

# **Robert Ridgway and the 40<sup>th</sup> Parallel Survey at Sacramento, 1867**

*John H. Harris, 12806 Lancaster Road, Oakdale, CA 95361. johnh@mills.edu*

In the summer of 1867, the 40<sup>th</sup> Parallel Survey party began what would become a five-year journey across the Great Basin of North America. The survey, established by an act of Congress on March 2, 1867, had the task of exploring the landscape and geological resources along the potential route of the transcontinental railroad. The concept for the survey was developed by Clarence King, who had been part of the Josiah Whitney's California Geological Survey. Under King's direction, particular attention was paid to geology and mineral resources, but a tremendous amount of data was collected on all natural resources, including birds.

The survey's ornithologist was Robert Ridgway, then 17 years of age and embarking on his first professional employment. Ridgway would go on to become one of America's most eminent ornithologists (Lewis 2012). The survey had the ambitious goal of studying a roughly 100 mile (160 km)-wide swath along the 40<sup>th</sup> parallel of latitude from the Sierra Nevada to the Rockies, roughly along the proposed route of the Union Pacific and Central Pacific Railroads. King's survey party was comprised of 15-20 members, including geologists, surveyors, support personnel such as teamsters and cooks, as well as Ridgway and the botanist William Bailey. The party was joined by a company of 20 U.S. Cavalry.

The survey party sailed to San Francisco and then set up a camp in the Sacramento area, spending from June 6 to July 4, 1867 there while preparing for the arduous journey ahead. The business of the survey lay primarily to the east of the Sierra Nevada, nonetheless Ridgway spent time collecting birds in the vicinity of Sacramento, and his observations while the party prepared for its journey offer a window into the avifauna of the region in 1867.

Results of the survey were published in eight volumes over the period 1870-1878. Volume IV, part III contained Ridgway's report on ornithology of the survey. This volume (Ridgway, 1877) provided information on birds seen and collected along the survey route, as well as species accounts for all species encountered. King had asked that the report remain "within the compass of 200 pages" (Lewis, 2012), but Ridgway's report grew to 366 pages. During the expedition, Ridgway collected 1,522 specimens, including 769 skins and 753 sets of nests and eggs. Two hundred sixty two species of birds were observed, mostly east of the Sierra Nevada. Ridgway's fieldwork spanned from the summer of 1867 through the fall of 1868, when he was

called back to the Smithsonian, and again from May through July of 1869. Most of his time in the field on the survey was spent in the Great Basin, and the species accounts reflect the depth of knowledge that he acquired about avian habitat relationships and distribution in the Interior West.

#### BACKGROUND ON ROBERT RIDGWAY

Robert Ridgway was born July 2, 1850 in Mount Carmel, Illinois, a town of about 935 people at the time, located 240 miles (386 km) south of Chicago. The surrounding landscape had not yet experienced the intensive agricultural development that was to come. Ridgway grew up in a rural environment with old-growth hardwood forest. He spent much time hunting and exploring in this environment on his own, with his father, and with his boyhood friend Lucien Turner. Turner became a prominent naturalist in his own right, and together they published a paper on Alaska (Ridgway and Turner 1886). Ridgway drew and painted, primarily birds, from an early age. From his pharmacist father, he learned to mix pigments. He became a careful observer and, given the lack of access to existing works of ornithology, began to develop questions about the birds that he was observing.

In 1864, at the age of 13, Ridgway sent a letter to the director of the U.S. Patent Office asking about the identity of a particular bird. The Patent Office had had an extensive collection of bird specimens, but these had been relinquished to the relatively new Smithsonian Institution. Ridgway's letter was forwarded to the institution, where it found its way to Spencer Fullerton Baird, Assistant Secretary. This event launched a mentoring relationship between Baird and Ridgway that was fundamental to Ridgway's career. A correspondence developed in which Baird encouraged Ridgway's keen observational skills, use of technical descriptive language, and use of scientific nomenclature. In those days, scientific literature was not generally available, so Baird's correspondence with Ridgway created a bridge between rural Mount Carmel and the scientists and institutions of the east. Baird also encouraged Ridgway to paint as accurately as possible, though Baird did not consider illustrations to be essential in works of ornithology.

