

MOHAVE DESERT AVIFAUNA IN THE VIRGIN RIVER VALLEY OF UTAH, NEVADA, AND ARIZONA

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The Mohave Desert biome, which occurs mostly in California, extends northward along the Virgin River Valley into extreme northwestern Arizona, southeastern Nevada and southwestern Utah. The approximate northern limits in Nevada have been mapped by Gullion et al. (1959:279). Included are the Meadow Valley Wash, Muddy River and Pahrangat Valley. In northwestern Arizona its area of occurrence is the localized lower Beaver Dam Wash area near Littlefield and the adjacent Virgin River Valley. In Utah this warm southern desert occurs as a relatively narrow tongue along the floor and immediate slopes of the Virgin River Valley up to the mouth of Zion Canyon near Springdale and Coal Pits Wash, as well as the lower stretches of tributary streams such as La Verkin, Ash and Santa Clara creeks and the Beaver Dam Wash. The Virgin River Valley is characterized by long, hot summers, a feature shared with the more southern deserts of Arizona and California, but correlated with the higher elevation (2,880 feet at St. George), the winters are colder. The most conspicuous indicator plants found in this northern portion of the Mohave Desert are cholla cactus, Joshua tree, mesquite, desert willow and creosote bush. The desert is discontinuous because of the interposition of high plateaus and mountain ranges.

Certain distinctions of the avifauna of the Virgin River Valley in southwestern Utah and adjacent parts of Nevada and Arizona that indicate an affinity with the Mohave Desert Biome or Lower Sonoran Life Zone have been known since the initial field work in the region by members of two U. S. Government surveys in the latter part of the nineteenth century. These were the Wheeler Survey of 1872 (Henshaw 1875) and the Death Valley expedition of 1891 (Fisher 1893). Linsdale (1936 and 1951) included what little data were then available for southeastern Nevada for the distinctive species. Additions since then for that state have been made by Gullion (1953), Gullion et al. (1959), Hardy (1949), Johnson (1956), Johnson and Richardson (1952), Pulich (1952), Hayward et al. (1963). Apparently Phillips et al. (1964) did little or no field work in the remote north-

western corner of Arizona, but what information was recorded in the literature was included in their summary for the state. Since then Wauer (1969) has added some records for Littlefield and the lower Beaver Dam Wash in Arizona. Knowledge concerning the birds of southwestern Utah was furthered by the observations of Tanner (1927), Presnall (1935), Hardy and Higgins (1940), Behle (1943), and Grater (1947). As a sequel to his earlier work Behle sent parties from the University of Utah to collect birds in extreme southwestern Utah in 1960 and 1961 (supported by NSF Grant No. G 17920) and he led parties in the spring of 1968, 1969, 1970 and 1972 to the Santa Clara and Beaver Dam Wash areas. Roland Wauer and Dennis Carter, naturalists of Zion National Park, and their associates made extended observations in the region from 1962 to 1966 with many significant observations resulting (Carter and Wauer 1965, Easterla 1966, Wauer 1965, 1967, 1968, 1969, Wauer and Carter 1965, Wauer and Russell 1967 and Audubon Field Notes for 1962-1966).

All this field work of the 1960's and early 1970's indicates natural changes in geographic ranges for several species whereby they seem to have extended their ranges into southwestern Utah. This paper is concerned with a re-analysis of the avifauna of the Mohave Desert in Utah. The extensions of range and distinctive species are discussed. To round out the distributional picture the records of occurrence of the Mohave Desert indicator species for the similar desert terrain in adjacent Nevada and Arizona have been included. There are 257 kinds of birds now known to occur in southwestern Utah representing all seasonal categories and degrees of abundance. Of these, 85 are breeders in the Virgin River Valley. Twenty eight kinds of the summer residents are distinctive to the region, being representatives of the Mohave Desert avifauna. Of these 15 are known to occur in Utah only in this area. The other 13 occur regularly in southwestern Utah but a few extra-limital records have turned up elsewhere in the state. In addition, there are five species of geographically variable birds that

are represented either by a race occurring in Utah only in this portion of the state or they show an intergrading population which is indicative of southern origin.

SPECIES ACCOUNTS

Buteogallus anthracinus. Black Hawk. This species was first discovered in Utah south of Springdale on 4 May 1962 (Carter and Wauer 1965:82-83). Additional data were recorded by Wauer and Carter (1965:47), Wauer and Russell (1967:420) and Wauer (1969:331). Still more information occurs in Audubon Field Notes (16:435 and 495, 1962; 17:474, 1963; 20:590, 1966; 22:44, 1968; 23:87, 1969) and in American Birds (25:884, 1971; 26:788, 1972; 27:800, 1973). One specimen has been taken (Wauer 1969:331) at Washington on 21 April 1966. The species seemingly is a late arrival in southern Utah which has persisted as a summer resident for several years. There has even been some reproduction.

Lophortyx gambelii gambelii. Gambel's Quail. This species is of native occurrence and fairly abundant in all three states as indicated by many observations and specimens. There are several records for Utah outside of the Virgin River Valley but whether they are naturally occurring or introductions is problematical. Those from the Moab area were assigned by Woodbury et al. (1949:11) to the race *sanus*, but Phillips (1958:365) placed this race in synonymy under *gambelii*.

