

ADDITIONAL NOTES ON SUBFOSSIL BIRD REMAINS FROM ASCENSION ISLAND

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The Centenary Expedition of the British Ornithologists' Union (Stonehouse 1960, 1962a) collected subfossil remains of birds from a number of localities on Ascension Island, South Atlantic Ocean, from 1957 to 1959. These were identified and discussed by Ashmole (1963). In 1970 and 1971 I visited several of the B.O.U. localities and some additional sites, collecting much new material. This has been deposited in the National Museum of Natural History, Smithsonian Institution (USNM). In preparing the present report I have also examined the specimens collected by the B.O.U. expedition.

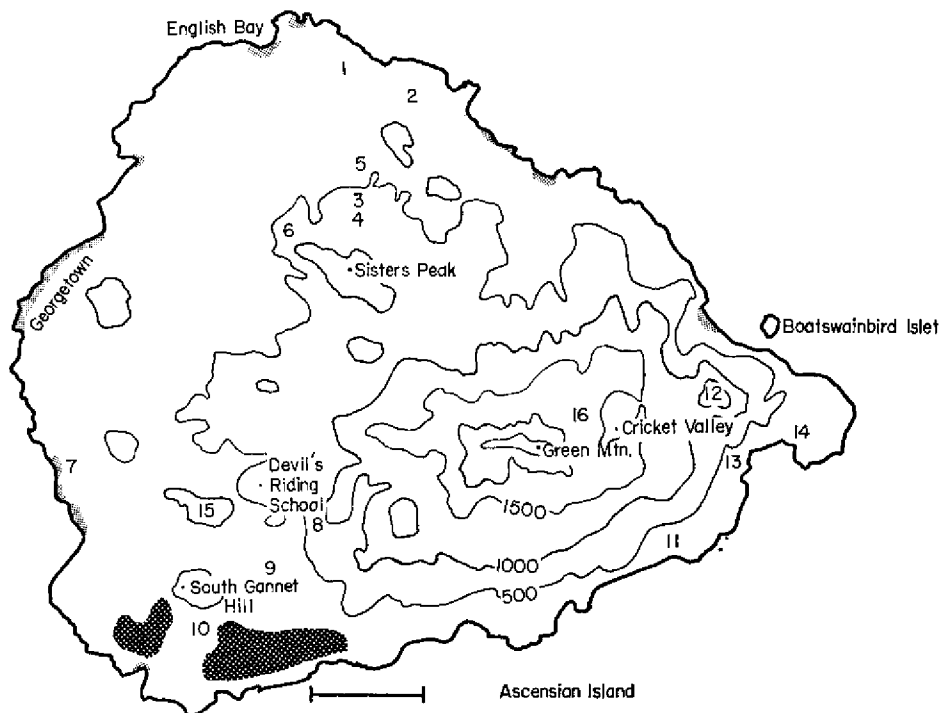


FIGURE 1. Subfossil collecting sites on Ascension Island. Numbers refer to localities mentioned in the text. Dark shading represents approximate location of present Sooty Tern colonies; light shading shows beaches. Contour intervals at 500 ft. Scale = 2000 yards.

Bird remains were found at the following localities (see Fig. 1). Most of these specimens are probably no more than a few hundred years old and are unmineralized. Those from Site 7, the lower layers of Site 4, and the various guano deposits, appear to be somewhat older.

