Faunal composition of Pamwak site, Manus Island, PNG

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Faunal analysis of an archaeological site can give an indication of the movement and interaction of people with their environment. Technological changes (such as technologies associated with fishing) may be indicated by alteration in faunal composition through time. This paper is designed to present the faunal composition of Pamwak site, PNG, and changes in that composition.

The paper concentrates on the presence/absence of animals in the site rather than discussions of MNI (Minimum Number of Individuals). The two factors which influenced this discussion were the sloping stratigraphy (causing possible mixing of different aged faunal assemblages), and the analysis of the bulk residue (discussed later).

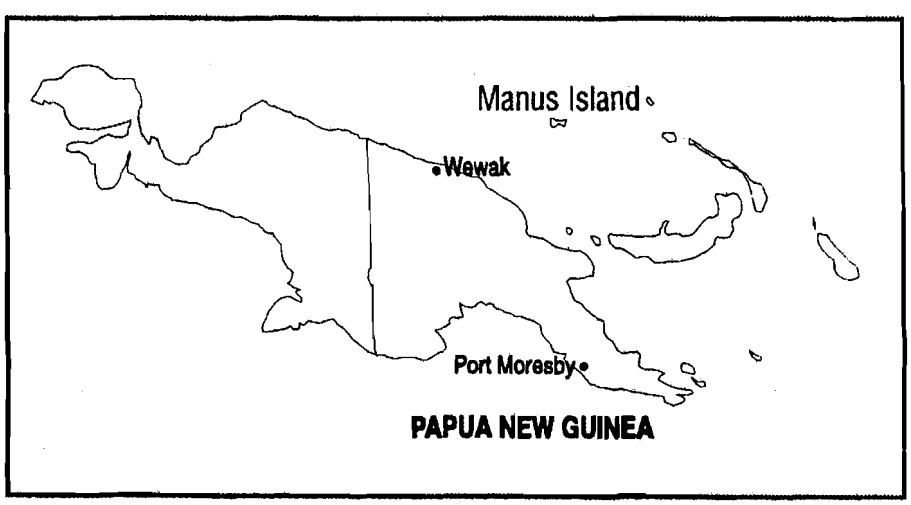

Figure 1
Map showing Manus Island, Papua New Guinea.

Method

The Site

Pamwak site is situated on Manus Island, Manus Province, PNG. It was dug in 1989 and 1990 by W. Ambrose, M. Spriggs and C. Fredricksen. It is a rockshelter site 4 km from the Manus Island south coast (Figure 1).

An area of 4 square m was excavated. 5 cm spits were taken by quadrat for each of the four squares (see Figure 2). Material was wet screened through 1.4 mm mosquito-wire mesh and sorted in the field. Bulk samples of the screen residue material were kept for later laboratory sorting of selected quadrats of the site. C14 dates taken from charcoal, shell and *Celtis* seeds range back to 12,000 BP (14,000 BP calibrated). AMS dates for the site are currently being processed. The stratigraphy and artifact assemblage of the site are described in Fredricksen *et al.* (1993).

