NOTES ON MIGRATIONS OF SOUTH AMERICAN BIRDS

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THERE have been many records of North American birds wintering in the tropics or even as far south as the South Temperate Zone and the Antarctic, and such migratory movement is too well known to need more than passing comment here. We have also some data on the travels of South Temperate Zone species of Africa and Australia northward into tropical regions of their own longitudes, but South America has not been documented to the same extent. It is not uncommon, therefore, to hear the statement made that South American birds do not migrate, a statement which is quite erroneous, as will be seen. A few writers have noted the disappearance or reappearance of certain species at certain places and seasons, but there has been little evidence to show where the period of absence has been spent. Within the tropics there is some wandering, evidently in relation to food supply. Such is the case with the Wood Ibis which has been reported to go from the Amazon to the Orinoco during that season when the enormous inundation of the Amazon Valley buries the shallows which these birds require for their feeding.

Various hummingbirds, such as *Rhodopis vesper atacamensis* of Chile, appear to be found in their known haunts only at certain seasons. It is possible that their movements may be governed by the flowering seasons of certain plants, but it is also possible that the cause may be no more than that which operates in better-known migrations. A somewhat comparable condition exists in species like *Agelaius thilius* which keeps to the marshes in breeding time but is more widely distributed in winter. This, as Dr. Chapman has maintained in his studies of Wagler's Oropendola on Barro Colorado, is, in its way, a true migration. Our own Red-winged Blackbird does the same thing. In the Andean regions there is occasional altitudinal movement from higher elevations to lower and return, such as occurs in *Cinclodes oustaleti* of Chile as well as in various North American birds. A still different type of travel is used by some high-mountain forms like *Muscisaxicola albilora* which keeps to the Temperate Zone of the Andes but migrates northward into regions hardly different from those where the breeding season is spent. Hudson and others have noted similar movements of certain lowland species which, like *Lessonia rufa*, nest toward the southern end of South America and spend the winter on the pampas in Argentina and Chile. Nearly allied to this type of movement is the winter crowding of the members of some species into the northern part of their range. Such movement may be difficult to detect except by careful studies in the field since, in the winter home, individuals may be found at all times of the year. It is

comparable to the southward movement of some of our North American birds to the southern States or only as far as they need to go to find their winter food.

Besides all these, however, there are other species which breed in the South Temperate Zone and, in the winter, leave the entire region and move into the tropics, just as many North American birds do when they pass into the West Indies, Central America, or South America. The geographical condition which affects the routes of travel is quite different in the two cases. The North American birds which go to South America are confronted by two major routes of travel to reach the southern continent. The most direct is that across the Gulf of Mexico; the other is by way of Central America, a course which is considerably longer but which can be travelled in a more leisurely manner. Often the eastern birds will carry their journeyings onward to South America while their western cousins will not go beyond some Central American country. Some ancestral factor, no doubt, is here involved, perhaps concerned with the occupation of terrain by the first arrivals, probably the birds from the nearest points of departure. In any case, the migrants over the land route must pass the narrow neck of Panamá, after which they may follow the western coast line, the main course of the Andes, the northern coast eastward from Panamá (sometimes on southward along the Atlantic coast), or a diagonal path southeastward across the Amazonian region. The arrivals from across the Gulf of Mexico are likely to continue southward across Venezuela and Brazil to a variable extent. The exact routes followed by the various migrant species have yet to be worked out in detail, though the study offers interesting possibilities.

On the other hand, Argentine birds which pass northward into the tropics have a wide, and for a long time an increasingly wide, front on which to advance, one which offers no bottle-necked isthmuses or barriers comparable to Panamá and the Gulf of Mexico. Theoretically, then, there is no geographical reason why birds of the South Temperate Zone should not be expected to behave like North Temperate Zone birds in similar circumstances.

The line of mean annual temperature of 70 degrees Fahrenheit in the northern hemisphere passes near the southern border of the United States; in South America it passes through Rio Grande do Sul (in southeastern Brazil), through southern Paraguay and northern Argentina, and turns sharply north on the eastern face of the Andes. The southern tip of South America is near the line of 40 degrees Fahrenheit and its equal in North America passes through Lake Superior and southern Alaska. A criterion of temperature as a factor in migration thus places Argentina, Paraguay, Uruguay, and southernmost Brazil on a plane of equality with the United States and southern and western Canada. If the length of daylight is a

factor in migration, similar equality can be traced in much the same areas although the parallels of latitude are straight lines while the isotherms are not.

If glaciation were a contributing factor in the development of the migratory instinct, it should be remembered that in prehistoric times Patagonia was glaciated and most of Argentina that was not covered by ice was under the sea and therefore equally uninhabitable for land birds. Whatever the cause or the present ruling factors of migration, therefore, the birds of the southern part of South America, south of the Tropic of Capricorn, should be expected to behave in a somewhat similar manner to North American birds of the corresponding latitudes. There is some evidence that they do.

Dr. Chapman (Auk, 46: 348–357, 1929) produced evidence to show that the martin, *Phaeoprogne tapera fusca*, and the swallows, *Pygochelidon patagonica* and *Pygochelidon cyanoleuca*, leave their breeding grounds in the neighborhood of Argentina and Paraguay and winter as far north as the Caribbean coast. Recent studies of certain of the tyrant flycatchers have now produced equally good evidence of similar migration in this family of birds. I shall not give the evidence here in detail; much of it is appearing in my current papers ('Studies of Peruvian Birds,' American Museum Novitates). A brief summary of a few of the conclusions will show some of what has been discovered.

