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BIRDS OF A FEATHER

edited by

Atholl Anderson

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AVIFAUNA AND MAN

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(The slightly revised text of a paper presented at the New Zealand Archaeological Association Conference, Dunedin, 17-23 May, 1969. Summary added by J. C. Yaldwyn)

At the 39th ANZAAS Congress in Melbourne, 1967, I presented a paper on "Moa and Man in New Zealand" (Scarlett 1974), and therefore I omit a detailed analysis of Moa remains at the sites discussed in the present paper, merely noting where they are present. The treatment given here is selective. From the many sites associated with Man from which I have now determined bird remains, I have selected some from each area, beginning in the far north and ending in Stewart Island.

At the outset, I will mention the difficulty, when dealing with "weathered out" middens in sand-dunes and beach areas, of being certain that every bone represented is contemporaneous with the midden, as birds still die on beaches, or are washed up as dead bodies. In the lists, I have included from such sites only those species of which there is reasonable certainty that their presence was due to the activity of Man. This can often be inferred from the state of the bone. Mammalian remains and fish are also listed. Systematic names are given only the first time a species is listed and follow those used by the Checklist Committee (1970). The reader is referred to "Bones for the New Zealand Archaeologist" (Scarlett 1972) for comments on the identification of archaeological bones in New Zealand.

I begin in Northland. From Spirits Bay in January 1961 Bob Jolly collected bones of:

Sooty Shearwater, Puffinus griseus
North Island Weka, Gallirallus australis greyi
Black-backed Gull, Larus dominicanus
North Island Kaka, Nestor meridionalis septentrionalis

as well as a few undetermined bones of other birds, Moa and seal.

Jack Grant-Mackie in January 1966 collected bones of:

Northern Blue Penguin, Eudyptula minor subsp.
Fluttering Shearwater, Puffinus gavia

To this list I added in February 1968:

Moa, Euryapteryx exilis
Seal, (probably Southern Fur Seal), ? Arctocephalus forsteri

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From Tom Bowling Bay Trevor Hosking in 1965, Jack Grant-Mackie and others in 1966 and 1967, and Jack and myself in February 1968, have gathered many bones. A composite list of species follows: those with an asterisk Jack and I also gathered at the adjacent Waikuku Beach.

- *North Island Kiwi, Apteryx australis mantelli
- Little Spotted Kiwi, Apteryx oweni (extinct in North Island)
- *Northern Blue Penguin
- Albatross, Diomedea sp. (uncertain if Royal or Wandering)
- *Mollymawk, Diomedea cauta subsp.
- Cook's Petrel, Pterodroma cooki
- *Fairy Prion, Pachyptila turtur
- Broad-billed Prion, Pachyptila vittata
- Various other prions (Pachyptila spp.) not determinable to species
- *Sooty Shearwater
- Buller's Shearwater, Puffinus bulleri
- *Fluttering Shearwater
- *Short-tailed Shearwater, Puffinus tenuirostris
- Little Shearwater (?North Island subsp.) Puffinus assimilis? haurakiensis
- Diving Petrel, Pelecanoides urinatrix
- Gannet, Sula bassana serrator
- Pied Shag, Phalacrocorax varius
- Black Shag, Phalacrocorax carbo novaehollandiae
- *White Heron, Egretta alba modesta
- *Royal Spoonbill, Platalea leucorodia regia (association with midden uncertain)
- Grey Duck, Anas superciliosa
- Other ducks, not determined
- *Large Harrier, the North Island form of Circus eylesi (extinct)
- *N.Z. Quail, Coturnix novaezealandiae (recently extinct)
- *North Island Weka
- Little Weka, Gallirallus minor (extinct)
- Falla's Rail, Capellirallus karamu (extinct)
- North Island Takahe, Notornis mantelli mantelli (extinct)
- *Variable Oystercatcher, Haematopus unicolor
- Banded Dotterel, Charadrius bicinctus
- *Black-backed Gull
- *Red-billed Gull, Larus novaehollandiae scopulinus
- Caspian Tern, Hydroprogne caspia
- White-fronted Tern, Sterna striata
- *N.Z. Pigeon, Hemiphaga novaeseelandiae
- *Kakapo, Strigops habroptilus
- North Island Kaka
- Red-crowned Parakeet, Cyanoramphus novaeseelandiae
- Morepork, Ninox novaeseelandiae
- Barn Owl, Tyto alba subsp. (several individuals, association with midden uncertain)
- Bellbird, Anthornis melanura
- Tui, Prothemadera novaeseelandiae
- *North Island Kokako, Callaeas cinerea wilsoni

