

A TRANS-GULF MIGRATION

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AMONG the many fields of ornithological activity, it is probable that no other commands as much popular interest as migration. Calendars of bird students the world over are attuned to the rhythmic movements of the migratory birds. Although the most astute of those students readily admit the great gaps in our knowledge of the subject, some beliefs have become so firmly rooted that to question their validity amounts almost to heresy. The concept of trans-Gulf migration is so rooted among North American students of bird migration.

The idea that the routes between summer and winter quarters of great numbers of North American migrants—particularly of the small "song bird" group—included the long over-water hop across the Gulf of Mexico apparently was first enunciated by the late Wells W. Cooke (1904) and ten years later (1915) was restated by him in somewhat greater detail. Subsequent students, including the junior author of the present paper (1935, 1939, 1950), have generally accepted this dictum as a foundation stone of the subject. Accordingly, it was a shock to complacency when Williams (1945) wrote his challenge to this concept. In a masterly manner, he presented much hitherto-unpublished and thought-provoking data. The gauntlet was promptly picked up by Lowery, who with a corps of collaborators published an investigation that was long overdue. His detailed report (1946) added greatly to our knowledge of the subject and served to reestablish the belief that great numbers of North American migrants not only can but regularly do cross the Gulf of Mexico.

It is not the purpose of the present authors to review the entire subject. Space will not permit such a summary, but we are listing the important references, chiefly those of Williams and Lowery. Our objective here is to place on record some observations by the senior author that we believe will further support the principle of trans-Gulf migration.

On the nights of April 6 and 7, 1951, the Fish and Wildlife Service exploratory boat, *M/V OREGON*, was trawling in an area in the Gulf of Mexico approximately 60 miles off the Louisiana coast. Its position was Lat. 28° 10' N., Long. 91° 06' W. This placed it well west of the delta of the Mississippi River and on a line a little west of Baton Rouge. The weather conditions were characterized by a slowly falling barometer, a low overcast, and wind of widely fluctuating velocity shifting from southerly on April 6 to northerly early in the

morning of the 7th. Table 1 presents the weather data as recorded in the captain's log and the bridge log of the *OREGON*.

The lighting on the afterdeck of the *OREGON* is provided by three 500-watt bulbs, two on the mast about 35 feet above the deck and the other on the tip of the boom, which in its raised position puts the light about 40 feet above the deck near the stern of the vessel. The entire afterdeck is therefore flooded by brilliant white light. A 150-watt spotlight is installed above the pilot house.

TABLE 1

WEATHER CONDITIONS PRECEDING, DURING, AND FOLLOWING THE MIGRATORY MOVEMENT. (TAKEN FROM THE BRIDGE LOG AND CAPTAIN'S LOG OF THE *M/V OREGON*)

Date	Hour	Wind (in miles per hour)	Barometer	Temperature	Sky condition
April 5	8:00 p.m.	SSE 30-35	30:00		Overcast
April 6	9:10 a.m.	S 10-12	29:90	69°	Overcast
April 6	4:00 p.m.	SE 8-10	29:80		Overcast
April 6	6:00 p.m.		29:82		Overcast
April 6	7:00 p.m.	E 6-10	29:81		Overcast
April 6	8:00 p.m.	S 6-8			Overcast
April 7	12:00 m.	SE 8-12			Overcast
April 7	2:00 a.m.	N 15-20	29:80	67°	Overcast
April 7	8:00 a.m.	NE 6-8			Overcast
April 7	10:00 a.m.	N 25	29:79		Partly cloudy
April 7	4:00 p.m.	NW 30-35			Partly cloudy
April 7	5:00 p.m.	NW 25-30	29:80	65°	Overcast
April 7	6:00 p.m.	NW 18	29:82		Cloudy
April 7	8:00 p.m.	NW 10-15			
April 7	10:00 p.m.	NW 20	29:82		
April 8	8:00 a.m.	N 6-12	29:96	61°	Clear

Late in the afternoon of April 6 a Broad-winged Hawk, *Buteo platypterus*, circled the boat and flew off to the west. Shortly before dark a few unidentified warblers landed on the boat's rigging. The direction of their approach was not noticed, but after resting a few minutes they flew off to the north, flying low over the water.

