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FISHING METHODS AND SEASONALITY AT PAREMATA (N160/50)

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IDENTIFICATION PROCEDURE

The excavations at Paremata near Wellington (described by Davidson, n.d.) produced a moderate quantity of fishbone which was identified using the comparative collection in the Anthropology Department at Otago University. The procedure followed a scheme developed during research in the Wairarapa and carried on in the Chatham Islands (see Figure 1), and is worth describing in some detail. The process involves three quite separate stages.

The initial breakdown is anatomical. Each bag of fishbone is searched for five paired cranial bones which have been found to be useful for the identification of a wide range of species, and are therefore the best from which to calculate minimum numbers on a standard basis. These are the dentary, articular and quandrate in the lower mandible, and the premaxilla and maxilla in the upper. In addition, certain other 'special' bones, characteristic of particular species, are separated.

These include the operculae of *Chelidonichthye kumu* (red gurnard) and *Helicolenus papillosus* (sea perch); the spines of *Navodon scaber* rough leatherjack), *Squalus acanthias* (southern dogfish), *Callorhynchus millii* (elephant fish), and several species of rays; scutes from *Scomber* spp. (Mackerels); and pharyngeal clusters from labrids, odaciids etc. The fish bone is re-bagged and re-labelled at this point using one small plastic bag for each part of the anatomy.

When all the bags of mixed bones have been thus treated, the resulting bags are then sorted into six piles according to the anatomical categories. It is now possible to examine, as a single group, all specimens of fish maxillae from the site, for example. This greatly simplifies the task of species identification, both by allowing a more satisfactory assessment of species, since a range of each bone can be observed at any one time, and also by speeding up the process. As the maxillae are sorted according to species and identified they are again re-bagged and re-labelled.

Some parts of the anatomy are easier to speciate than others, and it has been found worthwhile to undertake the identification in a certain order. The best bones are the dentaries; these are followed by the premaxillae, maxillae, articulae, quadrates, and finally the 'special' bones. The reason for following this order is that the speciation of successively more difficult bones is reinforced to some extent by prior more certain identifications - the same species naturally recur in the different anatomical piles. This order improves confidence and helps to prevent spurious identifications which might arise if articulae, for example, were examined first. The question arises, why try to identify anything other than the dentary? There are several reasons; firstly not all species may be easily distinguished by this bone, and in some fish another part of the anatomy may be far more characteristic. Secondly, the dentary is sometimes highly specialized, as in *Aplodactylus meandratus* (marblefish) and *Rhombosolea* spp. (flounders) and easily discarded as an unidentifiable fragment. Thirdly, in some species such as *Anguilla* spp. (freshwater eels) the dentary and premaxilla are far less durable than the articular, for example, which fortunately in this case is also quite characteristic of eels. There are more reservations again for each part of the anatomy other than the dentary, and to obtain anything like a complete list from a site much more than just this one bone must be identified.

The information can now be evaluated as a group of identifications belonging to each species in turn. The data are booked according to each cultural level in the site and minimum numbers calculated in the usual fashion (Chaplin, 1971:70ff); although it is usually difficult to give much attention to the possibility of unpaired left and right bones.

The procedure outlined may sound rather complicated, but in practice it has proved the simplest, quickest and most reliable method of carrying out a most difficult job. Osteological collections of New Zealand fish are very limited, and accurate identifications cannot be obtained by simply finding a comparable looking bone in a restricted comparative collection. Two examples of hazards might be mentioned. The standard cranial bones of *Thyrsites atun* (barracouta) are so similar to those of *Lepidopus caudatus* (frostfish) that even with a lot of experience, almost every fragment must be checked against both to be certain which it is. To make matters worse, the bones of both these species are very friable and seldom survive intact in archaeological sites. These two fish occupy very different ecological niches, and it is important to identify the frostfish if it is present because it is one of the best seasonal markers of winter habitation.

Again, the premaxillae of *Latridopsis ciliaris* (blue moki) and *Cheilodactylus macropterus* (Tarakihi) are extremely difficult to separate, and with these bones and a number of others, identification revolves about deciding what it is not, rather than the reverse.