Zenaida asiatica mearnsi. White-winged Dove. At the time of the last check-list of the birds of Utah by Woodbury et al. (1949:16) this species had a status of "probably accidental" based on one record of a specimen seen in East Canyon, Morgan County on 1 August 1939. Now it appears to be an uncommon summer resident of extreme southwestern Utah in the Beaverdam Wash with four additional sporadic records scattered around in the state. As regards the Beaver Dam area in Utah there are many sight records since 1960 (Behle et al. 1964:452). Six additional specimens have been taken since then. Wauer (1969:332) stated that he found the species regularly in the wash in Utah as well as in adjacent Arizona at Beaver Dam and Littlefield and in Nevada at Overton. The dates of occurrence were from 5 April to 4 August. Gullion et al. (1959:285) found this species to be a common summer resident in the hot, humid bottomlands of the Mohave Valley in southern Nevada and stated that it appeared to be extending its range, having been reported from Overton, Pahrnagat Valley and Pahrump Valley (see also Johnson and Richardson 1952:358). A still further extension is suggested by the Utah records. Phillips et al. (1964:41) also noted an extension of range in Arizona but made no reference to the occurrence of the species in the extreme northwestern corner of the state.

Columbina passerina pallescens. Ground Dove. This species has not yet turned up in Utah, but Wauer (1969:332) observed one at Overton, Nevada on 19 October 1965 and took an immature male there on 20 July 1966. Prior records for southern Nevada were provided by Hardy (1949) who observed one at Corn Creek Ranch, Desert Game Range, Clark County, Nevada on 27 and 29 June 1945, and by Gullion (1953) who obtained a specimen 4 miles east of Las Vegas, Nevada. Phillips et al. (1964:43) gave no records from extreme northwestern Arizona.

Scardafella inca. Inca Dove. A male was taken at the Terry Ranch in the Beaver Dam Wash in Utah

on 9 July 1963 and reported by Behle (1966:396). The late Stewart Murie observed the species farther north at Parowan, Iron County on 15 August 1963. Gullion (1953) gave a sight record of this species on 17 October 1952 at Logandale, Clark County, Nevada. Phillips et al. (1964:43) gave no records for northern Arizona.

Geococcyx californianus. Roadrunner. This species is fairly common in southwestern Utah, having been reported by virtually all observers. Extra-limital records for Utah are from Kanab (Behle et al. 1958:51) and near Provo, reported by Hayward (1944:204), the latter either of accidental occurrence or an escaped bird.

Linsdale (1936:61) reported the species as resident in southern Nevada, one record being from Pahrnagat Valley and another from St. Thomas. Gullion et al. (1959:285) stated that the northernmost record for Nevada pertains to one seen at Panaca. Phillips et al. (1964:45) did not include northwestern Arizona in the range of the species in that state.

Chordeiles acutipennis texensis. Lesser Nighthawk. Woodbury et al. (1949:17) indicated the status of the Lesser Nighthawk in Utah as being a sparse summer resident of the low Virgin River Valley of southwestern Utah, at least from 6 May to 14 August. This caused Wauer (1969:332) to surmise a change of status, since he found it to be a common summer resident throughout the Virgin River drainage below 2,500 ft. elevation from 24 April to 25 August. I doubt any change of status; rather this is probably a case where there was insufficient knowledge of the species' abundance when Woodbury et al. made their judgment. Wauer also cited two specimens taken, one from Washington on 7 May 1965, the other from Berry Spring, 2 June 1966. Wauer and Carter (1965:56) suggested a vagrant status for the species in Zion National Park with an occasional individual wandering in. Their data pertained to several nighthawks thought to represent the species seen over Blue Springs Lake on 30 August 1964 and one seen at the pond west of Coal Pits Wash on 2 September 1964. Evidence that the species is not confined to extreme southwestern Utah is afforded by two specimens from one mile north of Hanksville, Wayne County on 8 July 1961 (Behle et al. 1964:453). In addition, Wauer took a specimen from Berry Springs near Hurricane on 2 June 1966.

Linsdale (1936:65) reported the species as a summer resident in southern Nevada with records as far north as Pahrnagat Valley. Phillips et al. (1964:57) cited no records from northwestern Arizona but included this corner of the state in the range of the species as indicated by a square on their distribution map.

Aeronautes saxatalis saxatalis. White-throated Swift. This wide-ranging species occurs commonly throughout the tri-state region under consideration. The species shows both clinal and local variation with some distinctions of the population from southwestern Utah. A recent study by Behle (1973) showed that the population from there averaged the smallest in wing length of many samples studied from Utah and western North America, being even smaller than swifts from Arizona and New Mexico. This suggests a southern origin of this population from southwestern Utah.

Calypte costae. Costa's Hummingbird. This southern desert species has been reported repeatedly for southwestern Utah although few specimens have been obtained. An extra-limital record for Utah based on a specimen was reported by Porter and Bushman (1956:152) in "Garfield County, during

the spring of 1953." It has since been ascertained that the exact locality is two miles northwest of Tropic, 7,000 feet and the date of collection was 15 June 1953.