About 9 p. m. hundreds of small birds, for the most part warblers, were noticed flying around the lights of the boat. Occasionally one would strike the rigging and fall to the deck or into the water. All that could be reached were retrieved with a dip net. By 10 p. m. many larger birds were seen interspersed with the smaller forms. This mass movement continued until shortly before daylight. Above the din caused by the continuous peeps of the smaller birds, the quack of ducks was heard between 10 and 10:30 p. m. The searchlight was employed in an attempt to locate them, but they were not seen. The light, however, picked out thousands of birds, large and small, that were flying under the overcast. Most of the birds seemed to be flying within 200 feet of the water. Owing to the surging of the vessel and

the criss-cross movement of the birds, it was difficult to obtain a true bearing on the direction of flight, but the whole movement was in a north-northwesterly direction. If the flight followed that course from its origin, it seems certain that the last contact with land was along the northeast coast of the Yucatán Peninsula.

TABLE 2

LIST OF SPECIES RECORDED FROM *M/V OREGON* DURING THE NIGHT OF APRIL 6, 1951

*Common Gallinule, <i>Gallinula chloropus</i> (1)
Common Nighthawk, <i>Chordeiles minor</i>
*Olive-sided Flycatcher, <i>Nuttallornis borealis</i> (1)
*Vermilion Flycatcher, <i>Pyrocephalus rubinus</i>
Tree Swallow, <i>Iridoprocne bicolor</i>
*Purple Martin, <i>Progne subis</i> (2)
*Black and White Warbler, <i>Mniotilta varia</i> (3)
*Prothonotary Warbler, <i>Protonotaria citrea</i> (1)
*Worm-eating Warbler, <i>Helminthos vermivorus</i> (2)
Nashville Warbler, <i>Vermivora ruficapilla</i>
Yellow Warbler, <i>Dendroica petechia</i>
*Magnolia Warbler, <i>Dendroica magnolia</i> (2)
*Yellow-throated Warbler, <i>Dendroica dominica</i> (2)
*Black-pollled Warbler, <i>Dendroica striata</i> (1)
*Kentucky Warbler, <i>Oporornis formosus</i> (9)
*Yellow-throat, <i>Geothlypis trichas</i> (6)
Hooded Warbler, <i>Wilsonia citrina</i>
Redstart, <i>Setophaga ruticilla</i>
*Orchard Oriole, <i>Icterus spurius</i> (1 im. ♀)
Scarlet Tanager, <i>Piranga olivacea</i>
Summer Tanager, <i>Piranga rubra</i>

* Specimens of those species marked by an asterisk were retrieved from the water by means of a dip net; the figure following in parenthesis is the number so recovered.

Most of the identifications were made from the crow's-nest on the *OREGON*. At that altitude, the stream of birds was so thick that they were flying into the mast and rigging and striking the observer (Bullis) at the rate of three or four every minute. Hundreds fell into the water beyond the reach of the dip net. Under the prevailing conditions, unquestionable identification of birds in the air was almost impossible. Nevertheless, confirmation of many visual determinations was furnished by the 33 birds that were retrieved (Table 2). In fact, among those recovered by means of the dip net there were six species not recorded in the visual observations.

In addition to the species named in the table, tentative identifications were made of the Mourning Dove, *Zenaidura macroura*, and the Yellow-throated Vireo, *Vireo flavifrons*, and some other species of swallows. It is believed that in the flocks of passing birds there may have been 25 or more additional species that could not be definitely recognized. The variety and the density of the flight made an unforgettable impression. Because of the rarity of the Vermilion Fly-

catcher in Louisiana, the single observation of this species was easily the prize record. There was no error in its identification, however, as both it and the Summer Tanager were seen under the white deck lights, and in both cases the brilliant reds brought forth comments from the entire crew.

The width of this flight is, of course, a matter of conjecture, but it is believed that tens of thousands of birds passed the *OREGON* on the night of April 6. The flight was so dense that it is difficult to see how an application of the technique described by Lowery (1951) in his lunar studies of bird migration could have been applied.

Just before daylight on April 7, a Roseate Spoonbill, *Ajaia ajaja*, landed on the bridge of the vessel. It was captured and later turned over to the Louisiana Department of Wildlife and Fisheries. On that night, the *OREGON* was under way on an east-northeast course in the approximate vicinity of Lat. 28° 35' N., Long. 90° 00' W. Heavy seas prevented the usual fishing operations, so all deck lights were extinguished and only running lights were on. The following morning the wheel watch reported "a large number of birds flying over the boat." No identifications were made nor was the direction of flight recorded.

