

ON EVIDENCE FOR THE SURVIVAL OF MOA IN EUROPEAN FIORDLAND

Summary: It is widely thought that some small "bush" moa (*Dinornithiformes*) survived in Fiordland, New Zealand, into the European era. Possible sightings, especially that by Alice McKenzie, and archaeological evidence, particularly from the Takaha Valley rockshelter site, are discussed. They are insufficient to sustain the belief that moa survived until the eighteenth century or later.

Keywords: Moa, *Megalapteryx didinus*, takahe, Takaha Valley, archaeology, McKenzie sighting.

Introduction

There is an enduring belief that moa (*Dinornithiformes*) survived into the European era (A.D. 1769 and later). This has depended largely upon evidence which seemed to show that the so-called "bush" moa, usually specified as *Megalapteryx didinus*, survived in Fiordland until after A.D. 1770 (Skinner in Duff, 1956; Hall-Jones, 1976; Anderson, 1983), and perhaps until the early decades of the nineteenth century (Falla, 1962; 1974), or even later (Anon, 1971; Lockley, 1970). Even those who had some doubts about the evidence still thought moa had survived until the seventeenth century in Fiordland (Duff, 1956). My purpose here is to argue that direct observations and archaeological discoveries do not sustain such conclusions. I leave aside Maori traditions because of difficulties over chronology and interpretation, and also various early European observations of birds known as the "fireman" and the "emu" (e.g. Boulton, 1826 in Begg and Begg, 1979). The latter have been the subject of some speculation in connection with moa (e.g. Richards, 1986), but both were clearly identified by early observers as kiwi (Monro, 1845; Gould, 1849; undated letter from Lyon to Beattie, etc.).

Moa Sightings

Claims of moa sightings in Fiordland are typical of those from other regions in combining patent mistakes, probable hoaxes, and some reports which demand serious attention. Thomson (1859) refers to a moa caught by sealers in 1850 but it is clear from the context that he actually meant a takahe (*Notornis mantelli*) and was probably referring to the one captured in Dusky Sound in 1849. Sir George Grey was said by Buller (1888) to have described a visit to

Preservation Inlet in 1868 where he "... saw a party of natives... who gave him a circumstantial account of the killing of a small Moa (*?Palapteryx*), describing with much spirit its capture out of a drove of six or seven". Grey was not, however, in Preservation Inlet in 1868 or at any other time; his South Island journey in 1867 had reached as far as Riverton when he was recalled north. A likely explanation of this error is that Buller had simply mistaken the location of the moa story told by the Wanganui chief, Kawana Paipai, to McDonnell (1889). Paipai's story, which is very similar, was told when Grey and McDonnell visited the "West Coast" (i.e. Taranaki) in 1866. De Quatrefages (1893) certainly recalled that Buller had sent him McDonnell's paper in 1888.

Richards (1986) describes the trapping of a "big emu" weighing about 227 kg, probably in early 1844, by the crew of the whaler *Magnolia*. The captain, who was also a taxidermist, was said have preserved the bird to send it to "the London Museum". No such specimen ever reached the British Museum (Natural History), the bird was not mentioned when the *Magnolia* berthed at Otakou in October 1844 (Tod, 1982), and no other account of it by captain or crew has yet come to light.

The Waiau Valley (Southland) was the scene of several moa "sightings". James Cameron, a shepherd on the Manapouri Run, claimed to have seen a huge bird emerge from the bush across the river about 1860 (Beattie, 1958). His tale seems to have inspired claims in 1873 that a runholder saw the tracks of a large bird on the west bank of the Waiau and that his shepherd later encountered a bird larger than an emu with silvery-grey, green-streaked plumage. The runholder later denied both reports (*Otago Witness*, 5 April 1873; 12 April 1873. Buick (1931) confused the location with the North Canterbury Waiau Valley).

