

PREY REMAINS OF BARN OWLS IN THE SOUTHERN BAHAMA ISLANDS

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Numerous reports on the feeding habits of the Barn Owl (*Tyto alba*) in the continental United States indicate that mammals, particularly rodents, are the main prey of this species and that other food items at most form a small part of its diet. Wallace (1948), for example, indicated that mammals accounted for 98.93 percent and birds 1.07 percent of the total prey items in 2,200 pellets from East Lansing, Michigan. Stupka (in Wallace, op. cit.) found that birds accounted for 1 to 2 percent of the food items at three different stations in Ohio. Baumgartner and Baumgartner (1944) found many rodent remains but no bird remains among 880 food items in pellets and skeletal debris from a site in Oklahoma. Bailey and Neidrach (1965:410) reported that the food items over a four-year period at one nesting site in Morgan County, Colorado, consisted of kangaroo rats (*Dipodomys* spp.) and several species of mice, with no bird remains in evidence. Many other similar reports could be cited.

In his report on prey species utilized by the Barn Owl on Grand Cayman in the West Indies, Johnston (1974) stated that these owls consumed a markedly higher percentage of avian prey than did their continental counterparts. He found (op. cit.; pers. comm.) that bird remains constituted approximately 40 percent of all identified bones and other food remains taken from three different sites on Grand Cayman. Most of the non-avian bones were of black rats (*Rattus rattus*) and house mice (*Mus musculus*). In addition to the bird and rodent remains, he also found skulls of the large gekkonid lizard *Aristelliger praesignis* and of two species of bats previously unrecorded from the Cayman Islands, *Brachyphylla nana* and *Artibeus jamaicensis*. Johnston theorized that the relatively high percentage of avian prey taken by Barn Owls on these small islands may be a result of the reduced diversity and numbers of potential mammalian prey. On the whole, however, there is a dearth of information regarding prey preferences of the Barn Owl in the West Indies, especially on the smaller islands.

METHODS AND STUDY AREA

From 1970 to 1972 I collected skeletal remains of small vertebrates from Recent cave sites in the Bahamas south of the Crooked Island Passage (Fig. 1). The material was found near the mouths of caves, in the form of owl pellets, or, more often, as concentrations of loose bones. The presence of pellets among assemblages of loose bones, as well as the fact that many loose bones occurred at known Barn Owl feeding sites in Johnston's (1974)

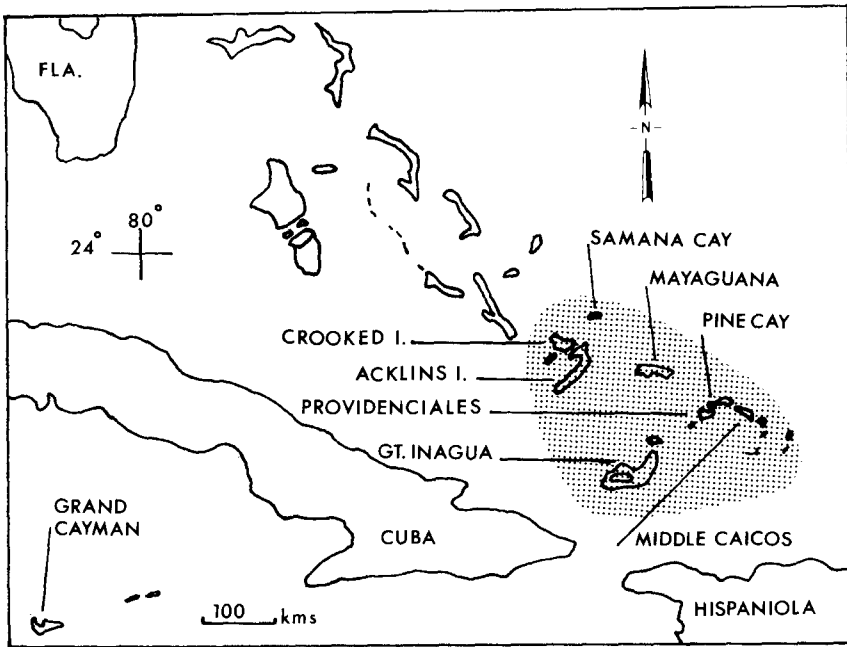


FIG. 1. Map of the Bahamas and adjacent land areas; stippling denotes the region of the southern Bahamas.

Grand Cayman study, suggest that my Bahamian samples represent food remains of owls, at least for the most part.