*N.Z. Crow, Palaeocorax moriorum (extinct)

Moa, Dinornis struthoides

Moa, Euryapteryx exilis

Moa, Euryapteryx curtus

(other species of Moa have also been found at Tom Bowling Bay)

Polynesian Dog or Kuri, Canis familiaris

*Polynesian Rat or Kiore, Rattus exulans

*Tuatara, Sphenodon punctatus

Seal and fish not determined

This gives a total of 42 plus birds, other than Moa, associated with Man, for Tom Bowling Bay.

To those already listed for Waikuku Beach can be added:

Buller's Mollymawk, Diomedea bulleri

Harrier, Circus approximans gouldi

?Eastern Bar-tailed Godwit, ?Limosa lapponica baueri

?Skua, ?Stercorarius sp.

Black-fronted Tern, Chlidonias hybrida albostratus

a total of 26 certain and two probable species.

From the important site of Houhora, N6/4, where for five enjoyable weeks I helped with the excavation, the number of species was less numerous. As I have not examined the bones, other than the Moa, in detail, I will mention only the New Zealand Swan Cygnus sumnerensis (the presence of this extinct bird at Houhora extended the known range greatly as the furthest north it had been found previously was in Hawkes Bay) and the extinct N.Z. Crow. The Moas at Houhora were Anomalopteryx didiformis (rare), Euryapteryx curtus and E. exilis (both abundant), E. geranoides (rare), Dinornis struthoides and D. giganteus (rare as bones, but many of the fish-hooks were made from Dinornis). C14 dates range from 556 ± 55 years B.P. (about 1394 A.D.) to 796 ± 56 years B.P. (about 1154 A.D.).

Moving down to the Coromandel Peninsula, the species represented at the various sites at Opito and Sarah's Gully are:

(O = Opito; S.G. = Sarah's Gully)

Little Spotted Kiwi (extinct in North Island)	O.
Northern Blue Penguin	O. S.G.
Albatross, <u>Diomedea</u> sp.	O. S.G.
Mollymawk, <u>Diomedea cauta</u> subsp.	O. S.G.
Mollymawk, <u>Diomedea</u> sp.	O. S.G.
Grey-faced Petrel, <u>Pterodroma macroptera gouldi</u>	S.G.
Fairy Prion	O. S.G.
Prion, <u>Pachyptila</u> sp.	S.G.
Flesh-footed Shearwater, <u>Puffinus carneipes hullianus</u>	O.
Sooty Shearwater	O. S.G.
Fluttering Shearwater	O.

Other shearwaters, <u>Puffinus</u> spp.	O. S.G.
White-faced Storm petrel, <u>Pelagodroma</u> <u>marina maoriana</u>	O.
Northern Diving Petrel	O. S.G.
Other petrels, not determined	O. S.G.
Various shags, not specifically identified	O. S.G.
Paradise Duck, <u>Tadorna variegata</u>	S.G.
Grey Duck	O. S.G.
N.Z. Shoveler, <u>Anas rhynchotis variegata</u>	O.
Duck, <u>Anas</u> sp.	O. S.G.
North Island Weka	O. S.G.
Stilt, <u>Himantopus</u> sp.	S.G.
Black-backed Gull	O. S.G.
N.Z. Pigeon	O.
North Island Kaka	O. S.G.
Pipit, <u>Anthus novaeseelandiae</u>	S.G.
Tui	S.G.
North Island Kokako	S.G.
N.Z. Crow (extinct)	O. S.G.
Moa, <u>Dinornis giganteus</u>	O. S.G.
Moa, <u>Dinornis struthoides</u>	O. S.G.
Moa, <u>Euryapteryx geranoides</u>	O.
Moa, <u>Euryapteryx exilis</u>	O.
Elephant Seal, <u>Mirounga leoninus</u>	O.
Southern Fur Seal	O. S.G.
Kuri	O.
Kiore	O.
Tuatara	O. S.G.
Snapper, <u>Chrysophrys auratus</u>	O. S.G.
Whale, not determined to genus	O.

