

greater than any I have come across elsewhere, or taken myself. While personally opposed to such extreme subspecification as is sometimes indulged in, and which necessitates a well-trained expert to make determinations, this case seems so obvious to the ordinary observer that I do not hesitate to present it to the ornithological public.

San Francisco, California, October 26, 1914.

THE STATUS OF THE ARIZONA SPOTTED OWL

By H. S. SWARTH

(Contribution from the Museum of Vertebrate Zoology of the University of California)

SINCE my description several years ago of *Strix occidentalis huachucae* (Univ. Calif. Publ. Zool., vol. 7, 1910, p. 3), I have been constantly on the lookout for opportunities of examining additional specimens of this race, but until recently was unaware of the existence in collections of any examples of the Arizona subspecies other than the single bird that served as a basis for the characterization of the form. A short time ago Dr. Louis B. Bishop informed me that he had in his possession three skins taken in southern Arizona, and he most generously proffered the loan of these specimens in case I was desirous of making comparisons with the type, or with other pertinent material. This opportunity was eagerly grasped, the more so that there happened to be available in the several collections on deposit in the Los Angeles County Museum of History, Science, and Art, a number of skins of the California form, *Strix occidentalis occidentalis*, affording an excellent chance for a critical study of these two subspecies. In fact it is doubtful if such an extensive series of these owls has ever before been gathered together at any one point.

Of the Arizona bird I have before me the type of *huachucae*, from the Huachuca Mountains, and Dr. Bishop's three specimens, a pair of adults and a juvenile male, collected by H. H. Kimball, in the Santa Catalina Mountains, July 7, 1906. Of the southern California subspecies, *S. o. occidentalis*, there are available skins of eleven adults and one juvenal, and a mounted pair of adult birds. The two series afford a quite satisfactory basis for comparison.

In general it may be said that the three additional examples from Arizona bear out most of the characters originally ascribed to *huachucae* from the single specimen serving as the type. Judging from this material the Arizona race, as compared with typical *occidentalis*, is somewhat paler colored. The brown body color of the whole bird is of a lighter tint, while on the individual feathers the brown colored portion is diminished in area, and the white portion correspondingly extended.

The California series shows but little variation, the birds being uniformly quite dark and heavily marked, while spring specimens show an almost inappreciable amount of fading, as compared with freshly molted fall birds. That there is slight change in the color of the feathers through fading is doubtless largely due to the manner of life of these birds, they being habitually frequenters of the darkest, shadiest canyons, avoiding bright light at all times.

Of the Arizona birds, the single adult female is slightly darker than the

two males, this being most apparent in the heavier markings on the tarsus and toes of the former. There is some indication that the arid climatic conditions surrounding this form are conducive to rather more marked fading of plumage in the course of months, than is the case with the California bird; and this too despite the fact that the mode of life of the two subspecies is practically the same. In the juvenile example of *huachucae* the newly grown rectrices and remiges are noticeably darker than is the case with the adults, taken in April and July. In typical *occidentalis*, taking specimens similarly comparable, the difference is inappreciable.

Careful comparison of the two series, from California and from Arizona, respectively, shows the following dissimilarities, aside from the generally paler coloration of the latter subspecies.

Facial discs: In *huachucae* these are noticeably grayish. The ground color of the anterior two-thirds is practically pure white, of the posterior margin, light brown. There is little variation in the three specimens. In *occidentalis* this part is quite uniformly dark brown, with a limited grayish area anteriorly.

White spots on individual body feathers: Careful analysis of patterns of separate feathers from any part of the body shows throughout an extension of the white areas, with corresponding reduction in brown, in *huachucae* as compared with typical *occidentalis*. This is quite noticeable, for example, in the plumage of the upper breast, where a feather that, in *occidentalis*, is brown with two white spots, in *huachucae* frequently will have the two spots coalesced, producing a barred feather instead of a spotted one.

Tail bars: In *huachucae* the tail bars are broader, and are more nearly pure white. The tendency in *occidentalis* is for them to become broken into spots. In both races the number of tail bars varies in different individuals and on different feathers, ranging from six to eight in number.

White spots on outer webs of primaries: In *huachucae* these are broader, more nearly white, and generally more conspicuous.

Throat and median line of abdomen: The throat patch in *huachucae* is pure white, and covers a relatively large area. In *occidentalis* the unmarked portion is rather more restricted, and is frequently buffy or grayish in color. The center of the abdomen is more nearly pure white in *huachucae*, as compared with the dusker hue usually seen in *occidentalis*.

