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SAYING SO DOESN'T MAKE IT SO

PAPERS IN HONOUR OF B. FOSS LEACH

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Moriori Fishing: Intensive Exploitation of the Inshore Zone

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INTRODUCTION

Archaeological research has defined sixteenth century Moriori settlement patterns and subsistence strategy at Point Durham on the south-west coast of Chatham Island. Occupation centred on a single settlement, known as the Waihora site (New Zealand Archaeological Site Number C240/283), which was probably occupied at all seasons of the year. It included a burial area, approximately ten houses which were clustered together, a series of discrete middens, and a large cooking area on the crest of a mound running down on to the leeward margin. The maximum population of the site is estimated to be in the range 50–100 people (Sutton 1980, 1982a, 1982b, 1983).

The Waihora site was situated on a relic sand dune near the only former New Zealand Fur Seal breeding colony on that stretch of coastline. A seal bone midden (C240/689) was found just 150 metres from the seal colony location. Over 150 seals from four species (New Zealand Fur Seal (*Arctocephalus forsteri*), Southern Elephant Seal (*Mirounga leonina*), Leopard Seal (*Hydrurga leptonyx*) and New Zealand Sea Lion (*Neophoca hookeri*) were represented in the excavation of a quarter of that site. Sealing occurred at all seasons of the year, with a specialisation in slaughter of adult animals, rather than pups (Smith 1977).

The other thirty or so coastal middens of the Durham area were highly specalised shellfish dumps. They represent short recurrent intervals of gathering on the inter-tidal shore, mostly during summer. The shellfishing sites were concentrated beside areas of maximum exposure of the intertidal zone (Sutton 1979).

Inland middens were also found. Those excavated (C240/680 and 681) were located near the inland terrace scarp which is a probable location for petrel burrowing. They contained the remains of large numbers of fledgling petrels, taken *en masse* during a short period of the summer. They also contained considerable quantities of fish remains.

The subsistence-settlement pattern of the 16th century Moriori at Point Durham was highly localised. This is indicated by the fact that very few of the economic species present in the excavated sites could not have been obtained from within the Durham area. The principal economic species were taken when and where they were most concentrated, productive and easily accessible. This was a stable economy based on the year-round presence of fur seals. It involved efficient hunting and gathering of coastal, marine-based sources. High

human population density was sustained within a small home range by the exceptionally high levels of primary and other marine production which occur around these islands.

AVAILABLE FISH SPECIES

The density of fish in Chathams waters is high (Waite 1909; Young 1923). Concentrations of certain species are known to exist on the offshore cod and groper "grounds" and inshore. The inshore zone is here defined as waters within 100 metres of the shore and 10 to 20 metres of the surface. Throughout the world's oceans inshore zones are rich in primary and other marine life due to increased light penetration, temperature gradients and turbulence (Colinvaux 1973).

Nine freshwater species were present in the islands (Table 1). Approximately 42 saltwater fish species were available at the Chatham Islands (McIlwraith 1976; Paul 1979; Paul *et al.* n.d.; Waite 1909). The latter can be classified as either inshore or offshore species, according to which of these zones they usually inhabit. However, the relationship between this binary division and where fish were actually caught is not simple. Some fish of offshore species venture inshore at times and can be caught there using inshore techniques, such as hand-held lines off the rocks, long lines and, sometimes, nets. In contrast, inshore species are more restricted in distribution and the capture techniques to which they fall prey. Therefore, there is likely to be a systematic overrepresentation of offshore fish species in Chathams middens, even if very little offshore fishing occurred. This bias is relevant in the reconstruction of Moriori fishing.

CAPTURED SPECIES

METHODOLOGY

The fish bone was identified on the basis of five bones of the head and a limited number of particularly distinctive bones from certain species. The bones generally used were maxilla, premaxilla, quadrate, articular and dentary. The other group included pharyngeal clusters of Labridae, spines of the leatherjacket, dental apparatus from ghost shark and elephant fish and dermal parts of the rough skate.

The author identified the material, to species level where possible, using comparative collections at the Anthropology and Zoology Departments of the University of Otago and the National Museum, Wellington, with help from Dr B. F. Leach and J. Moreland. Minimum numbers were calculated on the basis of frequency of occurrence of the various anatomical elements. A simple recording form was used throughout the work. Minimum numbers were calculated for each stratigraphical unit, to ensure comparability with bird and other faunal data (Sutton 1979).