A total of 20 birds, other than Moa, for the Opito sites and 23 for Sarah's Gully. For Skipper's midden, Opito (N 40/3), we have a C14 date of 654 ± 50 years B.P. (about 1296 A.D.) and for the main site at Sarah's Gully, (N 40/9), about a mile away over a hill, dates of 621 ± 50 years B.P. (about 1329 A.D.) and 664 ± 50 years B.P. (about 1286 A.D.) showing that the two main sites were contemporaneous.

For Taranaki, I choose site N 128/3, Kaupokonui, excavated by Alistair Buist and associates. N 129/77, Ohawe, also excavated by Alistair and the adjacent Te Rangatapu sites, also contained much bird bone, including Moa, but time necessitates their omission.

North Island Kiwi
 Little Spotted Kiwi (extinct in North Island)
 Northern Blue Penguin
 (?Fairy) Prion
 Diving Petrel
 (?Black) Shag
 Shag, Phalacrocorax sp.
 Spotted Shag, Stictocarbo punctatus punctatus
 Grey Duck

Blue Duck, Hymenolaimus malacorhynchos
 Four other ducks (one a teal or scaup) not identified to species
 Large Harrier (extinct)
 Giant Rail, Aptornis otidiformis (extinct)
 Hodgen's Rail, Capellirallus hodgeni (extinct)
 North Island Takahe (extinct)
 Black-backed Gull
 (?Red-billed) Gull (it is impossible to separate the Red and Black-billed
 Gulls on any bones other than the bill)
 N.Z. Pigeon
 Kakapo
 North Island Kaka
 Red-crowned Parakeet
 Tui
 Huia, Heteralocha acutirostris (recently extinct)
 North Island Kokako
 N.Z. Crow (extinct)
 Moa, Dinornis giganteus
 Moa, Dinornis struthoides
 Moa, Dinornis gazella
 Moa, Pachyornis mappini
 Moa, Pachyornis septentrionalis
 Moa, ?Euryapteryx geranoides
 Kuri
 Kiore
 Southern Fur Seal
 Fish (not identified)

A total of 28 birds, other than Moa. The Ohawe site also contained Takahe, Aptornis, and Huia. Note that fewer species of Petrels were found than in more northern sites. There is a C14 date for Kaupokonui of 570 years B.P. (about 1380 A.D.).

The final North Island site is N 160/50, Paremata, on the Wellington coast, excavated by Janet Davidson and E. D. Sinclair and a small amount by the late Walter Carkeek. The bones are in the National Museum, Wellington.

North Island Kiwi
 Little Spotted Kiwi (extinct in North Island)
 Northern Blue Penguin
 Fiordland Crested Penguin, Eudyptes pachyrhynchus pachyrhynchus
 (?Erect-crested) Penguin, Eudyptes pachyrhynchus ?sclateri
 Southern Crested Grebe, Podiceps cristatus australis (this is the third
 occurrence known to me of this in association with Man. Trevor
 Hosking had it in his Whakamoenga Cave site, Taupo (see Leahy 1976),
 and it was found at Marfell Beach, Lake Grassmere)
 Mollymawk, Diomedea cauta subsp.
 (? Buller's) Mollymawk
 (?Broad-billed) Prion
 Fluttering Shearwater (both P. gavia and the closely allied Hutton's
 Shearwater P. huttoni are found on the Wellington coast)

Shearwater, Puffinus sp.
 Black Shag
 (? Little) Shag, Phalacrocorax ? melanoleucos
 Shag, Phalacrocorax sp.
 Spotted Shag
 N.Z. Swan, Cygnus sumnerensis (extinct)
 N.Z. Goose, Cnemiornis calcitrans (extinct)
 Grey Duck
 Blue Duck
 Duck (teal or scaup), Anas sp.
 Duck, Anas sp.
 Harrier
 Large Harrier (extinct)
 Falcon, Falco novaeseelandiae
 Banded Rail, Rallus philippensis
 North Island Weka
 Little Weka (extinct)
 (? Falla's) Rail (extinct)
 North Island Takahe (extinct)
 Giant Rail (extinct)
 Oystercatcher, Haematopus sp.
 (? Antarctic) Skua, Stercorarius skua ? maccormicki
 Black-backed Gull
 N.Z. Pigeon
 Kakapo
 North Island Kaka
 Red-crowned Parakeet
 Parakeet, Cyanoramphus sp.
 Laughing Owl, Sceloglaux albifacies (probably extinct)
 Tui
 North Island Kokako
 N.Z. Crow (extinct)
 Moa, Eurapteryx gravis (represented by a "reel" possibly imported from
 Wairua Bar)
 Moa, Euryapteryx geranoides
 Moa, Dinornis giganteus
 Moa, Dinornis struthoides
 Moa, Dinornis novaezealandiae
 Moa, Pachyornis mappini
 Moa, Anomalopteryx didiformis
 Kuri
 Kiore
 Southern Fur Seal
 (probably other seals are represented also)
 Cetacean, not determined
 Tuatara