Linsdale (1936:67) found the species to be a summer resident of southern Nevada with records as far north as Pahrnagat Valley. Phillips et al. (1964:62) cited no records from northwestern Arizona but showed a spot on their distribution map for southwestern Utah.

Eugenes fulgens. Rivoli's Hummingbird. This species breeds in the mountains of southern Arizona and southwestern New Mexico south into Mexico but some extra-limital records have been obtained in recent years in southwestern Utah. One was observed at Springdale, Utah from 7 July to 10 August 1971 by Jerome Gifford and photographed on 11 July (Am. Birds 25:885, 1971 and 26:97, 1972). Field notes of the late Stewart Murie reveal that he saw one on 24 August 1962 at an abandoned farm three miles northwest of Parowan. His second observation was of a male at Cedar City on 24 August 1971 (Am. Birds 26:97, 1972). Linsdale (1936) gave no records for Nevada and Phillips et al. (1964:65) gave no records for northern Arizona.

Colaptes auratus chrysoides. Gilded Flicker. Phillips et al. (1964:68-69) discussed intergradation between the races *chrysoides* and *collaris* and cited locality records where intermediate specimens had been obtained, the one nearest to Utah being from the Verde Valley (Camp Verde). However, this phenomenon also occurs further north, for Wauer and Carter (Aud. Field Notes 18:377, 1964) saw a "Gilded Flicker" in the Beaver Dam Wash in Utah on 13 February 1964 and one again there on 26 March. Subsequently (Aud. Field Notes 20:591, 1966) two specimens (a pair) were obtained on 15 May 1965, each being an intermediate.

Dendrocopos scalaris cactophilus. Ladder-backed Woodpecker. This species has been reported for southwestern Utah by virtually all observers, many specimens having been obtained in recent years. For Nevada Linsdale (1936:73) gave its status as resident in the extreme southern end of the state, north to the vicinity of Charleston Peak, and he noted a specimen taken near Mesquite. Johnson (1956:450) extended the breeding range north to Pahrnagat Valley. Phillips et al. (1964:75) stated that this small desert woodpecker is a common resident throughout the Lower Sonoran Zone in Arizona which presumably included the extreme northwestern corner of the state.

Short (1968:7) analyzed the geographic variation in this species and found that examples from southwestern Utah are large, being at the north end of clines of increasing wing and tail length and large bill size from south to north. They exhibit intermediacy in back barring between examples from the Lower Colorado Valley "*yumanensis*" and both "*mojavensis*" and central Arizona *cactophilus*. However, he did not feel that "*yumanensis*" is sufficiently marked to merit subspecific recognition.

Myiarchus tyrannulus magister. Wied's Crested Flycatcher. Banks and McCaskie (1964) reviewed the distribution and status of this species in the lower Colorado River Valley and concluded that the species is a regular, and probably not uncommon, breeding species from southern Nevada at least to the Mexican border. Other records for the lower Colorado River Valley were given by Pulich (1952). Phillips et al. (1964:80) stated that the species was uncommon in Arizona along the Colorado River, occurring locally as far north as the southern tip of

Nevada. An extension of range northward into extreme northwestern Arizona and southwestern Utah was reported by Wauer (1968 and Aud. Field Notes 20:538, 1966) who took two specimens in the Beaver Dam Wash. One that was at Beaver Dam, Arizona on 5 May 1966 was one of a mating pair. The other was taken in Utah on 18 May 1966 three miles above the Lytle Ranch. Wauer observed the species in the Wash in 1966 on 27 April, 12 May (a pair mating), 19 May (carrying either nesting material or food), 26 May, 16 June, 23 June, 21 July. In our field work we obtained an additional specimen, a female taken on 24 May 1968 one mile north of the Lytle Ranch. It was frequenting a grove of cottonwoods and weighed 49.5 grams.

Sayornis nigricans semiatra. Black Phoebe. This is a fairly common permanent resident at localized water areas in the Utah portion of the Virgin River Valley with numerous records having accumulated through the years. Wauer and Carter (1965:60) felt that the species has increased in numbers in the Zion Canyon area. The range of the species in Utah is not confined to the Virgin River Valley, for it seemingly occurs regularly to the east at Kanab (Behle et al. 1958:57, and Behle et al. 1964:454) and sporadically to the north in the Great Basin as indicated by observations from Newcastle (Behle et al. 1964:454), Cedar City (Am. Birds 25:886, 1971) and a specimen from Salt Lake City on 4 June 1963 (Behle 1966:396).

For Nevada, Linsdale (1936:75) reported the species present at least in winter along the Colorado River on the southern border of the state, noting several localities of observation and specimens. Cottam (1936:122) reported that it occurred regularly in May at Alamo, Pahrnagat Valley. Johnson (1956:450) found it breeding at Meadow Valley Wash, 4 miles south of Caliente. Gullion et al. (1959:287) added many additional records for southern Nevada. Phillips et al. (1964:83) did not give any records for extreme northwestern Arizona although their distribution map indicates the occurrence of migrants in southwestern Utah.

