

**CHAPTER XVIII**  
**THE BIRDS OF THE GULF OF MEXICO**



## THE BIRDS OF THE GULF OF MEXICO<sup>1</sup>

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Birds are unlike any other class of animals in their relationship to water as an environment. Although some of them are absolutely dependent upon the sea for their existence, none of them is a creature of that medium in the same sense that a marine invertebrate is, or even a marine mammal such as a whale. All sea birds come to land to nest; and, in North America, all of them spend a part of their lives in the air. The birds of the Gulf of Mexico are thus, without exception, adapted to at least two media and endowed with a mobility that frequently makes their spacial and ecological classification difficult. None of them is wholly "pelagic" in the narrowest sense, and none of them wholly "littoral."

To make matters more difficult, the area delimited by the salt water of the Gulf of Mexico as it twice daily moves landward over the shores of the North American continent and up the tidal estuaries is a somewhat vague one. Its ill-defined boundaries have been crossed, and are daily being crossed, by hundreds of different kinds of birds. The overwhelming majority of these birds are really birds of the mainland, whose occurrence on the Gulf is wholly marginal. As a result, the Gulf and its tidal reaches present a vast interior surface, with a very limited avifauna, contained within a narrow rim around which birds occur in profusion.

This distributional pattern introduces serious problems when one attempts to summarize the bird life of the Gulf of Mexico, problems that are not encountered in the same degree in the case of more sedentary groups of animals, or even in the case of the avifauna of terrestrial regions. The conventional summary of the bird life of a land area seeks to review all the species that have been known to occur there, to provide the visitor to that area with a reference to the status of every bird that he is likely to observe. As long as we are dealing with the waters of the open Gulf, we

can employ much the same approach, mentioning all the species that have been found offshore. But the moment we turn to the intertidal zone, such a treatment becomes impossible. Too many of the records on which our judgments must be based do not include information on the proximity of the bird to tidewater. And, even if such information were available, the comprehensive approach would scarcely be desirable, for it would lead to a survey in which only a minor part of the species considered would be birds that are regularly and intimately associated with the Gulf itself.

Since birds differ so tremendously in their relationships with water and since their relevance to a discussion of the Gulf avifauna is so variable in degree, we have divided the species that we shall consider into three groups, each of which will be accorded a different type of treatment. These groups are: I. Offshore Birds; II. Birds of the Coast; III. Land Birds Over the Open Gulf.

Groups I and III, it will be noted, both chiefly represent the main expanse of the Gulf of Mexico, a portion of the earth's surface whose bird life has never been comprehensively reviewed. We have tried to mention every species in these groups in order to make the corresponding sections of the chapter a fairly complete reference source for bird students traveling on the open Gulf. The available data concerning land birds offshore can conveniently be compressed into tabular form, and this has been done. The status of the so-called pelagic species, on the other hand, being more complex, requires fuller discussion.

The birds of the littoral present a fundamentally different situation, since they cannot be defined in concrete spacial terms. Completeness becomes a less important concern in this group for reasons later to be emphasized. Consequently we have not hesitated to omit some species that have actually come in contact on occasion with the water of the Gulf itself. Even so, our list of coastal species is so long that, in order to adapt the ac-

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count to the available space, it has been necessary to use a summary written in telegraphic style.

There is a fourth group of birds whose distribution is affected by the Gulf of Mexico. These are the land birds of the Gulf islands. This group, however, is so large and so varied that it must be considered beyond the scope of this chapter.

Illustrations and condensed field marks for all of the birds included in these categories, except a few species occurring in western Cuba and on the coast of Mexico, are to be found in Peterson (1947). The Cuban species are concisely described in Bond (1936, 1947), and the Mexican species are among the birds briefly discussed by Sutton (1951). The several volumes of *The Birds of North and Middle America* (Ridgway 1901-19; Ridgway and Friedmann 1941, 1946; Friedmann 1950) offer the best technical keys and technical descriptions available for identifying a specimen in the hand. When completed, this work will include all of the birds of the Gulf of Mexico. Unfortunately several important orders, including such birds as the ducks, herons, ibises, pelicans, boobies, shearwaters, and petrels remain to be treated. Meanwhile, most of the gaps may be filled by recourse to the older keys in Ridgway (1900). The revision of Pratt's *Manual of the Vertebrates*, now in course of preparation, will also provide keys to all the birds of the Gulf that occur in the United States.

In preparing the distributional summaries contained in this paper, we have drawn freely on the published and unpublished work of many ornithologists. To include references for every quoted item would not only seriously lengthen the text but would interfere with its continuity. Many recent data relating to the birds of the Gulf have been taken from the appropriate sections of Bird-Lore's *The Season*, and its successor *Audubon Field Notes* (Weston 1924-48; Davis 1936-40; Williams 1941-51; Brookfield 1949-51; Lowery and Newman 1949-51). Most of the remaining published data included here, unless otherwise accredited, are to be found in the following works: Cuban records in Barbour (1943) and Bond (1936, 1950); Florida records in Howell (1932); Alabama records in Howell (1924); Mississippi records in Burleigh (1944); Louisiana records in Oberholser (1938); Texas records in Griscom and Crosby (1925-26); Mexican records in Friedmann et al. (1950), and Sutton (1951).

We wish to express particular thanks to Fred M. Packard and Mrs. Conger Hagar and to Dr. Frederick W. Loetscher, Jr., for permission to consult their splendid manuscripts dealing respectively with the birds of the central Texas coast and with the ornithology of Veracruz. The first draft of the present paper was mimeographed, and copies were sent to more than 30 zoologists, each of whom is intimately acquainted with the bird life or the marine ecology of one or more sections of the Gulf's periphery. In response, a wealth of critical suggestions and of useful data drawn from unpublished notes was received from the following: Ellinor H. Behre, H. J. Bennett, James Bond, Charles M. Brookfield, Jas. Hy. Bruns, Harvey R. Bullis, Thomas D. Burleigh, L. Irby Davis, Herbert Friedmann, Gordon Gunter, R. C. Hallman, Joseph M. Heiser, Julian A. Howard, Frederick C. Lincoln, John Lynch, Merriam L. Miles, Robert C. Murphy, Harry C. Oberholser, Raymond A. Paynter, Jr., J. H. Roberts, Chandler Robbins, Alexander Sprunt, George M. Sutton, Henry M. Stevenson, Herbert Stoddard, Robert W. Storer, J. Van Tyne, Francis M. Weston, A. Wetmore, and George G. Williams. Without the information obtained from these sources, a much less balanced picture of the bird life of the Gulf coast would have resulted.

## I. OFFSHORE BIRDS

The birds of any ocean that seem most truly its own are those so perfectly adjusted to a life on the open sea that they cannot long survive away from it. Although they usually live on or over the water, rather than in it, such birds form a direct adjunct to the pelagial community. They variously derive their sustenance from food chains that begin with the diatoms and brown algae of the lighted upper stratum of the sea, and, when they die, their bodies return to the water to aid in maintaining its fertility. In some ecologic classifications of sea birds, a distinction is made between species that chiefly inhabit the surface of the Neritic Province, above the continental shelf, and those commonly found out over the deeper water of the true Oceanic Province. In the present state of our knowledge of Gulf ornithology, such a distinction is scarcely profitable or practicable. For the purposes of this summary, the primary group of sea birds will be called

simply "offshore birds" and defined as those species that only rarely come close enough inshore for an observer on the mainland to see them.

So varied are the relationships of birds with their environment that even this simple definition is not without difficulties in practice. To begin with, it sets up a criterion that is fundamentally distributional rather than ecologic. The brown pelican, for example, often flies out to fish the same waters as the gannet. It spends a great deal of its time, however, resting along the beaches or in the quiet water of the bays. And so we have placed it with the coastal birds. The gannet, on the other hand, while it is linked to much the same food chain as the pelican, almost never comes in to the land or to the harbors. And so we have considered it an offshore bird. Moreover, so little is known about the real distribution of sea birds over the Gulf that in many cases their very presence is merely inferred from their occurrence in coastal situations after storms. In instances of this sort, the species can be recognized as pelagic only by reference to its habits in other oceans. On this basis, the scoters do not, perhaps, strictly fit the definition of an offshore bird, since farther north on the Atlantic seaboard, they are regularly observed from land. But in the Gulf, where there are long shallows, we are inclined to regard the occasional appearance of a few birds inshore as a probable indication of their much commoner occurrence on the deeper water out beyond the range of vision. The old-squaw, as another example, is usually thought of as a sea duck in the same sense that the scoters are; yet in the southern States there have been more records of the species inland than on the Gulf. Consequently, we have felt that the old-squaw does not qualify as an offshore Gulf bird. As these illustrations serve to show, some of the groupings of birds that follow are based on an interpretation of meager facts, are necessarily somewhat arbitrary, and are to be considered merely provisional.

Even when one employs this rather liberal interpretation of the term offshore, the list of Gulf birds that can be included in that category is a modest one. It amounts to but 24 species, and on the basis of current evidence, only about one-half of them can safely be presumed to occur regularly every year. Not a single one of these species has yet been formally recorded on the Gulf in every

month of the year, although reports of the white-bellied booby are lacking only in November. Of the other 11 kinds of birds that probably can be found there annually, 7 appear on the face of the record to be winter visitants and 4 to be summer visitants. The seasons of the summer and winter birds overlap in both spring and fall, and it is during these periods, when the domain of the sea birds is invaded by migrant birds of the land and the littoral, that the true pelagic avifauna reaches its own peak of variety and abundance. Only three pelagic species, the blue-faced booby and the sooty and noddy terns, are known to nest at present within the confines of the Gulf.

Ornithologically, as well as by other standards, the Gulf of Mexico is a tropical sea. Its breeding pelagic avifauna consists entirely of species that reach the northern limits of their normal range over its waters, and its scattered offshore islands<sup>1</sup> all lie in or near what has been termed the Lower Arid Tropical Life-zone. Thus the Gulf may be expected to share a characteristic feature of warm oceans by presenting vast expanses of surface that are virtually without birds. This condition results in part from a well-known principle. The higher the temperature of the water, the lower is its capacity, per given volume, to hold gases and the lower, therefore, its capacity to support the plankton upon which the food potentialities of the sea ultimately depend. As a result of these and other factors, the plant and animal life of the tropical oceans tends to be distributed in depth instead of concentrated in the upper stratum, and it is only where conditions cause a constant upwelling of water from the lower levels bringing up nutrient salts that surface feeders such as birds find an adequate food supply. Such a vertical mixing of strata is likely to occur where two currents come in contact or in the vicinity of islands.

While the breeding birds of the Gulf are all tropical, its pelagic avifauna as a whole is derived in about equal proportions from the north and the south. Many sea birds, however, that occur commonly in the upper latitudes of the North Atlantic, such as the fulmar, skua, and most of the Alcidae, seem to reach the southern limit of their ranges off New England or New Jersey,

<sup>1</sup> The term "offshore," as applied to islands in this paper, is used to designate those islands separated in all directions from the mainland by 25 miles or more of open sea.

where the cool Labrador current is met by a barrier of warm water. Even some northern species that penetrate this barrier and other species that wander up into the North Atlantic from below the equator never seem to get into the Gulf. Indeed, the whole offshore bird list of the Gulf, including accidentals, is only about one-half that of the North Atlantic from which it is drawn. The fact that the Gulf of Mexico is almost a closed sea is perhaps a factor in this result. In order to reach its waters, those sea birds that are reluctant to fly overland must thread their way through the maze of the Antilles and pass through the comparatively narrow portals of the Florida Straits or the Yucatán Channel. An interesting contrast, bearing on this point, is provided by the bird life of the Pacific Ocean within the same latitudinal limits, off the west coast of Mexico. Here, where there are different patterns of currents, a greater proximity to cool water, and no land barriers, 42 species of pelagic birds have been recorded, at least 22 of them as breeders.