The most obvious limitation of this approach is that differential disposal of the head and the rest of the body, which we know to have occurred in some Maori methods of fish preservation (Coutts 1972), will not be detected. Therefore, preserved fish will be underrepresented archaeologically.

Nichol (1978) has continued the study of archaeological fish bone using vertebrae. His method was applied to only one species, snapper (*Chrysophrys auratus*) from a series of very small samples. Minimum numbers of snapper present were 22, 36 and 102 for sites

TABLE 1
AVAILABLE FISH SPECIES
(after Sutton 1979: Appendix 2.6)

Nomenclature	Common Name
A. INSHORE FISH (13 species)	
Psychrolutidae	
Neophrynichthys latus (Hutton 1875)	Dark Toadfish
Labridae	
Notolabrus fucicola (Richardson 1840)	Banded Wrasse
Pseudolabrus miles (Bloch and Scheider 1801)	Scarlet Wrasse
Notolabrus celidotus (Bloch and Schneider 1801)	Spotty
Odacidae	
Odax pullus (Bloch and Schneider 1801)	Greenbone, butterfish
Mugiloididae	
Parapercis colias (Bloch and Schneider 1801)	Blue Cod
Moridae	
Lotella rhacina (Bloch and Schneider 1801)	Rock Cod
Centrolophidae	
Seriolella brama (Gunther 1860)	Blue Warehou
Balistidae	
Parika scaber (Bloch and Scheinder 1801)	Smooth Leatherjacket
Bothidae	
Arnoglossus scapha (Bloch and Schneider 1801)	Megrim
Pleuronectidae	
Colistium guntheri (Hutton 1873)	Brill
CRUSTACEA	
Plinuridae	
Jasus edwardsii (Hutton 1875)	Crayfish
Portunidae	
Ovalipes catharus (White 1843)	Swimming Crab
B. OFFSHORE FISH (28 species)	
Eptatreidae	
Eptatretus cirrhatus (Bloch and Schneider 1801)	Hagfish
Squalidae	
Squalus acanthias (Linnaeus 1758)	Spotted Spiny Dogfish
Carcharhinidae	
Galeorhinus australis (Gill 1895)	School Shark
Rajidae	
Raja nastuta (Banks in Muller and Henle 1841)	Rough Skate
Chimaeridae	
Hydrolagus novaezelandiae (Fowler 1911)	Dark Ghost Shark
Callorhinchidae	
Callorhynchus milii (Biry de Vincent 1823)	Elephant Fish
Muraenidae	
Gymnothorax sp.	Moray Eel*
Congeridae	
Conger verreauxi (Kaup 1856)	Southern Conger
Argentiniidae	
Argentina elongata (Hutton 1879)	Silverside
Moridae	
Pseudophycis bachus (Bloch and Schneider 1801)	Red Cod
Ophidiidae	
Genypterus blacodes (Bloch and Schneider 1801)	Ling
Zeidae	
Cyttus novaezealandiae (Arthur 1885)	Silver Dory

TABLE 1 (cont.)