Pyrocephalus rubinus flammeus. Vermilion Flycatcher. This is an uncommon but frequently reported resident in southwestern Utah with extra-limital records for Kanab (Behle et al. 1958:59). For Nevada, Linsdale (1936:79) considered it resident in the southern end of the state, a judgment based on several observations and specimens. Cottam (1936:122) reported at least a pair remaining throughout the winter of 1924-25 in Pahrnagat Valley south of Alamo. Wauer obtained a male at Overton on 8 December 1965 which is in the Zion National Park collection. Phillips et al. (1964:92) did not give records for extreme northwestern Arizona, although their distribution map shows that the species was known from southern Nevada and southwestern Utah.

Stelgidopteryx ruficollis. Rough-winged Swallow. Virtually all chroniclers have listed this species as occurring in the Virgin River Valley so the problem is not one of occurrence, but rather the systematic relationships of the population. Behle (1943:48) referred several specimens from various localities in southwestern Utah to the race *serripennis*. Wauer (1969:332) also referred a male from Springdale taken on 11 May 1965 and a male from Washington obtained on 25 April 1966 to that race. However, a female taken at Beaver Dam, Arizona on 14 April 1966, which was one of four nesting birds, he designated as *psammochroa*, commenting that the systematic status of the Rough-winged Swallows needed

further study. Linsdale (1936:81) referred his examples to *serripennis*.

Phillips et al. (1964:97) referred specimens from the Virgin River Valley in both Utah and extreme northwestern Arizona as well as one from Tuba City, much farther east, to *serripennis*, yet they considered a female from Flagstaff to represent *psammochroa*. As such it was their only representative of this race from northern Arizona. They attributed a range to the race *psammochroa* embracing all of southern Arizona north to Prescott as well as the southern tip of Nevada. On geographic grounds extreme northern Arizona would be expected to be an intergradational area between the two races with the population showing an approach to *psammochroa* but still closest to *serripennis*. The Flagstaff and Beaver Dam examples may be extreme variants closest to *psammochroa*. I have seen as yet no specimens from Utah referable to *psammochroa* although the Beaver Dam example suggests such may occur north of the border in the Beaver Dam Wash as well.

Petrochelidon pyrrhonota tachina. Cliff Swallow. In our early field work in southwestern Utah no specimens of Cliff Swallows were taken. Linsdale (1936:83) listed specimens from Lincoln and Clark counties, Nevada including Pahrnagat Valley under the name *P. albifrons albifrons*. Phillips et al. (1964:99) evidently had no material from northwestern Arizona. Subsequent field work in Utah has resulted in 34 specimens. These are all of small size with ochraceous foreheads, which places them in the race *tachina*. In the meantime Wauer (1969:332) obtained a single specimen from a colony at Littlefield, Arizona in the lower Beaver Dam Wash which he reported as representing *tachina*. However, he erroneously inferred that Behle (1960:19) considered the Cliff Swallows of the St. George Basin to represent the race *hypopolia*. The race *tachina* is confined in its distribution in Utah to the Virgin River Valley. Probably breeding birds from Pahrnagat Valley, Nevada and southward also represent this race.

Auriparus flaviceps acaciaram. Verdin. The paucity of records for southwestern Utah suggests that the species is rare, but new collections indicate that the species is fairly common in both the St. George and Beaver Dam areas. For Nevada, Linsdale (1936:88) reported it common in the Virgin River Valley. Gullion et al. (1959:289) found the species widely distributed in southern Nevada, giving several localities including those of Johnson and Richardson (1952). Phillips et al. (1964:113) gave no records for northwestern Arizona although they noted the occurrence of the species in southern Nevada.

Campylorhynchus brunneicapillus couesi. Cactus Wren. This is a common resident in southwestern Utah, many records and specimens having been obtained through the years. For Nevada, Gullion et al. (1959:289) brought the records up to date since the work of Linsdale (1936:92). Their northernmost record was from Lincoln County adjacent to Utah, 24 miles east-northeast of Carp, obtained on 27 June 1954. Phillips et al. (1964:119) gave no records for northwestern Arizona although their distribution map shows the species occurring in southwestern Utah and southern Nevada.

Toxostoma lecontei lecontei. Le Conte's Thrasher. Fisher (1893:128) reported this species at several localities in southern Nevada and on the west side of the Beaver Dam Mountains in Utah, almost to the summit of the range where it frequented the "tree yuccas and arborescent cactuses with the cactus wren." Presnall (1935:205) stated that it was rare or accidental in Zion National Park where the species

was supposedly observed by Vasco Tanner along Shunes Creek. Presnall furthermore gave the numbers of four specimens from the park allegedly in the collection at Brigham Young University. This was doubtless the basis for Wauer and Carter's (1965:69) statement that Tanner saw the species at Shunes Creek. The Zion Canyon records appear to be in error, however, since the four specimens could not be located in the B.Y.U. collection when I asked to examine them. Hardy and Higgins (1940:104) said the species was rare on the slopes of the Beaver Dam Mountains. A few specimens have been taken in Utah. These consist of one in the Dixie State College collection, St. George, and two in the collection at Long Beach State College, one taken by Ross Hardy, the other by Jay M. Sheppard. All were from the west slope of the Beaver Dam Mountains. For Nevada, Linsdale (1936:94) stated that it has been reported in summer from several localities south of the parallel of 37 degrees, all being those given by Fisher (1893:128). Phillips et al. (1964:124) mentioned no locality records for northwestern Arizona but showed a spot there on their distribution map, probably based on Fisher's data.