The fact that the greatest superiority of the waters off western Mexico is in breeding birds, suggests that the nature of the associated offshore islands plays an important part in limiting the Gulf avifauna. With the exception of Cuba, most of which is extralimital to this summary, all of the islands of the Gulf lie within the limits of the continental shelf, and therefore outside the Oceanic Province which is often considered the real habitat of pelagic birds. The most remote of them are small coral formation situated below latitude 25°. On the Campeche Bank there are seven islets or atolls of this sort scattered at varying distances of 70 miles or more from the mainland. Among these is Cayo Nuevo, which, lying 125 miles in a northwesterly direction from Yucatán, has the distinction of being the farthest offshore of all the Gulf islands. Alacran Reef, however, although it is only about 80 miles north of the Yucatán Peninsula, is the most distant from all other land, including other islands. The only other really offshore islets are the Dry Tortugas, 110 miles off the coast of peninsular Florida but only 68 miles from the termination of the main arc of the Florida Keys at Key West.

Whether or not all eight of these offshore island groups offer suitable nesting sites is not known. The Tortugas, the Alacran Reef, and the Arcas

and Triangle Keys are the only groups that have been reported on by ornithologists. The first three are definitely known to support sea bird colonies. The Triangle Keys are inhabited by a rare tropical seal (*Monachus tropicalis*), but whether it interferes with the colonization by birds is open to serious question. None of these islands is more than half a mile long or a few hundred yards wide, and, in view of their small numbers, the total area of dry land in the open Gulf must be so limited that it imposes serious restrictions on the breeding population of offshore birds. The sooty tern, it is true, is alleged to have once been established on Mujeres Island and the noddy tern on both Mujeres and Contoy Islands; but, although these islands are close inshore, they happen to be situated very close to the edge of the continental shelf.

Few aspects of field ornithology afford such opportunities to the general observer as the distribution of pelagic birds over the Gulf. Our present meager knowledge of this group of birds is reflected in the extremely imperfect summaries that follow.

#### Sooty Shearwater *Puffinus griseus*.

An occasional visitant to the Gulf, reported seven times from Florida (Pensacola; Pavilion Key; Florida Keys and adjacent waters), once from Texas (Aransas Bay, June 16-19, 1937), and from adjacent Cuban waters (Matanzas). Curiously enough, three of these occurrences were in winter, when the species is engaged in its breeding activities thousands of miles away in the Southern Hemisphere. The dates of occurrence in the Gulf proper range from December 29 to July 18 and involve every intervening month except February. The Texas record is substantiated by a photograph, and one of the Pensacola records (that of January 3, 1935) by a bird found dead on the beach; the other reports are based upon sight identifications, not all of which were positively assigned to this species by the observer. Apparently, there is no Gulf specimen extant.

#### Audubon Shearwater *Puffinus lherminieri*.

A breeding bird of the West Indies, said to occur more or less regularly in the Gulf, but apparently not observed there alive since the time of Audubon, who claims to have seen it in numbers in June off the western shores of Florida.

The only modern record in the Gulf seems to be that of a dead bird picked up on Brazos Island, Texas, on January 28, 1947 (Davis 1951, p. 333).

Greater Shearwater *Puffinus gravis*.

One record for the Gulf proper: a specimen found on Dog Island, near St. Marks, Florida, January 29, 1950, and preserved in the Florida State Museum (Stevenson, 1950b, p. 71). This shearwater has also once been noted in the Straits of Florida between Key West and Havana (Bond 1950, p. 2).

Leach Petrel *Oceanodroma leucorhoa*.

Rarely identified in the Gulf. The only records are those of Danforth (1935, p. 74), on a voyage from Puerto Rico to Galveston, Texas, in 1932. He identified a petrel of this species in Cuban waters south of the Dry Tortugas on June 1 and saw several others in the Gulf on the following 2 days. At a point 200 miles from Galveston, observations of the Leach petrel abruptly ceased and gave way to those of the Wilson petrel. No specimens were secured, but 2 years later, also in June, Danforth shot a Leach petrel half a mile off Cayo Francés, Cuba, the nearest point to the Gulf where the species has been taken.

Wilson Petrel *Oceanites oceanicus*.

The commonest of the Procellariiformes in the Gulf, where it appears widely during its nonbreeding season (records between Key West and Havana, off Dry Tortugas, off Pensacola, off Alabama, off southeastern Louisiana, off Texas, and off the coast of Veracruz). The known seasonal limits are April to the first week of September.

Black-bellied Storm Petrel *Fregatta tropica*.

An accidental straggler from the South Atlantic and Indian Oceans, only once recorded in North America, in 1851, when seven specimens were captured with a hook and line from a vessel at anchor in the harbor at St. Marks, Florida. The whereabouts of these specimens is not known.

Yellow-billed Tropic Bird *Phaëthon lepturus*.

A casual visitant from the Antilles, where it breeds. The seven definite reports in the last 130 years are scattered around the Gulf: three records in the Dry Tortugas (including Mason and Longstreet, 1936, pp. 19, 42); one at St. Marks,

Florida; two at Rockport, Texas, and vicinity; and one on the open sea, 109 miles north of Progreso, Yucatán (Bullis, in litt.). Dates include January, May, June, and August. The alleged "almost common" occurrence of this species in Louisiana in midsummer has not been supported by further evidence. There are no Gulf specimens extant.

Blue-faced Booby *Sula dactylatra*.

Breeds 60 miles north of Yucatán, on Pajaros and Chica Islands in the Alacran Reef, where some 50 pairs had eggs and downy young on May 20, 1912 (Kennedy 1917, pp. 42-43). The species occurs regularly, but in sparing numbers (maximum number seen in recent years, nine), on the Dry Tortugas, and has been recorded also from the coasts of northwest Florida, Louisiana, Texas, and Tamaulipas. The dates range from March 22 to September 9.

White-bellied Booby *Sula leucogaster*.

Formerly bred abundantly on the Dry Tortugas, where eggs and young were observed by Audubon on May 14, 1832; not now known to breed closer to the Gulf than Piedras Island on the Caribbean side of Cuba, but still a regular visitor to the Tortugas in somewhat larger numbers than the blue-faced booby. The numerous Gulf records, which also include observations or specimens from the Florida Peninsula, the northern Gulf coast, the central Texas coast, northeastern Tamaulipas, the Bay of Campeche, and the waters off northern Yucatán, involve every month in the year except November.

Red-footed Booby *Sula sula*.

Found breeding extensively in the Caribbean area, but only twice definitely recorded from the Gulf or its immediate environs. A specimen was taken near Rockport, Texas, sometime prior to 1910, and another was secured near the mouth of the Mississippi River, 7 miles below Buras, Louisiana, on November 1, 1940 (Lowery, 1947, p. 180).

Gannet *Morus bassanus*

Seemingly a rather common winter visitant to the Gulf; extreme dates November 22 (Pensacola) to July 27 (12 miles northwest of Key West). At Pensacola, where the species can frequently be observed from the beach, F. M. Weston has noted

an increase in numbers over the past 20 years. His counts have run as high as 51 for a 45-minute period, and he has noted that the typical ratio is about 12 of the brown immatures to every black and white adult. There is only one definite record each for the coastal waters of Mississippi, Louisiana, and Veracruz; three for Alabama and Texas; and four for the Dry Tortugas or the adjacent waters. Gannets have also been seen at various points on a direct line between the mouth of the Mississippi Delta and Yucatán, in April and May.

White-winged Scoter *Melanitta deglandi*.

A winter visitant (October 20 to April 17), once recorded in August (Rockport, Texas). The 22 records from the Gulf area—6 from Florida, 1 from Alabama, 9 from Louisiana, 6 from Texas—involve a total of 31 birds. The most recent dates are November 12, 1950, at Pensacola, Florida; December 23, 1950, at Cameron, Louisiana; November 3, 1951, in St. Bernard Parish, Louisiana; and December 9, 1951, at Cove, Texas. All of the birds have been observed from the shore, or a few miles inland, and, since elsewhere scoters occur most abundantly at sea beyond the range of vision of mainland observers, these records may be indicative of much commoner occurrence offshore.

Surf Scoter *Melanitta perspicillata*.

Winter visitant, recorded from September 10 to March 12. There are 11 definite records—3 from Florida, 3 from Alabama, 3 from Louisiana, and 2 from Texas. The most recent observations are November 11, 1950, at Cove, Texas, and December 26, 1950, at Grand Isle, Louisiana. All of these observations are from close inshore, but general statements quoted by Howell (1924, p. 65) indicate that the surf scoter has occurred in flocks of 50 to 75 in the sound near Coffee Island, Alabama.

American Scoter *Oidemia nigra*.

Less frequently reported than the other scoters, but seen in greater numbers. Prior to 1948, there was but a single observation on the Gulf, that of a flock of 75 on April 15, 1938, 75 yards off the shore at Holly Beach, Cameron Parish, Louisiana (Lowery, unpublished notes). More recently there have been reports from three additional localities: Alligator Point, Florida, (5 birds on June 26, 1948; 70 on March 18, 1949; 48 on March

19, 1949); Cove, Texas (single birds killed on November 11, 1950, and November 9, 1951); and Rockport, Texas (4 on January 13, 1950, and 1 on January 28, 1950).

Red Phalarope *Phalaropus fulicarius*.

A winter visitant, noted from October 13 to March 17, in the northeast sector of the Gulf. Although the species has only twice been observed on the beach, it is of fairly abundant annual occurrence 5 to 40 miles offshore from Pensacola. On January 15, 1950, for example, flocks numbering up to 25 were encountered there throughout the day. The largest flock noted was a close aggregation of about 300 on February 29, 1948. There are no records elsewhere in the Gulf.

Northern Phalarope *Lobipes lobatus*.

Recorded in groups of three and eight, 175 miles west of Tampa, Florida, on March 4, 1918 (Helmuth 1920, p. 258). Two were seen at Aransas Refuge, Texas, April 4, 1940, and seven on April 25.

Pomarine Jaeger *Stercorarius pomarinus*.

The relative status of the three species of jaegers in the Gulf is a somewhat uncertain matter, since they are difficult to distinguish in life even at close range and since most of the records are based upon sight identifications. No specimen of the pomarine jaeger has ever been taken in the Gulf proper, but a fair proportion of the sight identifications have been assigned to this species. There has been only one report from the western half of the Gulf, that of a single bird seen on Bolivar Peninsula, Texas, June 16 and 27, 1933 (Williams 1938, p. 68); but there are several records for the eastern half: various points at sea in March and April (Helmuth 1920, p. 261; Moore 1951, p. 13); one on September 17, 1950, 30 miles off Carabelle, Florida (Stoddard, in litt.); one on January 10, 1951, at sea 158 miles north of Progreso, Yucatán (Bullis, in litt.); and one on August 3, 1930, off Contoy Island, Quintana Roo. Jaegers seem to be a bit more common in the Straits of Florida and Cuban waters, where this species has been collected.

Parasitic Jaeger *Stercorarius parasiticus*.

Seemingly slightly commoner than the preceding species, especially to the north: not uncommon in Cuban waters; flocks of 10 to 15 reported by

Audubon on Florida Keys in April; specimen taken in Bay of Florida, April 26, 1903; seen at Palma Sola, Florida, November 5, 1909, and December 11, 1911; seen in northern Gulf in March and April (Moore 1951, p. 13); several seen 90 to 158 miles at sea north of Progreso, January 10 and 11, 1951 (Bullis, in litt.). Additional observations, by Lowery (unpublished notes), believed referable to the present species, are: one seen 28 miles south, and nine seen 56 miles south of Southwest Pass, Louisiana, on April 21, 1948; four seen near mid-Gulf on April 22; one seen 101 miles south of the Louisiana coast on May 2. There are no definite spring records after this date, though two probable parasitic jaegers were observed at Pensacola on June 17, 1951.

