

## EASTWARD MIGRATION THROUGH THE GULF STATES

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A VAST movement of birds from northwest to southeast is a recognized feature of the autumnal migration in North America. It brings to New England moderate numbers of Holboell's Grebe, Bonaparte's Gull, the Redhead, Canvasback, and the Lesser Scaup; to the middle Atlantic States, larger flights of those species, as well as the Baldpate, Shoveller, Black Tern, and the Western Palm Warbler; and to more southern states, the Gadwall, Western Sandpiper, Orange-crowned Warbler, Scissor-tailed Flycatcher, Arkansas Kingbird, Brewer's Blackbird, and Leconte's and Nelson's Sparrows. There are, for some species in the last group, a few scattered records in the Northern States (a result of occasional movement of individuals from southwest to northeast), but the regular group migrations of these birds in the Gulf States are predominantly eastward. Arkansas Kingbirds (*Tyrannus verticalis*) are sometimes common in Florida, and as many as 15 Scissor-tailed Flycatchers (*Muscivora forficata*) have been seen together on Key West (Greene, 1944:304).

Certain birds whose southeastern courses, if continued, would carry them south of the Gulf States, are deflected by the Gulf of Mexico, and follow it for varying distances, some to the very tip of Florida and even to the West Indies. They are joined by others moving more directly eastward and by a trickle of wanderers from Texas and (possibly) northern Mexico.

This flow across the Gulf States of birds of western and southwestern origin is sufficiently strong and regular to call for more general recognition. Little known as it still seems to be, this flight was, nevertheless, discussed by Robert Ridgway in 1874. Writing of the eastern and western forms of the Burrowing Owl, Aphelocoma Jay, Loggerhead Shrike, and the Dwarf Nuthatch, he said, "Not only with these stationary birds is there a near relation between the western region and Florida, but there is also a connection between them by the migratory ones, no less than five western species not found elsewhere in the Atlantic States, having been recorded from that peninsula" (1874:217).

Subsequent observations have added considerably to the evidence adduced by Ridgway. The published as well as numerous unpublished records, bearing on a Gulf Coast line of eastward flight, are summarized in Tables 1 and 2. It is fortunate for this presentation of the subject that for the avifaunas of three of the four states involved there are fairly recent books that can be used as key bibliographic sources. Information for Alabama is not so plentiful, because less intensive field work has been done there. For this reason, as well as on account of geographical proximity, non-peninsular Florida and Alabama are herein considered as

a unit. The results of nearly 30 years' field investigations by Francis M. Weston in extreme western Florida, added to the data available from Alabama, place the combined areas on a level comparable with that of the well-worked regions of Louisiana, southern Mississippi, and Florida.

The state and regional lists used in compiling Table 1 are: for Louisiana, Oberholser (1938); for Alabama, Howell (1924); for Florida, Bailey (1925), and Howell (1932); for the West Indies, Bond (1936 and 1940). Mississippi records are based almost exclusively on the observations and collections of Burleigh, who is now preparing a manuscript, "The Bird Life of the Mississippi Gulf Coast," for publication. The Georgia records have been compiled from a number of sources, including the personal observations of Burleigh and Stoddard. Much additional information has been drawn from the records and extensive collections in the Louisiana State University Museum of Zoology, assembled largely since the publication of Oberholser's book (to which Lowery is now compiling a supplement), and from statements kindly furnished us by several ornithologists who have done intensive work in the regions under consideration. Among these, we are particularly obliged to Earle R. Greene, Robert Norris, and Francis M. Weston. The state lists mentioned may be consulted for the names of the original authorities as well as for details about the occurrence of many of the birds listed in our tables. Other sources, particularly publications issued since the comprehensive works cited, are listed at the end of this paper. For the purposes of this study, the occurrence of a species or subspecies in a given region is considered established only when at least one specimen of the form has been collected there.

A factor that may well be taken into consideration in appraising the significance of bird records such as form the basis of this paper, is the large number of observers in the North, particularly in the North Atlantic States, which makes bird stragglers there, as reported in the literature, seem more common than they are, while in the South, bird students are so few that their records may make comparatively common birds appear to be stragglers. To put the situation in other words, there might be a hundred times as many individuals of a given species in a southern area as in a comparable tract in the Northeast, yet due to the inverse ratio of observers, reports eventually finding their way into print might give just the opposite impression.