Total birds, other than Moa, 43. There is a C14 date of 547 ± 48 years B.P. (about 1413 A.D.) for Paremata. Judging from the various levels reported by Janet Davidson, the site was probably occupied over a considerable period, and this single date is not to be taken as indicating either the earliest or latest occupation of the site.

Turning now to the South Island, Marfell Beach, S 29/8, is an area of several acres of sand dune at the north-east corner of Lake Grassmere, Marlborough. Artifacts of apparently early Maori manufacture were collected by C. H. Robson, as well as Moa bones, in the vicinity in the 1870s. Much of the coast-line west from Cape Campbell was occupied by both early (Moa-hunter) and later Maori settlements. In the 1940s Jim Eyles and Roger Duff, and later Elliot Dawson, Lew Gurr, and Jack and Ruby Britton collected bones from the dunes at Marfell Beach. In July 1952, I was, so far as I know, the first to uncover part of the actual ash midden layer. Briefly the sequence is as follows: a damp fine sea-gravel layer, on which when exposed by wind erosion, rotten skeletons of Moa are occasionally found. These crumble at the touch. Over this the dunes are formed. Between the gravel and the earliest occupation layer, occasional bones occur including those of Dinornis robustus, which apparently died out before man came to the district, as so far remains of this species have not been found in the human occupational levels. The midden varies, from a shallow 6 or 8 inches in the part where I first excavated (here the bones were in "pockets", with large areas of sterile ash between them), to a much more heavily concentrated deposit, two to three feet thick, with an uneven base, but a level top. Above this are dunes of varying heights now largely overgrown by Marram grass. These contain bone, haangi and artifacts. Some at least of the ovens are of Moa-hunter origin, as indicated by the Moa bones found around them.

In the following list I have included bones from the sand above the midden, which I consider to have been derived from the occupation layer by wind plantation.

South Island Kiwi, Apteryx australis australis
 Northern Blue Penguin
 Fiordland Crested Penguin
 Southern Crested Grebe
 N.Z. Dabchick, Podiceps rufopectus
 Mollymawk, Diomedea sp.
 White-headed Petrel, Pterodroma lessoni
 Petrel, Pterodroma sp.
 Fairy Prion
 Prion, Pachyptila sp.
 Sooty Shearwater
 Fluttering Shearwater
 Short-tailed Shearwater
 Shearwater, Puffinus sp.
 White-faced Storm petrel
 Diving Petrel
 N.Z. Pelican, Pelicanus conspicillatus novaezealandiae (extinct)
 Black Shag
 Little Shag, Phalacrocorax melanoleucos brevirostris
 Shag, Phalacrocorax sp.
 King Shag, Leucocarbo carunculatus carunculatus
 Spotted Shag
 N.Z. Swan (extinct)
 N.Z. Goose (extinct)

