Paria, Alton, Swain's, Duck and Mammoth creeks and the headwaters of the east fork of the Virgin River and the west fork of the Sevier River, the Escalante and Fremont rivers and many streams flowing from the Aquarius Plateau. These streams could perhaps be considered as constituting a fluvatile ecologic formation as opposed to lacustrine, but the distinction has little merit in this semi-arid region where the aquatic habitat is not prominent. Furthermore the same species occur in both stream and lake situations. They are mostly transients. The one species that is truly fluvatile, namely the ouzel is a resident along fast moving mountain streams.

TABLE 1. ECOLOGICAL OCCURRENCE OF NATIVE RESIDENT LAND BIRDS AT KANAB AND ADJACENT PLATEAUS  
DURING THE BREEDING SEASON

P = permanent resident; S = summer resident

NAME	Seasonal status	PLANT BELT				ECOLOGIC FORMATION										FAUNA			
		Desert shrub	Pinon-juniper sagebrush	Ponderosa pine- submontane shrub	Spruce-fir forest	Desert shrub	Sagebrush	Desert riparian woodland	Pinon-juniper woodland	Submontane shrub	Montane riparian woodland	Mountain meadow and parkland	Ponderosa pine forest	Montane-spruce fir forest	Subalpine coniferous forest	Alpine tundra	Sonoran	Great Basin	Boreal
Turkey Vulture ( <i>Cathartes aura teter</i> )	S	*	*	*		*	*	*	*	*							*	*	
Goshawk ( <i>Accipiter gentilis atricapillus</i> )	S			*	*							*	*					*	
Sharp-shinned Hawk ( <i>Accipiter striatus velox</i> )	P	*	*	*	*	*	*	*	*	*	*	*	*			*	*	*	
Cooper's Hawk ( <i>Accipiter cooperii</i> )	P		*	*	*				*	*	*	*	*				*	*	
Red-tailed Hawk ( <i>Buteo jamaicensis calurus</i> )	P	*	*	*	*	*	*	*	*		*	*	*	*		*	*	*	
Swainson's Hawk ( <i>Buteo swainsoni</i> )	S	*	*			*	*	*	*							*	*		
Ferruginous Hawk ( <i>Buteo regalis</i> )	P	*	*			*	*	*	*								*		
Golden Eagle ( <i>Aquila chrysaetos canadensis</i> )	P	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	
Marsh Hawk ( <i>Circus cyaneus hudsonius</i> )	P	*				*	*									*	*		
Osprey ( <i>Pandion haliaetus carolinensis</i> )	S				*								*					*	
Prairie Falcon ( <i>Falco mexicanus</i> )	P	*	*	*	*	*	*	*	*							*	*		
Sparrow Hawk ( <i>Falco sparverius sparverius</i> )	P	*	*	*	*	*	*	*	*		*					*	*	*	
Blue Grouse ( <i>Dendragapus obscurus obscurus</i> )	P			*	*						*		*	*				*	
Ruffed Grouse																			

Gambel's Quail ( <i>Lophortyx gambelii gambelii</i> )	P	*	*			*			*									*		
Band-tailed Pigeon ( <i>Columba fasciata fasciata</i> )	S			*	*					*	*		*	*						*
Mourning Dove ( <i>Zenaidura macroura marginella</i> )	S	*	*	*		*	*	*	*										*	*
Roadrunner ( <i>Geococcyx californianus</i> )	P	*				*													*	
Barn Owl ( <i>Tyto alba pratincola</i> )	P	*				*	*	*											*	*
Great Horned Owl ( <i>Bubo virginianus pallescens</i> )	P	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Pygmy Owl ( <i>Glaucidium gnoma californicum</i> )	P			*				*				*							*	*
Burrowing Owl ( <i>Speotyto cunicularia hypugaea</i> )	S	*				*	*												*	*
Long-eared Owl ( <i>Asio otus wilsonianus</i> )	P		*					*	*	*										*
Poor-will ( <i>Phalaenoptilus nuttallii nuttallii</i> )	S		*				*		*										*	*
Common Nighthawk ( <i>Chordeiles minor henryi</i> )	S	*	*	*	*	*	*	*	*	*	*								*	*
White-throated Swift ( <i>Aeronautes saxatalis saxatalis</i> )	S	*	*	*	*			*									*		*	*
Black-chinned Hummingbird ( <i>Archilochus alexandri</i> )	S			*	*				*	*	*									*
Costa's Hummingbird ( <i>Calypte costae</i> )	S	*	*			*													*	
Broad-tailed Hummingbird ( <i>Selasphorus platycercus platycercus</i> )	S		*	*	*	*		*	*	*	*	*							*	*
Calliope Hummingbird ( <i>Stellula calliope</i> )	S				*						*		*	*						*
Red-shafted Flicker ( <i>Colaptes cafer collaris</i> )	P		*	*	*			*	*		*	*	*	*	*	*			*	*
Pileated Woodpecker ( <i>Dryocopus pileatus picinus</i> )	P				*						*	*	*							*
Yellow-bellied Sapsucker ( <i>Sphyrapicus varius nuchalis</i> )	P			*	*				*		*	*								*
Williamson's Sapsucker ( <i>Sphyrapicus thyroideus nataliae</i> )	S			*	*						*	*								*

TABLE 1. ECOLOGICAL OCCURRENCE OF NATIVE RESIDENT LAND BIRDS AT KANAB AND ADJACENT PLATEAUS

DURING THE BREEDING SEASON (Continued)

P = permanent resident; S = summer resident

NAME	Seasonal status	PLANT BELT				ECOLOGIC FORMATION									FAUNA			
		Desert shrub	Pinon-juniper sagebrush	Ponderosa pine-submontane shrub	Spruce-fr forest	Desert shrub	Sagebrush	Desert riparian woodland	Pinon-juniper woodland	Submontane shrub	Montane riparian woodland	Mountain meadow and parkland	Ponderosa pine forest	Montane-spruce fir forest	Subalpine coniferous forest	Alpine tundra	Sonoran	Great Basin
Hairy Woodpecker ( <i>Dendrocopos villosus leucothorectis</i> )	P	*	*	*				*				*	*	*				*
Downy Woodpecker ( <i>Dendrocopos pubescens leucurus</i> )	P		*	*	*				*	*			*					*
Northern Three-toed Woodpecker ( <i>Picoides tridactylus dorsalis</i> )	P				*								*	*				*
Eastern Kingbird ( <i>Tyrannus tyrannus</i> )	S	*				*	*	*										*
Western Kingbird ( <i>Tyrannus verticalis</i> )	S	*				*	*	*										*
Cassin's Kingbird ( <i>Tyrannus vociferans vociferans</i> )	S		*					*								*	*	*
Ash-throated Flycatcher ( <i>Myiarchus cinerascens cinerascens</i> )	S	*	*	*		*	*	*	*							*	*	*
Black Phoebe ( <i>Sayornis nigricans semiatra</i> )	S	*				*	*									*	*	*
Say's Phoebe ( <i>Sayornis saya saya</i> )	S	*	*			*	*	*	*							*	*	*
Traill's Flycatcher ( <i>Empidonax traillii eximius</i> )	S	*						*							*	*	*	*
Hammond's Flycatcher ( <i>Empidonax hammondi</i> )	S				*								*	*				*
Dusky Flycatcher ( <i>Empidonax oberholseri</i> )	S				*								*	*				*
Gray Flycatcher ( <i>Empidonax wrightii</i> )	S	*					*	*									*	*
Western Flycatcher																		

Olive-sided Flycatcher ( <i>Nuttallornis borealis</i> )	S			*							*	*						*	
Vermilion Flycatcher ( <i>Pyrocephalus rubinus flammeus</i> )	S	*				*		*										*	
Horned Lark ( <i>Eremophila alpestris leucolaema</i> )	S					*				*									*
Horned Lark ( <i>Eremophila alpestris occidentalis</i> )	P	*						*	*									*	
Violet-green Swallow ( <i>Tachycineta thalassina lepida</i> )	S	*		*	*			*				*	*	*				*	*
Tree Swallow ( <i>Iridoprocne bicolor</i> )	S				*							*							*
Bank Swallow ( <i>Riparia riparia riparia</i> )	S	*	*					*	*										*
Rough-winged Swallow ( <i>Stelgidopteryx ruficollis serripennis</i> )	S	*	*					*	*										*
Barn Swallow ( <i>Hirundo rustica erythrogaster</i> )	S	*	*					*	*										*
Cliff Swallow ( <i>Petrochelidon pyrrhonota pyrrhonota</i> )	S	*	*					*	*										*
Gray Jay ( <i>Perisoreus canadensis capitalis</i> )	P					*						*	*						*
Steller's Jay ( <i>Cyanocitta stelleri maculophya</i> )	P			*	*						*	*	*						*
Scrub Jay ( <i>Aphelocoma caerulescens nevadae</i> )	P		*					*		*	*								*
Black-billed Magpie ( <i>Pica pica hudsonia</i> )	P	*						*	*	*	*	*							*
Common Raven ( <i>Corvus corax sinuatus</i> )	P	*	*					*	*	*	*		*						*
Pinon Jay ( <i>Gymnorhinus cyanocephalus</i> )	P		*					*		*									*
Clark's Nutcracker ( <i>Nucifraga columbiana</i> )	P				*						*	*	*						*
Black-capped Chickadee ( <i>Parus atricapillus nevadensis</i> )	P				*					*		*							*
Mountain Chickadee ( <i>Parus gambeli wasatchensis</i> )	P		*	*	*				*		*	*	*						*
Plain Titmouse ( <i>Parus inornatus ridgwayi</i> )	P		*						*										*



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DURING THE BREEDING SEASON (*Continued*)

P = permanent resident; S = summer resident

NAME	Seasonal status	PLANT BELT				ECOLOGIC FORMATION								FAUNA					
		Desert shrub	Pinon-juniper sagebrush	Ponderosa pine-submontane shrub	Spruce-fir forest	Desert shrub	Sagebrush	Desert riparian woodland	Pinon-juniper woodland	Submontane shrub	Montane riparian woodland	Mountain meadow and parkland	Ponderosa pine forest	Montane-spruce fir forest	Subalpine coniferous forest	Alpine tundra	Sonoran	Great Basin	Boreal
Common Bush-tit ( <i>Psaltriparus minimus providentialis</i> )	P		*														*		
White-breasted Nuthatch ( <i>Sitta carolinensis nelsoni</i> )	P		*	*	*				*			*	*						*
Red-breasted Nuthatch ( <i>Sitta canadensis</i> )	S				*								*						*
Pigmy Nuthatch ( <i>Sitta pygmaea melanotis</i> )	P			*								*							*
Brown Creeper ( <i>Certhia familiaris leucosticta</i> )	P			*	*							*	*	*					*
House Wren ( <i>Troglodytes aedon parkmani</i> )	S			*	*							*	*	*			*	*	
Bewick's Wren ( <i>Thryomanes bewickii eremophilus</i> )	P	*	*			*		*	*							*	*		
Cañon Wren ( <i>Catherpes mexicanus conspersus</i> )	P	*	*	*		*		*								*	*		
Rock Wren ( <i>Salpinctes obsoletus obsoletus</i> )	S	*	*	*	*			*							*	*	*	*	
Mockingbird ( <i>Mimus polyglottos leucopterus</i> )	S	*	*			*	*	*	*							*	*		
Catbird ( <i>Dumetella carolinensis</i> )	S	*						*									*		
Bendire's Thrasher ( <i>Toxostoma bendirei</i> )	S	*				*	*									*	*		
Sage Thrasher ( <i>Oreoscoptes montanus</i> )	S	*				*	*										*		
Robin																			

Swainson's Thrush ( <i>Hylocichla ustulata swainsoni</i> )	S			*								*	*				*		
Western Bluebird ( <i>Sialia mexicana bairdi</i> )	P		*	*	*			*				*					*	*	
Mountain Bluebird ( <i>Sialia currucoides</i> )	S	*	*	*	*	*	*	*			*						*	*	*
Townsend's Solitaire ( <i>Myadestes townsendi townsendi</i> )	P				*								*					*	
Blue-gray Gnatcatcher ( <i>Polioptila caerulea amoenissima</i> )	S	*	*			*	*	*	*	*							*	*	
Golden-crowned Kinglet ( <i>Regulus satrapa olivaceus</i> )	P				*								*	*				*	
Ruby-crowned Kinglet ( <i>Regulus calendula cineraceus</i> )	P				*				*				*	*				*	
Water Pipit ( <i>Anthus spinoletta alticola</i> )	S				*						*						*	*	
Cedar Waxwing ( <i>Bombycilla cedrorum</i> )	S		*					*	*								*	*	
Phainopepla ( <i>Phainopepla nitens lepida</i> )	S	*				*											*	*	
Loggerhead Shrike ( <i>Lanius ludovicianus nevadensis</i> )	P	*	*	*		*	*	*			*						*	*	*
Gray Vireo ( <i>Vireo vicinior</i> )	S		*					*									*	*	
Solitary Vireo ( <i>Vireo solitarius plumbeus</i> )	S		*	*					*	*							*	*	
Warbling Vireo ( <i>Vireo gilvus leucopolius</i> )	S			*	*			*	*			*					*	*	
Orange-crowned Warbler ( <i>Vermivora celata orestera</i> )	S			*					*	*								*	
Virginia's Warbler ( <i>Vermivora virginiae</i> )	S		*	*					*	*		*					*	*	
Lucy's Warbler ( <i>Vermivora luciae</i> )	S	*						*									*	*	
Yellow Warbler ( <i>Dendroica petechia morcomi</i> )	S	*						*									*	*	
Audubon's Warbler ( <i>Dendroica auduboni memorabilis</i> )	S		*	*	*						*	*	*					*	
Black-throated Gray Warbler ( <i>Dendroica nigrescens</i> )	S		*	*				*									*	*	

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Grace's Warbler ( <i>Dendroica graciae graciae</i> )	S			*								*						*
MacGillivray's Warbler ( <i>Oporornis tolmiei monticola</i> )	S			*	*				*	*							*	*
Yellow-breasted Chat ( <i>Icteria virens auricollis</i> )	S	*				*		*									*	
Wilson's Warbler ( <i>Wilsonia pusilla pileolata</i> )	S				*					*								*
Western Meadowlark ( <i>Sturnella neglecta neglecta</i> )	P	*				*	*									*	*	
Scott's Oriole ( <i>Icterus parisorum</i> )	S	*	*			*	*		*							*	*	
Bullock's Oriole ( <i>Icterus bullockii bullockii</i> )	S	*						*								*	*	
Brewer's Blackbird ( <i>Euphagus cyanocephalus</i> )	P	*	*	*		*	*	*	*							*	*	
Brown-headed Cowbird ( <i>Molothrus ater obscurus</i> )	S	*	*			*	*	*	*							*	*	
Western Tanager ( <i>Piranga ludoviciana</i> )	S		*	*	*				*			*	*				*	*
Black-headed Grosbeak ( <i>Pheucticus melanocephalus melanocephalus</i> )	S	*	*	*	*			*	*			*	*			*	*	*
Blue Grosbeak ( <i>Guiraca caerulea interfusa</i> )	S	*				*	*	*								*	*	
Lazuli Bunting ( <i>Passerina amoena</i> )	S	*	*	*		*	*	*	*	*						*	*	

House Finch ( <i>Carpodacus mexicanus frontalis</i> )	P	*	*	
Pine Grosbeak ( <i>Pinicola enucleator montana</i> )	P			
Pine Siskin ( <i>Spinus pinus vagans</i> )	P			*
American Goldfinch ( <i>Spinus tristis pallidus</i> )	P	*	*	*
Lesser Goldfinch ( <i>Spinus psaltria hesperophilus</i> )	S	*	*	
Red Crossbill ( <i>Loxia curvirostra grinnellii</i> )	P			
Green-tailed Towhee ( <i>Chlorura chlorura</i> )	S		*	*
Rufous-sided Towhee ( <i>Pipilo maculatus montanus</i> )	P		*	
Vesper Sparrow ( <i>Poocetes gramineus confinus</i> )	S		*	*
Lark Sparrow ( <i>Chondestes grammacus strigatus</i> )	S	*	*	
Black-throated Sparrow ( <i>Amphispiza bilineata deserticola</i> )	S	*		
Sage Sparrow ( <i>Amphispiza belli nevadensis</i> )	S	*	*	
Gray-headed Junco ( <i>Junco caniceps caniceps</i> )	S			*
Chipping Sparrow ( <i>Spizella passerina arizonae</i> )	S		*	*
Brewer's Sparrow ( <i>Spizella breweri breweri</i> )	S	*	*	
White-crowned Sparrow ( <i>Zonotrichia leucophrys oriantha</i> )	S			
Fox Sparrow ( <i>Passerella iliaca</i> )	S			*
Lincoln's Sparrow ( <i>Melospiza lincolni alticola</i> )	S			*
Song Sparrow ( <i>Melospiza melodia montana</i> )	S		*	*



Included in the aquatic formation as so conceived are the bare lake shores, stream banks, sand bars, exposed boulders or drift materials. The water edge shrubbery, like willows, cottonwoods, cattails, sedges or grassy areas, is not included in this formation.

The species found in this formation number 56. They are as follows: common loon, eared grebe, pied-billed grebe, white pelican, great blue heron, green heron, snowy egret, black-crowned night heron, white-faced ibis, whistling swan, Canada goose, mallard, gadwall, pintail, green-winged teal, blue-winged teal, cinnamon teal, shoveler, American widgeon, redhead, canvasback, lesser scaup, common goldeneye, Barrow's goldeneye, bufflehead, ruddy duck, common merganser, red-breasted merganser, bald eagle, osprey, peregrine falcon, American coot, snowy plover, killdeer, marbled godwit, lesser yellowleg, greater yellowleg, spotted sandpiper, willett, long-billed dowitcher, common snipe, least sandpiper, western sandpiper, black-necked stilt, avocet, Wilson's phalarope, northern phalarope, California gull, Franklin's gull, Bonaparte's gull, black tern, common tern, Forster's tern, belted kingfisher, yellow-headed blackbird, red-winged blackbird.

*Marsh.* — In the area as a whole, marshland is very limited and occurs either in discontinuous patches along streams or at the shallow margins of reservoirs and lakes. The vegetation consists primarily of sedges and cattails with occasionally marginal flooded areas of grasses and willows. The patches of marsh may be continuously vegetated and closed over or they may contain limited expanses of open water which are usually not more than 20 or 30 feet across. The principal marsh areas we found in our field work were located at Cottonwoods, Three Lakes, Cave Lakes Canyon, along Kanab Creek, especially south of town, at the upper and lower reservoirs at Kanab, Johnson Reservoir, a marsh in the center of Boulder and the most extensive of all, the Bicknell Bottoms.

Since the marsh and aquatic formations are in many cases adjacent, most of the species listed for the aquatic formation frequent the marsh for food or protection. Furthermore, since most are transient species they frequent nearly any body of water available in the arid region no matter how limited its extent. Hence virtually all those species listed for the aquatic formation also belong to the marsh formation. Exceptions are the common loon, white pelican, whistling swan, bald eagle and osprey which require more extensive, open water. In addition there are the following species typically found in the marsh formation: Virginia's rail, sora, marsh wren, yellow-throat, Brewer's blackbird, savannah sparrow and song sparrow. The marsh hawk ranges widely over dry flats as well as over the marshes.

*Cliffs and earth banks.* — Bare rock exposures are extensive throughout the region occurring along all the canyons, mesas, bluffs and faces of plateaus. The exposures are of sandstone, limestone or lava. The cliffs may be vertical, sloping or graduated. They are essentially free of vegetation so the formation is based on physical features of the terrain. The other aspect of this formation is seen in the sand and earth banks exposed along many of the creeks, notably Kanab Creek. According to the oldest residents of Kanab, when the area was first settled in 1863, grass of knee-high height existed on the floor of Kanab Canyon and one could jump across Kanab Creek which was lined with willows. About 1880 following a winter of heavy snows and spring rains a reservoir

several miles upstream from Kanab washed out which started the gully. With subsequent overgrazing and accelerated erosion the one-time brook flanked by grassland has become a mighty chasm varying from about 50 to 75 feet deep near Kanab and from about 30 to 50 yards wide. The stream now meanders along the bottom occasionally flanked by pockets of marshland. In places along Kanab Creek south of town water draining from the sides runs down through fissures or rodent holes and emerges at lower levels where large caverns have been formed (see Fig. 2).

Birds utilizing the bare cliff-earth bank ecologic formation are as follows: turkey vulture, red-tailed hawk, golden eagle, prairie falcon, sparrow hawk, barn owl, horned owl, white-throated swift, belted kingfisher, Say's phoebe, violet-green swallow, bank swallow, rough-winged swallow, barn swallow, cliff swallow, raven, cañon wren, rock wren.

*Desert shrub.* — The description of this ecologic formation closely approximates the desert shrub vegetative belt. The shrubs are low, xeric types varying from 6 inches to about 3 feet and are fairly widely spaced from about 3 to 10 feet. The ground in between is either bare or supports a sparse cover of annuals or grass. Examples are sage, rabbit brush, greasewood, black brush, shadscale, yucca, and ephedra. The species of birds found in this and subsequent formations are indicated in Table 1.

*Sagebrush.* — Considerable overlap exists between this formation and the preceding. Indeed they might well be lumped as a northern desert shrub formation except that extensive pure stands of sagebrush occur in some places and sage extends to higher elevations than the desert shrub being especially common in the piñon-juniper belt, in the clearings in the coniferous belt and upon the slopes of the higher unforested regions as high as 10,000 feet. It is also



FIG. 5. Duck Creek reservoir, 8555 feet elevation, with aspen-spruce-fir forest in background. Photographed by William H. Behle, June 18, 1947.

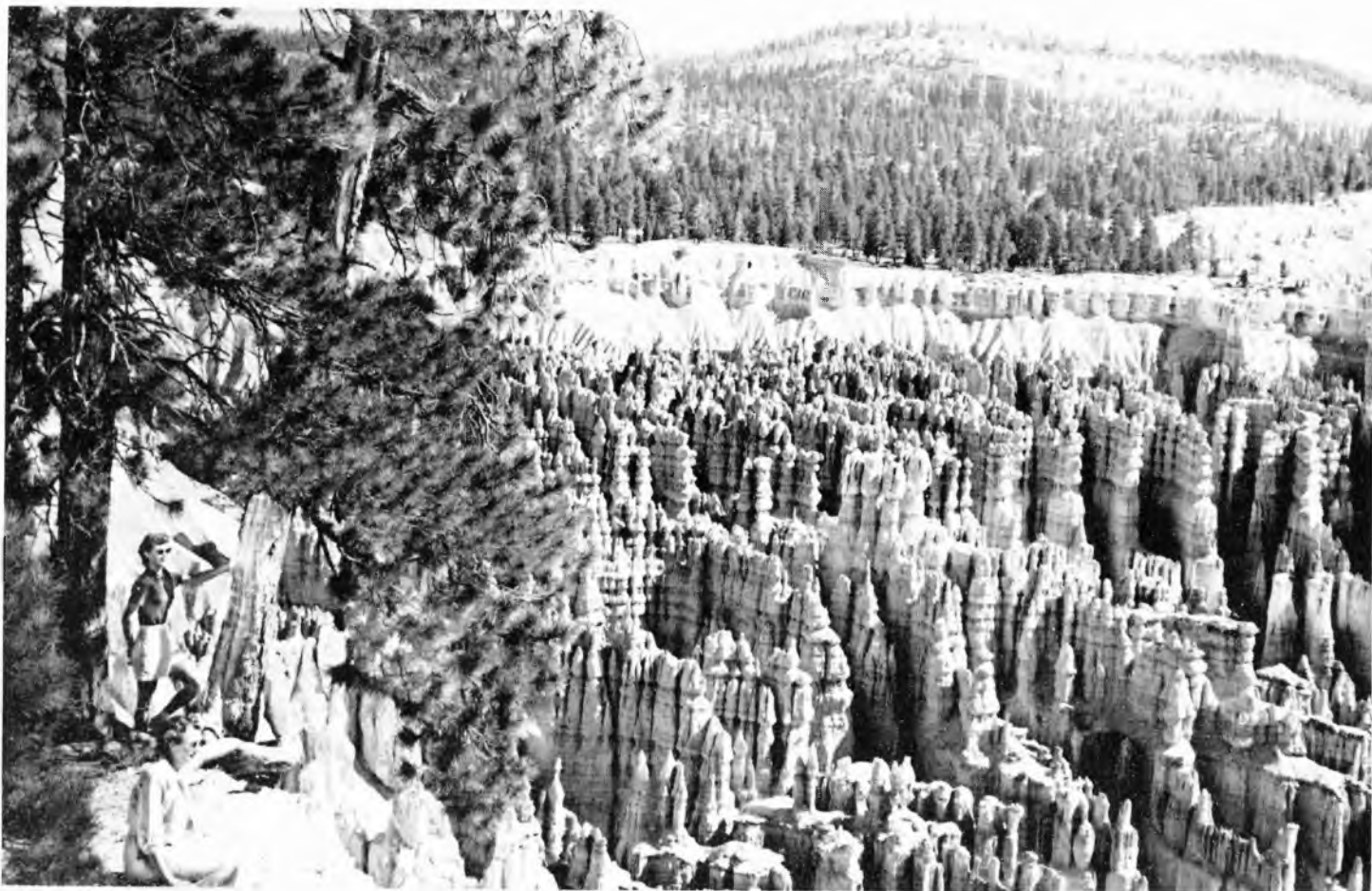


FIG. 6. Part of rim and amphitheater at Bryce Canyon National Park, about 8000 feet elevation, showing bare rock formation and yellow pine forest. Photograph courtesy of Union Pacific Railroad Company.



found bordering alpine meadow and grassland areas. The principal species is *Artemisia tridentata* at lower elevations but other species occurring higher are *A. nova* and *A. spinescens*. Occasionally horse brush (*Tetradymia canescens*) is found as a dominant along with the sagebrush.

*Desert riparian woodland.* — Along the waterways of the lowlands are two conspicuous deciduous plants that occur in association and largely determine this formation. They are cottonwoods (*Populus fremontii*) and willows (*Salix exigua*). The willows for the most part form a streamside thicket while the cottonwoods occur singly or in scattered groves. Other relatively rare components of this formation are box elders, ash and tamarix.

*Piñon-juniper woodland.* — This is the distinctive pygmy forest of the Great Basin and Southwest made up of piñon pine (*Pinus edulis*) and juniper (*Juniperus utahensis*). Reference has been made to this previously as one of the four vegetative belts. The areas between the scattered trees may support sagebrush, rabbit brush and grasses. It is rich in bird life.

*Submontane shrub.* — This formation represents a type of chaparral made up of Gambel oak (*Quercus gambelii*), mountain mahogany (*Cerocarpus*) and some less abundant shrubs like serviceberry (*Amelanchier*), manzanita (*Arctostaphylos*) mountain balm (*Ceanothus*), snowberry (*Symphoricarpos*) and bitter or antelope brush (*Purshia tridentata*). The areas of occurrence are discontinuous and often occur interspersed with other ecological formations. The submontane shrub occurs near the upper limits of the piñon-juniper forest but is most conspicuous in the ponderosa pine forest.

*Montane riparian woodland.* — This is somewhat like the desert riparian formation but it occurs at higher elevations along mountain streams, lake margins and seepage areas. Willows are the most conspicuous plant. At the lower limits of their distribution aspen may be associated with the other species as they follow tongues of cooler air downward along the streams. Other components of the vegetation are birch (*Betula*), alder (*Alnus*), rose (*Rosa*), dogwood (*Cornus*), chokecherry (*Prunus*).

*Aspen woodland.* — This is the distinctive forest of aspen (*Populus tremuloides*) that is typical throughout the region. The dense, pure stands of aspen have a distinctive understory of shrubs. Reference has been made to this previously as one of the vegetative belts.

*Grasslands.* — This formation found on the Aquarius Plateau consists of large expanses of subalpine grasslands which are void of streams, seeps or springs and are usually bordered by spruce-fir forests. The areas vary from one half to one mile in width and may extend one to eight miles in length. The major components of this formation are wheat grass (*Agropyron*), brome (*Bromus*), fescue (*Festuca*), June grass (*Koeleria*), bluegrass (*Poa*), white needlegrass (*Stipa*). *Festuca* is by far the dominant form.

*Mountain meadow and parkland.* — A conspicuous feature of the region at upper elevations is the extensive clearings in the coniferous forest. Frequently in these open parks are small streams or seepage areas with grasses and sedges. In places like Duck Creek there is a true grassy meadow. Elsewhere in drier situations sagebrush predominates with grasses and annuals interspersed among the sagebrush. The parkland ends abruptly as the coniferous or aspen forest begins. Because of the close proximity a number of avian spe-



FIG. 7. Navajo Lake, 9127 feet with montane coniferous forest. Ospreys were seen here.  
Photograph courtesy of Union Pacific Railroad Company.

cies of the forested areas venture into the clearings. Yet other species like vesper sparrows, mountain bluebirds, and sparrow hawks habitually occur in the open terrain.

*Ponderosa pine forest.* — The ponderosa pine forms an open type forest since the trees are widely spaced and there is comparatively little shrubery to form an understory. As noted in the discussion of plant belts ponderosa pines are in many areas associated with Gambel oak and other submontane shrubs, yet many pure stands of yellow pine occur. The altitudinal limits are about 7200 to 9000 feet. This formation is perhaps best seen at Bryce Canyon and on the Paunsagunt Plateau. Typical denizens of the ponderosa pine forest are white-breasted nuthatches, black-eared nuthatches and Grace's warblers.

*Montane spruce-fir forest.* — The spruce-fir coniferous forest may be divided into two ecologic formations. In the lower portion above the ponderosa pine belt, the forest is dense and consists of blue spruce (*Picea pungens*), white fir (*Abies concolor*), and Douglas Fir (*Pseudotsuga taxifolia*). The altitudinal range is from about 8000 to 9500 feet. The aspen reaches its best development here.

