

## New evidence on the life and death of Hawkins' rail (*Diaphorapteryx hawkinsi*): Moriori accounts recorded by Sigvard Dannefaerd and Alexander Shand

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**Abstract** A previously unknown Moriori-based account of the extinct Hawkins' rail (*Diaphorapteryx hawkinsi*) from the Chatham Islands is presented and discussed. The account, recorded by Sigvard Jacob Dannefaerd in a letter to Lord Lionel Walter Rothschild in 1895, includes details of the species' appearance, behaviour and Moriori hunting methods. A second, similar description of a previously unidentified Chatham Island bird is also linked to Hawkins' rail. The clarity of the accounts suggests a considerably later extinction date for the species than previously supposed.

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### INTRODUCTION

The Chatham Islands, 800 km east of New Zealand, are renowned in avian palaeontology for their vast assemblages of fossil bird bones, from which the remains of almost 100 species have been recovered (Millener 1999). These deposits were first drawn to the attention of science in 1892, when Henry Ogg Forbes received some unusual fossil bones from the Chatham Islands from William Hawkins (Forbes 1893). Forbes recognised a skull as specimens of a previously unknown extinct giant species of flightless rail, which he named *Aphanapteryx* (later *Diaphorapteryx*) *hawkinsi* (Forbes 1892a, b). Enthused by the discovery, Forbes made his own short visit to the islands in the same year, and returned with a wider selection of both fossil birds and recent specimens (e.g., Forbes 1893). However, he was not the only, nor the most avid, collector interested in the avifauna of the Chatham Islands.

The most extensive early collection of the Chatham Islands' birds, extinct and extant, was assembled by Lionel Walter, 2nd Baron Rothschild (1868-1937), at his private zoological museum in Tring, Hertfordshire, England. Rothschild initially

sent his collector Henry Palmer to the islands in 1890, and published his first species description, based on the resulting specimens, in 1891 – beating Forbes by several months (Rothschild 1891; Forbes 1892c). However, Palmer was soon dispatched to Hawai'i (Rothschild 1983), and Rothschild employed the New Zealand-based Danish collector Sigvard Jacob Dannefaerd (1853-1920) to continue collecting for him in the Chatham Islands. Unlike Palmer, Dannefaerd was also responsible for excavating fossil birds in addition to collecting recent specimens, and from 1894 to 1895 he sent "many hundreds of thousands" of bones to Rothschild, including "several thousand" Hawkins' rail bones (Rothschild Correspondence TM1, the Natural History Museum Archives; Rothschild 1907). These fossil collections are now held in the Departments of Zoology and Palaeontology of the Natural History Museum, London (NHM), whilst the recent specimens are to be found in the Department of Zoology, NHM, and the American Museum of Natural History, New York (AMNH).

Remains of Hawkins' rail are now known from both main Chatham Island and Pitt Island, and are frequently associated with middens of the islands' initial Polynesian inhabitants, the Moriori (Millener 1999; Tennyson 2004). From its skeletal remains,

the species can be reconstructed as having stood approximately 40 cm tall, with an estimated weight of about 2 kg (Atkinson & Millener 1991; Millener 1999). It had greatly reduced wings and robust legs with elongate toes, but its most striking feature was a long, decurved bill, which has been interpreted as an adaptation for probing into the earth in search of invertebrates (Millener 1999). Andrews (1896) suggested that its long, powerful legs were "well adapted for running" and that its stout tarsometatarsus was an adaptation for "scratching in the earth". It is generally regarded as having had an ecological niche as a ground-dwelling insectivore, similar to weka (*Gallirallus australis*) of New Zealand (Atkinson & Millener 1991; Millener 1999). Hawkins' rail was never recorded alive by European observers (from 1791; King 2000), and by the abundance of its remains in Moriori middens, its extinction is generally ascribed to the Polynesian settlement period. Millener (1999) suggests a date of between 450 to 300 years ago for the majority of the pre-European era extinctions, including Hawkins' rail.

## MATERIAL

### The Dannefaerd account

Dannefaerd's involvement in Rothschild's collections has largely gone unacknowledged, though Rothschild himself credited Dannefaerd's efforts in print and also named a species after him: Snares Island tomtit (*Miro dannefaerdi*) (now *Petroica macrocephala dannefaerdi*) (Rothschild 1894; see also Rothschild 1907, p.133). During recent investigations into Rothschild's collections of Chatham fossils, letters from Dannefaerd to his employer were re-discovered in the archives of the NHM, amongst the extensive Rothschild Correspondence. The letters effectively constitute progress reports from the collector, with notes on certain species, or specimens, details of the great efforts expended in acquiring material, and requests for further funding.

Of particular interest is a letter dated 21 February 1895 (NHM archives, ref. TM 1/12/9) written from Ponsonby, Auckland, which is accompanied by two pages entitled "Notes on Colection (sic) of Fossils". This letter records information gleaned by Dannefaerd from the "oldest Moriori Chief on the Island" on several of the extinct species, especially the Hawkins' rail. The information concerning this is unparalleled because no previous accounts of clearly identified live Hawkins' rails were known.