No problem has been more troublesome to us than that of deciding what to include in, and what to omit from, Table 1. Readers may wonder why they do not find certain forms listed, but in most cases we believe these will prove to be species that breed so far to the eastward that their representatives collected in the Gulf States could have reached that area by a southward movement with little or no eastward trend. The greater part of the breeding range may lie to the west or northwest, and the bulk of the migration may be eastward or southeastward; yet the fact that this is not true of all, counsels against inclusion of the

TABLE 1  
BIRDS WHICH MIGRATE EASTWARD IN THE GULF STATES

Species	Louisiana	Mississippi	Alabama and non-peninsular Florida	Georgia	Peninsular Florida	West Indies
White Pelican ( <i>Pelecanus erythrorhynchos</i> )	F	Occ.	F	R	F	R
Cinnamon Teal ( <i>Querquedula c. cyanoptera</i> )	Occ.	—	—	—	R	—
Western Red-tailed Hawk ( <i>Buteo jamaicensis calurus</i> )	Occ.	—	—	—	—	—
Fuertes' Red-tailed Hawk ( <i>Buteo jamaicensis fuertesi</i> )	R	—	—	—	—	—
Texas Red-shouldered Hawk ( <i>Buteo lineatus texanus</i> )	Occ.	—	—	—	—	—
Swainson's Hawk ( <i>Buteo swainsoni</i> )	—	—	—	—	F	—
Sennett's White-tailed Hawk ( <i>Buteo albicaudatus hypospodius</i> )	R	—	—	—	—	—
Harris's Hawk ( <i>Parabuteo unicinctus harrisi</i> )	R	—	—	—	—	—
Western Snowy Plover ( <i>Charadrius nivosus nivosus</i> )	F	Occ.	—	—	—	—
Mountain Plover ( <i>Eupoda montana</i> )	—	—	—	—	R	—
Long-billed Curlew ( <i>Numenius americanus</i> )	F	R	R	R	R	R
Western Willet ( <i>Catoptrophorus semipalmatus inornatus</i> )	F	F	R	F	F	R
Long-billed Dowitcher ( <i>Limnodromus griseus scolopaceus</i> )	F	—	R	Occ.	Occ.	—
Avocet ( <i>Recurvirostra americana</i> )	R	—	—	R	R	Occ.
Franklin's Gull ( <i>Larus pipixcan</i> )	Occ.	—	—	—	R	R
Mexican Ground Dove ( <i>Columbigallina passerina pallescens</i> )	Occ.	Occ.	—	—	—	—
Inca Dove ( <i>Scardafella inca inca</i> )	R	—	—	—	—	—
Groove-billed Ani ( <i>Crotophaga sulcirostris sulcirostris</i> )	F	R	—	—	R	—
Western Burrowing Owl ( <i>Speotyto cunicularia hypugaea</i> )	F	F	R	—	—	—
Howell's Nighthawk ( <i>Chordeiles minor howelli</i> )	Occ.	R	—	—	—	—
Cherrie's Nighthawk ( <i>Chordeiles minor aserriensis</i> )	Occ.	R	—	—	—	—
Western Nighthawk ( <i>Chordeiles minor henryi</i> )	R	—	—	—	—	—
Sennett's Nighthawk ( <i>Chordeiles minor sennetti</i> )	R	—	—	—	—	—
Pacific Nighthawk ( <i>Chordeiles minor hesperis</i> )	Occ.	—	—	—	—	—
Texas Nighthawk ( <i>Chordeiles acutipennis texensis</i> )	R	—	—	—	—	—

TABLE 1 (Continued)