It must be stressed that with the exception of the elasmobranches, the identification of infra-cranial anatomy such as vertebrae is notoriously difficult. Fine-grained X-rays of cartilaginous vertebrae reveal calcification patterns which can enable species to be identified. In the main, however, the systematic identification of fishbone must rest with cranial fragments. The minimum numbers, therefore, could be biased by various cultural practices related to preparation of the fish by prehistoric people such as filleting, and also by techniques of preservation to overcome winter shortages. No simple solution to these problems can be suggested, other than keeping a close watch for obvious discrepancies in the relative quantities of cranial and infra-cranial material.

THE PAREMATA ASSEMBLAGE

The remains of 136 fish belonging to 18 species were identified from the Paremata site. Fragments of at least three more species could not be matched with existing comparative material. This is a fairly large number of species for North Island middens, but is comparable to other sites in Cook Strait, such as those in Palliser Bay - the Washpool Midden Site (N168/22), for example, produced 27 species, and the Black Rocks middens (N168/77) had 17.

The fish were grouped into 6 stratigraphic units, of which 3 represent the major successive occupations of the site and 3 reflect disturbed or uncertain contexts, resulting from the recent history of the site. Paremata has long attracted fossickers and material grouped in unit D comes from gross disturbances detected during excavation and thought to be recent fossicking pits. Bulldozing of the site immediately before excavation redeposited some material on the surface of the site. This was grouped as layer 1. Material in both D and 1 could be derived from any of the major occupations. Layers 2A/2B were interpreted as the archaeological manifestation of an historically documented European Maori settlement, Paremata Pa, which existed on the site from the late 1830s to the mid 1840s. Layers 2C and 3 represent late and early prehistoric occupations respectively. Moa and other extinct birds were associated with layer 3 but not with layer 2C. In some parts of the site, it was not clear whether some lenses belonged to the layer 3 occupation, or to that of layer 2C; such material was accordingly separated as layer 2C/3, and is considered definitely prehistoric, but possibly a mixture of material from the two main prehistoric occupations.

The minimum numbers of species for each stratigraphic unit are set out in Table 1.

From a knowledge of modern fishing techniques and the habits and ecology of the various species (see B.F. Leach 1976:Appendix 27) it is possible to group these figures into several fishing zones and catching methods which were employed by the fishermen who occupied the site. This is set out in Table 2, from which it will be seen that the activity represented at all levels was concentrated around baited hook and line fishing for demersal fish, although significant catches of pelagic fish were also made with surface trolling lures. It is likely that set nets were also used, but there are no indications that either baited traps were used or diving or spearing was engaged in. This contrasts with Palliser Bay evidence to some extent (q.v. Leach 1976:Appendix 25). It is clear from Table 2 that these people at Paremata concentrated their fishing over rocky broken ground, apparently mostly in deeper offshore waters as distinct from inshore fishing from rock platforms for example. There is no such environment in the immediate vicinity of the Paremata site, which is situated on the shore of a sandy harbour. Evidently the occupants of the site made fishing expeditions, probably by canoe, to deep waters, possibly over some offshore weedy reef on the outer coast or towards Mana Island. It is curious that no hapuka (*Polyprion oxygeneios)* were present in the site if this interpretation is correct. Brees (1849:9) particularly mentions hapuka and moki as abundant in the area at the time of Paremata Pa. In addition, it is also clear that set nets and baited hook fishing were employed in weedy inshore rocky areas. Again, no environment of this kind is present in the immediate vicinity, and the people must have made trips to some area where a rocky shore is found, either across the harbour entrance to the Whitireia Peninsula, or along the coast to the North. Finally, the pelagic fish caught by trolling lure, and also the rays, may have been taken nearer to the site, as these species frequent open harbour areas.

Fishing gear recovered in the excavations was not numerous. However, one and two-piece bait hooks predominated, with lure shanks also represented in both prehistoric and historic occupations. This parallels the evidence of the fish themselves.

There do not appear to be any significant changes through time in the catching methods employed by the Paremata inhabitants. This contrasts with the Washpool site where a general decline in offshore fishing took place in favour of inshore foraging about broken rocky ground.