Nomenclature	Common Name
Scorpaenidae	
Scorpaena papillosus (Bloch and Schneider 1801)	Red Scorpionfish
Triglidae	
Chelidonichthys kumu (Leson and Garnot 1826)	Red Gurnard
Lepidotrigla branchyoptera (Hutton 1872)	Scaly Gurnard
Psychrolutidae	
Neophrynichthys latus (Hutton 1875)	Dark Toadfish
Serranidae	
Ellerkeldia cf. *huntii* (Hector 1875)	Halfbanded Sea Perch
Percichthyidae	
Polyprion oxygeneios (Bloch and Schneider 1801)	Hapuka
Cheilodactylidae	
Nemadactylus macropterus (Bloch and Schneider 1801)	Tarakihi
Aplodactylidae	
Aplodactylus arctidens (Richardson 1839)	Marblefish
Latridiidae	
Latridopsis ciliaris (Bloch and Schneider 1801)	Blue Moki
Latris lineata (Bloch and Schneider 1801)	Trumpeter
Gempylidae	
Thyristes atun (Euphrasen 1791)	Snook (Barracouta)
Trichiuridae	
Lepidopus caudatus (Euphrasen 1788)	Frostfish
Notothensidae	
Paranotothenia sp.	Ice Cod
Carangidae	
Trachurus sp.	Jack Mackerel
Pleuronectidae	
Pelotretis flavilatus (Waite 1910)	Lemon Sole
Peltorhamphus novaezeelandiae (Gunther 1862)	Common Sole
C. FRESHWATER FISH (8 species)**	
Anguillidae	
Anguilla australis (Richardson 1841)	Short-finned Eel
Anguilla dieffenbachi (Gray 1842)	Long-finned Eel
Galaxiidae	
Galaxias argenteus(Gmelin 1789)	Giant Kokopu
Galaxias maculatus (Jenyns 1842)	Inanga
Retropinnidae	
Retropinna retropinna (Richardson 1848)	Common Smelt
Eleotrididae	
Gobiomorphus huttoni (Ogilby 1894)	Redfinned Bully
Galaxiidae	
Galaxias fasciatus (Gray 1842)	Banded Kokopu Lowland Kokopu
Geotriidae	
Geotria australis (Gray 1851)	Lamprey

* Two genera and seven species of moray are currently recognised in New Zealand waters.

** The first six species listed probably occurred near Waihora during its occupation (see Sutton 1979: 40, Table 2.2). The next two occurred only in streams and would therefore have been at least 1 km from Waihora. The last species occurred no closer than the mouth of the Nairn River, 11 km to the north.

Note: Nomenclature used for salt and freshwater species in Sutton (1979) was after Paul *et al.* (n.d.) and Skrzynski (1967) respectively. Dr Brett Stephenson has changed that schema into the one given here, but was unable to reexamine the fishbone collection. For that reason errors may occur in this Table.

N38/30, N38/37 and N43/33 respectively. He calculated minimum numbers for these samples on the basis of size-matched thoracic vertebrae using a computer programme developed by Creak (1979) and reconstructed fish lengths (Nichol and Creak 1979) from the measurements of vertebrae.

The method was not applied in the present analysis. First, reconstruction of size distributions for species in the middens was not judged to be necessary to the first objective of the research. Second, no evidence of differential disposal of parts of the fish skeleton was observed in any of the middens. Fish remains were found in quantity in only three of the seven sites excavated. These were Waihora and each of the inland middens, C240/680 and 681.

THE SAMPLES

Captured species which were identified from excavated bone are listed in Tables 2 to 5.

TABLE 2
FISH AT WAIHORA
(after Sutton 1979: Appendix 5.2)

Inshore Species	MNI	Offshore Species	MNI
Blue Cod	1763	Tarakihi	73
Butterfish	1195	Moki	68
Labridae	801	Black Cod	67
Leatherjacket	6	Red Cod	60
		Barracouta	39
		Ghost Shark	35
		Rough Skate	14
		Conger Eel	11
		Elephant Fish	11
		Hapuka	8
		Mackerel	9
		Ling	8
		Trumpeter	6
		Sea Perch	3
		Dogfish	3
		Marble fish	2
		Gurnard	1
TOTALS	3765		418
Freshwater Species	MNI		
Eel	14		
TOTAL ALL SPECIES COMBINED = 4197			

The C240/689 fauna was very specialised. One hundred and thirty five southern fur seals, twelve elephant seals, eight leopard seals and two New Zealand sea lions were identified from approximately 25 percent of the site (Smith 1977: Table 10; Sutton 1979: Table 6:4). The identified fish bone represented one blue cod, a ling and a labrid. They were probably taken to the site in seal stomachs.