Species	Louisiana	Mississippi	Alabama and non-peninsular Florida	Georgia	Peninsular Florida	West Indies
Vaux's Swift ( <i>Chaetura vauxi</i> )	Occ.	—	—	—	—	—
Rufous Hummingbird ( <i>Selasphorus rufus</i> )	R	—	R	—	—	—
Vermilion Flycatcher ( <i>Pyrocephalus rubinus mexicanus</i> )	F	R	F	—	—	—
Western Brown Thrasher ( <i>Toxostoma rufa longicauda</i> )	Occ.	R	—	—	—	—
Palmer's Thrasher ( <i>Toxostoma curvirostre palmeri</i> )	—	—	R	—	—	—
Sage Thrasher ( <i>Oreoscoptes montanus</i> )	R	—	—	—	—	—
Mono Hermit Thrush ( <i>Hylocichla guttata polionota</i> )	—	R	—	—	—	—
Pacific Pipit ( <i>Anthus spinoletta pacificus</i> )	R	R	—	—	—	—
Sprague's Pipit ( <i>Anthus spraguei</i> )	Occ.	R	—	R	Occ.	—
White-rumped Shrike ( <i>Lanius ludovicianus excubitorides</i> )	R	—	—	—	—	—
Alaska Yellow Warbler ( <i>Dendroica aestiva rubiginosa</i> )	F	R	—	—	—	—
Hoover's Warbler ( <i>Dendroica coronata hooveri</i> )	Occ.	Occ.	—	—	—	—
Townsend's Warbler ( <i>Dendroica townsendi</i> )	—	R	—	—	—	—
Northern Pileolated Warbler ( <i>Wilsonia pusilla pileolata</i> )	—	R	—	—	—	—
Western Yellow-throat ( <i>Geothlypis trichas occidentalis</i> )	R	—	—	—	—	—
Gray Ovenbird ( <i>Seiurus aurocapillus cinereus</i> )	R	R	—	—	—	—
British Columbia Waterthrush ( <i>Seiurus noveboracensis linnaeus</i> )	F	Occ.	—	—	—	—
Rio Grande Meadowlark ( <i>Sturnella magna hoopesi</i> )	R	—	—	—	—	—
Thick-billed Red-wing ( <i>Agelaius phoeniceus fortis</i> )	R	—	—	—	—	—
Bullock's Oriole ( <i>Icterus bullocki</i> )	R	—	—	—	—	—
Mesquite Great-tailed Grackle ( <i>Cassidix mexicanus prosopidicola</i> )	F	—	—	—	—	—
Nevada Cowbird ( <i>Molothrus ater artemisiae</i> )	Occ.	—	—	—	—	—
Western Tanager ( <i>Piranga ludoviciana</i> )	R	R	—	—	—	—
Western Savannah Sparrow ( <i>Passerculus sandwichensis anthinus</i> )	—	R	—	—	—	—

TABLE 1 (Continued)

Species	Louisiana	Mississippi	Alabama and non-peninsular Florida	Georgia	Peninsular Florida	West Indies
Nevada Savannah Sparrow ( <i>Passerculus sandwichensis nevadensis</i> )	F	Occ.	—	—	—	—
Texas Seaside Sparrow ( <i>Ammodramus maritima sennellii</i> )	—	—	R	—	—	—
Western Vesper Sparrow ( <i>Pooecetes gramineus confinis</i> )	R	R	—	—	—	—
Western Lark Sparrow ( <i>Chondestes grammacus strigatus</i> )	R	R	—	—	—	—
British Columbia Junco ( <i>Junco hyemalis cismontanus</i> )	R	—	—	—	—	—
Gambel's Sparrow ( <i>Zonotrichia leucophrys gambeli</i> )	—	R	—	—	—	—
Golden-crowned Sparrow ( <i>Zonotrichia coronata</i> )	R	—	—	—	—	—
Dakota Song Sparrow ( <i>Melospiza melodia juddi</i> )	R	R	—	R	—	—
Alaska Longspur ( <i>Calcarius lapponicus alascensis</i> {> <i>lapponicus</i> !})	Occ.	—	—	—	—	—

R = rare (a few records over a number of years); Occ. = occasional (several records); F = frequent (of regular occurrence in appreciable numbers). These designations represent our interpretation of the available data. Records of subspecies are based entirely on collected specimens which, except for *Calcarius lapponicus*, are all perfectly typical examples.

species in the table. Examples are the Yellow-headed Blackbird, Giant Redwing, Western Meadowlark, Western Henslow's Sparrow, Clay-colored Sparrow, Bell's Vireo, Willow Thrush, and Grinnell's Waterthrush.

Frederick C. Lincoln informs us that banding records show that the Canada Geese and Ring-necked Ducks that winter in Florida come from the Mississippi flyway, but they are, of course, not included in the table since both species breed east to the Atlantic coast.

There are a number of Gulf States records of species that occur to the west and southwest but also in the West Indies; and it is probable that at least some of these records are of west-to-east travelers; they are, however, excluded from the tables because the birds may reach the Gulf Coast from the Bahamas, Cuba, and Puerto Rico. The species thus eliminated are the Mexican Cormorant, the Masked Duck, Mexican Jacana, Black-necked Stilt, and Eastern White-winged Dove.

The Arkansas Kingbird and Scissor-tailed Flycatcher, mentioned in the opening paragraph of this paper, may be regarded as regular west-to-east travelers in the Gulf States, but the number of scattered records

for these two flycatchers over the eastern states in general is so great that it was thought inadvisable to include them in the table.