Paradise Duck
 Grey Duck
 Grey Teal, Anas gibberifrons gracilis
 Brown Teal, Anas aucklandica chlorotis
 N.Z. Scaup, Aythya novaeseelandiae
 Finsch's Duck, Euryanas finschi (extinct)
 Australian Musk Duck, Biziura lobata
 Merganser, Mergus sp. (extinct)
 several other ducks, Anas spp.
 N.Z. Eagle, Harpagornis moorei (extinct)
 Harrier
 Large Harrier, Circus eylesi (extinct)
 Falcon
 N.Z. Quail (recently extinct)
 Banded Rail
 Weka, Gallirallus australis subsp.
 Little Weka (extinct)
 Hodgen's Rail (extinct)
 South Island Takahē, Notornis mantelli hochstetteri
 Giant Rail (extinct)
 several small rails, Rallus sp. (extinct)
 N.Z. Coot, Nesophalaris chathamensis (extinct)
 (?Asiatic) Whimbrel, Numenius phaeopus ? variegatus
 Eastern Bar-tailed Godwit
 Snipe, Coenocorypha sp.
 Pied Stilt, Himantopus himantopus leucocephalus
 Skua, Stercorarius skua subsp.
 Black-backed Gull
 Red-billed Gull
 Caspian Tern
 White-fronted Tern
 Tern, Sterna sp.
 N.Z. Pigeon
 Kakapo
 South Island Kaka, Nestor meridionalis meridionalis
 Small Kaka, Nestor sp. (extinct)
 Red-crowned Parakeet
 Parakeet, Cyanoramphus sp.
 Morepork
 Laughing Owl (probably extinct)
 South Island Robin, Petroica australis australis
 Tui
 Saddleback, Philesturnus carunculatus
 South Island Kokako, Callaeas cinerea cinerea
 South Island Thrush, Turnagra capensis capensis
 N.Z. Crow (extinct)
 Moa, Emeus crassus
 Moa, Euryapteryx gravis
 Moa, Anomalopteryx didiformis
 Kuri

Kiore
Southern Fur Seal
Elephant Seal
Tuatara
Fish, unidentified

A total of 71 plus birds, other than Moa. The great number of water fowl is easily explained by the proximity of the Lake, but the numerous bush birds indicate extensive forest cover much closer to the site than is the case today.

By contrast with this extensive list, that from the only South Island West Coast site so far excavated, the Heaphy River encampment (S 7/1) is very short, which is rather surprising when one considers the large numbers of subfossil species in the adjacent limestone caves.

Kiwi, Apteryx sp.
Southern Blue Penguin, Eudyptula minor minor
Fiordland Crested Penguin
Mollymawk, Diomedea cauta subsp.
Allied Shearwater, Puffinus assimilis subsp. (one bone)
Pied Shag
(small) Shag, Phalacrocorax sp.
N.Z. Pigeon
South Island Kaka
Small Kaka (extinct)
Tui
Moa, Anomalopteryx didiformis
Moa, ?Dinornis robustus
Kuri
Southern Fur Seal

The absence of Rat in the midden was striking. There was plenty of it in the adjacent caves. Eleven birds present, apart from Moa. Our one C14 date from the site, 573 ± 70 years B.P. (about 1377 A.D.) which came from a shell sample, represents neither the earliest nor the latest phase of occupation, but, I think, somewhere about the middle of it.

Site S 49/20, Whaler's Bay Cave, Kaikoura, excavated by the Canterbury Museum Archaeological Society mainly in 1968, is of fairly late occupation. The faunal content was identified as follows:

South Island Kiwi
Little Spotted Kiwi
Blue Penguin, Eudyptula minor subsp.
Fiordland Crested Penguin
Albatross, Diomedea sp.
Buller's Mollymawk
Mollymawk, Diomedea cauta subsp.
Petrel, Pterodroma ? hypoleuca subsp.
White-chinned Petrel, Procellaria aequinoctialis steadi
Sooty Shearwater
(? Hutton's) Shearwater, Puffinus ? huttoni

Diving Petrel
 (?Black) Shag
 Little Shag
 Spotted Shag
 Swan, Cygnus sp. (this is a puzzle, it is neither the extinct C. sumnerensis
 nor the Black Swan C. atratus)
 Paradise Duck
 Grey Duck
 Grey Teal
 Harrier
 N. Z. Quail (recently extinct)
 Weka, Gallirallus australis subsp.
 Pukeko, Porphyrio porphyrio melanotus
 Black-backed Gull
 (? Red-billed) Gull
 Black-fronted Tern
 White-fronted Tern
 South Island Kaka
 Laughing Owl (probably extinct)
 South Island Robin
 Tui
 Moa, fragments of subfossil material, not identified to genus
 Kuri
 Kiore
 Southern Fur Seal
 Fish, various species

A total of 30 birds. Less certainly associated with the midden were bones of the Reef Heron, Egretta sacra collected by Owen Wilkes in 1963.

Site S 84/46, Bromley, Christchurch, a small Moa-hunter occupation area (I think fairly late) excavated between 1963 and 1965 by the Canterbury Museum Archaeological Society, had bones of the following species represented. The site lies on the north side of the Heathcote estuary, in dunes. Rather strangely, no ducks or petrels were present.

