

ON GEOGRAPHICAL VARIATION IN *SIALIA*  
*MEXICANA* SWAINSON.

BY ROBERT RIDGWAY.

IN October, 1889, Mr. A. W. Anthony, of San Diego, California, described, in the 'Proceedings' of the California Academy of Sciences (2d Ser., Vol. II, p. 79), under the name *Sialia mexicana anabelæ*, a supposed new race of *Sialia mexicana*, resident on the San Pedro Martir Mountains, Lower California. A small number of specimens were sent to me by Mr. Anthony for examination, and upon this insufficient evidence an unfavorable opinion was formed as to the validity of the form. It was accordingly considered by the A. O. U. Committee on Publications ineligible for admission to the Check List on the ground that its characters were "deemed not sufficiently constant." (See 'The Auk,' Jan. 1890, p. 66.)

Not satisfied with the disposition made of it by the A. O. U. Committee, Mr. Anthony again visited the San Pedro Mountains and collected a large number of specimens, which he forwarded to me, early in November, 1893, for examination by the Committee; but the question of its status not having been raised during the year no action could properly be taken concerning it. It is for the purpose, therefore, of having this question available for consideration by the Committee at its next session that this paper has been prepared; for I am now convinced that an error was committed in rejecting the new subspecies which Mr. Anthony had described.

In order to clearly understand the nature and value of the characters presented in the resident birds of this species from Lower California, it has been found necessary to bring together for comparison as many specimens of the species, from all parts of its range, as possible. No difficulty has been experienced in getting a pretty good series of the common form of the western United States (*S. mexicana occidentalis*) and, thanks to Mr. Anthony, of the resident race of the Lower California mountains (*S. m. anabelæ*); but of the bird resident in southern Mexico (true *S. mexicana*), very few specimens — only 10 — could be

obtained, and for 9 of these I am indebted to Dr. C. Hart Merriam, Chief of the Division of Economic Ornithology, Department of Agriculture, the National Museum collection containing a single specimen only. Although so small, numerically, this series is highly important, as showing that the resident birds of southern Mexico alone are entitled, unqualifiedly, to the name *Sialia mexicana*, a fact which would not have been evident without them.<sup>1</sup>

The number of specimens examined in connection with this paper and the sources from whence obtained are shown in the following tables:—

	♂	♀	Total.
I. <i>Sialia mexicana</i> Sw.	6	4	10
II. <i>S. m. occidentalis</i> (Townsend).	82	23	105
III. <i>S. m. anabelæ</i> Anthony.	44	18	62
Total,	132	45	177

	I.	II.	III.	Total.
A. W. Anthony.	—	32	60	92
National Museum.	1	67	2	70
Division of Ornithology.	9	—	—	9
H. W. Henshaw.	—	6	—	6
Total,	10	105	62	177

The conclusions reached after very careful examination and comparison of the large number of specimens examined may be summarized as follows:—

(1) Although the *Sialia mexicana* of Swainson was plainly based on a specimen (from the "tableland of Mexico") having the back entirely blue, the series of specimens from southern Mexico, though small, is sufficient to show that such is by no means a constant—probably not even usual—character of the Mexican form. But these southern resident birds, besides averaging considerably larger than any others, are of a much deeper or darker, more purplish, blue color, and the females, at least,

<sup>1</sup> The northern and southern forms were, however, duly separated in 1881 by Mr. Henry Seebohm, in Volume V of the 'Catalogue of Birds in the British Museum' (pp. 331-333), though one of the supposed differential characters proves to be altogether unreliable.

have a far greater amount of cinnamon or rusty coloring on the under parts.

(2) A series of nearly 50 adult males collected during the breeding season on the higher parts of the San Pedro Martir Mountains, Lower California, present as practically constant characteristics several features which, individually, are very rarely and in combination with one another never, seen in a still larger series (82 adult males) collected in various portions of the western United States and in Mexico. These peculiarities of the Lower Californian bird consist in (1) the entire absence or scarcely obvious development of chestnut on the back, (2) separation of the chestnut on the breast into two lateral patches by the longitudinal extension of the blue of the throat to that of the belly, (3) greater average size, especially of the bill, and (4) appreciably deeper, richer blue color of the upper parts, with the blue of the throat—often that of the breast and upper belly also—nearly or quite as intense as that of the upper parts.

