

SHORT NOTE

Two Late Quaternary avifaunal assemblages from the Dunback district, eastern Otago, South Island, New Zealand

JAMIE R. WOOD*

Department of Geology, University of Otago, P.O. Box 56, Dunedin, New Zealand

In 2005 I examined a collection of bird bones that had been donated to Otago Museum in 1954 by W.G. Dalton (Otago Museum Av7304-16). The collection was from a 'cave near Dunback' but the exact location of the cave was not recorded in the museum register. I was, however, able to contact Mr Dalton (WGD) who kindly provided an account of the discovery of the bones.

In Mar 1954, a group from the Anderson's Bay Rover Sea Scouts, Dunedin, explored a cave on Messrs Callahan's property near Dunback, eastern Otago (Fig. 1). They found the entrance to the cave behind a small patch of bush halfway up the hillside (c.20 m above a creek). Within the cave the group found several moa bones, including a claw resting on top of a large boulder. While exploring a small chamber on the north side of the main cave, WGD noted seeing the complete skeleton of a small bird, although this was not collected at the time as it had become cemented by calcite to the rock. The group also explored the emergence of the subterranean creek flowing in the gully beneath the main cave, and collected several more moa bones from there. These are listed in the Otago Museum register but could not be found in the collections.

From the description and sketch map provided by WGD, there is no doubt that the cave they visited is that known as 'Palmerston Cave' (Smith 2004). The cave at the confluence of 2 creeks is located on private land, 2 km southeast of Makareao Limeworks,

Dunback (NZMG coordinates 2329587/5531865; New Zealand fossil record file I42/f0025). The area lies within a belt of late Paleozoic marble (Forsyth 2001), which commonly outcrops. The entrance to the cave is in a small remnant of broadleaf forest on the side of a hill, c.15 m above the valley floor. I visited the cave twice, in Apr and Sep 2005. The floor of the cave consists largely of boulders from a roof collapse, and there was little fine sediment. I did not excavate, but examined the cave floor thoroughly. Bones were found at 2 sites along the northern wall of the cave (Fig. 2). The bones were generally well preserved; many had a thin coating of calcium carbonate. The skeleton of the small bird seen by WGD in 1954 was not relocated.

Another previously unpublished assemblage of bird bones was discovered in a cleft during blasting at the nearby Makareao Limeworks in 1953 (NZMG coordinates c. 2328500/5533300; New Zealand fossil record file I42/f0024). These bones were identified by R. J. Scarlett, and are also in the Otago Museum collections (Table 2).

From a palaeoecological perspective, these sites and their assemblages are regionally important. Few sites of prehuman age containing fossil avifauna are known from eastern Otago south of the Kakanui River, and this area was not covered during a survey of Otago in the mid-1990's (Worthy 1998). The 2 bone deposits listed here offer a glimpse of the birds and the vegetation in the area before human settlement. The avifaunal assemblage of Palmerston Cave (Table 1) includes species (e.g., kakapo, *Strigops habroptilus*; New Zealand pigeon, *Hemiphaga novaeseelandiae*; tui, *Prothemadera novaeseelandiae*; New Zealand owl-nightjar, *Aegotheles novaezealandiae*) typically associated with

Received 1 Sep 2009; accepted 30 Nov 2009

*Current address: Landcare Research, P.O. Box 40, Lincoln 7640, New Zealand

Correspondence: woodj@landcareresearch.co.nz



Fig. 1. Historical image of Anderson's Bay Rover Sea Scouts returning from Palmerston Cave, Mar 1954. S. Kirkpatrick is at far left, holding a box of small bones; W.G. Dalton 5th from left, holding tibiotarsus of a South I giant moa (*Dinornis robustus*). Photograph courtesy of W.G. Dalton. (NB: Although random bone fossicking was once a common pastime, there is now widespread appreciation for the need to conserve and properly study Quaternary fossil sites, and all such discoveries of bones should be reported to museums or other responsible authorities).