The Swallow-tailed Flycatcher, *Muscivora tyrannus*, may be separated into four subspecies. These subspecies are distinguishable by certain positive characters of color and emargination of the primaries. Failure to recognize these distinctions in the past may well have been the direct result of the migration which one of the subspecies undergoes, since at certain seasons this form invades part of the breeding ranges of all three of the others. This form (the typical one, *M. t. tyrannus*) appears to occur in Argentina, Paraguay, and southernmost Brazil between the months of October and February only. From a little farther north, in Matto Grosso, for example, we have skins dated in August, September, and October, which may indicate dates of passage through the region or may point to the area as lying in the northern portion of the breeding range or the southern border of the winter range. In any case, there are many specimens of this form in the American Museum of Natural History from the Amazon, and regions north of it, as far as Santa Marta, Mérida, the Orinoco, the north coast of Venezuela, and the Guianas, and one skin each from Trinidad and Tobago. These are all dated between February and November, most of them between March and October. The other forms (one from Santa Marta, one from Central America, most of Colombia, and Venezuela, and one from the south bank of the lower Amazon) are represented by specimens taken at various times throughout the year and appear to be residents of their respective

ranges. It is interesting to note that the name of the Argentine form is based on a bird from Dutch Guiana which must have been a wintering individual from much farther south. The Argentine birds breed in somewhat worn plumage in the southern summer. The young are well grown in December and January and the birds migrate northward in February and March. Once on their wintering ground, they are in advanced molt in June and July and are in fresh plumage in August and September, ready to move southward to reach their breeding grounds in October.

Similarly, another large tyrant, *Myiodynastes maculatus solitarius*, is merely a summer resident in Argentina, Paraguay, Uruguay, and southernmost Brazil, from August to April; most of our specimens from the south are dated from September to March. A large series from the Amazon and northward to the Guianas, Venezuela, and Colombia is dated variously from late March to middle September. Dr. Wetmore (Bull. U. S. Nat. Mus., no. 133, 1926) noted the arrival of these birds in Paraguay in the latter part of September, but gives no dates of possible departure. Specimens from Bahia, taken in June, suggest an all-year residence in that latitude. On the Amazon and northward, typical *M. m. maculatus* is resident throughout the year.

Both species of *Empidonomus* have a migratory form. *E. varius varius* breeds in the south some time between September and February and migrates north to the Guianas, northern Brazil, Venezuela, Colombia, and eastern Perú, arriving in March in worn plumage. It molts from April to June and is in fresh plumage in July. Its tropical representative, *E. v. rufinus*, inhabits the extensive area from Bahia and the south bank of the Amazon north to the Guianas and the north coast of Venezuela, in all of which it is resident. *Empidonomus aurantio-atro-cristatus aurantio-atro-cristatus* breeds in Argentina, Uruguay, Paraguay, and possibly adjacent parts of Brazil and Bolivia, some time between middle September and February. A small series from eastern Perú, the upper Rio Negro, and the upper Orinoco shows dates between March and September only. *E. a. pallidiventris* from eastern Brazil, from the Rio Tapajoz to the State of Piauhy, is represented by dates throughout the year as befits a resident form.

Myiarchus s. swainsoni from eastern Uruguay, southeastern Brazil and eastern Paraguay migrates to British Guiana, Venezuela, and the Bogotá region of Colombia. The western form, *ferocior*, of northern Argentina, also migrates northward, at least as far as southeastern Colombia.

There is only one plumage and one molt in the birds mentioned, and the state of plumage is different in the summer and winter ranges. The breeding birds are fairly fresh at the beginning of the season, but become more worn as the season advances. Individuals from the winter range are, for

the most part, either badly worn or in process of molt, but prior to departure for the breeding range they are in fresh plumage. The series from the two areas are, therefore, exactly complementary and show the complete succession of plumage-change which is not demonstrable in the birds from either range alone. If the supposed migrants obtained in the north were in the same state of plumage as southern examples dated six months away, there would be considerable doubt as to their being members of the same population at different seasons. Such a case is illustrated by *Myiarchus ferox australis* of the South Temperate or dilute Tropical Zone. This bird has a counterpart on the Orinoco, in the Tropical Zone north of the equator, which is so similar that subspecific separation appears to be impossible. The most pronounced difference between the two populations is that the birds from the south molt in April, are in fresh plumage from May to August, and are ragged in January, while the Orinoco birds molt from August to November, are still in fresh condition in January, and are much abraded in June and July. Obviously the northern birds are not migrants from the south in spite of the great similarity in appearance and in spite of the fact that there is a different subspecies in the intermediate region. The molting season of tropical species is not always uniform in a varied range which may include areas on both sides of the equator or in different river systems. Consequently locally resident forms may have a molting season which coincides, in part, with that of the winter visitants. Fortunately some differentiation of season is often apparent and this, together with the known subspecific differences, helps to determine the true nature of some questionable specimens.

The tropics of the southern continent thus contains two transient elements, one arriving from North America as the other departs for still more southern regions, and vice versa. The two elements are very rarely conspecific. So far I have found only one case where the species is of such wide distribution that it has a migrant form from North America meeting a migrant from Argentina on common ground in the range of a still different tropical form. This species is *Vireo virescens*. In general, also, there is far from exact replacement. The migrants from the north, which come by way of the Isthmus of Panamá, largely follow the Pacific Coast or travel down the Andes to Perú and Bolivia. The northern birds that cross the Gulf of Mexico invade the region more commonly reached by the Argentine and Paraguayan species and it may be found that there is some replacement between these respective forms. At any rate there is ample evidence to show the existence of a well-developed migratory habit in birds of the South Temperate Zone of South America, comparable in its major aspects, if not in actual degree, with that of the North American avifauna. We have assurance by various careful students in and of South America that many

species are of only seasonal occurrence in particular regions. We have far to go before we learn where all of these spend the remaining portions of the year or by what routes they reach their objectives. It is an interesting field which is open for study.

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