(?Blue or White-flipped) Penguin, Eudyptula sp.
 (?Erect-crested) Penguin
 Black Shag
 Spotted Shag
 N. Z. Quail (recently extinct)
 Weka, Gallirallus australis subsp.
 Australian Coot, Fulica atra australis
 N. Z. Pigeon
 ?Fernbird, ?Bowdleria punctata
 Moa, Euryapteryx gravis
 Kuri
 Southern Fur Seal
 Cetacean, bones not determined as to genus

A total of nine birds other than Moa.

Site S 111/1, Dashing Rocks, Timaru, contained the following species:

Albatross, Diomedea sp.
(?Fluttering) Shearwater
Black Shag
Grey Duck
small Duck (a teal or scaup), Anas sp.
N.Z. Quail (recently extinct)
Small Kaka (extinct)
?Tui
Moa, too broken for identification
Kuri
Seal, not identified

A total of eight birds, other than Moa.

An inland rock shelter, now under the water of Benmore Dam, S 109/9, Shepherd's Creek II, Waitaki Gorge, was excavated by Graeme Mason and myself in late 1964. Jan Hjarnø assisted for two days.

Mottled Petrel, Pterodroma inexpectata
Paradise Duck
Grey Duck
Blue Duck
Duck, Anas sp.
Falcon
N.Z. Quail (recently extinct)
Weka, Gallirallus australis subsp.
Little Weka (extinct)
Black-backed Gull
Black-fronted Tern
White-fronted Tern
South Island Kaka
Small Kaka (extinct)
Red-crowned Parakeet
Parakeet, Cyanoramphus sp.
Laughing Owl (probably extinct)
Pipit
South Island Robin
Saddleback
South Island Kokako
South Island Thrush
Moa, Euryapteryx gravis, eggshell only, mainly in the moa nests we found.
Possibly ante-dates Man, although it appeared to be contemporaneous
with the lower occupation.
Moa, Megalapteryx didinus, bone and eggshell
Kuri
Kiore
Bat, species not yet determined
Fish, not determined

The paradise Duck, White-fronted Tern, and Black-backed Gull were still present during our visit. Even if some of the bush birds found were brought

from elsewhere as is possible, the climate must have differed vastly from the arid, dessicated region it is today. Sparrow, Goldfinch, Song Thrush, and Blackbird had died in the rock shelter also, and their bones were present on the surface and just into layer 1. Bones of Skink and Gecko were also present, but they were plentiful as living animals in the rocks near the site, and their presence may have nothing to do with Man. It is possible that Man's occupation was seasonal and that the considerable depth of Euryapteryx nest material, which contained much dung and broken eggshell, was deposited during a period of the year when Man was absent.

Site S 136/2, Ototara, a few miles from the sea near Teschemaker's, North Otago, excavated by Michael Trotter, had bones of the following species:

Yellow-eyed Penguin, Megadyptes antipodes
Prion, Pachyptila sp.
Diving Petrel
(?Black) Shag
Shag, Phalacrocorax sp.
N.Z. Swan (extinct)
N.Z. Goose (extinct)
Paradise Duck
Grey Duck
Duck (teal), Anas sp.
Duck, Anas sp.
N.Z. Shoveler
Harrier
Falcon
N.Z. Quail (recently extinct)
Pukeko
South Island Takahe
Black-billed Gull
White-fronted Tern
N.Z. Pigeon
Red-crowned Parakeet
Morepork
Laughing Owl (probably extinct)
Moa, Euryapteryx gravis
Kuri
Kiore

A total of 23 birds, other than Moa. The C14 date for the site is 561 ± 32 years B.P. (about 1389 A.D.).

Duckworth Midden, Long Island, Dusky Sound, in what appears to have been an occasional site used by coasting Maori, was situated on a rock platform. The midden was practically all along the lip, among trees which had since grown there, about 50 feet up from the sea, with forest below and sheltered by a high cliff at the back. It was found by John Hall-Jones on Nigel Duckworth's March 1965 trip, when a few bones were removed, and in March 1966, on Duckworth's second expedition, was excavated under my supervision.

