A NEW SUBFOSSIL NIGHT HERON AND A NEW GENUS FOR THE EXTINCT RAIL FROM ASCENSION ISLAND, CENTRAL TROPICAL ATLANTIC OCEAN

W.R.P. BOURNE[1], N.P. ASHMOLE[2] & K.E.L. SIMMONS[3]†.

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Bird bones found in guano deposits and caves on Ascension include remains of six small night herons, described as a new endemic species *Nycticorax olsoni*. It is concluded that the similarities between the endemic flightless Ascension Rail *Atlantisia elpenor* and the genus *Atlantisia* are due to convergence, and it is placed in a new genus *Mundia*.

[1]Department of Zoology, Aberdeen University, Tillydrone Avenue, Aberdeen AB24 2TZ, UK; [2]Division of Biological Sciences, University of Edinburgh, Edinburgh EH9 3JT, UK; [3]†Died 25 February 2002.

INTRODUCTION

Ascension (Figs. 1, 2) is a recent volcanic island some 10 km in diameter lying at 07°57'S 14°22'W in the central tropical Atlantic Ocean 350 nautical miles south of the Equator. When discovered in 1501 it had a poor flora and terrestrial fauna, but many breeding seabirds presumably feeding along the equatorial current system (Bourne & Simmons 2001). The birds' destruction may have begun when Black Rats *Rattus rattus* escaped when William Dampier's ship the Roebuck was wrecked in 1701 (Osbeck 1771; Ashmole & Ashmole 2000). It was accelerated by Cats *Felis catus* introduced to control the rats when the island was settled in 1815 (Packer 1968; Ashmole *et al.* 1994). The BOU Centenary Expedition to Ascension of 1957-59 (Stonehouse 1960; Moreau 1962-63) found that the seabirds were by then mainly confined to outlying stacks and cliffs, apart from a vast colony or 'fair' of Wideawakes or Sooty Terns *Sterna fuscata* in the south of the main island. Ashmole (1963) found guano and bird bones still widespread, however, including two bones of an extinct flightless rail seen alive by Peter Mundy in 1656 (Temple & Anstey 1936). In 1970-71 Olson (1973, 1977) found more bones, including some of the rail, which he named *Atlantisia elpenor*, and a small night heron *Nycticorax* sp. During recent visits Simmons, John Hughes, the Ashmoles and John Walmsley have

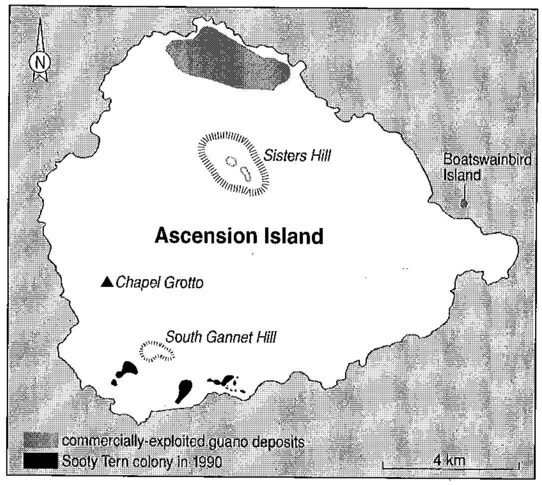


Fig. 1. Ascension Island, showing commercially-exploited guano deposits in the north and on Boatswainbird Island, Sooty Tern colonies in 1990 in the south, and the location of remains of Ascension Rail and Night Heron at the Sisters, Chapel Grotto, and for the Rail South Gannet Hill.

Fig. 2. Northern Ascension Island, showing old guano.

collected further bones. This note deals with the terrestrial species. Sites where bones have been found are shown in Fig. 1, and the records are summarised in Bourne *et al.* (in press).