Long-tailed Jaeger *Stercorarius longicaudus*.

An arctic species ranging south in winter barely to the Gulf. The records are mostly from the extreme eastern part of the Gulf or its environs: one collected at Marco in the winter of 1884; one seen at Passage Key, Tampa Bay, on numerous dates between June 14 and 30, 1910, one noted on Matecumbe Key, February 27, 1929. In addition, the long-tailed jaeger has been reported from the northern part of the Gulf on March 9 and April 6 (Moore 1951, p. 14), and has been taken at Matanzas Bay, Cuba, on November 29.

Kittiwake *Rissa tridactyla*.

The only evidence for the occurrence of this oceanic gull in the Gulf itself is Audubon's indefinite record for the Florida Keys. There is, however, a January specimen from the vicinity of Havana, Cuba.

Sooty Tern *Sterna fuscata*.

Breeds widely on islands of the Gulf: Arcas Keys, Alacran Reef, and the Dry Tortugas. In addition, a female incubating an egg was noted on a little island outside of Tampa Bay, May 25, 1949 (Nicholson 1950, p. 71); two females that had an egg and behaved like a mated pair were collected in 1933 on Curlew Island, in the Chandeleur group off the coast of Louisiana; and a nest was reported June 5, 1938, in the Corpus Christi, Texas, area, where the species is said to have nested in numbers prior to 1895. The best known colony is that on the Dry Tortugas which has grown from an estimated 3,600 birds in 1903 to

an estimated 120,000 birds in 1950 (Dilley 1950, p. 67). The birds generally arrive there in February and depart in September. Despite the size of this colony, there have been relatively few modern records from the Gulf mainland. In the past decade, for instance, the species has been reported there only six times: three occasions in August and September in the vicinity of Pensacola; June 26, 1949, in Bay County, Florida (Hallman, in litt.); October 4, 1949, at Cove, Texas; and near Port Isabel, Texas, May 6, 1948 (Cruikshank 1949, pp. 111-112). The Tortugas were the scene of a famous series of experiments with this species and the noddy tern by Watson and Lashley between 1907 and 1913, which demonstrated the great ability of the sooty tern to "home" but showed that this species cannot long remain in the water without drowning.

Bridled Tern *Sterna anaethetus*.

A tropical tern breeding as near to the Gulf as Cayo Mono Grande, Cuba. Half the Gulf records (Sprunt, 1951a, p. 59, 1951b, p. 223) are near the Florida Keys or the Dry Tortugas: one banded in the Bay of Florida, October 2, 1940; one taken at the Marquesas Keys, July 9, 1938; one seen at New Ground Shoal, 25 miles east of the Dry Tortugas, June 21, 1946; one taken at Fort Jefferson, September 7, 1949. The species has also been reported 90 miles west of Tampa, date unspecified (Packard, 1947, p. 131); at Alligator Point, Florida, August 31, 1950 (a count of six); at Pensacola, Florida, December 29, 1945 (specimen preserved); and 10 miles south of Foley, Alabama, September 2, 1932, when six birds were seen (Edwards, 1933, p. 105).

Noddy Tern *Anous stolidus*.

Breeds on Contoy Island and on the Dry Tortugas, where it has arrived at least as early as March 26. The Tortugas colony has variously accommodated from 400 (in 1903) to 622 (in 1950) birds (Dilley 1950, p. 68). Most of the fishing of this species is said to be done within about 10 miles of the island. Consequently, the noddy tern is less often seen from the mainland even than the sooty tern. We know of only two records in this century of its occurrence on the Gulf coast: a few seen in Tampa Bay in July 1923; one collected August 30, 1942, at Sabine Wildlife Refuge, Louisiana (Atwood, 1943, pp. 454-455). However, four

were seen 90 miles west of Tampa after a hurricane sitting on a floating log (Packard, loc. cit.). The noddy is a much better swimmer than the sooty tern.

#### Dovekie *Plautus alle*

A far northern species and the only representative of the family Alcidae ever known to have reached the Gulf. In 1932, during a tremendous southward influx of dovekies apparently unprecedented within the historic period (see Murphy and Vogt, 1933, pp. 322-333), birds reached Matecumbe Key, Florida, on December 3 and 9; Matanzas Bay, Cuba, on November 9; and Santa Maria del Rosario, 20 kilometers from Havana, on December 1 and 6. Since that year it has been reported at least three times: one observed at Key West in the winter of 1936-37 (Longstreet, 1937, p. 66); one collected at St. Andrews Bay, Florida, December 7, 1939 (Stevenson, 1950, p. 612); several seen and one taken at Key West, December 10, 1950; and another captured and released by J. R. De Weese, at Dry Tortugas in early December 1950.

## II. BIRDS OF THE COAST

As one moves shoreward from the open Gulf, the scene changes from one of wide vistas of seemingly empty sea and sky to one with a bird life of bewildering abundance and variety. In 5 minutes on the coast one can frequently see a greater number of kinds of birds than is listed in the whole pelagic category. In December 1950, a 1-day bird count made within a circle 15 miles in diameter, reaching back from the Gulf coast at Cameron, Louisiana (Newman and party, 1951) disclosed the presence of no less than 142 species. Fully nine-tenths of the species of birds in eastern North America have been recorded at one time or another in the counties bordering the Gulf coasts of Florida, Alabama, Mississippi, Louisiana, or Texas, and it is likely that all but a few of these species have occurred at certain times and places within a hundred yards of the surf. Except at the tip of the Florida Peninsula, these counties all lie within the Lower Austral Life-zone or its arid division, the Lower Sonoran. As one continues the circuit of the Gulf coast, however, one passes into the Tropical Region and through two sharply differentiated faunas, that of Mexico and that of the West Indies. These places are so rich in birds

of their own that the avifauna of the narrow coastal strip extending back a few hundred yards from the Gulf beach along its entire periphery very probably exceeds the entire avifauna of the United States in variety.

Which of these birds are to be considered coastal birds? As to their separation from the birds of the open Gulf, a line of distinction has already been laid down. The coastal birds may be said to be those species that occur more frequently on the shores of the mainland than on the open sea. This definition works very well except as it applies to a quartet of water birds that are more commonly encountered on the coastal islands of the Gulf than on its mainland shores. The great white heron, which many believe to be nothing more than a color phase of *Ardea herodias*, is best known as a bird of the Florida Keys; but, though infrequently observed on the Florida Peninsula itself, it has at least nested there. The man-o'-war-bird, popularly thought of as a bird of the oceans, has its center of abundance in the Gulf at roosting grounds on the islands near the coast; but, though it could have been classed with the offshore birds as here defined, it wanders often enough to the edges of the mainland to qualify as a borderline case. The oyster-catcher is so wary of man that it now spends most of its time on the inshore islands rather than the peripheral shores; but it remains clearly a littoral species. And the roseate tern, which has established a breeding colony in the Dry Tortugas, is as infrequently reported on the coasts of the mainland as some pelagics, but this is doubtless due to its small numbers, the difficulty in distinguishing it, and its scattered distribution when not nesting.

The problem of delimiting the coastal species from the inland bird fauna is much more complex. Such delimitation cannot be accomplished by simply considering the occurrence of a given species in a given place. As a starting point, we may specify that to qualify as a true part of the Gulf avifauna a coastal bird must be a species of the intertidal zone. But just what is meant by "a species of the intertidal zone?" If we interpret it to mean an organism confined to the area between the low-tide mark and the high-tide mark, virtually no species in this highly mobile class of animals with which we are dealing fits the definition. If on the other hand, we interpret it as any organism present at times in the inter-

tidal zone but also occurring elsewhere, we must admit an impossibly large part of the avifauna of the United States, Mexico, and Cuba. Tree growth invades the intertidal zone through the medium of the mangroves, forming the physical basis of a community over the very waters of the Gulf, where a whole host of small land birds must occur as visitants, though their identities remain uncertain since the situation has never been analyzed from that point of view, even in the United States. Even where there are no mangroves, the problem remains. Starlings, as one example, sometimes descend into the intertidal zone in such numbers that they blacken the beaches. But to consider the starling a Gulf bird is to accept a criterion of inclusion that has no practicable limit. Nor can the difficulty be satisfactorily avoided by setting up taxonomic distinctions so as to exclude all species not of the lower orders commonly called water birds. Some passerine birds, such as the seaside sparrow are so strictly Gulf birds that they have developed subspecies virtually endemic to its littoral. Conversely, some birds that are shorebirds by virtue of their systematic position, such as the upland sandpiper, almost never set foot on earth dampened by salt water.

From the ecological point of view, the birds found on the coast form a continuous gradient from species apparently dependent for their existence on some factor associated with salt water to species that enter the intertidal zone only as intruders. Whether or not they are physiologically capable of doing so, such birds as the brown pelican, the oyster-catcher, Cabot tern, and seaside sparrow seldom venture out of sight of salt water. Some races of the clapper rail, long-billed marsh wren, and sharp-tailed sparrow seem equally bound to salt water; but the species include other races adapted to a life inland. The laughing gull, gull-billed tern, and black skimmer, though mainly birds of the intertidal zone, prove their ability to exist away from it by occasional appearances in the interior. Several kinds of shorebirds, including the red knot, sanderling, and marbled godwit, are almost never found outside the zone of tidewater in the region of the Gulf of Mexico, yet have breeding grounds in interior situations of the northern United States or Canada. The white-faced ibis, the snow and blue geese, the dowitcher, and the

Wilson phalarope, among others, occur chiefly in the immediate environs of the coast without being notably characteristic of salt water situations. Numerous species, for example, the horned grebe, the greater scaup duck, both yellow-legs, the herring gull, and the least tern, are commonest on the coast but well represented inland. Contrariwise, the black-crowned night heron, the lesser scaup duck, the American coot, and the spotted sandpiper are well represented on the coast but commonest inland. The birds of the last two categories, together with a host of others that seem to be about equally well represented in both situations, are ecologically linked to aquatic food sources but not especially to salt water sources. It is questionable whether from a strictly objective point of view such species qualify any better as coastal birds than upland species that sometimes derive sustenance from food sources associated with the Gulf. Among such upland species may be mentioned the horned lark and the water pipit, which often feed at the very edge of the surf; the common goldfinch which resorts regularly to the outer beaches attracted by the ripening seeds of the sea oat, *Uniola paniculata*; and even the peregrine falcon which at seasons shows a preference for a diet consisting of birds of the littoral. Finally, living within sound of the surf, occur a host of birds whose ecological associations are essentially non-littoral. On the narrow wooded ridges of coastal Louisiana, for example, that rise out of the marshes sometimes within a hundred yards of Gulf waters, are to be found breeding such species as the downy woodpecker, crested flycatcher, mockingbird, white-eyed vireo, orchard oriole, and cardinal.

To complicate matters further, the degree of association of various birds with salt water varies in different sections of the Gulf littoral. Along the northern part of the Yucatán Peninsula, where there are practically no inland water features, the water birds represented necessarily occur almost exclusively in the salt lagoons of the coast, even though many of them, including the pied-billed grebe, white ibis, and sora, are elsewhere primarily inhabitants of fresh water situations. Somewhat similar conditions obtain along the Texas coast where great migratory flocks of water birds are apparently channeled down a narrow flight lane that brings many fresh water species to the very edge of the Gulf. In the great

duck marshes of southern Louisiana, adjoining the Gulf, hunting pressure often causes surprising numbers of dabbling or pond ducks to seek an unaccustomed refuge beyond the surf.