(3) The extensive series from the western United States, representing numerous localities from southern California to Washington on the Pacific coast and western Texas to Colorado in the interior, as well as from the northern and western States of Mexico, show great variations in plumage which are of a decided geographical significance<sup>1</sup> and may require subdivision of the series into two forms. The birds of this series are almost invariably smaller than those of the two preceding groups. They have, with few exceptions, the back more or less extensively chestnut, and the chestnut of the breast is almost invariably broadly continuous anteriorly. In 31 specimens from Colorado, New Mexico, Arizona, northern Mexico and western Texas all but 2 (both autumnal birds from New Mexico) have the back and scapulars 'solid' chestnut, at least laterally and, broadly,

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<sup>1</sup> Professor Baird first called attention to these variations in 'Birds of North America' (1858), p. 223, as follows:—

"The reddish brown of the back and breast is in the form of lateral patches, meeting more or less narrowly on the central line. Sometimes in the middle of the back it does not meet at all, and at others it is quite broadly continuous. The latter is most frequently seen in Rocky Mountain specimens. . . . Specimens from California occasionally have but little brown on the back, but it is almost always distinctly visible."

across the anterior portion. Among 34 specimens from Washington, Oregon, California, and the western edge of Nevada only 6 are of this character, the remainder having the chestnut of the back separated into two lateral patches, barely coalescing for a slight extent in a few specimens only, and often reduced to two widely separated and greatly restricted areas. The six exceptions are 1 from Fort Tejon (August 7), 1 from Walker's Basin (November 5), 2 from Berryessa (November 14 and December 8), 3 from Santa Isabel, San Diego Co. (December 29 and February 15), 1 from Murphy's, Calaveras Co. (winter), and 1 from San Francisco. The latter is without date, but is in spring or summer plumage; and being obtained from a dealer's stock may well be ignored. The others are all fall or winter specimens,<sup>1</sup> and, except that from Murphy's, from southern California, may have been migrants from the eastward.

The type of *Sialia occidentalis* Townsend is a bird of the western style, with perhaps a little more than the average amount of chestnut on the back. Whether the type of *S. caruleocollis* Vigors was also a representative of this style probably cannot now be determined, neither the description<sup>2</sup> nor colored figure being sufficiently accurate to permit positive identification, while nothing whatever is said as to its locality.

While hesitating to formally separate the Rocky Mountain bird I believe it will yet be found necessary to do so; and in view of this probability would suggest for it the name *Sialia mexicana bairdi*,<sup>3</sup> in respectful memory of Professor Baird, as well as a proper recognition of his discovery of the geographical variations referred to.<sup>4</sup>

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<sup>1</sup> The one from Fort Tejon, although taken in August, had nearly completed the fall moult.

<sup>2</sup> See foot-note on page 155.

<sup>3</sup> Type, No. 7637, U. S. National Museum, Camp 110, New Mexico, Jan. 31, 1854; Kennerly & Müllhausen.

<sup>4</sup> Since the above was written I find on reference to some memoranda which I made concerning specimens not now available for examination, that among specimens previously examined were the following having the back wholly chestnut: Beaverton, Oregon, 2; Wilson's Peak and Alhambra, southern California, 3. On the other hand, among those with the back only partly chestnut were the following: Beaverton, Oregon, 13; Wilson's Peak and San Diego, California, 1 each; Granite Gap, New Mexico, 1.

The amount of chestnut on the back is usually more or less correlated with a similar variation of that on the breast; but not always so. Of the specimens now at hand of *S. m. occidentalis* in its larger sense (that is, including both the typical form and the chestnut-backed style which I have named, provisionally, *S. m. bairdi*), only 6 out of a total of 65 have the chestnut of the breast nearly or quite divided into two lateral patches, these all of the western style, the localities represented being as follows: Ft. Steilacoom, Washington, 1 (April 17); Mt. Lassen, California, 1 (July 4); Nicasio, California, 1 (April 11); Mt. Whitney, California, 1 (October 23); Carson City, Nevada, 1 (February 21); and Genoa, Nevada, 1 (June 20). These all have very little chestnut on the back, amounting in the Genoa specimen to a mere trace, observable only on the closest inspection.<sup>1</sup>

The chestnut on the breast is as a rule decidedly broader in the birds with wholly brown backs, but occasionally an example with very little chestnut on the back will be found with the maximum width of that color across the breast. There is so much individual variation in the intensity of this color that it is difficult to tell whether in one form it averages deeper than in the other; but apparently it averages paler in the coast form.

From the foregoing it will be seen that while the presence or absence of chestnut on the back and the degree to which it is developed is largely a variable individual character and only

Dr. A. K. Fisher has examined a series of 10 adult males in the collection of the Division of Ornithology, U. S. Department of Agriculture, with the view of testing this character, and kindly submits the following result:—

*Back with more or less blue*: Pyramid Lake, Nevada, 2 (June 24); Prescott, Arizona, 1 (June 21).

*Back entirely chestnut*: Fort Davis, Texas, 1 (Jan. 2); Kanab, Utah, 1 (Dec. 26); San Francisco Mts., Arizona, 1 (August); Charleston Mts., Nevada, 1 (February); Mt. Whitney, California, 1 (Sept. 4); San Bernardino, California, 2 (Dec. 30).

