1916

38. The Scott Oriole again at San Diego. Condor, vol. 18, p. 129.
39. Excursion impressions (introduction). Trans. San Diego Soc. Nat. Hist., vol. 2, pp. 77-78.

1918

40. Frank Stephens—an autobiography. Condor, vol. 20, pp. 164-166.
41. Some southern California reptile notes. Copeia, no. 54, pp. 34-35.

1919

42. An annotated list of the birds of San Diego County, California. Trans. San Diego Soc. Nat. Hist., vol. 3, pp. 142-180 (reprint, pp. 1-40).
43. Unusual occurrences of Bendire Thrasher, Forked-tailed Petrel and Western Goshawk. Condor, vol. 21, p. 87.
44. Random notes. Condor, vol. 21, pp. 123-124.

1920

45. Old Squaw Ducks at San Diego. Condor, vol. 22, p. 43.
46. A swan hunt. Condor, vol. 22, p. 77.
47. Bohemian Waxwing in San Diego County. Condor, vol. 22, p. 159.

1921

48. An annotated list of the mammals of San Diego County, California. Trans. San Diego Soc. Nat. Hist., vol. 3, pp. 41-56.
49. An annotated list of the amphibians and reptiles of San Diego County, California. Trans. San Diego Soc. Nat. Hist., vol. 3, pp. 57-69.
50. Phyllodactylus in California. Copeia, no. 91, p. 16.
51. Early spring notes on birds of Coronado Islands, Mexico. Condor, vol. 23, pp. 96-97.
52. Eclipse plumage of Cinnamon Teal. Condor, vol, 23, p. 194.

1922

53. Occurrence of the Surf Scoter on fresh water. Condor, vol. 24, p. 134.

1924

54. Another California record for the Gray-headed Junco. Condor, vol. 26, p. 112.

1929

55. Notes on the marine Pleistocene deposits of San Diego County, California. Trans. San Diego Soc. Nat. Hist., vol. 5, pp. 245-256.

San Diego Society of Natural History, San Diego, California, February 24, 1938.

THE WHITE-THROATED SPARROW IN WESTERN NORTH AMERICA

WITH ONE ILLUSTRATION

By MARGARET W. WYTHE

From time to time various birds whose regular distribution is east of the Rocky Mountain divide are observed as so-called accidental stragglers far out of their normal range. Of such birds, the White-throated Sparrow (*Zonotrichia albicollis*) in western North America, and more particularly in California in increasing numbers, provides suggestive evidence bearing on the problem of distribution.

For the present study, in addition to published records and accounts of *Zonotrichia albicollis*, information has been received through correspondence. Especially helpful is that for Nebraska, furnished by Prof. Myron H. Swenk. Acknowledgment is due also to certain persons for permitting me to use the following records which otherwise would have been published by themselves: Mr. C. I. Clay, record of a bird taken at Eureka, Humboldt Co., Calif., November 29, 1934; the late Mrs. Harriet N. Blake, of a banded bird, no. 34–16915, at Berkeley, Alameda Co., Calif., December 1, 1935; Mr. D. E. Danby, of a bird banded by Mrs. L. B. Payne, no. 34–93660, at Santa Cruz, Santa Cruz Co., Calif., January 24, 1936; and Mrs. Otis S. Smith, of banded birds, nos. A-182000 and F-119333, at San Anselmo, Marin Co., Calif., from 1933 to 1935. Mr. L. Morgan Boyers furnished data pertaining to three California-taken specimens now in the Natural History Museum, Stanford University.

The majority of the records which form the basis of this paper present several limitations which make impossible more than an incomplete picture. The human factor is responsible for this, first, through collection of the unusual bird, thereby precluding any future evidence for that bird, of a nature here needed; second, localities of observation appear concentrated in certain sections, because more bird observers who publish their findings happen to live in population centers, and thus true conditions with regard to the birds are not indicated.