The more one analyzes the avifauna of the coastal strip, the more futile it seems to try to set up an objective criterion to separate Gulf birds from non-Gulf birds. But it would be just as futile, even if space permitted, to attempt a complete résumé of all the birds occurring on the coast. The Gulf of Mexico simply does not provide a convenient natural bond for tying together major elements of the diverse avifaunas of the West Indies, the United States, and Mexico. Though many of the birds of the coast are closely linked to the Gulf ecologically, their practical associations from a reference standpoint are with the birds of the mainland, and information concerning their status is best sought in works dealing with the birds of the States and counties bordering the Gulf. Works of this nature, either published or in the course of publication, are listed in the section "Literature Cited," since they constitute the major sources from which material for this chapter has been drawn.

Since the present list of coastal birds is not offered as an exhaustive reference, it is not too critical a matter just how much it includes. We would formally define coastal species as those that characteristically occur over the inshore waters within sight of the mainland and over that part of the mainland itself washed by tides. The term "characteristically," however, permits a wide latitude of interpretation and in applying it, we do not pretend to have exercised strict consistency. Many readers will doubtless think of birds they would consider more deserving of a place in the account than some species we have admitted. All we have tried to do is to give a comprehensive list of those birds that are definitely commoner in salt water than elsewhere, together with a somewhat arbitrary sampling of other species occurring on the coast but not primarily birds of the littoral.

Even on this selective basis, the coastal avifauna is a large one, amounting to 125 species. The relationships of these birds with the Gulf have many aspects—their relative abundance on the different coasts, their relative abundance at different seasons, their status as breeders or visitants, their degree of association with salt water. Since,

over the vast geographical extent of the Gulf, the seasons of many species vary from place to place, the complete status of a coastal bird is often a very complicated matter. In order to convey as much information as possible in the smallest space, we have presented the summary of coastal species in telegraphic form, arranged under three headings. The subdivisions are (1) Breeding Birds, (2) Regular Visitants, and (3) Species Not of Regular Annual Occurrence. If a species is present somewhere on the Gulf every year, it is deemed of regular annual occurrence. Records for 4 out of the past 10 years are regarded as good presumptive evidence of such yearly presence.

The ranges, for the most part, have been expressed in terms of their extent counterclockwise around the Gulf perimeter, starting with Cuba or Florida, at the open end of the Gulf. The phrase "Florida to Texas," for example, is meant to imply that the species concerned is represented on the coasts of both Florida and Texas, as well as on the coast in between. As an indication of the extent to which the various species frequent the coast, we have employed before the name of each, one, two, or three asterisks. Three asterisks (\*\*\*) denote a species that is seldom seen away from the coast; two asterisks (\*\*), a species that is not infrequently found inland, but which is consistently equally common, or more common, on the coast; one asterisk (\*), a species that is usually more frequent inland, but which for brief periods may be equally common on the coast. Our decisions in this matter have been based mainly upon the distribution of these birds in the States, Territories, and Provinces bordering on the Gulf, with recourse to a broader ecological viewpoint only in the case of those rare visitants that do not otherwise provide a basis of comparison. The resulting classification is a very rough one and one resting to some extent on personal opinion, since all the difficulties encountered in defining a coastal category are compounded when one attempts to divide that category into parts.

The brief statements as to the relative abundance of the different species along the different sections of the coast, of course, merely reflect the incidence of the currently available records and not necessarily the true incidence of the birds themselves. Some sections of the Gulf coast

have been studied much more intensively than others. Indeed, there are vast stretches of the Gulf coast, such as in Mexico, where the littoral birds have been almost entirely ignored. There are shorebirds, for example, which are known to

be regularly abundant on the coast of Texas but for which there are no records at all for adjacent Tamaulipas. Therefore, conclusions based on relative abundance as indicated in the following outline should be formulated with caution.

### COASTAL BREEDING BIRDS

- \*\*White Pelican, *Pelecanus erythrorhynchos*.—Irregular breeder in Texas; winter visitant to all coasts, most abundant from Florida to Texas, a mere straggler in Cuba.
- \*\*\*Brown Pelican, *Pelecanus occidentalis*.—Abundant resident throughout.
- \*\*Double-crested Cormorant, *Phalacrocorax auritus*.—Common (Cuba and Florida) to rare and irregular (Texas) summer resident or breeder; common visitant to Quintana Roo.
- \*\*Olivaceous Cormorant, *Phalacrocorax olivaceus*.—Fairly common to abundant resident from Louisiana counterclockwise to Cuba.
- \*\*\*Man-o'-war-bird, *Fregata magnificens*.—Occurs in colonies at Tamiahua Lagoon, Veracruz, on Contoy Island, and in Cuba; one report of nesting in Texas; abundant visitant, mainly April to October, to coastal islands all around Gulf, infrequently appearing over the inshore waters.
- \*\*\*Great White Heron, *Ardea occidentalis*.—Resident in Cuba (sparingly) and on Florida Keys (in fair numbers); extremely rare visitant to Mississippi, Texas, and Yucatán.
- \*\*Great Blue Heron, *Ardea herodias*.—Common resident and breeder from Cuba to Texas; common winter visitor on all coasts.
- \*\*American Egret, *Casmerodius albus*.—Common resident throughout, less numerous in winter on northern coast.
- \*\*Snowy Egret, *Leucophoyx thula*.—Status essentially the same as that of preceding species.
- \*\*\*Reddish Egret, *Dichromanassa rufescens*.—Uncommon to locally common breeder from Texas counterclockwise to southern Florida; rare to uncommon visitant from northwest Florida to Louisiana, extremely rare in winter.
- \*\*Louisiana Heron, *Hydranassa tricolor*.—Abundant summer resident throughout; uncommon in midwinter on northern coast.
- \*\*Little Blue Heron, *Florida caerulea*.—Fairly common to abundant throughout; uncommon to rare in midwinter on the northern coast.
- \*\*Black-crowned Night Heron, *Nycticorax nycticorax*.—Breeds from Cuba counterclockwise to Veracruz but common as a breeder only in Florida; more plentiful after the nesting season.
- \*\*American Bittern, *Botaurus lentiginosus*.—Breeds occasionally in Florida and Louisiana; fairly common winter visitant to all coasts.
- \*\*Least Bittern, *Ixobrychus exilis*.—Uncommon to locally common resident, recorded from all coasts; extremely rare on Gulf coast of United States in winter.
- Boat-billed Heron, *Cochlearius cochlearius*.—Resident from Tamaulipas to Yucatán, but relative abundance in tidewater uncertain.
- \*Wood Ibis, *Mycteria americana*.—Mainly a fall transient and summer resident (not certainly known to breed) from northwestern Florida to Texas; locally common resident on the more southern coasts.
- \*\*White-faced Ibis, *Plegadis mexicana*.—Resident from Louisiana to Veracruz, but less numerous in winter in northern part of range.
- \*\*Roseate Spoonbill, *Ajaja ajaja*.—Increasingly numerous resident, at least locally, from southwestern Louisiana counterclockwise to southern Florida; rare or absent from northwest Florida to central Louisiana, especially in winter.
- \*\*\*Flamingo, *Phoenicopterus ruber*.—Breeds in Yucatán and Cuba; winter visitant to Campeche; occasional visitant to Florida, Texas, and (formerly) the intervening coast.
- \*\*Mottled Duck, *Anas fulvigula*.—Fairly common resident from Florida west to Texas, unrecorded as a breeder between central Florida and Louisiana.
- \*Blue-winged Teal, *Anas discors*.—Uncommon local breeder in Louisiana and Texas; winter visitant to all coasts; most common from September to April.
- \*\*Bald Eagle, *Haliaeetus leucocephalus*.—Breeds from Florida (in numbers) to Texas (less numerously); rare from May to August.
- \*\*Osprey, *Pandion haliaetus*.—Breeds in Yucatán, and from Florida to Texas; occurs in migration on all coasts; extremely rare on northern Gulf coast in December and January.
- \*\*\*Clapper Rail, *Rallus longirostris*.—Abundant and sedentary resident from Yucatán counterclockwise to Texas.
- \*\*\*Rufous-necked Wood Rail, *Aramides axillaris*.—Resident in coastal lagoons of Yucatán.
- \*\*\*Black Rail, *Laterallus jamaicensis*.—Known to nest rarely in Florida; casually recorded in migration or as winter visitant in Cuba, Louisiana, and Texas; not reported in January or February or from June to August.
- \*American Coot, *Fulica americana*.—Local breeder in small numbers from Cuba counterclockwise to Texas; recorded in June in Veracruz; visitant to all coasts, mainly October to April.
- \*\*\*American Oyster-catcher, *Haematopus palliatus*.—Uncommon local breeder, definitely known to nest only in Florida, Louisiana, and Texas, but also recorded from Tamaulipas, Veracruz, Yucatán, and Cuba.

## COASTAL BREEDING BIRDS—Continued

- \*\*Snowy Plover, *Charadrius alexandrinus*.—Resident in small numbers from Cuba counterclockwise to Mississippi and in Texas; winter visitant in Louisiana; in general most common in migration when also recorded in Yucatán.
- \*\*\*Wilson Plover, *Charadrius wilsonia*.—Common summer resident from Cuba counterclockwise at least to Texas, breeding also in Veracruz; visitant to Yucatán.
- \*\*Azara Plover, *Charadrius collaris*.—Fairly common summer resident in Veracruz, recorded also in Tabasco.
- \*\*Long-billed Curlew, *Numenius americanus*.—Fairly common breeder in Texas; abundant there in winter, when also fairly common from Louisiana to Yucatán; rare winter visitant east to Florida and Cuba.
- \*\*\*Willet, *Catoptrophorus semipalmatus*.—Breeds from Florida counterclockwise to Tamaulipas; common (summer) to fairly common (winter) resident where it breeds; visitant to Veracruz, Yucatán, and Cuba.
- \*\*Avocet, *Recurvirostra americana*.—Rare breeder and winter resident, common transient, in Texas; occurring at least as rare to uncommon visitant from Cuba counterclockwise to Veracruz.
- \*\*Black-necked Stilt, *Himantopus mexicanus*.—Locally common summer resident in Cuba and Florida peninsula and from Louisiana to Yucatán; rare from November to February in Louisiana and Texas.
- \*\*\*Laughing Gull, *Larus atricilla*.—Common summer resident on all coasts but not actually found nesting from Tamaulipas to Tabasco; somewhat less common in winter, at least in United States and Cuba.
- \*\*Gull-billed Tern, *Gelochelidon nilotica*.—Breeds from northwest Florida to Texas; fairly common in breeding range from March to September, rarer in other months; visitant to Cuba and Veracruz.
- \*\*Forster Tern, *Sterna forsteri*.—Breeds in Louisiana and Texas and most numerous there from March to December; visitant as far as Florida and Veracruz.
- \*\*\*Common Tern, *Sterna hirundo*.—Known to breed only on Dry Tortugas but visitant throughout in fall, winter, and spring.
- \*\*\*Roseate Tern, *Sterna dougallii*.—Nests irregularly on the Dry Tortugas (none to 200 pairs); an extremely rare visitant around the coast to Texas and a rare visitant to Cuba; recorded from January to May and in July, September, and November.
- \*\*Least Tern, *Sterna antillarum*.—Breeds from Yucatán counterclockwise to Texas; common only from April to October.
- \*\*\*Royal Tern, *Thalasseus maximus*.—Common throughout, but not now known to nest from Florida to Mississippi or from Tamaulipas to Campeche.
- \*\*\*Cabot Tern, *Thalasseus sandvicensis*.—Fairly common at some season on virtually all coasts, but not now known to breed from Cuba to Mississippi or from Tamaulipas to Campeche; rare in winter on northern Gulf coast and in southern Texas, uncommon in peninsular Florida in summer.
- \*\*Caspian Tern, *Hydroprogne caspia*.—Common breeder and resident in Louisiana and Texas; visitant as far as Cuba and Yucatán.
- \*\*\*Black Skimmer, *Rynchops nigra*.—Breeder and resident in varying numbers from Florida counterclockwise to Yucatán; less common in winter on northern coast; casual in Cuba.
- \*\*Mangrove Cuckoo, *Coccyzus minor*.—Breeds from Tamaulipas counterclockwise to southern Florida; uncommon summer resident in Florida, March to September; resident, but possibly not characteristic of coast, elsewhere.
- \*\*\*Gray Kingbird, *Tyrannus dominicensis*.—Summer resident from Cuba to southern Florida (where common) to Alabama (one record), mainly from April to September but unrecorded only in November.
- \*\*Long-billed Marsh Wren, *Telmatodytes palustris*.—Abundant to locally uncommon resident from Florida west to Texas, occurring south in winter at least to Veracruz.
- \*\*Mangrove Swallow, *Iridoprocne albilinea*.—Resident from southern Tamaulipas to Yucatán.
- \*\*\*Black-whiskered Vireo, *Vireo calidris*.—Summer resident from Cuba to Anclote Key, Florida, mainly from April to September but also recorded in March and October.
- \*\*\*Mangrove Warbler, *Dendroica petechia*.—Coastal races from Tamaulipas counterclockwise to Florida Keys; seasonal status uncertain.
- \*\*Red Wing, *Agelaius phoeniceus*.—Common resident throughout, abundant in winter.
- \*\*Boat-tailed Grackle, *Cassidix mexicanus*.—Abundant resident from Florida to Yucatán.
- \*\*\*Seaside Sparrow, *Ammospiza maritima*.—Locally abundant resident from Florida west to Texas.
- \*\*\*Cape Sable Sparrow, *Ammospiza mirabilis*.—Presumed to be resident at Cape Sable (at least formerly) and in Collier County, Florida, but definitely recorded only in February, April, and May.