*Subalpine coniferous forest.* — At its upper limits, starting about 9500 feet, the complexion of the coniferous forest changes. Blue spruce is replaced by Englemann spruce (*Picea englemanni*) and the white fir by alpine fir (*Abies lasiocarpa*). Some dwarf juniper (*Juniperus communis*) occurs. The forest is more discontinuous than in the lower spruce-fir forest, with the trees tending to clump together in patches. Approaching timber line they thin out and become straggling and dwarfed. The subalpine forest is best seen in the Cedar Breaks area. The vast forest on the top of Boulder Mountain is exclusively Englemann spruce. While most birds inhabiting the coniferous forest will range through two or more formations there are some species more common in the sub-alpine portion. Examples are the creeper, pine grosbeak and Canada jay.

*Arctic tundra.* — Timber line is reached on the slopes of Brian Head, and Bluebell Knoll of Boulder Mountain. Above this is a small amount of true alpine tundra. Bird life was sparse here, probably correlated with the restricted area. It seems well, however, to at least mention this ecologic formation.

#### AVIFAUNAL RELATIONSHIPS

The area being treated in this report represents a meeting place for three avifaunas that are best represented in surrounding regions. These avifaunas are the Sonoran, Great Basin and Rocky Mountain. As pertains to the first mentioned, there occur to the west in the Virgin River Valley as around St. George, a number of species that are typical of the southern deserts (See Behle, 1943:19). Three of these have been found in the lowlands at Kanab. They are the vermilion flycatcher (*Pyrocephalus rubinus*), phainopepla (*Phainopepla nitens*) and Lucy's warbler (*Vermivora luciae*), although the latter is unsubstantiated by specimens. We also have a sight record of the latter from the Escalante region. These are all uncommon or rare in the Kanab area which suggests that they represent pioneers or stragglers from the normal area of occurrence to the west. The Kanab area has neither the climate nor the vegetation of the southern desert biotic area where these birds typically occur.



FIG. 8. Cedar Breaks National Monument showing rim at about 10,700 feet elevation, erosional formations and subalpine coniferous forest. On extreme right is Brian Head. The summit at 11,315 feet is above timber line.

A number of other species of southern or Sonoran origin, and which are known in Utah only in the Colorado River drainage of the southern and eastern portions of the state, were found either in the Kanab or Escalante areas or both which are still part of the Colorado drainage. These are the Gambel's quail (*Lophortyx gambeli*), roadrunner (*Geococcyx californianus*), Costa's hummingbird (*Calypte costae*), black phoebe (*Sayornis nigricans*), Bendire's thrasher (*Toxostoma bendirei*) and blue grosbeak (*Guiraca caerulea*). This group further suggests a southern origin of part of the avifauna of the Kanab area. Of similar nature, being of southern distribution, but occupying the ponderosa pine forest is the Grace's warbler (*Dendroica graciae*). Possibly the Cassin's kingbird (*Tyrannus vociferans*) should be included in this group of southern origin. Its northward limits in the state are uncertain.

The hypothesis of southern origin is further strengthened by some geographically variable forms represented in the Kanab area by races, the greater part of whose ranges lie to the south or southwest. These are the hairy woodpecker (*Dendrocopos villosus leucothorectis*), common bushtit (*Psaltriparus minimus providentialis*), the long-billed marsh wren (*Telmatodytes palustris aestuarinus*), and the brown-headed cowbird (*Molothrus ater obscurus*). In addition the song sparrows are intergradational, showing an approach to the Virgin River Valley race, *Melospiza melodia fallax* but are closest to the northern form *M. m. montana*. Three races having their ranges mostly in the southeast were found in the area of this report. They are the common nighthawk (*Chordeiles minor henryi*), horned lark (*Eremophila alpestris occidentalis*), and cliff swallow (*Petrochelidon pyrrhonota pyrrhonota*).

The influence of the Great Basin avifauna is seen in the presence of a number of forms, primarily those associated with the sage and piñon-juniper ecological formations (see Table 1), although the latter community is widespread throughout the southwest. Examples are the sage grouse and sage thrasher. Perhaps of more significance is the fact that some subspecies of geographically variable species represent the Great Basin races. These are the scrub jay (*Aphelocoma caerulescens nevadae*), black-capped chickadee (*Parus atricapillus nevadensis*), hermit thrush (*Hylocichla guttata polionota*), loggerhead shrike (*Lanius ludovicianus nevadensis*), warbling vireo (*Vireo gilvus leucopolius*), and yellowthroat (*Geothlyis trichas occidentalis*).

The great majority of the resident birds contained in the species accounts are of northern origin and belong to the Rocky Mountain or Boreal fauna. They are the ones listed in Table 1 under the spruce-fir formation. Some geographically variable forms, the Kanab-Cedar Mountain-Aquarius Plateau representatives of which are of northern boreal origin as opposed to Great Basin are as follows: blue grouse (*Dendragapus obscurus obscurus*), mountain chickadee (*Parus gambeli wasatchensis*), Rocky Mountain nuthatch (*Sitta carolinensis nelsoni*).

The mixed fauna derivatives of the region can be explained partially on the basis of the intermediate physiographic position of the area. The Great Basin and Rocky Mountain avifaunas are best represented, but it is significant that southern and southwestern forms are also present. For some of the southern species, their presence represents a considerable extension of range northward,

and furthermore, they have been found at higher elevations than elsewhere in southern Utah. The deep canyons and gorges that drain the high country may have acted as avenues for the Sonoran birds to extend their ranges into the region.

#### SEASONAL CHANGES IN THE AVIFAUNA

The list of birds known to occur in the Kanab region and the adjacent plateaus totals 234 kinds (species and subspecies). Of these, 63 or 26.9 per cent are permanent residents, 94 or 40.1 per cent are summer residents, 56 or 23.9 per cent are transients or through migrants, 15 or 6.4 per cent are winter visitants, 3 are of casual or vagrant status, and 3 are of accidental occurrence. These figures are only approximations since the exact seasonal status of several forms is uncertain. The seasonal status of most kinds is indicated in the species accounts and in Table 1. In addition there are some general items worthy of comment bearing on the seasonal changes in the avifauna of the region.

The large number of transient species reported for Kanab suggests that it lies on a migratory route. This probably runs south through central Utah following the Sevier River and continues across the rim of the Great Basin to the Kanab Creek tributary drainage of the Colorado River. In our field work we noted more migrant water and shore birds in mid-April than at other times. Observations farther north in the Great Salt Lake region suggest, however, that the height of migration occurs earlier than this. With little field work having been conducted in the fall we have no precise information on fall migration.

How long the transients and even the summer residents remain in the fall seemingly depends on weather conditions. This was brought to our attention during the week we spent at Kanab in December, 1946. Up until December 27 the weather was mild with only gentle rains and birds were numerous. Overnight it turned cold and the bodies of water froze. Birds were scarce after that, only permanently resident species being seen. Certain species observed the preceding few days like ducks and Wilson's snipes had evidently continued southward in their migration for we no longer found them in their haunts.

Doubtless some of the winter visitants come from the north but probably others show altitudinal migration simply moving from their breeding grounds on the high plateaus down to lower elevations. This is suggested by the occurrence of various "upland" species such as the hairy woodpeckers, sapsuckers, creepers, nuthatches, Steller's jays occurring in the pygmy forest or oak belt or even in the valleys during winter. The degree of altitudinal movement downward perhaps depends on the severity of the winter and the availability of food.

#### LOCALITIES

*Alton.* — This small community is located on upper Kanab Creek at an elevation of 6875 feet about 4 miles east of U.S. Highway 89. We did not collect here but observed some ducks on the nearby reservoirs.

*Aquarius Ranger Station.* — This station is located 11 miles south of Bicknell, on the northwest base of Boulder Mountain. The elevation is about 8200 feet. It is situated in the yellow pine belt which is very narrow on this side of the plateau. Along the stream are blue spruce, aspens and willows.

*Beef Meadows.* — This high meadow (11,000 feet), is situated on the top of the northeast portion of Boulder Mountain. It is one-half mile wide and one to two miles long and extends along a northwest-southeast axis. There are several small ponds with marsh along the bottoms of the meadow. Dense stands of Englemann spruce abut the meadow on the northeast and southwest.

*Big Lake.* — This lake (10,000) feet is located about 18 miles southwest of Bicknell. It is dry during the late summer months if precipitation is low. The area adjacent to the lake has low shrubs (sagebrush) while small islands of spruce-fir-aspen forests occur within one-half mile of the lake.

*Blind Lake.* — This is a fairly large lacustrine lake nestled in an aspen-spruce-fir association (10,000 feet) at the base of the lava cap on the north end of Boulder Mountain. The forest is very dense here. A small meadow lies between the lake and a cliff that is about 500 yards distant.

*Blue Spruce Forest Camp.* — This forest camp site is on Pine Creek where state highway 54 crosses the creek about 15 miles north of Escalante. The camp is located in a typical montane riparian woodland. The creek is lined with birch, alder and willows. Adjacent to the creek are blue spruce, Douglas fir and sparse white fir.

*Boulder and Boulder Creek.* — Boulder is a small community located on the southeast base of the Aquarius Plateau on state highway 54. Its elevation is 6205 feet. In the center of the community is a pond surrounded by a marsh area. This pond is about fifteen to twenty feet deep and contains open water measuring at the time of our visits about 25 yards by 75 yards. It is surrounded by a dense stand of rushes with stands of cattails in places. On the fringes are willows, a few Russian olives and an occasional juniper in higher and drier ground. Boulder Creek passes through the west side of the town. The creek bed is lined with tall interlocking cottonwoods and willows with a tangle of rose and various other types of vegetation. This is a typical example of a desert riparian woodland ecologic formation. Cultivated fields around the town provide good habitat for birds. Collections were also made at various points north along Boulder Creek.

One of our principal collecting stations was 5 miles north of Boulder. Camp was made along state highway 54 beside a small irrigation stream at an elevation of about 7000 feet. Here was an ecotone between the lower fringe of the yellow pine and upper limits of the piñon-juniper belt. In the lower belt there was a large sagebrush flat area with scattered clumps of scrub oak and widely scattered piñons and junipers. Along the creek were squawbush, serviceberry, willows and large stands of scrub oak. On the uphill (north) side of the creek were yellow pine, sparse clumps of chokecherry and rabbit brush. To the southeast of camp was an irrigated meadow area, with random clumps of willows along its border. Another collecting station was 8 miles north of Boulder in a typical montane riparian woodland where the dominant plant was aspen. A small stream fringed with dense willow thickets provided a habitat for many typical birds.

*Brian Head.* — Arising as a prominence on top the Markagunt Plateau just north of Cedar Breaks National Monument is Brian Head. Its flat top reaches an elevation of 11,315 feet. This is above timber line and thus a small area of alpine tundra is afforded. On the upper slopes are scattered copses of spruces and firs showing the typical dwarfed, scraggly and wind-swept appearance that one finds at timber line. At the base of Brian Head are mountain meadows.

*Bryce Canyon National Park.* — This national park covers 36,010 acres and is located on the eastern edge of the Paunsagunt Plateau about 20 miles airline southeast of Panguitch. Near headquarters at 8000 feet there is a ponderosa pine forest with numerous parks or clearings but at Rainbow Point to the southeast, the farthest point on the rim drive, there is at 9105 feet a spruce-fir forest. The canyon amphitheater with its fantastic and highly colored erosional formations shows a maximum of bare rock exposure. In the floors of the deep box canyons beneath the rim are scattered yellow pines and shrubs along ordinarily dry drainage courses. Although we visited the park many times we did no collecting in this area. However, a few specimens in the University of Utah collection from Bryce have been included in our listings. Most of the data on the birds of Bryce have come from Park Service sources or from the literature.

*Carcass Creek.* — This area at 7800 feet is located on the northeast part of Boulder Mountain about 3 miles south of Grover. The plant belt is yellow pine with sparse scattered aspen in some of the shady draws. Along the creek are abundant birches but sparse elderberries and willows.

*Cave Lakes Canyon.* — This was our principal collecting station of the lowland area near Kanab where on three occasions base camp was made at the Mark Hamblin ranch. The entire surrounding area was worked. Cave Lake Canyon is located about 5 miles airline northwest of Kanab. It is a tributary of Three Lake Canyon entering from the west immediately south of Three Lakes. The ranch at 5500 feet is about half a mile up the canyon from its mouth. The canyon is a relatively narrow box canyon with vertical walls and has been cut about 50 to 100 feet deep in the sandstone mesa. It tops out near the heads of Cottonwood and Red canyons. It is narrow at its head but widens considerably at its mouth. Unlike most of its counterparts in the region it has considerable water, some of which comes up in caves at the base of the vertical walls and forms small lakes. Kanab gets much of its water from this source. Several dry caves serve as natural corrals. In localized areas upstream from the ranch are small cattail marshes. At the ranch is an extensive wet meadow with willow patches along the stream. Nearby are several large cottonwoods and an orchard. In drier areas of the canyon floor are Gambel oaks. In a few shady areas small aspens occur. Above on the canyon rim is an extensive piñon-juniper forest with intervening patches of sagebrush. Some of the birds of this Upper Sonoran pygmy forest were found to have dropped down to the canyon below which, although at a lower elevation approached transition zone conditions.

*Cedar Breaks.* — More properly called Cedar Breaks National Monument, it is similar in general physiographic aspect to Bryce but is located at a higher elevation and is west-facing on the west side of the Markagunt Plateau. The rim ranges from 10,400 to 10,700 feet. Back of the rim is a dense spruce-fir-aspen forest with park-like clearings and alpine meadows. We did not collect in the monument but did so up to the south boundary.

*Chamberlain Ranch.* — The Chamberlain ranch designated as the locality of collection for several specimens taken on early University of Utah expeditions to Kane County is located on U.S. Highway 89 about 5 miles north of Glendale.



*Chokecherry Point.*—This high rocky prominence (11,000 feet) is the northeasternmost point of the lava cap on Boulder Mountain. Two trips were made over this precipitous point on a steep access road which was used by loggers. The dominant vegetation is Englemann spruce and aspen.

*Confluence of Calf Creek and the Escalante River.*—Camp was established in a grove of cottonwood along the Escalante River where State Highway 54 crosses and Calf Creek empties into the river. Several small narrow box canyons adjacent to the main river gorge have fairly thick growths of box elder, cottonwood and other shrubs. The high vertical sandstone cliffs provide habitat for cliff swallows, Say's phoebes and white-throated swifts.

*Cottonwood Canyon.*—This runs in a general north-south direction originating near the head of Cave Lakes Canyon and having its mouth several miles west of the mouth of Kanab Canyon. On December 27, 1946 we collected at the Riggs Ranch near the canyon head. Here there was much sand, a stream, small pond and cattail swamp. Access to the site was through Red Canyon.

*Cyclone Lake.*—This high mountain lake (10,000 feet) is on the south edge of the Aquarius plateau. It is about 18 miles north and five miles west of Escalante. The lake extends for one mile in length and is a half mile wide. It has no inlets or outlets. The edges have gentle slopes with a wide margin of shallow water which has an abundant growth of filamentous algae. The margin around the lake is covered with grass which abruptly ends at the spruce-fir forest.

*Dark Valley.*—This narrow valley ranges 15 to 18 miles south of Bicknell at an elevation of about 8500 feet. It is bordered on the east by the high north-south scarp of Boulder Mountain and on the west with high rolling hills. Numerous small streams drain from the high lava cliffs and provide a dense growth of willow thickets along the water courses leading to the luxuriant meadow. The meadow is heavily grazed by cattle. Along the east border are mixed stands of aspen, blue spruce, white fir and Douglas fir.

*Davis Flats.*—This large open grassland area is located about 20 miles north of Escalante at an elevation of approximately 10,000 feet. The flat is several miles long and about one mile wide. Horned larks were very common at this grass flat.

*Deer Lake.*—The Deer Lake area (9500 feet) is at the base of the lava cap on the south side of Boulder Mountain, about 10 miles north of Boulder. The lake is fed by several springs in addition to the spring run-off from the surrounding mountains. The south side of the lake supports very thick groves of tall aspen. On the east, north and west sides of the lake are dense stands of sub-alpine forest of alpine fir and Englemann spruce. The emerging sedge provides nesting facilities for coots, and mallards and perhaps other ducks.

*Duck Creek.*—This is a much used recreational and fishing area located at 8555 feet on State Highway 14 about 15 miles west of the junction with U.S. Highway 89. A U.S. Forest Service Ranger Station is located here. The area is generally wooded with a spruce-fir-aspen forest interrupted with extensive lava flows and parklands. Several springs feed a reservoir, the outlet of which forms a creek lined with willows that meanders for a half-mile before forming some ponds and finally disappearing in an extensive wet meadow.

*Escalante.* — In areas adjacent to the town are cultivated lands and then come tall dense stands of sagebrush and rabbitbrush. There is an occasional clump of squawbush. Collections were made 2 and 10 miles south of Escalante. At the latter site the area supports sparse scattered junipers and in the intervening spaces low brushy shrubs are found. There are some small clumps of grass and annuals but these are badly overgrazed.

*Fish Creek.* — State Highway 54 crosses Fish Creek about 5 miles southeast of Teasdale. The creek is lined with willows and birches while squawbush and rabbit brush are less common a short distance from the creek. The elevation is 7200 feet.

*Green Lake.* — This high lake (9500 feet) is located at the base of Donkey Point on the north base of the lava cap of the Aquarius Plateau about 6 miles south of Teasdale. The lake is about one quarter mile in diameter and is fed by snows from the high mountain. Aspens and spruce-fir forests surround the lake.

*Grover.* — Collecting was done in the piñon-juniper forest in the Grover area, 7000 feet, on the north slope of Boulder Mountain.

*Hidden Lake.* — This is located on the west side of U.S. Highway 89 about 3 miles north of Glendale. It is not discernable from the road. Many years ago a few birds were collected at this site and in recent years some observations have been made of migrant waterfowl.

*Hungry Creek.* — This creek area is 12 miles north of Escalante at an elevation of about 9700 feet. The dominant vegetation is yellow pine with small groves of aspen. Along the creek are scattered clumps of willows. Grass borders line both sides of the stream.

*Jacob's Reservoir.* — This large reservoir is located on top the Aquarius Plateau about 20 miles south of Bicknell and approximately the same distance north of Escalante. Its elevation is about 10,000 feet. During normal periods of precipitation Jacob's Reservoir is the largest body of water in this region. It is fed by a small stream as well as the seasonal run-off from an extensive area called Jacob's Valley. This is perhaps 6 miles long and a mile wide and shows grassland vegetation between the numerous glacial boulders. The surrounding areas are forested by aspen, alpine fir and Englemann spruce. Along the small stream that empties into the reservoir, clumps of willows commonly occur. Our camp site was located 2 miles to the east of the reservoir at a sawmill on a fault bench about 10,400 feet in elevation. In addition to collecting in Jacob's Valley and around the reservoir we worked the sub-alpine forest of sparse alpine fir and common Englemann spruce up to the top of the plateau. Over half of the forest is dead timber.

*Johnson, Johnson Canyon and Johnson Reservoir.* — These are all located about 10 miles east of Kanab. The canyon roughly parallels Kanab Canyon but is much wider. Several ranches about 10 miles northeast of Kanab at 6250 feet are referred to collectively as Johnson. Nearby are some ponds and reservoirs with cattails at the margins in some instances. Several visits were made to this general area working out from Kanab or Cave Lakes Canyon.

*Kanab and Kanab Creek.* — Kanab is located on U.S. Highway 89 at the base of the Vermillion Cliffs at the mouth of Kanab Canyon about 5 miles north of the Utah-Arizona border. Its elevation is 4973 feet. South of town

and east of the creek are fields and pasture land of limited extent. Elsewhere is range land. The upper and lower reservoirs are located east of U.S. Highway 89 south of town, the upper one on the immediate southern outskirts, the lower one about 3 miles further south. A third reservoir along Kanab Creek just north of town is essentially non-functional being filled with silt. We collected upon several occasions in the fields south of town, at both reservoirs and along Kanab Creek both north and south of town. Along the creek course we found riparian, marsh, and cave and earthbank habitats (see Fig. 1).

*Kings Pasture.*—The east fork of Boulder Creek runs through this montane meadow about 9 miles north of Boulder. The meadow is about 9000 feet in elevation. It is sharply delimited by the aspen-spruce-fir forest.

*Long Valley.*—After crossing the divide of the Great Basin south of Hatch, U.S. Highway 89 follows down Long Valley on the headwaters of the East Fork of the Virgin River. The towns of Glendale, Orderville and Mt. Carmel are located in Long Valley.

*Lower Reservoir.*—This is located 3 miles south of Kanab and a quarter of a mile east of U.S. Highway 89.

*Mammoth Creek and Mammoth Cave.*—These are located about 6 miles northeast of Duck Creek on the Markagunt Plateau.

*Navajo Lake.*—Navajo Lake is adjacent to State Highway 14 about 5 miles southwest of Duck Creek or about 20 miles west of U.S. Highway 89. The elevation of the lake is 9127 feet. A dense coniferous forest extends nearly to the edge of the lake except for open clearing and meadow at the west end. At the east end is a dam and bare area where the meandering outlet of the lake flows away to disappear in lava flows.

*Navajo Wells.*—This water site is located in the desert about 13 miles east of Kanab on the road that leads to Paria. A few birds were collected here by University of Utah personnel several years prior to the start of our project.

*Paria.*—This location lies on Paria Creek where Crawford Creek joins as a tributary about 35 miles airline east of Kanab. There was no settlement or ranch here at the time of our field work but a road leads there as an access road to desert range land. This whole country is now being opened up in connection with the building of the Glen Canyon dam on the Colorado River.

*Pear Lake.*—This small lake is one-half mile south of Blind Lake at the base of the lava cap on the north end of Boulder Mountain. The shallow edges of the lake support a marsh-like area of cattails and other emergent vegetation. The elevation is about 10,000 feet.

*Pine Creek Reservoir and Pine Creek.*—This reservoir is 10 miles south of Bicknell on the northwest slope of Boulder Mountain. The elevation is about 9000 feet and supports the yellow pine-aspen-blue spruce plant type. Pine Creek drains north from the reservoir and flows through the same plant type. In addition, birch and sparse willows are encountered on the stream bank.

*Pipe Springs.*—This oasis and historical site is a National Monument located in northern Arizona about 16 miles airline southwest of Kanab. We visited it on two occasions making a few bird observations.

*Posy Lake.*—This was one of our major collecting areas. We camped in the Posy Lake Forest Camp area (8700 feet) and made sorties to Hungry

Creek and Cyclone Lake. The camp area was in an ecotone area on the upper limits of the yellow pines including aspen, Douglas fir, white fir, blue spruce and willows. Along the shallow inlets of the lake are rushes, cattails and other emergent plants.

*Red Canyon.* — This is another tributary of Three Lakes Canyon in the Kanab area. It has its mouth immediately north of Three Lakes. The canyon swings west and southwest bringing one to the head of both Cave Lakes and Cottonwood Canyons. We collected here on December 27, 1946.

*Roundy Springs and Roundy Reservoir.* — The reservoir is about 18 miles north and 4 miles west of Escalante at an elevation of about 10,000 feet. The spring is one mile west of the lake. There are discontinuous stands of alpine fir, Englemann spruce and aspen throughout the area.

*Sand Creek.* — The only birds collected here were eight crossbills and a mountain chickadee in yellow pines along Sand Creek one-half mile upstream from State Highway 54 about two miles east of Hell's Backbone. The creek is lined with birch and is about 8000 feet in elevation.

*Sand Dunes.* — While sand typifies the whole Kanab region the site referred to as the Sand Dunes is an extensive area of red, drifting dunes located about 8 miles airline northwest of Kanab. They lie 12 miles from U.S. Highway 89 to the south along a side road which leaves the main highway about 5 miles southeast of Mt. Carmel Junction. Several visits were made to the dunes. They are moving north along the wide canyon floor and are covering a few yellow pines. Scrub oak is extensive in the region in areas adjacent to the dunes.

*Spectacle Lake.* — This lake is on the central-southern top of Boulder Mountain, 13 miles south of Teasdale. The lake is man-made and drains into the west fork of Boulder Creek. The lake is about 10,750 feet in elevation. There are large discontinuous areas of grasses. The trees are exclusively Englemann spruce. The spruce are either on the north facing slopes or on the crests and ridges of the depressions. In many instances the spruce occur in small islands or copses, and frequently are gnarled and dwarfed.

*Steep Creek.* — This is a small stream located on the east side of the Aquarius Plateau about 10 miles north of Boulder and crosses State Highway 54.

*Strawberry Creek.* — This is a tributary to the Sevier River originating on the Markagunt Plateau and flowing northward. It crosses State Highway 14 about 10 miles west of the junction with U.S. Highway 89. A side road extends south along Strawberry Creek. Our collecting was done along this road but particularly at a spring about 2 miles from the state highway. An open clearing and the dense spruce-fir-aspen forest at its edge were the principal ecological situations encountered in this area.

*Swain's Creek.* — This stream drains northeast toward the Sevier River and crosses State Highway 14 about 7 miles west of Alton Junction. A sawmill is located on Swain's Creek at about 7750 feet, near the highway at the lower margin of the ponderosa pine forest. Scattered patches of willows occur along the stream.

*Three Lakes and Three Lakes Canyon.* — Three Lakes Canyon is a tributary of Kanab Canyon. U.S. Highway 89 follows along this route. The Three Lakes are adjacent to the road on the west and are located about 5 miles north-

west of Kanab. We collected the Three Lakes area extensively from our camp at nearby Cave Lakes. In the area are the following habitats: lakes, marsh, riparian, meadow, oak brush, pygmy forest, cliffs and a cottonwood-willow association.

*Tinny Canyon.* — This is another tributary to Kanab Canyon entering the latter about 3 miles north of Kanab. It is for the most part a dry box canyon typical of the region. The canyon floor in its upper portion has large oaks. A spring and range cabin belonging to the Greenhalgh's constituted the principal collection station in this canyon.

*Upper Reservoir.* — This small body of water held back by an earthen dam is located on the southeastern outskirts of Kanab east of U.S. Highway 89. In addition to the open water there are marginal marshes and willows.

*Widtsoe.* — This is an abandoned town site located at the junction of State Highways 22 and 23. The elevation is about 7600 feet. To the north is Johns Valley. This is part of a range management experimental project. A few observations of birds were made at this locality.

*Wildcat Ranger Station Area.* — This ranger station is about 16 miles air-line north and 4 miles east of Boulder. The station's elevation is 8714 feet. It is located in a montane meadow at the upper limits of the yellow pine. The pine stands are continuous with little understory. In the upper portions of the meadows are dense stands of willows and sparsely scattered yellow pine and blue spruce. Wildcat Creek passes through a meadow two miles long and one mile wide. Dense, pure stands of aspen begin about two miles west of the station buildings.

*Willow Draw.* — This meadow is situated between Beef Meadows and Chokecherry Point on the northeastern spur of the Boulder Mountain at an elevation about 11,000 feet. This meadow is covered with glacial-strewn boulders and is sharply delimited by dense stands of Englemann spruce.

## SPECIES ACCOUNTS

In presenting the data on the various species of birds found in the region the following treatment has generally been followed except in cases where the data are perfunctory. For each kind the specimens are listed by locality with dates, the arrangement following our field work. The listings are chronological where specimens were taken at different times at the same location. The total number is then indicated. The localities are given briefly since the collecting stations have been described in detail. Sight records of Greenhalgh for the years 1931 and 1935, if few in number are given, or summarized where the data were numerous. These pertain mostly to the Kanab area proper. Then our finds of more recent dates are presented. The ecological places of occurrence are usually indicated together with any pertinent observations on natural history. The latter type of information is admittedly sparse since the emphasis throughout the field work has been on collecting specimens, especially of the geographically variable kinds, so as to accumulate material for working out the problems of geographic variation and distribution of the birds of Utah. This has been coupled with student training in the collection and preparation of specimens, so relatively little time has been devoted to ecological or behavioral studies. Any data appearing in the literature is abstracted. Citations to

sources are given except in the case of the information on Bryce Canyon National Park and Cedar Breaks National Monument. Information on the birds of these areas is summarized primarily from Grater (1947) supplemented by data from Presnall (1934, 1936, 1937), Long (1937) and the mimeographed check-list of the birds of the National Parks issued by the National Park Service in December, 1937. An indication is frequently given as to the seasonal status and relative abundance of the species in the region. Any systematic comment concludes the account.

Family Gaviidae: Loons

*Gavia immer* (Brünnich)

Common Loon

A loon was observed by Greenhalgh at the Upper Reservoir on April 24, 1931. A day later it was shot by others and taken to George Adams who mounted it for his collection. A second record pertains to a specimen shot at Kanab sometime in the spring of 1945 which was brought to Mrs. George M. Shields for identification. This specimen was not saved. Thus the loon appears to be a rare transient through the region.

Family Podicipedidae: Grebes

*Podiceps caspicus californicus* (Heermann)

Eared Grebe

Hidden Lake, April 25, 1930; Lower Reservoir, May 18, 1946; Cyclone Lake, June 12, 1952. Total specimens, 3.

Sight records, all at the Lower Reservoir, were obtained on April 27, May 3, 9, and 10, 1931; April 28, 1935; May 17, 1946 and May 24, 1947. On the latter date 12 were seen. Its status therefore appears to be that of a regular spring migrant.

*Podilymbus podiceps podiceps* (Linnaeus)

Pied-billed Grebe

Kanab Creek, 2 mi. S. Kanab, July 10, 1940. One specimen. Several sight records were obtained of lone birds at the Upper Reservoir on May 3 and 10, 1931 and April 15, 1947. One was also seen at Kanab Creek Reservoir on May 17 and 19, 1947. Three were seen at the Lower Reservoir on May 24, 1947. Grater (1943: 76) saw one along the Sevier River near Hatch on February 14, 1942. Three were seen at the pond at Boulder on June 11, 1953. The date of some specimens suggests that the species is a summer resident and breeds in the region.