The 100th meridian sets, in general, the boundary between common and uncommon occurrence in the distribution of *Zonotrichia albicollis* within the United States. In the West, the species has been noted so rarely as to cause special comment or published record. In this western area, most of the record stations appear in two distinct, separate regions, the Rocky Mountain region, and the Pacific coast region. For the intervening Great Basin region, probably because of few observers, but one record is at hand: Cottonwood Creek, near Mt. Grant, Mineral Co., Nevada, July 15, 1934. This single out-of-season record is not made use of in this study.

ZONOTRICHIA ALBICOLLIS IN ROCKY MOUNTAIN REGION

Locality	County	Spring	Fall
		Montana	
Great Falls	Cascade	May 8, 12	Sept. 18, 24
Gallatin Valley	Gallatin	June 8	———
Fallon	Custer	———	Oct. 5
Fallon Creek		———	Sept. 6
Miles City		———	Sept. 26, 30
Fort Keogh		———	Sept. 22
		South Dakota	
———	Harding	———	Early Sept.
		Wyoming	
Douglas	Converse	———	Oct. 8
Torrington	Goshen	May 13	———
		Nebraska	
Mitchell (west of)	Scotts Bluff	April 21, May 29	———
Antioch	Sheridan	April 29	———
Oshkosh	Garden	———	———
Simeon (west of)	Cherry	———	———
Stapleton	Logan	common migrant	
		Colorado	
Clear Creek Valley	Logan	———	Nov. 2
Yuma	Yuma	May 3	———
Coal Creek, 8 miles W. Denver	Adams	———	Oct. 5
Pueblo	Pueblo	———	Oct. 4, 18, 24, and to Nov. 4
		Idaho	
Nampa	Ada	———	Nov. 2
		New Mexico	
Elephant Butte	Sierra	———	Nov. 23, Dec. 9

Within the Rocky Mountain region, including the states of Montana, South Dakota, Nebraska, Wyoming, Colorado and Idaho, the White-throated Sparrow has been located and recorded at times since 1886, on various dates from September 6 to November 4,

and from April 21 to June 8. All of these dates, with the exception of June 8, coincide with average migration dates of the species farther east. The fact that no mid-winter dates are represented in this region points to the probability that the few birds that drift through are migrants only, passing south, thus accounting for wintering records in Texas. Also, they account for the two individuals observed at Elephant Butte, New Mexico, on November 23 and December 9.

The breeding metropolis of *Zonotrichia ablicollis* nearest to the Rocky Mountain region of the United States lies in the vicinity of Edmonton, Alberta, where to sum up published statements, it is a "common summer resident." A recognized, well-defined migration route passes through Alberta and crosses the northwestern part of Montana. Here the pathway divides, one branch turning southwest and the other turning southeast. Along this latter route it is conceivable that Rocky Mountain migrant White-throated Sparrows travel into Texas for the winter. It is likewise conceivable that by traversing the former branch, the two vagrants listed somehow drifted into New Mexico.