## REGULAR VISITANTS ON THE COAST

- \*\*Common Loon, *Gavia immer*.—Florida west to Texas in moderate to large numbers, mainly from October to May.
- \*\*Horned Grebe, *Colymbus auritus*.—Florida (common in the northern part) to Texas (where uncommon); mainly November to April, but unrecorded only from June to September.
- \*\*Eared Grebe, *Colymbus nigricollis*.—Rare to not uncommon from Texas south to Veracruz, October to April and occasionally May; unrecorded from June to September.
- \*\*Canada Goose, *Branta canadensis*.—Florida counterclockwise to Veracruz; common in United States part of range (except peninsular Florida); mainly October to March, but unrecorded only in August.

## REGULAR VISITANTS ON THE COAST—Continued

- \*White-fronted Goose, *Anser albifrons*.—Visitant rarely to Cuba and Florida and regularly from Louisiana (where fairly common) and Texas (where abundant) to Veracruz; September to April only.
- \*\*Snow Goose, *Chen hyperborea*.—Cuba counterclockwise to Texas; abundant in Louisiana and Texas, decreasingly common to the east; mainly October to March.
- \*\*Blue Goose, *Chen caerulescens*.—Cuba counterclockwise to Texas; rare to uncommon in the east, abundant in the west; mainly October to May, but several hundred said to have summered in Louisiana in 1949.
- \*\*Black Duck, *Anas rubripes*.—Cuba (doubtfully) and Florida to Texas; mainly October to May, but unrecorded only in July and August.
- \*Shoveler, *Spatula clypeata*.—Visitant throughout, moderately common (eastern part) to common (western part) on United States Gulf coast; mainly October to April, but unrecorded only in July.
- \*\*Redhead, *Aythya americana*.—Visitant from Cuba to Tamaulipas; rare to uncommon except in Texas, where abundant; mainly October to May, but unrecorded only in August.
- \*\*Ring-necked Duck, *Aythya collaris*.—On all coasts, but apparently common only in Florida, and Louisiana; October (occasionally September) to April only.
- \*\*Canvasback, *Aythya valisineria*.—Cuba counterclockwise to Veracruz; rare (Cuba) to moderately common (Louisiana); mainly October to May, but unrecorded only in August.
- \*\*Greater Scaup Duck, *Aythya marila*.—Cuba (allegedly) and Florida west to Texas, but relative abundance uncertain; mainly November to March, but unrecorded only from June to October.
- \*\*Lesser Scaup Duck, *Aythya affinis*.—Common on all coasts; mainly October to May.
- \*\*American Goldeneye, *Bucephala clangula*.—In small numbers from Florida counterclockwise to Texas; mainly December to March, but unrecorded only from June to October.
- \*\*Bufflehead, *Bucephala albeola*.—Rare to uncommon from Cuba (where only once recorded) counterclockwise to Tamaulipas; mainly November to March, but unrecorded only from June to September.
- \*\*Oldsquaw, *Clangula hyemalis*.—Rare to uncommon from Florida to Texas; November to May only.
- \*\*American Merganser, *Mergus merganser*.—Uncommon from Florida counterclockwise to Tamaulipas; mainly November to April, but unrecorded only from July to September.
- \*\*Red-breasted Merganser, *Mergus serrator*.—Casual in Cuba, fairly common to abundant from Florida to Texas; mainly November to May.
- \*Virginia Rail, *Rallus limicola*.—Not commonly observed but recorded on all coasts; mainly October to April.
- \*Sora, *Porzana carolina*.—Common transient and fairly common winter visitant, recorded on all coasts and in every month.
- \*\*\*Piping Plover, *Charadrius melodus*.—Winter visitant, rare in Cuba, fairly common from Florida west to Texas; recorded in every month, but infrequent in summer.
- \*\*Ringed Plover, *Charadrius hiaticula*.—On all coasts; most abundant in April and May and in August and September.
- \*Mountain Plover, *Eupoda montana*.—Rare to abundant spring migrant (March to May) and rare fall migrant and winter visitant in Texas; once recorded (in December) at Key West, Fla.
- \*Golden Plover, *Pluvialis dominicus*.—Spring migrant in March and April, rare in Cuba, regular from northwest Florida to Texas; occasional on northern Gulf coast in fall and winter.
- \*\*Black-bellied Plover, *Squatarola squatarola*.—Common migrant and winter visitant throughout, less common in summer.
- \*\*\*Ruddy Turnstone, *Arenaria interpres*.—Fairly common to abundant on all coasts; most numerous in spring and fall.
- \*\*\*Hudsonian Curlew, *Numenius phaeopus*.—Recorded from Cuba counterclockwise to Tabasco, but common only in Florida, Louisiana, and Texas, and there only as a migrant; irregular in winter and autumn.
- \*Spotted Sandpiper, *Actitis macularia*.—On all coasts; most common in April and May and from August to November; uncommon on northern coast in winter; doubtfully recorded nesting near coast in Louisiana and Texas.
- \*\*Greater Yellow-legs, *Totanus melanoleucus*.—Common to abundant on all coasts in spring and fall, fairly common in winter.
- \*\*Lesser Yellow-legs, *Totanus flavipes*.—Status similar to that of preceding species.
- \*\*\*Red Knot, *Calidris canutus*.—Recorded from Florida to Texas and in Veracruz and Yucatán; apparently really common only in peninsular Florida, where it is an abundant spring and fall transient.
- \*\*Pectoral Sandpiper, *Erolia melanotos*.—Common migrant, recorded from Cuba counterclockwise to Veracruz; mainly March to April and July to October; rare and irregular in winter, unreported in June.
- \*\*\*White-rumped Sandpiper, *Erolia fuscicollis*.—Recorded on all coasts, but really common only in Texas; mainly late April to June and August to October, but also recorded in December and February.
- \*\*Least Sandpiper, *Erolia minutilla*.—Common to abundant migrant and fairly common winter visitant on all coasts.
- \*\*\*Red-backed Sandpiper, *Erolia alpina*.—Common to abundant from Florida west to Texas; mainly October to May.

## REGULAR VISITANTS ON THE COAST—Continued

- \*\*Dowitcher, *Limnodromus griseus*.—Common winter visitant and abundant spring and fall transient on all coasts except in Cuba (where uncommon); most numerous from August to October and March to early May.
- \*\*Stilt Sandpiper, *Micropalama himantopus*.—Cuba counterclockwise to Veracruz, but fairly numerous only in northwestern quadrant and in Cuba; mainly April to May and July to October, but unrecorded only in January and February.
- \*\*Semipalmated Sandpiper, *Ereunetes pusillus*.—Common to abundant on all coasts, except from Tamaulipas to Tabasco; least numerous in summer.
- \*\*Western Sandpiper, *Ereunetes mauri*.—Common to abundant winter visitant and transient from Florida west to Texas; infrequently recorded in Cuba and Veracruz; uncommon on all coasts in summer.
- \*\*\*Marbled Godwit, *Limosa fedoa*.—On all coasts; common to abundant in Florida and Texas, but rare to uncommon elsewhere; mainly July to April.
- \*\*\*Sanderling, *Crocethia alba*.—Common to abundant on all coasts; least numerous in early summer.
- \*\*Herring Gull, *Larus argentatus*.—Recorded on all coasts, occurring mainly October to March and mainly around northern half of Gulf, where abundant.
- \*\*\*California Gull, *Larus californianus*.—Winter visitant, recorded only from Texas and Veracruz and from October to June.
- \*\*Ring-billed Gull, *Larus delawarensis*.—Fairly common to common from Cuba counterclockwise to Texas, mainly October to April.
- \*\*Franklin Gull, *Larus pipixcan*.—Florida and Louisiana to Yucatán, but recorded as abundant only in Texas, in April and from September to December; no records for July or August.
- \*\*Bonaparte Gull, *Larus philadelphia*.—Cuba to Texas, common except in Cuba, southern Florida, and south Texas; mainly November to April, but unrecorded only in July.
- \*\*Black Tern, *Chlidonias niger*.—Common transient on all coasts, except in Cuba, where rare; mainly April to June and July to October, but also in November and December.
- \*\*Sharp-tailed Sparrow, *Ammospiza caudacuta*.—Florida west to Texas; common except in south Florida; mainly October to March, but unrecorded only from June to August.

## VISITANTS TO COAST NOT OF REGULAR ANNUAL OCCURRENCE

- \*\*\*Red-throated Loon, *Gavia stellata*.—Several old, and one recent, record from Florida (Hillsboro, November 23, 1949); four recent records from Texas (Galveston Bay region, November 27–March 21).
- \*\*\*Holboell Grebe, *Colymbus grisegena*.—Several sight records, most of them recent, from Florida and from Rockport, Tex.; extreme dates: November to March.
- \*\*Western Grebe, *Aechmophorus occidentalis*.—Two records at Rockport, Tex., one bird on December 12, 1936, and four on February 2 and 4, 1949; also one seen at Pensacola, November 12, 1927.
- \*\*\*Whistling Swan, *Cygnus columbianus*.—Several records, mostly November to March and most frequently from northwest Florida, but including Louisiana and Texas; formerly more numerous.
- \*\*\*Trumpeter Swan, *Cygnus buccinator*.—Several records, Louisiana, Texas, and Tamaulipas, but all prior to 1916.
- \*\*\*American Brant, *Branta bernicla*.—Two old records from Florida; also reported from vicinity of Rockport, Texas, in 1910, 1938 (five on October 5 and 19; two on November 8) and 1950 (one on April 22).
- \*\*Ross's Goose, *Chen rossii*.—Twice taken in Louisiana (1910 and 1916); twice observed at Cove, Texas, in 1948 and November 22, 1950.
- \*\*\*Harlequin Duck, *Histrionicus histrionicus*.—Two seen on January 14, 1945, near Rockport, Texas, and one on January 29 at Aransas Refuge; also single old records for Florida and Louisiana.
- \*\*\*Surf-bird, *Aphriza virgata*.—One seen at Port Aransas (April 1–12, 1951).
- \*\*Eskimo Curlew, *Numenius borealis*.—Two reported from Galveston Island, Texas, April 29, 1945; not otherwise recorded from the Gulf coast in over 50 years.
- \*\*\*Purple Sandpiper, *Erolia maritima*.—One collected at Marco, Florida, November 1886; five seen at St. Joseph Bay, Florida, May 29, 1948 (Hallman in litt.)
- \*\*\*Sharp-tailed Sandpiper, *Erolia acuminata*.—One reported at Galveston, Texas, March 21, 1948.
- \*\*\*Curlew Sandpiper, *Erolia ferruginea*.—One seen April 13, 1947, Galveston Island, Texas.
- \*\*\*Glaucous Gull, *Larus hyperboreus*.—Several records, Florida, Mississippi, and Texas; December 22 to May 10.
- \*\*\*Iceland Gull, *Larus leucopterus*.—One taken at Crystal River, Florida, February 9, 1927, and another photographed from the Long Key viaduct, Florida, January 6, 1950 (Cruickshank, 1951: 113).
- \*\*\*Great Black-backed Gull, *Larus marinus*.—One seen at Rockport, Texas, February 21–27, 1949; two old and indefinite Florida records, as well as two immature birds seen on Matecumbe Key, Florida, February 4, 1935 (Broun, 1935: 320).
- \*\*\*Lesser Black-backed Gull, *Larus fuscus*.—One reported at Key West, Florida, March 10, 1938.
- \*\*\*Black-headed Gull, *Larus ridibundus*.—One seen at Tampa Bay, Florida, March 2, 1948 (Cruickshank, 1949: 205); one taken in Bay of Campeche near Veracruz, February 1912.