Toxostoma dorsale coloradense. Crissal Thrasher. This species appears to be a more common permanent resident than the preceding form since several observations for Utah have been placed on record and several specimens have been obtained.

Linsdale (1936:95) summarized several records for southern Nevada. Phillips et al. (1964:124) considered the species to be a common resident of the Lower Sonoran Zone in Arizona but gave no records for the northwestern corner of the state. Instead the status of the species for northern Arizona was reported as an uncommon fall migrant.

Poliophtila melanura lucida. Black-tailed Gnatcatcher. The range attributed to this species includes central Arizona and southern Nevada, but indications are that it also extends north into Utah even though no specimens have been obtained. One was seen near St. George on 29 December 1969 by Barbara Lund (Aud. Field Notes 24:416 and 527, 1970). For southern Nevada, Linsdale (1936:100) gave several records. Gabrielson (1949:184) saw two at Nelson on 19 November 1934. Wauer (1969:333) observed the species at Bunkerville and took a specimen at Overton on 12 May 1966. Phillips et al. (1964:134) did not indicate the occurrence of the species in northwestern Arizona although they showed a locality in Nevada near the junction of the Muddy and Virgin rivers which is farther downstream from the Bunkerville locality of record.

Phainopepla nitens leptida. Phainopepla. This is a fairly common summer resident in the Virgin River Valley of southwestern Utah substantiated by numerous observations and specimens. It occurs extralimitally at Kanab (Behle et al. 1958:72). Wauer (1969:333) noted a temporal phenomenon wherein the species occurs throughout the year in Arizona south of Beaver Dam but has been recorded in Utah only from 1 April to 15 November. Furthermore, early nesting was noted at Littlefield where a male with enlarged testes was defending a territory when taken on 22 February 1966 and a group of 14, including young of the year, was seen at Beaver Dam on 22 April 1965. On 19 May 1966 a nest containing three eggs was found in a mesquite at Littlefield. Woodbury (1939:160) and Hardy and Higgins (1940:105) reported that nesting occurs in May and June in the St. George area. Wauer (loc. cit.) commented "These observations indicate that the species is either double-brooded or that Phainopeplas in the

Virgin River Valley exist in different roles, as Phillips et al. (1964:139) suggests for the species in Arizona. Apparently, wintering birds nest early and move north, being replaced by summer visitants from the south."

Linsdale (1936:102) reported the species as resident in southern Nevada, occurring farther north in summer, but that the northern limit had not been definitely determined. Cottam (1936:123) found it regularly at Alamo in Pahranaagat Valley in summer from May to September. Gabrielson (1949:185) took a male at Glendale on 20 November 1934. A nest with two young was discovered at Overton on 1 June 1954 (Aud. Field Notes 8:356, 1954). Phillips et al. (1964:139) gave no records for northwestern Arizona although they indicated that it is a summer visitant in southwestern Utah. A specimen taken at Littlefield, Arizona by Wauer on 22 February 1966 is in the Zion National Park collection.

Vireo bellii arizonae. Bell's Vireo. This is an uncommon species in southwestern Utah but enough records exist to suggest that it occurs regularly and has breeding status. It was first reported by Hardy and Higgins (1940:105) on the basis of two specimens from St. George taken on 19-20 April 1940 as *V. b. pusillus*, later corrected (Hardy 1941:125) to *V. b. arizonae*. Wauer and Carter (1965:73) stated that one was seen and heard along the Virgin River at the mouth of Parunuweep Canyon in Zion National Park on 17 August 1962, and an immature was observed begging food from an adult in the same locality on 26 August 1962. The only record for Nevada given by Linsdale (1936:103) pertains to a specimen taken at Ash Meadows, Nye County, on 30 May 1891 by Bailey of the Death Valley Expedition. Phillips et al. (1964:142) indicated breeding records on their map for northern Arizona along the Colorado River but not for the Virgin River area in the extreme northwest corner of the state.

Vermivora luciae. Lucy's Warbler. This warbler is a common summer resident in southwestern Utah but also occurs eastward along the Colorado River and its tributaries. For Nevada Linsdale (1936:106) said it was a summer resident along the Colorado River but he had only one record of a female taken on 8 May 1934 opposite Fort Mohave. Johnson (1956:450) gave many additional records for southern Nevada and extended the breeding range north to Overton and Caliente. Phillips et al. (1964:148-149) showed numerous records of occurrence throughout northern Arizona and across the whole of southern Utah, but none for extreme northwestern Arizona where it doubtless also occurs.

Geothlypis trichas. Common Yellowthroat. This is a fairly common breeder in southwestern Utah, many sight records and specimens having been obtained. A systematic problem has been raised concerning the racial affinities of the yellowthroats of the St. George area. Van Rossem (1930) pointed out the racial differences between *occidentalis* and *scirpicola*, and extended the range of the latter north along the Colorado and Virgin river drainages as far as Washington, Utah on the basis of a single specimen that he had from there which he regarded as typical. Behle (1950:203) agreed that this one individual was "good" *scirpicola* but the series from the region in the University of Utah collection was highly variable with extremes representing *occidentalis* as well. Most representatives were intergradational between the two races. Wauer (1969:333) obtained two breeding specimens from St. George and one from Washington which he referred to *occidentalis*.