Family Pelecanidae: Pelicans

*Pelecanus erythrorhynchos* Gmelin

White Pelican

A small flock of pelicans was seen at Kanab on April 10 and another on April 28, 1935. Five were seen at the Lower Reservoir on April 16, 1947. Presnall (1937: 259) reported a flock of 14 flying low and circling over Bryce Canyon National Park on June 14, 1937. They flew away in a southward direction. Residents of Bicknell report that the white pelican is occasionally seen in the Bicknell Bottoms. The species thus appears to be an occasional transient through the region at least in spring.

Family Phalacrocoracidae: Cormorants

*Phalacrocorax auritus auritus* (Lesson)

Double-crested Cormorant

Greenhalgh saw this transient at Kanab on April 21, 1931.

Family Ardeidae: Herons and Bitterns

*Ardea herodias treganzai* Court

Great Blue Heron

Early sight records at Kanab are April 21, 1931; and June 9, 1935. A specimen was shot and brought to Mrs. George M. Shields for identification in the spring of

1945. More recent records are as follows: One at the Lower Reservoir on May 1, 1946; 5 circling over Hidden Lake on April 14, 1947; 4 at both the Upper and Lower Reservoirs on June 18, 1947 (probably the same birds); one at the Lower Reservoir on June 18, 1947. An unusual record given by Grater (1943: 76) is of one at Strawberry Creek, 8000 feet on July 17, 1942. Riley Osborn reports that this heron is a year-long resident some years in the Bicknell Bottoms and probably breeds in the marsh areas. Heber Hall has observed the species at an irrigation pond at Salt Gulch, eight miles west of Boulder. The species is probably an uncommon transient through the region with the possible exception of Bicknell where it may breed.

*Butorides virescens* (Linnaeus)  
Green Heron

Our only record is of one seen at Kanab by Greenhalgh on June 9, 1935. It is an uncommon summer resident to the west in the St. George area. Woodbury, *et al.* (1949) indicate that it may breed at Kanab but this is doubtful.

*Leucophoyx thula brewsteri* (Thayer and Bangs)  
Snowy Egret

Early records for Kanab are April 13, 24 and May 9, 1931. We observed 4 at the Lower Reservoir on May 1, 1946; 5 at the Upper Reservoir on April 15, 1947 and one at the Lower Reservoir the same day; 5 at the Lower Reservoir on April 16, 1947. The species has been seen at Bryce Canyon for it is included in the checklist for the park. Heber Hall reports that this species has been seen occasionally in the spring and fall at a small pond in Salt Gulch, eight miles west of Boulder. The species appears to be a transient through the region in small numbers.

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

Observed at Kanab on May 5, 11 and 28, 1931, and April 13 and 28, 1935. One was seen at the Lower Reservoir May 1, 1946, 3 at the Upper Reservoir on April 15, 1947 and one at the Lower Reservoir on May 24, 1947. It is a sparse transient through the region.

Family Threskiornithidae: Ibises and Spoonbills

*Plegadis chihi* (Vieillot)  
White-faced Ibis

An early record for Kanab was on May 5, 1931. Twenty were seen at the Lower Reservoir on May 1, 1946. Three were seen there on May 17 that same year but were not present on the 18th. A flock of about 50 was seen at the same location on April 15, 1947. It was reduced to 30 by the 16th. Three were seen there on May 24, 1947 and two on June 18, 1947. A single ibis was seen at the pond at Boulder on June 11, 1953. These birds were all probably transients, some lagging until mid-June but it is doubtful that they breed in the region.

Family Anatidae: Swans, Geese and Ducks

*Olor columbianus* (Ord)  
Whistling Swan

In the spring of 1945 a specimen was shot at Kanab and brought to Mrs. George M. Shields for identification. It has been reported for the Bicknell Bottoms during autumn. It is a rare transient.

*Branta canadensis* (Linnaeus)  
Canada Goose

Grater (1947:88) indicates that this goose has been seen at Bryce where it would be a rare transient. It probably has the same status in the Kanab area although we have no certain records of its occurrence there. It is a common breeding bird at the Bicknell Bottoms. The local game warden reported that approxi-

mately 150 nested there during the spring of 1954. It is an abundant migrant there during the fall of the year. On January 16, 1942 Grater (1943:75) noted 24 Canada Geese at Duck Creek along with representatives of several species of ducks.

*Anas platyrhynchos platyrhynchos* Linnaeus  
Mallard

Deer Lake, June 9, 1953; Kings Pasture, August 22, 1953. Total specimens, 2. A pair was seen at the Upper Reservoir on December 28, 1946. It froze that night and the mallards were gone the next day. A few were seen in a mixed flock of ducks at the Lower Reservoir on April 16, 1947. One was seen there on May 24, 1947. Grater (1943:75) found six at Duck Creek on January 16, 1942. The species probably does not breed in the Kanab region; rather its status is that of an uncommon transient. However, on the Aquarius Plateau it was found nesting at some of the lakes. Several mallards were seen on Posy Lake during June 8-10, 1952 and at dusk of June 8, a female with six young was seen swimming near a thick stand of cattails. Two pairs of mallards were observed on a series of small ponds along a creek that empties into Jacobs Reservoir, on June 12, 1952. A female mallard at Beef Meadows (11,000 feet) was noted at dusk on August 13, 1952, flopping around on the ground and making a loud, conspicuous call. She would run along the meadow with her wing distorted, apparently trying to lead us away. After fifteen minutes of injury feigning and when we were apparently a safe distance away, she alighted on a small pond and we could hear the call of small ducklings. After making close observations, we were able to see five or six young.

At Deer Lake, June 9, 1953, a female mallard was flushed from her elevated nest on a hummock in a meadow. The nest was located about eighteen inches above the former water level so there was little chance of flooding. It was in a protected situation beneath a small spruce with a canopy of willows. She was very dark in color, both dorsally and ventrally, and had reddish legs. The nest was lined with feathers and contained fourteen eggs, some browner than others. We broke two eggs open and found embryos about one inch long, indicating that incubation had taken place for several days.

Thus the mallard was found at every lake or marsh from the lowest elevation to the highest. They were especially common in the Bicknell Bottoms during the spring and fall migrations. Woodbury, *et al.* (unpublished manuscript), refer to Beck and Bee finding nests along Steep Creek, Cyclone Lake as well as some of the aforementioned areas.

*Anas strepera* Linnaeus  
Gadwall

Our one record for Kanab is of a lone bird seen on April 27, 1931. It has been reported as common during fall migration at Bicknell Bottoms. It may breed there.

*Anas acuta* Linnaeus  
Pintail

The species was seen at Kanab on May 28, 1931 and several were seen at the Lower Reservoir on May 1, 1946. Two were at Hidden Lake on March 20, 1953. Grater (1943:75) saw nine at Duck Creek on January 16, 1942. It is therefore transient in small numbers through the greater part of the region. The local game warden reports that a few pintails nest at the Bicknell Bottoms and that they are common during fall migration.

*Anas carolinensis* Gmelin  
Green-winged Teal

At Kanab the species was seen on March 18 and 28 and again on April 16, 1931. We saw a few in a mixed flock of ducks at the Lower Reservoir on April 16, 1947. Grater (1943: 75) reports 33 at Duck Creek on January 16, 1942. It is regarded as common in migration at the Bicknell Bottoms and supposedly a few nests have been observed. This species is essentially a transient through the region.



*Anas discors* Linnaeus  
Blue-winged Teal

Early records for Kanab are May 10, 1931 and March 21, 1935. A pair was seen on the Lower Reservoir on May 24, 1947. Grater (1943:75) observed eight at Duck Creek on January 16, 1942, and one at the Sevier River near Hatch on February 14, 1942. It is regarded as a common fall migrant at the Bicknell Bottoms area. On August 7, 1939, D. Eldon Beck found a blue-winged teal on the Escalante River a few miles below the Calf Creek crossing. It had been dropped by a coyote which had captured it on the river. The species is thus a sparse transient.

*Anas cyanoptera septentrionalium* Snyder and Lumsden  
Cinnamon Teal

Lower Reservoir, May 18, 1946; Boulder, June 11, 1953. Total specimens, 2. This teal was seen at Kanab ten times in April and May, 1931 and on August 12, 1931; March 21, and April 28, 1935. One was seen at the Lower Reservoir on May 1, one on May 17 and two on May 18, 1946, one of which was taken. A pair was seen at Hidden Lake, April 14, 1947. Seven were seen at the Lower Reservoir the following day. Two pairs were there May 20, one pair on May 22 and again on May 24, 1947. Grater (1943:75) saw 5 at Duck Creek on January 16, 1942. The species has been reported from Bryce. James Bee found a nest with one egg on July 2, 1935, at the north end of Posy Lake. On June 11, 1953 we saw a pair swimming in the small area of open water at the swamp in Boulder, the male being taken. On May 8, 1954 we found a male dead on the road one mile south of Escalante. It is thus a fairly common transient and a rare breeder in the region.

*Mareca americana* (Gmelin)  
American Widgeon

All our records are for 1946 when one was seen at Hidden Lake on April 14, a flock of about 15 at the Lower Reservoir on April 15, a few in a mixed flock there on the 16th and lone individuals there on May 20, 22, and 24. It is reported to be an uncommon migrant at the Bicknell Bottoms.

*Spatula clypeata* (Linnaeus)  
Shoveler

Observed at Kanab April 28, 1935. In 1946, a pair was seen at the Lower Reservoir on May 20 and one male was there on June 18. In 1947 ten were seen on April 15 and several in a mixed flock of ducks the following day. It is common in migration at the Bicknell Bottoms during the autumn, some remaining until the freeze-up. A few reportedly nest there. It appears to be an uncommon transient through the region and may breed in selected areas.

*Aythya americana* (Eyton)  
Redhead

Spectacle Lake, October 26, 1952. One specimen. One was killed at Kanab on May 12, 1931. Additional records for Kanab, all at the Lower Reservoir, are as follows: one on May 1 and another on May 18, 1946; a flock of 25 on April 15, 1947 with a few in a mixed flock the following day; two males on May 20; one on May 22 and four on May 24, 1947. A flock of 12 was observed at Hidden Lake on March 20, 1953. We saw four together with an equal number of mallards in a flock at Deer Lake on June 13, 1952. Beck observed a redhead on a small lake near Steep Creek on the southeast side of the Aquarius Plateau on June 29, 1938. The species is regarded as fairly common in migration at the Bicknell Bottoms. Its status is thus a fairly common transient and possibly a sparse breeder.

*Aythya valisineria* (Wilson)  
Canvasback

Boulder, June 11, 1953. One specimen. We have three records for the Lower Reservoir at Kanab in 1947. These are a lone female on May 20, also one on May

24, and a mixed flock of four on June 18. The specimen taken at Boulder was one of a pair. A lone female was observed at Navajo Lake on July 2, 1953. The species is uncommon in the Bicknell Bottoms during fall migration although as many as sixty have been seen as late as December 12. Its status is therefore an uncommon transient. Despite the late dates we have no evidence of its breeding in the area.

*Aythya affinis* (Eyton)  
Lesser Scaup

Early records for Kanab are April 24 and 27 and May 11, 1931. In 1946 one was seen at the Lower Reservoir on May 1. In 1947 a female was seen at Hidden Lake on April 14, while about 25 were at the Lower Reservoir on April 15. A few were seen in a mixed flock of ducks there on the 16th. Two pairs were seen on May 20 and 22 but only one pair on the 24th. Our last record is for 4 individuals at Hidden Lake on March 20, 1953. Grater (1943:76) reports five along the Sevier River near Hatch on February 14, 1942. Four pairs were seen at Deer Lake on June 14, 1952 in a mixed flock with eight ruddy ducks. Scaups appear to be fairly common transients.

*Bucephala clangula americana* (Bonaparte)  
Common Goldeneye

Greenhalgh saw this transient at Kanab on April 21, 1931. The local game warden reports that this species is found in the Bicknell Bottoms in the fall of the year and that some remain through the winter until late spring.

*Bucephala islandica* (Gmelin)  
Barrow's Goldeneye

Greenhalgh saw this species at Kanab on April 20, 22 and 27, 1931. Grater (1943:76) saw seven on the Sevier River near Hatch on February 14, 1942. The species is a rare transient.

*Bucephala albeola* (Linnaeus)  
Bufflehead

Early records for Kanab are May 9, 1931 and April 28, 1935. We saw one at Johnson Reservoir April 15, 1947 and about 20 at the Lower Reservoir near Kanab the same day. A few remained there the following day, occurring in a mixed flock of several species. Two were seen at the reservoir near Alton on March 20, 1953. It is a transient.

*Oxyura jamaicensis rubida* (Wilson)  
Ruddy Duck

Hidden Lake, April 25, 1930; Lower Reservoir, May 18, 1946. Total specimens, 2. Sight records for Kanab are April 21, May 12, and 28, 1931 and April 28, 1935. The specimen secured on May 18 was the female of a pair. A single individual was seen at Deer Lake on June 13, 1932 in a mixed flock of mallards, redhead, scaup and coots. The following day we observed eight pairs of ruddy ducks together with seven scaups and eight coots in the center of the lake. The ruddy duck is a fairly common transient through the region.

*Mergus merganser americanus* Cassin  
Common Merganser

Six were seen at the Lower Reservoir near Kanab on April 15, 1947. Grater (1943:76) reported large numbers scattered for several miles along the Sevier River near Hatch on February 14, 1942. The species is a transient through the region.

*Mergus serrator serrator* Linnaeus  
Red-breasted Merganser

Early sight records were made in 1931 on April 21, May 5 and 10. We saw 7 of the species at the Johnson Reservoir on April 15, 1947 and 50 at the Lower Reservoir the same day. However, only ten were there on the following day. They are fairly common transients.

## Family Cathartidae: American Vultures

*Cathartes aura teter* Friedmann

Turkey Vulture

Greenhalgh saw the species ten times in 1931 from April 20 through August 24. They nested in some dead cottonwood trees two miles south of town. His records for 1935 only number two on April 13 and 28. Later records are for May 1, 1946 when one was seen over the fields south of Kanab, one on May 18, 1946 at Cave Lakes Canyon, several south of Kanab on May 20, 1947 and again on May 22. Thus around Kanab it is a fairly common summer resident. One was seen at Sunset Point, Bryce Canyon, September 4 and 17, 1934 where it is a rare summer visitant. Ten were seen on June 14, 1953 soaring high above Hungry Creek of the Aquarius Plateau area. Three were seen above the Escalante River near the confluence of Calf Creek on May 7, 1954 and the following day three were seen near Escalante. Beck found vultures fairly common throughout the last half of June, 1938, at Steep Creek, occurring in flocks numbering up to fifteen individuals.

## Family Accipitridae: Hawks, Old World Vultures, and Harriers

*Accipiter gentilis atricapillus* (Wilson)

Goshawk

Aquarius Ranger Station, August 26, 1953. One specimen. A sight record for the Kanab area is for March 21, 1935. We found the species on Cedar Mountain at Strawberry Creek on June 22, 1947 and at Duck Creek on June 23rd. A nest with 3 young in an advanced fledgling stage was located in a ponderosa pine near the Swain's Creek sawmill on June 24, 1947. At Cedar Breaks the species is considered rare to uncommon. Grater (1943: 76) saw one here on September 27, 1942. Beck observed this hawk at the north end of Boulder Mountain and at the Steep Creek area in June, 1938. The specimen from the Aquarius Ranger Station was taken in an ecotone area of yellow pine, blue spruce, Douglas fir, and aspen. Miller (1934:158) saw the goshawk in aspens on Escalante Mountain. The species is a summer resident in the mountains in the aspen-conifer forest and a transient through the lower valleys.

*Accipiter striatus velox* (Wilson)

Sharp-shinned Hawk

Tinny Canyon, September 22, 1946; Cave Lakes Canyon, May 23, 1947. Total specimens, 2. Early sight records for Kanab for 1931 number ten and extend from March 21 to August 24. The species was also seen on March 21 and April 19, 1935. One was seen at the sand dunes about 8 miles northwest of Kanab on March 16, 1946, at Kanab Canyon north of town on September 23, 1946 and along Kanab Creek one mile south of town on December 24, 1946. Records for 1947 are: one at Johnson Reservoir April 15, Cave Lakes Canyon May 19, Kanab Creek south of town May 20 and Tinny Canyon May 21. At Cave Lakes Canyon a nest was located in a boxelder tree on May 19, 1947 and at Tinny Canyon a nest was found in scrub oaks on May 21, 1947. At Bryce Canyon it is considered an uncommon summer visitant and is believed to be a breeding bird. One was seen at Bryce Point August 29, 1934. In the Aquarius Plateau region one was seen by us at Hungry Creek on June 9, 1952, one at Boulder Creek, June 11, 1953 and several at Kings Pasture by Lee during the week of August 20-27, 1953. Ecological situations where they occurred were thick foliage of cottonwoods, rose thickets and climbing vines and waterways lined with willows and flanked with aspen and yellow pine. This hawk seems to be a fairly common permanent resident in the whole region.

*Accipiter cooperii* (Bonaparte)

Cooper's Hawk

This hawk was seen at Kanab seven times in 1931 from March 7 through August 12 and also on April 3, 1935. Our only subsequent record was of one seen in the pygmy forest at Red Canyon, about five miles northwest of Kanab on December 27, 1946. At Bryce, Grater (1947:20) classed it as a rare fall migrant based on

September and November records but believed it may be a permanent resident. Our December Red Canyon observation would seem to corroborate this. On the Aquarius Plateau Lee saw this hawk daily at Kings Pasture August 20-27, 1953 and Beck observed the species at Steep Creek and the north end of the plateau during the summer of 1938.

*Buteo jamaicensis kriderii* Hoopes  
Red-tailed Hawk

Kings Pasture, August 23, 1953. One specimen. This record has been reported by Porter and Bushman (1956:152). There was an abundance of red-tailed hawks in the montane meadow (9000 feet) at the time the specimen was taken.

*Buteo jamaicensis calurus* (Cassin)  
Red-tailed Hawk

Cave Lakes Canyon, May 17, 1946; Kings Pasture, August 20-23, 1953; Chokecherry Point, August 28, 1953. Total specimens, 4. Red-tails were wide-ranging, being seen in scattered areas from the dry, desert lowlands to the forested areas and highest cliffs of the mountains. Forty-five observations of this hawk made in nearly every month of the year and over a period of several years indicate that the species is an abundant permanent resident, and the most common raptore in the Kanab area. On April 6, 1953 a nest with two eggs was found near Kanab by Greenhalgh. Another nest was located on May 16, 1946 in Cave Lakes Canyon. This one was situated on a ledge of a vertical sandstone cliff on the south side of the canyon about 50 feet above the canyon floor. Progress of the nesting season was not determined, although no young were observed. At Bryce it is considered a common permanent resident while at Cedar Breaks it is an uncommon summer visitant, possibly a summer resident. At the Aquarius Ranger Station on August 23-25, 1953 immature red-tails were common and perched in spruces within fifty yards of our tent.

*Buteo swainsoni* Bonaparte  
Swainson's Hawk

Presnall (1934) listed the species for Bryce as a common summer resident but Grater (1947:22) states that there have been no records in recent years. Grater considers it to be a fairly common summer visitant from June to September at Cedar Breaks since migratory flocks are frequently seen at Hawk Valley. We have only one record and this is for the Aquarius region where one was seen five miles north of Boulder, on July 6, 1952, soaring over an ecotonal area of yellow pine, juniper, deciduous shrubs and cultivated fields. Beck saw the species several times at Cyclone Lake and at Boulder Mountains during the early summer of 1938 according to Woodbury (MS).

*Buteo lagopus s.johannis* (Gmelin)  
Rough-legged Hawk

Long (1937:41) observed a single individual on November 23, 1935 a short distance west of the boundary of Bryce Canyon National Park. He stated that the species is uncommon in the region. It is a winter visitant.

*Buteo regulis* (Gray)  
Ferruginous Hawk

Our only observation pertains to a single specimen seen at the Lower Reservoir on April 15, 1947. Long (1937:41) saw a member of this species on October 8, 1935 in Swamp Canyon, 7300 feet, Bryce Canyon National Park with a second observation being made the next day in the same place. He states that the species is common throughout southern Utah and is seen frequently at Cedar Breaks National Monument in all seasons except winter. It is a permanent resident of the region.

*Aquila chrysaetos canadensis* (Linnaeus)  
Golden Eagle

Early sight records for Kanab were on February 21, March 21 and May 1, 1935. A single individual was seen 14 miles northwest of Kanab on May 17, 1947 and two days later one was flushed from a ledge at the head of Cave Lakes Canyon. It was pursued by a Red-tailed Hawk. Two were seen at Johnson, March 21, 1953 and one near the top of Brian Head July 3, 1953. Grater (1947:23) states that the species has been observed at Rainbow Point, Bryce Canyon, October 20, 1934 where it is considered a rare fall visitant. At Cedar Breaks two were seen at Brian Head in June, 1935. It is thought to be a rare summer visitant there. Sight records for the Aquarius Plateau region are as follows: Loa, October 25, 1952; Kings Pasture, August 21-22, 1952; 5 miles north Widtsoe, May 9, 1954; Spectacle Lake, August 12, 1952; Boulder Creek, August 10-12, 1952. Thus the species is not uncommon as a permanent resident and ranges widely throughout the region.

*Haliaeetus leucocephalus* (Linnaeus)  
Bald Eagle

A lone adult was seen perched in a dead tree at Johnson Reservoir on December 27, 1950 by Clifton Greenhalgh. Five were seen at the Lower Reservoir at Kanab in mid-April, 1951 by Harry Greenhalgh. It has been recorded at Bryce. In the Aquarius region Lee reported seeing a pair at Kings Pasture during the week of August 20-27, 1953. Reed Thompson saw four perched on a fence east of Widtsoe on several occasions for two consecutive winters. Its status is an uncommon winter visitant and transient.

*Circus cyaneus hudsonius* (Linnaeus)  
Marsh Hawk

Many observations of this hawk were made in the fields south of Kanab by Greenhalgh in February, March and April of 1931, 1935 and again in 1938. In 1946 we saw one at the Lower Reservoir on May 18 and two were flying over a dry sagebrush area at Johnson on December 29. Our last observation was of a lone individual along Kanab Creek south of town on May 20, 1947. It is common in the marshes around Bicknell. The species is thus a common permanent resident of the region.

Family Pandionidae: Ospreys  
*Pandion haliaetus carolinensis* (Gmelin)  
Osprey

Two were seen at Navajo Lake on June 17-18, 1950. They were foraging mornings and evenings each day and may have been nesting in the area. Each time they left the lake they flew northeast as though to a nest. A single osprey was seen at the same locality July 1 and 2, 1953. It alternately foraged or alighted in dead trees bordering the lake where it rested and preened. Lee observed two at Lower Bowns Reservoir on the Aquarius Plateau during July, 1953. They were seen on several consecutive days. The species is a rare summer resident at mountain lakes.

Family Falconidae: Caracaras and Falcons  
*Falco mexicanus* Schlegel  
Prairie Falcon

This hawk was observed near Pipe Springs on March 4, 1946, along Kanab Creek a mile south of town on May 12, 1946 and at Kanab May 17, 1947. It was observed at Bryce on June 15, 1934 where it is considered to be a rare summer visitant. One was seen August 12, 1952 at the high cliffs on the west side of the Aquarius Plateau. The species is uncommon and probably has the status of permanent resident.

*Falco peregrinus anatum* Bonaparte  
Peregrine Falcon

An early record for Kanab was on April 28, 1935. One was seen at the Lower Reservoir on April 16, 1947. Two were seen along Kanab Creek 3 miles south of

town on May 20, 1947 where they were observed to swoop on a flock of mourning doves. A short time later, two, possibly the same individuals, were seen to fly over the Lower Reservoir. The species is merely transient through the region.

*Falco columbarius bendirei* Swann  
Pigeon Hawk

Without any details, Grater (1947:88) lists this as having been recorded at Bryce Canyon. It is probably a migrant and rare.

*Falco sparverius sparverius* Linnaeus  
Sparrow Hawk

Six mi. S. Johnson, November 27, 1937; 1 mi. S. Kanab, September 16, 1946; Kanab, December 29, 1946; 5 mi. N. Boulder, July 6, 1952. Total specimens, 4.

Sixteen early records by Greenhalgh in 1931, 1935 and 1938 through nearly all months of the year, and eight records by our field parties in 1946 and 1947 indicate that this is a fairly common permanent resident around Kanab. The species is wide-ranging from the desert lowlands to clearings in the high mountains. At Bryce Canyon it is considered an uncommon permanent resident in the lower parts of the park while at Cedar Breaks it is a rather common summer resident. On the Aquarius Plateau, while travelling along mountain meadows from Roundy Reservoir to Cyclone Lake, a distance of five miles, on August 11, 1952 we counted 35 individuals. One was seen ten miles south of Escalante on May 6, 1954 flying over junipers.

Family Tetraonidae: Grouse and Ptarmigan  
*Dendragapus obscurus obscurus* (Say)  
Blue Grouse

Duck Creek, August 3, 1935; Spectacle Lake, August 9 and October 26, 1952. Total specimens, 4.

At Bryce Canyon the dusky grouse is an uncommon permanent resident to be found along the rim during the summer where it nests in June and July. According to Grater (1947:25) during the winter it wanders below the rim to places where there is protection from the heavy snows. At Cedar Breaks the species is an uncommon permanent resident, nesting in June and July. Grater (1943:76) flushed seven from a dense grove of Englemann spruce at Cedar Breaks on January 17, 1942. The species is fairly common on the Aquarius Plateau, several being seen at the times when specimens were taken. One was also seen near Hell's Backbone on June 12, 1952. The grouse taken on the Aquarius had been eating the budding tips of Englemann spruce and gooseberry stems.

*Bonasa umbellus* (Linnaeus)  
Ruffed Grouse

The local Fish and Game warden reports that a few ruffed grouse have been seen on the Aquarius Plateau along deciduous streamside growths. This seems to be the southernmost place of occurrence in Utah. The species is fairly common on the Fish Lake Plateau to the north.

*Centrocercus urophasianus urophasianus* (Bonaparte)  
Sage Grouse

Ranchers reported that this permanent resident species formerly occurred in Sink Valley east of Alton, Kane County. Sheep grazed the area heavily but have not been allowed to do so in late years and the sage grouse have been reported there again. In the Parker Mountain area near the Aquarius Plateau the species is sufficiently abundant that limited hunting has been allowed in recent years. There is a sparse population on the west side of Boulder Mountain in the low sagebrush areas.

## Family Phasianidae: Quails, Pheasants and Peacocks

*Lophortyx californicus* (Shaw)

## California Quail

In their check-list of the birds of Utah, Woodbury, Cottam and Sugden (1949: 11) state that the species has been introduced in Kane County but no specific localities are given. We found no evidence of the species occurring in the Kanab area. Beck saw a covey on July 4, 1938 in thickets of squawbush and virgin bower along Calf Creek between Boulder and Escalante.

*Lophortyx gambelii gambelii* Gambel

## Gambel's Quail

Kanab Wash, 1 mi. S. Kanab, December 28, 1946; 3 mi. S. Kanab, June 19, 1947; Fremont River, 1 mi. S. Bicknell, May 18, 1956. Total specimens, 4. According to several long-time residents of Kanab, Gambel quail were abundant in the area in their youth but through the years shooting gradually reduced their numbers. Greenhalgh found them to be still fairly common during 1931 and 1935. Then the very severe winter of 1936 virtually wiped them out. Evidently the population made a recovery for we found the species several times. In 1946 a flock of about 25 was flushed along the Kanab Creek one mile south of town on December 28. In 1947 five males were seen together on April 15 and a pair on May 20. The female of the pair shot on June 19 had an egg with a calcified shell in the oviduct. Our last observation for the Kanab area was of a flock of about 25 birds on December 1, 1948. In the Aquarius region we saw one along Fish Creek on June 15, 1952, in a stand of squawbush and rabbit brush. One was seen three miles west of Teasdale in a cultivated field on February 21, 1953.

Woodbury *et al.* (1949:11) give Wayne County as the northern extremity of the range in Utah. An extension of range is indicated by two additional specimens. Norman Chamberlain obtained a female with 7 mm. ova near Sigurd, Sevier County on June 24, 1953 and Richard D. Porter secured a female at Green River, Emery County on May 13, 1952. They are permanent residents.

*Phasianus colchicus* Linnaeus

## Ring-necked Pheasant

One mi. S. Kanab, December 29, 1946 and May 20, 1947. Total specimens, 2. Sight records pertain to a female flushed from the fields south of Kanab on May 12, 1946; a male along Kanab Creek, December 28, 1946; 6 males and 3 females in the fields south of Kanab on April 15, 1947 and a female with a brood of about 25 young along Kanab Creek on May 20, 1947. The young were capable of flight at this time. It is not known when the species was first introduced into the Kanab area but the suitable habitat is limited. At Escalante, the species was seen and heard frequently in alfalfa and other cultivated fields during May 7-8, 1954. Local people reported it as occurring at Loa in limited numbers.

## Family Rallidae: Rails, Gallinules, and Coots

*Rallus limicola limicola* Vieillot

## Virginia Rail

Cave Lakes Canyon, May 14, 1946. One specimen.

The only early record for Kanab Creek was April 14, 1931. Our specimen was obtained from a wet meadow with fairly tall grass and willow patches. One was flushed from the cattail-tule swamp in Boulder on July 6, 1952. As compared with the sora, the Virginia rail is a rare summer resident.

*Porzana carolina* (Linnaeus)

## Sora

Lower Reservoir, May 1 and 18, 1946; Cave Lakes Canyon, May 14, 1946. Total specimens, 6. The species was seen in the Kanab area on May 12, 1931. Our more recent sight records were on May 12, 1946 at Cave Lakes Canyon and May 1 and 17, 1946 at the Lower Reservoir. At the former place the species occupied a wet

grass-willow habitat along with the Virginia rail. At the Lower Reservoir the sora was common in the shallow water among protective grass and willow patches. Beck observed one along Steep Creek on June 19, 1938. It is a summer resident.