## VISITANTS TO COAST NOT OF REGULAR ANNUAL OCCURRENCE—Continued

\*\*\*Sabine Gull, *Xema sabini*.—One taken at Corpus Christi, Texas, October 4, 1889; one seen on Padre Island, Texas, December 30, 1951.

\*\*\*Elegant Tern, *Thalasseus elegans*.—One taken at Corpus Christi, Texas, July 25, 1889.

Despite the great geographic extent of the Gulf of Mexico, only one species of bird is endemic to its shores or to its islands, in the sense that it occurs there and nowhere else. This is the Cape Sable sparrow, a bird so closely related to *Ammospiza maritima* that some taxonomists would prefer to place it under that species. However, at least 16 subspecies peculiar to the Gulf area are rather generally recognized. While the present summary deals primarily with the status of birds as species, these endemic races are a subject of considerable pertinence, since they reveal the effectiveness of the Gulf perimeter in the development of geographic variations. Of these subspecies restricted to the Gulf coast, four are seaside sparrows: *Ammospiza maritima peninsulae*, occurring from Tampa Bay to Lafayette County, Florida; *A. m. juncicola*, from Taylor County to St. Andrew Bay, Florida; *A. m. fisheri*, from the coast of Alabama to High Island, Texas; and *A. m. sennetti*, from Galveston Bay at least to Corpus Christi, Texas. Three are clapper rails: *Rallus longirostris insularum*, of the Florida Keys; *R. l. saturatus*, of the coasts from Alabama west at least to Rockport, Texas; and *R. l. pallidus*, of the northeastern coast of the Yucatán Peninsula. Two are long-billed marsh wrens: *Telmatodytes palustris marianae*, occurring from Charlotte Harbor, Florida, to Mobile, Alabama; and *T. p. thryophilus*, of the coasts of Mississippi, Louisiana, and Texas. The remaining endemics with their respective ranges are: the nominate race of the great white heron, *Ardea occidentalis occidentalis*, southern Florida and the Florida Keys; a reddish egret, *Dichromanassa rufescens colorata*, the coast of the Yucatán Peninsula and its offshore islands; an insect hawk, *Buteo magnirostris gracilis*, islands off the northwestern coast of the Yucatán Peninsula; a barn swallow, *Hirundo rustica insularis*, coastal islands and beaches from northwestern Florida to southeastern Louisiana; a horned lark, *Eremophila alpestris giraudi*, southwestern Louisiana to northern Tamaulipas; a Carolina wren, *Thryothorus ludovicianus burleighi*, islands off the Mississippi coast; and a red-wing, *Agelaius phoeni-*

*ceus littoralis*, Choctawatchee Bay, Florida, to Galveston, Texas.

A striking feature of the coastal bird list is, however, that it includes only three species that have never been recorded in the United States. Many a person interested in birds tends to think of tropic shores as places teeming with strange and unfamiliar species; but to the extent that this expectation is realized around the southern half of the Gulf, it is mainly fulfilled by those resident land birds whose home ranges happen to adjoin tidewater or to encroach upon it. The birds of the lower orders, the water birds that necessarily make up the great bulk of any coastal avifauna in the strict sense, are for the most part species of ancient origin that have extended their ranges over vast areas of the hemisphere and the world. The tropical water birds that have occurred in the lands bordering the Gulf but have never reached the United States are, with the exception of the three named in the summary and one accidental, all primarily inland species, at least insofar as available records reflect their distribution. The group is a rather small one, consisting of eight rails, four ducks, four herons, two sun-grebes, two shorebirds, a stork, and a tern. Twenty-nine species in the summary have yet to be reported from the southern half of the Gulf, but well over half of them are not of regular annual occurrence. If we were to divide the Gulf into an eastern and a western half by a line passing between Louisiana and Mississippi and along the western edge of the Yucatán Peninsula, that is, approximately by the 90th meridian, we would find that only four of the listed breeders and regular visitants have never been observed on the shores west of the line, while only three have yet to be seen on the shores east of it. To put these facts in a different way, all but 19 of the birds in the groups of regular annual occurrence have occurred at times and places on the northern and southern, as well as the eastern and western, Gulf coast. The real coastal avifaunas of all sections thus have a tremendous common denominator, and their variance is more a matter of relative abundance of individuals of

species rather than the mere presence or absence of particular species.

The wide geographical ranges of many coastal birds are related to the fact that they are highly migratory. A vast majority of the coastal species move, in part at least, southward in winter beyond the boundaries of the United States. In doing so, they are believed mainly to follow coastwise routes. Notable in this regard are the herons and shorebirds. It is a common sight to see flocks of each, in spring, flying in close formations just beyond the surf, as they pass northward and eastward along the Texas coast. On the eastern side of the continent, the coastwise flights inevitably involve eventual passage over wide expanses of open sea. While the path followed by many birds doubtless leads across the Straits of Florida and the Caribbean Sea, there is evidence that others pass well out over the Gulf itself. The occurrence of over 50 species of coastal birds, in several cases regularly, on the Dry Tortugas (Sprunt, 1951a, b) is evidence of over water flights of considerable length. There are, in addition, specific records of coastal birds having been seen on the open Gulf by ornithologists aboard ships. Helmuth (1920) saw three great blue herons approximately 100 miles off the Louisiana coast on March 29, 1918, and five Louisiana herons the following day about 180 miles off Alabama. Frazar (1881) noted the ruddy turnstone 30 miles beyond the mouth of the Mississippi River on April 2, 1881, and Lowery (1946) recorded a single great blue heron and seven long-billed curlews, in the spring of 1945, 19 and 34 miles respectively, off the same promontory. J. C. Howell (in Lowery, 1946) observed one green heron, two least bitterns, and a single red-backed sandpiper on May 4, 1945, when his ship was plying between two points, 121 and 179 miles off Louisiana. Bullis and Lincoln (1952) describe the capture aboard ship of a roseate spoonbill 38 miles off Louisiana, and Packard (1947) states, without giving a date, that he saw a wood ibis, among other species, at least 10 miles from land. A. H. Howell (1932) notes of the black rail that "a migrant was taken on a vessel, off Pensacola, March 10, 1885." That coastal birds of several kinds, notably gulls, terns, and ducks, forage out to sea is a well-known fact, but there are so few specific records out on the Gulf that we are unable to analyze at this time

the frequency of such visitations in offshore waters or the distances involved.

In this connection, it should be pointed out that the greatest seabird colonies of the Gulf are on islands. The majority of them lie within sight of the mainland, but a few of the species we class as coastal resort in part to the remoter islands where they nest side by side with birds that we place in the offshore category. Thus the royal tern is said to breed on the Arcas Keys; the Cabot tern on Alacran Reef; and the laughing gull, in both places. On May 20, 1912, on Alacran Reef, Kennedy (1917) collected two specimens from a flock of 10 sandpipers, which he called "Baird's sandpiper (*Tringa fuscicollis*)."

This record is repeated in the account of the Baird sandpiper in the Mexican Check List, but according to J. D. Macdonald (in litt.), of the British Museum, where the specimens now repose, actually refers to the white-rumped sandpiper. This is apparently the only published observation of a transient migrant on any of the offshore islands of the Campeche Bank.

Just as these birds, for the most part, have a wide geographic representation around the Gulf, so too do they have a wide seasonal representation there. Among the entries in our coastal list that are of regular annual occurrence, 56 have the status of breeders, 49 occur as winter visitants, and 8 are migrants not regularly represented in summer or winter. There are no summer visitants in the strict sense. In 77 cases—that is, in the case of every species for which the annotation does not explicitly state or definitely imply otherwise—actual Gulf records are available for every month of the year. Such gaps as do occur are predominantly in summer (24 in the period from June through August against 8 in the period from December through February), demonstrating that winter is the period of greater variety. This contrast gains increased force from the fact that several of the species found in every month of summer seem never to be continuously present throughout the season. It is not uncommon among shorebirds for the last of the northbound migrants to delay their departure until early June and for the first of the southbound migrants to return before July 31.

One factor in the seasonal spread of the records is the central position of the Gulf, and the essentially mild climate that goes with it. Only infre-

quently, and then only on the northern coast, do conditions of food or temperature place absolute physical limitations on the ability of a bird to survive there. This is especially true of the large and non-insectivorous species that make up the bulk of a coastal bird list. Year after year, as a result, Gulf localities go on making reports of birds "earlier than ever before" or "later than ever before," even in the comparatively well-worked sections of the United States. We may expect the present monthly gaps in the record of occurrence to diminish steadily.

As a further consequence of climate and position, the patterns of seasonal activity on the Gulf differ rather strikingly from the patterns for the United States as a whole. The regional editors of "Audubon Field Notes" for the Gulf States often find themselves handling half of their records of northward migration during the so-called Winter Season, from December 1 to March 31. In the stated period of spring migration, April 1 to May 30, they find the major nesting events of the year taking place. And by the time they reach the nominal nesting season, June 1 to August 15, they are already concerning themselves with the first effects of southward migration. This last, somewhat paradoxical situation stems from the fact that early southward migratory movement results in the North in invisible subtractions from large summer populations, while in the South those same invisible subtractions are translated into additions to the avifauna or accretions to populations that are at very low ebb.

### III. LAND BIRDS OVER THE OPEN GULF

In the discussions up to this point, we have been concerned with birds that frequent the region of the Gulf of Mexico and its tidal reaches *because* of the Gulf: species that are attracted by some particular environmental advantage, or set of advantages, that they find there. Now we turn to a group of birds of opposite relationship, those that occur over this same part of the earth's surface *despite* the Gulf. They are the land birds and the inland water birds that from time to time and in varying numbers have been observed out over the open Gulf during the seasons of migration.

From the strictly ecological point of view, such birds are not birds of the Gulf at all. But, in a broad ornithological sense, their associations with

the Gulf are of vastly greater importance than those of either the pelagic or the coastal birds. Interposed as the Gulf and its environs are between the summer and winter ranges of scores of highly migratory species, they furnish the most favored testing grounds in the world for theories of bird migration, particularly hypotheses regarding the effect of water barriers.

