

FOSSIL BIRDS OF THE BAHAMAS

by Storrs L. Olson

A recent analysis (Olson and Hilgartner, in press) of newly collected specimens and re-examination of all previously reported fossil birds from the Bahamas, revealed many interesting facts about the former birdlife of the islands. These permit some generalizations concerning the past environment of the Bahamas that should be of interest to naturalists in general. I have therefore attempted to summarize the highlights of our findings here.

Caves and sinkholes in the West Indies are well known as likely places to find fossil remains of birds, mammals, reptiles and amphibians. These fossils do not consist of slabs of rocks with impressions of entire animals, but instead are disarticulated bones, often fragmentary, that occur in the soil that accumulates in caves. Most often these bones were deposited as pellets regurgitated by owls that roosted or nested in the caves, although some were the result of animals falling into sinkholes from which they could not escape.

Despite the fact that the Bahamas are composed mainly of limestone and consequently are riddled with sinks and caves, only two sites have been reported so far that contained significant vertebrate fossils. This is merely a reflection of neglect by paleontologists. The first vertebrate fossils from the Bahamas were picked out of cave dirt that had been used as fertilizer. These bones were sent to Harvard University in 1937, and the bird bones were submitted to Alexander Wetmore of the Smithsonian Institution for study. These specimens were first thought to have come from Great Exuma but were later determined as having originated on Little Exuma. Wetmore (1937) listed 13 species from this deposit, including three that were described as new.

In 1958, Walter Auffenberg and J. C. Dickinson of the Florida State Museum, discovered a fossil deposit in a sink on the west end of New Providence Island, a site they called the "Banana Hole," for a banana tree that grew there at the time. They collected some of the fossils, and the birds were studied by Pierce Brodkorb (1959) of the University of Florida who identified 15 species, 6 of which were then believed to be new.

In 1978, David Campbell, formerly of the Bahamas National Trust, informed me that many fossils could probably still be obtained from the Banana Hole. It seemed worthwhile to attempt to increase the sample size of the rather small avifauna then known from this site. Therefore, in August, 1978 I went to New Providence with my able assistants, Frederick V. Grady, Helen F. James and Charles A. Meister. We spent a week carefully sifting the fine red dirt that remained in pockets amongst the boulders in Banana Hole. By using fine screen, we were able to recover numbers of very small fossils, including bones from two species of hummingbirds (Fig. 1) as well as the remains of larger species.



Fig. 1. Some fossil hummingbird bones from Banana Hole, New Providence. The scale is in millimetres. Careful screening of fossil deposits permits even such tiny bones as these to be collected. (photo by Victor E. Krantz)

Through the new collections, we were able to study more than five times as many fossil birds as were available to Brodkorb. Although the sample size is still rather small (350 specimens total), we succeeded in more than doubling the number of species of birds known from this site (from 15 to 32). In analyzing the new specimens, all of the previously described bird fossils from the Bahamas were obtained and re-studied, which resulted in a number of changes in the identification of some specimens (Olson and Hilgartner, in press). Of the 9 fossil birds thought by Wetmore (1937) and Brodkorb (1959) to represent extinct species, we believe 4 to be the same as existing species, and two others to be at most subspecifically distinct from existing species. All of the birds reported as fossils from Little Exuma also occur in the New Providence deposits.

The precise age of the fossils is not yet known, but considerable indirect evidence indicates that they were deposited during, or shortly after, the last advance of the glaciers in North America in the Pleistocene epoch—the so-called "ice ages"—and would thus be 10 to 20 thousand years old. At the time of deposition, sea levels were much lower and most of the Bahamian islands were coalesced into fewer, but much larger islands. Although most of the fossil birds are not of extinct species, many of them no longer are found in the Bahamas. Of the 32 species known from Banana Hole, 16 (50%) are no longer found on New Providence and 13 (40%) no longer occur in the Bahamas (except for the Cuban Crow in Caicos.)

Most of the vertebrate fossils from Banana Hole are bones and teeth of the hutia (Geocapromys ingrahami), a large rodent that now exists only on tiny East Plana Cay, but which was once abundant through most of the Bahamas. The thousands of bones of this mammal were concentrated by a giant extinct barn owl (Tyto pollens) that was nearly twice the size and

The Red-necked Pigeon (Columba squamosa), found through most of the West Indies, is absent now in the Bahamas but was common in the Banana Hole deposits and is known from fossils on Little Exuma as well. Both the Cuban Crow (Corvus nasicus), of Cuba and Caicos, and the Palm Crow, (C. palmarum) of Cuba and Hispaniola, occur as fossils in the Bahamas, as does an undetermined species of hummingbird larger than either of the two resident species of the Bahamas. Most of these species are found either in arid scrublands, hardwood forest or coppice. In addition, there are remains from both New Providence and Little Exuma of what appears to be the North American subspecies of Sharp-shinned hawk (Accipiter striatus velox) and an undetermined species of hawk similar to the Red-shouldered Hawk (Buteo lineatus). The former now occurs in the Bahamas only as a rare vagrant and the latter not at all.

From New Providence there are fossils of the Cuban Emerald Hummingbird (Chlorostilbon ricordii), Cuban Parrot (Amazona leucocephala) and West Indian Red-bellied Woodpecker (Melanerpes supercilialis), none of which occurs on the island today, although found elsewhere in the Bahamas.