According to Bond (1956) two species of owls are known as residents in the southern Bahamas, the Burrowing Owl (*Speotyto cunicularia*) on Samana Cay and Great Inagua and the Barn Owl on Crooked Island and Great Inagua. Other species of owls may occur as vagrants in the southern Bahamas (for example, *Asio flammeus* on Grand Turk—Schwartz and Klinikowski, 1963), but these would probably make only negligible contributions to accumulations of prey debris left by resident owls.

Because *Speotyto cunicularia* is characteristically an inhabitant of open areas and rarely frequents caves, and because I have seen feathers of Barn Owls or the actual birds at all sites where I obtained my skeletal samples, I believe it reasonably safe to assume that all my samples pertain to Barn Owls.

The Bahamian collection sites include Crooked Island, Acklins Island, Mayaguana, and two islands on the Caicos Bank (Providenciales and Middle Caicos). Among these sites, Crooked Island is the only one where the Barn Owl has been recorded previously (Bond, *op. cit.*). I also observed a Barn Owl on Pine Cay (a small islet between Providenciales and North Caicos) on 23 May 1970. I was unable to locate the bird's roosting site, which, according to some of the local residents, was a "hole in the rocks" in a more remote section of the cay.

I identified skull material through reference to collections at Louisiana State University and Harvard University. The identifications are my own, but several were verified by

TABLE 1
VERTEBRATES IDENTIFIED FROM SKULL MATERIAL FROM RECENT CAVE DEPOSITS IN THE
SOUTHERN BAHAMAS (NUMBERS INDICATE INDIVIDUALS)

	Crooked Island	Acklins Island	Mayaguana	Providen- ciales	Middle Caicos	Total
RODENTS:						
<i>Rattus</i> spp.	71	2	14	128	59	274
<i>Mus musculus</i>			4	4	3	11
BATS:						
<i>Macrotus waterhousii</i>				3		3
<i>Artibeus jamaicensis</i>				1		1
<i>Lasiurus</i> sp. cf. <i>minor</i>			1			1
<i>Tadarida brasiliensis</i>	2					2
BIRDS:						
<i>Porzana carolina</i>					1	1
<i>Charadrius wilsonia</i>				1		1
<i>Columbina passerina</i>				2		2
Columbidae spp.				4		4
<i>Coccyzus</i> spp.				2		2
<i>Tyrannus dominicensis</i>				2		2
<i>Margarops fuscatus</i>	3					3
Mimidae spp.			1	10		11
<i>Vireo</i> spp.			2	19	1	22
<i>Coereba flaveola</i>	1		1	3	1	6
Parulidae spp.			1	1		2
<i>Spindalis zena</i>				2		2
Unidentified				4		4
LIZARDS:						
<i>Anolis scriptus</i>			3			3
TOTALS	77	2	27	186	65	357

others (see Acknowledgments). Unless otherwise indicated the nomenclature follows that of Hall and Kelson (1959) for mammals, Bond (1956) for birds, and Schwartz and Thomas (in prep.) for reptiles and amphibians. Skeletal material from the Bahamas has been deposited in the Louisiana State University Museum of Zoology (LSUMZ).

RESULTS AND REMARKS

The identification of the 357 individuals represented in my samples of skulls and skull fragments from the Bahamas is given in Table 1. The ratio of individual bird to mammal remains for each Bahamian sample is as follows: Crooked Island 4/73 (5.5 percent), Mayaguana 5/19 (26.3 percent), Providenciales 50/136 (36.8 percent), and Middle Caicos 3/62 (4.8 percent). The sample from Acklins Island consists only of skull fragments of two rats.

Although 62 is a relatively high total of bird skulls, the incidence (18.7 percent) of avian remains in my samples is much less than Johnston's figure of about 40 percent for three samples from Grand Cayman. Different yet are Barn Owl pellets reported from Hispaniola by Wetmore and Swales (1931), one sample having a bird/mammal ratio of 34/97 (35.1 percent) and the other 9/144 (6.3 percent). Even so, the incidence of bones in all these West Indian samples is higher (4.8 to ca. 40 percent) than in continental North American samples mentioned above (0 to 2 percent).

Particular skeletal items associated with Barn Owl feeding sites in the West Indies merit additional comments.