Linsdale (1936:110) considered the race *scirpicola*

to be resident in the southern half of Nevada, referring breeding specimens from Hiko, Crystal Springs and 5 miles south of Crystal Springs in Pahranaagat Valley, and St. Thomas to this race. He also listed some nonbreeders, evidently migrants, as *occidentalis*. Phillips et al. (1964:158) assigned their breeding specimens from the Colorado River drainage, Arizona to *occidentalis* rather than *scirpicola* and failed to show the occurrence of *scirpicola* in extreme northwestern Arizona, southern Nevada or southwestern Utah, thus either not recognizing the race *scirpicola* or overlooking the above-noted distributional data. In any event they gave no systematic discussion.

Setophaga picta. Painted Redstart. An early record for Utah pertains to an observation by Tanner (Presnall, 1935:207) in Zion National Park on 26 April 1930. Wauer (1969:333) gave additional observations of the species in Zion Canyon where two individuals were seen on 22, 24 and 30 April 1966 and a third heard. Phillips et al. (1964:160) marked the initial Zion Canyon, Utah, record on their distributional map, an occurrence that they considered accidental.

Agelaius phoeniceus. Redwinged Blackbird. This occurs commonly the year around in the Virgin River Valley, Utah with numbers greatly augmented in winter. The racial affinities of the breeding population of the Virgin River Valley are uncertain. Presnall (1935:207) commented that these blackbirds resembled the Nevada race (*nevadensis*) more than the Thick-billed (*fortis*). Hardy and Higgins (1940:107) commented that Tanner called birds from there *sonoriensis*, while Dickey had identified some specimens as *fortis*. They referred their Dixie College specimens to *utahensis*. Behle (1943:68) referred his series to *utahensis*, since synonymized with *fortis*, but noted that some individuals were atypical, intergrading with *nevadensis*. Linsdale (1936:113) assigned breeding specimens from St. Thomas, and Hiko and Crystal Springs in Pahranaagat Valley to *nevadensis*. Phillips et al. (1964:166) indicated that the population from southwestern Utah is intermediate but they did not say what races are involved. They commented that *nevadensis* is of uncertain validity and assigned their birds from the lower Colorado River Valley to *sonoriensis*. Linsdale (1936:114) also referred specimens from the Colorado River opposite Fort Mohave taken on 7 May 1934 to *sonoriensis*. A specimen in the Zion National Park collection has been identified as *sonoriensis*.

All of this indicates a highly variable population from an intergrading area, complicated by the circumstance that migrants from the north occur in the region while local birds are breeding. Perhaps there is a three-way blend of *fortis* from the north, *sonoriensis* from the south and *nevadensis* from the west, but I do not believe that *sonoriensis* breeds as far north as southwestern Utah. Rather, I favor the judgment of an intergrading population between *fortis* and *nevadensis*. The intergrades have narrower bills than *fortis*, thus more like *nevadensis* but they are shorter. Some of the adult males have paler epaulets than do examples from northern Utah, and certain females are less reddish on the bend of the wing. Thus while as a whole the specimens are closest to *fortis*, the beginning of an intergradational gradient is indicated. This has significance in terms of avifaunal derivation, indicating a southwestern influence.

Icterus cucullatus nelsoni. Hooded Oriole. According to the A.O.U. Check-list (1957) this race is casual in southwestern Utah, where it may breed. Locality records cited were St. George and the Beaver Dam Wash. More recent information indicates that

it is actually an uncommon summer resident, substantiated by several observations and specimens. For Nevada, Linsdale (1936:114) listed but one specimen from Pahrump taken 12 June 1929. Johnson and Richardson (1952:358) extended the range to Ash Meadows and recorded a second specimen from Pahrump. Both these localities are outside the Virgin River area in Nevada where the species doubtless also occurs. Phillips et al. (1964:167) gave no intimation that this species occurs in extreme northwestern Arizona, but Wauer (1969:334) obtained a specimen from the Beaver Dam Wash in Arizona on 12 May 1966 and found two nests at Littlefield on 14 June 1966. Both were attended by adults.

Icterus parisorum. Scott's Oriole. At one time I thought that this oriole was confined in its distribution in Utah to the extreme southwestern corner, but since then it has turned up as a breeder in several other areas. Nevertheless, it is more common in Washington County than elsewhere in Utah. For Nevada, Linsdale (1936:114) found it to be a summer resident in the southern part of the state but noted a few more northern records. One locality from which specimens have been obtained is the Juniper Mountains east of Panaca, near the Utah-Nevada border. Phillips et al. (1964:168) did not indicate that the species occurs in extreme northwestern Arizona, but it doubtless does.

Molothrus ater obscurus. Brown-headed Cowbird. This common summer resident has been reported many times from southwestern Utah with numerous specimens obtained, 31 since 1961. Linsdale (1936:116) reported this race present in summer along the Colorado River on the basis of specimens from opposite Fort Mohave taken 6-10 May 1934. Johnson and Richardson (1952:359) extended the range northwest to Ash Meadow. Phillips et al. (1964:171) failed to indicate the occurrence of the dwarf cowbird in northwestern Arizona and in southwestern Utah. The new material from southwestern Utah corroborates that the breeding birds from southwestern Utah represent the race *obscurus*. Wing length of breeding males averages 101.49 (97.0-106.5) mm as compared to *artemisiae* from northern Utah which have a mean wing length of 108.68 (100.1-116.3).