*Fulica americana americana* Gmelin  
American Coot

Lower Reservoir. May 15, 1946; Fremont River, 2 mi. SW. Bicknell. May 20, 1956. Two specimens.

Greenhalgh observed the species five times in April and May, 1931. Most of our later sight records for the Kanab area were obtained at the Lower Reservoir where they were seen as follows: one on May 17 and 18, 1946, 8 on April 15, 10 on April 16, about 15 on May 20 and again on May 22 and 24 and 40 or more on June 18, 1947. These figures suggest a build up of the population through migration. One was also seen at the Johnson Reservoir on April 15, 1947; one at Duck Creek on June 23, 1947, and one at Navajo Lake on July 2, 1953. In the Aquarius Plateau area several pairs were seen in June at Cyclone Lake, Deer Lake and the pond in Boulder. The species was common at the Bicknell Bottoms. The seasonal status is that of summer resident. A few pairs seemingly are breeders at permanent bodies of water. Two nests were found at Deer Lake on June 14, 1952.

Family Charadriidae: Plovers, Turnstones and Surfbirds  
*Charadrius alexandrinus nivosus* (Cassin)  
Snowy Plover

Our only record is of one seen by Greenhalgh at Kanab on March 28, 1931. The date of this transient is earlier than the extreme migration date of April 3 cited by Woodbury, *et al.* (1949:12).

*Charadrius vociferus vociferus* Linnaeus  
Killdeer

Cave Lakes Canyon, May 12, 1946; Jacobs Res., June 10, 1952. Two specimens. Greenhalgh's early sight records for Kanab number 21 and are distributed from March through August in both 1931 and 1935. The species was seen regularly in our field work in April, May and June in wet meadows, ponds and reservoirs both at the Johnson and Kanab areas. In Cave Lakes Canyon 4 eggs were discovered among a pile of pebbles in an otherwise sandy area. Several killdeer were seen at the confluence of Calf Creek and the Escalante River on May 7, 1954. Two were flushed along the shore of Spectacle Lake on October 25, 1952. Thus this is a common summer resident ranging from the desert streams to the high mountain lakes.

Family Scolopacidae: Woodcock, Snipe and Sandpipers  
*Capella gallinago delicata* (Ord)  
Common Snipe

Lower Reservoir, April 15, 1947. One specimen. The species was seen at Kanab six times in April and May, 1931, and on January 17, March 21 and April 3, 1935. In later field work we saw one at the Hamblin Ranch in Cave Lakes Canyon on March 4, 1946, and one two days later at Three Lakes. One was also seen at Three Lakes on December 27, 1946 during mild weather, but the bird was gone the following day after a sudden freeze during the night. A flock of 8 was seen at the Johnson Reservoir on April 15, 1947, 6 at the Lower Reservoir the same day, and 10 there the following day. Long (1937:41) flushed a Wilson snipe on October 10, 1935 from the edge of Campbell Canyon spring, 6800 feet. A second observation was made the following day. He stated that Wilson snipes are common in suitable places in southern Utah throughout the fall and winter. The species appears to be a permanent resident at least in mild years.

*Numenius americanus* Bechstein  
Long-billed Curlew

One was seen at Kanab on April 7, 1935 and six at the Lower Reservoir on April 15, 1947. A very unusual observation was of a pair on the flat alpine tundra



at the summit of Brian Head, 11,315 feet on July 3, 1953. Beck observed several in a mountain savannah bordered by spruce, fir and aspen, near Cyclone Lake on July 5, 1939. The species is migrant through the region.

*Actitis macularia* (Linnaeus)  
Spotted Sandpiper

Kanab Cr., 1 mi. S. Kanab, May 12, 1946; Duck Creek, August 6, 1935 and June 23, 1947; Deer Lake, June 14, 1952; Spectacle Lake, August 8, 1952; Green Lake, August 17, 1952; Kings Pasture, August 21, 1953; confluence of Calf Creek and Escalante River, May 8, 1954; Bicknell Bottoms, May 18-19, 1956. Total specimens, 12.

The species was seen in the Kanab area along the creek and at both reservoirs a total of 16 times. The records extended from 1931 to 1947 and from April through June. The numbers seen varied from one to several. This sandpiper was also observed at Duck Creek on July 1, 1953 and at Navajo Lake July 2, 1953. The specimens taken at Duck Creek on August 6 were in winter plumage.

Woodbury, Cottam and Sugden (1949:13) in their check-list of the birds of Utah state that the western solitary sandpiper, *Tringa solitaria cinnamomea* (Brewster), is a casual summer resident breeding in Uintah and Kane counties, Kane County being included on the basis of the two specimens taken at Duck Creek on August 6, 1935 which were identified as the western solitary sandpiper. Behle and Selander (1952:26) have recently corrected this misidentification pointing out that they are instead spotted sandpipers in winter plumage. Several pairs were observed at Deer Lake on June 13-14, 1952. The gonads of the adult male taken measured 7 x 10 mm. in size indicating breeding condition. Apparently the spotted sandpiper is a common summer resident throughout the area at all bodies of water.

*Catoptrophorus semipalmatus inornatus* (Brewster)  
Willet

Our first records for Kanab are on April 27 and May 5, 1931. The species was seen again on April 28, 1935. There are four sight records of one or two individuals at the Lower Reservoir in April and May, 1947. Presnall (1937:259) records one having been seen on April 20 and 21, 1937 at a small area of mud alongside a pipeline being repaired near the head of East Creek, 8775 feet, in the Bryce Canyon region. All the rest of the area was covered with snow. Presumably this same bird was found dead there April 23. It was not preserved. The species appears to be an uncommon spring transient.

*Totanus melanoleucus* (Gmelin)  
Greater Yellowlegs

One was seen at the Lower Reservoir on May 1, 1946, while 8 were there on April 15, 1947 and 4 the following day. The species is seemingly commoner than the preceding but also a migrant.

*Totanus flavipes* (Gmelin)  
Lesser Yellowlegs

Lower Reservoir, April 15, 1947. One specimen. The species is seemingly a rare migrant.

*Erolia minutilla* (Vieillot)  
Least Sandpiper

The only records we have of this transient species are for 1931 when it was seen by Greenhalgh on May 7, 9 and 10 and July 26.

*Limnodromus scolopaceus* (Say)  
Long-billed Dowitcher

Lower Reservoir, May 1, 1946. One specimen. The species was also seen on April 28, 1935. The specimen is listed by Pitelka (1950:71) in his treatise on the dowitchers. It is an uncommon transient.

*Ereunetes mauri* Cabanis  
Western Sandpiper

Lower Reservoir, May 1, 1946. One specimen. Five were seen at the time this specimen was taken. The species was observed earlier on May 7, 9, 10, 1931. It is a fairly common transient.

*Limosa fedoa* (Linnaeus)  
Marbled Godwit

Lower Reservoir, April 15, 1947. One specimen. Sight records at either the Upper or Lower reservoirs at Kanab are as follows: April 28, 1935; six on April 15 and 16, 1947. The species is a sparse migrant, at least in spring.

Family Recurvirostridae: Avocets and Stilts  
*Recurvirostra americana* Gmelin  
American Avocet

Three Lakes, May 13, 1946. One specimen. Two early observations at Kanab were on May 5, 1931 and April 28, 1935. The specimen taken was one of a flock of twelve. Perhaps this same flock remained in the area for some time, since eleven were seen at the Lower Reservoir on May 17 and again on the 18th, 1946. In 1947, four were seen at the Lower Reservoir on April 15, two on May 20 and a flock of 30 or more on May 24. It is an uncommon transient.

*Himantopus mexicanus* (Muller)  
Black-necked Stilt

One was seen at the Lower Reservoir on April 16 and two on May 24, 1947. Heber Hall recalled seeing it in both spring and fall at a pond at Halls Ranch in Salt Gulch, 8 miles west of Boulder. It is apparently an uncommon transient.

Family Phalaropodidae: Phalaropes  
*Steganopus tricolor* Vieillot  
Wilson's Phalarope

Lower Reservoir, May 18, 1946. One specimen. Greenhalgh has 7 records in April and May, 1931 for Kanab. He also saw it on April 28, 1935. The specimen taken was one of a flock of 20. They had been seen the previous day. About 30 were found at the Lower Reservoir on May 20, 1947. On June 18, only a single female remained. The species is a fairly common transient in the Kanab area.

*Lobipes lobatus* (Linnaeus)  
Northern Phalarope

We did not see this migrant phalarope in our recent field work, but Greenhalgh recorded it for Kanab on May 9, 10, 12, 1931 and on April 28 and May 20, 1935.

Family Laridae: Gulls and Terns  
*Larus californicus* Lawrence  
California Gull

Two were seen at the Lower Reservoir on May 1, 1946 and a flock of about 30 flew over our camp at Cave Lakes Canyon on May 18, going north. On April 15, 1947 four were observed at the Upper Reservoir and also 15 at the Lower Reservoir, presumably the same birds. The species has also been reported at the Bicknell Bottoms in spring. It is an uncommon transient through central southern Utah.

*Larus pipixcan* Wagler  
Franklin's Gull

In 1947 a flock of 12 was seen at the Lower Reservoir on April 15. Only one was seen the following day. Uncommon transient.

*Larus philadelphia* (Ord)  
Bonaparte's Gull

Lower Reservoir, April 15, 1947. One specimen. It was a lone individual. This is a rare transient.

*Sterna forsteri* Nuttall  
Forster's Tern

Five were seen at the Lower Reservoir on May 1, 1946. Uncommon transient.

*Sterna hirundo hirundo* Linnaeus  
Common Tern

Greenhalgh saw this species at Kanab on May 5, 1931. Uncommon transient.

*Chlidonias niger surinamensis* (Gmelin)  
Black Tern

Three sight records of single individuals at the Lower Reservoir are for May 1, 1946, and May 20 and 24, 1947. Uncommon transient.

Family Columbidae: Pigeons and Doves  
*Columba fasciata fasciata* (Say)  
Band-tailed Pigeon

According to Grater (1937:14) Ed Laws, former resident of Kanab, reported the species breeding on East Fork Mountain, Utah. This is in the Bryce Canyon area. Grater (1943:76) reported 18 from the rim of the Great West Canyon in Zion National Park, September 30, 1942. On the west face of Cedar Mountain, 8000 feet, 2 miles east of Cedar City, nine pigeons in a flock were seen by Floyd Thompson and Dale Jones on June 11, 1950. Elsewhere in the coniferous forest in the same general area they estimated that they saw 100 additional band-tailed pigeons that same day. During the summer of 1953 and 1954 flocks of as many as 200 have been reported from Orderville. The local game warden has seen the species on Boulder Mountain. It is a fairly common summer resident in the mountains of the region.

*Zenaidura macroura marginella* (Woodhouse)  
Mourning Dove

One mi. S. Kanab, December 28, 1946; Boulder, June 11, 1953; confluence of Calf Cr., and Escalante R., May 8, 1954. Total specimens, 3. The species was common in the fields south of Kanab being observed on all our trips to the area. The numbers seen varied from 10 to 50 in a morning of collecting. They were also numerous at Cave Lakes Canyon. The species is permanently resident, at least during mild winters, for flocks of 10 to 15 were seen on December 24 to 28, 1946. The status of the species is, however, essentially a summer resident and a common spring and fall migrant. At Bryce Canyon the species is an uncommon summer resident being seen in open glades in the yellow pine forest and along the canyon rim. The same is true for the Aquarius Plateau. A large flock was observed in yellow pine on June 12, 1952, six miles north of Boulder. They were common along the Escalante River on May 7-8, 1954.

Family Cuculidae: Cuckoos, Roadrunners, and Anis  
*Geococcyx californianus* (Lesson)  
Roadrunner

Several sight records indicate that this species is not uncommon as a permanent resident of the region. One was seen in rabbit brush along Kanab Creek one mile south of town on May 1, 1946. Dan Gardiner told us of seeing one in Kanab Canyon near the dam north of town on April 2, 1947. Another was seen along Kanab Creek 3 miles south of town by us on May 20, 1947. Greenhalgh saw one near the dam north of Kanab on November 29, 1947 and learned that one had been shot near the Lower Reservoir a week previously. While Fish and Game Department employees were trapping Gambel quail for transplanting, two roadrunners got into the traps on December 1, 1948.

Family Tytonidae: Barn Owls  
*Tyto alba pratincola* (Bonaparte)  
 Barn Owl

Kanab, June 14, 1939; 2 mi. S. Kanab, July 10 and 12, 1940; 1 mi. S. Kanab May 2, 1946. Total specimens, 4. The utilization of holes in the bank of Kanab Creek has previously been reported by Behle (1941:160), based on Greenhalgh's observations. The species breeds in these caverns. In the fall at the termination of nesting as many as 30 have been observed to congregate together. The species is seemingly less abundant now than formerly for we did not find it during our extensive field work of 1946-47. This owl is probably permanently resident.

Family Strigidae: Typical Owls  
*Bubo virginianus pallescens* Stone  
 Great Horned Owl

This owl occurs from the lowlands to the high plateaus. Greenhalgh recorded it frequently from March through August in 1931, and in March and April, 1935. They too nested in caverns along Kanab Creek. We saw the species south of Kanab on May 12, 1946 and again on May 20, 1947. Miller (1934:160) flushed the species several times from spruce thickets at Cedar Breaks between June 28 and July 1, 1931. It is reported to be fairly common at Bryce Canyon as a permanent resident. On the Aquarius Plateau one was seen in dense aspens at Posy Lake on August 13, 1952. At Beef Meadows, 11,000 feet, on August 15, 1952 at dusk we saw one swoop from Englemann spruce and fly low over a meadow on a hunting sortie. During the last week in August, 1952 one was seen and heard daily at the Round Willow Bottom Reservoir.

*Glaucidium gnoma californicum* Sclater  
 Pygmy Owl

Reported for Bryce Canyon, being seen in October, 1935. Uncommon resident.

*Speotyto cunicularia hypugaea* (Bonaparte)  
 Burrowing Owl

In 1931 and 1935 Greenhalgh found this owl to be common along the margins of Kanab Creek wash where small holes were formed by water running down and emerging at a lower level. We did not find any in the area of former occurrence. Heber Hall reported that he had seen this owl occasionally in the Salt Gulch area 8 miles west of Boulder. It is a summer resident.

*Asio otus wilsonianus* (Lesson)  
 Long-eared Owl

Tinny Canyon, May 21, 1947; Wildcat Ranger Station, August 29, 1953. Total specimens, 4 (including two young). A nest, containing four downy young, was located in a grove of Gambel oaks at Tinny Canyon about 25 feet above the ground. It was probably an abandoned hawk's nest. The species was seen at Cave Lakes Canyon on March 3, 1946 and May 19 and June 19, 1947. In each an adult was flushed from a cave but there was no evidence of nesting. The specimen from the Aquarius Plateau was taken from a meadow area with a small stream lined by numerous dense clumps of willows. Fairly common permanent resident.

Family Caprimulgidae: Goatsuckers  
*Phalaenoptilus nuttallii nuttallii* (Audubon)  
 Poor-will

Cave Lakes Canyon, May 19, 1946 and May 18, 1947; 5 mi. N. Boulder, June 12, 1953. Total specimens, 3. Early records for Kanab are on April 19 and 25, 1935. We also saw it there on May 26, 1946. The species was heard each evening around our camp in Cave Lakes Canyon in 1946 in mid-May but it wasn't until our automobile headlights attracted one to the road that a specimen was secured. The performance was repeated the following year. We had the same experience in the

Boulder area where the species was common in areas where the vegetation consisted of sage, squawbush, serviceberry, scrub oak and juniper. Two poor-wills were seen along the road at dusk with the aid of a spotlight near the Aquarius Ranger Station on August 23, 1953. The species is a summer resident.

*Chordeiles minor henryi* Cassin  
Common Nighthawk

Lower Reservoir, June 18, 19, 1947; Donkey Lake, 10,000 feet. Boulder Mt., July 11, 1947; 5 mi. N. Boulder, July 4-5, 1952 and June 9-13, 1953; Sulphur Cr., 3 mi. NW. Fruita, June 26, 1956. Total specimens, 14. Nighthawks were seen regularly by Greenhalgh from June 5 to August 24, 1931. His only observation for 1955 was on June 20. We did not see any of these summer residents in our spring field work but found them common in mid-June. Nighthawks have been recorded from both Bryce and Cedar Breaks. They were common in the Aquarius Plateau area. Hayward (1937:305) notes that an adult female was obtained on June 22, 1936 at 10-Mile Spring, south of Escalante. They are summer residents. While closest to the race *henryi* they incline toward *hesperis*. Probably representatives of the races *hesperis* and *howelli* migrate through the region commonly.

Family Apodidae: Swifts  
*Aeronautes saxatalis saxatalis* (Woodhouse)  
White-throated Swift

Cottonwood Canyon, April 4, 1940; Kanab Creek, 1 mi. S. Kanab, May 12, 1946; 2 mi. N. Boulder, June 13, 1953. Total specimens, 3.

Greenhalgh had nine records for Kanab from April to August in 1931. He recorded it again on April 10, 1935 and on April 10, 1938. We found the species common along Kanab Creek south of town in the spring of 1946. They were seen at Three Lakes on April 14, 1947 and were abundant in Cave Lakes Canyon in mid-May, 1946 and 1947 where they were nesting along with Violet-green Swallows in small holes on a vertical sandstone cliff. They were still actively foraging there on June 19, 1947 seemingly feeding young. The species was also seen over the fields two miles south of Kanab on June 18, 1947. At Bryce Canyon it is a common summer resident and at Cedar Breaks a common spring migrant. On the Aquarius Plateau we found them common in several areas: one half mile east of Spectacle Lake, August 7-12, 1952; 2-5 miles north of Boulder, June 7-13, 1953; Escalante River Gorge, near Calf Creek, May 8, 1954. At lower elevations they occurred around sandstone cliffs and at higher elevations around lava cliffs. On June 13 two were seen flying higher than the others. They came together and copulated in mid-air and while doing so dropped to the level of the tree tops.

Family Trochilidae: Hummingbirds  
*Archilochus alexandri* (Bourcier and Mulsant)  
Black-chinned Hummingbird

Hidden Lake, April 25, 1930; Cave Lakes Canyon, May 12, 1946; 2 mi. E. Bicknell, June 25, 1956. Total specimens, 3. Greenhalgh had five observations for Kanab from April 19 to July 19, 1931. Most observations were made in oak and the piñon-juniper forest. We saw the species at Duck Creek on June 23, 1947. At Bryce Canyon this species is a common summer resident along the rim and in canyons around 8000 feet and below. It nests there in June. We found a nest with eggs at the junction of Calf Creek and the Escalante River on May 7, 1954. The nest was situated on a branch of a small Douglas fir growing out of a sandstone cliff at the base of which the river flowed. Beck found this type of hummingbird common in the same area on July 4 and August 3, 1938.

*Calypte costae* (Bourcier)  
Costa's Hummingbird

Heber Hall collected a specimen at Salt Gulch, 8 miles west of Boulder on May 16, 1953. This extension of range in Utah has been noted by Porter and Bushman (1956:152).

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

Cave Lakes Canyon, May 19, 1947; Duck Creek and vicinity, July 26 and August 2, 1935, and June 23-24, 1947; Boulder, July 5, 1952 and 8 mi. N. Boulder, June 9, 1953. Total specimens, 7. This species, the commonest of all the Utah hummingbirds, ranged from the lowlands around Kanab to the high plateaus. They were fairly common in Cave Lakes Canyon where it was seen on all our visits. A nest was found there on May 14, 1946. It was located above a small pond on a willow branch about 4 feet above the ground near the edge of a vertical face of rock. It was protected from view by overhanging grass projecting from a crevice in the cliff. The nest contained two eggs. The female was incubating the eggs when the nest was discovered. At Duck Creek the species was common. It was also seen at Strawberry Creek on June 22 and 25, 1947. In both the latter places it was found hovering at currant bushes. At both Bryce and Cedar Breaks it is a common summer resident. Miller (1934:160) saw or heard this hummingbird daily at Cedar Breaks between June 28 and July 1, 1931. In the Aquarius Plateau areas it was again common along streams and in meadows as well as occurring in the spruce-fir forest. Observations were made at Beef Meadows, August 12-14, 1952; Aquarius Ranger Station, August 10-12 and 25-27, 1953; Dark Valley, August 27, 1953; confluence of Calf Creek and Escalante River, May 8-10, 1954. Miller (*loc. cit.*) also saw the species on Escalante Mountain. It was our impression that the species was common at lower elevations in May and moved to higher elevations in the mountains as the plants started blooming. They were most abundant in August in the mountain meadows.

*Selasphorus rufus* (Gmelin)  
Rufous Hummingbird

Our only record for this migrant is for Kanab Canyon near its junction with Three Lakes Canyon where one was seen on September 24, 1946. It has been seen along the rim of Bryce Canyon in late July and August. Transient.

*Stellula calliope* (Gould)  
Calliope Hummingbird

The only record of this sparse summer resident is that of Miller (1934:160) who found a female building a nest on July 3, 1931 in the dense spruce timber on Escalante Mountain.

Family Alcedinidae: Kingfishers  
*Megasceryle alcyon cawrina* (Grinnell)  
Belted Kingfisher

Five mi. NW. Escalante, September 20, 1935. One specimen. One was seen at Kanab by Greenhalgh on April 28, 1935 and Lee and Hansen saw one dive low over the water at Round Willow Bottom Reservoir on the Aquarius Plateau during the last week in August. The species is probably transient through the region.

Family Picidae. Woodpeckers and Wrynecks  
*Colaptes cafer collaris* Vigors  
Red-shafted Flicker

One-two mi. S. Kanab, September 16, 1946, December 28, 1946; June 19, 1947; Johnson, December 29, 1946; Cottonwood Canyon, December 27, 1946; Cave Lakes Canyon, May 19, 1947; Posy Lake, June 9, 1952; Spectacle Lake, August 9, 1952; Boulder, June 8, 1953; 5 mi. N. Boulder, June 9-10, 1953; Kings Pasture, August 21, 1953, 8 mi. S. Escalante, September 20, 1935. Total specimens, 13.

This species was common throughout the region all year. Greenhalgh saw it regularly in 1931 and 1935. It was recorded at all our collecting stations on virtually every visit through the entire region. The largest concentration was at the Johnson Reservoir area where seven were seen on December 29, 1946 and 10 on April 15, 1947. Miller (1934:160) found them to be common at Cedar Breaks between June 28 and July 1, 1931 and noted that the species ranged up to timber line. For Bryce Canyon

it is listed as a common permanent resident at all elevations and at Cedar Breaks as a common summer resident, possibly a permanent resident. Miller (*loc. cit.*) also records the species at the Escalante Mountains, July 2-4, 1931.

*Dryocopus pileatus picinus* (Bangs)  
Pileated Woodpecker

One was seen in the yellow pine forest near Wildcat Ranger Station on the Aquarius Plateau by Bushman and Lee on August 16, 1952 and another there by Lee about ten days later, this time in aspens. It is probably permanently resident and seemingly rare.

*Asyndemus lewis* Gray  
Lewis' Woodpecker

Hidden Lake, November 28, 1937. One specimen.

Greenhalgh observed the species at Kanab on May 5-6, 1931 and May 19 and September 17, 1935. We saw one in cottonwoods two miles south of Kanab on May 20, 1947. Miller (1934:160) found it on June 28, 1931 in open yellow pine timber, 7500 feet on the east side of the Parowan Mountains. According to Presnall (1934) one was seen on the rim of Bryce Canyon on September 10, 1934. The species is probably transient.

*Sphyrapicus varius nuchalis* Baird  
Yellow-bellied Sapsucker

Hidden Lake, November 28, 1937; Duck Creek, July 27, 1935, June 22 and 24, 1947; Posy Lake, June 9 and August 12, 1952; Deer Lake, June 13, 1952; Kings Pasture, August 20-21, 1953. Total specimens, 12.

Another location where it was seen was Strawberry Creek, June 22, 1947. The species occurred in yellow pine and the spruce-aspen forest, but particularly in the aspens. At Bryce Canyon it is a common permanent resident along and below the canyon rim, occurring in the oaks and other deciduous trees where it nests in June and July.

*Sphyrapicus thyroideus nataliae* (Malherbe)  
Williamson's Sapsucker

Duck Creek, August 1, 1935, June 22-23, 1947; Navajo Lake, July 2, 1953; 20 mi. W. Escalante, 9000 ft., September 21, 1935; Posy Lake, August 12, 1952 and June 14, 1953; 7 mi. S.E. Grover, 8500 ft., May 20, 1956. Total specimens, 12.

This summer resident occurred in yellow pine and the spruce-fir forest but principally in aspens. At Navajo Lake two nests were located in aspens on July 2, 1953. The trees measured about 12 inches in diameter. The holes were about 8 feet above the ground, one facing east, the other west. Young could be heard calling from within. At Bryce Canyon this species of sapsucker is a fairly common summer resident in the conifers below the rim but is uncommon on the rim. Beck observed this sapsucker at Table Cliff Plateau on June 11-13, 1936 in an aspen grove and found a nest in an aspen trunk. Miller (1934:161) noted the species in the mixed spruce-fir forest on Escalante Mountain.

*Dendrocopos villosus leucothorectis* Oberholser  
Hairy Woodpecker

Duck Creek, July 28, 1935; Cave Lakes Canyon, May 12-13, 1946 and May 18, 1947; Tinny Canyon, December 30, 1946; Johnson, December 29, 1946; 20 mi. W. Escalante, September 21, 1935; Beef Meadows, August 13-15, 1952; Spectacle Lake, October 26, 1952; Posy Lake, June 14, 1953; Aquarius Ranger Station, August 26, 1953; confluence Calf Cr. and Escalante R., May 7, 1954. Total specimens, 17.

The hairy woodpecker is a summer resident of the coniferous forested areas but drops down altitudinally into the lower areas in winter. In addition to the specimen taken at Duck Creek in July, Greenhalgh saw the species there on June 20, 1935 and we saw it at Strawberry Creek on June 22, 1947, at Swain's Creek on June 24, 1947 and at Navajo Lake on July 2, 1953. Miller (1934:161) noted it at Cedar Breaks between June 28 and July 1, 1931. Greenhalgh found it nesting in 1931 in the piñon-juniper forest in Tinny Canyon. We saw one at nearby Cave Lakes Canyon

on May 18, 1947. Thus in summer it occurs from the pygmy forest upwards through the yellow pine belt to the spruce-fir forest.

As to winter records in addition to the December Johnson specimen which was taken in an apple orchard, we saw one in the pygmy forest at Red Canyon on December 27, 1946 and Greenhalgh saw it in the hills near Kanab five times from March 2 to April 28 in 1931 and 1935. Evidence of early downward migration is seen in two records for the vicinity of Kanab on August 12 and 24, 1931. In contrast, they were seen at Spectacle Lake as late as October 26. At both Bryce Canyon and Cedar Breaks this is a common permanent resident. Grater (1943:76) found two individuals at Cedar Breaks on January 17, 1942. They occurred together and were located in a dense forested growth in an area well protected from the strong winds. The hairy woodpecker was fairly common during May 7-9, 1954 in the streamside vegetation of the Escalante River gorge near Calf Creek. Miller (1934:161) noted the species on Escalante Mountain July 2-4, 1931.

*Dendrocopos pubescens leucurus* (Hartlaub)

Downy Woodpecker

Navajo Lake, July 29, 1935; Duck Creek, June 23, 1947. Total specimens, 2.

Both specimens were taken in aspens. Long (1937:41) saw this woodpecker several times in cottonwood trees in Swamp Canyon, 7300 feet, Bryce Canyon National Park in the autumn of 1935 and a male and female were collected on October 8. He states that the species is not common over most of southern Utah. He found it ranging from 3900 to 7500 feet elevation. It ranges much higher, however, as indicated by the Navajo Lake specimen taken at 10,000 feet. Grater (1947:41) considers it an uncommon permanent resident at Bryce Canyon and a rare winter visitant, possibly a permanent resident, at Cedar Breaks since all records for these areas are thus far in January. Earlier he reported (Grater, 1943:76) seeing four at Cedar Breaks on January 17, 1942. They all occurred in a protected grove of alpine fir. The downy woodpecker also shows altitudinal migration for Greenhalgh saw it 7 times at Kanab from February 22 to April 28, 1931. A single specimen in the collection at Brigham Young University was taken in a dead spruce at Cyclone Lake on July 1, 1938.

*Picoides tridactylus dorsalis* Baird

Northern Three-toed Woodpecker

Navajo Lake, July 29, 1935; Duck Creek, August 1, 1935 and June 24, 1947; Beef Meadows, August 13, 1952. Total specimens, 6.

Grater (1947:89) lists this as rare to uncommon at Cedar Breaks. Miller (1934:161) found this species to be at least as common as the White-breasted Woodpecker in the spruces at Cedar Breaks and Escalante Mountain on June 28-July 1, 1931. He took a female on June 28. We found the species rare and wary. Our specimens were taken in either pure stands of spruces or a spruce-aspen association. It has a status of uncommon permanent resident.

Family Tyrannidae: Tyrant Flycatchers

*Tyrannus tyrannus* (Linnaeus)

Eastern Kingbird

Three mi. S. Kanab, June 18, 1947. Total specimens, 2.

These were taken near the Lower Reservoir and seemingly represented a breeding pair. The male had testes measuring 6 x 15 mm. and the female had a 15 mm. ovum. Thus this kingbird is an uncommon summer resident. Woodbury, *et al.* (1949:20) stated that they had no records from extreme southern Utah beyond Wayne and Millard counties.