SUMMARY

The Waihora fish bone sample is large and highly structured. Less than half of the available fish species are represented. Furthermore, ninety percent of the identified fish are from four

TABLE 3
FISH FROM C240/680, LAYER ONE
(after Sutton 1979: Table 7.3)

Species Name	MNI	% of sample
Blue Cod	3066	61.59
Butterfish	1288	25.87
Labridae	242	4.85
Tarakihi	183	3.68
Black Cod	116	2.33
Leatherjacket	30	0.60
Moki	22	0.44
Conger Eel	16	0.32
Red Cod	5	0.10
Ling	4	0.08
Eels	4	0.07
Hapuka	2	0.04
TOTAL	4978	99.97%

TABLE 4
FISH FROM C240/681, LAYER ONE
(after Sutton 1979: Table 7.5)

Species Name	MNI	% of sample
Blue Cod	602	68.01
Butterfish	147	16.63
Labridae	89	10.06
Tarakihi	21	2.38
Black Cod	14	1.58
Moki	9	1.02
Hapuka	1	0.11
Eel	1	0.11
TOTAL	884	99.9

TABLE 5
FISH REPRESENTED IN COASTAL MIDDENS, C240/266, 273, 277
(after McIlwraith 1976: Table 9)

	SITE		
	Site 266	Site 273	Site 277
Species Name	L.2	L.1	L.1
Blue Cod	1	2	-
Tarakihi	-	1	1
Ling	1	1	-
Labridae	-	1	1
TOTAL	2	5	2

Also present: *Anguilla* spp. and School Shark. These species were represented by a very small amount of material. Minimum numbers per species were not calcuated for them.

inshore species whereas seventeen offshore species make up the other ten percent, with a small number of eels.

The fish bone recovered from C240/680 represented a total minimum number of almost 5,000 fish from thirteen species. Four inshore fish (blue cod, butterfish, labrids, leatherjacket) comprise 93 percent of the sample. Seven offshore species (tarakihi, black cod, moki, conger eel, red cod, ling and hapuka) make up the balance, with a few eels.

The fish bone recovered from C240/681 was very similar to the C240/680 sample, although smaller in size. Again, inshore species are predominant; blue cod, butterfish and labrids comprise 95 percent of the sample. Eels are represented amongst the minor species.

It is of interest that eels are consistently represented in the excavated sites, although in very small quantities. By comparison, eel bone has been identified "from only six sites [in mainland New Zealand] ... and then only in very small quantities" (Marshall 1987: 55, parentheses mine). Eels may have been taken in quantity at specific locations on Chatham Island, preserved, either by smoking or drying, and used during shellfishing and birding trips away from perennially occupied settlements. Skinner (1923) illustrates a number of *patu tuna* (eeling clubs) used for taking eels in streams and from the shallow lakes.

CAPTURE METHODS

Archaeological reconstruction of capture methods is difficult, as Kirch and Dye (1979), Masse (1986) and Green (1986) have pointed out. This problem is particularly severe where, as in the present case, few fishing artefacts have been recovered. In this study Chathams fish species are organised into groups according to the methods required to catch each species in quantity. This follows the method developed by Leach (1976: Appendix 26) in his study of Palliser Bay fishing, although the present scheme differs in matters of detail. The results are shown in Table 6.

The division of the Waihora fish by method of capture is shown in Table 7.

INTERPRETATION

The Waihora fish were apparently taken using several of the potential capture methods listed in Table 6. However, inshore fishing using baited traps, nets, spears and linefishing accounts for nearly 82% of the sample. Offshore and pelagic fishing, using trolling and other linefishing methods, together contributed less than 9%. The eels may not have been captured within the Durham area, because they are uncommon there at present. On that basis it appears likely that they were traded or exchanged down the coast from the north where they occur in quantity in lakes, creeks and the lagoon.

The C240/680 and 681 samples (Tables 3 and 4) are specialised versions of the one from Waihora. A comparable fishing strategy is indicated. However, the long list of minor species which were represented in the Waihora site were not represented in the inland middens. This is presumably because only the more valued species were carried up the slope to those sites.

Fish were a very minor component of the coastal middens compared to the quantities of shellfish they contained (McIlwraith 1976). A very few fish, from inshore waters, were captured during shellfish gathering. Eels were also represented in the middens.

