THE PHYSICAL AND CULTURAL SETTING OF MOTUPORE ISLAND, CENTRAL PROVINCE, PAPUA NEW GUINEA

Motupore Island is a submerged hilltop 16 km east of Port Moresby, and 650 m from the nearest point of the mainland. It is narrow and steep, being approximately 800 m long, 200 m high and less than 100 m wide at its widest point. It is situated in a large bay, Bootless Bay, which is protected from heavy seas by a barrier reef which runs across its mouth. There is another island, Loloata, of about the same size as Motupore, and several smaller islands in the bay, each of which has a fringing coral reef. Depths in the bay vary considerably, but inshore they are quite shallow.

Climate in the Port Moresby region is controlled primarily by the wind system which alternatesseasonally. From April/May to November/December the SE trade winds bring drier and cooler conditions. For the remainder of the time the NW monsoon brings the rain. Since both the coast and ranges are generally aligned along a NW-SE axis, rainfall is abnormally low in comparison with other areas in Papua New Guinea, particularly right on the coast, where the average annual rainfall is less than 100 cm p.a. Average daily sunshine exceeds seven hours with the result that annual evaporation rates are higher than rainfall. Thus the flora of the region, unlike the lowland tropical rainforests on other parts of the coast, ranges from subtropical to temperate, with large areas of savannah.

Landforms on the mainland immediately adjacent to Motupore have been classified by Mabbutt *et al.* (1965) into a coastal hill zone and a littoral plain zone. The coastal hill zone comprises rounded hills and lowlands covered with savannah (predominantly *Themida australis - Eucalyptus*, with some *Ophiuros - Eucalyptus alba*) and is characterised by cherty limestone ridges, dark alkaline lithosols and red clay soils. Areas of grassland (*Saccharum spontaneum - Imperata*) also occur. The littoral plains zone in this region is represented only by narrow pockets of mangrove tidal flats (mainly *Rhizophora - Bruguiera*).

Motupore Island itself is covered in *Themida australis - Eucalyptus* vegetation, with mangrove along its shoreward (protected) side. At the northern end a cuspate sandspit of approximately 1.5 ha has formed and been consolidated with grass cover. This is fronted by a sand beach and

tidal sandspit from whence it derives its name in Motu, the local language (motu = island; pore = gravel or sand bank). It has also been known in the past as Motuhanua (hanua = village).

Given the environment, its potential to provide human food resources can be summed up as follows. Bootless Bay is a large and reasonably well-protected stretch of water which, with its coral reefs provides abundant resources in terms of fish, shellfish, turtle, and in the past, dugong and crocodile. No major rivers enter the sea in this area, so that true esturine conditions are absent. However several small creeks empty into the bay, so that even in prolonged dry spells there would have been drinking water readily available, and within reasonable canoe distance of the waterless Motupore Island. The overriding impression of the adjacent mainland and inland plains, often mentioned by the early ethnographers, is one of a dry and rocky and fairly barren landscape unsuited to gardening. In a general sense this is accurate, particularly when this area is compared to other higher rainfall areas with their lush tropical vegetation. However, small edaphically determined areas and some valley floors provide land that can be cultivated at a subsistence level in conjunction with the wet season rains. A variety of "bush foods" - vegetables and fruits - available in the region have recently been discussed by Oram (in press) but the available quantities and distribution of these foods are unknown. Similarly, no detailed studies of the fauna of the area have been made, but the following list of animals is given to suggest what may have been available at the time of European contact: the short-beaked echidna (*Tachyglossus aculeatus*); a variety of bandicoots (including *Echymipera kalubu*, *E. rufescens*, *Peroryctes raffrayanus* and *Isoodon macrourus*) of which the last listed, the brindled bandicoot, is probably the most common; the phalangers (cuscus) *P. maculatus* and *P. orientalis* and possibly the possums *Dactylopsila trivirgata* and *Pseudocheirus canescens*; the sugar glider (*Petaurus breviceps*); the agile wallaby (*Macropus agilis*), the dusky wallaby (*Thylogale bruijni*) and the greater forest wallaby (*Dorcopsis hageni*); various species of bats, rats, snakes, lizards and insects; and the introduced pig and dog. Of this list, the agile wallaby and the brindled bandicoot are perhaps the only true grassland dwellers, with the echidna being very adaptable to this environment, and therefore likely to have been present in quantity.