It will thus be seen that this material, in the main, bears out the geographical significance of the variation in question, though the two examples with wholly chestnut backs from Beaverton, Oregon (which is on the west side of the mountains and near the Columbia River), in addition to other exceptions to the rule, show clearly that the variation is not strictly geographical.

<sup>1</sup>These six examples bear a very close resemblance to *S. m. anabelle*, but may be separated by their decidedly more slender bill, and, except in the case of the one from Fort Steilacoom and that from Genoa by the perceptibly lighter shade of blue and lighter chestnut on the sides of the breast.

partially correlated with locality, its absence or very slight development is the rule among the birds of this species resident on the high mountains of Lower California; that it is never (?) wholly absent though sometimes very slightly developed among those from the Pacific coast district north of Lower California, from which area most specimens have the chestnut on the back moderately developed, that is, almost always more or less interrupted (often widely) by blue along the median line; and that among those from the interior plateau region the back is, as a rule, entirely chestnut.

The series of resident Mexican birds is much too small to admit of even a guess as to which style of plumage prevails among them.

I have taken advantage of the opportunity offered by the large series of specimens brought together as the basis of this paper, to prepare descriptions of typical specimens of the several forms, representing the two sexes in these seasonal adult plumages, which are presented herewith, together with their principal synonymy and various critical observations.

The preparation of a 'key' for the ready identification of specimens has proven a matter of extreme difficulty, for the reason that no single character will serve for the definition of any form, the nearest approach to constancy of a single character being, so far as the material examined indicates, the much darker, more purplish, blue of the resident birds of southern Mexico and the wholly chestnut back of the birds from the plateau region of the United States.

I am aware the following attempt at a key is very unsatisfactory; but on account of the fact that our series of true *S. mexicana* is very inadequate, and not wholly sufficient as to the other forms (the proportion of specimens obtained during the breeding season being too small), it is the best I have been able to devise.

- A. Chestnut color of back extremely variable in amount, sometimes entirely absent, but in the latter case chestnut of breast continuous anteriorly.
  - a. Back usually (?) with little if any chestnut; blue of upper parts of a rich deep 'smalt' hue; wing in adult male averaging 4.38. (Highlands of southern Mexico.) 1. *S. mexicana* SWAINS.

- b. Back usually with much chestnut, often wholly so, very rarely with a mere trace; blue of upper parts varying from rich ultramarine to light cobalt; wing in adult male averaging 4.07.
- a<sup>1</sup>. Back with median portion more or less blue, the chestnut sometimes restricted to a mere trace on each side. (Pacific coast, from British Columbia to southern California, east to western Nevada, casually, during migrations, to New Mexico.)
2. *S. m. occidentalis* (Towns.).
- b<sup>2</sup>. Back wholly chestnut. (Rocky mountain district south to northern Mexico.)
3. *S. m. bairdi* RIDGW.
- B. Chestnut color of back and breast greatly reduced in extent, usually wholly wanting or barely indicated on the former, and divided into two lateral patches by backward extension of blue of throat on the latter. Blue of upper parts intermediate between 'smalt' and ultramarine; wing in adult male averaging 4.29. (Mountains of Lower California.)
4. *S. m. anabelæ* ANTHONY.

## I. *Sialia mexicana* SWAINSON.

### MEXICAN BLUEBIRD.

*Sialia mexicana* SWAINS. F. B.—A. II, 1831, 202, foot-note (tableland of Mexico<sup>1</sup>).—SCL. P. Z. S. 1856, 293 (Cordova<sup>2</sup>); 1859, 362 (Jalapa<sup>3</sup>); Catal. 1862, 11 (part, Jalapa).—SUMICHR. Mem. Bost. Soc. I, 1869, 544 (alp. reg. of Mt. Popocatepetl).—SCL. and SALV. Nom. Neotr. 1873, 4 (Mexico).—BOUC. Cat. Av. 1876, 149 (Mexico).—SALV. and GODM., Biol. Centr. Am. I, pt. 6, 1879, 47 (part).—SEEBOHM, Cat. B. Brit. Mus., V, 1881, 331 (highlands of Mexico).

**GEOGRAPHICAL RANGE.**—Highest mountains of southern Mexico, (Orizaba, Popocatepetl, etc.) in summer, descending to the tableland in winter.

*Adult male in breeding season* (135,701, Cofre de Perote, Vera Cruz, Mexico, May 30, 1893; E. W. Nelson): Above uniform rich smalt-blue, darker (hyacinth blue) anteriorly; shafts of remiges and rectrices deep black, and tips of the former, especially on inner webs, dull blackish

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<sup>1</sup>"*SIALIA mexicana* SW. Size of *S. arctica*; upper plumage bright purple-blue, chin and throat the same; across the breast a rufous band, which color is continued on the sides and flanks; middle of the body, vent, and under tail covers light blue, inclining to white. Total length 6 1-2, wings 4 1-2, tarsi 3-4, tail 3 inches. Inhabits Mexico. In Mr. Taylor's collection."