Based on his lengthy correspondence with Ridgway, and his confidence in the youth's developing abilities as an ornithologist, Baird offered him the position of ornithologist on the survey in March of 1867. Ridgway was then 16 years old. He arrived in Washington, D.C. on April 18, 1867, where he spent three weeks with Baird at the Smithsonian, learning to prepare study specimens and learning as much as he could about the workings of the Smithsonian. He must by then have had access to the Pacific Railroad Survey, volume IX (Baird et al. 1858), which would have represented the state of the art for California ornithology.

## SACRAMENTO CAMP AND ENVIRONMENT

The survey party departed for the west by ship in two groups; Ridgway was part of the second group, with botanist William Bailey, photographer Timothy O'Sullivan, and King. The voyage provided Ridgway with his first exposure to the extravagant beauty and diversity of tropical America, which would lead ultimately to much further study (Lewis 2012). The group arrived in San Francisco on June 2, 1867. Ridgway remarked that "only Purple Martins and Cliff Swallows were seen while in the city", though he also commented on hearing the songs of caged canaries while at that location. (I do not include scientific names of birds in this paper; common names are those of the A.O.S. checklist (American Ornithologists' Union 1998) and supplements, through the 58<sup>th</sup> Supplement (American Ornithologists' Union 2017).

The party established a camp at Sacramento on June 6, 1867. They remained in the vicinity of Sacramento from June 6 to July 4. The diary of William Bailey (1868), who was often Ridgway's companion, show that the survey party spent most of this month gathering supplies and meeting with individuals with experience in the region, including the ornithologist James Cooper, geologist Josiah Whitney, and prominent California political and business figures, such as Senator John Conness. Various members of the party made excursions to San Francisco or eastward into the Sierra. Bailey often accompanied Ridgway on collecting trips, commenting that "Impossible cliffs, thorny trees, or dismal swamps alike fail to deter him when in pursuit of a bird". The pair visited local ranches, riding mules which had been provided to the party. This too was a new experience for the easterners: "The latter (Ridgway) has very much my experience with this animal, the mule being the master spirit".

Sacramento in its earliest decades was known as a location prone to flooding and infested with mosquitos. Major floods had occurred in 1850 and the winter of 1861-62. The city's first sewage and drainage system began construction in 1864, as did work on the raising of the grade of streets in the city and the movement of the channel of the American River (Castaneda and Simpson, 2013). At the time of the 40<sup>th</sup> Parallel Survey's visit, streets in the city would have been at different grades. The previous decade's drought and flooding, combined with exotic invasion and widespread grazing, had already modified the environment to a considerable degree. There was already irrigated agriculture in the region, as well as grazing, and much of the grassland had been taken over by non-native plant species.

Ridgway found time to explore the Sacramento region and to collect and observe birds despite the preparations for the survey party's departure. Nonetheless, he points out that the first "working camp" of the expedition was the camp established on the Truckee River in Nevada. No collections were made as the group progressed eastward from Sacramento through the

foothills and western slope of the Sierra, and Ridgway expressed regret at this circumstance. Ridgway remarked on the “parched” landscape at this time of year, away from water. Riparian forests of oak, sycamore, willow and cottonwood harbored more birds, and extensive marshes were found near the rivers. Ridgway described the riverine environment as: “Extensive marshes, connected with the river, were filled with tall rushes, or tule (*Scirpus validus*), and other aquatics, many of them being hemmed in by skirting jungles of willows and other shrubs, having a dense, often impenetrable, undergrowth.” He commented on the fact that there was more bird life near moist environments than in the dry plains, though the difference was less extreme than in the Interior. Bailey’s diary comments that the area around Sacramento was low-lying and prone to flooding, and that levees had begun to be built around the city. The party regarded the area as unhealthy and infested with mosquitos.