An Outline of Archaeological Research on Motupore

The archaeological importance of Motupore Island was brought to the attention of Mr R. Lampert of the Department of Prehistory, ANU, in 1967 by Mr R. McKay, then of the Papuan New Guinea Museum, and Dr W. Woods, then of the Medical Faculty, University of Papua New Guinea. These gentlemen had previously dug up some skeletal material on the island which has since been lost. With the permission of the owners, Lampert conducted a small excavation which was reported in a roneoed document written by himself and J. Golson and circulated by the Department of Prehistory 1967. In 1970 the island was purchased by the University of Papua New Guinea as a field station and laboratory for a number of disciplines including archaeology, and excavations have been carried out there as follows :

July 1970	J. Allen and W. Ambrose
April 1971	J. Allen and S. Bowdler
June-July 1971	J. Allen
April-May 1972	S. Bowdler and M-J. Mountain
June-July 1972	S. Bowdler and M-J. Mountain
April-September 1973	J. Allen and intermittently M-J. Mountain and P. Swadling
June-July 1974	M-J. Mountain
May-June 1975	J. Allen and A. Thorne
June-July 1975	M-J. Mountain

Mr I. Saem Majnep, Department of Anthropology and Sociology, University of Papua New Guinea, was chief field assistant for all these field seasons.

This schedule reflects the use of the site as a training site for UPNG prehistory students. This course was initiated by Allen, and after he had left UPNG, subsequently maintained by Bowdler and Mountain. With the exception of the 1972 excavations, however, the strategy of excavation initiated in the first year had been continued, both in terms of excavation techniques and policy. The one major season, 1973, was designed to follow-up specific problems which had arisen in the preceding seasons. The first of the 1975 seasons was specifically to excavate burials discovered in 1973. All of the material produced from the site between 1970 and 1975 is in the Department of Prehistory, ANU, for

analysis by Allen. The analysis deals primarily with the material directly excavated by Allen, which is the bulk of the collection.

The prehistoric site is essentially coterminous with the sandspit, plus the beach and tidal spit. Pottery, shell and other archaeological debris can be recovered from all these areas, but are not found anywhere else on the island. The previous owners of Motupore had rotary hoed the entire flat area of sandspit and had planted much of it under coconut and other gardens. By 1970 these gardens had perished, although some of the coconut trees had survived. However, any surface indications of deposit had been effectively obliterated, with the major exception of the area hard against the hillslope. Subsequent testing indicated an average depth of a metre of midden sitting against this slope for a distance of over 200 m, while at three localities very distinct mounds of greater depth projected out from the hill.

Since in 1970 almost nothing was known of the prehistoric sequence in the region it was decided, against the canons of good archaeological excavation, to sink a two metre square test pit through the centre of the largest of these mounds, as this promised some hope of providing a complete sequence of material, and particularly pottery, for the site. Surface indications suggested that not only was this mound very rich in material, but that the pottery sherds were likely to be on average very large in size. For this reason the material was sieved through half inch sieves. Both the excavation strategy and the coarse sieves reflected as well the short periods of time available for excavation in 1970 and 1971 and the short supply of student labour.

Against all expectation archaeological deposit continued down for over four metres. The upper 2.5 metres consisted of very rich midden material, while the lower portion, considerably less rich in material, produced several postholes and suggested habitation deposit. This early test excavation produced vast quantities of pottery, flaked chert, shell jewellery and implements and faunal remains. As an example of this richness, despite the coarse sieves, this square produced 142,000 sherds - an average of almost 9000 per cubic metre. This density was considerably higher in the upper midden layers. It was to further explore the early habitation layers that 45 square metres of deposit was opened up adjacent to this mound in 1973, as well as to test the possibility of an

hiatus in the midden test square.