ZONOTRICHIA ALBICOLLIS IN CALIFORNIAN PORTION OF PACIFIC COAST REGION

Locality	County	Date	Circumstance
3 mi. SE Standish	Lassen	Feb. 20, 1936	Observed
Adams	Del Norte	Nov. 4, 1915	Taken
Eureka	Humboldt	Nov. 29, 1934	Taken
Santa Rosa	Sonoma	Oct. 13, 1898	Taken
		Nov. 23, 1898	Taken
		Nov. 23, 1898	Taken
Sonoma	Sonoma	Oct. 27, 1896	Taken
Petaluma	Sonoma	March 16, 1903	Taken
San Geronimo	Marin	Jan. 26, 1901	Taken
		Jan. 26, 1901	Another seen
		Feb., 1905	Taken
		Dec. 11, 1907	Taken
		Dec. 11, 1907	Another seen
		Oct. 21, 1933	Seen
Woodacre	Marin	Oct. 18, 1928	Banded
		Nov. 18, 1933	Banded
		Nov. 25, 1933	Banded
San Anselmo	Marin	Nov. 7, 1931-1932	Seen
		Mar. 28, 1933	Banded
		Nov. 1, 1933	Same bird seen
		Fall, 1934–Mar. 2, 1935	Same bird seen
		Nov. 19, 1933	Seen
		Nov. 26, 1933	Banded
		Nov. 26, 1933–Feb. 25, 1934	Same bird seen
		Apr. 11, 1934	Same bird seen
San Rafael	Marin	Winter, 1931	Banded
Berkeley	Alameda	Jan. 28–Feb. 15, 1915	Seen
		Dec. 17, 1920	Seen
		Jan. 7-9, 1921	Seen
		Jan. 25, 1922	Banded
		Nov. 29, 1922–Apr. 4, 1923	Same bird returned
		Winter, 1922	Banded
		Winter, 1924–May 2, 1925	Seen
		Nov. 13, 1927	Banded
		Nov. 15, 1927	Same bird repeated
		Dec. 4, 1928	Taken

		Dec. 16, 1928	Seen
		Dec. 13, 1928	Taken
		Jan. 10, 1929	Banded
		Oct. 15, 1929	Banded
		Oct. 1930–Feb. 1931	Seen
		Nov. 19, 1931	Banded
		Nov. 23, 1931	Banded
		Dec. 7, 1931–Jan. 9, 1932	Same bird seen
		Jan. 11-25, 1935	Seen
		Dec. 1, 1935	Banded
		Dec. 1, 1935–Jan. 16, 1936	Same bird seen
Oakland	Alameda	Winter, 1933	Banded
		Apr. 25, 1936	Seen
Hayward	Alameda	Jan. 2-14, 1889	Seen
		Nov. 18, 1889	Seen
		Nov. 20, 1889	Same bird taken
San Francisco	San Francisco	Dec. 23, 1888	Taken
		May 5, 1929	Seen
Redwood City	San Mateo	May 10, 1914	Taken
		Nov. 2, 1919	Taken
Fair Oaks	San Mateo	Oct. 6, 1895	Taken
Pescadero	San Mateo	Dec. 29, 1900	Taken
Stanford University	Santa Clara	Dec. 26, 1923	Banded
San Jose	Santa Clara	Nov. 5, 1928	Taken
Santa Cruz	Santa Cruz	Jan. 1, 1894	Taken
		Jan. 1, 1894	Another seen
		Jan. 24, 1936	Banded
Near Stockton	San Joaquin	Apr. 22, 1892	Taken
Modesto	Stanislaus	Jan. 1, 1934	Banded
Le Grand	Merced	Feb. 28, 1936	Banded
Tule River bottom, 10 mi. E Porterville	Tulare	Oct. 12, 1930	Taken
Near Mission Santa Ynez	Santa Barbara	Dec. 6, 1891	Taken
Santa Barbara	Santa Barbara	Fall, 1915	Seen
		Dec. 8, 1915	Seen
		Winter, 1930	Seen
Eagle Rock	Los Angeles	Jan. 6, 1929	Banded
Pasadena		Nov. 21, 1894	Taken
Hollywood		Nov. 13, 1922	Seen
Los Angeles		Feb. 25, 1897	Taken
		Nov. 1918–Feb. 1919	Seen
Los Angeles, Lincoln Heights		Apr. 10, 1924	Banded
Buena Park	Orange	Mar. 19–Apr. 10, 1921	Seen
		Jan. 15–Mar. 31, 1923	Seen
Near Laguna	Orange	Jan. 12, 1923	Seen
		Jan. 12, 1923	Another seen

Within the Pacific coast region of the United States a different situation is noted. In order to draw conclusions as to the status of *Zonotrichia albicollis* in California a brief summary is in order. Until 1915, the White-throated Sparrow was spoken of as "accidental," "straggler," or "casual visitant" in California. Then, on the basis of a summary of records to that date, in the Distributional List of the Birds of California (J. Grinnell, Pacific Coast Avifauna No. 11, 1915) the status of *Zonotrichia albicollis* was summed up as: "Rare winter visitant west of the Sierras: 17 specimens have been recorded as taken."