An uncorrected transcription of the information on the extinct birds in Dannefaerd's letter is given below. It should be noted that Dannefaerd's grammar and handwriting are extremely idiosyncratic; this can be very helpful in identifying his handiwork.

### "Notes on Colection of Fossils

- 1 Ralus Dieffenback W Buller has in his work as Native Name "Moeriki" but that is Wrong, I made all the Enquiri I could and the Moriori Name for R. Dieffenback is Mehoriki (riki) mens small)
- 2 The Large Rail that Hutton Forbes Clased as Aphenapteryx the Moriori Name for same is "Mehonui" (nui mens Large)  
I hunted ap the oldest Moriori Chief on the Island and ther tradition of the Bird is, it ware Larger than a Goase and had a verry loud Cry like Tue-ck  
it alwas walked with the Head down pecking in decaed wood on the Ground, the would often catch them by walking stret ap to them from the front of them, but they could not cam over them from the side, and the yused to Sleep together in Colonies and the Morioris yused to find out ware a Colony had ther Sleeping plase, then sneek quietly ap and make a rush and Kill the hole Colony  
The described them as of a Dull Brick Red Colour  
SD
- 3 The Coote the Moriori do not seeme to remember or have any traditions about only the had some memory of some large White & Black Bird ther should have been long agoe (centuries), Ther is a tradition of a Large Bird as tall as a man the called Poua as I did not find a single Bone to that descriptions I wanted to argue that the must have bin mis in formed but the seems to be firm in this tradition about the Poua, the do not semes to know any thing about the Crow"

### The Shand account

Alexander Shand was regarded as an authority on the history and traditions of the Moriori people, about which he wrote several accounts (King 2002). His references to the Mehonui, included in a section of his writings about Moriori food (Shand 1911), are reproduced below.

"For variety they had Fernroot (*Eruhe*) and Karaka nuts (of which latter, in good seasons, they preserved very large quantities); together with birds of the forest, such as the wood pigeon (*Pare* or *Parea*), *Koko* (Maori, Tui), *Komako* (Maori, Makomako), *Mehonui*, a species of the New Zealand Kakapo (*Stringops habroptilis*), larger than a goose, and the *Mehoriki*, a bird about the size of a small hen. Both the latter are extinct; they were wingless birds. There were also several varieties of duck (*Perer'*), which were snared in pools or ponds, or driven ashore in the moulting season (*Perer' mounu*). They were driven from

the lagoons into the rushes and coarse growth of the “clears,” or open land, where large numbers were caught. They also had the *Pākura* (*Porphyrio melanotis*). The *Mehonui* was usually captured on its sleeping place or nest, where several – six or eight – might be found huddled together, as the Morioris declare, like pigs in a bed. Having by observation, found its sleeping place on the “clears,” the Morioris made long tracks leading up to it, carefully removing any sticks or obstructions which might alarm the bird by cracking, and then, by making a stealthy rush, they pounced on and secured all in the nest or sleeping place. This bird had a powerful strident call, which could be heard at great distances. Its neck was said to be about as long as a man’s arm. The *Mehonui* was peculiar in this, that if any one approached it in front it did not see him, and, approached thus quietly, was caught by the neck and strangled. It kept its head continually on the ground looking for food, chiefly fernroot, which it burrowed for and dug out with its powerful bill, making, it is said, a rooting like a pig; any one, however, coming from the side or behind was quickly detected, and the bird made off. Its colour was a reddish brown, something like the New Zealand Kaka.”

## DISCUSSION

Dannefaerd’s previously unknown description of Hawkins’ rail reveals information on the bird’s physical description, behaviour, relationship with humans and the timing of its extinction. Dannefaerd’s account also seems to demonstrate that previously published observations of the “extinct” *Mehonui*, recorded by Shand (1911), refer to Hawkins’ rail. The conclusion that the name *Mehonui* referred to Hawkins’ rail was suggested tentatively by White (1897) and adopted by Jefferson (1955). However, Shand’s account appears to confuse more than one species of bird (White 1897), by his suggestion that the *Mehonui* is a large parrot, specifically a kakapo (*Strigops habroptilus*). The remainder of his description compares extremely closely to Dannefaerd’s, who explicitly names Forbes’ “*Aphanapteryx*” as his subject, i.e. Hawkins’ rail. Although an extinct species of large parrot (a kaka, *Nestor* sp.) is known from fossil bones on the Chatham Islands (Millener 1999), Shand’s account of the *Mehonui* seems to be primarily based on a ground-dwelling “wingless” species, which fits closely with the expected behaviour of a flightless rail. The kakapo is not considered to have ever been part of the Chatham Islands’ fauna (Millener 1999). If Shand’s account is accepted as primarily referring to Hawkins’ rail also, then in combination

with Dannefaerd’s account, a considerable amount of new information about the species is revealed.

Dannefaerd’s informant was probably Hirawanu Tapu (1824–1900), a Moriori elder who became the leading source on Moriori ways (King 2000). Certainly, Forbes is known to have spoken with him regarding the recollections of Tapu’s father (when Tapu was a “young fellow”) of the giant bird known as the Poua (Forbes 1893) (probably in fact the swan (*Cygnus atratus*), White 1897), though some have dismissed Tapu’s descriptions of great bones in the lake as his teasing researchers (King 2000). Tapu was also closely involved with Shand’s research on the Moriori, and the striking similarities between Dannefaerd’s and Shand’s reports strongly suggest a common origin.