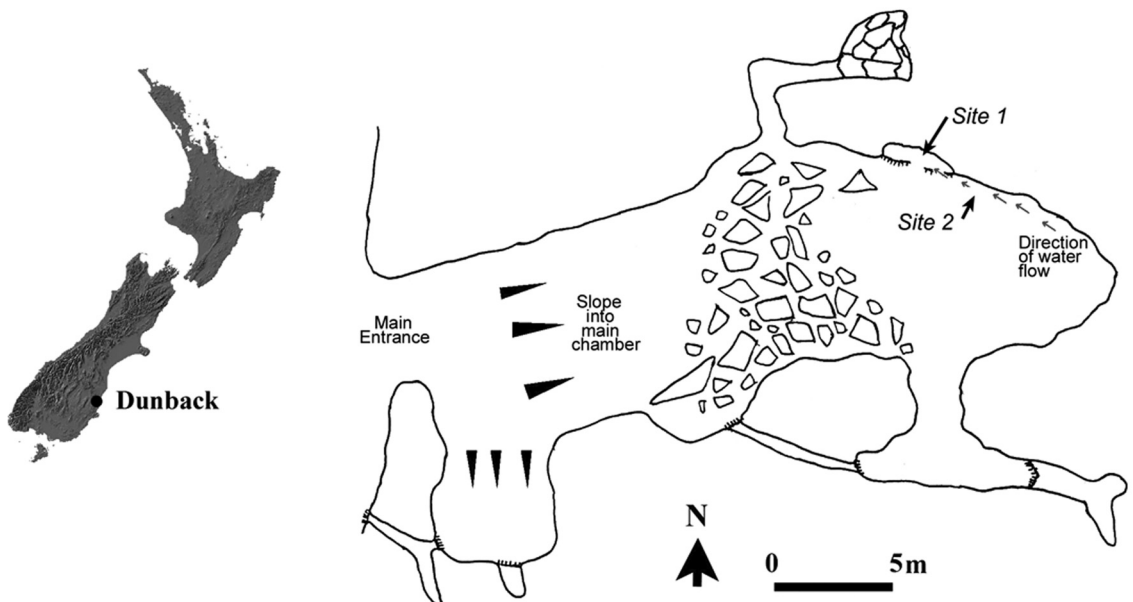


Fig. 2. Map of Palmerston Cave (adapted from Smith 2004), showing position of bone deposits identified in 2005.

Table 1. Late Quaternary avifaunal remains from Palmerston Cave, eastern Otago, South I, New Zealand. Abbreviations: acet, acetabulum; cmc, carpometacarpus; cor, scapuloacoracoid; cran, cranium; fem, femur; fib, fibula; frag., fragment; furc, furcula; hum, humerus; mand, mandible; pel, pelvis; phal, phalanx; pmx, premaxilla; quad, quadrate; rad, radius; sac, synsacrum; scap, scapula; stern, sternum; tmt, tarsometatarsus; tt, tibiotarsus; vert, vertebra. Where distinguished, left and right elements prefixed by L and R; proximal and distal by p, d, respectively. NISP, Number of individual specimens; MNI, minimum number of individual birds represented by NISP. No., Otago Museum accession number.

Visit/Taxon	No.	Elements	NISP/ MNI
W.G. Dalton <i>et al.</i> , 1954			
Moa sp. (large)	Av7315	1sac, 1vert	2/1
Moa sp.	Av7316	1tt, 1phal, 1vert	3/1
South I giant moa	<i>Dinornis robustus</i>	1tt (in photograph, Fig. 1)	1/1
Kiwi	<i>Apteryx sp.</i>	1frag. pel, 1Rtt	2/1
Kereru	<i>Hemiphaga novaeseelandiae</i>	1rad	1/1
Weka	<i>Gallirallus australis</i>	1Rhum	1/1
Kakapo	<i>Strigops habroptilus</i>	Av7307	1ulna
		Av7313	coprolites
Owlet-nightjar	<i>Aegotheles novaezealandiae</i>	Av7308	1cran, 1pel, 2tmt, 2tt, 2fem, 1hum, 1ulna, 2cmc, 1rad, 1pmx, 2cor, 2vert, 2rib
		Av7309	1fem, 1hum, 1tmt, 1tt, 1rad, 1stern, 1vert, 1acet, 1phal
		Av7310	2tmt, 2tt, 2pmx, 1ulna, 1cran
Laughing owl	<i>Sceloglaux albigacies</i>	Av7311	1L1Rtmt, 1tt
Tui	<i>Prosthemadera novaeseelandiae</i>	Av7312	1Rulna
J.R. Wood, 3 Apr 2005			
Site 1			
South I adzebill	<i>Aptornis defossor</i>	Av10634	1acet, 1L1Rscap, 10vert, 2phal
Finsch's duck	<i>Chenonetta finschi</i>	Av10628	1stern
J.R. Wood & G. Rogers, 15 Sep 2005			
Site 1			
Upland moa	<i>Megalapteryx didinus</i>	Av10633	1dRtt
South I adzebill	<i>A. defossor</i>	Av10634	6vert, 10phal
Finsch's duck	<i>C. finschi</i>	Av10630	2sac, 1phal, 1cor, 1cran
Site 2			
Upland moa	<i>M. didinus</i>	Av10633	1cran, 1quad, 1mand, 21vert, 5rib, 1frag. stern, 2scap, 19phal, c.200 tracheal rings, gizzard stones
Finsch's duck	<i>C. finschi</i>	Av10630	1sac, 2cran, 1pmx, 1vert
Weka	<i>G. australis</i>	Av10632	1Rhum