In the opinion of the authors the observations recorded here provide definite evidence of a heavy trans-Gulf migration between the Yucatán Peninsula and the coast of Louisiana. Since, however, the statement has been made that the presence of large numbers of land birds south of the Louisiana coast may be the result of heavy off-shore winds ("northers"), we have thought it well to obtain from the Weather Bureau the pertinent meteorological data. Through the courtesy of the Washington headquarters, the April records have been obtained for the stations at Pensacola, Florida, New Orleans, Louisiana, and Galveston and Port Arthur, Texas. The daily weather maps for the period April 3-7, inclusive, also have been studied.

On April 3, a high-pressure area was centered over eastern Texas. By April 4 this had moved southeasterly into the northern part of the Gulf of Mexico where it moved eastward. On April 5 it was centered south of the Florida panhandle with a long trough extending northwest to the upper Mississippi Valley. At the same time a low-pressure area had developed over northcentral Mexico, with another over western New Mexico and southeastern Colorado, resulting in a relatively small area of light precipitation in Colorado, Kansas, western Oklahoma, and northern Texas. By April 6 the high had crossed the Florida peninsula and was centered over the Bahamas, while the two lows had joined. The area of precipitation had spread east to the Mississippi Valley and thence south to the Gulf Coast. In the latter

area the amount was very small, being only a trace at some stations. The wind and cloud conditions during this period at the four Gulf-Coast stations are shown in Table 3.

An examination of the data in this table shows that, except for the overcast with light rain that developed along the Texas coast on April

TABLE 3
METEOROLOGICAL CONDITIONS ALONG THE GULF COAST OF THE UNITED STATES
APRIL 3-6, 1951

1951	Direction	Wind		
		Average miles per hour	Fastest miles per hour	Percent possible sunshine
Pensacola, Florida				
April 3	N	8.9	17	68
April 4	W	6.9	14	100
April 5	SE	6.9	13	87
April 6	SE	15.0	24	0
New Orleans, Louisiana				
April 3	N	7.7	13	68
April 4	NE	4.9	9	100
April 5	SE	8.7	15	38
April 6	SE	8.3	14	0
Port Arthur, Texas				
April 3	N	9.2	17	78
April 4	S	11.0	21	100
April 5	S	17.2	29	0
April 6	S	7.4	17	1
Galveston, Texas				
April 3	NE	8.6	13	67
April 4	SE	13.3	22	100
April 5	SE	15.3	26	0
April 6	SE	7.8	22	2

5 and moved eastward to Louisiana and Florida on April 6, the general climatic conditions were not unusual. Winds were moderate and, for most of the period, from directions that would best serve the migrating birds.

The evidence seems to indicate clearly a heavy trans-Gulf migration of many species of birds which came under observation through the fortuitous location of a brilliantly lighted vessel in the path of travel at a time when an overcast was causing the birds to fly at low altitudes.

LITERATURE CITED

- COOKE, WELLS W. 1904. Distribution and migration of North American warblers. U. S. Dept. Agr., Div. Biol. Surv., Bull. No. 18: 1-142.
- COOKE, WELLS W. 1915. Bird migration. U. S. Dept. Agr. Bull. No. 185: 1-47.
- LINCOLN, FREDERICK C. 1935. The migration of North American birds. U. S. Dept. Agr. Circ. 363: 1-72.
- LINCOLN, FREDERICK C. 1939. The migration of American birds. (Doubleday, Doran and Co., New York), xii + 189 pp.

- LINCOLN FREDERICK C. 1950. Migration of birds. U. S. Dept. Int., Fish and Wildlife Service, Circ. 16: iii + 102 pp.
- LOWERY, GEORGE H., JR. 1945. Trans-Gulf spring migration of birds and the coastal hiatus. *Wilson Bull.*, 57 (2): 92-121.
- LOWERY, GEORGE H., JR. 1946. Evidence of trans-Gulf migration. *Auk*, 63 (2): 175-211.
- UNITED STATES WEATHER BUREAU. 1951. Station meteorological summary, April (Stations of Pensacola, Fla., New Orleans, La., Port Arthur, Tex., Galveston, Tex.).
- UNITED STATES WEATHER BUREAU. 1951. Daily weather maps (April 3-7).
- WILLIAMS, GEORGE G. 1945. Do birds cross the Gulf of Mexico in spring? *Auk*, 62 (1): 98-111.
- Fish and Wildlife Service, Pascagoula, Mississippi, and Washington, D. C., June 1, 1951.*