#### AVIFAUNA OF THE SACRAMENTO AREA

Ridgway’s (1877) report included a summary section for each field camp, in which he describes the environment of the camp and presents a summary of the avifauna. Ridgway’s table of birds found breeding in the vicinity of Sacramento listed 54 species (Table 1). He does not describe the criteria for including species on this list, but many are represented by specimens or nest and egg collections (Tables 1 and 2). He included a column giving an impression of each species’ abundance. Standardized survey techniques were not in use at this time, so these were impressions based on Ridgway’s limited time in the field in the Sacramento region, and may have included information gleaned from other naturalists. The species accounts include additional information on a number of other species encountered in the area that were not included in the table of breeding birds (Table 2). Some of these are explicitly identified as likely breeders, suggesting that Ridgway only included species in the table when he had direct evidence of breeding.

Several of the species that were common in 1867 are currently species of conservation concern. Riparian habitats and wetland habitats supported such birds as Yellow-billed Cuckoo, Willow Flycatcher, Least Bell’s Vireo, Bank Swallow, and Yellow Warbler. Ridgway noted that Bell’s Vireo was “the characteristic and most abundant species at Sacramento City, where it inhabited the dense willow copses along with *Empidonax pusillus* (Willow Flycatcher)”. Although his table indicated that Yellow-billed Cuckoos were rare, his species account stated that “At Sacramento City its well-known notes were heard on more than one occasion in June, among the oak groves in the outskirts of the city”. Willow Flycatchers were noted to be second only to Western Kingbirds as a breeding flycatcher, and Yellow Warblers were said to be one of the commonest breeding species in the Sacramento area. Loss of riparian and wetland habitats, combined with the diversion of water are no

doubt factors in the decline of these species, but it is also worth noting that the Brown-headed Cowbird was absent from the region then (Laymon 1987). Brood parasitism by Brown-headed Cowbirds has been implicated in the decline of several riparian species in California, notably Willow Flycatcher and Least Bell's Vireo (Gaines 1974). Cowbirds were not observed by the survey party until they crossed the Sierra Nevada.

One interesting aspect of the survey report is the frequent mention of relations between birds and humans. Ridgway often comments on the adaptation of birds to the human environment, a prominent example being Purple Martins, which he describes as "swarming around old buildings" with Cliff Swallows. Captive birds were common. For example, Ridgway describes the sale of young Lark Sparrows (then called "Mexican Larks" by young boys in Sacramento City). The survey party itself travelled with two hand-reared Western Kingbirds. Though free-flying, the birds followed the survey party during all activities. Eventually, however, they were consumed by the party's two domesticated Swainson's Hawks. The party encountered a domesticated Sandhill Crane in Carson City that had learned to check the pockets of visitors.

Many birds that are common in the Sacramento area today are notably lacking from Ridgway's table. Examples include California Quail, California Scrub-Jay, Oak Titmouse, White-breasted Nuthatch, Bushtit, American Robin, and California Towhee. Some of these species are explicitly noted later in the report to have been encountered for the first time as the party climbed into the foothills east of Sacramento (e.g. California Quail, California Scrub-Jay, California Towhee). The American Robin was not encountered until the party reached conifer forests, and the species account for White-breasted Nuthatch appears to apply only to the interior form. Some of the species probably did not occur in the area of the city at that time. The city would not have had the well-developed urban forests and parks, golf courses, and other habitats that are available now.

One of the most surprising observations of Ridgway's in the Sacramento area is his conclusion that Brewer's Sparrow was an abundant breeder in the area, "quite common in the brushy fields". No specimens were collected, and it appears that Ridgway's characterization was not accepted by early California ornithologists. For example, Lyman Belding (1980) commented that he seldom found the Brewer's Sparrow in the Sacramento Valley, and then only in migration. Belding further commented that "The early explorers in their extensive marches seldom named the location where their specimens were obtained, a distance of one hundred or even five hundred miles seeming, apparently, but a trifle to them, and there have been changes to the outlines of States and Territories since their time." Grinnell and Miller (1944) thought that Ridgway's claim was "doubtful".

