Pleistocene Birds of Puerto Rico

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Grant 1748: For an expedition to obtain vertebrate fossils and recent comparative skeletal material in Puerto Rico.

The first Pleistocene fossils of mammals and birds described from the Greater Antilles came from cave deposits in Puerto Rico (Anthony, 1918; Wetmore, 1922). These provided the impetus for further research in similar deposits elsewhere in the West Indies. Cave deposits in Puerto Rico were by no means exhausted, however, and in 1976, at the incentive of Noel Snyder, who was then engaged in research on the Puerto Rican parrot, I ventured to Puerto Rico with Frederick Grady, from the Department of Paleobiology at the Smithsonian, in search of more fossils. We discovered several extensive new deposits and collected thousands of vertebrate fossils, including representation of several new species of birds, mammals, and reptiles.

When I returned to Washington and attempted to identify the fossil birds in these collections, I was dismayed to find that the Smithsonian's collections included only four skeletons of three species of recent birds from Puerto Rico. A check of other museums revealed that no one had ever prepared any significant number of skeletal specimens of Puerto Rican birds. Thus, in order to be able to identify the fossils, it was necessary to return to Puerto Rico to remedy this glaring deficiency. I also wished to return to our most productive fossil site to recover sediment samples, because in the course of sorting the fossils collected in 1976, a single bone of a hummingbird was found stuck to a bone of a larger bird. This suggested that bones of smaller vertebrates may have been lost through the 1/8-inch mesh screens that we had used in sifting the fossiliferous cave sediments.

On my return trip to Puerto Rico, sponsored by the National Geographic Society, I was in the field from April 13 to May 1, 1977, with J. Phillip Angle, also of the Smithsonian. From April 13 to 18 and April 25 to 27, we were in the arid scrub forest near Guánica and in the mangrove areas near La Parguera, in the southwestern part of the island. From April 18 to 25 we collected in the montane forests near Maricao, and from

April 27 to May 1, we collected in the hilly coffee plantations near Utuado, venturing from there to the cave localities near Ciales, in the center of the island. Thus a variety of habitats was sampled.

This resulted in the collection of 279 specimens of 47 species of birds, including 1 genus, 9 species, and 10 subspecies for which no, or insufficient, skeletal material had been available previously. Specimens of six endemic species were also preserved whole in alcohol for future anatomical studies. At Guánica, we found the Puerto Rican Whip-poor-will *(Caprimulgus noctitherus)* to be common, and we obtained three specimens that were prepared as complete skeletons and nearly complete skins. Only two other specimens of this species are in existence, ours being the only skeletons. In addition to birds, we obtained over 40 specimens of bats, including 3 individuals of the very rare species *Stenoderma rufum*, the first for the Smithsonian collections.

The skeletal specimens have served admirably for analysis of the Puerto Rican fossils and will provide a basic resource for future paleontological and anatomical studies of Antillean birds. A list of the bird specimens obtained, with their weights, has been published elsewhere (Olson and Angle, 1977).

When we returned to "Blackbone Cave" (see Pregill, 1981) in 1977, we found that our diggings from the previous year had been undisturbed. We then removed about 300 lb of previously screened sediment and shipped it back to Washington, where it was passed through finer mesh and assiduously sorted by Mr. Grady. This resulted in the recovery of hundreds of additional bones of very small vertebrates, including over 75 bones of hummingbirds. Furthermore, the new material more than doubled the number of species of reptiles and amphibians known as fossils from Puerto Rico (Pregill, 1981). Very few larger bones were obtained in this sample, which testifies to the effectiveness of our field screening in 1976, but it is quite evident that finer mesh is needed to recover a truly representative fauna.

The scientific results of our Puerto Rican work have been most gratifying. The fossil herpetofauna has been analyzed in detail by Pregill (1981), who identified 21 species of reptiles and amphibians, including 2 new species of lizards of the genus *Leiocephalus*. Although not all of the bird fossils have been identified, two new species have been named so far —*Pedinorhis stirpsarcana*, an enigmatic sparrow of uncertain relationships (Olson and McKitrick, 1982), and *Tachornis uranoceles* Olson (1982a), a swift closely related to the Palm Swift *T. phoenicobia* that occurs in Cuba, Jamaica, and Hispaniola but is absent from Puerto Rico. In addition, there is a tiny new species of burrowing owl *(Athene)* that remains to be named (Pregill and Olson, 1981).