Undeterred, another Waiiau Valley shepherd named McDonald claimed to have seen a bird so big that a man would appear as a worm in its mouth. The man he told this to, Charles Port, was later alleged to have seen a moa five feet (150 cm) tall near Lake Hauroko in 1896. Port himself never mentioned this when he discussed moa with Beattie (unpubl. and Overton, 1951). Another story which might refer to moa was the observation by Jules Berg in about 1928, of three grey, goose-sized birds, which he saw by torchlight, in the Dawsonburn area near Preservation Inlet (Orbell, pers. comm.).

In their uncertainty or lack of details these stories provide little of substance. In marked contrast is the experience of Alice McKenzie, probably the most widely credited of all apparent moa stories. The earliest reference comes from the recollection of Dr Orbell that Alice McKenzie, his patient, told it to him soon after the Second World War. Orbell (pers. comm.) concluded then that she had seen a takahe. The first written report was in the *Otago Daily Times* (24 July 1947), but the best first-hand account is in a letter from McKenzie to the North Otago historian, G.B. Stevenson, dated 11 May 1948, which was before the re-discovery of the takahe. The pertinent section of this is as follows:

"I was very much interested in your description of the Moa's, and wish to tell you of a very large bird which lived at Martin's Bay. I saw it twice, but many others saw its footprints in the sand, it must have gone about the beaches at night, as its fresh tracks were plainest in the early mornings, and it only frequented the sea beach in winter, generally in July, we thought it probably lived in a large swamp between the sea and Lake McKerrow and when it was frozen it came to the sea beach.

First time I saw it was in 1880, I was 7 years of age. I was along the beach inside the sand hills, there are high sand hills covered with tussock, inside of them the bush starts, flax grows around the edge of the bush in the sand. I saw this large bird lying beside the flax. I got nearer and nearer, it took no notice of me. I got behind it, and sat down on the sand, it seemed quite round behind, as if it had no tail, and was the colour of a swamphen blue - I put a hand under it and drew out one of its legs, it was as thick as my wrist, and covered with dark-green scales, I thought I'd tie it up, so split a blade of flax and started to tie it around the birds legs, then it got up and making a harsh cry went for me. I went

over those sand hills like a red shank, the bird after me for a short distance. I can't remember if it had wings, but I don't think so, when it went for me the feathers round its neck stood out like a ruff, I think if it had wings I would have noticed. I ran home and told of the huge bird which chased me, Mother thought I was exaggerating, but I persuaded Father to come and see where it had been, he saw its tracks where it went after me, he had a foot rule in his pocket and measured the feet 11 inches from heel to point of middle toe, its feet were three toes like a hen, he recorded it in his diary, but some allowance could be made for the feet sinking in the dry sand, and may have seemed larger than they were.

For years then we saw its tracks in the winter, 10 years after I was driving some cattle from the Kaipo River to Martins Bay, coming round a rocky point I saw the cattle standing on the sand beach looking startled towards the bush. I looked and saw a blue object disappearing into the scrub, it looked like a mans navy blue coat, and I felt very frightened as there were prisoners working at Milford Sound at the time, and was afraid it was one of them, however I had to pass the place to get home, then I saw the large birds tracks taking long strides towards the place I saw it entering the bush. I did not try to look for it, my early experience was too fresh in my memory, it is 23 years since my brothers sold their cattle runs to Mr Gunn, and they told me they had not seen the track for a few years before they left, and they have not been seen since, so probably it was a solitary bird, and died, its remains may yet be found in that swamp, that is one reason I wished to have had a description of it in my book (McKenzie, 1948)."

McKenzie's brother and father also saw the bird several times and measured its footprints, in dune sand, as six inches long. The McKenzies, including Alice, thought that the bird was a takahe (Beattie, 1950), but seventy years later, in 1949, Alice saw a mounted takahe in the Otago Museum, and thought it shorter than the bird she remembered and with different coloured legs. Doubts arose (*Otago Daily Times*, 29 June 1950), and the publishers of her history of Martin's Bay (McKenzie, 1952) thereupon translated her story into a possible sighting of the "bush" moa.