Test excavations at several points on the flat produced high densities of material as well, but being in beach sand offered little or no stratigraphic control. Bowdler and Mountain excavated further on the flat area in 1972 and recovered seven burials; confirming other evidence to suggest that a large number of people were likely buried in the site. In 1973, adjacent to these excavations, Allen opened up a ten by nine metre square to a depth of approximately 30 cm and traced a compacted living surface over this area which revealed a confused pattern of postholes and approximately 20 more graves. In 1975 Allen and Thorne removed 17 individuals from this area, bringing the total number of burials removed under archaeological control to approximately 40.[1]

Altogether 190 square metres of the site have been opened up, of which 170 have been under the direct control of Allen. In terms of area this represents approximately 1% of the site. The staggering artefactual richness of the site forced the adoption of a policy of discarding artefacts from certain areas where excavation was used to answer other specific problems, such as posthole distribution. Thus in certain areas only a sample of material was retained, in others no artefacts were kept. In most areas however, material has been retrieved through sieves varying in size between 3/16 and 1/2 inch mesh. The artefacts thus recovered represent considerably less than 1% of probable site totals. Despite this small percentage the sample is considered a valid one because sampling over a very wide area of the site failed to produce material or dates which differed from the main areas excavated, and because artefact numbersare huge - for example over 500,000 sherds, weighing almost four tonnes have been processed.

Twenty-two radiocarbon samples from Motupore Island suggest that permanent occupation of the site continued without interruption from the beginning of the 13th century AD until well into the 17th century AD - in round terms a period of 450 years

A Résumé of the Site History and its Cultural Setting

A preliminary analysis of the excavated data from Motupore Island suggests the following general reconstruction of events there.

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[1] Several burials taken out in 1973 were so disturbed that it is uncertain exactly how many individuals are represented.

One early radiocarbon date of apparent transient human activity on the island, 1010±80 BP (ANU-1219), and two radiocarbon dates (2530±80 BP (ANU-1648) and 2940±80 BP (ANU-1647)) predating human occupation and relating to beach formation against the hill, strongly suggest that the earliest occupation on land was confined to a very narrow strip of sand beach on the protected side of the island (R. McLean, ex Department of Biogeography and Geomorphology, ANU, pers. comm.).[1] If dry land occupation was in fact as confined as this, it is necessary to postulate the probability that settlement took the form of houses constructed over the water. One expectation of such a situation would likely be the rapid formation of the sandspit itself, since in such a situation rapid silting can be expected around housepiles. It is along this early beach line that the earliest evidence of occupation is found in the form of postholes, artefacts and interleaved layers of rapidly accumulated gravels from the side of the hill which are consistent with the denudation of the flora on the slope itself and subsequent hillwash erosion.

Excavations on the flat sandspit areas further strengthen this interpretation, with younger pottery styles being those found further out from the hill and with large proportions of the pottery and shells from the lower levels being rolled, and bone being absent - all signs consistent with the material having been washed by the sea.

As "dry" land moved further out from the hill the character of deposition against the hill changed from one of habitation to one of midden dumping.

Preliminary scrutiny and analysis of all the archaeological evidence from the site is consistent with an interpretation of the same cultural group being there throughout the 450 years of human occupation. There is, for example, no evidence of a break in the occupation layers and this is consistent with the radiocarbon dates mentioned earlier. Although stylistic changes take place from top to bottom in the ceramic sequence these are thoroughly consistent with a model of gradual evolutionary development, and an exhaustive examination of the technology involved (including sources of raw materials, proportions of these materials in the pottery, and manufacturing

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[1] Space does not permit the development of this argument in full. It will appear in the projected monograph on this site.

processes) also supports this general view (O. Rye, Department of Prehistory, ANU, pers. comm.). An examination of the shell remains by P. Swadling (ex Department of Anthropology, UPNG, pers. comm.) suggests that the earliest shell remains are from a population similar to the modern and unexploited local shell beds, both in size and composition. Throughout the history of the site the shells decrease in size (maturity) and frequency in the site - results also consistent with continuous occupation. Stone tools, although not yet studied closely, are mainly amorphous flaked cherts, although tiny drill points, used for drilling shell beads, are easily recognisable as a functional type. A cursory examination of this assemblage indicates no apparent change in either raw lithic materials or the artefacts made from them throughout the history of the site. Distinctive burial patterns also remain generally unchanged, as do the narrow range of faunal species represented.