Tarsus and toes: In the two adult males of *huachucae* tarsus and toes are almost pure white, sparsely flecked with pale brown. The single adult female at hand has these parts much more heavily marked, being in this respect quite like certain examples of *occidentalis*, though in most specimens of the latter form the legs are somewhat darker. It is noteworthy that in the juvenile male of *huachucae* tarsus and toes are pure white, unmarked, while the juvenile female of *occidentalis* at hand has these parts heavily marked. The inference that might be drawn from these facts is that the observed variation in color and markings of toes and tarsus is to some extent due to difference in sex. This, however, is not corroborated by conditions in the series of adult *occidentalis*. In the two juvenals described in my previous paper on the species (Univ. Calif. Publ. Zool., vol. 7, 1910, p. 7), toes and tarsus were pale colored and unmarked, but unfortunately the sex of these birds had not been ascertained.

Under tail coverts: These are parti-colored feathers of white and brown. In *huachucae* the white areas are the most extensive, while in *occidentalis* the

reverse is usually the case. In the California bird the white is in relatively narrow bars, generally not so broad as the brown portions, though in an occasional feather the two will be found of practically equal width.

Two birds in juvenile plumage are available for comparison, of *occidentalis* a young female, taken at Forest Home, San Bernardino County, California, August 17, 1913; of *huachucae* a young male from the Santa Catalina Mountains, Arizona, July 7, 1906. The Arizona bird is clothed entirely in the juvenile down, except for the nearly grown rectrices and remiges; the California bird is somewhat older, and new feathers are appearing on the sides of the body, in the scapulars, and in the wing coverts. There is little difference apparent between these juvenals. In fact I am not able to distinguish with certainty any color difference in the down of the two birds, though the Arizona specimen appears to be slightly more tawny where the other is rather more gray. In the newly grown rectrices and remiges, however, there is a difference, these feathers in the Arizona specimen being distinctly of a lighter tint, as compared with the more dusky ones of the California example.

As might be expected, examination of so much additional material is productive of slightly altered conceptions from those derived from the single specimen of *huachucae* which served as the basis of my first study of the species. The differences between the two forms here contrasted are, of course, of degree rather than of kind; and it is to be expected that more extensive suites of skins would reveal considerable variation in characteristics. On the whole, however, taking Spotted Owls from the designated regions, as represented by the quite satisfactory material here assembled, there is no difficulty whatever in distinguishing the two forms, *Strix occidentalis occidentalis* and *Strix occidentalis huachucae*.

It may be argued that the comparisons so far made are not final, in that no example of *huachucae* in fresh fall plumage has been available; and that even though certain appreciable differences are shown in birds taken at approximately the same season in spring or summer, in Arizona and in California, respectively, it is not proved that these differences are not due to a greater rate of fading in one region than in the other. This might be partly true of the different shades of brown shown in the two races (though I doubt it), but the difference shown by the two forms in the relative areas occupied by brown and by white on the parti-colored feathers of which practically the entire plumage is composed, a maximum of brown in the California bird, a maximum of white in the Arizona race, is a feature that is not dependent upon long wear and consequent fading of the birds' covering. Then again, in the juvenals of the two forms, as described above, the new rectrices and remiges are of distinctly different shades of brown.

As shown in the accompanying table of measurements, *huachucae* appears to be of slightly smaller size than typical *occidentalis*, though judging from the range of variation shown in the latter series, the apparent size difference in the races may be due to the small number of Arizona specimens examined. However, taking everything into consideration, there seems sufficient reason for the recognition of the Arizona race of the Spotted Owl. The four specimens examined show a certain range of variation, as is to be expected, but any of them can readily be distinguished from the California form. The extensive series of the latter subspecies available does not contain any specimens with characters at all like those of the Arizona birds.

Geographically the two forms appear to be absolutely and widely separated. Between the mountains of the San Diegan district of southern California, comprising the habitat of *occidentalis*, and the mountains of southeastern Arizona, where *huachucae* occurs, lies a stretch of desert several hundred miles in extent, forming an impassable barrier between the two. The Spotted Owl is a bird of the high Upper Sonoran and Transition zones, and is nowhere known to have occurred at any Lower Sonoran locality. Furthermore, it is restricted associationally, showing marked preference for heavily timbered regions; such places in the habitats of *occidentalis* and *huachucae* being almost invariably shady canyons or densely wooded hillsides. Although the Upper Sonoran zone extends quite continuously from southeastern Arizona northward into central Nevada, and then westward into California, and there might be deduced from this a continuity of range of one form with the other, such argument would be fallacious, for this region is the extremely arid Upper Sonoran of piñon and juniper, offering nothing to a bird with the requirements of the Spotted Owl.

The species has not so far been found in northern Arizona, nor is it known from the east slope of the Sierras, in California, so that altogether it seems highly probable that there is an extensive hiatus between the regions inhabited by the Spotted Owl in southern Arizona and in southern California. It is to be expected, of course, that segregation amid widely different surroundings, acting upon a non-migratory animal, would be productive of some variation in the inhabitants of the different regions. Furthermore, the observed differences distinguishing the few known specimens of the Arizona race from the California subspecies, are exactly such as we would expect to find, reasoning from analogous cases among other animals of similar distribution. Thus there seems to be ample justification for the recognition of the differences existing between the California and the Arizona races of *Strix occidentalis*. As to the relationship of the latter, the Arizona bird, to the form of Spotted Owl occurring southward over the table land of Mexico, that is another matter, to be determined by future study of more material than is now available.