*Tyrannus verticalis* Say

Western Kingbird

Two-three mi. S. Kanab, May 22 and June 18, 1947; Boulder, June 11, 1953; 2 mi. S. Escalante, May 9, 1954. Total specimens, 4.

This summer resident is much commoner than the preceding species. Greenhalgh observed it regularly at Kanab from April through August in 1931 and 1935.



We saw it on nearly all our trips to the fields and lanes south of Kanab in the spring and summer. We saw it at Boulder where it occupied deciduous streamside growth along the creek. The Escalante specimen taken May 9, 1954 was probably a migrant for in addition to small gonad size it frequented sage and rabbit brush rather than nearby cottonwoods.

*Tyrannus vociferans vociferans* Swainson  
Cassin's Kingbird

Ten mi. S. Escalante, May 9, 1937. One specimen.

According to Greenhalgh this species also occurs in the Kanab area and he has one specific record for May 3, 1935 based upon a bird that someone shot but which was not saved. Numerous records are cited by Woodbury and Russell (1945:70-71) for the Navajo country including one specimen from the Kaiparowits Plateau, taken at 7000 feet in chaparral on August 13, 1937. Presnall (1934) reports one at Bryce Canyon on June 15, 1934 where it is a rare summer visitant. At Boulder we observed one near the marsh on June 11, 1953 and the same day saw one in the streamside growth along Boulder Creek. The one specimen was taken in scattered junipers.

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

Cave Lakes Canyon, May 14-19, 1946, May 19-23, 1947; 10 mi. S. Escalante, May 9, 1937; confluence Calf Cr. and Escalante R., June 14, 1953 and May 7, 1954; Fruita, June 25, 1956. Total specimens, 11.

Early observations for Kanab were on May 18, 1931 and June 1, 1935. In this area the species was common in the piñon-juniper forest although one was taken from willows bordering a marsh near the pygmy forest. They are common summer residents. In the Aquarius area it was found in river bottoms frequenting cottonwoods, sage and rabbit brush.

*Sayornis nigricans semiatra* (Vigors)  
Black Phoebe

In their check-list, Woodbury, Cottam and Sugden (1949:20) state that the species is a sparse resident of the low valleys of the Virgin River drainage in Washington County and of the Kanab region in Kane County. The basis for including Kanab in the range rests on observations by Nelson and Birdseye who saw a few along Kanab Creek and borders of irrigated fields near Kanab on August 31, September 3 and 18-22, 1909 (Woodbury *et al.* MS). Greenhalgh states that he too observed the species in Kanab both in 1931 and 1935 but we found no record of the exact dates.

*Sayornis saya saya* (Bonaparte)  
Say's Phoebe

Three mi. SW. Kanab, May 20, 1947; Cave Lakes Canyon, May 12, 1946 and May 19, 21, 1947; Duck Creek, June 24, 1947; Escalante, September 20, 1935; confluence of Calf Cr., and Escalante R., May 7, 1954; 6 mi. S. Grover, June 17, 1956. Total specimens, 9.

The Say's Phoebe is primarily an inhabitant of low vegetation areas or broken country where brush is interspersed with ledges and scattered trees. It was common along Kanab Creek south of town where Greenhalgh saw it repeatedly in 1931 and 1935 from March through mid-August. We observed it there on all our visits. It was common too at Cave Lakes Canyon. At Bryce Canyon it is considered to be a common summer resident below 8500 feet and nests in June. The species was common south of Escalante in scattered sparse junipers on May 8, 1954. It was also found along the Escalante gorge.

*Empidonax traillii extimus* Phillips  
Traill's Flycatcher

Three mi. S. Kanab, May 22, 1947. One specimen.

Of the four examples taken of this species, only this one represents the southern race *extimus*, the range of which presumably includes the Kanab area. This was

taken in a patch of willows in a field but there was no evidence of its being a breeding bird. Dense willow thickets which constitute the habitat of the species are scarce in the area so the species is correspondingly rare.

*Empidonax traillii adastus* Oberholser  
Traill's Flycatcher

Two-three mi. S. Kanab, May 22 and June 18, 1947. Total specimens, 3. These were evidently migrants.

*Empidonax hammondii* (Xantus)  
Hammond's Flycatcher

Cave Lakes Canyon, May 15, 1946 and May 23, 1947. Total specimens, 2. The specimens were taken in a Gambel oak and an apple tree and represent transients. The species doubtless breeds in the dense coniferous forest of the adjacent high plateaus.

*Empidonax oberholseri* Phillips  
Dusky Flycatcher

Cave Lakes Canyon, May 14, 1946 and May 18-23, 1947; Duck Creek, July 28, 1935; Jacobs Reservoir, June 12, 1952; 8 mi. N. Boulder, June 9, 1953. Total specimens, 8.

The specimens from Cave Lakes Canyon were taken in box elders and in the pygmy forest where they were probably migrants. An additional record of a migrant along Kanab Creek, presumably this species, was on May 1, 1946. The examples from Duck Creek and the Aquarius Plateau were in the aspen-spruce forest which represents the breeding habitat of these summer residents. They were fairly common.

*Empidonax wrightii* Baird  
Gray Flycatcher

Cave Lakes Canyon, May 14-16, 1946; May 18-23, 1947; Tinny Canyon, May 21, 1947. Total specimens, 20.

The species was abundant as a summer resident in the pygmy forest.

*Empidonax difficilis* Baird  
Western Flycatcher

Greenhalgh recorded this at Kanab on May 13, 1931. It was a migrant there but probably is an uncommon summer resident at higher elevations. Miller (1934:161) reported this species in the Escalante Mountains on July 2-4, 1931.

*Contopus sordidulus veliei* Coues  
Western Wood Pewee

Cave Lakes Canyon, May 12-18, 1946 and May 19-22, 1947; Duck Creek, July 26, 1935 and June 23, 1947; Posy Lake, June 9-10, 1952; Boulder, July 5, 1952; Fremont R., 2 mi. SE. Bicknell, May 18, 1956; Fremont R., ½ mi. W. Fruita, June 25, 1956; Spring Canyon, 3 mi. NE. Fruita, June 26, 1956. Total specimens, 17. Greenhalgh saw the species repeatedly at Kanab from May through August in 1931 and 1935 and states that they nested in cottonwoods along the highway south of town. We found them to be abundant there in May, 1946 and 1947. We also observed pewees at Tinny Canyon, May 21, 1947 and Cave Lakes Canyon on June 19, 1947, at both of which places they frequented broad-leaved deciduous trees like cottonwoods and box elders. At Swain's Creek they were in yellow pine on June 24, 1947. At Strawberry Creek on June 22, 1947, at Duck Creek on June 20, 1947 and Navajo Lake on July 2, 1953 they frequented the spruce-aspen forest.

This species is a common summer resident at Bryce Canyon throughout the park. At Cedar Breaks it is an uncommon summer visitant in the forests back of the rim. Perhaps they are less numerous at higher elevations for Miller (1934:161) found them scarce at Cedar Breaks between June 28 and July 1, 1931. In the Aquarius Plateau area they were very common at Posy Lake, June 8-10, 1952; and many were seen at Deer Lake on June 12, 1952. They were seen in the streamside

deciduous thickets at Boulder and 5 miles north on July 5, 1952 and again on June 9-10, 1953. Thus the species is a widespread and common summer resident of the region ranging from Kanab up to the tops of the high plateaus.

*Nuttallornis borealis* (Swainson)  
Olive-sided Flycatcher

Duck Creek, August 1, 1935 and June 22, 1947; 2 mi. E. Jacobs Reservoir, June 11, 1952. Total specimens, 4.

We also observed this flycatcher at Strawberry Creek on June 22, and 25, 1947. Its habitat is the spruce-fir forest where all specimens were taken. The species was uncommon in our experience. At Bryce Canyon it is reported to be a fairly common summer resident in the forests along the rim toward Rainbow Point and at Cedar Breaks it is said to be a rare summer visitant in the forests near the rim. Miller (1934:161) saw a single individual at Cedar Breaks on June 30, 1931.

*Pyrocephalus rubinus flammeus* van Rossem  
Vermilion Flycatcher

Two mi. S. Kanab, June 18, 1947.

The specimen obtained was one of a pair in an apple orchard. Its testes measured 4 x 7 mm. The female was seen at the same location the following day and was presumably nesting. The species is rare in the region. The only other records for Kanab are on May 10 and 11, 1931 and April 25, 1935. Woodbury (1939:159) cites Greenhalgh's 1935 record and comments that the area where it was seen on Kanab Creek, 4750 feet, is definitely nearer the Upper than the Lower Sonoran Zone and the occurrence of the species there presumably represents an overflow from the Lower Sonoran Zone because of proximity to a suitable habitat. Its status is sparse summer resident.

Family Alaudidae: Larks  
*Eremophila alpestris leucolaema* Coues  
Horned Lark

Six mi. N. Widtsoe, June 8, 1952; Jacobs Valley, June 10, 1952; Jacobs Reservoir, June 11-12, 1952; Davis Flats, June 11, 1952; Roundy Springs, June 12, 1952; Spectacle Lake, August 11, 1952; Beef Meadows, August 14-15, 1952; Big Lake, October 26, 1952; June 14, 1953; 9 mi. SE. Bicknell, February 22, 1953; 10 mi. S. Escalante, May 8, 1954; Bicknell, May 18, 1956. Total specimens, 45.

Breeding specimens from the high meadows of the Aquarius Plateau region seem clearly referable to *leucolaema* but a lowland specimen from 10 miles south of Escalante taken on May 8 inclines slightly toward *occidentalis* and thus indicates the beginning of the area of intergradation referred to previously by Behle (1948a:77). Two specimens from the Wasatch Plateau to the north taken by Miller (1934:162) are badly worn so that little can be told of their coloration. They were referred to the race *utahensis* earlier by Behle (1941:241). On the basis of these Aquarius Plateau specimens it now appears that this was erroneous and that the race *leucolaema* extends south in these high mountain meadows and represents a different population than that in the desert lowlands of western Utah.

*Eremophila alpestris occidentalis* (McCall)  
Horned Lark

One mi. S. Kanab, December 25, 1946; 3 mi. S. Kanab, May 20, 22, 1947; Arizona Strip, 6 mi. S. Pipe Springs, 4500 feet, Coconino County, Arizona, March 4, 1946; 6 mi. S. Johnson, November 27, 1937. Total specimens, 14. Greenhalgh recorded horned larks regularly from January 21 through April 20, 1935 at Kanab. We found them more common in the Arizona strip than around Kanab. On March 4, 1946 they occurred in flocks of 50 to 100 individuals in bare, overgrazed areas. A flock of about 25 was seen in the fields 3 miles south of Kanab from December 23 to 28, 1946. A flock of about 50 was observed at Johnson on December 29, 1946. The species breeds early, for specimens taken in late February had enlarged gonads and a female taken May 20 had a brood patch. They also flock early for 15 flew over the Lower

Reservoir on June 18, 1947. Hence they are common permanent residents in the lowlands. At Bryce Canyon horned larks are common winter visitants in the open flats near the checking station and back of the canyon rim. At Cedar Breaks they are uncommon winter visitants.

The breeding population from the Kanab area is closest to *occidentalis* but atypical as noted by Behle (1948a:72). The winter birds are best referred here too although some incline toward *leucolaema*.

*Eremophila alpestris utahensis* (Behle)  
Horned Lark

Big Lake, October 26, 1952. One specimen. An adult male of this race was taken along the shore of Big Lake on October 26, 1952. Three horned larks were taken at the time, the other two being typical *leucolaema*. The race *utahensis* occurs as a breeding bird in the eastern portion of the Great Basin. This is a fall migrant or wanderer.

Family Hirundinidae: Swallows  
*Tachycineta thalassina lepida* Mearns  
Violet-green Swallow

Kanab Cr., 1-2 mi. S. Kanab, May 12, 1946 and June 18, 1947; Cave Lakes Canyon, May 15-17, 1946 and May 21, 1947; Duck Creek, June 21, 1947; nr. Mammoth Cave on Mammoth Creek, August 1, 1935; Wildcat R. Sta., August 16, 1952; 3 mi. N. Boulder, June 13, 1953; confluence of Calf Cr., and Escalante R., May 7, 1954; Fremont R., 2 mi. SE. Bicknell, May 18, 1956. Total specimens, 17.

This swallow is a cosmopolitan summer resident ranging from the Kanab lowlands to above 10,000 feet. Greenhalgh observed it regularly along Kanab Creek from April 13 through August 24, 1931 and 1935. We found it abundant on all our visits there as well as at the Lower Reservoir in spring and summer of 1946-47. In Cave Lakes Canyon in May of 1946 and again in 1947 a colony seemed to be nesting along with white-throated swifts in holes in a vertical sandstone cliff. We did not see the swallows carry nesting material but they continuously flew out on sorties over a nearby wet meadow and then returned to enter the holes as though feeding young. The swallows foraged at lower levels than the swifts. The swallows were still actively foraging and entering the holes on June 18, 1947.

The species was common at Strawberry Creek on June 22 flying over an open flat. At Duck Creek individuals foraged over the lake, stream and meadow area. At Cedar Breaks they were active in the air at the edge of the amphitheatre on June 25, 1947. At Bryce the species is a common summer resident, especially at Sunset Point where it nests in the broken walls below the point. At Cedar Breaks it is reported to be a common early summer resident around the canyon rim. It nests in June and leaves the region by late August. The species was common along the Escalante River, over the pond in Boulder and along Boulder Creek in early June. Here also they occurred with swifts. They were seen at Posy Lake and nearly all mountain meadows and water courses in the Aquarius Plateau region.

*Iridoprocne bicolor* (Vieillot)  
Tree Swallow

Posy Lake, June 9, 1952; 8 mi. N. Boulder, June 9, 1953; Fremont R., 2 mi. SE. Bicknell, May 18, 1956. Total specimens, 6.

As compared to the previous species the tree swallow was an uncommon summer resident and its breeding habitat was restricted to the conifer-aspen forest of higher elevations. It was also observed at Strawberry Creek, June 22, 1947, at Duck Creek, July 1, 1953, and at Deer Lake, June 13, 1953. An early record of a transient in the lowlands is for Kanab, April 24, 1931.

*Riparia riparia riparia* (Linnaeus)  
Bank Swallow

This summer resident was observed regularly from April 20 through June 25 in 1931 and 1935. We found it occasionally along Kanab Creek and at the Lower

Reservoir in the spring of 1946 and 1947. It was also observed at Three Lakes on April 14, 1947. Woodbury (MS) gives an observation by Clarence Cottam on August 14, 1936 at the Bicknell Bottoms. Its status is a fairly common summer resident.

*Stelgidopteryx ruficollis serripennis* (Audubon)

Rough-winged Swallow

Kanab Cr., 1 mi. S. Kanab, May 12, 1946; 1 mi. N. Boulder, June 13, 1953; Fremont R., 2 mi. SE. Bicknell, May 18, 1956. Total specimens, 6.

Greenhalgh's early observations are distributed from May 12 to August 12, 1931 and 1935 for Kanab. We observed the species at the Lower Reservoir and along Kanab Creek on May 18-20, 1946 and June 18, 1947. At Boulder this swallow was seen flying over the swamp and pond. It is a common summer resident of the lower valleys.

*Hirundo rustica erythrogaster* Boddaert

Barn Swallow

Lower Reservoir, May 18, 1946. One specimen.

Observations of the Barn Swallow were made along Kanab Creek south of town on May 3, 1935, May 1, 1946 and May 20, 1947. The species was not common. According to Grater (1947:89) the species has been seen at Cedar Breaks. It is a summer resident of the region.

*Petrochelidon pyrrhonota pyrrhonota* (Vieillot)

Cliff Swallow

Kanab Cr., 1 mi. S. Kanab, May 12, 1946 and May 20, 1947; Kanab Canyon, 2 mi. NW. Kanab, May 17-18, 1946; Boulder, July 5, 1952; confluence Calf Cr. and Escalante R., June 14, 1953; Fremont R., 2 mi. SE. Bicknell, May 18 and June 24-27, 1956. Total specimens, 30.

This species, another summer resident, was observed regularly in 1931 and 1935 in the Kanab area from May 9 to August 24. We found them to be numerous along Kanab Creek in the spring of 1946 and 1947 and they were nesting on vertical sandstone cliffs in Kanab Canyon, 2 miles northwest of town on May 17, 1946. A few nests were observed at Three Lakes on June 19, 1947. The species has been seen at both Bryce Canyon and Cedar Breaks but is evidently rare in these places. A small nesting colony was found on a sandstone cliff alongside Calf Creek near its confluence with the Escalante River on June 14, 1953.

As to the systematic relationships of these swallows, Behle (1948:73) referred them to the race *albifrons*, now designated as *P. p. pyrrhonota*. They represent a variable lot. In size they stand closest to the eastern race. Six males had an average wing measurement of 108.4 (111.2-104.2) mm. and tail 48.1 (53.8-46.7). Eight females measured for the wing 107.8 (113.5-105.2) and tail 48.7 (53.3-46.2) mm. Some have deeper, paler foreheads as in the Great Basin and Oregon population *hypopolia*, but others are narrow and buffy. In the breast character they are mostly like *hypopolia* being more grayish and less ochraceous, but two are like *pyrrhonota*. Thus it would appear that although closest to *pyrrhonota* en masse they are nevertheless intergradational with *hypopolia*.

Family Corvidae: Jays, Magpies, and Crows

*Perisoreus canadensis capitalis* Ridgway

Gray Jay

Long Valley, 10,000 ft., nr. S. border Cedar Breaks National Monument, June 25, 1947; Jacobs Reservoir and 1½ mi. E., June 11-12, 1952; Beef Meadows, August 13-14, 1952; Spectacle Lake, October 25, 1952. Total specimens, 9.

At Bryce Canyon a few have been seen on the rim in late September and October (Presnall, 1934), apparently as altitudinal migrants. Grater (1947:89) considered this species rare to uncommon at Cedar Breaks. Miller (1934:162) twice encountered this jay at Cedar Breaks between June 28 and July 1, 1931 where they were in the larger spruce thickets. On June 29 the male of a pair of adults was collected and the 2 mm. testes length indicated that the bird was long past breeding.

However, no juvenile or immature birds accompanied the adults. The specimens we took on June 25 were in process of molting. On the Aquarius Plateau in early June these jays were wandering about in small family groups consisting of the two adult birds and 3 or 4 dark-appearing juveniles. On October 25, 1952 they were still present at Spectacle Lake, showing no altitudinal migration. Twomey (1942:417-418) noted an altitudinal descent to the yellow pine during the winter. We failed to see the species in yellow pine on February 22-23, 1953. The species is a permanent resident.

*Cyanocitta stelleri macrolopha* Baird  
Steller's Jay

Tinny Canyon, September 22, 1946; Swain's Creek, June 24, 1947; nr. Duck Creek, August 2, 1935; Navajo Lake, July 29, 1935 and July 2, 1953; Dry Cr., nr. Cedar Mt., August 2, 1935; S. border Cedar Breaks, June 25, 1947; Boulder Mt., August 7, 1951; Posy Lake, June 9, 1952; Beef Meadows, August 14, 1952; 5 mi. N. Boulder, June 8-12, 1953; Kings Pasture, August 25, 1953. Total specimens, 30.

In addition to the above localities the Steller jay was observed at Strawberry Canyon on June 22, 1947. We found them during the breeding season in the yellow pine-oak belt and in the spruce-fir forest at higher elevations. Grater (1947:49) states that the species is a common permanent resident throughout Bryce Canyon National Park and is a common summer resident at Cedar Breaks, becoming very numerous during the late summer. This suggests an upward altitudinal movement at the close of the breeding season. Miller (1934:162) did not find them at Cedar Breaks at the time of his visit from June 28 to July 1, 1931, but he did see them in the oak belt on the east side of the Parowan Mountains on June 28. We took juveniles at Swain's Creek on June 24 and also at Navajo Lake on July 29 and near Duck Creek August 2. Adults were in molt at these times. Following the immediate post-breeding season movement to higher altitudes, Steller jays evidently move down to lower elevations for they were seen in the piñon-juniper forest in Kanab Canyon 3 miles northwest of Kanab on September 21 and 23, 1946, and at Tinny Canyon on September 22. At the latter locality they were in an oak-juniper situation. They were associating with scrub jays here on December 30, 1946 but were less numerous than the scrub jays. On the Aquarius Plateau we found them common in early June at the lower limits of the yellow pine belt as well as in the piñon-juniper forest. In August they also occurred in the spruce belt on top the plateau. Miller (*loc. cit.*) found this jay fairly common in the Escalante Mountains on July 2-4, 1931, where he found a juvenile hidden in a spruce clump adjoining a grove of yellow pines. Several jays were seen in yellow pines on February 22, 1953 when there was snow on the ground.

*Aphelocoma coerulescens nevadae* Pitelka  
Scrub Jay

Johnson Canyon, December 29, 1946; Tinny Canyon, September 22 and December 30, 1946; Three Lakes, November 28, 1937 and May 14, 1946; Cave Lakes Canyon, March 5, 1946, May 12-16, 1946, May 18-23, 1947; 3-5 mi. N. Boulder, July 4, 1952 and June 12-13, 1953; confluence of Calf Cr., and Escalante R., May 7, 1954. Total specimens, 24.

Scrub Jays were observed in the vicinity of Kanab by Greenhalgh on April 13 and 21, 1931 and May 25, 1935. Our later observations were made at Cave Lakes Canyon, March 3-6, 1946 and May 17-18, 1947; Kanab Canyon, 5 miles north of Kanab, May 17 and September 21-23, 1946; Red Canyon, Cottonwood Canyon and Three Lakes all on December 27, 1946, and Tinny Canyon, May 21, 1947. Miller (1934:162) saw this jay in the piñons along the road between Zion Canyon and Mount Carmel, Kane County, on June 28, 1931. At Bryce Canyon it is a common summer resident in the lower portions of the park. Long (1937:42) observed the species several times in Swamp Canyon, Bryce Canyon National Park, in the fall of 1935 and took a female on October 8. He stated that the species is common in the oak belt throughout the region. We found it as often in the pygmy forest as in the oaks and occasionally in willows. Four nestlings were found in a nest in oaks at Cave Lakes Canyon on May 19, 1947. They were common throughout the piñon-

junipers north of Boulder during June and July and were also seen in scrub oaks and streamside thickets. They were seen in small numbers along the Escalante River gorge May 7, 1954 in cottonwoods. They were uncommon in the piñon-juniper of the Carcass Creek area on February 22, 1953. This jay is permanently resident in the region.

As indicated by Behle (1948:74) and Pitelka (1951:293, 402) the scrub jays from the Kanab area are intermediate between the races *nevadae* and *woodhouseii*, but closest to *nevadae*.

*Pica pica hudsonia* (Sabine)  
Black-billed Magpie

The magpie was not found in any of our field work around Kanab. Apparently it does not occur south of the divide between the Sevier and Virgin river drainages. Our only record for the region is for one seen at Hatch, Garfield County, September 15, 1935. It is permanently resident where found and occupies thick brush or trees of valleys, streamsidcs, benchlands, foothills or lower mountain slopes.

*Corvus corax sinatus* Wagler  
Common Raven

Lower Reservoir, May 22, 1947. One specimen.

The raven is a fairly common permanent resident in the region. Greenhalgh observed it regularly from February 21 through July 24 in 1931 and 1935. Several were seen in the fields south of Kanab on each of our visits in May and June, 1946 and 1947 and it was also common over the desert flats 5 miles east of Kanab and at Johnson on April 15, 1947. One flew over our camp at Cave Lakes Canyon, May 12, 1946. We saw several ravens in the fields south of Kanab on December 23, 24 and 28, 1946, two at Cottonwood Canyon, December 27 and one at Tinny Canyon, December 30. At Bryce the raven is a fairly common permanent resident. They were common in the lowlands of Escalante Valley, several being seen 10 miles south of Escalante on May 8, 1954. The species is often associated with cliffs or ledges where nesting sites are located.

*Corvus brachyrhynchos hesperis* Ridgway  
Common Crow

We did not encounter this bird in any of our trips but Greenhalgh has an early sight record for April 13, 1935 at Kanab. Its status is uncertain. It may be accidental in the region. Heber Hall reports crows being seen occasionally at Salt Gulch, 8 miles west of Boulder.

*Gymnorhinus cyanocephalus* Wied  
Piñon Jay

Between Navajo Wells and Kaibab Plateau, 5000 ft., Kane County, November 28, 1937; 1 mi. S. Kanab, September 16, 1946; 8 mi. S. Escalante, September 19, 1935; Grover, February 21, 1953. Total specimens, 9.

This resident of the region which occurs in the pygmy forest, was observed by Greenhalgh nine times from February 7 through August 24, 1931 and 1935. A few were seen by us at Cave Lakes Canyon, May 21, 1947 and several along Kanab Creek, one mile south of town on December 23-24, 1946. At Bryce Canyon it is a fairly common permanent resident in the lower reaches of the park. In the Aquarius Plateau area this jay was abundant in large flocks of as many as 200 individuals in the pygmy conifers at Grover, Torrey and Teasdale on February 21, 1953.

*Nucifraga columbiana* (Wilson)  
Clark's Nutcracker

Dry Valley, nr. Duck Cr., August 2, 1935; Cedar Breaks, August 3, 1935; 20 mi. N. Escalante, September 16-21, 1935; Posy Lake, June 10, 1952; Aquarius R. Sta., August 26, 1953; 2 mi. E. Bicknell, June 23, 1956. Total specimens, 10.

Although primarily residents of the mountainous areas occasionally nutcrackers drop down to the lowlands. Greenhalgh recorded the species at Kanab once on

September 17, 1935. Miller (1934:162) found a few nutcrackers, presumably a family group, at Cedar Breaks on June 30, 1931. He considered them to be scarce. We found this to be the case there also, as compared with their frequency in the mountains elsewhere in Utah. Indeed, in addition to the single specimen taken, we only saw two nutcrackers at Navajo Lake on July 2, 1953. However it is regarded as a common permanent resident at Cedar Breaks National Monument by Park Service observers. Grater (1943:76) found it throughout the forested areas there on January 17, 1942. At Bryce Canyon the Clark Nutcracker is reported to be a fairly common permanent resident although seldom getting into the lower portions of the park. Miller (*loc. cit.*) found the species to be common in the Escalante Mountains on July 2-4, 1931 in mixed stands of pine and spruce. We found them at Posy Lake June 8-10, 1952 and at Cyclone Lake on June 9. They were particularly abundant at Spectacle Lake August 7-11 and October 25-26, 1952 where they were observed searching for insects under the bark of dead Englemann spruces. We saw them also at Beef Meadows on August 13-14, 1952. Nutcrackers were common in yellow pine about 5 miles north of Boulder on June 12, 1953 and a family group was seen in a stand of junipers. This may represent a case of downward, post-breeding altitudinal migration. One other sight record was at 5 miles west of Escalante on July 9, 1954.

Family Paridae: Titmice, Verdins, and Bushtits

*Parus atricapillus nevadensis* (Linsdale)

Black-capped Chickadee

Navajo Lake, July 20, 1935. One specimen.

At Bryce Canyon there is a record of one being seen October 24, 1936 below Youimpa Point, 8000 feet. The Navajo Lake specimen may have been a wanderer after the breeding season to higher elevations, for the normal breeding habitat elsewhere in Utah seems to be at lower elevations either in the cottonwood association of the canyon bottoms or willow stands in the valleys. We did not find the species in the Kanab area so the specimen in question may have moved up from the western Great Basin as at Cedar City. This is further suggested by it being closest to the race *nevadensis*, yet is atypical showing some approach to *garrinus* (see Behle, 1951:78).

*Parus gambeli wasatchensis* Behle

Mountain Chickadee

Tinny Canyon, September 22 and December 30, 1946; Red Canyon, December 27, 1946; Duck Creek, July 27, 1935 and June 21-24, 1947; South Boundary Cedar Breaks National Monument, June 25, 1947; 1 mi. E. Jacobs Reservoir, June 10-11, 1952; Sand Cr., June 11, 1952; Deer Lake, June 13 and July 26, 1952; Boulder, July 5, 1952 and June 8-13, 1953; Beef Meadows, August 15, 1952; Spectacle Lake, October 26, 1952; Carcass Cr., February 21, 1953; 3 mi. N. Boulder, June 13, 1953; Pine Cr., August 25, 1953; Aquarius R. Sta., August 26-27, 1953; 2 mi. E. Bicknell, June 23, 1956. Total specimens, 57.

Miller (1934:163) found this species in small numbers in the conifer forest at Cedar Breaks, June 28 to July 1, 1931. We found this to be the case at our collecting station at the south boundary of the monument as well as at Duck Creek, and Strawberry Creek on June 22, 1947. The species shows altitudinal migration as indicated by the specimens collected at Tinny and Red canyons where they were fairly common in the pygmy forest. The September 23 date at Tinny Canyon indicates that some move down early in the fall. A few were seen in willows along Kanab Creek south of town on December 24, 1946. A pair was heard in Cave Lakes Canyon on March 3, 1946. Despite this altitudinal migration many remain in the mountains for Grater (1943:75) reported them numerous at Cedar Breaks on January 17, 1942. At Bryce Canyon and Cedar Breaks this chickadee is a common permanent resident. Miller (*loc. cit.*) also reported chickadees in small numbers on Escalante Mountain on July 2-4, 1931. We found them common June to August at all localities visited on the Aquarius Plateau. On October 25-27 at Spectacle Lake the species was found in mixed flocks with Montana juncos. They were more solitary at Carcass Creek on February 21, 1952 where they occurred in yellow pine.

The Mountain Chickadees of this area have been referred to the race *wasatchensis* by Behle (1950:274).



*Parus inornatus ridgwayi* Richmond  
Plain Titmouse

Red Canyon, December 27, 1946; Cave Lakes Canyon, May 23, 1947; Grover, February 21, 1953; 5 mi. N. Boulder, June 9-12, 1953; confluence Calf Cr. and Escalante R., May 7, 1954. Total specimens, 10.