<sup>2</sup>These localities, according to Prof. Sumichrast (l. c.), are probably incorrect.

slate. Chin, throat, and upper part of chest dull smalt-blue (decidedly, but not abruptly, paler and duller than top and sides of head); sides of chest, sides, and flanks chestnut-cinnamon, inclining to mars brown, this color extending rather narrowly across the upper breast, where, however, somewhat streaked with blue along the median line; lower median portion of breast, upper part of belly, axillars, and under wing-coverts, light, grayish smalt-blue, inclining to campanula-blue; the under tail-coverts similar but still paler, with basal portion and edges of feathers grayish white; lower belly and anal region dull grayish white. Bill and feet black. Total length (skin), 6.20; wing, 4.62; tail, 2.88<sup>1</sup>; exposed culmen, 0.50; tarsus, 0.85; middle toe, 0.62.

*Adult male in autumn* (No. 135,709, Villar, San Luis Potosi, Mexico, Sept. 28, 1892; E. W. Nelson): Above purplish cobalt-blue, the back and scapulars overlaid or obscured by grayish brown wash occupying, broadly, the tips of the feathers; top of head similarly but more faintly obscured by brownish gray. Otherwise similar to the breeding plumage, as described above, but blue of under parts much paler (intermediate between 'campanula' blue and 'flax-flower' blue), except on axillars, under wing-coverts, and under tail-coverts, which are campanula blue, the latter with whitish margins. Cinnamon-chestnut of breast extending continuously across. Total length (skin), 6.65; wing, 4.35; tail, 2.78; tarsus, 0.82; middle toe, 0.60.

*Adult female in breeding season* (No. 135,705, Mt. Orizaba, Puebla, April 19, 1893; E. W. Nelson): Above dull grayish blue, becoming bright blue (intermediate between 'campanula' and 'cobalt') on rump, upper tail-coverts and tail, dullest on the back, where inclining to drab-brown on scapular region, especially anterior portion; outermost primary with outer web broadly margined with pure white, and outer web of exterior tail-feather almost wholly pure white. Chin, throat, and malar region dull light bluish gray, the chin and upper throat very indistinctly mottled with darker; entire chest (except upper median portion, where mixed with gray of throat), upper breast, sides, and flanks, uniform rufous-cinnamon, deepest on sides of chest; median portion of lower breast light dull gray, fading to dull whitish gray on belly and anal region; under tail-coverts light grayish blue, broadly margined with white. Bill and feet black. Total length (skin), 6.20; wing, 4.30; tail, 2.70; exposed culmen, 0.43; tarsus, 0.82; middle toe, 0.60.

*Adult female in winter* (No. 135,711, Mt. Popocatepetl, Mexico, February 24, 1893; E. W. Nelson): Very similar to the specimen (in breeding plumage) described above, but back and scapulars uniformly warm brown ('Prout's' brown), and cinnamon-color of breast, etc., deeper as well as much more extensive (covering entire chest and breast, as well

<sup>1</sup> Extreme and average measurements of wing and tail of 7 adult males are as follows: Wing: Average, 4.38; longest, 4.62; shortest, 4.18. Tail: Average, 2.69; longest, 2.88; shortest, 2.50.



as whole of sides and flanks). Total length (skin), 6.25; wing, 4.25; tail, 2.60<sup>1</sup>; exposed culmen, 0.40; tarsus, 0.82; middle toe, 0.58.

The six adult males of this form before me vary remarkably in coloration. The one in breeding plumage described above was selected as agreeing more closely with Swainson's original description than any of the others. Like Swainson's 'type,' this is absolutely without a trace of brown on the back or scapulars, and the uniform blue of the upper parts is of the same rich, dark purplish hue.

An adult male in similar condition of plumage collected on Mt. Orizaba, Puebla, April 19, by Mr. Nelson (No. 135,703, collector's number 1040), is in general appearance similar, but has a distinct patch of chestnut-brown on each side of the back (on outermost anterior scapulars), has the blue of the throat and lower breast paler and duller, and the cinnamon-chestnut of the breast much more extensive and absolutely unbroken in the median portion.

Another specimen from the same locality collected April 21 (No. 135,704) has these features still more pronounced, the chestnut of the back extending quite across on the anterior portion, and the whole breast, as well as the chest, being uniform cinnamon-chestnut, though not quite so deep in color nor so extensive as in the February specimen from Mt. Popocatepetl, mentioned below.

An adult male in perfect plumage from Mt. Popocatepetl obtained February 24, 1893, by Mr. Nelson (No. 135,710, collector's number 849), has the upper parts exactly as in the example just mentioned, but the under parts are still more extensively cinnamon-chestnut, this color occupying not only the whole of the chest, breast, sides, and flanks, but also the lower throat. The whole throat is faintly tinged with rusty, and the color of the breast, etc., approaches far more closely to chestnut than cinnamon.