1. Crevice in phosphate deposits near English Bay excavated by Ashmole (1963: 383).

2. Lava field 'rather further to the east' of Site 1, where bird remains were found by E. Duffey (Ashmole 1963: 384).
3. Large fumarole north of Sisters Peak, about 12 m deep, consisting of three interconnecting cave-like chambers (see Stonehouse 1960, Ashmole 1963, Olson 1973). No bones were found in the first chamber, the second contained chiefly sea-bird remains, and the third, with the exception of one skeleton of *Gygis*, contained only rails. The bones lay in crevices on bare rock.
4. Small fumarole north of Sisters Peak, a few metres south of Site 3. The many bones collected here were found mainly in a small pocket floored with about 60 cm of dust and cinders (Olson 1973). Bones from the deeper layers were stained dark brown while those at the surface were white.
5. Crevices in the rugged lava just north of Sites 3 and 4.
6. Phosphate deposits 'just to the west of the northwestern foothills of Sisters Peak,' excavated and described by Ashmole (1963: 383).
7. Lava tunnel extending about 15 m into the cliff behind the rubbish tip near Clark's Beach. This yielded a few fragments of a single procellariid. In contrast to bones from the other sites, these were encrusted with mineral and are probably of greater antiquity.
8. Lava tube about a mile northwest of Booby Hill at about 500 ft elevation, containing the bones of a single booby.
9. A line of several small, shallow fumaroles running to the northeast of Booby Hill, described by Daly (1925: 15).
10. Two sites in phosphate deposits south of South Gannet Hill from which Ashmole (1963: 384) collected bones.
11. Two sites in the phosphate deposits in the vicinity of Crystal Bay explored by Ashmole (1963: 384).
12. Slopes of White Hill, on which the B.O.U. expedition found three booby skulls (Ashmole 1963: 385).
13. Ledge at Crater Cliff.
14. Depression at Devil's Inkpot. Abundant recent remains of frigatebirds were discovered by D. Rogers at these two localities, the former of which I visited in 1970 (see account of *Fregata aquila*).

Two other localities that produced no bones are of interest in that they further exemplify the near absence of procellariiform birds on the island.

15. Large cave extending 30-35 m under the southeast side of Command Hill. Although seemingly a perfect place to find bones, I found none either at the surface nor in a large test pit dug in the deep sediments at the rear of the cave.
16. Deep ravine running from the eastern side of Cricket Valley to the vicinity of Northeast Cottage. Where this ravine divides, at about 1700 ft elevation, there are vertical rock walls with many small openings extending varying distances into the cliff. These would appear to be ideal as nesting sites for petrels, but such material as could be scraped from them with a hoe yielded no bones.

SPECIES ACCOUNTS

In the following accounts, the number of individuals for each species represents the minimum possible number for all sites combined.

Puffinus lherminieri. Site 7; 1 individual.

Audubon's Shearwater was previously known from Ascension from a single moulting individual examined and banded by the B.O.U. expedition on Boatswainbird Islet in March 1959 (Stonehouse 1960: 185). Site 7 contained a few mineral-encrusted fragments of this species, including the proximal part of a humerus and part of the rostrum, all probably from a single individual since

the fragments were found within a few centimetres of each other. Although this tropical species is extremely abundant in the most recent bone deposits on St Helena (Olson 1975), it seems never to have been well established on Ascension.

Oceanodroma castro. Sites 1, 2, 4, and 10; 4 individuals.

A small population of this storm-petrel, estimated at about 3000 birds (Allan 1962), still breeds on Boatswainbird Islet. The subfossil record indicates that the species was once more generally distributed over the main island. The paucity of specimens, as at St Helena (Olson, 1975), probably reflects the breeding habits of this species.

Phaethon aethereus. Sites 1, 9, and 11; 3 individuals.

The Red-billed Tropicbird nests mainly on Boatswainbird Islet but also on some of the steep cliffs of the main island (Stonehouse 1962b). Because both this species and the White-tailed Tropicbird *P. lepturus* are cliff-nesters, it is not surprising that their bones were only infrequently encountered. It does seem curious that no remains of *P. lepturus* were discovered, since this is the more abundant species at Ascension.

Fregata aquila. Sites 1, 2, 10 and 11 (5 individuals); sites 13 and 14 (many individuals).*

The Ascension Frigatebird is endemic to the island and is now known to breed only on Boatswainbird Islet, although early explorers recorded it as breeding in numbers on the main island (Stonehouse 1962a: 110). At Crater Cliff, a volcanic cone on the southeast corner of the island that has been breached by the sea, I found 20 or more frigatebirds sitting on narrow ledges on the vertical cliff face inside the crater on 4 July 1970, a concentration I interpret as a roost. The amount of droppings below these birds suggested that this area had been in use for some time. On a ledge on the northeast side of this same crater, D. S. Rogers showed me a great concentration of frigatebird remains, the bones of 20 to 25 individuals being scattered over a small area about 3 × 8 m. Some bones were still greasy, articulated by tendons, and had feathers attached, while others were much older and considerably weathered. Rogers has sent me a photograph, taken the following year, of a similar mass of frigatebird bones in a depression in nearby Devil's Inkpot. Such accumulations must be the result of cat predation.