TABLE 6
CAPTURE METHODS
(after Sutton 1979: Appendix 2.6 II)

(A)	Freshwater: nets, traps, clubs and spears
	Anguilla spp.
	Giant Kokopu
	Banded Kokopu
	Lowland Kokopu
	Inanga
	Common Smelt
	Redfinned Bully
(B)	Inshore: baited traps, nets and spearing
	Leatherjacket
	Greenbone butterfish
	Dark Toadfish
	Blue Warehou
	Megrim
	Brill
	Crustacea:
	Crayfish
	Swimming Crab
(C)	Inshore: Nets, hooks, baited traps and spearing
	Blue Cod
	Rock Cod
	Labridae
(D)	Set Nets(1) Pelagic
	Elephant Fish
	Dark Ghost Shark
(E)	Set Nets (2) Demersal
	Lemon Sole
	Common Sole
(F)	Offshore: Line-Fishing
	Hagfish
	Dogfish
	School Shark
	Rough Skate
	Moray Eel
	Conger Eel
	Silverside
	Red Cod
	Ling
	Silver Dory
	Scorpionfish
	Gurnard
	Toadfish
	Sea Perch
	Hapuka
	Tarakihi
	Marblefish
	Moki
	Trumpeter
	Frostfish
	Ice Cod
(G)	Offshore: Pelagic trolling
	Snook (Barracouta)
	Horse Mackerel

TABLE 7
WAIHORA FISH BONE BY METHOD OF CAPTURE
(after Sutton 1979: Table 5.6)

Zone	Method of Capture	Species	MNI	Total	%
Freshwater	Nets, Traps,				
	Spears & Clubs	*Anguilla* spp.	14	14	0.33
Inshore	(A) Baited Traps,	Leatherjacket	6		
	Nets & Spears	Butterfish	1195		
		Crayfish	11	1212	28.80
	(B) Nets, Baited	Blue Cod	1763		
	Traps, Spears &	Labridae	801	2564	60.93
	Linefishing				
	(C) Set Lines	Elephant Fish	11		
		Ghost Shark	35	46	1.09
Offshore	(A) Linefishing	Tarakihi	73		
		Moki	68		
		Black Cod	67		
		Red Cod	60		
		Rough Skate	14		
		Conger Eel	11		
		Hapuka	8		
		Ling	8		
		Trumpeter	6		
		Sea Perch	3		
		Dog Fish	3		
		Marblefish	2		
		Gurnard	1	324	7.69
	(B) Pelagic	Barracouta	39		
	Trolling	Mackerel	9	48	1.14
TOTALS				4208	99.98

SEASONALITY

Unfortunately, seasonality of Moriori fish capture cannot be established on the basis of species presence/absence. This is because the seasonal movements of fish in the Chathams area have never been adequately studied (Paul 1979). It is also a reflection of the very limited quality and quantity of the official records of commercial fishing in the Chathams (Anon. 1928–1974). This means that useful seasonal probability distributions (Leach 1976: 436–56) cannot be produced for individual fish species.

However, two lines of evidence help to define the seasonality of fishing. The first is the need for calm weather. Inshore fishing is made very difficult in high seas or strong winds. However, only 3.64% of days are calm in the Chathams. Moreover, winds from the south-west, to which the Durham Coast is most exposed, are predominant, particularly in winter when they occur with colder air and water temperatures and high southerly swells. Therefore, it is probable that fishing was concentrated in calm periods which, although infrequent, occurred most often in the summer months (Sutton 1979: Figures 2.4, 2.5 ff.).

The quantity of fish bone present in Waihora, and its association there with a diverse range of other seasonal marker species, suggest that at least some fishing occurred at seasons throughout the year (Sutton 1979). However, the association of a large amount of fish bone with osteologically immature bone of Taiko (*Pterodroma magentae*), Southern

Diving Petrel (*Pelecanoides urinatrix chathamensis*) and Broad-billed Prion (*Pachyptila v. vittata*) at C240/680 and 681 can be used to infer the season of occupation of those sites. Broad-billed Prion fledglings are available from December (Fleming 1939; Richdale 1944). Diving Petrel fledglings are available in January (Richdale 1943a). However, presence of Taiko bone in C240/680 and 681 in the absence of immature bone of Whitefaced Storm Petrel (*Pelagodroma marina maoriana*), Sooty Shearwater (*Puffinus griseus*) and Mottled Petrel (*Pterodroma inexpectata*) whose fledglings are available in March, April–May and May respectively (Richdale 1943b, 1963, 1964) suggested to the author that Taiko fledglings were available in the interval December–January and that the inland sites were established within that interval, although not necessarily for the whole of it (Sutton 1984). However, recent field evidence, although limited in quantity, indicates that Taiko eggs are laid about the middle of November and that advanced chicks are present in burrows until approximately the end of April (Crockett and Imber 1988). This implies that the inland sites were occupied or at least visited in December–January and again in April–May, or from December until May. The apparent absence of structural evidence at those sites may indicate short visits, rather than longer term occupation. The absence of Sooty Shearwater bone, in particular, suggests that there was preferential selection of Taiko, although the reasons for that selection remain unknown.