Piranga rubra cooperi. Summer Tanager. Either this species was overlooked in all the early field work in southwestern Utah or during the past two decades it has become well established as a summer resident. However, possibly the sight record by Merriam of one where Beaver Dam Creek enters the Virgin River (which would be near Littlefield today in northeastern Arizona) recorded by Fisher (1893:109) under the Hepatic Tanager may have been this kind instead. Numerous records have been obtained in recent years from the Beaver Dam Wash in both Arizona and Utah and Santa Clara, Utah (see Aud. Field Notes 16:498, 1962; 18:63, 1964; 20:591, 1966; Easterla 1966:210; Wauer and Russell 1967:422). Wauer (1969:334) reported an extension of range northwest along the Virgin River based on a male taken on 11 May 1966 at Berry Spring near Hurricane. An extra-limital but nearby record pertains to one seen by Stewart Murie at Parowan on 21 August 1963. In our recent collecting eight specimens were obtained from the Beaver Dam Wash and near Santa Clara.

Linsdale (1936:117) stated that this species was common in cottonwoods along the Colorado River in the extreme tip of Nevada in Clark County, a pair being taken on 7 and 9 May 1934. Phillips et al. (1964:174) did not indicate that this species occurs in northwestern Arizona where it is an uncommon summer resident.

Guiraca caerulea interfusa. Blue Grosbeak. This species has long been known to occur in Utah in the Colorado River drainage in the southern and eastern part of the state based on numerous records and specimens, but in recent years records have been turning up in the western Great Basin area suggesting an extension of range. The species is most numerous in Utah in the Virgin River Valley. Linsdale (1936:117) summarized a few records from southern Nevada. Phillips et al. (1964:179) implied that the species occurs in northwestern Arizona with their statement that it is a fairly common summer resident of the major valleys of the Sonoran zones, but they gave no specific records for northwestern Arizona.

Pipilo aberti dumeticolus. Abert's Towhee. The presence and abundance of this permanent resident in southwestern Utah is substantiated by many records and specimens from numerous localities as far as the mouth of Zion Canyon. For Nevada, Linsdale (1936:123) in addition to summarizing Fisher's (1893:105) records, reported it common near Mesquite on 1 October 1931, and at St. Thomas, 25 July and 19 October 1931. Phillips et al. (1964:188 and 191) showed this towhee ranging up along the Colorado and Virgin River drainages into extreme northwestern Arizona but stated the examples were of uncertain race. They intimated that it is a straggler in southwestern Utah, whereas it is definitely a fairly common resident there.

The University of Utah series was studied by van Rossem (1946) when he described the race *P. a. dumeticolus* and later by Davis (1951:88-92) when he reviewed the races of the species. Davis commented that the Utah-Nevada population, although farthest removed from the supposed center of origin of the species, was little different from other populations of the subspecies. Phillips (1962:358) recognized only two races, *P. a. vorhiesi* which he described from 15 miles south of Tucson, Arizona and characterized as having the upper parts, especially the head and upper tail coverts of a more "grizzled" brown and darker, and *P. a. aberti* from the Lower Colorado River and surrounding regions which have the upper parts a more reddish brown and a more pallid coloring generally.

Aimophila ruficeps scottii. Rufous-crowned Sparrow. One of the new birds found in recent years in southwestern Utah is this sparrow, which is known from two sites, St. George in winter and lower Zion National Park where it nests sparingly. Also there are indications of an autumn-winter concentration in Zion Canyon (see Wauer and Carter 1965:82, Wauer 1965:447, Wauer 1967:348, Aud. Field Notes 18:60 and 293, 1964; 20:589, 1966, 22:361, 1968; Amer. Birds 25:463 and 887, 1971). The species is unknown from Nevada. Phillips et al. (1964:198 and 200) showed this species occurring as far north in Arizona as the Grand Canyon region but they commented that its range and status there were poorly known.

Melospiza melodia fallax. Song Sparrow. As a summer resident, the species is fairly common in Utah along the Virgin River. In winter the resident population is mixed with a large influx of visitants. Linsdale (1936:133) listed no breeding specimens from the Virgin River area in Nevada. He stated that *M. m. saltonis* was the resident form in the southern part of the state. Phillips et al. (1964:209-210) showed the race *M. m. fallax* as the breeding race along the Virgin River in Nevada, northwestern Arizona and southwestern Utah.

Despite the confusion of names used in the literature the systematics of the breeding race has been

worked out. As pointed out by Marshall and Behle (1942:123), Marshall (1942:233) and Behle (1943:79) the breeding population of song birds of the Virgin River Valley represents the race *fallax*, whereas immediately to the north and also further east the race *montanus* occurs. Wauer (1969:334) suggested that there are still problems concerning the racial affinities of the breeding population of the Virgin River Valley, since four specimens taken in the Zion Park area are referable to *montanus*. However, two of these were not breeding birds and thus may have been migrants. The other two taken during the breeding season probably indicate the beginning of intergradation between *fallax* on the periphery of its range with *montanus*. A transition between these two races is shown by breeding birds from Kanab a short distance farther east (see Behle 1948a:79 and Behle et al. 1958:89). Although intergradational, the Kanab examples are closest to *montanus*. I would expect a large series of the Zion-Springdale birds to be en masse closest to *fallax*.