Table 1. Breeding bird species noted by Robert Ridgway (1877) in the vicinity of Sacramento, California, June 6 – July 4, 1867. Common names, and the sequence of species, are those of the A.O.S. checklist (American Ornithologists’ Union 1998) and supplements, through the 58<sup>th</sup> Supplement (American Ornithologists’ Union 2017). Abundance descriptions are those provided by Ridgway for species for which he had obtained evidence of breeding. The number of specimens collected in the Sacramento area is shown as nests with eggs (NE) or skins (SK). Species currently listed as Threatened or Endangered under Federal (ESA) or State (CESA) Endangered Species Acts, and those that are considered Species of Special Concern by the California Department of Fish and Wildlife (CSCC; Shuford and Gardali 2008) are indicated.

<b>Common name</b>	<b>Abundance</b>	<b>Specimens</b>	<b>Notes</b>
Mallard	Abundant	0	
Gadwall	Abundant	0	
Cinnamon Teal	Abundant	0	
Aythya spp.	Abundant	0	Probably Redhead, CSCC
Mourning Dove	Abundant	2 NE	
Yellow-billed Cuckoo	Rare	0	FT, SE
Black-chinned Hummingbird	Common	0	
Anna’s Hummingbird	Common	1 NE	
Common Gallinule	Abundant	1 SK	
American Coot	Abundant	0	
Killdeer	Abundant	0	
Larus spp.	Abundant	0	
Black Tern	Abundant	1 SK	CSCC
Forster’s Tern	Abundant	0	
Great Blue Heron	Common	0	
Great Egret	Rare	0	
Green Heron	Abundant	2 SK	
Black-crowned Night Heron	Common	0	
Long-eared Owl	Common	2 SK	CSCC
Burrowing Owl	Abundant	2 SK	CSCC
Northern Flicker	Rare	0	
American Kestrel	Abundant	1 SK	
Western Wood Pewee	Abundant	1 N, 4 NE, 2 SK	
Willow Flycatcher	Abundant	3 NE, 2 SK	SE
Black Phoebe	Rare	0	
Western Kingbird	Abundant	5 NE, 2 SK	

Table 1. (cont). Breeding bird species noted by Robert Ridgway (1877) in the vicinity of Sacramento, California, June 6 – July 4, 1867.

<b>Common name</b>	<b>Abundance</b>	<b>Specimens</b>	<b>Notes</b>
Western Kingbird	Abundant	5 NE, 2 SK	
Loggerhead Shrike	Common	0	CSSC
Bell's Vireo	Common	2 SK	Least Bell's Vireo, FE, SE
Warbling Vireo	Common	0	
Purple Martin	Abundant	0	CSSC
Barn Swallow	Abundant	0	
Northern Rough-winged Swallow	Common	0	
Bank Swallow	Common	0	ST
Cliff Swallow	Abundant	0	
Bewick's Wren	Common	0	
House Finch	Abundant	9 NE, 1 SK	
American Goldfinch Common	Abundant	7 NE	
Yellowthroat	Abundant	0	
Yellow Warbler	Abundant	5 NE	CSSC
Yellow-breasted Chat	Abundant	1 NE, 1 SK	CSSC
Spotted Towhee	Common	1 NE	
Chipping Sparrow	Common	0	
Brewer's Sparrow	Common	0	
Lark Sparrow	Abundant	6 NE	
Grasshopper Sparrow	Common	0	CSSC
Song Sparrow	Common	0	
Black-headed Grosbeak	Common	1 NE, 2 SK	
Blue Grosbeak	Common	5 NE, 2 SK	
Lazuli Bunting	Common	3 NE	
Western Meadowlark	Common	0	
Red-winged Blackbird	Abundant	0	
Tricolored Blackbird Yellow-headed	Abundant	0	CSSC, candidate SE
Blackbird	Abundant	1 NE	
Bullock's Oriole	Abundant	1 NE	