As specifically related to the Gulf of Mexico, there are two such hypotheses. One is that normal bird migration between South and Central America on the one hand and North America on the other takes place around the edges of the Gulf. According to this view, the records of nonpelagic birds over the open Gulf are of the same nature as records of similar species over the North Atlantic—they represent displaced birds. It has been pointed out that such records are few and that, whenever impressive numbers of individuals have been involved, the associated weather conditions have been such that they might have blown or otherwise shifted birds from overland routes. The most spectacular observations of migrants have been along the Texas coast, and most transient spring migrants have been noted more commonly either in Texas or in peninsular Florida than on the north central Gulf where the bulk of the trans-Gulf flights might be expected to land in spring, if they occur. Indirect evidences of trans-Gulf migration, such as comparative arrival dates in the United States, can be explained without assuming that any major migration routes lie across the Gulf. As originally expounded, these views were carefully confined to spring migration. More recently it has been implied that migrants do not customarily cross the Gulf in fall either.

The opposing hypothesis holds that, while large numbers of birds, particularly those that winter in Mexico, do migrate northward entirely overland, a significant proportion of those returning from South and Central America fly directly across the Gulf from Yucatán. It is pointed out that trans-Gulf migrations may be expected to take place on a very broad front with so much resultant dispersal that the number of birds observable at any one location should be small, and that the only concentrative factors operating on the Gulf are those associated with bad weather. In the light of these considerations, the present

records of small land birds over the Gulf are just the sort of records one should anticipate if trans-Gulf migration is an important reality. Because of the failure of recent fieldwork in eastern Mexico to produce more than a few scattered records of many migrants that are overwhelmingly abundant in Texas, the volume of the flight on the coast of Texas is regarded as evidence in favor of trans-Gulf migration, rather than evidence against it. Telescopic studies of the density and direction of night migrations leaving the coast of Yucatán have shown that the over-all trend of the flights is directed northwestward toward the Texas coast in conformity with the prevailing movement of the air masses in the western Gulf. And finally, these same studies have indicated that the flights are of major proportions.

This brief summary does not do full justice to the arguments supporting either hypothesis. It will serve, however, to indicate the main features of the controversy and to emphasize the importance of placing on record all future observations of land birds on the open Gulf, with notes describing the surrounding weather conditions. For a fuller understanding of the case for and against trans-Gulf migration, reference may be made to the following: Williams (1945, 1947, 1950, 1951); Lowery (1945, 1946, 1951); Bullis and Lincoln (1952).

Table 1 is an attempt to bring together all records of the species of land birds that have been identified over the waters of the Gulf at distances a mile or more from the nearest coast. It is to be hoped that this summary will stimulate additional observations of the same sort by providing a background against which they may be evaluated. The data were drawn from the following published or unpublished sources: Frazar (1881); Helmuth (1920); the anonymous account (1927) of observations on the S. S. *West Quechee*, designated as "W. Q." in the table; Griscom (1945); Williams (1945); Lowery (1946), including, among other records, the observations by J. C. Howell and by personnel of the U. S. C. G. Cutter *Blanco*; Dufresne (1947); Packard (1947 and in litt.); Lowery's unpublished notes for 1948 and 1949; Paynter (1951 and in litt.); observations made by H. R. Bullis in 1950 and 1951, the latter incorporated in a paper by Bullis and Lincoln (1952). The number of individuals when stated is that recorded by the original observer, except in the case of Frazar, where "the most abundant," "very abundant," "abundant," "large numbers," and "quite a number" are all referred to in the table as "many." In order to condense the material for tabular presentation scientific names of species have been omitted except for the one species that does not appear in the A. O. U. Check List (1931) and has no standardized English name.

TABLE 1.—Records of Land Birds Over the Open Gulf

Species	Number	Distance offshore	Date	Source
Broad-winged Hawk	1	60 miles off Louisiana	Apr. 6	Bullis
Buteos (spp.?)	1+	"10 miles or more"	[Spring]	Packard
Duck Hawk	1	do	do	Do.
Pigeon Hawk	1	16 miles off Louisiana	May 11	Lowery
Sparrow Hawk	1	30 miles off Louisiana	Apr. 2	Frazar
Purple Gallinule	1	"Fairly close to land"	[Spring]	Williams
Florida Gallinule	15	121-179 miles off Louisiana	May 4	Howell
Mourning Dove	1	60 miles off Louisiana	Apr. 6	Bullis
	A few	30 miles off Louisiana	Apr. 2	Frazar
	1	177 miles off Yucatán	May 1	Lowery
	1	204 miles off Yucatán	May 2	Do.
	1	25 miles off Louisiana	Nov. 17	Do.
Yellow-billed Cuckoo	8	121-179 miles off Louisiana	May 4	Howell
Nighthawk (?)	50	18 miles off Yucatán	Sept. 3	Paynter
Eastern (?) Nighthawk	3	121-179 miles off Louisiana	May 4	Howell
Ruby-throated Hummingbird	1	60 miles off Louisiana	Apr. 6	Bullis
	1	(?)	August	Griscom
	2	40 miles south-southeast Pensacola	May 4	Bullis
Belted Kingfisher	1	220 miles off Yucatán	Aug. 18	Blanco
	1	100± miles off Louisiana	Mar. 29	Helmuth
<i>Erator inquisitor</i>	1	Few miles off Southern Veracruz	Nov. 28	Paynter
Eastern Kingbird	1	8-9 miles off Louisiana	Apr. 30	Lowery
Gray Kingbird	1	32 miles off Louisiana	May 11	Do.
Eastern Phoebe	1	30 miles off Louisiana	Apr. 2	Frazar
<i>Empidonax</i> sp.?	1	121-179 miles off Louisiana	May 4	Howell
Olive-sided Flycatcher	1	60 miles off Louisiana	Apr. 6	Bullis
Vermillion Flycatcher	1	do	do	Do.
Flycatchers (spp.?)	Many	30 miles off Louisiana	Apr. 2	Frazar
Tree Swallow	Several	100± miles off Louisiana	Mar. 29	Helmuth
	1	60 miles off Louisiana	Apr. 6	Bullis
	(?)	"10 miles or more"	[Spring]	Packard
Bank Swallow	1	224 miles off Yucatán	May 10	Lowery