The appearance of the *Mehonui* is mentioned only briefly by Dannefaerd and Shand, but the dull, brick-red plumage colour, described by Dannefaerd, is reminiscent of its presumed relative and closest ecological equivalent on mainland New Zealand – weka. Similarly, Shand’s account notes its “reddish brown” colour, but, continuing his parrot-based interpretation, he compares it to the plumage of a kaka. The size of the species is also commented on by both authors, but in somewhat exaggerated terms. However, their comparison to the size of a goose is perhaps not unreasonable; Hawkins’ rail was the largest terrestrial species in the Chatham Islands’ avifauna and, at 2 kg, falls in size between weka and South Island takahe (*Porphyrio hochstetteri*) (Marchant & Higgins 1993). It was a substantial-sized bird, for which a “goose” provides a ready frame of reference. Shand’s account is less clear, particularly his mention of a neck “about as long as a man’s arm”. In this instance, it seems more likely that Shand is referring to the swan (White 1897), an impression strengthened by Dannefaerd’s similar use of human size as a comparison for the Poua, i.e. the swan.

Shand’s (1911) account of the call of the *Mehonui* complements that of Dannefaerd, for although he does not describe the sound made, he does emphasize its great strength. Comparison with the calls of weka and other rails (Marchant & Higgins 1993) suggests that the “Tue-ck” call described by Dannefaerd may have been the contact call of Hawkins’ rails.

The inferred ecological niche of Hawkins’ rail is confirmed with both authors’ descriptions of its feeding behaviour. Pecking into decayed wood, as described by Dannefaerd, is a common feeding tactic of a number of New Zealand bird species seeking invertebrates, including weka (Marchant & Higgins 1993). Shand’s account gives further information on its feeding habits, and suggests fern root as an important food. Both accounts indicate that the bill of Hawkins’ rail possessed considerable

strength, and that, in addition to vegetation, it would have been well capable of tackling a wide range of prey species, including small ground nesting birds such as the abundant petrel species. Its apparent propensity for digging suggests that petrel chicks in burrows would have been vulnerable to its predation.

Dannefaerd and Shand have also recorded a hint of the social organisation of Hawkins' rail. Based on comparison with the habits of other New Zealand rails, including weka, South Island takahe and banded rail (*Gallirallus philippensis*), Dannefaerd's mention of "Colonies" is most likely to refer to family groups during the breeding season. In weka, such groups would typically include five or six individuals (Marchant & Higgins 1993). This ties in very well with Shand's account of the groups being made up of six or eight individuals.

The presence of Hawkins' rail in Moriori middens has long been admitted as evidence that it was hunted by humans for food (Forbes 1893; Millener 1999). However, details of the hunting methods were, until now, unknown. Dannefaerd's and Shand's accounts provide clear and detailed descriptions of hunting of Hawkins' rail by Moriori, differing somewhat in the amount of information provided, but both emphasizing the attacks on roosting groups - the so-called "Colonies".

Neither account gives any indication of how common Hawkins' rail was, nor how frequently such hunts were carried out, but accepting that "Colonies" were family groups, then these are graphic depictions of a hunting strategy - the deliberate targeting of both adults and juveniles - that would have had the maximum possible impact on the bird's population.

Live Hawkins' rails were not recorded after the arrival of Europeans in the early 1800s (Millener 1999) and, therefore, the species is presumed to have gone extinct during the preceding 200-450 years of Polynesian occupation (McFadgen 1994; Holdaway 1999). Livezey (2003, p.25) suggests an extinction date for the species of late 16th or early 17th centuries; however, our interpretation of the accounts presented here suggests that it may have survived until even more recently. The fact that detailed descriptions of live Hawkins' rails were recalled in the late 1800s suggests that the species survived well after initial Polynesian settlement, despite the documented human hunting. As the largest terrestrial bird in the Chatham Islands, it might be expected to have been an early extinction casualty (Duncan *et al.* 2002). However, despite three species of flightless rail being exterminated on mainland New Zealand in pre-European times (Holdaway *et al.* 2001), it is significant that two of the largest flightless species (weka, South Island takahe) survive there to this day, albeit in

drastically reduced numbers, and that two other flightless rails survived on the Chatham Islands until the 19th century (Marchant & Higgins 1993, BirdLife International 2000). Furthermore, the weka has been introduced to the Chatham Islands and, despite 5,000 being hunted by people for food each year, it survives in large numbers (BirdLife International 2000). Notwithstanding numbers of Hawkins' rail presumably being depleted by Moriori hunting, it is possible that the rail even survived into the early European era. It may have finally succumbed to on-going human hunting, or the first mammalian predators (cats, dogs, Norway rats and pigs) introduced by European settlers prior to the first systematic documentation of the native Chatham Islands' fauna in 1840 (Dieffenbach 1841; King 2000).

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