The change there was interpreted as part of a more general decline in marine conditions towards the end of the fourteenth century A.D. related to a deteriorating local environment brought about by deforestation, and augmented by a more general climatic shift in New Zealand (Leach, 1976:179). No such indications are present in the Paremata evidence, and this suggests that the general marine conditions remained fairly stable over the period involved. Nineteenth century descriptions of Porirua suggest that the hills in the immediate vicinity of the site were still bush clad at the time Paremata Pa was occupied (Brees 1849:9). In Palliser Bay, therefore, cultural interference with the land may have been the most significant factor in bringing about the observed changes.

Using information on the modern migratory habits of New Zealand fish, together with both the accumulated data on commercial catches and recorded observations by both Maori and European fishermen, it is possible to assess the likelihood of catching any species of fish in any given month for a particular part of New Zealand. By scaling these probabilities according to the minimum numbers of the different species of fish in a midden deposit, an assessment may be made of the probable months at which the site was occupied. This method of seasonal dating is fully discussed elsewhere (Leach, n.d.,), and was applied to the Paremata remains. The results are shown in Figure 2. On the whole it appears that people occupied the site on an increasingly permanent basis through time. In the earliest context, there is a clear pattern of summer exploitation. This recedes, until with the European Maori phase the probabilities are more or less uniform throughout the year, and resemble the pattern obtained for a permanent settlement such as the Washpool Midden site (Leach, 1976:203). Historical evidence shows that Paremata Pa was permanently occupied. Although the date of its founding is uncertain, it was inhabited for at least five years and abandoned by the mid 1840s, when relations between Maoris and settlers in the area deteriorated (Davidson n.d.). The indication of permanent settlement in the fish from layers 2A/2B, therefore, is strongly supported by a completely different line of evidence.

Although it was earlier suggested that the prehistoric occupation may also have been permanent settlements of several years duration in the main excavation report (Davidson n.d.), this view may need revision since the fish remains appear to indicate summer occupation, particularly for the earliest layer. It is always difficult to show that sites were not occupied in winter, even if there are no positive winter indicators. In this case, however, the contrast between the probabilities for the known permanent settlement and the earlier settlements is highly suggestive.

One of the most important aspects of the Paremata site is the comparison it offers between an historically documented nineteenth century Maori settlement, and earlier prehistoric occupations of the same spot. The inhabitants of Paremata Pa were recent Ngati Toa immigrants to the district from a quite different part of the North Island and had apparently no connection with earlier occupants of the site. Nevertheless, they chose to occupy exactly the same position and to exploit many of the same resources. The similarities in catching methods and fishing grounds exploited through time, revealed by the analysis of fish bones, parallel the similarities in the exploitation of birds, sea mammals and shellfish previously observed. The indication that the site's inhabitants were travelling by canoe to various fishing grounds across the harbour and on the outer coast is in line with the suggestion that the reason for the occupation of the site by successive unrelated groups was its convenient position for canoe travel to different resources. On the other hand, a striking difference between Paremata Pa and its predecessors is revealed in the seasonal occupation patterns. Paremata Pa co-existed with a European whaling station, inn and ferry. The possibility must therefore be considered that the proximity to European settlement permanent occupation of a kind which the site's resources could not sustain in prehistoric times.

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FIGURE 1 Fish identification schema