Sula sula. Sites 3, 4, 8, 10 and 12; 16 individuals.

The three skulls from White Hill tentatively referred to this species by Ashmole (1963: 385) are indeed those of Red-footed Boobies, as they are smaller than those of *S. dactylatra* and differ from those of *S. leucogaster* in the shape of the basioccipital processes, among other characters. Pierce Brodkorb's collection contains bones of a single individual picked up on the main island by Archie Carr in 1969 and bones of six individuals, also from the main island, collected in 1972 by D. W. Johnston.

Although the subfossil remains indicate that the Red-footed Booby was once rather common, it is now very rare, if not altogether extirpated from Ascension. At the time Murphy (1936: 154) wrote, the testimony of Osbeck (1771) provided the only basis for listing *Sula sula* from Ascension, as the species had not been reported by any of the various collecting expeditions to the island. There is, however, a specimen in the USNM (18739) collected by W. H. Brown of the U.S. Eclipse Expedition in March 1890. This was prepared as a skeleton and appears to be the only recent specimen of *Sula sula* from Ascension.

* While this paper was in proof, Mr G. C. Guy forwarded to me some fairly well weathered bones of *F. aquila* collected by Mr Robin Hannay in a small cave on a lava flow west of Sisters Peak. Five individuals are represented, so there probably was a breeding colony at this site.

In June of 1946 Tomlinson (1947) observed 'thousands' of Red-footed Boobies roosting in the vicinity of White Hill and was told by residents that the birds appeared there annually. Ashmole (1963: 388) suggested that these were the remnants of the 'original Ascension population, long prevented from breeding on the island by the presence of cats'. It seems improbable to me that the species would have been able to persist in such numbers undetected until 1946. Perhaps these birds arrived at Ascension from Fernando de Noronha, possibly after having been displaced from the latter island by increased human activity during World War II. In 1957-59 the B.O.U. expedition found only about ten pairs of Red-footed Boobies on Boatswainbird Islet, one of which could be confirmed as breeding on a cliff ledge. Simmons (1968) saw single examples of at least two individuals on several occasions from 1962 to 1964. I failed to encounter the species on either of my visits in 1970 and 1971.

The apparent former abundance of this species at Ascension is not an indication that the island was once forested, as Murphy (1936) was inclined to believe, but rather that these birds do not always require trees for nesting sites, since there is no evidence that the island ever had other than an impoverished flora (Olson 1973: 10).

Sula leucogaster. Sites 10 and 11; 2 individuals.

The Brown Booby still breeds fairly commonly on the cliffs of Boatswainbird Islet and on a number of the small offshore stacks around the main island. Its cliff-nesting habits probably account for the scarcity of subfossil remains.

Sula dactylatra. Sites 1, 3, 4, 5, 6 and 9; 15 individuals.

The total surviving population of White Boobies at Ascension consists of about 9000 individuals (Dorward 1962), the breeding portion of which nests only on the top of Boatswainbird Islet. Stonehouse (1962a) documented the historical accounts of boobies nesting on the main island. These colonies evidently disappeared between 1840 and 1860. The number of bones of *Sula dactylatra* from the area north of Sisters Peak suggests that this species was probably one of the primary producers of the guano deposits on the northeastern part of the island.

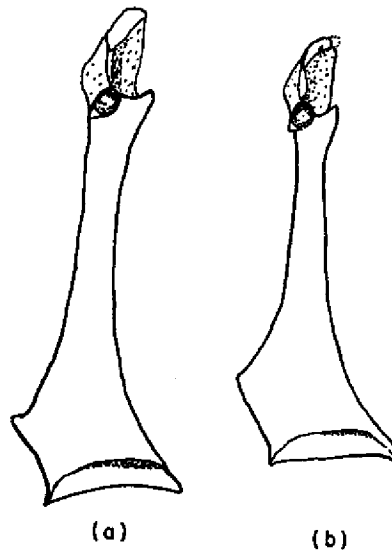


FIGURE 2. Size comparison of right coracoids of two night herons. (a) Smallest available individual of recent *Nycticorax n. nycticorax* (USNM 430527). (b) Sub-fossil *Nycticorax* sp. from Ascension Island (USNM 209515). Enlarged about 25%.