An example in fresh autumnal plumage from the foot-hills near Charcas, San Luis Potosi (No. 124,903, November 13, 1891, P. L. Jouy) is not only wholly rich deep smalt blue above, but

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<sup>1</sup> Average and extreme measurements of wing and tail in 4 adult females are as follows: Wing: Average, 4.26; longest, 4.30; shortest, 4.22. Tail: Average, 2.64; longest, 2.70; shortest, 2.55.

the lower parts are also chiefly blue (deep 'campanula'), fading into pale bluish gray on lower belly and anal region and relieved anteriorly by a large patch of chestnut extending from the sides of the chest to the flanks, but posteriorly narrower and broken by admixture of light grayish blue.

That the type of *S. mexicana* (described from a specimen "in Mr. Taylor's collection") came from some part of the State of Puebla, or immediately contiguous territory, is rendered probable through the re-discovery near Charcas, by Mr. P. L. Jouy, of *Aphelocoma cyanotis*, the type of which (without definite locality) was also collected by Mr. Taylor.<sup>1</sup>

Females of this form may be at once distinguished from those of *S. m. occidentalis* and *S. m. anabelæ* (which are much alike) by the far deeper, more purplish blue of the upper parts, and altogether more distinct and extended cinnamomeous color of the under parts. They are also decidedly larger, especially in length of wing.

## 2. *Sialia mexicana occidentalis* (TOWNSEND).

### WESTERN BLUEBIRD.

*Sialia occidentalis* TOWNS. Jour. Ac. Nat. Sci. Philad. VII, 1837, 188 (Columbia R.).<sup>2</sup>—AUD. B. Am. II, 1841, 176, pl. 135.—NUTT. Man. 2d ed. I, 1840, 513.—HEERM. Jour. Ac. Nat. Sci. Philad. II, 1852, 264 (California).—WOODH. Sitgreave's Rep. 1853, 68.—HENRY, Proc. Ac. Nat. Sci. Philad. VII, 1855, 310 (New Mexico).—NEWB. P. R. R. Rep. VI, 1857, 80.—SEEBOHM, Cat. B. Brit. Mus. V, 1881, 332 (Pacific Coast U. S. to Rocky Mts., n. to Brit. Columb., s. to Colorado basin).

*Sylvia occidentalis* AUD. Biog. V, 1839, 41, pl. 393.

<sup>1</sup> Cf. Proc. U. S. Nat. Mus., —, —, —.

<sup>2</sup> "Description. Colour bright blue; shoulders and lower part of breast, chestnut-rufous; chin and upper part of the breast, azure; belly and vent faintly tinged with blue.

"Female and young, grayish, faintly tinged with blue, becoming brighter on the rump, wings and tail; beneath, pale rufous and gray. The bill is longer than that of the common native [*i. e.*, eastern] species, which it strongly resembles in many respects.

"Inhabits the plains of the Columbia River." (TOWNSEND, l. c.)

Townsend's types (adult male and female) are in the National Museum collection.

*Sialia cæruleocollis* VIG. Zool. Voy. Blossom, 1839, 18, pl. 3 (California?).<sup>1</sup>

*Sialia mexicana* (nec SWAINS.) GAMB. Proc. Ac. Nat. Sci. Philad. III, 1846, 113 (California); Jour. Ac. Nat. Sci. Phil. I, 1847, 37 (do.).—SCL. P. Z. S. 1857, 126 (California); 1859, 235 (Vancouver I.).—BAIRD, B. N. Am. 1858, 223; Cat. N. Am. B. 1859, No. 159; Review, 1864, 63.—COOP. Orn. Cal. I, 1870, 28.—COUES, Key, 1872, 76; 2d ed., 1884, 258; Check List, 1873, No. 17; 2d ed. 1882, No. 28; B. N. W. 1874, 14; B. Col. Val. 1878, 80.—B. B. & R. Hist. N. Am. B. I., 1874, 65, pl. 5, fig. 2.—LAWR. Mem. Bost. Soc. N. H. II, 1874, 267 (Mazatlan; plains of Colima<sup>2</sup>).—RIDGW. Nom. N. Am. B. 1881, No. 23; Man. 1887, 581.—ANTHONY, Zoe, IV, No. 3, 1893, 247 (San Pedro Martir Mts., Lower Cal.; common during migrations).

**GEOGRAPHICAL DISTRIBUTION.**—Western United States in general (in wooded districts), north to British Columbia, east to Colorado, western Texas, and New Mexico, south to San Pedro Martir Mts., Lower California, western and northern Mexico (Mazatlan, Colima, Sonora, Chihuahua and Cohahuila). Apparently breeding to nearly the southern limit of its range.<sup>3</sup>

**SUBSP. CHAR.**—Smaller than true *S. mexicana*, with the blue color of upper parts much lighter (ultramarine or light smalt blue instead of deep

<sup>1</sup> "Sial. capite, gula, collo, corporeque superiori cæruleis; dorso interscapulari brunnescenti; pectore abdominisque lateribus rufis, hoc imo albescenti.