This story deserves careful scrutiny since Falla and Scarlett both thought that McKenzie had seen a

moa, probably *Megalapteryx* sp. (Richards, 1986). First, however, some additions to McKenzie (1948) should be noted. In McKenzie (1952) the height was given as at least three feet (91 cm), the bird was said to have had big curved feathers behind, the colour of its legs was variously dark-green, greenish-yellow or grey, and McKenzie concluded that it was probably a moa.

The stature is about right for a small moa. From measurements of leg bones in Oliver (1949), the mean leg length (femur + tibiotarsus + tarsometatarsus) of *Anomalopteryx* sp. in South Island specimens is 77 cm, and of *Megalapteryx* sp., 81 cm. In a normal standing position these species would have had a back height of about 70 cm. Assuming moa ran with the neck carried low, McKenzie's estimate of three feet would approximate the stature of a running moa of the small genera. An adult takahe, by comparison, stands 30-45 cm tall, but only 25-30 cm in the running position (Wright, pers. comm.).

The McKenzies measured the maximum length of the tracks as 28 cm, and later 15 cm. This is about the length of small moa feet which, for *Anomalopteryx*, have been estimated at 19 cm (Owen, 1879). The adult takahe foot is 10-11 cm long (Wright, pers. comm.), and shaped like that of a hen, which is how McKenzie described the prints she saw. Both have a hallux which touches the ground. The moa hallux is high above the sole and generally left no print (Owen, 1879).

The diameter of the leg of McKenzie's bird was, by comparison with the wrists of seven-year old girls (Figure I), about 4.3 cm. This is significantly less than the probable minimum diameter of a small moa's leg in the tibiotarsal or tarsometatarsal areas. Measurements from a leg of *Megalapteryx*, which is desiccated and lacks some tissue, suggest that a live leg would be more than 6 cm in diameter. An *Anomalopteryx* leg would probably have been stouter again (Kooyman, 1985). However, it is also apparent that the leg of McKenzie's bird was substantially thicker than that of a takahe, which is about 1.5 cm in diameter (Figure I).

The colour of the leg of the McKenzie bird was variously described but never as red, as in takahe, nor buff to reddish-brown as in moa skin fragments. It was, however, described as scaly whereas no preserved moa leg skins have scales. The legs are either patterned with raised subcircular patches or, in the case of *Megalapteryx didinus*, are feathered down to the toes (Oliver, 1949). Lack of feathering is, perhaps, the strongest evidence against the inference that the

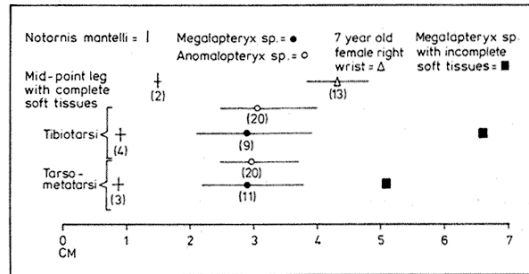


Figure 1: Comparison of takahe leg bone and leg diameters (data from Otago Museum and Wright, pers. comm.), with moa leg bone and leg diameters (data from Oliver (1949) and Otago Museum), and right wrist diameters of seven year old girls. Sample size in brackets. Horizontal bars give range.

McKenzie bird was *Megalapteryx*. It might not rule out *Anomalopteryx*, but we have no leg skins of that genus.

The blue plumage in all the McKenzie sightings strongly indicates a takahe. Moa feathers exist in a variety of colours, but none are "swampen-blue" (Hutton, 1872; White, 1875; 1885). Furthermore, moa feathers are quite short, soft and filamentous and none seem to have been tail plumes. It seems more likely that the big curved feathers reported by McKenzie were folded wing primaries of a takahe.