Nycticorax sp. Site 4; 1 individual.

One of the more surprising discoveries were the remains of a heron in the deeper layers of the dust pocket in the small fumarole north of Sisters Peak. Both coracoids as well as fragments of fibulae, tibia, humeri, and some vertebrae were recovered. These are very dark brown and, coming from the bottom layers, are evidently relatively old. On comparison of the coracoids, the slender shaft, the elevated position of the sterno-coracoidal process, the larger and deeper scapular facet, and the less distinct internal dorsal lip of the sternal facet clearly indicate that the bird is a night heron and is not any of the species of *Ardeola*, *Butorides*, or the *Egretta-Ardea* group. It agrees in general with *Nycticorax nycticorax* but is smaller than any of some 45 skeletons of that species I examined (Fig. 2). The length of the coracoid (measured with the sternal edge flat on the calipers) is 41.5 mm in the Ascension bird, while that of the smallest *N. nycticorax* measured was 47.6 mm (USNM 430527, from Rhodesia).

N. nycticorax is known to wander widely on occasion, having been recorded even on the remote island of New Amsterdam in the southern Indian Ocean (Segonzac 1972). An extinct population of night herons with reduced powers of flight, known as *Nycticorax megacephalus*, once inhabited the small island of Rodrigues in the Mascarenes (Günther & Newton 1879). Unless we regard the present specimen as being an extremely small vagrant individual of *N. nycticorax* that by some chance happened to be trapped in the fumarole, then we must entertain the equally extraordinary possibility that there once was an endemic population of night heron on the barren island of Ascension. I prefer to suspend judgment on the matter until more is known of the degree of size variation in African populations of *Nycticorax nycticorax*, although it seems unlikely that the very small size of the Ascension specimen could be duplicated by any modern example of that species.

Atlantisia elpenor. Sites 3, 4 and 10; 53 individuals.

Two bones of the endemic flightless rail of Ascension were recovered by the B.O.U. expedition and the extensive series I collected formed the basis for the original description of the species (Olson 1973). *Atlantisia elpenor* is most closely related to the larger extinct species *Atlantisia podarces* of St Helena. It was exterminated sometime after 1656, when living specimens were observed by the traveller and diarist Peter Mundy. Because there was little else in the way of food on the island to sustain a native land bird, I have suggested that *A. elpenor* subsisted as a scavenger in seabird colonies.

cf. *Porphyryla alleni*. Site 4; 1 individual.

In the small fumarole north of Sisters Peak I found the ends of a left femur of a rail larger than *Atlantisia elpenor*, *Gallinula angulata*, *G. melanops*, *Crex crex*, *Crecopis egregia*, *Amaurornis flavirostris*, *Aenigmatolimnas marginalis*, *Rallus aquaticus*, *R. caerulescens* or any of the species of *Porzana*. It is too small for *Gallinula chloropus* or *Porphyryla martinica* but is otherwise similar to the latter. It seems likely, therefore, that it represents *Porphyryla alleni*, which species has previously occurred as a vagrant on Ascension (Olson 1973). Unfortunately, no skeletons of *P. alleni* were available for comparison.

Gygis alba. Sites 1, 3, 4 and 10; 7 individuals.

The White or Fairy Tern breeds at Boatswainbird Islet and on the adjacent mainland cliffs as well as on cliffs and in trees on Green Mountain. The sub-fossil record indicates that it probably bred over a somewhat greater area of the island than it presently does. *Anous stolidus* and *A. tenuirostris* also breed at Ascension but, as at St Helena, are absent from bone deposits, no doubt because of their cliff-nesting habits.

Sterna fuscata. Sites 3, 4, 9 and 10; 152 individuals.

The Sooty Tern or Wideawake still nests in great numbers in the so-called 'fairs' in the southwestern corner of the main island. Stonehouse (1962a) has documented some of the earlier accounts showing that fairs were once located farther east and also northward to near the Devil's Riding School. The 1300 bones recovered from Site 4 alone indicate that a large breeding colony of this species must also have existed on the level plains at the base of Sisters Peak.

DISCUSSION

Most of the avian populations on the main island of Ascension were extirpated before and during the 1800's by introduced predators (Stonehouse 1962a). The principal retreat for the remaining species is small, steep Boatswainbird Islet, about 250 m off the eastern coast of the island (Fig. 1). Historical accounts of seabird colonies on the main island are summarized by Stonehouse (1962a).