"Longitudo corporis, 6 1-4; rostri, 5-8; alæ, a carpo ad apicem remigis secundæ, 4 1-2; caudæ, 3; tarsi, 7-8.

"This species may be distinguished from the *Sylvia sialis*, Lath., which forms the type of Mr. Swainson's genus *Sialia*, by the blue color of the throat in front, and the brown color of the back. The bill is also slighter than in the latter bird. A young specimen, or perhaps a female of the species, is in the collection, which has the colours much less vivid than in the adult bird; the rufous color of the lower body seems also to extend further up the throat. It, however, evinces its distinction from the young of the allied species by the slighter bill, and by a white mark extending over the outer web of the interior quill-feathers, at their base." (VIGORS, l. c.)

No locality is mentioned, but the specimens on which the above descriptions were based were either from California or the west coast of Mexico.

<sup>2</sup> I have not seen Col. Grayson's Mazatlan specimens, but an adult male and female collected by Xantus on the plains of Colima, in October, 1863, now in the National Museum Collection, are of this form.

<sup>3</sup> An adult female from Saltillo, Cohahuila, obtained by Lieut. Couch in May, 1853, is in worn breeding plumage. Even in the San Pedro Martir Mountains, Lower California, where it is said to be "very common during migrations from sea level to the top of the range," a few remain, according to Mr. Anthony (l. c.) "to nest with the local race."

small); female with cinnamomeous color of under parts paler and much less extensive.<sup>1</sup>

a. TYPICAL FORM (true *S. m. occidentalis*).

*Adult male in spring* (type, No. 1930, Columbia River; J. K. Townsend): Upper parts rich cobalt blue; sides of upper back (not scapulars) chestnut, forming two somewhat wedge-shaped patches, nearly connected anteriorly, the median feathers of the upper back being tipped with chestnut; tips of remiges (broadly) brownish dusky. Sides of head and neck, chin, throat, and chest cobalt-blue, rather lighter than upper parts; sides of breast wholly chestnut, this color extending across the upper breast and posteriorly over the sides to the flanks, where considerably paler; median lower breast or upper belly light grayish blue, fading into dull white on lower belly and anal region; under tail-coverts pale grayish blue margined with grayish white, and with dusky shafts. Bill deep black; legs and feet dark brown. Total length (skin), 6.10; wing, 4.10; tail, 2.55; exposed culmen (tip of bill broken); tarsus, 0.80; middle toe, 0.60.

*Adult male in autumn* (No. 107,287, Humboldt Bay, California, Nov. 21, 1885; Chas. H. Townsend): Similar to the male in spring, as described above, but feathers of hinder half of head, neck, back, chin, throat, and chest indistinctly tipped with pale brownish gray, considerably obscuring the blue, which on the chin, throat, and chest is considerably paler than on the upper parts; feathers of chestnut patch on breast tipped with paler; remiges and rectrices with narrow terminal margins of whitish. The blue is of a much more purplish hue than in the type, and the chestnut color on the sides of the back is more restricted, but these are individual, not seasonal, differences. Total length (skin), 6.00; wing, 4.05; tail, 2.48; exposed culmen, 0.43; tarsus, 0.75; middle toe, 0.55.

*Adult female in spring* (No. 82,590, Marin Co., California, April 15, 1878; C. A. Allen): Top of head and hind-neck mouse-gray, faintly tinged with light blue, especially on hind-neck; back and scapulars hair-brown, becoming paler and grayer, and tinged with light blue, posteriorly; rump, upper tail-coverts, lesser wing-coverts, and tail cerulean blue, brightest on rump; outer web of lateral tail-feather broadly edged with white; middle wing-coverts dusky, margined with grayish blue; greater coverts and tertials deep grayish brown margined with light brownish gray; primary-coverts similar, but strongly tinged with blue; outer webs of primaries light glaucous-blue, narrowly edged with whitish, the outermost one broadly and sharply edged with pure white. Sides of head grayish brown, more decidedly brown on ear-coverts, the eyes encircled

<sup>1</sup> Average and extreme measurements of wing and tail in a series of 82 adult males (including both true *occidentalis* and *bairdi*) are as follows: Wing: Average, 4.20; longest, 4.55; shortest, 3.90. Tail: Average, 2.63; longest, 2.80; shortest, 2.40.

by an indistinct orbital ring of dull grayish white; malar region, chin, and throat, pale grayish brown; whole breast dull light cinnamon, this color extending (more faintly) over sides but disappearing on flanks; rest of under parts similar in color to throat, passing into dull whitish on lower belly and anal region; lower tail-coverts grayish blue centrally, with blackish shaft-streaks, and broadly margined with grayish white. Bill and feet brownish black. Total length (skin), 6.10; wing, 3.95; tail, 2.45; exposed culmen, 0.45; tarsus, 0.82; middle toe, 0.60.