It is, of course, impossible to be certain about the McKenzie bird. Even the choice of either takahe or moa might be too definite. It is possible, though very unlikely, that Alice McKenzie saw a large penguin, such as the King (*Aptenodytes patagonicus*) or Emperor (*Aptenodytes forsteri*), which are both rare visitors to the southern South Island. They both have dark, thick legs, a dark blue-grey to black dorsal plumage, no tail, and stand 95-115 cm tall (Falla, Sibson and Turbott, 1979). The likelihood that she saw a takahe is supported by her father's description of the same individual as a "fairly tall bird with bright blue plumage" (Reid, 1974) which made tracks about 15 cm long in dune sand. It is also fair to emphasize that the dimensions recalled by Alice McKenzie were estimated by a small child who first encountered the bird lying down and was chased by it as soon as it arose. She apparently wrote no account of her experience for more than sixty years afterward. Moa cannot be ruled out, although a *Megalapteryx* does

seem very unlikely. I conclude that the case for moa is no stronger than that for takahe, and thus the McKenzie report cannot be used as evidence of the late survival of moa in Fiordland.

Archaeological Discoveries

In October 1949 a scorched *Megalapteryx* vertebra was found in a rockshelter (shelter A) in Takahe Valley by K.A. Miers. In December an expedition led by Falla "thoroughly raked over" the surface of the shelter floor and recovered further remains from at least one adult moa, as well as feathers and Maori artefacts.

In February 1950 Skinner and Duff excavated part of the shelter floor, and found below the surface dust, in the outer part of the shelter, a thin, discontinuous layer of sparsely-strewn charcoal, upon which the moa remains lay. At about the same level, but towards the back wall, there had been tussock "bedding" containing moa feathers. Along the open edge of the shelter floor a low ridge had been created, they thought, by a lens of "consolidated spoil" (layer B) which intervened between the surface dust and the charcoal layer. The "spoil" had been dumped, they argued, in the course of preparing the bedding area (Duff, 1952; 1956).

Falla considered that a wooden fire-plough, from Shelter A, was so cleanly cut that steel tools must have been used and therefore that the site was post-European. Skinner also concluded that 3-4 mm deep cut-marks on a *Megalapteryx* pelvis were "the work, not of a stone flake, but of a heavy steel knife" (Skinner to Falla in Duff, 1952).

Two samples were later submitted for radiocarbon dating. One comprised fragments of totara bark, thought to have been part of a container lying in the surface dust. Their precise stratigraphic relationship to the moa remains cannot be established due to "confusion through raking" (Duff, 1952). The sample was run twice and gave the results [Old Half-Life, uncorrected B.P.] 820 ± 60 (NZ 52), 840 ± 60 (NZ 52 dup.) which were averaged as 830 ± 50 (Ferguson and Rafter, 1957).

A second sample, described as "tussock, presumably used as bedding", gave a date of 230 ± 60 B.P. (Grant-Taylor and Rafter, 1963). According to Duff (1956) Rafter reported this to him as 110 ± 60 before 1955, which had such startling implications that he was obliged to argue that the real date must lie at the lower extreme of the error range. In the case of the official date the assumption is that the true date lies at the upper extreme of the error range. In each

case the result is approximately A.D. 1780. But how secure is this chronological and cut-mark evidence?

The deep, clean cuts impressed Skinner; and Duff, although sceptical, admitted that he had seen no comparable marks on material from other moa hunting sites. However, McCully, an experimenter with Maori stone tools, assured him that a stone flake could produce such marks. Duff's doubts about the steel knife proposition were reinforced when a flake, apparently from a larger flint knife, was recovered from shelter A during the extensive excavations in 1951.

Recent experiments show that sharp steel knives tend to peel back fresh bone and leave small "chatters" as the blade catches momentarily (Binford, 1981). These features were seen on the shelter A pelvis by Kooyman (pers. comm.), a specialist in analysing archaeological butchery. Together with the direction of the cuts (Duff, 1952), they rule out the use of an adze. The critical point, however, is that the cut-marks are small enough to have been produced by a sharp stone flake with a more obtuse edge angle than a steel blade. Since obsidian and flint can hold edges comparable to those on steel, the cut-marks could have been produced by a pre-European stone tool.