This resident form is primarily a bird of the pygmy forest although we found stragglers in sagebrush, rabbit brush, and squawbush. Greenhalgh observed the species on May 16, 1931 and April 19, 1935 at Kanab. It was seen at Tinny Canyon September 21-23, 1946 and May 21, 1947, and at Cave Lakes Canyon, May 15 and 16, 1946. At Bryce Canyon this species is an uncommon summer resident in the lower portions of the park. A definite record for Bryce is at Boat Mountain in October, 1933. In the Aquarius Plateau region several were observed at Grover on February 21, 1953. They were also seen north of Boulder June 9-12, 1953 and along the Escalante River gorge on May 7, 1954.

*Psaltriparus minimus providentialis* Arvey  
Common Bush-tit

Tinny Canyon, December 30, 1946; Cave Lakes Canyon, May 18-23, 1947; 5 mi. N. Boulder, June 8-12, 1953. Total specimens, 13.

An early record for the outskirts of Kanab is April 13, 1935. We saw a flock of 12 at Red Canyon on December 12, 1946. At Bryce Canyon the bush-tit is considered to be an uncommon summer resident in the lower portions of the park. Long (1937: 42) observed a small flock of bush-tits in Campbell Canyon, 6000 feet. Bryce Canyon National Park on October 10, 1935 and stated that they were common all over southwestern Utah, occurring sparingly up to about 7000 feet. Adults and juveniles occurred in flocks on June 12, 1953. Long stated that their favorite habitat is the oak and cedar [-juniper] belts in the canyons and on the mountain sides. Most of our observations were made of the species in the piñon-juniper forest, but we also found them occasionally in the oaks and yellow pine. Behle (1948:75) has referred these bush-tits to the race *providentialis*.

Family Sittidae: Nuthatches  
*Sitta carolinensis nelsoni* Mearns  
White-breasted Nuthatch

Hidden Lake, November 28, 1937; Swain's Creek, June 26, 1947; Duck Cr., August 1, 1935 and June 22-24, 1947; Navajo Lake, July 29, 1935 and July 2, 1953; Bryce Canyon, July 23, 1950; Posy Lake, June 9, 1952; Spectacle Lake, August 8, 1952; Beef Meadows, August 14, 1952; Carcass Cr., February 21, 1953; 5 mi. N. Boulder, June 8, 1953; Aquarius R. Sta., August 26, 1953. Total specimens, 20.

The species was also seen during the breeding season at Strawberry Creek, June 22, 1947 and Duck Creek June 20, 1935. It occurred in yellow pine primarily, but occasionally in ecotone areas where white firs and blue spruces occurred. Two were seen in the pygmy forest at Red Canyon, December 27, 1946 and one in similar habitat at Tinny Canyon, December 30, 1946. Whether the species breeds in the juniper-piñon forest or whether these were altitudinal migrants was not determined. At Bryce Canyon this is a common permanent resident on the plateau but infrequent below the rim. It nests there in June. At Cedar Breaks it is said to be a common late summer visitant. Miller (1934:163) observed this nuthatch on July 2-4, 1931 in the more open timber on the south-facing slopes of the Escalante Mountains. We found it common in the lower yellow pine ecotonal areas mixed with oaks, squawbush and serviceberry while at the upper limits of the yellow pines the species occurred in areas of aspens, Douglas fir and blue spruce. Several were seen one mile north of Boulder on June 13, 1953 in the piñon-juniper habitat.

*Sitta canadensis* Linnaeus  
Red-breasted Nuthatch

Hidden Lake, November 28, 1937; Duck Cr., April 27, 1935; Navajo Lake, July 2, 1953; 20 mi. N. Escalante, September 16, 1935; Posy Lake, June 9, 1952; Deer Lake, June 9, 1953; Kings Pasture, August 21, 1953. Total specimens, 9.

Other observations were made at Strawberry Creek on June 22 and 25, 1947. Presnall (1937:45) describes an influx of the species into the Bryce Canyon region in September and October, 1935. On September 6, three were seen at Rainbow Point. This constituted the second record for the park. On September 9 they were common on the Sevier Plateau between 8000 and 10,000 feet, 20 miles north of Bryce. Maximum numbers were seen at Cedar Breaks between 10,000 and 10,700 feet, between September 30 and October 3. On the former date the spruce-fir forest was alive with them and at this time four were collected, all males. After this peak of concentration, there was a gradual diminution of numbers. A few were observed from October 10 to 12 and between October 19 and November 4 a further decrease was noted at Cedar Breaks. Miller (1934:163) observed two in the Escalante Mountains on July 2-4, 1931. On the Aquarius Plateau we saw the species in yellow pine, aspen and the spruce-fir forest.

*Sitta pygmaea melanotis* van Rossem  
Pigmy Nuthatch

Mammoth Cave, August 1, 1935; Bryce Canyon, July 23, 1950; 20 mi. N. Escalante, September 16, 1935; Aquarius R. Sta., August 26-27, 1953; Pine Cr. Reservoir, August 26, 1953. Total specimens, 11.

At Bryce Canyon this is a common permanent resident in the coniferous forest along the canyon rim, found especially in the yellow pines. At Cedar Breaks it is a common visitant during the late summer and early fall. They were not common on the Aquarius Plateau but when found they occurred in yellow pine. In late August they occurred in flocks with the mountain chickadee.

Family Certhiidae: Creepers  
*Certhia familiaris leucosticta* van Rossem  
Brown Creeper

Tinny Canyon, December 30, 1946; nr. South Boundary Cedar Breaks Nat. Mon., June 25, 1947; Swain's Creek, June 26, 1947; Navajo Lake, July 2, 1953; Spectacle Lake, August 10, 1952; Blind Lake, August 17, 1952; Aquarius R. Sta., August 26, 1953. Total specimens, 8.

During the breeding season we observed creepers in the spruce-fir forest and the yellow pine belt. Our winter record for Tinny Canyon was in the pygmy forest, suggesting an altitudinal migration for the species. At Bryce Canyon, this is an uncommon permanent resident in the forests on top of the plateau. Miller (1934:163) saw three individuals at Cedar Breaks June 28-July 1, 1931. Creepers were surprisingly scarce in our experience on the Aquarius Plateau considering the great abundance of seemingly suitable habitat. However, Miller (1934:163) found them abundant in the Escalante Mountains during July 2-4, 1931. Behle (1948:75) has previously referred some of these specimens to the race *leucosticta*.

Family Cinclidae: Dippers  
*Cinclus mexicanus unicolor* Bonaparte  
Dipper

Five mi. N. Boulder, June 12 and July 6, 1952, June 10, 1953; Kings Pasture, August 20, 1953. Total specimens, 4. An immature specimen taken July 6 indicates nesting probably in late May or early June.

Family Troglodytidae: Wrens  
*Troglodytes aedon parkmanii* Audubon  
House Wren

Cave Lakes Canyon, May 12-14, 1946; May 18, 1947; Duck Creek, June 22, 1947; Boulder, July 5, 1952; Deer Lake, June 13, 1952; Chokecherry Point, August 15, 1952; 5-8 mi. N. Boulder, June 8-9, 1953. Total specimens, 16.

The species was common in Cave Lakes Canyon in thickets around the ranch house and also at the canyon rim in the pygmy forest. At Duck Creek these wrens occurred in a spruce-aspen habitat. Other observations were at Strawberry Creek, June 22, 1947; Duck Creek, June 10 and 20, 1935 and June 23, 1947; and Kanab, April

1, 1931. At Bryce Canyon it is an uncommon summer resident that nests in June. In the Aquarius Plateau region we found them in the Escalante River gorge on May 7, 1954. Juveniles were found in deciduous tree growth along the creek bottom at Boulder on July 5, 1952. Adults were also common in willows along the creek north of Boulder in July. One specimen was taken among rocks in aspens at 11,000 feet.

*Troglodytes troglodytes* (Linnaeus)

Western Winter Wren

Woodbury, *et al.* (MS) list an observation along the Fremont River in Capitol Reef National Monument on November 5, 1941. The species is a rare winter visitant in Utah.

*Thryomanes bewickii eremophilus* Oberholser

Bewick's Wren

Cave Lakes Canyon, May 16, 1946 and May 18, 1947; Tinny Canyon, December 30, 1946. Total specimens, 6.

Habitats where this wren occurred were squawbush and the pygmy forest. Other localities where the species was found are: Kanab, March 28 and April 21, 1931, and April 1 and June 1, 1935; Kanab Canyon, just north of town, September 23, 1946; Upper Reservoir, April 15, 1947. This species is a permanent resident.

*Telmatodytes palustris aestuarinus* Swarth

Long-billed Marsh Wren

Cave Lakes Canyon, March 3, 1946; Kanab Creek, 1 mi. S. Kanab, December 28, 1946. Total specimens, 3.

The specimens were taken in cattails at small, isolated swamps. The species was also observed at Cave Lakes Canyon on May 19, 1947 and Three Lakes on December 27, 1946. The three specimens listed above have been referred to the race *aestuarinus* by Behle (1948:76). A single specimen from Kanab Creek is typical but two from Cave Lakes Canyon are intergradational toward *plesius*. These winter specimens suggest a sedentary population in the Kanab area.

*Telmatodytes palustris plesius* (Oberholser)

Long-billed Marsh Wren

Upper Reservoir, April 15, 1947. One specimen.

This occurred in rabbit brush adjacent to this reservoir at Kanab and presumably was a migrant, especially since it represents the more northern race as previously noted by Behle (1948:76).

*Catherpes mexicanus conspersus* Ridgway

Cañon Wren

Cave Lakes Canyon, March 3 and December 30, 1946; Three Lakes, December 27, 1946; Pine Cr., N. Escalante, September 18, 1935; confluence of Calf Cr. and Escalante R., May 7, 1954; 2 mi. E. Bicknell, May 19, 1956. Total specimens, 7.

Other observations were at Kanab on March 15, 28 and April 28, 1931 and April 10, 1935; in Kanab Canyon just north of town on September 23, 1946; at Johnson, December 29 and Tinny Canyon, December 30, 1946; and along Calf Creek, June 14, 1953. The species is a fairly common permanent resident on the steep sandstone cliffs and ledges of the region. It is said to nest in the Upper Sonoran Zone at Bryce Canyon in June.

*Salpinctes obsoletus obsoletus* (Say)

Rock Wren

Head of Sevier River, Kane County, 7200 feet, August 5, 1935; Cave Lakes Canyon, May 17, 1946; Kanab Creek, 1 mi. S. Kanab, May 12, 1946; 3 mi. SW. Kanab, May 22, 1947; Deer Lake, July 26, 1952; Aquarius R. Sta., August 26, 1953. Total specimens, 7.

Rock wrens were seen fifteen times in the Kanab area from March 7 to August 24, 1931 and 1935. They were also seen along Kanab Creek just south of town on May 20 and June 19, 1947. The species is a common summer resident ranging from

the lowlands as around Kanab into the high country. Rock Wrens usually occur around rocky areas but also were seen along the banks of Kanab Creek and even in the adjacent sagebrush. It is listed as a rare summer visitant at Bryce, one having been observed along the Navajo Trail on August 1, 1941. We found the species along the Escalante River on May 7 and 10 miles south of Escalante on May 8, 1954 in sandstone areas. At Spectacle Lake they were common at outcroppings of the volcanic lava cap on August 7-10, 1952.

Family Mimidae: Mockingbirds and Thrashers

*Mimus polyglottos leucopterus* (Vigors)

Mockingbird

Kanab Creek, 1 mi. S. Kanab, May 1 and 12, 1946; 10 mi. S. Escalante, May 8, 1954. Total specimens, 4.

This summer resident was seen sixteen times from April through August in 1931 and 1935. Additional observations in the fields south of Kanab were made on April 15, May 20 and June 18, 1947. We found them fairly common south of Escalante in May, 1954 where Tanner (1936:185) had previously recorded them in June, 1936. He reported several pairs in the valley and along the base of the Kaiparowits Plateau. The males that we took had enlarged testes indicating breeding. We found them chiefly in the juniper forests although occasionally in low brush.

*Dumetella carolinensis* (Linnaeus)

Catbird

Boulder, June 11, 1953. One specimen. The bird was taken in a dense willow thicket at the marsh. Its testes measured 10 mm. in length. It is probably a sparse summer resident.

*Toxostoma bendirei* (Coues)

Bendire's Thrasher

Five mi. S. Escalante, May 9, 1937. One specimen.

This has been reported by Woodbury (1939:159). It occurred in a juniper at the edge of a sagebrush flat in company with mockingbirds. We visited the same area on May 8, 1954 but did not observe the species.

*Oreoscoptes montanus* (Townsend)

Sage Thrasher

Kanab and 2 mi. S. Kanab, May 21, 22 and June 18, 1947; 2 mi. S. Escalante, May 9, 1954. Total specimens, 7.

We have five observations for Kanab for April, July and August, 1931 and 1935. Ten birds were observed in the fields one mile south of Kanab on April 15, 1947 indicating a flocking prior to the pair formation during the nesting season. The species was common in Escalante Valley in May, 1954. While primarily an inhabitant of sage and allied low desert scrub, we also found the species in cultivated fields. Its local status is a fairly common summer resident.

Family Turdidae: Thrushes, Solitaires and Bluebirds

*Turdus migratorius propinquus* Ridgway

Robin

Cave Lakes Canyon, May 12, 1946, May 22, 1947; Three Lakes, May 27, 1946; 5 mi. N. Boulder, June 9, 1953. Total specimens, 4.

Early records for 1931 and 1935 extending from February through September total 24. Robins occurred in the area in mid-winter also, for we saw a flock of 8 along Kanab Creek, one mile south of town on December 24, seven in Kanab December 28 and several at Johnson on December 29 all in 1946. The species was commonly seen in the Kanab and Cave Lakes canyon areas on all our spring and early summer trips in 1946 and 1947. Greenhalgh found robins nesting in Kanab on April 9, 1938 and we found a nest in Cave Lakes Canyon on May 14, 1946. The species was seen at Duck Creek on June 20, 1947 and July 1, 1953 and at Navajo Lake, July 2, 1953. At Bryce Canyon the robin is a common permanent resident although less

common during the winter months. It nests there in June. Grater (1947:59) considered it an uncommon late summer visitant at Cedar Breaks. However, Miller (1934:163) found robins fairly common there and noted a pair feeding young in a nest on June 30, 1931. They were common at all of our collecting stations in the Aquarius Plateau region. Nests containing 2 and 3 eggs were found in spruces at Posy Lake on June 10, 1952. Miller (*loc. cit.*) found robins at all elevations on the Escalante Mountains, July 2-4, 1931. This species is therefore a common and wide ranging permanent resident, seemingly nesting at progressively later times at higher zones. It frequented every vegetative type but was most common in ecotonal areas of yellow pine and deciduous trees and shrubs. It shows some altitudinal migration in fall and winter and is probably partly migratory.

*Hylocichla guttata polionota* Grinnell  
Hermit Thrush

Duck Creek, July 26-27, 1935 and June 22-25, 1947; nr. South Boundary Cedar Breaks Nat. Mon., June 25, 1947; Posy Lake, June 10, 1952; 1½ mi. E. Jacobs Reservoir, June 11, 1952; Deer Lake, June 9, 1953; Spectacle Lake, August 8, 1952; 3 mi. N. Wildcat R. Sta., August 30, 1953. Total specimens, 18.

Observations were made at Duck Creek on June 20, 1935, Strawberry Creek, June 22 and 25, 1947; and Cedar Breaks, June 21, 1947. At Bryce Canyon the species is a fairly common summer resident throughout the rim region, especially at the higher Rainbow Point area. The species nests at Bryce in June. At Cedar Breaks it is a fairly common summer resident. Miller (1934:163) saw many of these thrushes at Cedar Breaks in dense spruce thickets at the time of his visit from June 28 to July 1 and at Escalante Mountains, July 2-4, 1931. As to systematic status, Behle (1948:76) has referred them to the Great Basin race *polionota*.

*Hylocichla ustulata swainsoni* (Tschudi)  
Swainson's Thrush

Deer Lake, June 14, 1952. One specimen. It was taken in a dense fir thicket within 100 feet of the lake's edge.

*Sialia mexicana bairdi* Ridgway  
Western Bluebird

Cave Lakes Canyon, May 15-17 and December 30, 1946; Posy Lake, June 9, 1952; confluence of Calf Cr. and Escalante R., May 7, 1954. Total specimens, 10.

The species was observed regularly in the Kanab area from January through April in 1931 and 1935. Twomey (1944:89) in reporting a specimen of *S. m. occidentalis*, mentions that it was taken from a flock of seven *S. m. bairdi* at Kanab on October 21, 1937. Our sight records for the species in 1946 are several as follows: two at Cave Lakes Canyon and one at Three Lakes on March 6; one at Kanab, September 23; a flock of 15 at Red Canyon, December 27; one at Johnson, December 29; and 7 at Tinny Canyon, December 30. Several were seen at Hidden Lake, April 14, 1947. The following day many were observed on the desert flats five miles east of Kanab. Thus western bluebirds are common winter visitants in the Kanab area, representing both this and the next race. During the non-breeding season this kind of bluebird occurred in the piñon-juniper forest, apple orchards, on fence posts and bushes alongside roads. It is a common summer resident at Bryce from June to October and nests in June. Grater (1947:60) considers it a common summer resident at Cedar Breaks. There is no evidence to my knowledge of its breeding at such high elevations, however. As a breeding bird it is found primarily in the upper limits of the pygmy forest through the yellow pine belt. Here we found them on June 9, 1952 at Posy Lake. There are some indications that the species may breed at lower elevations for we found them at Calf Creek and the Escalante River gorge in cottonwoods in the canyon bottoms on May 7, 1954 and the specimens taken had enlarged gonads. Some observations on the advent of the nesting season are as follows: On March 6, 1946 at Cave Lakes Canyon, a pair was going through aerial courtship maneuvers. Of two specimens taken at the same locality May 15, 1946, the female had ovaries that were reduced in size, yet a brood patch seemed to be

developing. The accompanying male had an insect in its mouth as though carrying food to young. Greenhalgh has a May nesting record for this bluebird in the pygmy forest at Ed Little Canyon, near Kanab in 1935. At Strawberry Creek a pair likewise behaved as though they were nesting birds from June 22 through 25, 1947. They probably nest later at higher elevations.

*Sialia mexicana occidentalis* Townsend  
Western Bluebird

Ten mi. N. Kanab, 5500 ft., November 28, 1937; Cave Lakes Canyon, March 5, 1946. Total specimens, 4.

This subspecies is probably transient through the region and a winter visitant in small numbers. Twomey (1944:89) collected a single male from a flock of seven *S. m. bairdi* at Kanab on October 21, 1937.

*Sialia currucoides* (Bechstein)  
Mountain Bluebird

Chamberlain Ranch, April 25, 1930; Cave Lakes Canyon, May 14, 1946; Kanab Canyon, 4 mi. N. Kanab, May 18, 1946; Duck Creek, June 21-22, 1947; 3 mi. E. Jacobs Reservoir, June 11, 1952; Beef Meadows, August 14, 1952; Jacobs Reservoir, October 26, 1952; 3 mi. N. Boulder, June 13, 1953. Total specimens, 12.

Mountain Bluebirds were observed regularly around Kanab from February 20 to August 24 in 1931 and 1935. We saw the species on all our visits in 1946, 1947 and 1953 around Kanab and Johnson. On March 4, 1946 a wave of migration seemingly occurred for they were abundant along the roadways of Kanab occupying virtually every post. The same was true the following day at Johnson and again on March 6th in the Paria area.

We observed this bluebird to be fairly common in the open valley at Strawberry Creek on June 22 and 25, 1947. Miller (1934:164) found them present but not common about the meadows at Cedar Breaks, June 28 to July 1, 1931. The species is for the most part a summer resident in the region ranging from the lowlands to sub-alpine meadows. At Bryce Canyon it is regarded as a permanent resident being common during the summer months but less frequently observed during the winter. At Cedar Breaks it is, according to Grater (1947:61) a common visitant from late summer to late winter. Grater (1943:76) found large numbers at Cedar Breaks on January 17, 1942. They occurred on the snow in open meadows where they were feeding actively on horntail insects (*Sirex* sp.). In the Aquarius Plateau area we saw the species at Widtsoe on June 8, 1952 where a pair was nesting in a woodpecker hole in a yellow pine. Another pair was found nesting in a woodpecker hole in an Englemann spruce near Jacobs Reservoir on June 10. They were common at Davis Flats on August 11, 1952 where a flock of about 35 was noted. Young were abundant at Beef Meadows August 12-14, 1952. On October 25, 1952 they were abundant in flocks at Roundy Reservoir. In 1953 we found them common on fence posts north of Boulder on June 8 and in 1954 we saw them along Birch Creek west of Escalante on May 9. The mountain bluebird is more common in the region than the western bluebird.

*Myadestes townsendi townsendi* (Audubon)  
Townsend's Solitaire

Cave Lakes Canyon, March 3, 1946; Duck Creek, July 27-29, August 2, 1935, and June 24, 1947; South Boundary Cedar Breaks National Monument, June 25, 1947; 5 mi. W. Escalante, September 20, 1935; 3 mi. E. Jacobs Reservoir, June 10, 1952. Total specimens, 10.

Solitaires were observed at Kanab on May 6, 1935 and at Three Lakes on March 6, 1946. Miller (1934:164) saw a pair at Cedar Breaks in the timber at the edge of a meadow during the time of his visit from June 28 to July 1, 1931. At both Bryce Canyon and Cedar Breaks the species is regarded as a fairly common permanent resident with records extending throughout the year. While nesting data are lacking for Bryce, it breeds at Cedar Breaks in late June and July. In the Aquarius Plateau area, in addition to the two specimens, only one was seen at Spectacle Lake

on August 10, 1952 in an Englemann spruce. Miller (*loc. cit.*) noted several males singing on July 2-4, 1931 in the Escalante Mountains. Flocks are formed during the fall of the year and altitudinal migration occurs as shown by the Kanab records. In the lowlands the solitaire is a sparse winter visitant. Many remain in the mountains for Grater (1943:75) found them "in relatively large numbers" at Cedar Breaks and surrounding country on January 17, 1942. They were in active song at this time.

Family Sylviidae: Old World Warblers, Gnatcatchers, and Kinglets

*Poliophtila caerulea amoenissima* Grinnell

Blue-gray Gnatcatcher

Chamberlain Ranch, April 25, 1930; Spencer Ranch, Long Valley, 6300 feet, May 8, 1937; Cave Lakes Canyon, May 12-16, 1946 and May 18-23, 1947; 5 mi. N. Boulder, June 8-12, 1953; Fruita, June 25, 1956. Total specimens, 22.

Gnatcatchers were common in the piñon-juniper forest in mid-May at Cave Lakes Canyon in both 1946 and 1947. One field observer reported the species to be nesting in Tinny Canyon on May 21, 1947. Several were seen in Kanab Canyon, September 21-23, 1946. The species is a summer resident of the region. At Bryce Canyon it is considered an uncommon summer resident, usually occurring in the lower part of the canyon but occasionally on the rim. It nests there in June. In the Aquarius region several were seen at Fish Creek on July 4, 1952. In addition to the pygmy forest the species occurs in scrub oak and serviceberry and occasionally frequents the ecotone area between the piñon-juniper forest and the yellow pines.

*Regulus satrapa olivaceus* Baird

Golden-crowned Kinglet

Duck Cr., July 26, 1935; Mitchell's Sawmill, 10,200 ft., nr. S. Boundary of Cedar Breaks Nat. Mon., June 25, 1947; 3 mi. S. Grover, February 21, 1953. Total specimens, 4.

Woodbury (1939:160) has previously reported the Duck Creek specimen and Miller (1934:164) noted the species on Escalante Mountain, July 2-4, 1931. This kinglet occurs during the breeding season in the spruce-fir belt. It was not as common as the ruby-crowned kinglet and the two species occupied the same general habitat. The golden-crowned kinglet is seemingly a permanent resident, although showing altitudinal migration, for the specimens taken in February were from a small flock of 8 in the piñon-juniper forest.

*Regulus calendula cineraceus* Grinnell

Ruby-crowned Kinglet

Hidden Lake, April 25, 1930; Tinny Canyon, December 30, 1946; Duck Creek, June 21-23, 1947; Navajo Lake, July 29, 1935; edge Long Valley nr. S. boundary Cedar Breaks Nat. Mon., June 25, 1947; 1½ mi. E. Jacobs Reservoir, June 11, 1952; Spectacle Lake, August 8, 1952; Aquarius R. Sta., August 25, 1953. Total specimens, 13.

We found this kinglet to be common at Duck Creek June 21-23, 1947, at Strawberry Creek, June 22 and 25, 1947; and at Navajo Lake, July 2, 1953. At Bryce the species is a fairly common summer resident in the higher portions of the park around Rainbow Point. At Cedar Breaks, Grater (1949:63) considers this kinglet to be a common summer resident and states that it nests in late June and early July. Miller (1934:164) found them at Cedar Breaks from June 28 to July 1, 1931. We found them to be common there in the dense spruce clumps on June 21, 1947. Miller (*loc. cit.*) also reports this kinglet from Escalante Mountain, July 2-4, 1931. We heard them singing at Posy Lake on June 8, 1952 and at Deer Lake on June 9, 1953. Immatures were taken at Spectacle Lake on August 8, 1952 in a spruce-fir forest and at the Aquarius Ranger Station on August 25, 1953 in willows along a stream in a stand of yellow pine and blue spruce.

Seemingly the ruby-crowned kinglet molts early and some individuals start migrating to lower elevations. A male taken at Navajo Lake on July 29 is in fresh fall plumage and we saw the species in Kanab Canyon on September 21 and 23, 1946. This kinglet frequents the lowlands through the winter and spring. One was seen at Tinny Canyon, December 30, 1946 and at Kanab, February 21, 1931. Spring records for Kanab are March 21 and April 17, 1935. The species is therefore a summer resident in the mountains but a winter resident at lower elevations.

Family Motacillidae: Wagtails and Pipits

*Anthus spinoletta alticola* Todd

Water Pipit

Lower Reservoir, April 15, 1947; Spectacle Lake, August 7-11 and October 26, 1952; Beef Meadows, August 14, 1952; Willow Draw, August 28, 1953. Total specimens, 16.

Miller (1934:164) found a solitary pipit in the alpine meadow at Cedar Breaks on June 30, 1931 which suggested that the species was a summer resident of the area. Grater (1947:90) listed the species for Cedar Breaks. In our field work in the boreal region of Cedar Mountain only a lone pipit was seen on August 27, 1950 at 10,000 feet elevation, 3 miles north and 5 miles east of Cedar Breaks. The species was not found on the top of Brian Head on July 3, 1953. If it occurs regularly in this area in the summer as a breeder it is evidently uncommon. In contrast the pipit was common in the grasslands and meadows on the top of the Aquarius Plateau.

Pipits occur at Kanab as transients. One was seen along Kanab Creek south of town on May 1, 1946 and a flock of 50 near the Lower Reservoir on April 15, 1947. Probably other subspecies are represented in mixed flocks for at St. George, Twomey (1944:89) found a specimen of *A. s. pacificus* among a flock of *A. s. alticola* and Behle (1943:60) reported four examples of *A. s. rubescens* from the St. George area.

Family Bombycillidae: Waxwings

*Bombycilla garrula pallidiceps* Reichenow

Bohemian Waxwing

This species is of rare or accidental occurrence in the non-breeding season. A few individuals were seen at Kanab on May 23 and 31, 1931.

*Bombycilla cedrorum* Vieillot

Cedar Waxwing

Cave Lakes Canyon, May 12-13, 1946. Total specimens, 4.

This type of waxwing was seen at Kanab on May 23, 29 and 31, 1931 and June 7, 1935. In our later field work we found them in Cave Lakes Canyon in small groups, frequenting cottonwoods, box elders and an apple orchard from May 11 to 17, 1946. Although still in small flocks they seemed to be paired and members of the pair were actively chasing about as though in courtship activity. Reference to the specimens collected and their activities which suggested breeding in the area has been made by Behle and Selander (1952:29). Mrs. George M. Shields observed a flock of about 50 feeding on pyrocanthus berries at her home in Kanab on March 6, 1953. The species has been reported at Bryce Canyon. There are unconfirmed reports of the species occurring during the summer on the Aquarius Plateau. Its status is that of an uncommon transient in the Kanab area, possibly breeding in small numbers in the piñon-juniper belt.

Family Ptiligonatidae: Silky Flycatchers

*Phainopepla nitens lepida* Van Tyne

Phainopepla

Two mi. S. Kanab, June 18-19, 1947. Total specimens, 6.

The phainopepla was observed by Greenhalgh at Kanab on July 13, 1930 and on June 20 and July 13, 1935. Woodbury (1939:160) cited the record of July 13, 1935 and commented that breeding in the area was problematical since the bird observed



may have been a wanderer from elsewhere after the breeding season. In their check-list Woodbury, Cottam and Sugden (1949:27) also indicate that the species is casual in Kane County. Our findings indicate that they do breed at Kanab for among the specimens taken are juveniles. Besides the specimens taken five other examples were seen on June 19. They seemed to be especially concentrated around mulberry trees. The species therefore is a fairly common summer resident at Kanab.

Family Laniidae: Shrikes

*Lanius excubitor invictus* Grinnell  
Northern Shrike

Six mi. S. Johnson, near Utah-Arizona line, Coconino County, Arizona, November 27, 1937. One specimen.

This northern shrike is evidently an uncommon winter resident in the Kanab area.

*Lanius ludovicianus nevadensis* Miller  
Loggerhead Shrike

Navajo Wells, November 28, 1937; 1-3 mi. S. Kanab, September 24 and December 28-29, 1946; 1 mi. W. House Rock Valley, 4500 feet, Coconino County, Arizona, April 16, 1947; 10 mi. SE. Escalante, May 8, 1954. Total specimens, 8.