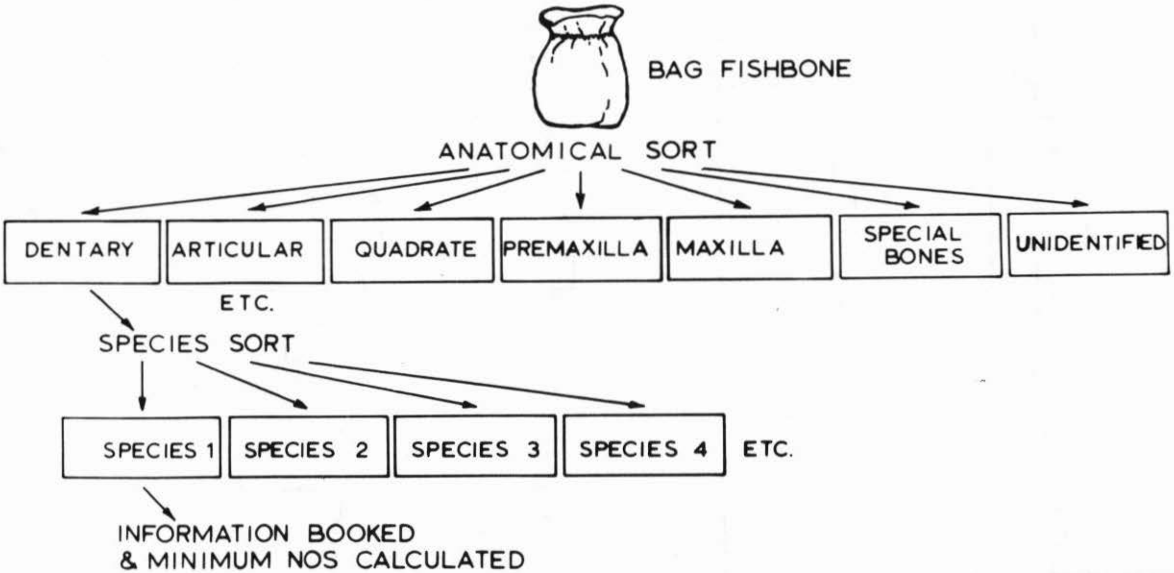

FIGURE 2 Seasonality at Paremata (N160/50)

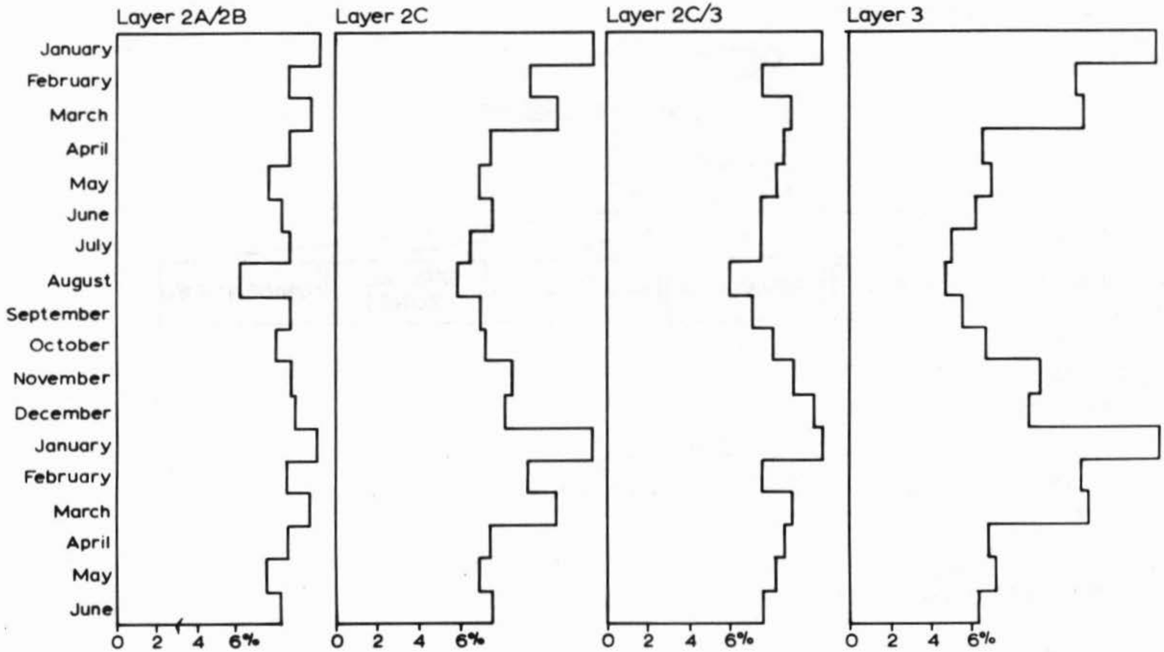

TABLE 1

FISH MINIMUM NUMBERS FROM PAREMATA N160/50

(figures in brackets are percentages)