*Adult female in autumn* (No. 2,949, Columbia River; J. K. Townsend): Similar to the spring plumage, as described above, but colors more suffused, the blue less bright, top of head and hind-neck more strongly tinged with blue, whitish orbital ring much more distinct, the breast and sides deeper cinnamon-brown. Total length (skin), 6.50; wing, 3.97; tail, 2.42; exposed culmen, 0.45; tarsus, 0.85; middle toe, 0.63.

*b. CHESTNUT-BACKED FORM (S. m. bairdi).*

*Adult male in spring*<sup>1</sup> (type of *S. m. bairdi* Ridgw., No. 7637, Camp 110, "New Mexico," Jan. 31, 1854; Kennerly and Möllhausen): Head and neck all round, chest, and upper parts except back and scapulars, rich ultramarine-blue, with a tinge of smalt-blue, rather paler on chin, throat, and chest; entire back, including most of the scapulars, uniform chestnut, forming a 'solid' shield-shaped patch, abruptly defined anteriorly against the blue of the hind-neck; upper tail-coverts with indistinct blackish median streaks; ends of remiges abruptly blackish dusky, with very narrow but distinct terminal margins; shafts of remiges and rectrices glossy black. Entire breast (except lower median portion), sides, and flanks, uniform chestnut, of a rather lighter more rusty shade than that on the back; lower median portion of breast and upper part of abdomen, bright grayish blue, like throat and chest; rest of belly light bluish gray becoming whitish about the anal region; under tail-coverts light campanula-blue, margined with white. Bill and feet black. Total length (skin), 6.60 (6.25 before skinning); wing, 4.35; tail, 2.75; exposed culmen, 0.45; tarsus, 0.80; middle toe, 0.52.

*Adult male in autumn* (No. 68,442, Black River, Arizona, Oct. 7, 1874; H. W. Henshaw): Similar to the spring plumage, as described above, but blue of head, neck and chest obscured by brownish gray tips to the feathers (these more rusty on the chest), chestnut of back and scapulars duller and broken by paler tips to the feathers, that of the chest also varied with paler tips; blue of upper belly and median lower breast rather paler and duller. Total length (skin), 6.20; wing, 4.43; tail, 2.85; exposed culmen, 0.40; tarsus, 0.80; middle toe, 0.58.

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<sup>1</sup> Although the date is so early the plumage is in perfect condition, without a trace of the paler, duller tips to many of the feathers which characterize the autumnal and early winter dress.

*Adult female in spring* (No. 41,230, Ft. Whipple, Arizona, April 29, 1865; E. Coues): Practically identical in coloration with No. 82,590, Marin Co., California (described previously), but buffy cinnamon of breast tinging chest and throat, instead of being sharply defined against the clear light drab-gray of chest. Total length (skin), 6.30 (6.60 before skinning); wing, 4.15; tail, 2.47; exposed culmen, 0.45; tarsus, 0.75; middle toe, 0.60.

*Adult female in autumn* (No. 69,216, Apache, Arizona, Oct. 24, 1874; H. W. Henshaw): Practically identical in coloration with No. 2949, described on page 157. Total length (skin), 5.95; wing, 4.00; tail, 2.50; exposed culmen, 0.43; tarsus, 0.75; middle toe, 0.55.

In adult males of the Coast form, the blue varies from the light azure hue of the type to a clear purplish smalt blue in No. 21,425, Ft. Crook, Cal. (October 22). Both these extremes are very unusual, however, no other examples in the entire series approaching either of them very closely. Among the remainder, the blue ranges from a hue intermediate between smalt and ultramarine to pure ultramarine.

The only specimen which, at first sight, seems to have no chestnut on the back is No. 13,281, Genoa, Nevada (June 20); but close inspection discovers traces of chestnut in the form of edgings to some of the feathers on each side of the upper back. This example also has the blue of the chest extended to the belly, completely dividing the chestnut of the breast. It is also unusually large, the wing measuring 4.35, the tail 2.80. It thus approaches in all these characters *S. m. anabelæ*, but may be at once separated by the much more slender bill. Specimens in perfect adult spring plumage (as No. 82,589, Nicasio, California (April 11) show little if any difference in intensity of color between the blue of the throat and chest and that on top of the head.

Adult males of the Rocky Mountain form average perhaps a little more purplish blue than the coast form, the extremes being cobalt and smalt-blue, the average hue being intermediate between smalt and ultramarine, but nearer the former. Several males of this form show very distinct black mesial streaks on the upper tail-coverts (*e. g.*, No. 105,258, El Paso Co., Colorado, March 30, and No. 41,227, Ft. Whipple, Arizona, April 19).