Sight observations for the Kanab area were made by Greenhalgh ten times from March 5 to August 24, 1931 and again on April 2, 1935. We saw shrikes on all our visits to the fields south of Kanab and in the desert areas east of Kanab from March to June, 1946 and 1947, and on September 24, 1946. This shrike was fairly common in the desert areas around Escalante. A male taken May 8, had gonads measuring 10 mm. indicating breeding. Here the species occupied sage, greasewood and scattered junipers. The species also occurred on top the Aquarius Plateau, two being seen at Roundy Reservoir on August 11, 1952. It is a permanent resident of the region but less abundant in winter.

Family Sturnidae: Starlings

*Sturnus vulgaris vulgaris* Linnaeus  
Starling

Grater (1942:41) saw a flock of about 200 at Mt. Carmel, Kane County, on January 2, 1941 and Mrs. George M. Shields reported a lone individual at Kanab on September 18, 1948. Both of these records were noted by Behle (1954:50). The starling is at present an uncommon winter visitant in south central Utah.

Family Vireonidae: Vireos

*Vireo griseus noveboracensis* (Gmelin)  
White-eyed Vireo

A specimen was taken at Halls Ranch, 8 miles west of Boulder on May 11, 1953. The record has been reported by Porter and Bushman (1956:153).

*Vireo vicinior* Coues  
Gray Vireo

Cave Lakes Canyon, May 15-16, 1946 and May 23, 1947; confluence Calf Creek and Escalante R., May 7, 1954. Total specimens, 7.

The principal habitat of this uncommon summer resident is the juniper-piñon forest but occasionally individuals venture into intervening sagebrush.

*Vireo solitarius plumbeus* Coues  
Solitary Vireo

Cave Lakes Canyon, May 12-14, 1946 and May 19, 1947; Tinny Canyon, May 21, 1947; Swain's Creek, June 24, 1947; Boulder, July 5-6, 1952; 3-5 mi. N. Boulder, June 10-13, 1953. Total specimens, 18.

The usual habitat where we found this vireo is a canyon situation with brush and broad-leaved trees such as scrub oaks, box elders and cottonwoods. Mostly they

occur below 7500 feet but occasionally they wander higher into the yellow pine belt where the Swain's Creek specimen was taken at 8000 feet. At the base of the Aquarius Plateau we also took them in junipers near a stream. The condition of the gonads of all the specimens indicates breeding. At Bryce the species is reported to be a fairly common summer resident in the lower portions of the park where they nest in June.

*Vireo solitarius cassinii* Xantus  
Solitary Vireo

Our only record of this uncommon transient is a sight observation by Greenhalgh at Kanab on May 20, 1931. It is listed for Bryce Canyon as an uncommon migrant.

*Vireo gilvus leucopolius* (Oberholser)  
Warbling Vireo

Three mi. S. Kanab, May 18, 1946; Tinny Canyon, September 22, 1946 and May 21, 1947; Cave Lakes Canyon, May 19, 1947; Duck Creek, July 26, 1935 and June 22-24, 1947; Posy Lake, June 9-10, 1952; Boulder, July 5, 1952; 5 mi. N. Boulder, June 8-12, 1953. Total specimens, 24.

This vireo was also seen at Kanab May 21, 1931; at Duck Creek, June 20, 1935; at Strawberry Creek, June 22 and 25, 1947; and Navajo Lake, July 2, 1953. This vireo is a common summer resident, being widely distributed from the lowlands as around Kanab where it frequents cottonwoods and willows up through the box elders and maples of the canyons at middle elevations to the aspens of the coniferous belt. However, it is considered as uncommon at Bryce, and is said to occur usually in the lower portions of the park. It was abundant on the Aquarius Plateau at Posy Lake, the Boulder area and at Deer Lake.

Family Parulidae: Wood Warblers

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

One mi. S. Kanab, September 16, 1946. One specimen.  
This is a rare migrant through the region.

*Vermivora celata orestera* Oberholser  
Orange-crowned Warbler

Tinny Canyon, May 21, 1947; Spectacle Lake, August 10, 1952. Total specimens, 2. This is the breeding race of the region but was rare. The specimen from Tinny Canyon was taken in scrub oak and that from Spectacle Lake in a stand of Englemann Spruce. The species was also observed in oaks at Hungry Creek on June 9, 1952 and in similar habitat 5 miles north of Boulder, July 5, 1952.

*Vermivora ruficapilla ridgwayi* van Rossem  
Nashville Warbler

This warbler is a fairly common migrant through Utah. However, our only record is an observation by Greenhalgh made at Kanab on April 21, 1935.

*Vermivora virginiae* (Baird)  
Virginia's Warbler

Hidden Lake, April 25, 1930; Cave Lakes Canyon, May 14, 1946 and May 19, 1947; Spectacle Lake, August 8, 1952; 5 mi. N. Boulder, June 8, 1953; Posy Lake, June 14, 1953; confluence Calf Cr., and Escalante R., May 7, 1954. Total specimens, 8.

Virginia's warblers were observed at Kanab on April 21, 1935. They were paired and probably nesting in willows in Cave Lakes Canyon in mid-May, 1946 and 1947. They are reported to be uncommon at Bryce around the rim and in the canyon below the rim. On the Aquarius Plateau the species was observed in Englemann spruce at Spectacle Lake and an immature male was taken there on August 8. At Posy Lake they occurred in aspens, at Boulder in oaks, and along the Escalante River in deciduous streamside shrubs. The altitudinal range was from 4973 to 10,750 feet. They are summer residents.

*Vermivora luciae* (Cooper)

## Lucy's Warbler

This warbler was observed by Greenhalgh at Kanab on April 28, 1931 which record was cited by Woodbury (1939:161). We did not obtain any specimens at Kanab where it is probably a rare summer resident but saw them at Lee's Ferry on April 17, 1947 (Behle, 1948:306). Woodbury and Russell (1945:120) report that a specimen was obtained in willow and squawbush along the Colorado River 41 miles upstream from Lee's Ferry on August 8, 1938 in Kane County, Utah. Beck took a single specimen on July 4, 1938 at the junction of Calf Creek and Escalante River.

*Dendroica petechia morcomi* Coale

## Yellow Warbler

Kanab Creek, 1-3 mi. S. Kanab, May 12, 1946 and May 20, 1947; Lower Reservoir, May 18, 1946 and May 20, 1947; Kanab Canyon, 5 mi. N. Kanab, May 17, 1946; Cave Lakes Canyon, May 14-16, 1946 and May 19, 1947; Boulder, July 5-6, 1952 and June 11, 1953; Fremont R., 1 mi. SW. and 2 mi. E. Bicknell, May 19 and June 24, 1956; ½ mi. W. Fruita, June 25, 1956. Total specimens, 34.

The yellow warbler was regularly observed by Greenhalgh from April 28 through September 23 in 1931 and 1935 around Kanab. We found it to be common on all our visits there. It was common at Boulder where a nest was found in a willow on July 6, 1952 and young nearby that had presumably recently left the nest. The species inhabits willows and cottonwoods and other dense, leafy types of riparian growth in valleys and lower canyons. It is a summer resident. Reference to the Kanab series has been made by Behle (1948:77).

*Dendroica auduboni memorabilis* Oberholser

## Audubon's Warbler

Tinny Canyon, May 21, 1947; Duck Creek, August 6, 1935 and June 21-24, 1947; Navajo Lake, July 29, 1935 and July 2, 1953. Posy Lake, June 9, 1952; Jacobs Reservoir, June 10, 1952; Spectacle Lake, August 8, 1952; Beef Meadows, August 14-15, 1952; 5 mi. N. Boulder, June 8, 1953; Kings Pasture, August 20, 1953. Total specimens, 19.

While it is a summer resident in the coniferous belt of the mountains, the Audubon warbler is transient in the Kanab area. Here it was regularly observed from April 17 through May 27, 1931 and 1935 with one laggard being seen June 25, 1931. We saw it commonly in migration on all our visits to the Kanab area in April and May, 1946 and 1947. These warblers were common on their nesting grounds in 1947 at Duck Creek June 20-23, at Strawberry Creek, June 22 and 25; and at Cedar Breaks, June 21 and 25. Miller (1934:164) collected a male at Cedar Breaks at the time of his visit there June 28-July 1, 1931. Grater (1947:66) states that it is a fairly common summer resident in the forests back of the rim at Cedar Breaks where it nests in July. At Bryce it is also a fairly common summer resident along the forested rim and in the protected canyons below the rim. Here it nests in late June and early July. Miller (*loc. cit.*) reported Audubon warblers at the Escalante Mountains July 2-4, 1931. We found the species to be common throughout the Aquarius Plateau where it was found mainly in the spruce-fir forest but was also seen in aspens and yellow pine. Immature birds were abundant in early August on top of the plateau at about 11,000 feet elevation. A migrating flock of 15 was seen in a large cottonwood 10 miles west of Escalante on May 7, 1941.

Miller referred his specimen to the race *memorabilis* on the basis of large size stating that he detected no color differences from Pacific Coast examples representing the race *auduboni*. Since then (Grinnell and Miller, 1944:404) he has expressed the opinion that it is inadvisable to recognize a large race from the Rocky Mountain region, even though there is a graded increase in size interiorward. He states that many coastal examples are equivalent in size to those from the Rocky Mountains. Aldrich (In Jewett, Taylor, Shaw and Aldrich, 1953:563) recognizes the race *memorabilis*.

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

Orderville, May 7, 1937; Cave Lakes Canyon, May 16-17, 1946 and May 18-21, 1947; 5 mi. N. Boulder, June 12-13, 1953; 1 mi. E. Bicknell, May 19, 1956. Total specimens, 18.

This warbler occurs mostly in the juniper-piñon forest but occasionally moves into the scrub oak. We found the species at Cave Lakes Canyon in oaks on the canyon floor where they had seemingly dropped down from the pygmy forest on the rim. They were common in occurrence and have a seasonal status of summer resident. Two observations at Kanab on April 21, 1931 and April 20, 1935 give some indication of the time of arrival in spring. At Bryce Canyon it is considered a common summer resident in the lower portions of the park, occasionally reaching the rim. It nests there in June. We saw relatively few of these warblers in the Aquarius Plateau region but when seen they were in the pygmy forest and favored thickly forested hillsides with a stream at the bottom.

*Dendroica townsendi* (Townsend)  
Townsend's Warbler

None were seen or taken in our field work but it occurs in the area in migration for Woodbury and Russell (1945:125) report a specimen from the Kaiparowits Plateau taken August 12, 1937 in the pygmy forest at 7000 feet and Woodbury (1939:160) cites Presnall's observation of the species at Boat Mountain, Bryce Canyon National Park on October 7, 1933.

*Dendroica graciae graciae* Baird  
Grace's Warbler

As in the previous case we did not encounter this species, but it is listed by Grater (1947:68) as a fairly common summer resident over the Paunsaugunt Plateau where it nests in late June and early July. It has been observed as late as September 19. At Cedar Breaks on the Markagunt Plateau it is an uncommon summer visitant along the forested rim.

*Oporornis tolmiei monticola* Phillips  
MacGillivray's Warbler

Swain's Cr., June 24, 1947; Posy Lake, June 9-10, 1952; 5-8 mi. N. Boulder, June 8-9, 1953. Total specimens, 9.

These specimens represent the race that is a summer resident in the region. This warbler was a widespread summer resident at intermediate levels, occupying canyons where there was an abundance of streamside thickets, mainly willows, and adjacent stands of scrub oak. We have sight records for Dark Valley on August 26, 1953 and Wildcat R. Sta., August 28, 1953. Three specimens from Swain's Creek, June 24, constitute a family group consisting of adult male, adult female and a juvenile.

*Oporornis tolmiei tolmiei* (Townsend)  
MacGillivray's Warbler

Caves Lake Canyon, May 21, 1947. Total specimens, 2.

This subspecies is transient through the region. Both specimens were males and were taken in the piñon-juniper forest which is not their breeding habitat. One of the specimens was identified by A. R. Phillips as of the race *intermedia*, the other of the race *tolmiei*.

*Geothlypis trichas occidentalis* Brewster  
Yellowthroat

Lower Reservoir, May 18, 1946 and May 20-22, 1947; Kanab Cr., 1-2 mi. S. Kanab, May 1 and September 16, 1946 and May 20, 1947; Cave Lakes Canyon, May 12-14, 1946 and May 19, 1947; Boulder, July 6, 1952 and June 11, 1953; confluence Calf Cr., and Escalante R., May 7, 1954; Fremont R., 1 mi. SW. Bicknell, May 19, 1956. Total specimens, 23.

Yellowthroats were regularly observed by Greenhalgh at Kanab from April 24 to June 25, 1931 and 1935. At Cave Lakes Canyon we found them in small cattail marshes, at the Lower Reservoir they frequented willows, and along Kanab Creek they were found in both these habitats. Another place of observation was Three Lakes on June 19, 1947. In the Aquarius Plateau area the only two suitable breeding sites were the pond at Boulder and the Bicknell Bottoms. This elusive warbler is a summer resident.

*Icteria virens auricollis* (Deppe)  
Yellow-breasted Chat

Cave Lakes Canyon, May 12, 1946; 3 mi. S. Kanab, May 22, 1947; Boulder, July 5, 1952 and June 11, 1953; Fremont R., ½ mi. W. Fruita, June 25, 1956. Total specimens, 7.

Chats were observed by Greenhalgh regularly at Kanab from May 3 to August 24, 1931. We found them about a mile south of Kanab not only in late May but also on June 17, 1947. In the Aquarius Plateau area in addition to occurring at Boulder, they were seen at the junction of Calf Creek and the Escalante River. The Boulder example was an immature bird. The species was most often seen in dense willow-cottonwood thickets, sometimes along streams but also occasionally out in fields. This is another summer resident.

*Wilsonia pusilla pileolata* (Pallas)  
Wilson's Warbler

Jacobs Reservoir, June 12, 1952. Total specimens, 2.

Greenhalgh has a sight record for the species at Kanab on April 28, 1935. We found it only on the Aquarius Plateau at Jacobs Reservoir about 10,000 feet, where the birds were evidently breeding. They frequented willows in a wet meadow.

Family Ploceidae: Weaver Finches  
*Passer domesticus domesticus* (Linnaeus)  
House Sparrow

Not only was this sparrow common at the barnyards of all the ranches in the Kanab area the year around, but flocks were observed in the fields two miles south of Kanab on June 17, 1947 and along the roadways at Johnson on December 29, 1946. We also saw the species at Escalante, Boulder and Bicknell.

Family Icteridae: Meadowlarks, Blackbirds and Orioles  
*Sturnella neglecta neglecta* Audubon  
Western Meadowlark

One mi. S. Kanab, December 28, 1946. One specimen.

The meadowlark is a permanent resident in the fields south of Kanab having been observed repeatedly nearly every month in the year in 1931 and 1935. We found it to be common on all our trips in April, May and June, 1946-47. At Bryce Canyon it is an uncommon summer resident in the park at open meadows. It is common on the plateau west of the park and in the lower valley at Tropic. We saw the species in cultivated fields at Boulder and Escalante on the south side of Aquarius Plateau and at Loa, Teasdale and Bicknell on the north side.

*Xanthocephalus xanthocephalus* (Bonaparte)  
Yellow-headed Blackbird

Lower Reservoir, May 18, 1946; Boulder, July 6, 1952; 1 mi. S. Bicknell, May 19, 1956. Total specimens, 6.

Observed periodically throughout May in 1931 and 1935. A few were seen at Johnson Reservoir, April 15, 1947, one at Three Lakes May 11, 1946 and many at the Lower Reservoir May 20-24, 1947. They were more common there than Redwings on June 17, 1947. In the Aquarius Plateau area we found them abundant at the pond in Boulder in May and June in cattails and willows. They were also abundant at the Bicknell Bottoms. The species is a summer resident of the region.

*Agelaius phoeniceus utahensis* Bishop  
Redwinged Blackbird

Cottonwood Canyon, April 6, 1940; Cave Lakes Canyon, April 6, 1940 and May 16, 1946; Kanab Cr., 1-3 mi. S. Kanab, May 1 and 12, 1946, December 28, 1946, May 20, 1947; Lower Reservoir, May 18-19, 1946; Johnson, December 29, 1946; Deer Lake, June 14, 1952; Boulder, July 6, 1952 and June 11, 1953; 5 mi. N. Boulder, June 8, 1953; 1 mi. S. Bicknell, May 19, 1956; 2 mi. E. Bicknell, June 24, 1956. Total specimens, 36.

Redwings were observed regularly by Greenhalgh in 1931 and 1935 at Kanab from March 18 through August 12. We found a few in the willows in wet meadows at the ranch in Cave Lakes Canyon as early as March 4, 1946 and a lone male was established at a small cattail marsh at Three Lakes on March 6. They were much commoner at both localities on March 16 and even more abundant by mid-May. At the Lower Reservoir they were abundant on April 15, 1947 and we saw them on each visit thereafter. Being permanent residents of the area, they gather in large winter flocks. In contrast to a lone male that was seen at a small cattail marsh at Cottonwoods on December 26, 1946 and a few scattered along Kanab Creek on the 28th, a thousand or more were congregated in a flock at Johnson Reservoir on December 29. A flock of 40 was observed at the same locality on April 15, 1947. At Bryce Canyon the redwing is a rare summer visitant in the park but nests just outside the park near the north boundary. In the Aquarius Plateau area they occurred up to 9000 feet in June. They were common at the pond in Boulder as well as in wet fields and along creeks. Small groups of 2 to 4 were seen along the shores of Posy and Deer lakes.

*Icterus parisorum* Bonaparte  
Scott's Oriole

One was seen at Kanab by Greenhalgh on May 1, 1935 in the piñon-juniper forest. It is probably a rare summer resident.

*Icterus bullockii bullockii* (Swainson)  
Common Bullock's Oriole

Cave Lakes Canyon, May 12, 1946; 2 mi. S. Kanab, June 18, 1947; Boulder, July 5, 1952 and June 11, 1953; confluence Calf Cr. and Escalante R., May 7, 1954; 2 mi. E. Bicknell, June 27, 1956. Total specimens, 7.

Greenhalgh regularly observed this summer resident in the Kanab area from April 24 through August 12 in 1931 and 1935. Our earliest observation for 1946 was May 1 and they were seen on each visit thereafter. The species was seen on all our visits in 1947. It was common along Boulder Creek and the Escalante River bottoms in the Aquarius region. The favorite trees frequented were cottonwoods where they nested.

*Euphagus cyanocephalus* (Wagler)  
Brewer's Blackbird

Johnson, December 29, 1946; 1 mi. S. Kanab, May 20, 1947; Duck Creek, June 23, 1947; 3-5 mi. N. Boulder, June 8-13, 1953; confluence Calf Cr. and Escalante R., May 7, 1954; 1 mi. S. Bicknell, May 19, 1956; 2 mi. E. Bicknell, June 24-27, 1956. Total specimens, 15.

The Brewer's blackbird was regularly observed by Greenhalgh at Kanab during all months of the year in 1931 and 1935. They seem to congregate in winter flocks in the valleys and then spread out to the higher ranches and mountain meadows for the nesting season. A flock of about 20 was seen at Johnson on December 29, 1946. Only one was seen in Cave Lakes on March 6 but they were common there on May 12. A few were located at Three Lakes, June 18, 1947. On June 22, 1947 they were common at Duck Creek but were scattered through the large meadow area where the creek terminates. There is seemingly some segregation of the sexes in non-breeding times for a flock of 25 observed at Johnson on March 21, 1953 were all females. When not breeding they occur in many environmental situations like meadows, along streams, in fields and at ranches but during the nesting season prefer wet meadows. At Bryce this blackbird is an uncommon summer resident

being found toward the north end of the park around meadows near the rim. It nests near the park in June. In the Aquarius Plateau area breeding birds were found generally in the wet fields and streamsides as around Boulder, Escalante and in the Bicknell Bottoms but one specimen near Boulder was taken deep in the pygmy forest.

*Molothrus ater obscurus* (Gmelin)  
Brown-headed Cowbird

Cave Lakes Canyon, May 14, 1946 and May 23, 1947; 2 mi. S. Kanab, June 18, 1947. Total specimens, 3.

Greenhalgh has eight observations from May 7 through August 24, 1931. The species is not common in the region. In addition to the specimens collected, we saw one or two in the fields north of Kanab on May 20, 22 and June 18, 1947. Of the specimens collected one was taken in willows, another in a field and the third in the pygmy forest. At Bryce the cowbird is an uncommon summer resident occurring in the north end of the park. Cottam observed this species in the Bicknell Bottoms on August 14, 1936.

Family Thraupidae: Tanagers  
*Piranga ludoviciana* (Wilson)  
Western Tanager

Cave Lakes Canyon, May 14, 1946 and May 22-23, 1947; Kanab, September 20, 1946; Duck Creek, July 27 and August 1, 1935 and June 22-23, 1947; Navajo Lake, July 2, 1953; Posy Lake, June 9, 1952; Beef Meadows, August 15, 1952; 5 mi. N. Boulder, June 8-10, 1953. Total specimens, 17.

The western tanager seemingly breeds from the pygmy forest up through the spruce-fir forest and during migration passes through the lowlands. Sight records for Kanab are May 21, 23 and August 15, 1931 and May 19, 1935. We also saw the species at Strawberry Creek June 22 and 25, 1931. At Bryce it is a fairly common summer resident. At Cedar Breaks, the tanager is an uncommon summer resident, but nests there in July. In the Aquarius Plateau area the species occupied several types of habitat during the breeding season. In the Boulder area they occurred in the stream bottoms and adjacent junipers. Five miles north of Boulder they were in the yellow pine. At Deer Lake and the Juniper Reservoir area they occurred in the spruce-fir forest while at Posy Lake they were in aspens. In the Beef Meadow area, 11,000 feet, we found them in dense Englemann spruce. We found them common but Miller (1934:165) noted that they were unaccountably scarce and found only two separated birds in the Escalante Mountains during July 2-4, 1931.

Family Fringillidae: Grosbeaks, Finches, Sparrows and Buntings  
*Pheucticus ludovicianus* (Linnaeus)  
Rose-breasted Grosbeak

On April 26, 1935 Greenhalgh observed a grosbeak at Kanab that he feels certain was this species but in the absence of a specimen it must remain hypothetical. The species is known as an accidental in Colorado, Arizona and California which adds to the plausibility of the record.

*Pheucticus melanocephalus melanocephalus* (Swainson)  
Black-headed Grosbeak

Cave Lakes Canyon, May 12-18, 1946 and May 18-23, 1947; Kanab Cr., ½ mi. S. Kanab, May 20, 1947. Duck Cr., June 22, 1947; Boulder and 5 mi. N., July 6, 1952 and June 8-12, 1953; Fruita, June 26, 1956. Total specimens, 31.

Black-headed grosbeaks were observed by Greenhalgh in the Kanab area repeatedly from May through August in 1931 and in May, 1935. He also observed them at Duck Creek on June 20, 1935. Other places where we saw grosbeaks were Tinny Canyon on May 21, 1947 and Strawberry Creek on June 22 and 25, 1947. Thus the species is wide ranging from the valley areas up to the lower coniferous forest. We took specimens from several broad-leaved vegetative types like cottonwoods, box elders and scrub oaks at lower elevations and in mixed aspen-spruce stands in the coniferous belt. At Cave Lakes Canyon on May 11, 1946 two males were actively

vieing with one another in song as though establishing territories. At Bryce it is an uncommon summer resident throughout the park. It nests in late June. At Cedar Breaks it is fairly common as a late summer visitant. In the Aquarius Plateau area in June grosbeaks were common 5 to 8 miles north of Boulder in willow thickets along streams and in aspen groves. Nearer Boulder they occurred in the pinon-juniper forest.

*Guiraca caerulea interfusa* Dwight and Griscom  
Blue Grosbeak

One-three mi. S. Kanab, May 12, 1946 and May 18-22 and June 18, 1947; Boulder, July 5, 1952. Total specimens, 7.

The early records for Kanab of Greenhalgh are cited by Woodbury (1939:161) who also observed the species at Kanab on June 14, 1939. The species was not common and was found mostly along Kanab Creek and in adjacent fields, although we also saw one at Three Lakes on June 19, 1947. The Boulder specimen from the Aquarius Plateau area constitutes an extension of range and a high altitude record for Utah at 6200 feet. It was taken in a dense river bottom thicket of willow, rose, hop vine, and cottonwoods. It had enlarged gonads indicating a breeding bird. The species is a summer resident.

*Passerina amoena* (Say)  
Lazuli Bunting

Kanab Canyon, 5 mi. N. Kanab, May 18, 1946; Boulder and 5 mi. N., July 5-6, 1952. Total specimens, 4.

Greenhalgh had four records for May in 1931 and saw the species on April 30 and May 19, 1935. We saw it only twice on May 22 and June 17, 1947. It is thus a regular summer resident in the Kanab area but is not common. In the Kanab area it frequented hedgerows in fields and oak thickets. In the Aquarius Plateau region it was found at Boulder in fringe shrubbery along the streams as well as at willows and other shrub types adjacent to cultivated fields.

*Hesperiphona verpertina brooksi* Grinnell  
Evening Grosbeak

Posy Lake, June 8, 1952. One specimen. This species was not found in the Kanab area but is reported from Bryce Canyon where it is considered rare to uncommon. Here a small flock was observed on September 11, 1934 and two pairs were observed starting to nest near Sunrise Point in June, 1937. It has the same status at Cedar Breaks. Our only record for the Aquarius Plateau is the Posy Lake specimen. It was an adult male taken in a dense stand of aspens and had enlarged gonads, indicating a breeding bird.

*Carpodacus cassinii* Baird  
Cassin's Finch

Duck Creek, July 27, 1935 and June 21-23, 1937; Navajo Lake, July 29, 1935; Posy Lake, June 9-10, 1952; 1½ mi. E. Jacobs Reservoir, June 11, 1952; Spectacle Lake, August 10, 1952; Big Lake, June 14, 1953; Wildcat R. Sta., May 19, 1956. Total specimens, 15.

Other places of observation on Cedar Mountain were Swain's Creek, June 24, 1947, Strawberry Creek, June 22 and 25, 1947, Navajo Lake, July 2, 1953 and the south border of Cedar Breaks June 22 and 25, 1947. At Bryce it is an uncommon summer resident in the higher portions of the park. Nests have not been found but young have been seen in early August. At Cedar Breaks it is a common permanent resident and nests in July. Miller (1934:165) found them abundant at Cedar Breaks at the borders of the timber, June 28-July 1, 1931. Grater (1943:76) noted 11 at Cedar Breaks on January 17, 1942. He commented that for the most part they were quiet, only occasionally uttering call notes. Miller (*loc. cit.*) also found the species in the Escalante Mountains, July 2-4, 1931.

In our experience this species is primarily a denizen of the coniferous forest and was found in both yellow pine and Englemann spruce. One, however, was taken during the breeding season among rocks at the shore of a lake with adjacent low



brush. The nearest spruce-fir forest was a half mile distant. A specimen obtained on June 21, 1947 had a porcupine quill imbedded in its right eye and projecting out of the eye about an inch. It had worked its way inward entirely through the eyeball to the socket and a pus-filled cavity existed at the base of the eye. The bird acted perfectly normal, however, and the injury was not detected until the specimen was retrieved.

*Carpodacus mexicanus frontalis* (Say)

House Finch

Two-three mi. S. Kanab, December 29, 1946 and May 18-22, 1947; Orderville, April 25, 1930; Cave Lakes Canyon, May 12-17, 1946 and May 14-23, 1947; confluence Calf Cr., and Escalante R., May 7, 1954. Total specimens, 22.

Greenhalgh observed house finches or linnets regularly throughout the year in 1931 and 1935 in the Kanab area, and again in April, 1938. We saw the species on all our visits there too, winter, spring and summer. They were abundant and occurred in fields of sunflowers, along lanes, in trees and out in desert scrub vegetation. A few were seen at Johnson on December 29, 1946, several there on March 21, 1953 and a lone individual far from civilization at the junction of Crawford Creek and the Paria River on March 6, 1946. They were common around the ranch in Cave Lakes Canyon in mid-May but were more numerous in the pygmy forest on the rim of the canyon. In the Aquarius plateau region they were only found in the lowlands and river bottoms on the south side of the plateau where they were uncommon. Two specimens taken May 7 had enlarged gonads indicating breeding.

A nest was found on May 22, 1947 three miles south of Kanab. It was located in a cholla cactus, 3 feet off the ground and contained four eggs. In mid-June, that same year house finches were common in flocks that contained many young. They were especially frequenting apple and mulberry trees.

The characters of the Kanab population have been discussed by Behle (1948: 79). Certain differences exist in comparison with the Great Basin birds. The Kanab birds are referable to *frontalis*.

*Pinicola enucleator montana* Ridgway

Pine Grosbeak

Navajo Lake, July 29, 1935; Cedar Breaks, August 3, 1935; Spectacle Lake, August 7-10, 1952. Total specimens, 6.

At Bryce Canyon the species is an uncommon summer and fall visitant in the higher portions of the park and there is a definite record of a pair being seen near Rainbow Point on June 17, 1934. Miller (1934:165) found them abundant at Cedar Breaks, June 28-July 1, 1931 where they were in sight almost continually throughout the day, usually frequenting the low, dense spruces near the meadows but also occurring back from the meadows in the spruce forest. They fed in pairs or small groups, foraging both on the ground and on the low limbs of the trees. At this time there seemed to be family groups in which young were independent of the adults but in addition there were aggregations of as many as 12 individuals. Two adult females were taken by Miller that were long past breeding. However, a male had testes that measured 7 mm. At times birds were heard singing. Grater (1947:77) states that pine grosbeaks are fairly common summer residents at Cedar Breaks and while no nests have been found, young have been seen in late July. On the Aquarius Plateau we found them only on top in forested areas of Englemann Spruce. They were seen at Beef Meadows as well as at Spectacle Lake in early August and occurred in small groups of two to four birds each.