Rodents.—The 117 specimens of *Rattus* that I identified to species comprised 116 *R. rattus* and only one *R. norvegicus*. Johnston's largest sample from Grand Cayman included 30 specimens of *R. rattus* and one of *R. norvegicus*. In their study of rats in the West Indies, Schwarz and Schwarz (1965) pointed out several ecological factors that could account for the seemingly greater abundance of *R. rattus* over *R. norvegicus* on many islands in the West Indies, particularly in the southern Bahamas: 1, *norvegicus* is found on ships far less frequently than is *rattus*; 2, a relative scarcity of fresh water (as occurs on many small islands) is much more unfavorable for *norvegicus*; and 3, *norvegicus* is mostly an urban rat, whereas *rattus* is mostly a rural rat. Clearly, the small, relatively arid, and isolated islands of the southern Bahamas, with their settlements relatively small and mostly confined to the coast, and with agricultural plots scattered throughout much of the interior, seem more ideally suited for *rattus* than for *norvegicus*. I have seen presumptive *R. rattus* even on the most bleak and barren islets of the Turks and Caicos banks, where the species is able to subsist under extreme xeric conditions apparently without benefit of resources provided by humans.

Rats are clearly the dominant item in my Bahama sample (76.5 percent). Where rodents are readily available, Barn Owls sometimes subsist almost entirely on them, even in the Bahamas. For example, Northrop (1891) at a nest site on Andros Island found a large number of remains of *Rattus* but none of birds.

Bats.—Nearly all the bat bones from my Bahamian samples are of species that are presently common components of the fauna. An exception is the skull of *Lasiurus* sp. (LSUMZ 18,313) taken from a cave on Mayaguana, near the site of the former U.S. military base, on 10 May 1972. This represents a new distribution record for the genus, which has been taken previously in the Bahamas on New Providence, Andros Island, Cat Island, Long Island, Great Inagua, and the Caicos Bank (Koopman et al., 1957). Fewer than two dozen specimens of *Lasiurus* are known from the Bahamas, and their taxonomic status is open to question. Populations of *Lasiurus* in Hispaniola

and the Bahamas are currently segregated under the name *minor* and are treated either as a monotypic species (Hall and Kelson, 1959), or as a subspecies of a wide-ranging, predominantly continental species, *L. borealis* (see Koopman et al., op. cit.).

A skull of *Artibeus jamaicensis* (LSUMZ 18,309) was taken by me on Providenciales, in a cave located less than 0.5 miles (0.8 km) north of the airport at Blue Hills on 25 February 1972. I collected two other individuals of this species (preserved in alcohol) on Providenciales on 17 May 1970. These are an adult male (LSUMZ 15,633) and a gravid female (LSUMZ 15,632), bearing a fetus with a crown-rump length of 12.8 mm, taken from an undercut section of a solution hole, located near the north coast between the settlement of Blue Hills and the Third Turtle Inn. This species has not been reported previously from the Caicos Bank, but specimens have been taken in the southern Bahamas on Great Inagua and Mayaguana.

Birds.—Most of the identified bird remains in my Bahamian samples are small to medium-sized passerines. Mockingbirds (*Mimus gundlachi*), thrashers (*Margarops fuscatus*), and vireos (*Vireo* spp.) are among the most common representatives. Of at least 12 avian genera found in the samples, *Vireo* provided the most specimens. I identified 22 individuals (35.5 percent of all avian items) as members of this genus. In three sets of pellets from Hispaniola, vireos made up 4.0 percent, 35.3 percent, and 17.4 percent of the identified avian prey items (Wetmore and Swales, 1931). No vireos were found by Johnston (1974) in samples from Grand Cayman, although *V. crassirostris* and *V. magister* are common there (Johnston et al., 1971).

Of particular interest among the avian remains are an incomplete skull of *Porzana carolina* (LSUMZ 75,512), taken on Middle Caicos on 29 January 1972, and two incomplete skulls of *Spindalis zena* (LSUMZ 75,513 and 75,514), taken on Providenciales on 25 February 1972. No previous records of these species from the Caicos Islands have been published, although other specimens of *P. carolina* have been taken on South Caicos (Schwartz collection: AS 1533—study skin) and Middle Caicos (LSUMZ 71,486—specimen in alcohol).

I did not see any living representatives of the tanager *Spindalis zena* during four months of field work in the Turks and Caicos Islands. The nearest islands where the species has been taken are Great Inagua and Mayaguana, each more than 30 miles (48.3 km) from the Caicos Bank. Although a small population of *Spindalis* may now occur on one or more of the Caicos Islands, a more likely possibility is that members of the genus inhabited the Caicos Islands in the past (or at least reached Providenciales at one time). Extinction rates and faunal turnover rates on small islands are notably high, especially for birds (Mayr, 1965), and the number of successful colonizations on islands

is undoubtedly less than the number of landfalls made by potential colonists (see for example Heatwole and Levins, 1973; Levins and Heatwole, 1973).

