

## CALIFORNIA SPARROWS FAIL TO RETURN FROM DISPLACEMENT TO KOREA

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WE have previously shown that significant numbers of migratory White-crowned Sparrows, *Zonotrichia leucophrys gambelii* and Golden-crowned Sparrows, *Z. atricapilla*, can return to their winter home at San Jose, California in the next fall migration after geographical displacement by commercial aircraft 2,900 km (Baton Rouge, Louisiana) and 3,860 km (Laurel, Maryland) the previous winter or spring (Mewaldt 1963, 1964). Most of these birds probably made their way directly to their traditional nesting grounds in northern Canada or Alaska prior to their return to San Jose (Mewaldt 1964). Also included in these displacements were wintering migratory White-crowned Sparrows of the race *Z. l. pugetensis*, which nest only as far north as Vancouver Island, British Columbia (Banks 1964, Cortopassi and Mewaldt 1965). Some of the *pugetensis* returned from Louisiana but none returned from Maryland (Mewaldt 1964).

We here report results of an experimental displacement of sparrows from the same California winter population westward over the Pacific Ocean 9,060 km to Seoul, Korea. The fortuitous combination of favorable biological, government regulatory, transportational, and climatic factors gave this controlled transoceanic displacement of land birds a maximum chance to yield observable results.

The release at Seoul, Korea was made on 25 April 1971 when controls had already left, or were about to leave San Jose (37° 20' N, 121° 50' W) on their northward spring flight. We hypothesized that these strong migrants would leave Seoul (37° 20' N, 127° 00' E), fly northeastward up the east coast of Asia, would undertake the necessary overwater flights to reach their North American nesting grounds, and any survivors would return to San Jose in normal fall migration in September or October 1971.

Vagrants of both displaced species have been recorded in Japan (Kobayashi 1965), but have not been recorded in the Republic of Korea (Gore and Won 1971). These species undertake overwater flights in normal migration along the Pacific Coast of North America. They occur regularly in migration on the Farallon Islands 30 km off the central California Coast (PRBO Annual Reports 1968-71) and on the Channel Islands as much as 100 km off the southern California Coast (Grinnell and Miller 1944). Golden-crowned Sparrows breed at Prince of Wales, Alaska, just across the Bering Strait from the U.S.S.R., as

well as on Nunivak and Kodiak Islands 30 to 50 km off the Alaskan Coast (A.O.U. 1957).

Passerine birds displaced substantial distances in longitude in the fall migration period are known to attempt return to their previously established winter home by the most direct route (Perdeck 1958). When displaced from San Jose just prior to the spring migration period to Laurel, Maryland, a Golden-crowned Sparrow was recovered at Penetanguishene, Ontario on 13 May on a direct line between Laurel and the bird's presumed nesting grounds in northwestern North America (Mewaldt 1964). We therefore hypothesized those birds released in Korea at the time of their spring migration would fly northeastward, and that at least some would return successfully to North America across the Bering Strait or by way of the Aleutian Islands. We surmise those *Z. l. gambelii* and *Z. atricapilla* from nesting grounds well north in Alaska had the best chance for successful return, whereas *Z. l. poge-tensis*, which do not nest north of Vancouver Island, had little chance for successful return.

Prior to making this demanding displacement, we permitted the San Jose population to reconstitute itself without experimental manipulation for 2 years prior to the spring of 1971. As in the 1961-63 displacements to Baton Rouge and to Laurel, we assembled the displacees in the roof aviary of the Avian Biology Laboratory on the campus of California State University, San Jose, 10 km southwest of the east San Jose trapping station, in late March and early April. Here they underwent prenuptial molt and nearly all birds put on their typical premigratory fat. Each bird carried a U. S. Fish and Wildlife Service numbered band below a pink-red plastic band on its left leg.

On 22 April 1971 we assembled 264 birds (261 actually released, Table 1) into 18 shipping cages. We placed 2-3 cm of ground homogenized Gaines dog food mixed with red millet on the floor of each cage. Water in their customary hanging-drop bottle was provided whenever possible en route. The birds thrived on this same diet prior to shipment. They were taken in midafternoon by station wagon the 65 km from San Jose to the Alameda Naval Air Station on the east side of San Francisco Bay. One of us (Cowley) accompanied the shipment on military aircraft to Payne Field near Seattle, Washington where they were transferred by station wagon to McCord Air Force Base, thence to Elmendorf Air Force Base at Anchorage, Alaska, Yokota Air Base in Japan, and finally to Kimpo Air Base at Seoul, Korea on the evening of 24 April. En route the birds fed and took water, when offered to them, eagerly and in quantity.