The frequency of occurrence of western birds eastward across the Gulf States is about that which on geographical grounds would be expected. Excluding breeding forms, there are 49 for Louisiana; 27 for Mississippi; 9 for Alabama and non-peninsular Florida; 7 for Georgia; 11 for peninsular Florida; and 5 for the West Indies (Table 1). Adding to the 54 migrant species (including the two flycatchers mentioned above) the 11 resident species probably derived from eastward wanderers (Table 2), we have 65 species, a significant fraction of the total North American avifauna (some 700 species, excluding stragglers). In spite of deficiencies in available information, the statement is probably justified that, measured by the number of kinds of birds that reach the various states, the west-east flight along the Gulf Coast is about three times as strong in Louisiana as it is in peninsular Florida, and that between these points, it decreases in strength more or less in proportion to its eastward extension.

TABLE 2  
BIRDS OF PROBABLE WESTERN ORIGIN \*  
NOW RESIDENT IN THE GULF STATES (EAST OF TEXAS)

White-faced Glossy Ibis, <i>Plegadis guarauna</i> (La., Fla.)
Fulvous Tree-duck, <i>Dendrocygna bicolor helva</i> (La.)
Florida Duck, <i>Anas fulvigula fulvigula</i> (Fla.)
White-tailed Kite, <i>Elanus leucurus majusculus</i> (Fla.)
Audubon's Caracara, <i>Polyborus cheriway auduboni</i> (Fla.)
Attwater's Prairie Chicken, <i>Tympanuchus cupido attwateri</i> (La.)
Florida Crane, <i>Grus canadensis pratensis</i> (Miss., Ga., Fla.)
Eastern Willet, <i>Catoptrophorus s. semipalmatus</i> (Miss., Ala., Fla.)
Florida Burrowing Owl, <i>Speotyto cunicularia floridana</i> (Fla.)
Texas Horned Lark, <i>Otocoris alpestris giraudi</i> (La.)
Florida Jay, <i>Aphelocoma coerulescens</i> (Fla.)
Brown-headed Nuthatch, <i>Sitta pusilla</i> (La., Miss., Ala., Ga., Fla.)
Boat-tailed Grackle, <i>Cassidix mexicanus major</i> (La., Miss., Ala., Fla.)

The chief interest of this eastward flow of birds is its significance in relation to theories of bird distribution. As Ridgway pointed out in 1874, we have here a clue to the origin of eastern colonies of western birds. In contrast to Ridgway's four, we are now able to list ten, Floridian (as well as three Louisianian) forms of probable western derivation (Table 2). The proximate cause of their settling in the East seems to be their becoming acquainted with the country by participating in the west-east migration; the ultimate cause of the migration itself is, of course, unknown.

The fact that the connection between western and Gulf Coast avifaunas can be traced even through forms that are now locally extirpated,

\* The shrike (*Lanius ludovicianus*), although included in Ridgway's list of western birds in Florida, is omitted from this table because we consider that it has a northern rather than a western origin.

or entirely extinct and known only as fossils, is also relevant. One of these is the Painted Vulture of Bartram (1773-74 [1943]: 165), which in all probability was a form of the species *Sarcoramphus papa* (Bonaparte, 1826-28; Lesson, 1831; Harper, 1936; McAtee, 1942).

The Pleistocene bird life of Florida (see Wetmore, 1940) was much like that now existing, but it included some notable strangers, and in nearly every case these were forms with western relationships. An observer then could have seen the Anhinga, the White Ibis, and most of the herons, egrets, and shoal-water ducks that are now present; also certain cranes and rails, the Coot, and Common Gallinule; various vultures, hawks and eagles (including the Osprey and Bald Eagle), the Bob-white, Wild Turkey, owls, crows, blackbirds, and grackles. The remains of small birds are not so susceptible of preservation in the fossil state (though they doubtless were in general of about the same species as we now find in Florida). The known Pleistocene birds with western affinities were mostly large birds and included the California Condor and the Whooping Crane, as well as two extinct raptors known both from California and from Florida fossil beds (*Teratornis merriami* and *Polyborus prelutosus prelutosus*).

These facts regarding the fossil avifauna of Florida are of the greatest interest in connection with the strong present-day tendency of western birds to push to the eastward along the Gulf of Mexico. This avian stream, evidently the source of the western element in the bird fauna of the Southeast, has been flowing for geologic time, but we are only beginning to realize its importance as a subject of ornithological inquiry.

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