Table 2. Additional species observed in the Sacramento area but not included in Ridgway's table of breeding birds. Specimens are indicated as nests with eggs (NE) or skins (SK). (It is unknown why Ridgway did not include the species noted with nests and eggs as breeding birds.) Abundance is indicated if mentioned in the species account, and some additional notes from the species accounts are provided. None of the species in this table are currently listed as Threatened or Endangered under Federal (ESA) or State (CESA) Endangered Species Acts, or considered Species of Special Concern by the California Department of Fish and Wildlife (CSCS).

Common name	Abundance	Specimens	Notes
Ruddy Duck	Common	0	Lagoons near Sacramento
Turkey Vulture	Rare	0	Rare in Sacramento Valley: only seen at edge of foothills
Red-shouldered Hawk	Common	0	Common among the trees near the river
Barn Owl		0	Single individual observed near Sacramento
Western Screech Owl		3 SK	Three specimens collected in Sacramento
Acorn Woodpecker		0	Present in Sacramento Valley
Lewis's Woodpecker		2 SK	Mated pair, collected in Sacramento
Nuttall's Woodpecker		0	Present in Sacramento Valley
Ash-throated Flycatcher		0	Plains from Sacramento to Sierra Nevada
Yellow-billed Magpie	Abundant	11 SK	Nests observed, only in Sacramento valley
American Crow		0	Plains from Sacramento to Sierra Nevada
Tree Swallow	Common	0	Common in Sacramento Valley

In any event, no Brewer's Sparrow specimens were collected in the Sacramento area, although a number were collected once the expedition crossed the Sierra Nevada and entered the Great Basin. It is worth noting that the state of knowledge of this species at the time that Ridgway was in Sacramento was rudimentary at best. The distribution of the species was characterized in the Pacific Railroad Survey as "Rocky Mountains of U.S. to Pacific Coast" (Baird, 1858). Baird thought that it might not be distinct from the Clay-colored Sparrow, commenting that "This species, if really distinct, is so very similar to the *S. pallida* (what we now as the Clay-colored Sparrow) as to require very close and critical comparison to separate it". Thus, some confusion about these taxa at the beginning of the survey might be expected.



Like other ornithologists learning about the American West, Ridgway often compared the avifauna of a region with eastern avifaunas at a similar latitude. His description of the Sacramento avifauna ends by comparing the area with the Mississippi Valley. He noted similarities, but that a similar area in the Mississippi Valley would have more breeding species. Of the species in his table of Sacramento breeding species, 16 would not be found in the Mississippi Valley, but 12 of those had related eastern equivalents, for example Eastern and Western Wood-pewees, Black and Eastern Phoebes, Baltimore and Bullock's Orioles.

From Sacramento the party travelled eastward through the foothills and across the Sierra, establishing the first real working camp along the Truckee River. Thus began five long years of travel and fieldwork. Following completion of the 40<sup>th</sup> Parallel Survey, Ridgway returned to the Smithsonian, where he was employed by Baird preparing species descriptions and drawings for the publication *A History of North American Birds* (Baird et al. 1874) while beginning to publish lists of the birds observed at the field camps during the 40<sup>th</sup> Parallel Survey (Ridgway 1874, 1875). His official employment at the Smithsonian began in 1874, where he rose to become the Curator of Birds, a position he held until his death in 1929.

Ridgway was a seminal figure in the development of ornithology in the United States, producing hundreds of scientific papers including the magisterial eight-volume *Birds of Middle and North America*, published as Bulletin 50 of the U.S. National Museum from 1901-1919. The survey report of the 40<sup>th</sup> Parallel survey gives a glimpse into the early professional life of this remarkable man and a window into the avifauna of a part of the Central Valley in the mid-1800s.

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