I have been unable to detect any difference between females of the two forms. There is a considerable amount of individual

variation in this sex, affecting chiefly the blue color, which varies from light cobalt or azure to very nearly a verditer hue, with a decided greenish tinge to the edges of the rectrices; the distinctness of blue tinge to color of pileum and hind-neck, and the color of the back, which is always distinctly browner than adjacent parts, and, strange to say, sometimes more distinctly brown in coast specimens than those from the interior.

### 3. *Sialia mexicana anabelæ* ANTHONY.

#### SAN PEDRO BLUEBIRD.

*Sialia mexicana anabelæ* ANTHONY, Proc. Cal. Ac. Sci. 2d ser. II, Oct. 1889, 79 (San Pedro Martir Mts., Lower Cal.); Zoe, IV, No. 3, 1893, 247 (in text, under *S. mexicana*).—A. O. U. COMM. Auk, Jan. 1890, 66.

GEOGRAPHICAL RANGE.—San Pedro Martir Mountains, Lower California (resident).

SUBSP. CHAR.—Differing from true *S. mexicana* in shorter wing, the tail averaging a little longer; lighter blue above; lower parts with much more blue; the chestnut color often confined to a patch on each side of the breast. Differing from *S. m. occidentalis* in longer wing and tail, larger bill, and less extent of the chestnut color, both above and below, that of upper parts never extensive, and usually nearly, often quite, wanting, that of under parts usually confined to a patch on each side of breast. *Females* to be distinguished from those of *S. m. occidentalis* only (?) by stouter bill.

*Adult male in spring* (type, coll. A. W. Anthony, San Pedro Martir Mts., Lower California, May 6, 1889): Upper parts entirely rich smalt-blue, inclining to ultramarine in certain lights, without even a trace of blue on back or scapulars; greater part of inner webs of tertials and tips of all the remiges (broadly) dull black; shafts of remiges and rectrices glossy black. Lower parts rich blue (intermediate between smalt and ultramarine), nearly as intense anteriorly as color of upper parts, but fading to light grayish blue on belly, which becomes lighter, scarcely bluish, gray centrally; under tail-coverts campanula-blue. A patch of chestnut on each side of breast, separated by a bright blue space about 0.80 of an inch wide. Bill, legs, and feet deep black. Total length (skin), 6.20; wing, 4.32; tail, 2.90<sup>1</sup>; exposed culmen, 0.47; tarsus, 0.75; middle toe, 0.55.

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<sup>1</sup> Average and extreme measurements of wing and tail of 41 adult males are as follows: Wing: Average, 4.29; longest, 4.48; shortest, 4.10.

*Adult female in spring* (same locality, May 1, 1889; A. W. Anthony): Top of head, hind-neck and sides of neck brownish gray distinctly glossed with lavender-blue; ear-coverts deeper brownish gray, or drab, without blue gloss; chin pale gray; throat and upper chest similar but tinged with fawn-color; breast and sides russet-cinnamon, paler on flanks; belly light smoke-gray; under tail-coverts light grayish blue, margined with white, and with narrow dusky shaft-streaks. Back and scapulars dull grayish brown, tinged with purplish cinnamon, the median portion of the back glossed with grayish blue; lesser and middle wing-coverts bright smalt-blue; greater coverts and tertials duller, more grayish, blue, margined with dull light grayish; secondaries and primary-coverts dull smalt-blue, dusky at tips, and edged with paler; primaries and rectrices campanula-blue, becoming dusky at tips, the outer web of exterior primary and tail-feathers broadly edged with white; lower back, rump, and upper tail-coverts bright campanula-blue, or light smalt-blue. Bill and feet black. Total length (skin), 6.40; wing, 4.15; tail, 2.80<sup>1</sup>; exposed culmen, 0.45; tarsus, 0.80.

In the series of 44 adult males examined there is naturally a considerable amount of individual variation in plumage. That affecting the development of the chestnut color on back and breast may be summarized as follows:—

With no chestnut whatever on back or scapulars. . . . .	21
With the back chiefly blue. . . . .	18
With the back about equally blue and chestnut. . . . .	4
With the chestnut of the breast divided. . . . .	30
With the chestnut of the breast continuous anteriorly. . . . .	11
Not belonging strictly to either category. . . . .	2

In addition to this individual variation in the development of the chestnut there is a very slight one in the shade of the blue, which ranges from almost a 'smalt' hue to rich ultramarine; but the variation in this respect is far less than in either true *S. mexicana* or either of the northern races.

Unfortunately there are no specimens in Mr. Anthony's series representing either sex in autumn or winter plumage, all his specimens having been obtained during the breeding season.

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<sup>1</sup> Average and extreme measurements of wing and tail in 18 adult females are as follows: Wing: Average, 4.13; longest, 4.27; shortest, 4.00. Tail: Average, 2.62; longest, 2.70; shortest, 2.45.