In short, the site appears to represent a continuous history of a single cultural group who remained at this particular site until about 200 years before the beginning of European settlement. There is sufficient linguistic and oral traditional evidence to accept that the incumbents of the coast at that time, namely the Austronesian-speaking Motu, have been in the area for a far longer period than 200 years. Thus, independent of the specific archaeological evidence involved, it is extremely likely that Motupore Island was occupied by Motu. This felicitous situation thus permits direct comparisons from the ethnography of the Motu to the archaeological evidence to be made *not* to give an identity to the archaeological manifestation, but rather to extend the ethnographic picture back in time and examine in detail processes of development and perhaps even origins.

This is not the place to give an exhaustive review of comparisons between the ethnography and the archaeology of Motupore, but some examples are relevant. The Motu fall into two broad groups, Eastern and Western, with the geographical division coming at Bootless Bay. Both groups traditionally occupied the very fringes of the littoral, with lines of houses extending out into the sea in just the manner suggested for the beginnings of occupation at Motupore. As well, some houses were built on the beach, and dry land was communally used for dances and feasts and other social activities. Both Eastern and Western Motu constructed ceremonial platforms called *dubu* for such occasions, which were characterised by

large and ornately carved upright posts, which were often reused. The confusion of large, deep postholes found in the early habitation layers of the main excavation against the hillslope conform to what might be expected to result from such activities, and furthermore contrast markedly with the small, shallow and irregular configuration of postholes found out on the flat sandspit area. These latter postholes do however resemble the patterns one might expect from ethnographic Motu houses, constructed as they are on numerous, slender mangrove piles. The proximity of burials to these structures, the shallow, fully extended burials themselves, and the infill of graves with shelly, gritty beach sand from the water's edge, all conform to the ethnographic picture, as do the items of jewellery and other exotica from the site. At contact only two Motu villages made small circular shell disc beads. These were extensively produced at Motupore, as evidenced not only by numerous beads in all stages of manufacture, but also by the huge quantities of stone drill points recovered, many of which show traces of calcium carbonate on their tips. Rye's analysis of pottery manufacture at Motupore and the most recent styles present on the site conform to ethnographic Motu pottery.

In particular, faunal remains from Motupore reflect a subsistence pattern similar to that of the ethnographic Motu. There is a very narrow suite of animals in the site with small amounts of dog and pig, but a very heavy preponderance of marine foods - shallow and reef species of fish, turtle, dugong and shellfish. The absence of deeper water fish conforms with the ethnographic data on Motu fishing techniques - principally netting and poisoning with an absence of line and hook fishing. Many shell sinkers were recovered from Motupore, but no fishhooks. Most surprising, however, is the virtual absence in the Motupore fauna of any land animals, with one great exception - the presence on the site of vast quantities of *Macropus agilis* bones. Ethnographically agile wallabies were taken in quantity in large, seasonal, communal hunts by the inland Koita and Koiari peoples, smoked, and traded into the coastal Motu villages.

Ethnographically the Motu, and especially the Western Motu, engaged extensively in a variety of year round exchange, including an annual long-distance trading voyage to the Gulf of Papua known as the *hiri*,

where as many as 30,000 pots might be exchanged for up to 600 tons of sago, in addition to other trade items including armshells from east of Port Moresby. All the indications are that the inhabitants of Motupore were, for all or most of their time on the island, engaged in similar trading activities. This is not to suggest that they journeyed as far afield as the Gulf of Papua, although neither is this impossible. The reduction in variety and decoration, and possible increases in production of their pottery through time may be weak arguments for increasing commercialism of this industry, but nevertheless it is difficult to see the vast quantities of pottery from the site representing only production for internal use.

Detailed analytical studies of the archaeological evidence from Motupore Island are now under way to focus at a finer level of developmental processes during the 450 years of occupation there. But despite contrary views (Oram, in press) there is nothing in the archaeological evidence from Motupore to dissuade me from my original view that its inhabitants arrived there as fully developed specialists in coastal exploitation, canoe building, manufacturing and trade, who quickly articulated inland and coastwise trading links and turned what has traditionally been regarded by landlocked anthropologists and ethnographers as a marginal niche into a productive and prosperous one.

Jim Allen

References

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