CAPTURE TECHNOLOGY

The data presented above indicate that Moriori fishing was based predominantly on inshore fishing using baited traps, nets, spears and line fishing with some offshore and pelagic fishing, using trolling and other line fishing methods, inshore set lines and eeling. This is supported by what is known of prehistoric Moriori fishing gear.

NETTING

The importance of netting is mirrored in the scarcity of fishhooks in the excavated and museum collections. For instance, only three hooks and one fishhook blank were found at Waihora. They are illustrated elsewhere (Sutton 1979: Figure 5.10). The hooks were: a 5 cm long lure point made of (? seal) bone from Area IV, Square 7 Layer 1; a 3 cm long one-piece fishhook in ivory, probably the circumferential section of a large cetacean tooth (Area VII, Square 13, Lens B); and the snood and shank of a one-piece fishhook in ivory (Area VII, Initial Deflated Surface). The blank was a transverse section of the ascending ramus of a New Zealand Fur Seal. The section was sawn from the mandible and the thin cortical bone was partly drilled out. If that process had been completed, an arc of thick and robust bone would have been left for use as a one-piece hook, approximately 6 cm from snood to base.

Given this tiny number of fishhooks present in relation to the size of the fishbone assemblage (Total Minimum Number for all species combined = 4197) other evidence of fishing techonology was sought. It is, however, very elusive. Some evidence was found of scraping of fibre, possible associated with working of flax to make nets or lines. Valves of *Paphies subtriangulata porrecta* and *P. a. australe* were found at Waihora (Sutton 1979: Table 8.9). They had been taken there from at least 13 km to the northeast, apparently for use as scrapers. Harsant (1978: 117, 166–7) identified the function of four of the Waihora *Paphies* valves as scraping a medium–hard textured material, such as wood. Some of the

abraders (Sutton 1979: Figures 5.15, 5.16) and two of the worked shell artefacts (Figure 5.17a, b) recovered from Waihora could have been used in the same way.

One (? human) bone artefact from Waihora, Area VIII, Square 6, Layer 2, was identified as possibly "a gouge used for either fish or seabirds" (Sutton 1979: Figure 5:11, p. 180). Finally, a grooved piece of pumice was found at Waihora (Area VII, Square 9, Layer 3). It may have been a net float.

Clearly, nets in several sizes were made by the Moriori. Broughton (1792) saw fishing nets at Kaingaroa or Skirmish Bay in 1791.

TROLLING

The kahawai lure is represented in the Chathams by only one example (Anell 1955: 184). The scarcity of lures in the Chathams is related to local sea conditions and fish populations. The one found at Waihora could have been used in a barracouta lure, although Baucke (Skinner and Baucke 1928: 360) figures a similar point in use in a cast lure.

LINE FISHING

One-piece unbarbed fishhooks are predominant in Chathams collections. These are made of marine mammal bone, cetacean ivory or stone. Examples in stone are rare but widely known. Stone fishhooks are found on the Chathams, Pitcairn and Easter Island. These islands all lack reefs and sheltered inshore fisheries. Therefore, stone fishhooks may have been intended for use in turbulent water. Seventy-nine one-piece Chatham Island fishhooks are held in the Canterbury and Otago Museums (Simmons 1962). Smaller numbers are held elsewhere. The author's impression is that some stone hooks were pendants and not functional hooks. The composite hook is very uncommon. Two very large specimens (6.5 and 4.5 inches long) are shown by Skinner with two smaller examples (Skinner 1923: 84, Plate XII).

GAFFING

Baucke's account (Skinner and Baucke 1928: 360) of Moriori fishing shows large curved and barbed hooks on a gaff. This may account for the function of the two large composite hooks mentioned above. However, it is not certain that gaffing occurred in precontact times.