Of interest is the near absence of domestic fowl (*Gallus gallus*) bones in all the samples under discussion, in view of the fact that many West Indians maintain small flocks of chickens. Only one of four pellet sets from Hispaniola had remains of *Gallus* in it, and these amounted to only three of 34 items (Wetmore and Swales, 1931). No chicken remains were found in the Grand Cayman material (Johnston, 1974), and the species is unknown in owl prey remains anywhere in the Bahamas. This situation may perhaps be attributed more to the care that West Indians take in housing their fowl at night than to any voluntary abstinence on the part of owls.

Amphibians and reptiles.—In comparison to birds and mammals, the herpetofauna seems to play only a minor role as prey for Barn Owls. Nevertheless, loose bone and pellet samples have fairly frequently contained remains of amphibians and reptiles: *Hyla*, *Anolis*, and *Ameiva* on Hispaniola (Wetmore and Swales, 1931); the afore-mentioned specimen of *Aristelliger* on Grand Cayman; and specimens of *Anolis* on Mayaguana (my material).

For the most part, the occurrence of these herpetological remains is not surprising. Lizards of the genus *Aristelliger*, for example, often may be seen on Grand Cayman at night, crawling along the walls and roof edges of old buildings or on the trunks and larger branches of trees (pers. obs.). Anoles, on the other hand, are basically diurnal, but many characteristically sleep extended lengthwise, and exposed, on the surfaces of branches and leaves. The occurrence of a specimen of *Ameiva* is somewhat unexpected. This is a genus of diurnal, ground-dwelling lizards that are most active during the brightest and hottest part of the day. They characteristically seek shelter in underground burrows or under trash heaps toward late afternoon. One would not expect to find any "normal," healthy individuals of *Ameiva* exposed at night, when Barn Owls are usually feeding.

In the Hispaniolian remains, the abundance of *Hyla dominicensis* bones is particularly striking (Wetmore and Swales, 1931). Taking into account the relatively large size of this frog (greatest snout-vent length ca. 60 to 75 mm, fide Cochran, 1941) and its habit of resting exposed on rocks and vegetation at night, one can easily appreciate the potential of individuals of this species as prey items for Barn Owls. Furthermore, the loud frequent calls of this frog may possibly attract owls.

Interestingly enough, *Hyla vasta*, a tree frog nearly twice the size of *H. dominicensis*, also occurs throughout the areas from which came the Hispaniolan pellet samples; however, no bones attributable to *vasta* were present in any of the samples. This species, too, sits exposed at night and calls loudly. Also puzzling is the complete absence of frog remains in the skeletal samples

from Grand Cayman and the Bahamas, although *H. septentrionalis*, comparable to *H. dominicensis* in size and habits, occurs rather commonly on the Crooked-Acklins Bank in the Bahamas and on Grand Cayman (pers. obs.). Whether the absence of frogs other than *H. dominicensis* in the samples is an artifact of sampling or a reflection of some biologic factor is not known.

Invertebrates.—Johnston (1974) reported invertebrate remains along with vertebrate skeletal debris as indications of the food items of Barn Owls. Although I also found invertebrate remains in the form of crab and insect fragments in association with bone deposits, the reason for the presence of this arthropodan material is highly conjecturable, and I did not include such material in the analysis. I found no crustacean or insect fragments in any of the intact pellets.

SUMMARY

The Barn Owl appears to be a more opportunistic feeder in the southern Bahamas than on the North American continent. Although rodents are the predominant item of diet in both places, samples of food remains from the islands contain a higher proportion of non-rodent material, especially of birds, than do continental samples. These results probably reflect the lower abundance of rodents on islands.

Skulls representing new locality records for two species of birds (*Porzana carolina* and *Spindalis zena*) and two species of bats (*Lasiurus* sp. and *Artibeus jamaicensis*) are part of the skeletal debris collected at feeding sites of Barn Owls in the southern Bahamas.

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Manuel A. Plenge is now a Life Member of the Wilson Ornithological Society. Mr. Plenge is a member of several scientific organizations and has published papers on the birds of western South America. He lives with his wife and son in Lima, Peru and is employed by a mining company. His hobbies include field hockey, photography, hunting, and trout-fishing.