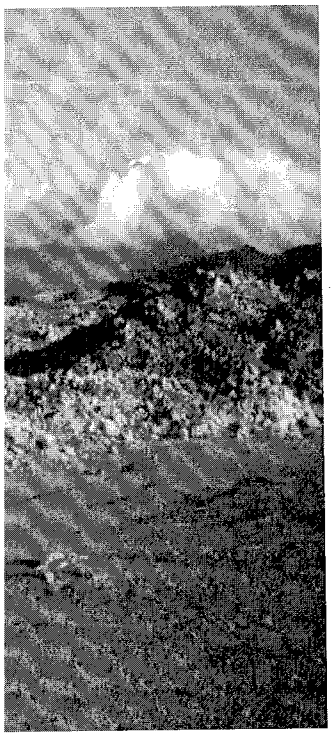
THE ASCENSION NIGHT HERON *NYCTICORAX OLSONI*, NEW SPECIES

After finding the first night heron bones, Olson (1977) commented 'unless we regard the present specimen as being an extremely small vagrant individual of *Nycticorax nycticorax* that by some chance happened to be trapped in the (spatter cone), then we must entertain the equally extraordinary possibility that there was once an endemic population of night heron on the barren island of Ascension'. With the discovery of similar bones of several small individuals, including an immature bird, in a different part of the island, clearly the latter must be correct. While it seems debatable if the Ascension population deserves full specific status, this course has been followed with its allies in the Mascarene Islands, and it now seems time to name this new form: *Nycticorax olsoni* new species.

ETYMOLOGY: Named after Storrs L. Olson, who discovered the first remains, because the holotype was collected on his birthday and as a tribute to his major contribution to avian palaeontology and knowledge of the lost birds of islands.

HOLOTYPE: Well preserved complete right femur, probably a few hundred years old, from specimen 0716, Natural History Museum registered number (NHMRN) S/1999.1.1, collected by N.P. Ashmole on the lava floor just beyond the main chamber of Chapel Grotto, Ascension, South Atlantic, on 3 April 1990. Length 62.5, width shaft 4.0, width distal end 9.5 mm.

PARATYPES: Broken complete left femur and parts of pelvis, tibiotarsus, 2 scapulae, humerus



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and 2 carpometacarpi collected with the holotype, and fragmentary bones of four other individuals, NHMRN S/1999.1.10 (two, one immature), NHMRN S/1999.1.13 and NHMRN S/1999.1.16 collected in this cave in 1995 (Table 1, Fig. 3). Also 2 coracoids (one, USNM 209519, figured by Olson 1977), and fragments of fibulae, tibia, humeri and some vertebrae in the U.S. National Museum collected by S.L. Olson some 5 km to the NE in the smaller spatter cone north of Sisters Peak in 1970-71.

DESCRIPTION: The fragments of bone available (originally including the distinctive metacarpi) agree with the Black-crowned Night Heron *N. nycticorax*, but where measurable, including the coracoid of the first specimen (Olson 1977) and the femur of the second (Fig. 3), are 10-20% smaller than the mean for that species (Table 1). While the wing is small, the fragment of sacrum is large and solid and the distal metatarsi broad so the bird may have had reduced powers of flight and strong lower limbs adapted for terrestrial habits.

RANGE: Ascension Island, South Atlantic Ocean.

STATUS: It is unexpected to find a night heron, an often nocturnal inhabitant of wet places, on an arid oceanic island. But formerly there were also large endemic derivatives of *N. nycticorax* on each of the three main Mascarene islands (Mourer-Chauviré *et al.* 1999), and it has also colonised the Falkland and Hawaiian and recently the Seychelles Islands. Brown *et al.* (1982) report that *N. nycticorax* is a strong migrant with a broad diet, and like other herons it migrates in flocks (Bourne, personal observation). Fifteen occurred on Hierro in the Canaries in April 1986 (Nogales *et al.* 1987), one on St Helena in April 1908 (Benson 1950), and it has also reached Fernando de Noronha (Nacinovic & Teixeira 1989). Presumably a party once colonised Ascension, still visited by other herons (and also rails; Bourne & Simmons 1998). It may have been exterminated, probably by introduced rats or cats, within the last 500 years. An endemic derivative of the even more highly aquatic Purple Heron, *Ardea* (*purpurea*) *bournei*, also occurs in the arid Cape Verde Islands (Naurois 1988).