forest. Bones of upland moa (*Megalapteryx didinus*) were also present in both the Palmerston Cave and Makareao Limeworks collections. Although this species is more commonly found at inland sites in South I, it is also known from coastal or lowland areas, such as Punakaiki on the west coast (Worthy & Holdaway 2002), where there is steep, rocky terrain. The ages of the 2 assemblages described

here are not known, but both include species typical of late Holocene assemblages in North Otago documented by Worthy (1998).

ACKNOWLEDGMENTS

Mr W.G. Dalton kindly provided details and photographs of his trip to Palmerston Cave. I am grateful to J. & H. Prebble for permission to visit the cave, and to G. Rogers

Table 2. Faunal remains from a Late Quaternary deposit at Makaraeo Limeworks, eastern Otago, South I, New Zealand. Abbreviations as in Table 1.

Taxon		No.	Elements	NISP/ MNI
South I giant moa	<i>Dinornis robustus</i>	Av4193	1Lfem, 1Ltt, 1Ltmt, 1fib	4/1
Upland moa	<i>Megalapteryx didinus</i>	Av6201	1Lfem, 1Ltt, 1 frag. acet, 1 frag. sac, 7 frag	4+/1
Brown / Great spotted kiwi	<i>Apteryx australis / haastii</i>	Av7092	14 ribs	
		Av7093	1pel	
		Av7094	1pRtt, 1Ltt	
		Av7095	1Rtmt	
		Av7096	1Lfem	19/1
Finsch's duck	<i>Chenonetta finschi</i>	Av6726	1pL1pRtt, 1R1pLhum, 1L1Rfem, 1tmt, 1cor, 1L1Rrad, 10 frag (all juvenile)	10+/1
		Av6725	2L1Rtt, 1sac, 1cran, 2R1Lhum, 1 frag stern, 2 furc, 1cmc, 2R1Lfem, 1acet, 1unla, 1cor, 1rad, 5 ribs	21/2
Weka	<i>Gallirallus australis</i>	Av7089	1Rtt	
		Av7090	1Lfem	
		Av7091	1fib	3/1
Tuatara	<i>Sphenodon punctatus</i>	Vt642	1L dentary, 3 vert, 1 rib	12/1

for field assistance. Otago Museum kindly allowed access to the specimens.

LITERATURE CITED

- Forsyth, P.J. (compiler). 2001. *Geology of the Waitaki area. Lower Hutt*, Institute of Geological & Nuclear Sciences 1:250 000 geological map 19.
 Smith, N. 2004. *The New Zealand cave atlas: Vol. 2, South*

Island. New Zealand Speleological Society occasional publication 12.

- Worthy, T.H. 1998. Quaternary fossil faunas of Otago, South Island, New Zealand. *Journal of the Royal Society of New Zealand* 28: 421-521.
 Worthy, T.H.; Holdaway, R.N. 2002. *The lost world of the moa*. Christchurch, Canterbury University Press.

Keywords Otago; fossil birds; Holocene; moa