The bones represented were:

Southern Blue Penguin
 Fiordland Crested Penguin
 Fairy Prion
 Prion, Pachyptila sp.
 Fluttering Shearwater
 Diving Petrel
 Pied Shag
 Little Shag
 N.Z. Quail (recently extinct)
 Western Weka, Gallirallus australis australis
 N.Z. Pigeon
 South Island Kaka
 South Island Kokako
 Moa, Euryapteryx gravis, one piece of femur and two pieces of tibio-tarsus,
 probably a haunch taken round from Southland.
 Kuri
 Kiore
 Southern Fur Seal
 Fish, not identified

A total of 13 birds, excluding the Moa. Most of them, except the Quail, which became extinct last century, can be found in Dusky Sound today. From the appearance of the bones, they might have been killed a few days before excavation.

The Native Island midden, S 189/1, Stewart Island, has not yet been excavated. The following bones were surface collected by myself in 1954 and by Baden Norris in 1961 and 1963. They indicate the rich potential of the site.

Southern Blue Penguin
 Yellow-eyed Penguin
 Mollymawk, Diomedea cauta subsp.
 (?Buller's) Mollymawk
 Mollymawk, Diomedea sp.
 Broad-billed Prion
 Sooty Shearwater
 Fluttering Shearwater
 Southern Diving Petrel, Pelecanoides urinatrix chathamensis
 Little Shag
 Stewart Island Shag, Leucocarbo carunculatus chalconotus
 Blue Shag, Stictocarbo punctatus steadi
 N.Z. Swan (extinct)
 (?Brown) Teal
 Stewart Island Weka, Gallirallus australis scotti
 Little Weka (extinct)
 Black-backed Gull
 Red-billed Gull
 Small Kaka (extinct)
 Laughing Owl (probably extinct)
 N.Z. Crow (extinct)
 Moa, Euryapteryx gravis
 Kuri
 Southern Fur Seal

Kuri

Southern Fur Seal

The birds total 21 species, plus three more not as yet identified.

The final site is Old Neck, S 189/4, Stewart Island. The following bones were surface collected from midden material weathered out from the sand dune by myself in 1954, Baden Norris in 1962, Olga Sanson in 1964 and by Les Lockerbie in 1959. I have not seen Les's excavated bones as yet, except the Moa, but expect that they will add still more species to the list.

Stewart Island Kiwi, Apteryx australis lawryi

Southern Blue Penguin

Yellow-eyed Penguin

Fiordland Crested Penguin

Mollymawk, Diomedea sp.

Fairy Prion

Broad-billed Prion

Sooty Shearwater

Fluttering Shearwater

Shearwater, Puffinus sp.

Southern Diving Petrel

Little Shag

Stewart Island Shag

Blue Shag

(?Brown) Teal

Duck, Anas sp.

Banded Rail

Stewart Island Weka

Little Weka (extinct)

Variable Oystercatcher

Black-backed Gull

N.Z. Pigeon

South Island Kaka

Small Kaka (extinct)

South Island Kokako

Moa, Euryapteryx n.sp., abundant, found also in the Murihiku area of the South Island

Kuri

Kiore

Southern Fur Seal

Sea Lion, Otaria hookeri

Lockerbie's excavated Moa contained some Eurapteryx gravis, abundant material of the new small Euryapteryx and one femur of Anomalopteryx didiformis.

The total of bird species, other than Moa, is 25, plus six others not as yet identified.

A bird rarely found in association with Man, the Giant Rail, Aptornis otidiformis, was recorded by von Haast at Moa Point Cave, Redcliffs. A few bones occurred in middens adjacent to the Cave, and Michael Trotter found

some in his Katiki excavations. Thus we have a picture of man exploiting all the animal resources of his environment, including shellfish, not mentioned in this paper, but abundant in many of the sites. The complementary resources, such as fruits and berries, as well as vegetables, rarely leave traces, except in the form of pits, which in many cases were presumably for storage. At Sarah's Gully, for instance, we found comparatively shallow rectangular pits, with drains, and the bottoms covered with fine white shell sand from the beach, which probably served such a purpose. The bell shaped Rua are more obviously storage pits.