The first specimen recorded from California was taken in 1888. To the end of 1936—a forty-nine year period—a total of 72 individuals has been recorded. Of these, 25 were taken as specimens, 21 have come to notice through banding activities, and the remaining 26 have been dependable sight observations. Four of the banded birds repeated in traps the same season, while two birds returned to the banding locality the succeeding season, remaining throughout the winter.

Analysis of California records brings out several interesting facts. Seasonally, the earliest published fall date is October 6, and the latest spring date, May 10. First observations of individual White-throats have been made in each month from October to May, giving the following totals: 8 for October; 9 for November; 12 for December; 16 for January; 5 for February; 3 for March; 2 for May. In other words, more birds have come to notice in California during mid-winter than during months of either fall or spring migration. The longest consecutive period of observance of one bird is from November 29 to April 4; and 20 individuals have been observed over briefer continuous periods. In most years but a single bird has been recorded; but in four different years two were recorded; three in each of three years; four in each of five different years; five individuals were observed in 1928; and in 1933 and in 1936 six birds were observed. To what extent the human factor of increasing numbers of bird observers has to do with increased number of records is not known, but the point to be considered is that if as many as six birds are brought to notice in a given season, the probabilities are that the numbers of *unobserved* birds are correspondingly large. One writer has said that, if it were possible to carry on long-continued comprehensive observations, "some birds now known from but a few records, or even as accidentals, would come to be considered of frequent, though not necessarily regular, occurrence. With the White-throated Sparrow it is not impossible that a thousand of the birds have wintered in California in certain years" (J. Grinnell, Auk, vol. 39, 1922, p. 376). On the basis of the number of records of the White-throated Sparrow in California to the end of 1936, it now seems plausible to assume that "rare" and "casual" may be removed from the statement of status for *Zonotrichia albicollis* within this State; evidence points to its being essentially a *winter visitant*.

Thirty-two localities in California are reported for observance of White-throated Sparrows in the forty-nine year period of occurrences, through 1936. The greatest number lie in the San Francisco Bay region, while the Los Angeles region has the second largest number (see fig. 33). It is not impossible that these two coastal sections *do* hold habitat-preferences for this species, but warning of the human factor is again mentioned—a greater number of reporting observers live in these two regions.

With this accumulation of occurrences in mind, questions naturally arise as to source of supply, and routes of entrance into this western area, far removed from the normal range of the species. The same nesting area in Alberta, Canada, from which the Rocky Mountain states derive their "accidental" migrants, is the nearest available source of California's wintering contingent of White-throats. That this is entirely possible can be seen by referring to the map of flight-ways as delineated by students of migration. From the north, southwest across Alberta, the great highway of travel which crosses northwestern Montana, swings west along the Columbia River, and, turning abruptly south in Oregon, traverses the length of California through the great Sacramento and San Joaquin valleys. This route thus provides a normal line of entrance of White-throated Sparrows into California, from the western portion of the breeding range of this so-called *eastern* species.

ZONOTRICHIA ALBICOLLIS IN THE PACIFIC NORTHWEST

Locality	Spring	Fall
British Columbia		
Kispiox Valley, 23 mi. N Hazelton	May 11, 14	———
Vanderhoof	June 21, July 15	Aug. 15
Bowron Lake	———	———
Indianpoint Lake	———	Sept. 12, Oct. 5, 7
Saanich (dist.), Vancouver Island	———	Oct. 6
Washington		
Sherlock, Thurston County	———	Oct. 13
Oregon		
Mulino, Clackamas County	Apr. 27	———
Blaine, Tillamook County	———	Oct. 25

While the present scarcity of records of appearance of *Zonotrichia albicollis* in the Pacific northwest (see fig. 33) is undoubtedly partly due to paucity of observers in the right localities at the right seasons, it is probably correct to assume that the White-throat is less common here than in California. All but one of the occurrences listed are found to be fall or spring dates, normally within seasonal migration. But whether the individuals observed can be definitely termed "migrant" or "winter-visitant" must for the present remain an open question.