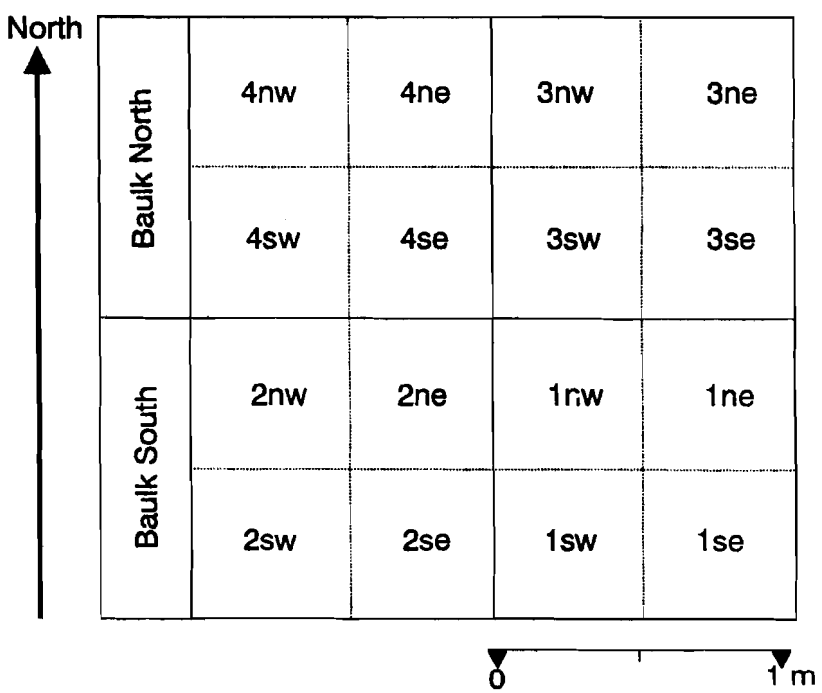

Figure 2
Pamwak excavation, plan view.

Bulk sample analysis

Analysis of the bulk sample from the screen residue was undertaken to quantify the loss of bone during excavation and field sorting. The bulk sample was the screen residue kept after the original (non-bulk) sample was field sorted. All of the bulk fragments were counted, the greatest particle length measured and then identified as far as possible. T-tests were used to determine the size similarity of the bulk and non-bulk samples.

Results

Results of bulk residue analysis

The size of bulk and the non-bulk material was the same. Overall the size decreased with depth. Species of anurans (frogs) were the only taxa which were recorded in the bulk samples when not already present in the non-bulk sample. Postcranial element numbers were depressed by up to 50% in the original sample when compared with the bulk sample. Cranials elements were missed to a lesser degree.

The Fauna

Identifiable bone was recovered down to spit 29a. Small pieces of highly degraded bone were recovered below this but could not be identified. Most of the fish in the sequence are onshore or reef species.

Two groups, the Sphyraenidae and Scombridae, are pelagic fish, although species within these groups are known to venture nearshore into shallow waters. The single scombrid occurs in Square 2 Spit 5b (approx 8730+/-130). The Sphyraenidae occur at Sq4/2b, SQ2/2a ,4a, 5a (later than 10160+/-90) (see Table 1).

Square One (Fig. 3 and 4)

The Bandicoot *Echimpera kalubu* first appears in the square at spit 15a (approx 12400+/-480 BP).

Mammals		Reptiles	
Spilocuscus kraemeri	(Admiralty Cuscus)	Tiliqua sp.	(Blue Tongue Lizard)
Echimpera kalubu	(Common Echimpera Bandicoot)	Varanidae	(Varanid Lizard)
Pteropus hypomelanus	(Variable Flying-Fox)	Gekkonidae	(Gekkonid Lizard)
P. admiralitatum	(Admiralty Flying-Fox)	Scincidae	(Skincid Lizard)
P. neohibernicus	(Great Flying-Fox)	Bony Fish	
Hippersideros maggietaylorae	(Maggie Taylor's Horseshoe Bat)	Platycephalidae	(Flatheads)
Melomys sp.	(Manus Melomys)	Serranidae	(Gropers, Coral Cod)
Rattus rattus	(Black Rat)	Lutjanidae	(Snappers, Bass, SeaPerch)
R. mordax	(Eastern Rat)	Nemipteridae	(Sea Breams)
R. praetor	(Large Spiny Rat)	Pomadasyidae	(Grunters, Javelin Fish)
Birds		Lethrinidae	(Emperors)
Rallidae cf Porphyrio porphyrio	(Swamphen)	Sparidae	(Silver Breams)
		Sphyraenidae	(Barracudas)
Ardiedae cf Nycitiorax caledonicus	(Rufous Night Heron)	Labridae	(Wrasses)
		Scaridae	(Parrot Fishes)
Podicepedidae	(Grebes)	Scombridae	(Mackerels, large Scaled Tuna)
Amphibian		Balistidae	(Trigger Fishes)
Anura	(Frogs and Salamanders)	Diodontidae	(Porcupine Fishes)

Table 1
Fauna list from Pamwak Site, Manus Island, PNG. The faunal composition of the site is shown, by square, in Figures 3 to 10 and discussed below.