ROD FISHING

Baucke illustrates points the same length as Skinner's two smaller specimens (1.5 inches) set into a wooden barracouta lure. This may account for the few smaller points known from the Chathams. The lure was evidently cast on a rod rather than being trolled behind a boat (Skinner and Baucke 1928: 360).

SPEARING

Types of bone spear points similar to those associated with early levels in New Zealand are represented in the Chathams, although uncommon there (Skinner 1923; Sutton 1979: Chapter 5, Section III). The more robust spear and awl types illustrated by Skinner (1923), may have been used in fishing, specifically for taking fish from inshore pools and still

channels. This is possibly true of the most robust spears found in Waihora (Sutton 1979: Figure 5.11e, f), although unlikely given the range of alternative uses for which they were more suitable. The 61 awls recovered from Waihora appear to have been used in skin working (Cave 1977).

The toggle harpoon is represented in the Chathams by one example which was found at Matarakau in the north-east of Chatham Island (Skinner 1937). This artefact type could have been amongst the tool kit taken to the islands by the initial settlers. Its importance is very likely to have declined quickly in a situation of common cetacean strandings (Gaskin 1968: 1972) and common occurrence of fur seal breeding colonies. However, the practice of spearing fish could have been adopted from the use of toggle harpoons.

WATERCRAFT

Moriori watercraft (Skinner 1919) were wash-through rafts, rather than canoes. They were broad and low in the water (Shand 1911; Skinner 1923) and therefore relatively stable in the prevailing conditions of frequent wind shifts and high wind speeds. Sailing canoes would be disadvantaged by these conditions. Indirect evidence suggests that the rafts developed after approximately A.D. 1500 (Sutton and Campbell 1981). They were used in birding, exchange and social contact, and some fishing. They were particularly suitable for making landings on the steep shores of the albatross colonies (Sutton personal observation 1974–1976) and were evidently used in controlled drift voyages to the albatross colonies (Sutton 1979). However, they were not suitable for open ocean or sustained voyaging (Skinner 1923; see also Lothrop 1932 and Jones 1976).

People living on the south-west coast of Chatham Island would have been unable to maintain boats there, other than those which could be lifted out of the water and carried over the boulder beach into shelter. This practical factor would have limited their ability to fish in the offshore zone, had they wished or needed to do so.

THE IMPORTANCE OF FISH IN MORIORI DIET

Food values were calculated for marine mammals, marine and terrestrial birds, fish and shellfish. The methods used are specified in Sutton (1979: Appendix 8.1). The results indicate that fish contributed 10.1% of the food energy (measured in Kilocalories), 34.6% of the protein (kg) and 2.5% of the fat (kg) represented by the excavated remains of marine mammals, marine birds, terrestrial birds, fish and shellfish in the seven excavated sites (Sutton 1979: Appendix 8.1).

By comparison, 85% of the food energy, almost 60% of the protein, 97% of the carbohydrates and 92% of the fats represented were drawn from the seals identified from C240/680, Waihora and one quarter of the C240/689 midden. On the other hand, shellfish in the excavated sites, although gathered in quantity and presumably by the use of time consuming and laborious methods (Meehan 1977; Kirch and Dye 1979), represented only 1.3, 3.6, 2.9, and 1.6% respectively of the same totals. Terrestrial birds are of approximately the same importance as shellfish. Marine birds appear to have contributed over twice as much in terms of total food values as the terrestrial species.

Fish was also important as a soft food source for the young and old in a highly fibrous dietary regime where the shortage of such foods can cause problems (Sutton 1986). Fish was an accessible and plentiful food source, whenever wind and sea conditions allowed.

CONCLUSION

Fishing was an important part of the prehistoric Moriori lifestyle on the Durham coast during the sixteenth century. It was concentrated on the accessible and productive inshore zone. A few species were taken using a limited set of efficient techniques. Netting from the shore is very likely to have been the principal one of these. Offshore fishing appears to have been uncommon and the development of shore-based fishing using one piece hooks on hand-held lines, rods, and composite hooks and lures on gaffs is indicated by historic and ethnological data. Common species of saltwater fish appear not to have been preserved. By implication, their use in trade and exchange is likely to have been very limited. However, fish species which are available in quantity at only a few places may have had that use. They include eels, lampreys, and inanga which can be taken in quantity from stream mouths, lakes and estuarine locations in the central portion of Chatham Island.

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