*Leucosticte tephrocotis* (Swainson)

Gray-crowned Rosy Finch

A mixed flock of about 300 gray-crowned and black rosy finches flew over us at the junction of Crawford Wash and the Paria River, March 6, 1946.

*Leucosticte atrata* Ridgway

Black Rosy Finch

Junction Crawford Wash and the Paria River, March 6, 1946. One specimen. This was the only specimen obtained from the mixed flock previously noted.

*Spinus pinus vagans* Aldrich  
Pine Siskin

One mi. S. Kanab, December 28, 1946; Cave Lakes Canyon, May 23, 1947; Hidden Lake, April 25, 1930; Duck Creek, June 21-24, 1947; Posy Lake, June 9, 1952 and June 14, 1953; Spectacle Lake, October 26, 1952; 5 mi. N. Boulder, June 8, 1953. Total specimens, 13.

Greenhalgh observed the species at Kanab six times from April 20 to May 12, 1931 and again on August 12. They are migrants and winter visitants in the lowlands but breed in the mountains. We noted a mixed flock of siskins and pale goldfinches in the fields south of Kanab on December 28, 1946. There were about 100 birds, all actively feeding on sunflower seeds. A similar but smaller mixed flock was seen at Johnson the following day but a pure flock of 25 siskins occurred there on December 29. The species was common at Cave Lakes Canyon in cottonwoods on May 14, 1946 but they were not present on the 15th. On their breeding grounds on Cedar Mountain they occurred in a spruce-aspens situation where we found them at Strawberry Creek, June 22 and 25, 1947, at Navajo Lake, July 2-3, 1953, and at the south boundary of Cedar Breaks on June 21, 1947. Miller (1934:166) found them especially abundant in the meadows at Cedar Breaks on June 28-July 1, 1931 where they were feeding on the heads of short composites which were in seed. Grater (1947:77) considers them to be common permanent residents at Cedar Breaks becoming very abundant in late summer and early fall. He reports (Grater, 1943:76) that they were to be seen everywhere on January 17, 1942 and were the commonest bird at the time. There are no nesting records for Cedar Breaks although young have been observed in late July. At Bryce Canyon it is also a common permanent resident on the plateau, nesting in June. Siskins were widely distributed throughout the Aquarius Plateau region. On top the plateau, in addition to inhabiting the coniferous forest they frequented parks and meadows in the spruce-fir forest. They were abundant in this habitat at Hungry Creek on June 9, 1952, feeding on dandelions in seed. We also saw them at Spectacle Lake, August 7, 1952 and at Deer Lake, June 9, 1953. They were common in cottonwoods along the Escalante River near the confluence of Calf Creek on May 7, 1954.

*Spinus tristis pallidus* Mearns  
American Goldfinch

One mi. S. Kanab, December 28, 1946; Johnson Canyon, December 29, 1946; confluence Calf Cr. and Escalante R., May 7, 1954. Total specimens, 8.

Pale Goldfinches were seen regularly at Kanab from February 21 through June 25 in 1931 and 1935. A flock was also observed there on April 10, 1938. In our spring collecting we saw a flock of 12 at Johnson on March 21, 1953 still in winter plumage. On May 20, 1947 a few in breeding plumage were seen in willows at the Lower Reservoir. Long (1937:42) saw four on November 23, 1935 in Bryce Canyon National Park at the east boundary, 6890 feet and a female was collected. He states that the pale goldfinch is quite common in the region but the Bryce record is as high as he had recorded. He also observed the species at Kanab among other localities noted. These goldfinches were common in winter around Kanab. A mixed flock of goldfinches and siskins, together numbering about 100 birds, were actively feeding in a patch of sunflowers in the fields south of Kanab on December 28, 1946. Another mixed flock of 25 was observed in an orchard at Johnson the following day. Thus the species is a permanent resident in the region. In the Aquarius Plateau area, in addition to the specimen taken along the Escalante River we saw one in Escalante on May 8, 1954. In both instances they were in mixed flocks with several other related species.

*Spinus psaltria hesperophilus* (Oberholser)  
Lesser Goldfinch

Hidden Lake, April 25, 1930; Cave Lakes Canyon, May 12-17, 1946 and May 22-23, 1947; 2 mi. S. Kanab, June 18, 1947; Boulder, June 11, 1953. Total specimens, 8.

This goldfinch was regularly observed at Kanab by Greenhalgh from April 10 through August 24, 1931 and 1935. We found them common on all of our spring and summer visits at Kanab and Cave Lakes Canyon. They occurred in cotton-

woods, in fields and along hedgerows. They were paired by mid-May, 1946. The species was not seen in December so it is presumably a summer resident only, although to the west in the Virgin River Valley it is a permanent resident. This goldfinch is a rare summer visitant at Bryce, the only record being on June 15, 1934 along the canyon rim. In the Aquarius region we found them in cottonwoods at Boulder on June 11, 1953, two breeding males being taken.

*Loxia curvirostra grinnelli* Griscom  
Red Crossbill

Near Navajo Lake, July 29, 1935; Swain's Cr., June 26, 1947; Posy Lake, June 9, 1952; Sand Cr., June 12, 1952. Total specimens, 14.

The Navajo Lake specimens were taken in a spruce-fir forest while the Swain's Creek examples were in yellow pine. At Bryce the species is an uncommon permanent resident, believed to be nesting in the higher portions of the park along the rim and wintering in the forests along the rim and in the canyons. Grater (1947:79) considers crossbills to be common permanent residents at Cedar Breaks in the forested zones along the rim and states that young have been noted in late July. Grater (1943:75) found two large flocks at Cedar Breaks on January 17, 1942 and heard others. Miller (1934:166) found small flocks present at Cedar Breaks at the time of his visit June 28-July 1, 1931. On the Aquarius Plateau a flock of about 20 crossbills was found in yellow pines at Sand Creek on June 12, 1952; eight being taken. A flock of similar size had been seen at Hungry Creek on June 10. Our only other records pertain to two seen in a yellow pine grove five miles north of Boulder on June 10, 1953.

The four specimens from near Navajo Lake were submitted to Ludlow Griscom who identified them as *grinnelli* intergrading toward *benti* and suggested that they had probably bred near where they were collected (See Woodbury, 1939:162).

*Loxia curvirostra benti* Griscom  
Red Crossbill

A post breeding female taken at Cedar Breaks June 30, 1931 by Miller (1934:166) and two males from Escalante Mountain, July 2-4 were called *L. c. bendirei* but have since been referred to *benti* by Griscom (1937:170).

*Loxia curvirostra stricklandi* Ridgway  
Red Crossbill

Near Navajo Lake, July 29, 1935. Total specimens, 4. These are rare vagrants from southward.

*Chlorura chlorura* (Audubon)  
Green-tailed Towhee

Cave Lakes Canyon, May 16, 1946 and May 21-23, 1947; Chamberlain Ranch, April 25, 1930; Navajo Lake, July 29, 1935; 5 mi. N. Boulder, June 12, 1953; 1 mi. E. Bicknell, May 18, 1956. Total specimens, 8.

The green-tailed towhee was only observed by Greenhalgh at Kanab on April 21, and 26, 1935. We saw a few in hedges along the fields south of town on September 21-23, 1946 and again on May 22, 1947. All these observations in the immediate Kanab area were probably transients. The species nests at higher elevations, however. At Cave Lakes Canyon they occupied a habitat in the pygmy forest association where they frequented the serviceberry bushes in the sage clearings among the junipers and piñons. At Bryce this towhee is a common summer resident throughout most of the park where it nests in late June. At Cedar Breaks it is also a common summer visitant and probably nests in the lower portions of the monument. Miller (1931:166) found this species on Escalante Mountain on July 2, 1931 and located a nest containing five eggs. It was located 18 inches above ground in a ceanothus bush. Robert Bee (Woodbury MS) found a nest on Steep Creek in 1938. It was located on the ground in an open bush area and was constructed of twigs and grass lined with horse hair. The eggs hatched the last of June. We found the

species north of Boulder in serviceberry bushes in sage clearings among the junipers and piñons in June where they were established in breeding territories. As migrants they were seen along the Escalante River on May 7.

*Pipilo erythrophthalmus montanus* Swarth  
Rufous-sided Towhee

Hidden Lake, April 25, 1930 and November 28, 1937; Cave Lakes Canyon, March 4 and May 14-17, 1946 and May 19-23, 1947; 1 mi. S. Kanab, December 28, 1946; Johnson, December 29, 1946; 5 mi. N. Boulder, July 4, 1952 and June 8, 11-12, 1953; Boulder, June 11, 1953; confluence Calf Cr. and Escalante R., May 7, 1954. Total specimens, 26.

The spurred towhee was observed a few times in March, April and August, 1931 and 1935 at Kanab. We saw it there only on September 21-24, 1946 and December 24, 1946. It was fairly common at Cave Lakes Canyon in March, 1946, in mid-May, 1946 and 1947 and in June 1947. The species occurred in oaks, squawbush and sagebrush in the pygmy forest. It was also observed at the Sand Dunes March 16, 1946 and at Tinny Canyon on May 21, 1947. At Bryce Canyon it is a common summer resident especially in the lower portions of the park where it occurs frequently in thickets of red birch. It nests in June. Evidently it nests earlier at lower elevations for three young barely able to fly were found at Cave Lakes Canyon on May 14, 1946. In the Boulder area we found this towhee mainly in scrub oaks and adjacent junipers, but also in streamside thickets, sage and squawbush. Nearly always there was a mat of deciduous leaves in which the birds could scratch.

*Paserulus sandwichensis nevadensis* Grinnell  
Savannah Sparrow

One mi. S. Kanab, April 15, 1947; 10 mi. S. Escalante, May 8, 1954; 1 mi. S. Bicknell, May 19, 1956. Total specimens, 8.

This sparrow was seen by Greenhalgh on April 21, 1935 at Kanab. They were abundant in the fields south of town on April 15, 1947. A few were seen at Johnson on March 21, 1953. All these were probably migrants for they were not frequenting the usual breeding habitat of moist meadows. However, the species may be an uncommon breeder in the Kanab region. At Bryce it is considered rare to uncommon and Presnall (1937:259) reports that in the course of bird banding operations from July 31 to August 3, 1937, two specimens were banded. They were taken in a sparse stand of yellow pine but open meadows were nearby. We found the species to be rare on the south side of the Aquarius Plateau, only one migrant being seen in low, dry grassland south of Escalante on May 8, 1954. On the north side it was common in mid-May and possibly breeding in the Bicknell Bottoms. Woodbury (MS) gives records for Torrey, June 17-18, 1938, near Bicknell and Lyman on September 20, 1935; at Escalante, June 10, 1936 and Boulder, June 29, 1936.

*Poocetes gramineus confinis* Baird  
Vesper Sparrow

One-three mi. S. Kanab, March 5 and September 16, 1946 and May 22, 1947; Johnson, April 15, 1947; Chamberlain Ranch, April 25, 1930; Duck Creek, June 21, 1947; Jacobs Reservoir, June 10, 1952; Beef Meadows, August 14, 1952; Spectacle Lake, October 26, 1952; 10 mi. S. Escalante, May 8, 1954. Total specimens, 19.

The vesper sparrow was observed regularly at Kanab from March 14 to April 24, 1931 and 1935. We saw a few scattered along the open desert country between Fredonia and Pipe Springs, Arizona on March 4, 1936. They were abundant in the fields one mile south of Kanab on April 15, 1947 and a few were seen at Johnson the same day. Greenhalgh observed the species at Duck Creek on June 20, 1935 and we found them common there in sagebrush clearings on June 21, 1947 and at Strawberry Creek on June 22 and 25, 1947. Miller (1934:166) noted the species in an artemisia flat at 10,000 feet elevation near Brian Head on June 25 [= June 28], 1931. Grater (1947:81) indicates that it is a fairly late summer visitant in the mountain meadows back of the rim of Cedar Breaks. Similarly at Bryce it is a common summer resident in the meadows back of the rim and young have been

noted in early July. A flock of a hundred was seen near the north boundary on September 10, 1934. Miller (1934:166) found them common near Widtsoe July 2-4, 1931. On the Aquarius Plateau we found them on the dry flats around Cyclone Lake and Jacobs Reservoir in June, 1952. A late record pertains to the specimen taken at Spectacle Lake on October 25, 1953.

We found the vesper sparrow to be primarily an inhabitant of sagebrush but also occurring in low grass areas of subalpine or alpine meadows. Occasionally they would seek protection in willows, spruce or other tree forms fringing the sage or grass flats.

*Chondestes grammacus strigatus* Swainson  
Lark Sparrow

One mi. S. Kanab, May 12-13, 1946 and May 20, 1947; Boulder, June 11, 1953; confluence Calf Cr., and Escalante R., May 7, 1954. Total specimens, 13.

The lark sparrow was observed regularly at Kanab from April 13 to August 24, 1931 and 1935. We found them common in the fields south of town on May 20-22, 1947 but less abundant on June 17, 1947. At Bryce Canyon it is considered an uncommon summer visitant. In the Aquarius region they were common in fields around Escalante and 10 miles south in early May as well as along the Escalante River gorge. The normal habitat was sage, rabbit brush, and other low desert shrubs. Occasionally they were seen in a juniper-sage habitat. One was taken in the swamp at Boulder, an atypical habitat for the species.

*Amphispiza bilineata deserticola* Ridgway  
Black-throated Sparrow

Three mi. S. Kanab, May 20-22, 1947; 5 mi. E. Kanab, April 15, 1947; Cave Lakes Canyon, May 23, 1947. Total specimens, 10.

This sparrow was seen regularly at Kanab from April through August 24, 1931 and 1935. We saw about 20 in the desert flats five miles east of Kanab on April 15, 1947 in sage. They were numerous along Kanab Creek in sage and greasewood on May 20, 1947. At Cave Lakes Canyon they occupied a sage-juniper habitat. Our only record for the Aquarius region was one seen 10 miles south of Escalante on May 8, 1954. Beck observed this sparrow at Willow Tank Springs on June 5, 1940. It is therefore a common summer resident of the lowlands occupying a desert shrub association.

*Amphispiza belli nevadensis* (Ridgway)  
Sage Sparrow

We have only two sight records for the fields south of Kanab, one on March 15, 1931, the other on May 20, 1947. It is probably a rare breeder in the Kanab area, although to the west in Zion Canyon it is, according to Grater (1947:82), a fairly common summer resident. Woodbury and Russell (1945:147) report a juvenile male taken June 15, 1936 in willows along Warm Creek, 3100 feet, near the Colorado River, Kane County, Utah. We did not find the species in the Aquarius region although Woodbury (MS) gives a record for Widtsoe on August 4, 1940. Probably the species is more common than the few records indicate. There is a tremendous expanse of the sage habitat and the species is illusive.

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

Tinny Canyon, December 30, 1946. One specimen.

This individual occurred in a small flock of *Junco oreganus* in a juniper thicket. Grater saw four at the Capitol Reef National Monument on November 5, 1951 (Woodbury MS). It is a rare winter visitant.

*Junco oreganus montanus* Ridgway  
Oregon Junco

Kanab, December 26, 1946; Tinny Canyon, December 30, 1946; Cave Lakes Canyon, March 3-5 and December 30, 1946; Cottonwoods, December 27, 1946; Spectacle Lake, October 26, 1952; Fish Cr., February 21, 1953; confluence Calf Cr. and Escalante R., May 7, 1954. Total specimens, 20.

Observations of the species at Kanab were made regularly from February 21 through April 13 in 1931 and 1935. We found them common on December 24-30, 1946 along Kanab Creek, Johnson and Three Lakes as well as at the areas from which specimens were taken. They frequented oaks and streamside thickets and occasionally junipers. Flocks as large as 50 were observed. This junco is a common winter visitant. Oregon Juncos, probably of this subspecies although listed as *shufeldti* by Grater (1947:83), are common migrants at Bryce, arriving in September, and may be winter residents. Similarly they are common migrants arriving in September at Cedar Breaks. On the Aquarius Plateau early migrants were common at Spectacle Lake October 25-27, 1952 where they occurred in the Englemann Spruce often mixed in flocks with mountain chickadees. The species was common in the juniper forest, near Fish Creek on February 21, 1953 but were solitary or in small groups of 3 to 5 birds and not mixed with chickadees. A migrant female was taken along the Escalante River May 7, 1954 that had a slightly enlarged ovary.

*Junco oreganus mearnsi* Ridgway  
Oregon Junco

This rather distinctive subspecies of the Oregon Junco which can be distinguished in the field was seen at Kanab by Greenhalgh on February 22 and five times throughout March in 1931.

*Junco caniceps caniceps* (Woodhouse)  
Gray-headed Junco

Duck Creek, July 26-28, 1935 and June 21-24, 1947; Navajo Lake, July 2, 1953; Posy Lake, June 9, 1952; Deer Lake, June 13, 1952; Spectacle Lake, August 8 and October 25-26, 1952; 5 mi. N. Boulder, June 9, 1953; Aquarius R. Sta., August 26, 1953; confluence Calf Cr., and Escalante R., May 7, 1954. Total specimens, 24.

Our only two records for the lowlands are for Kanab where migrants were seen on May 13, 1931 and March 21, 1935. They were common as breeding birds at Duck Creek, Strawberry Creek, Navajo Lake and Cedar Breaks, June 20-25, 1947 and July 2, 1953. At these localities they occurred in the spruce-fir forest. A few were seen at Swain's Creek, June 24, 1947 in the yellow pine, but they were scarce here as compared to the spruce-fir forest. Miller (1934:167) found them to be moderately common at Cedar Breaks, June 28-July 1, 1931. Grater (1947:84) considers the species to be a common summer resident at Cedar Breaks and states that young have been observed in August. At Bryce they are fairly common permanent residents nesting in June and early July. We saw a migrant in the lowlands along the Escalante River at Calf Creek on May 7, 1954. Miller (1934:167) found this junco moderately common on Escalante Mountain, July 2-4, 1931.

In our field work on top the Aquarius Plateau we found them to be common each year at all collecting stations throughout the summer. They occurred in yellow pine, blue spruce and Douglas fir and mixtures of these coniferous trees and aspens. Juncos of this type were seen at Roundy Reservoir on October 25, 1952 and at Spectacle Lake the following day in small numbers in mixed flocks with Oregon juncos and chickadees.

Concerning the events of the breeding season the male junco taken along the Escalante River on May 7 had testes measuring 6 mm. long. That from 5 miles north of Boulder taken June 9 had testes 9 mm. in length. At Strawberry Creek on the Markagunt Plateau we found a nest on June 22, 1947. It contained 4 eggs and was located on the ground at the base of an overhanging aspen trunk, thus receiving protection from above. At Spectacle Lake we found a nest on August 9, 1952. It contained 3 eggs and was also located on the ground but in the hollow end of a 6 inch log of Englemann spruce. Tall grass partially obscured the nest. Adults continuously incubated the eggs as long as the nest was observed up to August 11. About the same time immature juncos were seen in Englemann spruce at Beef Meadows, August 12-14, 1952.

*Spizella passerina arizonae* Coues  
Chipping Sparrow

Cave Lakes Canyon, May 14-16, 1946 and May 19-23, 1947; near Orderville, May 7, 1937; Chamberlain Ranch, April 25, 1930; near Mammoth Cave, August 1, 1935; Duck Creek, July 28, 1935 and June 21, 1947; Posy Lake, June 9, 1952; 2 mi. E. Jacobs Reservoir, June 11, 1952; Boulder, July 5, 1952; 3-5 mi. N. Boulder, June 8-13, 1953. Total specimens, 33.

Chipping sparrows were regularly observed at Kanab from April 14 through August 12, 1931 and 1935. In the fall they were seen there on September 23, 1946. As breeding birds they were common at Cave Lakes Canyon in mid-May, 1946 and 1947. They occurred mostly in the sage patches in the juniper forest along the rim rock but occasionally ventured down into the oaks in the canyon. We observed them at Swain's Creek on June 24, 1947 and at Strawberry Creek June 22, 1947, in each case in sagebrush. They were the commonest bird around the campground at Navajo Lake in June, 1953 where they frequented the spruces and would come down to the tables and camp areas for bits of food. Miller (1934:167) found Chipping Sparrows abundant about the borders of the meadows at Cedar Breaks, June 28-July 1, 1931. Several groups of young were seen and once a male was heard singing by moonlight. Grater (1947:84) considers them to be common summer residents there, nesting in late June and early July. At Bryce Canyon they are likewise common summer residents throughout most of the park where they nest in June. On the Aquarius Plateau chipping sparrows were common in aspens and oaks at Posy Lake June 8-10, 1952 but were sparse in Englemann spruce near Jacobs Reservoir June 11-12, 1953. They were common north of Boulder in June and July, 1952-53 in an ecotonal area of yellow pine, squawbush, oak, rabbit brush and serviceberry. They were also common along the Escalante River at Calf Creek on May 7 in sage and rabbit brush and again in the fields south of Escalante on May 9, 1954.

*Spizella breweri breweri* Cassin  
Brewer's Sparrow

Two-three mi. S. Kanab, May 20, 1947; near Orderville, May 7, 1937; Cave Lakes Canyon, May 17, 1946 and May 18-23, 1947; confluence Calf Cr. and Escalante R., May 7, 1954; 10 mi. S. Escalante, May 8, 1954; Bicknell, May 19, 1956. Total specimens, 20.

Greenhalgh observed the species regularly at Kanab from May 10 through July 19, 1931. We found them to be common in the sage on the west side of Kanab Creek south of town on May 12, 1946 and again on May 20, 1947. On June 17, 1947 they were seen in sage areas along with Desert Black-throated Sparrows two miles south of Kanab. At Cave Lakes Canyon in mid-May, 1946 and 1947 they were common in the sage areas of the pygmy forest but less numerous than Chipping Sparrows. Although the species occurs up to 10,500 feet, elsewhere in Utah, Brewer Sparrows have seemingly not been recorded from Bryce Canyon or Cedar Breaks. In the Aquarius region they were moderately common in sagebrush and rabbit brush at lower elevations on the south side of the plateau at Escalante in May. They were not found on top the plateau but occurred again at Bicknell on the north side at 7200 feet elevation. Here too they were in sage.

*Zonotrichia leucophrys oriantha* Oberholser  
White-crowned Sparrow

One-three mi. S. Kanab, May 20-22, 1947; Cave Lakes Canyon, May 12-14, 1946; Duck Creek, June 22, 1947; nr. S. Boundary Cedar Breaks National Monument, June 25, 1947; Brian Head, 2 mi. N. Cedar Breaks National Monument, July 3, 1953; Jacobs Reservoir, June 12, 1952; Spectacle Lake, August 9, and October 26, 1952; 8 mi. N. Boulder, June 9, 1953; Kings Pasture, August 20, 1953; Aquarius R. Sta., August 25, 1953; confluence Calf Cr. and Escalante R., May 7, 1954; 1 mi. E. Bicknell, May 19, 1956. Total specimens, 30.

White-crowned sparrows were observed at Kanab six times from March 15 to June 13, 1931. They were abundant in the fields south of town and on the desert flats five miles east of Kanab on April 15, 1947. They were numerous along Kanab

Creek from May 1 to 21, 1947. Only the specimen taken was seen at Duck Creek in 1947 but several occurred there in the willows on July 1, 1953. We found them to be numerous at the south entrance to Cedar Breaks on June 25, 1947 where they occurred in currant bushes on rocky slopes or in spruce copses. They preferred the sunny side of the cover but would dive into the dense, shady growth at one's approach. A few were singing. In general they were wild at this time of the year and if pursued would fly several hundred yards to another clump of trees. This was two days after a heavy snow storm which may have upset the normal behavior of the breeding season. Miller (1934:167) reported that they were abundant in the high meadows and artemisia bush at Cedar Breaks at the time of his visit June 28-July 1, 1931. He found that in the meadows they inhabited the low clumps of willows and conifers. A pair had a nest which was located on the ground in a dry clump of grass at the edge of a wet meadow. On June 28 it contained four eggs all of which hatched between daylight and noon of the following day. Other pairs had young either still in the nest or just able to run about. Males sang regularly by moonlight. A pair was collected. Grater (1947:85) indicates that the species is a fairly common summer resident at Cedar Breaks nesting in June. It is apparently unreported from Bryce.

In the Aquarius region they occur as migrants in the lowlands as indicated by the specimen from Calf Creek on May 7. It was associated with several Gambel sparrows. During the breeding season they were common around Jacobs Reservoir on June 12 frequenting willows alongside small streams. The males had testes measuring 10 mm. in length and an egg was found in the oviduct of a female. This sparrow was common in willow clumps along the water's edge at Deer Lake on each of six visits during June and July, 1952-53. They were again found at Spectacle Lake, August 7-11, 1952 where they occurred commonly in the spruces near the lake and around small marshy areas. Large numbers inhabited the willow thickets along streams 8 miles north of Boulder on June 9, 1953. It was common at Kings Pasture August 20, 1953 and in streamside willows at the Aquarius Ranger Station August 25, 1953.

*Zonotrichia leucophrys gambelii* (Nuttall)  
White-crowned Sparrow

One mi. S. Kanab, September 20 and December 28, 1946; Tinny Canyon, September 22, 1946; Hidden Lake, November 28, 1937; Spectacle Lake, October 26, 1952, confluence Calf Cr. and Escalante R., May 7, 1954. Total specimens, 7.

The Gambel sparrow is a fairly common winter resident and transient in the Kanab area. It was regularly observed by Greenhalgh in 1931 and 1935, his records extending from January 7 through May 14. Our more recent records indicate that it was common at Kanab and Tinny Canyon, September 21-23, 1946. It occurs in mixed flocks with *Z. l. oriantha*. At Bryce Canyon it is reported to be a common migrant in the fall and spring. In the Aquarius region not only were they migrants in the lowlands but also on top the plateau. The Spectacle Lake specimen was an immature.

*Passerella iliaca* (Merrem)  
Fox Sparrow

A single record exists which is listed in Woodbury *et al.* (MS) and pertains to a sight record of Beck and Bee who saw a single fox sparrow in a boggy basin below Coot Lake on Steep Creek on June 22, 1938. There is considerable habitat in the study area similar to that of the northern part of the state occupied by this sparrow but we did not encounter it in our field work.

*Melospiza lincolni alticola* (Miller and McCabe)  
Lincoln's Sparrow

Junction of Crawford Wash and Paria River, March 6, 1946; 3 mi. S. Kanab, April 16, 1947; Cave Lakes Canyon, March 4, 14-17, 1946; Duck Creek, June 22-24, 1947; Cedar Breaks, August 3, 1935; Posy Lake, June 9-10, 1952; Jacobs Reservoir, June 11, 1952; Deer Lake, June 12-13, 1952; 8 mi. N. Boulder, June 9, 1953. Total specimens, 18.



In the lowlands the species occurs as a transient. In addition to the specimens listed a few were seen at Johnson Reservoir on April 15, 1947. In the mountains and plateaus it has a status of an uncommon summer resident. We found them in June at Duck Creek among willows in a wet meadow-streamside habitat. Miller (1934:168) found three males stationed along the wettest part of a meadow at Cedar Breaks and collected one. Our specimen from there was a juvenile, so the species doubtless nests in the monument area. Grater (1947:87) indicates that the species is a rare summer visitant at Cedar Breaks. At Bryce it is reported to be an uncommon summer resident with young having been observed in June. In the Aquarius region they occurred at Posy Lake on June 9-10 in a narrow fringe of rushes and cattails at one corner of the lake. A pair was found in willows along a small stream near Jacobs Reservoir, June 12-13, 1952. A pair was seen in a small marsh of sedges at the edge of Pear Lake on August 17, 1952. They were most numerous at Deer Lake where several were observed on June 9, 1953. They were also observed in the dense willows of Dark Valley on August 26, 1953.

*Melospiza melodia montana* Henshaw  
Song Sparrow

Hidden Lake, November 28, 1937; Kanab Canyon, 5 mi. N. Kanab, May 17, 1946; Cave Lakes Canyon, March 3, 1946; May 14-18, 1946; December 30, 1946; May 19-21, 1947; Three Lakes, December 27, 1946; Cottonwood Canyon, December 27, 1946; 1 mi. S. Kanab, December 28, 1946; Swain's Creek, June 24, 1947; Fish Cr., July 4, 1952; Boulder, July 6, 1952 and June 11, 1953; 5 mi. N. Boulder, July 6, 1952 and June 8-11, 1953; Fremont R., 1 mi. SW. Bicknell, May 19, 1956. Total specimens, 29.

Song sparrows occur in the Kanab region the year around but the winter birds are probably migrants from the north and thus do not represent the breeding population. Greenhalgh observed the species regularly from February 21 to April 28, 1931 and on April 12, 1935. We saw a few along Kanab Creek, one mile south of Kanab on December 23-24, 1946 and several in Cottonwood Canyon, December 27. They were numerous along the hedgerows, fences and in dry weed stalks in the fields south of Kanab on December 28. Thus in winter they were not attracted to willow thickets along streamides, marshes or swamps which is their habitat during the breeding season. On March 6 and 12, 1946 a few were seen at Cave Lakes Canyon where they frequented a cattail swamp. The species was nesting here in mid-May. Three young were found on May 16, 1946 that had evidently just left a nest for they could barely fly. Adults were also seen at this time in willows bordering a wet, boggy meadow. During the breeding season on May 19-20 they were also seen at Three Lakes, the Lower Reservoir and Kanab Creek south of Kanab. They were again observed at these locations on June 19. The highest point of occurrence on the Markagunt Plateau was Swain's Creek at 7750 feet on June 24. Above this they seemed to be replaced by the Lincoln sparrow in similar habitat. In the Aquarius region they were seen in dense willows along the creek and in the marsh and pond area in Boulder in June and July.

As to the systematic position of the resident population at Kanab, Behle (1948: 79) indicated that they are intergrades between the races *fallax* of the Virgin River Valley to the west and *montana*, but closest to *montana*. Farther north in the Aquarius region they are *montana*.

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