Melomys sp. occurs at spit 25a, but there is an inconsistency with the C14 dates at this level and further AMS dates are being processed. *Murid sp.* (from post-cranials) occur throughout the site although none are recorded in the top two spits. Unlike the mammals, the reptiles, fish and amphibians are recorded throughout most of the levels.

Square Two (Fig. 5 and 6)

E.kalubu first appears in spit 15a and continuies until the present. The small cuscus *Spilocuscus kraemeri* first appears at spit 13b (approx. 11,000 BP). The occurrence of *Rattus rattus* at the lower depths (i.e. Spit 15b) is surprising, and accordingly this identification (from four mandibles) is under review.

Rattus praetor first appears at approximately 9000 BP. *R. mordax* is present towards the top of the sequence (Spits 3 and 4). The larger bats first occur at around Spit 15b. Fish and amphibians extend throughout depth. A single Scombrid occurs in Square 2 Spit 5b dated at 8730 +/-130 BP. The Sphyraenids occur at Square 2 spits 2a, 4a and 5a (later than 10160+/-90 BP). A single bird is recorded from Spit 7B and has been assigned to the family Podicepedidae (Grebes).

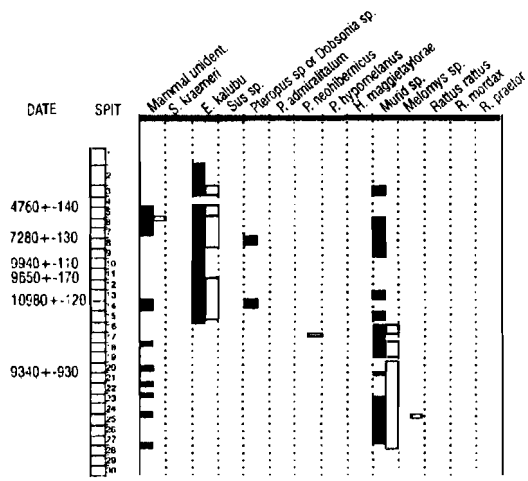

Figure 3
Mammal species by depth for Square One. Black filled boxes indicate postcranial bones, white filled boxes indicate cranial bones.

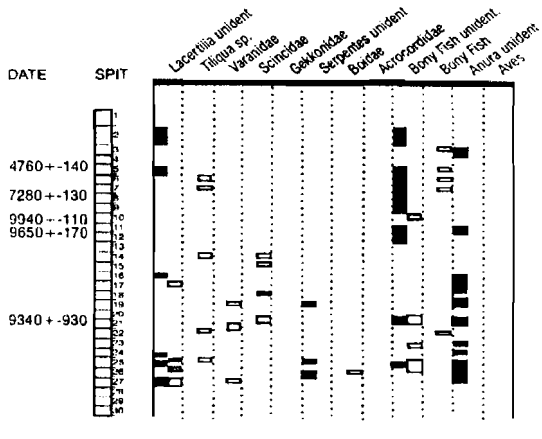

Figure 4
Non mammal species by depth for Square One. Black filled boxes indicate postcranial bones, white filled boxes indicate cranial bones.

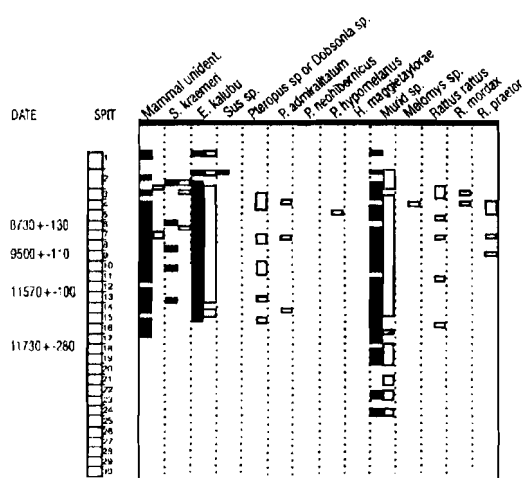

Figure 5
Mammal species by depth for Square Two. Black filled boxes indicate postcranial bones, white filled boxes indicate cranial bones.