The second question concerns the sample used for the NZ 51 date. Duff (1956) described it as tussock bedding, from a position which was estimated from the recollections of two of Falla's party who had thoroughly fossicked the area in which it lay. But was the material bedding? The sample descriptions presume so (Ferguson and Rafter, 1957; Grant-Taylor and Rafter, 1963) but Duff (1952) hinted at another possible origin in recording "butts of tussock with cut blades, butts of tussock with blades chewed (?*Notornis*)". His argument that it was bedding relied upon the existence of the "spoil" ridge but advanced no reasons why a more or less level floor should require such modification. Since the low ridge follows the outer rim of the floor it could easily have formed from consolidation of sediments along the drip-line of the shelter, coupled with periodic wind deflation within. This then leaves the possibility that the tussock flooring was a natural phenomenon. In dismissing the NZ 51 date, Trotter and McCulloch (1973) noted that masses of apparently cut tussock could occur in rock shelters containing no evidence of human occupation. Tussock grew within the perimeter of the Takahe Valley shelter in 1959, and may well have grown further inside, been blown in, or carried in by birds. Consequently, there is no reason to continue to

prefer the NZ 51 date. The NZ 52 dates are also of dubious provenance, but since the bark was totara, and torn, they must represent human activity (Duff, 1956).

Since the 1950s, moa remains have been discovered in several other Fiordland sites in contexts which might appear to suggest a European age (Coutts, 1972). At the Breaksea Sound 1 site, fragments of moa bone occurred in a layer containing European materials but the stratigraphy was badly disturbed. At the Southport 1 site (Chalky Sound), three moa feathers were recovered in association with late Maori artefacts and evidence of European contact, including copper buttons probably manufactured about 1825-1850. Since there was no moa skin or bones in the site as evidence of a contemporary kill, the feathers may have arrived as part of an artefact of indeterminate age. Strips of skin and feathers from other species were found, which suggests cloak-making or repair (Coutts, 1972).

Discussion and Conclusions

Claims that moa survived until European times in Fiordland have not always been evaluated entirely on their merits. They were linked to, and gained in credibility from, the contemporary re-discovery of the takahe. This apparent analogy created a climate of optimism within which equivocal data were given unwarranted validity. Yet the analogy was never particularly apt, because takahe, unlike moa, had been killed or captured by Europeans during the 19th century. In addition, takahe sightings continued right up until the time of re-discovery in 1949 (Reid, 1974). This important ornithological event coincided with the publication of McKenzie's account, the most credible of possible moa sightings, and the discovery of the Takahe Valley archaeological evidence. Understandably, the combination proved irresistible.

Duff suggested that moa might still exist, in 1949, in the Murchison Range (*Otago Daily Times*, 30 April 1949). Orbell demurred only slightly in replying that "while there is no doubt that the moa was still in existence at the beginning of this century, I do not think that there are any left in the Murchison Ranges" (*Otago Daily Times*, 17 June 1950). Nevertheless, Duff responded with the hope that Orbell would add *Megalapteryx* to his takahe triumph. Such public enthusiasm was sustained until the 1970s, by Falla in particular (Falla, 1962, 1974, *Otago Daily Times*, 12 October 1964; Forster in *Otago Daily Times*, 29 January 1953; Skinner to Beattie, 30 March 1949).

The evidence for modern moa in Fiordland looks much less impressive today. The early reports are either wrong or lack any corroborative evidence. Alice McKenzie probably saw a takahe. No archaeological evidence, even that from Takahe Valley, is at all convincing. Furthermore, no other evidence of moa surviving into the European era has been produced by archaeological research anywhere else in New Zealand since 1949.

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