	D	1	2A/2B	2C	2C/3	3	Total
Chrysophrys auratus (Snapper)	5(18.5)	4(25.0)	5(17.9)	3(15.8)	6(31.6)	6(22.2)	29(21.3)
Pseudolabrus spp. (Spotty)	4(14.8)	2(12.5)	4(14.3)	5(21.1)	3(15.8)	6(22.2)	23(16.9)
Arripis trutta (Kahawai)	3(11.1)	1(6.3)	2(7.1)	3(15.8)	1(5.3)	6(22.2)	16(11.8)
Latridopsis ciliaris (Moki)	2(7.4)	1(6.3)	3(10.7)	1(5.3)	1(5.3)	1(3.7)	9(6.6)
Caranx lutescens (Trevally)	2(7.4)	1(6.3)	1(3.6)	1(5.3)	1(5.3)	2(7.4)	8(5.9)
Conger verreauxi (Conger eel)	2(7.4)	1(6.3)	2(7.1)	-	1(5.3)	1(3.7)	7(5.1)
Thyrsites atun (Barracouta)	2(7.4)	1(6.3)	1(3.6)	1(5.3)	1(5.3)	1(3.7)	7(5.1)
Zeus japonicus (John Dory)	1(3.7)	1(6.3)	1(3.6)	1(5.3)	1(5.3)	2(7.4)	7(5.1)
Coridodax pullus (Greenbone)	2(7.4)	-	2(7.1)	1(5.3)	-	-	5(3.7)
Physiculus bachus (Red Cod)	-	1(6.3)	2(7.1)	1(5.3)	1(5.3)	-	5(3.7)
Myliobatis tenuicaudatus (Eagle ray)	1(3.7)	1(6.3)	1(3.6)	-	1(5.3)	1(3.7)	5(3.7)
Cheilodactylus macropterus (Tarakihi)	1(3.7)	-	1(3.6)	1(5.3)	-	1(3.7)	4(2.9)
Aplodactylus meandratus (Marblefish)	-	-	-	2(10.5)	-	-	2(1.5)
Callorhynchus millii (Elephant fish)	-	-	1(3.6)	-	1(5.3)	-	2(1.5)
Parapercis colias (Blue cod)	-	-	1(3.6)	-	1(5.3)	-	2(1.5)
Chelidonichthys kumu (Gurnard)	1(3.7)	1(6.3)	-	-	-	-	2(1.5)
Dasyatus thetidis (Sting ray)	1(3.7)	-	1(3.6)	-	-	-	2(1.5)
Dasyatis brevicaudatus (Sting ray)	-	1(6.3)	-	-	-	-	1(0.7)
TOTALS:	27(99.9)	16(100.5)	28(100.1)	19(100.3)	19(100.4)	27(99.9)	136(100.0)

TABLE 2

FISH FROM PAREMATA (N160/50) BREAKDOWN ACCORDING TO DIFFERENT CATCHING METHODS

Catching Method	D	1	2A/2B	2C	2C/3	3	Totals
Hook and line - demersal offshore Reefs and Sandy Bottoms *Chrysophris auratus* *Latridopsis ciliaris* *Caranx lutescens* *Conger verreauxi* *Physiculus bachus* *Cheilodactylus macropterus* *Parapercis colias* *Chelidonychthys kumu*	13(48.1)	9(56.3)	15(53.6)	7(36.8)	11(57.9)	11(40.7)	66(48.5)
Hook and Line - demersal inshore Rocky Ground *Pseudolabrus* spp. *Zeus japonicus*	5(18.5)	3(18.8)	5(17.9)	5(26.3)	4(21.1)	8(29.6)	30(22.1)
Hook and Line - demersal inshore Sandy Bottoms. *Myliobatis tenuicaudatus* *Dasyatus thetidis* *Dasyatus brevicaudatus*	2(7.4)	2(12.5)	2(7.1)	-	1(5.3)	1(3.7)	8(5.9)
Baited Traps and/or diving and Spearing - demersal inshore rocky ground	-	-	-	-	-	-	-
Trolling Lure - Pelagic *Arripis trutta* *Thyrsites atun*	5(18.5)	2(12.5)	3(10.7)	4(21.1)	2(10.5)	7(25.9)	23(16.9)
Baited Traps and/or spearing Freshwater	-	-	-	-	-	-	-
Set Nets *Coridodax pullus* *Aplodactylus meandratus* *Callorhynchus millii*	2(7.4)	-	3(10.7)	3(15.8)	1(5.3)	-	9(6.6)
TOTALS:	27(99.9)	16(100.1)	28(100.0)	19(100.0)	19(100.1)	27(99.9)	136(100.0)