Table 1. Mean ± SD and range (mm) of nine Black-crowned Night-heron *Nycticorax nycticorax* skeletons compared with measurements (mm) and size in percent of bones of the most complete Ascension Night-heron *Nycticorax olsoni*. Source of the material of *Nycticorax nycticorax*: Tring (7), Cambridge (2), at least three from Europe, including the smallest, a female, one of the largest a male from Mexico, the rest captives of uncertain origin. W- width, L- length, P- proximal end, S- shaft, D- distal end, Phalanx- first phalanx of second digit.

Measurement	*Nycticorax nycticorax (n = 9)*		*Nycticorax olsoni* S/1999.1	% of *N. nycticorax*
	mean ± SD	range		
WS humerus	5.9 ± 0.8	5.2 - 6.5	4.8	81%
WD humerus	17.0 ± 7.5	13.6 - 21.0	12.7	75%
L phalanx	20.4 ± 1.5	18.3 - 22.8	14.9	73%
L femur	71.5 ± 4.8	67.6 - 81.4	62.5	87%
WS femur	5.0 ± 0.3	4.5 - 5.4	4.1	82%
WD femur	11.9 ± 1.2	10.1 - 14.2	9.5	80%
WP tibiotarsus	9.2 ± 2.2	8.0 - 10.2	7.5	82%
WS tibiotarsus	4.6 ± 0.2	4.2 - 4.9	3.8	83%
WS tarsometat.	3.8 ± 0.2	3.4 - 4.0	3.7	97%

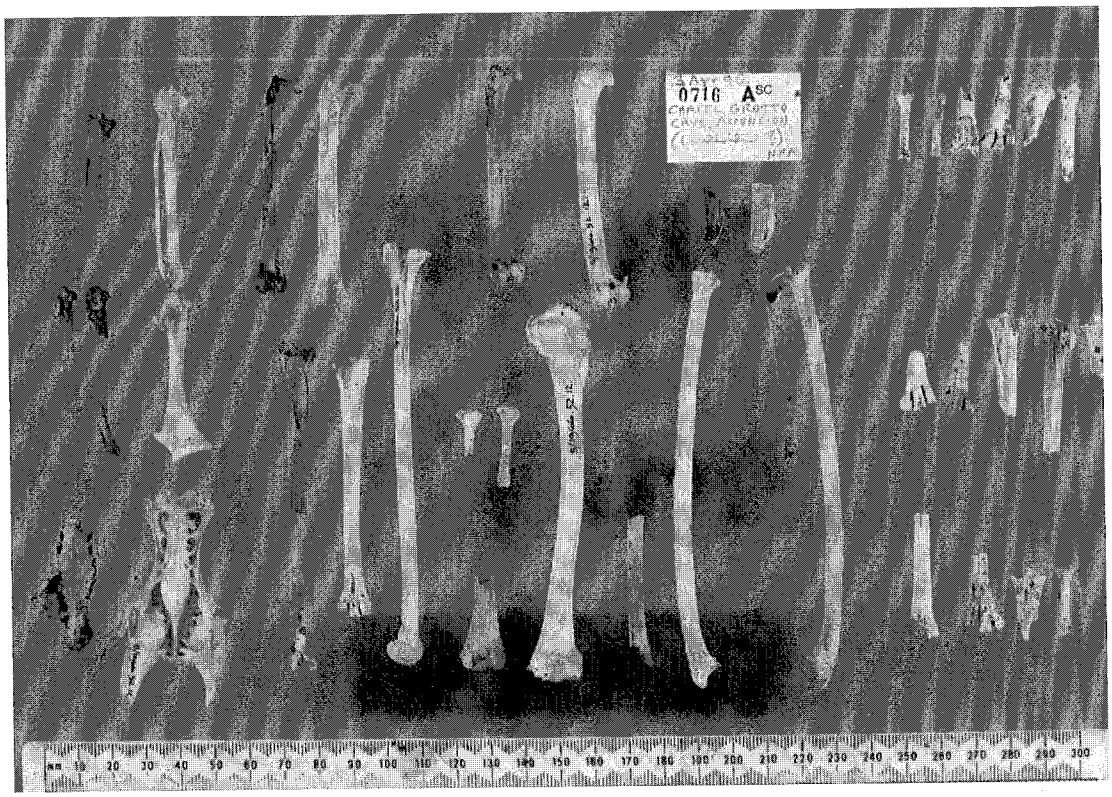
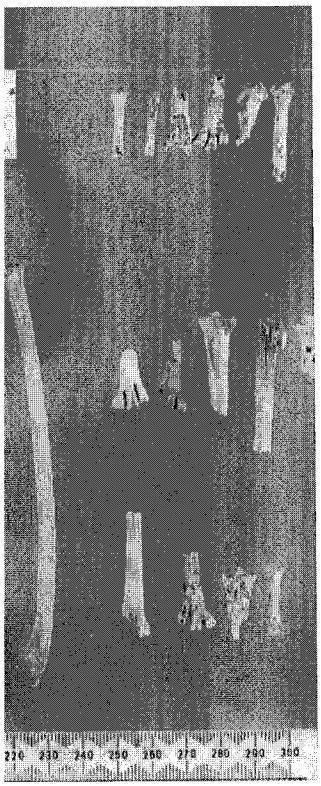