What is certain, from the faunal remains, is that the Polynesian population of these islands found almost every bird and animal edible. I have not attempted in this paper to deal with the proportions of the different birds in the respective sites, even where I have such data, which is not always the case. In Whaler's Bay Cave, for instance, there are far more Albatross and Mollymawk represented than any other bird. At Houhora, more Snapper appear to have been eaten than any other form of animal food. Various shags are plentiful in some sites. Cook's sailors found shags palatable food. In most middens, some species are represented by one or a few bones. The chances of survival of the bones of the smaller bush birds and tiny petrels, such as Pelecanoides, are less than those of the bigger birds. The presence of a Tui humerus indicated the use of at least one bird, and many more may have been eaten, without any trace surviving. At some sites, excavated at several periods, later 'digs' have produced a number of bones of species not represented at all in the first excavations. For such reasons, I consider in the present stage of our knowledge that statistics are rather unreliable for many sites.

SUMMARY

Bird, mammal and Tuatara bone identifications from 19 New Zealand archaeological sites (9 in the North Island and 10 in the South Island) are listed site by site. Fifteen moa species, 111 other bird species and subspecies, and five mammals are named in the list.

Extinct non-ratite birds are recorded as follows: N.Z. Pelican from a site near the South Island coastal Lake Grassmere; N.Z. Swan from North Auckland, Paremata near Wellington, the Lake Grassmere site, North Otago, and Stewart Island; N.Z. Goose (Cnemiornis) from Paremata, Lake Grassmere, and North Otago; Finsch's Duck (Euryanas) and Merganser from Lake Grassmere; Large Harrier (North Island form) from four sites between North Auckland and Paremata; Large Harrier (Circus eylesi) and N.Z. Eagle (Harpagornis) from Lake Grassmere; N.Z. Quail from North Auckland to Dusky Sound (nine sites); North Island Takahe from four sites between North Auckland and Paremata; Little Weka (Gallirallus minor) from North Auckland to Stewart Island (six sites); Giant Rail (Aptornis) from Taranaki, Paremata, and Lake Grassmere; Hodgen's Rail (Capellirallus) from Taranaki and Lake Grassmere; Falla's Rail (C. karamu) from North Auckland and possibly from Paremata; a small extinct rail and N.Z. Coot (Nesophalaris) from Lake Grassmere; small extinct Kaka from six South Island sites between Lake Grassmere and Stewart Island; Huia from Taranaki; and N.Z. Crow (Palaeocorax) from eight sites between North Auckland and Stewart Island.

Moa records are as follows: Anomalopteryx didiformis from North Auckland, Paremata, Lake Grassmere, West Coast South Island, and Stewart Island; Megalapteryx didinus from Waitaki Gorge; Pachyornis mappini from Taranaki and Paremata; P. septentrionalis from Taranaki; Emeus crassus from Lake Grassmere; the small Euryapteryx curtus from North Auckland; E. exilis from North Auckland and Coromandel; the larger E. geranoides from four North Island sites between North Auckland and Paremata; the large, characteristic "moa-hunter" species E. gravis from Paremata in the North Island (worked into a reel) and from seven South Island sites between Lake Grassmere and Stewart Island (represented by eggshell at Waitaki Gorge and by a single leg in Dusky Sound); an undescribed small species of Euryapteryx from Stewart Island; Dinornis gazella from Taranaki; D. struthoides from six North Island sites between North Auckland and Paremata; D. novaezealandiae from Paremata; D. giganteus from five North Island sites between North Auckland and Paremata; and D. robustus possibly from the West Coast of the South Island.

Other interesting records include: Little Spotted Kiwi (now extinct in the North Island) from four North Island sites between North Auckland and Paremata; crested penguins (now not breeding north of south Westland) from Paremata and Lake Grassmere as well as sites further south; Southern Crested Grebe (now breeding only in the South Island) from Paremata and Lake Grassmere; Mottled Petrel from the inland Waitaki Gorge site (did it breed nearby?); a swan different from the extinct N.Z. Swan and the Australian Black Swan from a cave site at Kaikoura; Australian Musk Duck (not known in N.Z. in post-European contact times) and South Island Takahe from Lake Grassmere; Australian Coot (only known as a straggler in N.Z. in post-European contact times) from a site near Christchurch; Kakapo from four North Island sites between North Auckland and Paremata, and from Lake Grassmere and North Otago in the South Island; Laughing Owl (probably extinct) from Paremata, and from five South Island sites between Lake Grassmere and Stewart Island; Barn Owl (the Australian subspecies is a rare straggler to N.Z.) from North Auckland; South Island Thrush (possibly extinct) from Lake Grassmere and Waitaki Gorge; and Tuatara remains from North Auckland, Coromandel, Paremata, and Lake Grassmere.

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