Species that occur elsewhere in the West Indies but that have retreated from Puerto Rico were also found among the fossils; e.g., the Hispaniolan Siskin *Carduelis dominicensis*, which now lives only in montane pine forests of Haiti and the Dominican Republic (Olson and McKitrick, 1982), and the Bahaman Mockingbird *Mimus gundlachii* (Figure 1), which now occurs only in the Bahamas and the driest parts of Jamaica (Pregill and Olson, 1981). We have tentatively identified other fossils as possibly belonging to species of passerine birds that are now restricted to the Bahamas. If so, it would be difficult to avoid the conclusion that the endemic elements in the Bahaman avifauna are relictual species that were more widely distributed in the West Indies in the past. This would be in accor-

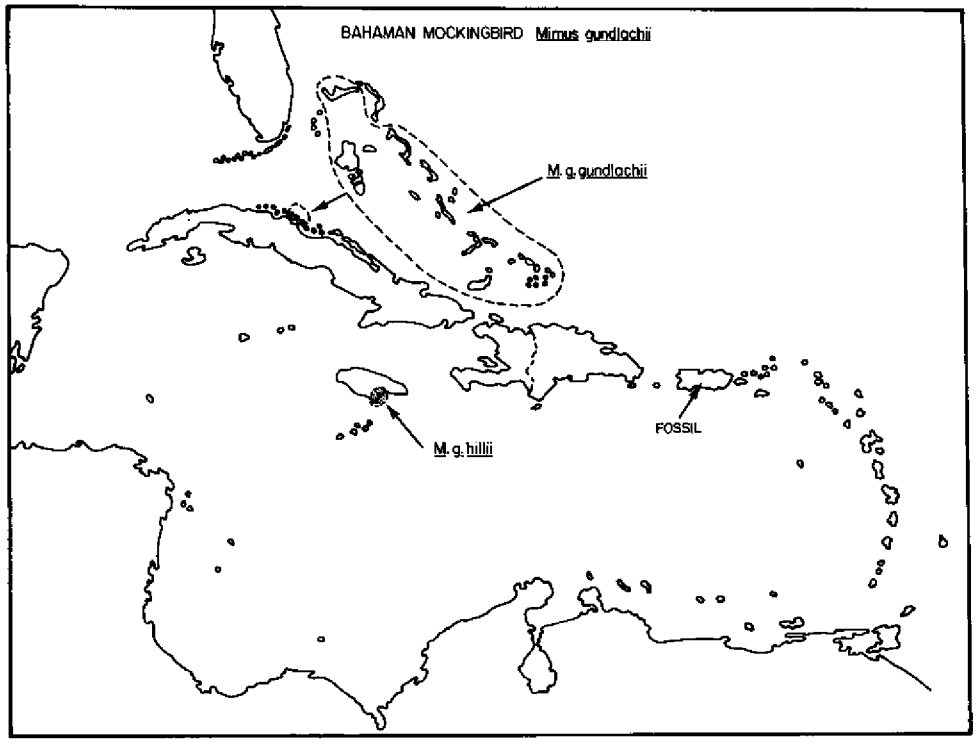

FIGURE 1. Recent and fossil distribution of the Bahaman Mockingbird *Mimus gundlachii*. This species is adapted to arid conditions, and evidently retreated from parts of its range as a result of the moister conditions that came at the end of the Pleistocene. A similar distributional history can be postulated for other species that now appear to be endemic to the Bahamas.

dance with the fact that the Bahamas were almost entirely submerged during the interglacial period that preceded the Wisconsinan glaciation, when they could hardly have been home to an extensive endemic fauna of vertebrates.

The Puerto Rican fossil vertebrates have played a crucial role in understanding broader patterns of distribution of organisms in the West Indies, and they provided the insight that led to our generalization that the West Indies as a whole was more arid during the last glacial period than it is at present (Pregill and Olson, 1981; Olson, 1982b). Thus, extinctions and discontinuous distributions of vertebrates in the West Indies can in many instances be correlated with the loss of arid habitats since the end of the Wisconsinan glaciation (Pregill and Olson, 1981).

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