Fig. 3. Bones of *Nycticorax olsoni* from Chapel Grotto, Ascension. Main series, Natural History Museum specimen S/1999.1.1 on left compared with *N. nycticorax* on right. Series S/1999.1.10, 13 & 16 down right hand margin.

CLASSIFICATION OF THE ASCENSION RAIL

Rails have commonly colonised, and often become flightless on, oceanic islands, where they fill the ecological niche occupied on the mainland by small mammals. They are very vulnerable to introduced predators, and Steadman (1995) estimates that 2000 species may have been lost from the Pacific islands since the arrival of man, where only four are known to survive. The first rails of the South Atlantic oceanic islands to attract attention were the similar large, dark, sluggish, flightless moorhens *Gallinula nesiotis* and *G. comeri* of Tristan da Cunha and Gough Islands, originally placed in a distinct genus *Porphyriornis*, but treated by Beintema (1972) as races of a single species *Gallinula nesiotis*. Olson (1973) then argued that the two forms 'have evolved in parallel from separate colonisations of flying *G. chloropus* and are phylogenetically more closely related to that species than to each other'. Although 'what we see is two forms on separate islands that have evolved features different from the parent stock but that are essentially identical to each other' they should either be considered as well-defined flightless subspecies of *G. chloropus*, or (in the case of behavioural reproductive isolation between them) as separate species.

Olson then went on to consider three other flightless rails of much more uncertain affinities on three other much more widely separated islands of different character, tiny *Atlantisia rogersi* of Inaccessible Island in the Tristan



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group, large *Aphanocrex podarces* of St. Helena, and intermediate '*Atlantisia*' *elpenor* of Ascension. The differences between them are clearly sufficient to merit their treatment as separate species, and it is the generic treatment that is debatable. Olson observed that 'there is no reason to believe that the ancestors of (these birds) did not arrive at their islands as windblown strays from continental areas, just as other species of rails still do'. This implies that all three species must, as in the case of the island forms of *Gallinula* discussed above, be more closely related to their (unknown) continental ancestor(s) than each other. Yet Olson then grouped the three species as the only members of a single genus *Atlantisia* on morphological grounds, despite their presumably independent origins and large difference in size. Such treatment is in direct opposition to that used by Olson in the case of the members of the genus *Gallinula* discussed above, and is clearly inappropriate in the context of modern cladistics, in which taxonomic treatment is based on the formal recognition of monophyletic clades (a clade being defined as the entire part of a phylogeny that is descended from a single ancestral species).

Ashmole (1963), in the first modern discussion of the Ascension Rail, suggested that it should be placed provisionally in the broad genus *Rallus*. Olson (1973), in implicit agreement with the thinking behind this treatment, commented that 'examination of the osteology of *Atlantisia* [comprising all three forms] reveals that this genus is related to the *Rallus* assemblage'. We agree with Olson that the ancestors of these three flightless rails must have reached these recent volcanic oceanic islands by flying, and they are unlikely to have colonised one from an other. Given these independent origins, their similar adaptations for terrestrial (non flying) life were presumably developed through convergence, as in the Tristan-Gough gallinules. This conclusion is tentatively supported by the analysis by Livesey (1998), who found little evidence (pending molecular investigation) for any close relationship between them. In this context it seems appropriate to abandon the broad use of *Atlantisia* proposed by Olson (1973), and adopt a separate genus for the Ascension rail, putting it on a par with *Aphanocrex* of St. Helena and *Atlantisia* (*sensu stricto*) of Inaccessible Island. We therefore propose a new generic name for the Ascension Rail.