DISCUSSION

The distribution of these species and races indicates that the avifauna of the lowlands of the Virgin River Valley and its tributaries consists in part of a northeasterly extension of certain species from the Mohave Desert. Thus Utah's avifauna is enriched by a southern Mohavian complement in addition to two northern components, namely the Great Basin and southern Rocky Mountains. These kinds of birds of southern origin constitute 31.8 percent of the 85 breeding species of birds of the Virgin River Valley in Utah. These distinctive kinds can be grouped into three categories. First, there is a complement of 15 kinds known to occur only in the extreme southwestern corner. These are the Black Hawk, Gilded Flicker, Ladder-backed Woodpecker, Wied's Crested Flycatcher, Vermilion Flycatcher, Verdin, Cactus Wren, Le Conte's Thrasher, Crissal Thrasher, Black-tailed Gnatcatcher, Bell's Vireo, Painted Redstart, Hooded Oriole, Abert's Towhee and Rufous-crowned Sparrow. The second group consists of 13 Lower Sonoran or Mohave Desert species that occur regularly and fairly commonly in southwestern Utah but which are also known to occur in neighboring regions, having "spilled over" the boundaries of the southern desert. These are the Gambel's Quail, White-winged Dove, Inca Dove, Roadrunner, Lesser Nighthawk, Costa's Hummingbird, Rivoli's Hummingbird, Black Phoebe, Phainopepla, Lucy's Warbler, Scott's Oriole, Summer Tanager and Blue Grosbeak. The third category consists of seven geographically variable kinds that are represented either by a different race or population in southwestern Utah as compared with elsewhere in the state. These are the White-throated Swift, which has a popu-

lation of very small individuals in the Beaver Dam Wash—St. George area; the Rough-winged Swallow, which shows a population closest to the race *serripennis* but tending slightly toward *psammochroa*; the Cliff Swallow; the Yellowthroat, showing an intergrading population that is closest to *occidentalis* but tending toward *scirpicola*; the Redwinged Blackbird, another intergrading population that is closest to *fortis* but tending toward *nevadensis*; the Brown-headed Cowbird, and the Song Sparrow. The races of three of these species and the races that two others approach, are of southern distribution. *Agelaius phoeniceus nevadensis*, however, is western and the small size of members of the population of *Aeronautes saxatalis saxatalis* is similar to that of swifts from the southeast in New Mexico.

Several of the species listed have been reported as new to the area and new to the state list (Behle and Perry 1975) in recent years. They probably have extended their ranges. These kinds are the Black Hawk, White-winged Dove, Inca Dove, Rivoli's Hummingbird, Gilded Flicker, Wied's Crested Flycatcher, Black-tailed Gnatcatcher, Summer Tanager and possibly the Rufous-crowned Sparrow, although the latter may indeed be an overlooked relict species. The individuals taken or seen representing these several species probably represent outposts on the northernmost fringe of their ranges, having been crowded north by internal population pressure behind them. If there has been such a natural spread, then the question arises as to whether they will become firmly established. Phillips (1968) discussed the instability of the distribution of land birds for several species in the southwest, especially for Arizona. Long-range studies on the population dynamics of these birds in southwestern Utah should continue so as to determine the applicability of this concept.

SUMMARY

This paper summarizes new data on certain distinctive species of birds occurring in extreme southwestern Utah, northwestern Arizona and southeastern Nevada, together with a re-analysis of the avifauna there. As shown by climate, vegetation and bird life, a finger of the Mohave Desert or Lower Sonoran Zone extends north along the Virgin River Valley as far as southwestern Utah. As regards this state, 28 distinctive kinds represent the Mohave avifauna. Fifteen occur only in this portion of the state. The other 13 are regu-

larly found in southwestern Utah but in addition there are extra-limital records elsewhere in the state. Of considerable zoogeographical significance is the circumstance that three geographically variable species are represented by races in the Virgin River Valley that do not occur elsewhere in the state (*Petrochelidon pyrrhonota tachina*, *Molothrus ater obscurus*, *Melospiza melodia fallax*). These races are of southern distribution. In two other instances populations are intergradational toward southern races (*Geothlypis trichas occidentalis* toward *scirpicola* and *Stelgidopteryx ruficollis serripennis* toward *psammochroa*). As a result of the intrusion of an arm of the Mohave Desert into extreme southwestern Utah, three avifaunas are represented, namely the Mohavian, Great Basin, and southern Rocky Mountain. Eight or nine southern species seem to have spread naturally into southwestern Utah in recent years to enrich the state's avifauna. These kinds are the Black Hawk, White-winged Dove, Inca Dove, Rivoli's Hummingbird, Gilded Flicker, Wied's Crested Flycatcher, Black-tailed Gnatcatcher, Summer Tanager and possibly the Rufous-crowned Sparrow.

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