TABLE 1.—Records of Land Birds Over the Open Gulf—Continued

Species	Number	Distance offshore	Date	Source	
Barn Swallow	1	169-271 miles off Yucatán	May 5	Howell	
	2	4-5 miles off Louisiana	Apr. 30	Lowery	
	1	21 miles off Louisiana	do.	Do.	
	1	61 miles off Louisiana	do.	Do.	
	1	67 miles off Louisiana	do.	Do.	
	1	82 miles off Louisiana	do.	Do.	
	2	101 miles off Louisiana	do.	Do.	
	4	119 miles off Louisiana	do.	Do.	
	16	149 miles off Louisiana	do.	Do.	
	3	248 miles off Louisiana	May 1	Do.	
	3	190 miles off Yucatán	do.	Do.	
	7	154 miles off Yucatán	do.	Do.	
Cliff Swallow	12	121-179 miles off Louisiana	May 12	Howell	
	1	242 miles off Louisiana	Aug. 16	Blanco	
	1	228 miles off Yucatán	Aug. 26	Do.	
	100+	"10 miles or more"	[Spring]	Packard	
	++	20-30 miles off Texas	do.	Williams	
	1	(?)	August	Grisoom	
	1	30 miles off Louisiana	Apr. 2	Frazar	
	100+	125 miles off Louisiana	Aug. 25	"W. Q."	
	2	60 miles off Louisiana	Apr. 6	Bullis	
	2	121-179 miles off Louisiana	May 4	Howell	
Purple Martin	7	"10 miles or more"	[Spring]	Packard	
	3	90 miles off Louisiana	Mar. 29	Helmuth	
	20	30 miles off Louisiana	Apr. 2	Frazar	
	2	121-179 miles off Louisiana	May 4	Howell	
	?	"10 miles or more"	[Spring]	Packard	
	1	do.	do.	Do.	
	1	do.	do.	Do.	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	1	85-95 miles off Tampa	Mar. 31	Helmuth	
	3	60 miles off Louisiana	Apr. 6	Bullis	
Catbird	Many	30 miles off Louisiana	Apr. 2	Frazar	
	1	85-95 miles off Tampa	Mar. 31	Helmuth	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	30 miles off Louisiana	Apr. 2	Frazar	
	2	60 miles off Louisiana	Apr. 6	Bullis	
	1	[12 miles off Mississippi]	[Spring]	Packard	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	100 ± miles off Louisiana	Mar. 15	Lowery	
	1	83 miles off Yucatán	Mar. 14	Do.	
	1	18 miles off Yucatán	Aug. 30	Paynter	
Robin	(?)	"10 miles or more"	[Spring]	Packard	
	1	90 miles off Louisiana	Mar. 29	Helmuth	
	1	85-95 miles off Tampa	Mar. 31	Do.	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	5	121-179 miles off Louisiana	May 4	Howell	
	1	196 miles off Louisiana	Aug. 25	Blanco	
	(?)	"10 miles or more"	[Spring]	Packard	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	2	1 mile off Southwest Pass, La.	Apr. 30	Lowery	
	1	121-179 miles off Louisiana	May 4	Howell	
Wood Thrush	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	176 miles off Yucatán	May 10	Lowery	
	1	38 miles off Louisiana	Apr. 21	Do.	
	1	226 miles off Louisiana	Apr. 22	Do.	
	1	90 miles off Louisiana	Mar. 29	Helmuth	
	1	60 miles off Louisiana	Apr. 2	Frazar	
	1	90 miles off Louisiana	Mar. 29	Helmuth	
	Several	85-95, miles off Tampa	Mar. 31	Do.	
	1	119-255 miles off Yucatán	Mar. 14	Lowery	
	1	45 miles south-southeast Pensacola	May 5	Bullis	
Veery	1	66 miles off Louisiana	May 11	Do.	
	2	60 miles off Louisiana	Apr. 6	Do.	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	(?)	"10 miles or more"	[Spring]	Packard	
	1	121-179 miles off Louisiana	May 4	Howell	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	119 miles off Louisiana	Apr. 30	Lowery	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	119 miles off Louisiana	Apr. 30	Lowery	
	A few	30 miles off Louisiana	Apr. 2	Frazar	
Thrush (sp.?)	(?)	"10 miles or more"	(?)	Packard	
	1	121-179 miles off Louisiana	May 4	Howell	
	0	60 miles off Louisiana	Apr. 6	Bullis	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	1	121-179 miles off Louisiana	May 4	Howell	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	Many	do.	do.	Do.	
	1	121 miles off Louisiana	May 11	Lowery	
	6	60 miles off Louisiana	Apr. 6	Bullis	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
Eastern Bluebird	1	(?)	August	Grisoom	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	18 miles off Yucatán	Aug. 30	Paynter	
	(?)	"10 miles or more"	[Spring]	Packard	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	1	90 miles off Louisiana	Mar. 29	Helmuth	
	1	16 miles off Louisiana	May 11	Lowery	
	2	121-179 miles off Louisiana	May 4	Howell	
	1	220 miles off Yucatán	Aug. 19	Blanco	
	1	60 miles off Louisiana	Apr. 6	Bullis	
Red-eyed Vireo	1	210 miles off Yucatán	May 10	Lowery	
	1	30 miles off Louisiana	May 4	Dufresne	
	Black and White Warbler	1	30 miles off Louisiana	Apr. 2	Frazar
		1	85-95 miles off Tampa	Mar. 31	Helmuth
		3	60 miles off Louisiana	Apr. 6	Bullis
		Many	30 miles off Louisiana	Apr. 2	Frazar
		1	85-95 miles off Tampa	Mar. 31	Helmuth
		1	60 miles off Louisiana	Apr. 6	Bullis
		1	30 miles off Louisiana	Apr. 2	Frazar
		2	60 miles off Louisiana	Apr. 6	Bullis
1		[12 miles off Mississippi]	[Spring]	Packard	
1		60 miles off Louisiana	Apr. 6	Bullis	
Prothonotary Warbler	1	100 ± miles off Louisiana	Mar. 15	Lowery	
	1	83 miles off Yucatán	Mar. 14	Do.	
	1	18 miles off Yucatán	Aug. 30	Paynter	
	(?)	"10 miles or more"	[Spring]	Packard	
	1	90 miles off Louisiana	Mar. 29	Helmuth	
	1	85-95 miles off Tampa	Mar. 31	Do.	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	5	121-179 miles off Louisiana	May 4	Howell	
	1	196 miles off Louisiana	Aug. 25	Blanco	
	(?)	"10 miles or more"	[Spring]	Packard	
Worm-eating Warbler	1	60 miles off Louisiana	Apr. 6	Bullis	
	2	1 mile off Southwest Pass, La.	Apr. 30	Lowery	
	1	121-179 miles off Louisiana	May 4	Howell	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	176 miles off Yucatán	May 10	Lowery	
	1	38 miles off Louisiana	Apr. 21	Do.	
	1	226 miles off Louisiana	Apr. 22	Do.	
	1	90 miles off Louisiana	Mar. 29	Helmuth	
	1	60 miles off Louisiana	Apr. 2	Frazar	
	1	90 miles off Louisiana	Mar. 29	Helmuth	
Nashville Warbler	1	85-95, miles off Tampa	Mar. 31	Do.	
	1	119-255 miles off Yucatán	Mar. 14	Lowery	
	1	45 miles south-southeast Pensacola	May 5	Bullis	
	1	66 miles off Louisiana	May 11	Do.	
	2	60 miles off Louisiana	Apr. 6	Do.	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	(?)	"10 miles or more"	[Spring]	Packard	
	1	121-179 miles off Louisiana	May 4	Howell	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	119 miles off Louisiana	Apr. 30	Lowery	
Parula Warbler	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	119 miles off Louisiana	Apr. 30	Lowery	
	A few	30 miles off Louisiana	Apr. 2	Frazar	
	(?)	"10 miles or more"	(?)	Packard	
	1	121-179 miles off Louisiana	May 4	Howell	
	0	60 miles off Louisiana	Apr. 6	Bullis	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	1	121-179 miles off Louisiana	May 4	Howell	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	Many	do.	do.	Do.	
Yellow Warbler	1	121 miles off Louisiana	May 11	Lowery	
	6	60 miles off Louisiana	Apr. 6	Bullis	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	1	(?)	August	Grisoom	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	18 miles off Yucatán	Aug. 30	Paynter	
	(?)	"10 miles or more"	[Spring]	Packard	
	Many	30 miles off Louisiana	Apr. 2	Frazar	
	1	90 miles off Louisiana	Mar. 29	Helmuth	
	1	16 miles off Louisiana	May 11	Lowery	
Magnolia Warbler	2	121-179 miles off Louisiana	May 4	Howell	
	1	220 miles off Yucatán	Aug. 19	Blanco	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	210 miles off Yucatán	May 10	Lowery	
	1	30 miles off Louisiana	May 4	Dufresne	
	Cape May Warbler	1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
		1	16 miles off Louisiana	May 11	Lowery
		2	121-179 miles off Louisiana	May 4	Howell
		1	220 miles off Yucatán	Aug. 19	Blanco
1		60 miles off Louisiana	Apr. 6	Bullis	
1		210 miles off Yucatán	May 10	Lowery	
1		30 miles off Louisiana	May 4	Dufresne	
Black-throated Blue Warbler		1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
	1	16 miles off Louisiana	May 11	Lowery	
	2	121-179 miles off Louisiana	May 4	Howell	
	1	220 miles off Yucatán	Aug. 19	Blanco	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	210 miles off Yucatán	May 10	Lowery	
	1	30 miles off Louisiana	May 4	Dufresne	
	Myrtle Warbler	1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
1		16 miles off Louisiana	May 11	Lowery	
2		121-179 miles off Louisiana	May 4	Howell	
1		220 miles off Yucatán	Aug. 19	Blanco	
1		60 miles off Louisiana	Apr. 6	Bullis	
1		210 miles off Yucatán	May 10	Lowery	
1		30 miles off Louisiana	May 4	Dufresne	
Black-throated Green Warbler		1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
	1	16 miles off Louisiana	May 11	Lowery	
	2	121-179 miles off Louisiana	May 4	Howell	
	1	220 miles off Yucatán	Aug. 19	Blanco	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	210 miles off Yucatán	May 10	Lowery	
	1	30 miles off Louisiana	May 4	Dufresne	
	Yellow-throated Warbler	1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
1		16 miles off Louisiana	May 11	Lowery	
2		121-179 miles off Louisiana	May 4	Howell	
1		220 miles off Yucatán	Aug. 19	Blanco	
1		60 miles off Louisiana	Apr. 6	Bullis	
1		210 miles off Yucatán	May 10	Lowery	
1		30 miles off Louisiana	May 4	Dufresne	
Chestnut-sided Warbler		1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
	1	16 miles off Louisiana	May 11	Lowery	
	2	121-179 miles off Louisiana	May 4	Howell	
	1	220 miles off Yucatán	Aug. 19	Blanco	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	210 miles off Yucatán	May 10	Lowery	
	1	30 miles off Louisiana	May 4	Dufresne	
	Bay-breasted Warbler	1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
1		16 miles off Louisiana	May 11	Lowery	
2		121-179 miles off Louisiana	May 4	Howell	
1		220 miles off Yucatán	Aug. 19	Blanco	
1		60 miles off Louisiana	Apr. 6	Bullis	
1		210 miles off Yucatán	May 10	Lowery	
1		30 miles off Louisiana	May 4	Dufresne	
Black-poll Warbler		1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
	1	16 miles off Louisiana	May 11	Lowery	
	2	121-179 miles off Louisiana	May 4	Howell	
	1	220 miles off Yucatán	Aug. 19	Blanco	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	210 miles off Yucatán	May 10	Lowery	
	1	30 miles off Louisiana	May 4	Dufresne	
	Ovenbird	1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
1		16 miles off Louisiana	May 11	Lowery	
2		121-179 miles off Louisiana	May 4	Howell	
1		220 miles off Yucatán	Aug. 19	Blanco	
1		60 miles off Louisiana	Apr. 6	Bullis	
1		210 miles off Yucatán	May 10	Lowery	
1		30 miles off Louisiana	May 4	Dufresne	
Northern Water-thrush		1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
	1	16 miles off Louisiana	May 11	Lowery	
	2	121-179 miles off Louisiana	May 4	Howell	
	1	220 miles off Yucatán	Aug. 19	Blanco	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	210 miles off Yucatán	May 10	Lowery	
	1	30 miles off Louisiana	May 4	Dufresne	
	Louisiana Water-thrush	1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
1		16 miles off Louisiana	May 11	Lowery	
2		121-179 miles off Louisiana	May 4	Howell	
1		220 miles off Yucatán	Aug. 19	Blanco	
1		60 miles off Louisiana	Apr. 6	Bullis	
1		210 miles off Yucatán	May 10	Lowery	
1		30 miles off Louisiana	May 4	Dufresne	
Kentucky Warbler		1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
	1	16 miles off Louisiana	May 11	Lowery	
	2	121-179 miles off Louisiana	May 4	Howell	
	1	220 miles off Yucatán	Aug. 19	Blanco	
	1	60 miles off Louisiana	Apr. 6	Bullis	
	1	210 miles off Yucatán	May 10	Lowery	
	1	30 miles off Louisiana	May 4	Dufresne	
	Mourning Warbler	1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
1		16 miles off Louisiana	May 11	Lowery	
2		121-179 miles off Louisiana	May 4	Howell	
1		220 miles off Yucatán	Aug. 19	Blanco	
1		60 miles off Louisiana	Apr. 6	Bullis	
1		210 miles off Yucatán	May 10	Lowery	
1		30 miles off Louisiana	May 4	Dufresne	
Common Yellow-throat		1	30 miles off Louisiana	Apr. 2	Frazar
		1	90 miles off Louisiana	Mar. 29	Helmuth
	1	16 miles off Louisiana	May 11	Lowery	
	2	121-179 miles off Louisiana	May 4	Howell	
	1	22			

TABLE 1.—Records of Land Birds Over the Open Gulf—Continued

Species	Number	Distance offshore	Date	Source
Orchard Oriole.....	1.....	94 miles off Louisiana.....	Apr. 30.....	Lowery.
	3.....	121-179 miles off Louisiana.....	May 4.....	Howell.
	1.....	60 miles off Louisiana.....	Apr. 6.....	Bullis.
Baltimore Oriole.....	1.....	121-179 miles off Louisiana.....	May 4.....	Howell.
Baltimore Oriole (?).....	1.....	43 miles off Louisiana.....	May 11.....	Lowery.
Scarlet Tanager.....	Many.....	30 miles off Louisiana.....	Apr. 2.....	Frazar.
	1.....	60 miles off Louisiana.....	Apr. 6.....	Bullis.
Summer Tanager.....	A few.....	30 miles off Louisiana.....	Apr. 2.....	Frazar.
	1.....	60 miles off Louisiana.....	Apr. 6.....	Bullis.
Tanager (sp. ?).....	1.....	121-179 miles off Louisiana.....	May 4.....	Howell.
Indigo Bunting.....	Many.....	30 miles off Louisiana.....	Apr. 2.....	Frazar.
	1.....	121-179 miles off Louisiana.....	May 4.....	Howell.
Painted Bunting.....	Many.....	30 miles off Louisiana.....	Apr. 2.....	Frazar.
	1.....	94 miles off Louisiana.....	Apr. 30.....	Lowery.
Dickeissel.....	1.....	30 miles off Louisiana.....	Apr. 2.....	Frazar.
Red-eyed Towhee.....	A few.....	ca. 180 miles off Alabama.....	Mar. 30.....	Helmuth.

The table includes records of 64 species, 28 of which have been observed more than once. If the summary were to include the herons and sandpipers seen over the Gulf and discussed in the section on coastal birds, the total of nonpelagic birds definitely recorded at sea would be increased to 73 species. The seasons covered by these observations extend from March 29 to May 11 and from August 16 to November 28. Sixty-one of the species listed in the table have been observed in spring, but only twelve have been definitely seen in fall.

There are 140 entries in the table, and for 123 the approximate position of the observations is known. Among these 123 entries, only 3 represent birds seen less than 10 miles from land; only 9, less than 20 miles from land; and no more than 12, less than 30 miles from land. Thus the published data so far offer little to support the idea advanced by Williams (1945, 1947) that migrating birds cut chords of varying length across indentures of the coast, an idea, incidentally, at variance with experience of European observers who have studied the relation of migration routes to coast lines. While the waters rather close inshore are those most frequented by boats and therefore the waters over which maximal proportions of the birds present might be expected to be seen, it is highly questionable that the present records reflect the true relative abundance of land birds over various sections of the Gulf. Certainly many more land birds must have been seen from time to time over inshore waters than have been reported.

Moreover, the majority of the records are supplied by four observers: Frazar, Bullis, Helmuth, and Howell, who were, respectively, 30, 60, 80 (estimated), and 121-179 miles offshore from

Louisiana when birds appeared in numbers on or near their boats. Just as concentrations of species and individuals in spring on land on the northern Gulf coast are associated with inclement weather, so are these exceptionally high counts at sea. Three of the notable concentrations occurred after the passage of moderate or severe cold-front storms and the coincident shift of the winds to the north, which imposed an obstacle to northward flight. But the fourth spectacular flight, that observed by Bullis, which involved thousands of small land birds, was recorded mainly when the winds were southerly, even though the skies were heavily overcast. In all cases where the direction of flight of land birds over the Gulf has been recorded, they were proceeding in the seasonal direction of migration. This has been the case irrespective of the direction of the wind at the time the observations were made.

The foregoing discussions should make it apparent that, in the present state of our knowledge, any record of any pelagic bird, or of any land bird, anywhere over the Gulf of Mexico, as well as of any coastal species seen offshore, has potential significance and is worth recording.

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