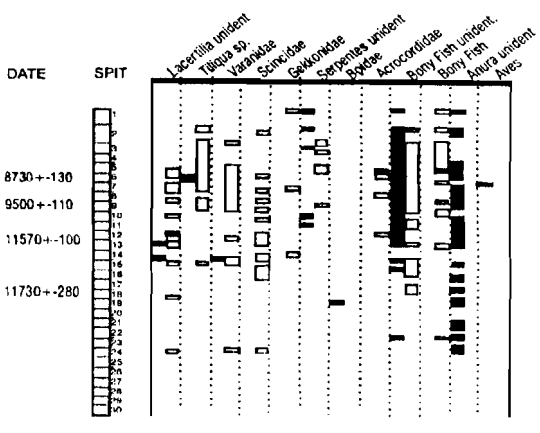

Figure 6
Non mammal species by depth Two Square Two. Black filled boxes indicate postcranial bones, white filled boxes indicate cranial bones.

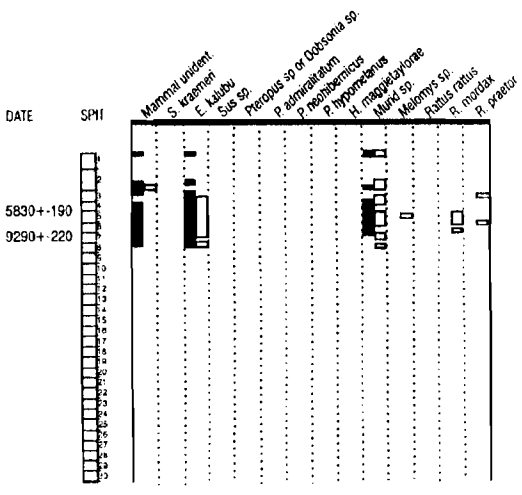

Figure 7
Mammal species by depth for Square Three. Black filled boxes indicate postcranial bones, white filled boxes indicate cranial bones.

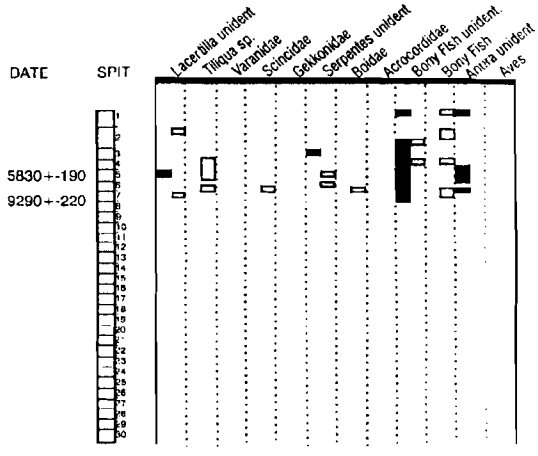

Figure 8
Non mammal species by depth for Square Three. Black filled boxes indicate postcranial bones, white filled boxes indicate cranial bones.

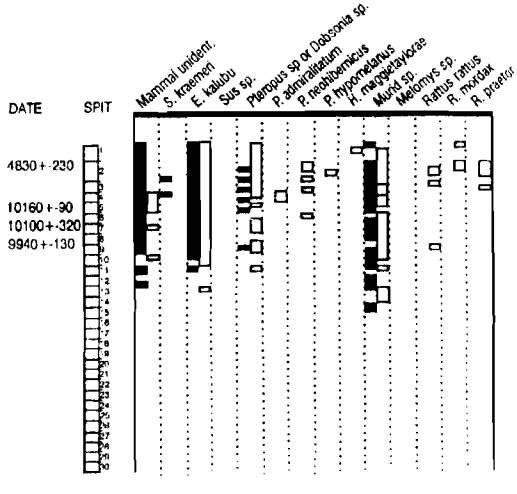

Figure 9
Mammal species by depth for Square Four. Black filled boxes indicate postcranial bones, white filled boxes indicate cranial bones.