As stated above, the opportunity I have enjoyed of making the comparisons herein recorded, is primarily due to the consideration of Dr. Louis B. Bishop, in loaning me his Arizona specimens. Of the other skins examined, the type specimen of *S. o. huachucae* was borrowed from the California Museum of Vertebrate Zoology, where it is on deposit as part of the Morcom collection; while the examples of *S. o. occidentalis* are all either from the collection of the Los Angeles Museum of History, Science, and Art, or of the several individuals who have their collections on deposit in that institution. Their names appear in the appended list of specimens, and to each one I wish to express my appreciation of the privilege I have enjoyed.

Accompanying is a list of the specimens upon which this study is based. The examples of *S. o. occidentalis* are all from points in the San Diegan district, southern California; of *S. o. huachucae*, from southeastern Arizona. For the sake of the measurements I have included several skins not actually handled at this time. The data pertaining to these is copied from my previous paper on the species, before cited, and these skins, during the preparation of that paper, were carefully compared with the one example of *huachucae* then available.

Strix occidentalis occidentalis

No.	Sex	Collection of	Locality	Date	Wing	Tail
1392	♂	G. Willett	Monrovia	Nov. 9, 1913	314	203
1394	♂	G. Willett	Monrovia	Nov. 3, 1913	320	205
152 ^a	♂	J. Grinnell	Pasadena	Nov. 30, 1894	321	197
1674 ^a	♂	H. S. Swarth	Pasadena	Oct. 22, 1900	328	206
1675 ^a	♂	H. S. Swarth	Pasadena	Oct. 22, 1900	326	212
.... ¹	♂	G. F. Morcom	San Diego Co.	Oct. 11, 1885	318	207
130 ^a	♂	Mus. Hist., Sci. and Art	Castaic Canyon	Apr. 1, 1909	...	...
151 ^a	♀	J. Grinnell	Pasadena	Nov. 30, 1894	323	213
1477	♀	J. E. Law	San Dimas Canyon	Dec. 9, 1913	326	207
1393	♀	G. Willett	Monrovia	Nov. 3, 1913	326	208
829	♀	G. Willett	Fillmore	Dec. 13, 1910	320	205
830	♀	G. Willett	Fillmore	Dec. 13, 1910	314	193
494	♀	C. H. Richardson	Mt. Wilson	Mar. 21, 1905	325	214
5589	♀	F. S. Daggett	San Dimas Canyon	Feb. 14, 1903	322	209
....	♀	L. H. Miller	Castaic Canyon	Apr. 10, 1911	...	213
131 ^a	♀	Mus. Hist., Sci. and Art	Castaic Canyon	Apr. 1, 1909	...	...
1395	?	G. Willett	Monrovia	Nov. 3, 1913	330	208
....	?	Mus. Hist., Sci. and Art	Newhall	May 20, 1906	...	...
....	♀ juv.	L. H. Miller	Forest Home	Aug. 17, 1913	...	....

Strix occidentalis huachucae

(3691) ^a	♂	G. F. Morcom	Huachuca Mts.	Apr. 11, 1903	318	192
16876	♂	L. B. Bishop	Santa Catalina Mts.	July 7, 1906	314	188
16877	♀	L. B. Bishop	Santa Catalina Mts.	July 7, 1906	323	200
16878	♂ juv.	L. B. Bishop	Santa Catalina Mts.	July 7, 1906	...	...

¹Specimen not examined in the present connection.

^aMounted bird; not available for measurements.

^bType; no catalogue number. Number given is that of the field note book of the collector, H. S. Swarth. Specimen on deposit at the Museum of Vertebrate Zoology, Berkeley, California.

Los Angeles, California, November 15, 1914.

NIAGARA AT YOUR DOOR

An Appeal to San Franciscans

By WILLIAM LEON DAWSON

WE HAVE all heard of the family which having been resident for fifty years at a point seven miles from Niagara, finally scraped enough money together to come to California—without ever having seen Niagara Falls. We are glad they came, of course, and we will not chide them; because we are fearful lest they in turn should ask us Californians certain embarrassing questions. Let us see!

One afternoon in July, 1912, viz., the 21st, during a three-day sojourn in your beautiful city, I was delighted to find that the famous Seal Rocks off the mouth of the Golden Gate were thickly populated with a nesting colony of Farallon Cormorants. There were five hundred birds, by count, on the shoreward aspect of the largest rock (in delightfully plain view from the portico of the Cliff House, as every one knows), and it seemed probable that as many more were occupying the seaward slopes. Inasmuch as I had on all former occasions beheld these rocks practically monopolized by Steller Sea Lions, I was very much interested, and became, naturally, curious as to further developments. Not being privileged to follow the fortunes of this notable colony