How can we account for the disappearance of so many species of birds from the Bahamas in the past few thousand years? Information from elsewhere in the West Indies indicates that the Caribbean area as a whole experienced drier, more savanna-like conditions during the late Pleistocene. There are clear indications that habitats have changed dramatically since then. When the islands of the present Great Bahama Bank were united into a single land mass, this great island must have possessed large areas of open grassland and savanna, along with areas of arid scrub and hardwood forest or coppice. Otherwise, birds such as thick-knees, meadowlarks, caracaras, flockers, red-necked pigeons and crows could not have existed there. At the end of the last glacial period, sea levels rose, the Bahamas were inundated, the climate probably became wetter, causing erosion and loss of arid scrub and grassland. Pine forest replaced most of the hardwood forest and coppice on the larger northern islands, and suitable habitats for many species either disappeared or became too small in area to support viable populations. This resulted either in extinctions or greatly reduced and fragmented distributions. For example, the West Indian Red-bellied Woodpecker is now rather rare in the Bahamas, being restricted to areas of coppice on the largely pine-forested islands of Grand Bahama and Abaco and also on the distant smaller island of San Salvador. From the fossil record, however, we know that it also occurred on Little Exuma and New Providence, so its present distribution is quite obviously a relictual one. Changes in land area and habitat also may have affected the now very rare Kirtland's Warbler (Dendroica kirtlandii), which winters exclusively in the Bahamas and is found almost entirely in scrub (Olson, manuscript). It is not difficult to see how knowledge of the past history of endangered species and their environment would be useful in efforts to conserve them today.

Our knowledge of the prehistory of the Bahamas is still very incomplete. We need many more fossils from more islands before we can be at all confident of the true nature of the former vertebrate fauna of

probably three times the weight of the living barn owl of the Bahamas (Tyto alba), fossils of which also occurred in the Banana Hole. Two species of giant barn owl of similar size are known from Cuba and Hispaniola. It is not inconceivable that these giant pale birds with their somewhat human facial features could have persisted long enough to give rise to the Chickcharnies of Bahamian folklore.

Another giant predatory bird in the Bahamas was Titanohierax gloveralleni, which was larger than most eagles but which is more closely related to certain hawks. The same, or related, giant hawks are also known as fossils from Hispaniola, Cuba and Grand Cayman. Both the giant hawk and the giant barn owl must have subsisted almost entirely on hutias.

An extinct falcon, the caracara Polyborus creightoni, may have been the chief scavenging bird of the Bahamas. It is known so far only from three fragmentary bones from Banana Hole, but appears to have had a larger head and smaller wings than its relative, P. plancus, which is found in prairies and other open habitats in Cuba, southern Florida and most of Central and South America.

These raptorial birds, by virtue of their large size and the fact that they are totally extinct, excite the imagination; but the smaller, less spectacular fossils tell an even more interesting story, for they show that the environment of the Bahamas in the late Pleistocene was considerably different from that of today. Many birds have very specific habitat requirements and when they occur as fossils it may be assumed that their particular habitat must have been present at the time of deposition.

The fossil thick-knee, Burhinus bistriatus nanus, is a small subspecies known so far only from New Providence, but which belongs to a species that is now found in Hispaniola and Central and South America. Thick-knees are long-legged birds related to plovers and sandpipers but which inhabit open areas of dry grassland. Fossils of meadowlarks (Sturnella) were found on New Providence and Little Exuma. Meadowlarks occur in most of North America but are known in the West Indies only on Cuba. Meadowlarks live entirely in open pastures and prairies.

Burrowing owls (Athene cunicularia) are relatively common in the Banana Hole deposits, and are known as fossils from Little Exuma as well. Although the burrowing owl is found in the Bahamas today, the fossils appear to be from a smaller form, possibly an extinct endemic subspecies. Burrowing owls, like thick-knees, caracaras, and meadowlarks are inhabitants of open, arid environments.

Fossils of a flicker (Colaptes) occur on New Providence and Little Exuma. Flickers are mostly terrestrial woodpeckers, found in savannas or hardwood forest. In the West Indies, flickers are now found only in Cuba and Grand Cayman. An enigmatic snipe (Capella), larger than the North American species, C. gallinago, which migrates through the Bahamas today, was found as fossils on New Providence and Little Exuma. Snipes usually occur in open boggy situations.

the archipelago. It is fair to say that work has only just begun and that our present comprehension of the subject is but the briefest of glimpses into the past. Nevertheless, it is hoped that the fact that important conclusions may be drawn from the relatively scant information available so far will provide stimulus for further inquiry.

LITERATURE CITED

Brodkorb, Pierce. 1959. Pleistocene Birds from New Providence Island, Bahamas. Bulletin of the Florida State Museum, Biological Sciences, 4(11): 349-371.

Olson, Storrs L. Manuscript. A Possible Explanation for the Rarity of Kirtland's Warbler.

Olson, Storrs L., and Williams B. Hilgartner. In press. Fossil and Subfossil Birds from the Bahamas. Smithsonian Contributions to Paleobiology.

Wetmore, Alexander. 1937. Bird Remains from Cave Deposits on Great Exuma Island in the Bahamas. Bulletin of the Museum of Comparative Zoology. 80(12): 427-441.