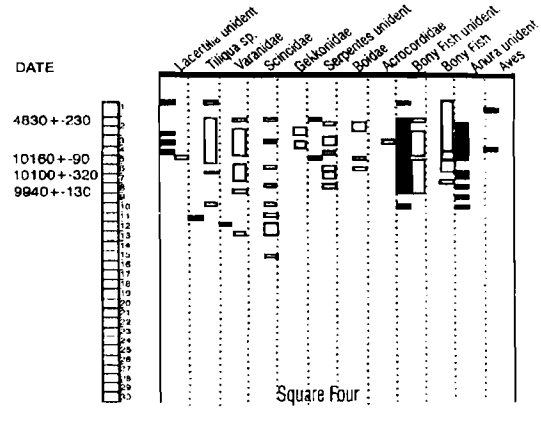

Figure 10
Non mammal species by depth for Square Four. Black filled boxes indicate postcranial bones, white filled boxes indicate cranial bones.

Square Three (Fig. 7 and 8)

This square was excavated to 95 cm. The limited depth mirrors the faunal patterns seen in the other squares. The rats, *R. praetor* and *R. mordax* occur in the same levels, although *R. mordax* continues to occur at the top of the sequence when *R. praetor* is no longer recorded.

Square Four (Fi. 9 and 10)

Excavated to 170 cm depth this square displays a solid record of the bandicoot, large bats and the murids.

This square had the greatest numbers and diversity of bats recorded. Once again, the presence of *R. rattus* (1 individual) requires further investigation. The bird from Spit 2B is from the family Rallidae and the other (Spit 4B) is assigned to the family Ardeidae. It is similar to the Rufous Night Heron *Nyciticorax caledonicus*, but further material is needed to confirm the identification. A Sphyraenid fish occurs at Square 4 Spit 2b, dated to 4830+/- 230 BP.

Discussion

Implications of Bulk Analysis

The size of a bone was not a significant factor in its frequency of recovery. The uniform overall decrease of size of bones with depth may be an indicator of site-wide postdepositional destruction and or compaction.

Frogs were the only taxa missed in excavation. The element composition was markedly different in the two samples, with the postcranial elements were often missed in the nonbulk collection. This has implications for the calculation and reliability of MNI counts. Any counts of MNI from Pamwak will require that spits with no corresponding bulk residue be viewed with caution. Further discussion of the analysis of the bulk sample residue is undertaken in Williams (1997).

Faunal Change

Echimpera kalubu first appears at approx. 12,000 BP. This corresponds to the change in use from stone tool to obsidian (Fredricksen *et al.* 1993). Reef- and onshore captured fish also appear in the site from this time onwards. The implication of the bandicoot presence is that it was brought to the island by people accidentally or as a food source.

Spilocuscus kraemeri, the small Cuscus, first appears at approx. 11,000 BP. This is an older date than the phalanger *(P. orientalis)* from the Balof shelters (White *et al.* 1991) and a younger date than the phalanger *(P. orientalis)* from Panakiwuk Site, New Ireland (Marshall and Allen 1991). The Manus Island Cuscus is a different species from the one found on New Ireland, and because of its smaller size is believed to have come from a different original population from the New Ireland phalanger (Flannery 1995).

The identification of *Rattus rattus* at approx. 11,000 BP is surprising, and if it does turn out to be a true artifact of the site then it will be the earliest occurrence of this species in the region. The majority of fish in the sequence were onshore or reef species. Two of the recorded groups (the Sphyraenidae and Scombridae) are pelagic, fish, although individuals from these groups may be found in shallow marine waters. Pelagic fish appear in the site at approximately 10,000 to 4,800 BP. This suggests the use of sophisticated fishing technologies from at least 10,000 BP.

Rattus praetor first appears at approx. 9,000 BP, and is present in the sequence at the same time as *R. mordax*. *R. mordax* is present at the top of the sequence when *R. praetor* is no longer recorded. This is in contrast to the Balof shelters where the introduction of R. praetor preceeds the extinction of *R. mordax* (White *et al.* 1991).

Further Work

Measures of bone modification such as breakage, weathering, burning, presence of cutmarks and dissolution have been taken. Once processed, these results will be analysed to elucidate possible agents of accumulation of the site. From initial inspection it would appear that the fauna accumulated by both human and animal means. Comparisons will be carried out between the faunal and human artifact components of the site. Also, the early presence of *R. rattus* will be investigated further.

Acknowledgements

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