MUNDIA NEW GENUS

ETYMOLOGY: Named after Peter Mundy, the only man to record it alive, on 7 June 1656 (in Temple & Anstey 1936).

CHARACTERS: Similar in general form to *Atlantisia* and *Aphanocrex*, but intermediate in size. Reported by Olson (1973) to differ from *Atlantisia* in having larger jaw muscle attachments, a lacrimal bone with a broad square head with a deep depression on the medial surface, well-developed area of attachment to the nasal bone, short descending and long, strong and tapering horizontal processes, a wider shaft of the coracoid, a sternum with an even more reduced keel but better-developed sterno-coracoidal processes and a notch in the caudal margin, a humerus with a more pronounced bicipital crest but less prominent epicondylar tuberosities, an ulna with a more prominent external condyle with a proximal depression, a flared posterior iliac crest, a more curved shaft of the femur, and a narrower shaft of the tibia. It differs from *Aphanocrex* in having a less domed cranium, slighter jaw muscle attachments, a slighter coracoid with a less bent shaft and deeper scapular facet, a small head to the humerus with reduced epicondilar prominences, a slighter ulna, a narrower shaft of the tibia and slighter fibula with a shorter crest, a less flared internal trochlea of the tarsometatarsus, and shorter toes and claws.

TYPE: *Atlantisia elpenor* Olson (1973).

DISCUSSION

The guano and remains found on Ascension demonstrate that seabirds must once have bred widely on the main island. It remains debatable

how many more birds there were then than breed on the outlying islets now. The discovery of the bones of a night heron and flightless rail, from wet habitats on the mainland, more than 2.5 km from the coast in a barren cinder desert once used by many breeding seabirds, is remarkable. While the heron could have fed along the shore, and the rail in the herbage on Green Mountain inland, it seems likely that like the introduced Common Mynahs *Acridotheres tristis* which have now replaced them (Hughes 2002) both once also frequented the seabird colonies, eating the associated invertebrates, spilt food, eggs, chicks, and carrion. In the absence of native predators, water or tall vegetation they may also have nested on the open ground, so that their eggs and young would have been very vulnerable to introduced predators. The affinities of the night-heron seem obvious, and those of the rail present the main problem. A particular difficulty is caused by the similarities with other insular species which may have arisen either because they are related to each other, or through convergence in form and behaviour owing to the adoption of a similar flightless way of life. There is no evidence that these very remote islands were ever joined to each other or the mainland, so the birds presumably arrived there by flying. If so, if *Atlantisia rogersi* is now distinct enough to merit generic separation from all other rails, this must apply equally to all of them. Similar considerations may apply to a variety of other palaeontological material.

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SAMENVATTING

Op Ascension, een jong vulkanisch eilandje in het centrale deel van de Atlantische Oceaan, werden in guanopakketten en in grotten de botresten gevonden van een kwakkensoort die 10-20% kleiner was dan de Kwak *Nycticorax nycticorax*. De kleine vleugel, het grote en stevige sacrum en de brede distale metatarsus wijzen op een gereduceerd vliegvermogen en een overwegend bodembestaan en rechtvaardigen de status van aparte soort: Ascension Kwak *N. olsoni*. Deze endemische kwakkensoort is vermoedelijk in de afgelopen 500 jaar uitgestorven na de introductie van ratten en katten. Voor de niet-vliegende endemische ral, de Ascension Ral *Atlantisia elpenor*, alleen door Peter Mundy levend gezien in 1656, wordt voorgesteld deze in een apart genus te plaatsen, *Mundia* genaamd. Deze inmiddels uitgestorven rallensoort is intermediair aan *Atlantisia* (voorkomend op Inaccessible Island) en *Aphanocrex* (St. Helena). De overeenkomsten tussen deze rallen worden toegeschreven aan convergente evolutie.

(RGB)

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