The more extensive collections of subfossil remains reported here further confirm that the seabird fauna on Ascension before man's intervention was composed of the same species of tropical boobies, frigatebirds and terns as known from the island today. Perhaps the chief value of the present report is in emphasizing that further paleontological investigations on Ascension are unlikely to reveal the former presence of any previously undetected species of seabirds.

The dearth of Procellariiformes is evidently not an artifact of recent exterminations. Few species of the order are characteristic of truly tropical waters in any case. Those listed by Murphy (1936) as tropical forms are *Oceanodroma castro*, *Puffinus lherminieri*, and the *Pterodroma hasitata-phaeopygia* group. *O. castro* was, and is, present at Ascension in low but consequential numbers. The two known occurrences of *P. lherminieri*, both recent and fossil, hardly appear to be more than accidental and there is as yet no evidence of breeding. The genus *Pterodroma* is unknown at Ascension, perhaps in part due to the absence of soil for burrowing, a factor that may have affected *P. lherminieri* as well, but more likely due to the nature of the marine habitat.

The seabird fauna of the much older island of St Helena, 700 miles to the southeast of Ascension, changed during the Pleistocene from one mainly of subtropical Procellariiformes, to one including tropical frigatebirds, boobies, and terns, while several of the petrels became extinct or were greatly reduced in numbers (Olson 1975). This appears to have been the result of changes that took place in the marine environment surrounding the island. Nevertheless, before man's arrival there were great numbers of *Puffinus lherminieri* and lesser numbers of an endemic *Pterodroma* on St Helena. Evidently the terrestrial and marine conditions at Ascension would not permit either of these species to become established there. The island appears to have had throughout its geologically short existence a relatively stable, tropical marine environment and was inhabited by seabirds characteristic of this environment.

Ascension and St Helena constitute the only dry land in an area of 15 000 000 km² (Daly 1927: 31), so their former significance as breeding sites for seabirds can hardly be overestimated. In the five centuries since the discovery of these islands, man and his introduced predators have reduced seabird populations that must once have numbered in the tens of millions almost to non-existence (except for the Sooty Terns of Ascension). Thus the composition of seabird populations over a vast extent of ocean was probably dramatically affected by relatively minor alterations on two very small specks of land. The vulnerability and fragility of seabird populations have seldom been more forcefully demonstrated.

The subfossil record and recent observations show that there probably always has been a steady influx of potential land bird colonizers to Ascension. However, only the one species of rail is certainly known to have survived and adapted to the harsh conditions

existing on the island. If I am correct in assuming that *Atlantisia elpenor* was a scavenger in seabird colonies, then its existence, too, was dependent upon the sea.

ACKNOWLEDGMENTS

Appreciation for the many considerations that made my studies on Ascension possible has been expressed in my paper on South Atlantic rails (Olson 1973). In connection with the present paper I must express again my indebtedness to Mr Douglas S. Rogers who showed me many of the Ascension localities and aided in collecting specimens. For additional assistance in this regard I am also grateful to Messrs Jesse M. Couch, Dave Gallop, and John and Michael Hutchfield. Dr David W. Snow kindly lent me the B.O.U. material from the British Museum (Natural History) for examination, and I also consulted specimens in the collections of Dr Pierce Brodkorb, the National Museum of Natural History (USNM), and the American Museum of Natural History. To Mr John Farrand, Jr. and Dr Ralph W. Schreiber I am grateful for reading and commenting on a draft of the manuscript.

SUMMARY

More extensive collections of subfossil bird bones from Ascension Island in the South Atlantic further confirm that the former seabird populations of the main island were composed of tropical species still present in greatly reduced numbers, mostly on offshore islets. A single specimen of *Puffinus herminieri* provides the first fossil evidence of that species from the island. The extinct flightless rail *Atlantisia elpenor* was the only land bird certainly known to have been native. A femur, apparently from a vagrant individual, is referred to *Porphyryla alleni*. A specimen of *Nycticorax*, much smaller than any recent examples of *N. nycticorax* seen, is either from an unusually small vagrant or possibly indicates an undescribed endemic species.

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