As with migrants and winter visitants at all other western points visited, the nearest logical source of supply is the breeding area in Alberta, Canada. The two Oregon records, and, possibly, the one Washington record, might well represent individuals that had drifted to these points after traveling along the major west-bound flight line from Canada, which turns west down the Columbia River Valley. However, since there are other records for farther north, in British Columbia, another hypothesis is suggested.

Turning first to the most outstanding British Columbia record: It is for *summer*, with June-July dates, and indicates a nesting pair (Brooks and Swarth, Pacific Coast Avifauna No. 17, 1925, p. 94). In an endeavor to explain how *Zonotrichia albicollis* is found here in summer there are two points to be considered: (1) the summer range of the species from its center of abundance around Edmonton, Alberta, north along the Mackenzie River; (2) the physiography of this northwestern Rocky Mountain region. North of Edmonton vicinity, summer stations of record dot the Mackenzie River Valley in lessening numbers clear to Lower Ramparts at the river's delta, and dates of appearance are from May 1 to September 3. The inference drawn from extremes of dates is that early and late dates *may* pertain to birds-of-passage toward summer or toward winter grounds. That summer vagrants from here *might* cross the Rockies toward the west may be inferred by an inspection of the physiography of this northwest region.

Yellowhead Pass is an accepted passage-way to the western side of the Rocky Mountains in the southern half of British Columbia. North of this Pass region, whence as yet practically nothing ornithological is known, physiographically the situation is summed up in the following quotations: "Between the Athabaska and Peace rivers not much is known of the character of the Rocky mountains except that they are very rugged and high and there are no known passes low as the Yellowhead pass 3200 feet in elevation. Approaching the Peace river, however the mountains decrease in height and width and are traversed by some low passes. Pine River pass, which was estimated by Dawson to have an elevation of 2850 feet above the sea, traverses the ranges where the bordering summits do not rise more than 6000 feet above the sea; and Peace river itself cuts a

valley directly through the main ranges of the Rockies, where their highest points bare exceed 6000 feet in elevation and the valley bottom is less than 2000 feet. . . . The whole of this portion of the Cordilleran province is drained by three principal streams, the Athabaska, Peace and Liard rivers. These rivers have their sources either in the central ranges of the Rockies or in the western slopes, but flow eastward by transverse gaps . . ." (Camsell and Wyatt, Canada Dept. Mines, Geol. Surv., mem. 108, 1919, pp. 15, 16).