Two of us (Cowley and Won) released the 261 birds that survived the

TABLE 1

KOREAN DISPLACEMENTS AND CONTROLS APRIL 1971 AND RETURNS TO SAN JOSE 1971-72 AND 1972-73.

Group	Established adults <sup>1</sup>			Other adults			First-year birds			Total		
	No.	Ret. <sup>2</sup> 71-2	Ret. 72-3	No.	Ret. 71-2	Ret. 72-3	No.	Ret. 71-2	Ret. 72-3	No.	Ret. 71-2	Ret. 72-3
<i>Z. l. gambelii</i>												
Disp. to Korea	78	0	0	20	0	0	49	0	0	147	0	0
Controls <sup>3</sup>	27	12	5	29	7	4	57	7	3	113	26	12
<i>Z. l. pugetensis</i>												
Disp. to Korea	31	0	0	9	0	0	30	0	0	70	0	0
Controls	26	13	9	25	11	5	21	4	3	72	28	17
<i>Z. atricapilla</i>												
Disp. to Korea	21	0	0	9	0	0	14	0	0	44	0	0
Controls	12	2	1	10	0	0	19	0	0	41	2	1
All <i>Zonotrichia</i>												
Disp. to Korea	130	0	0	38	0	0	93	0	0	261	0	0
Controls	65	27	15	64	18	9	97	11	6	226	56	30

<sup>1</sup> Captured at San Jose during one or more winter seasons prior to winter of 1970-71.<sup>2</sup> Includes several birds not actually seen winter 1971-72 but captured winter 1972-73.<sup>3</sup> Controls include all birds known alive during the 1970-71 winter season that were not displaced to Korea and not known to be dead prior to 25 April 1971 (see text).

trip between 09:30 and 10:30 on 25 April (Korean time) on the campus of Kyung Hee University in Seoul. The release was made in clear weather onto a sizeable hillside planted to pines and flowering shrubs. Nearly all the birds appeared strong and vigorous upon release. They had completed their prenuptial molt, most carried substantial migratory fat, and none appeared to be dehydrated. They dispersed readily into the vegetation and disappeared. Three birds died en route and one of the 261 released was later found dead in the release area. It is possible these four birds sustained obscure mechanical injuries during preshipment handling. Subsequent checks of the release area during the next few days failed to reveal additional displacees alive or dead. We assume they departed from Seoul shortly after release.

Half of the displacees (Table 1) were adults that had already demonstrated their ability to return to the San Jose station after at least one summer presumably on their far northern breeding grounds. Our experience shows that first-year wintering *Zonotrichia* are imprinted on the San Jose station by January of their first winter season. Had we not displaced these birds to Korea, but instead released them at San Jose, we would have expected to retrap well in excess of 100 of the 261 birds at San Jose by January 1972.

None of the birds displaced to Korea is known to have returned to San Jose in the winters of either 1971-72 or 1972-73. None of the

displaces has been reported from Asia or any other part of the world. On the other hand 56 controls were known alive in the vicinity of San Jose in the winter of 1971-72, and 30 controls returned to San Jose in the winter of 1972-73.

The total of 226 controls in Table 1 is highly inflated. It includes all banded *Zonotrichia* known alive at the San Jose station during the 1970-71 winter season (over 500) not displaced to Korea and not known dead prior to 25 April 1971. We estimate reasonable adjustments for mortality (October to April) and for exclusion of transients reduce the viable April control figure to about 100 birds. One *Z. l. gambelii* captured 2 November 1970 was recovered 420 km southeast in January 1971. One color-banded *Z. l. pugetensis* that escaped from the Avian Biology Laboratory aviary at the time of boxing for displacement returned to San Jose 20 October 1971.

We are confident all conditions surrounding the displacement were optimal, and that the birds had the maximum possible opportunity to make the successful return. They may have dispersed widely in northern Asia, but we believe it most likely they perished in North Pacific, Bering Sea, or Arctic waters while trying to return to their ancestral North American nesting grounds.

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