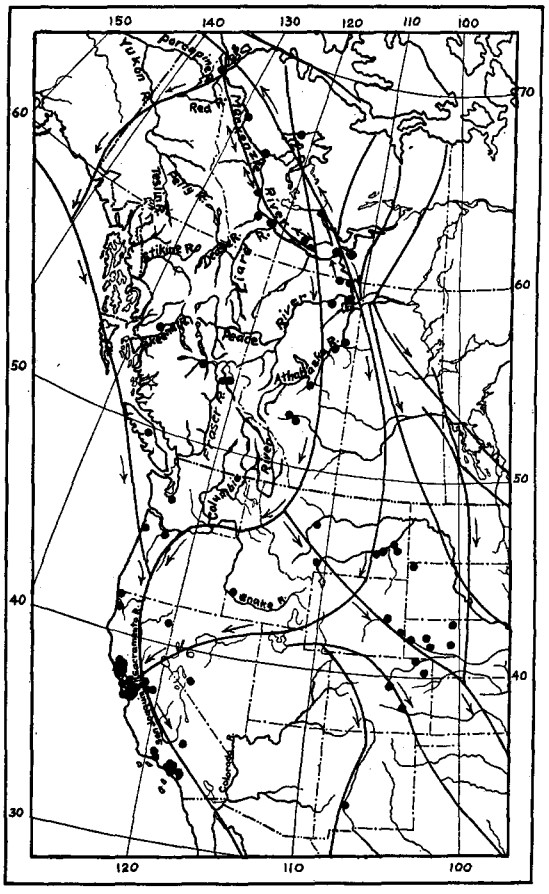

Fig. 33. *Zonotrichia albicollis* in western North America. Dots represent localities of "accidental" occurrence in U. S. west of 100°, and in British Columbia; also summer stations beyond Edmonton, Alberta, and in Mackenzie basin. Northwest drainage shows possible means of access to this region from east of Rocky Mountain divide.

(Migration routes adapted from U. S. Dept. Agric., Circ. No. 363, map 21, p. 40.)

Other statements are made concerning this region—that tributary streams of the Stikine River and the Mackenzie River *interlock,* with height of intervening watershed at about 2700 feet; and to the northwest, branches of the Stikine and Liard rivers inter-

lock with headwaters of several tributaries of the Yukon River. Where Peace River "cuts a valley directly through the main range of the Rockies" and is fed by headwater tributaries, and where Pine River Pass and other passes occur, there, also, the Skeena River, flowing to the Pacific, has its tributary headwaters. In the same sense, as with streams farther north, headwaters of these streams *interlock*. (See fig. 33.)

Thus, reasoning from the physiographical set-up of this region, together with general acceptance of the theory of birds' use of river courses as routes of progression during migration, the following hypothesis is offered to account for the occurrence of *albicollis* at Kispiox Valley in summer. Certain individuals of the species flying north to summer nesting territory were deflected from the usual course of travel when Peace River was reached, and, continuing their flight along this river course, eventually found themselves at the *interlocking* headwaters of the Peace and Skeena rivers, which latter river course carried them on to the destination at which they were later discovered. Also, by this same route up the Peace River, and turning along its southern branch, the White-throats recorded for Bowron Lake and Indianpoint Lake in spring and fall are thus obviously accounted for.

The question has doubtless arisen in the reader's mind as to why so much detail has been given to account for appearance of the White-throated Sparrow in western North America. At the beginning of this paper it was stated that the continuing and increasing number of appearances of *Zonotrichia albicollis* in the west demonstrates a significant phase in the problem of distribution. Therefore, to sum up briefly: On the basis of the appearances of *Zonotrichia albicollis* discussed in this study, the following thoughts are offered.

Each occurrence toward the mouth of the Mackenzie River, beyond the region of regular summer visitation (the farthest outpost being at Lower Ramparts), may well be a demonstration of the previously published concept that "pioneers" are seeking "new territory which may prove fit for occupancy by the species as a whole" (Grinnell, *loc. cit.*). The two birds found in summer in Kispiox Valley were very possibly hardy pioneers potentially initiating a new outpost colony. Or, perhaps, such a detached colony *has* in fact become established, the exact location of which is as yet unknown. Is it not possible that the recorded White-throats of Washington and Oregon, rather than travelling along a Columbia River flyway, may have drifted south from such a British Columbian colony composed of birds which have pioneered from the Mackenzie-Peace-Athabaska summer area, these in turn having come west by various passes and interlocking waterways?

Observed fall, winter and spring visitations of so-called "accidentals" in the United States west of the 100th meridian, with reference to the problem of distribution, may then be looked upon as "pioneers" and "scouts"; and, in time, winter visitation of *Zonotrichia albicollis* in California may be regarded as a *regularly established* extension of the wintering range of the species as a whole.

Museum of Vertebrate Zoology, University of California, Berkeley, October 26, 1937.