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The Lapita Site of Natunuku, Fiji

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ABSTRACT

Excavations were carried out in three locations at Site VL1/1, Natunuku, in Fiji in 1967. This site has long been regarded as one of the earliest Lapita sites in the Central Pacific. Pottery from all periods of Fijian prehistory was abundant, but sherds with dentate-stamped Lapita decoration were found in primary position in the lower layers at only one location. The analysis concentrated on the distribution of decoration and vessel form in this location. Some Lapita decorated and other sherds are illustrated and metrical data are presented on sherd numbers and weight, and vessel form. Some physical properties of the Lapita and later pottery are described.

Keywords: FIJI, NATUNUKU, ARCHAEOLOGY, POTTERY, LAPITA.

INTRODUCTION

The Natunuku site has long been regarded as the earliest known archaeological site in Fiji. This is partly because the single radiocarbon date from the site is early, but also because of the apparent range in decoration and vessel form of the Lapita pottery recovered from the excavations. Lack of a published excavation report has hampered proper assessment of the limited data that have been published on the site. This lack has also restricted comparisons with assemblages of Lapita ceramics from other sites in the Fiji-Western Polynesian region. As a step towards remedying this deficiency, this paper presents an account of the excavations at Natunuku in 1967, and describes some of the material recovered.

BACKGROUND TO THE EXCAVATION AND ANALYSIS

The site was discovered in the mid-1960s by Peter Bean. He collected sherds from the eroding beach front and took them to the late Bruce Palmer, then Director of the Fiji Museum, who recognised the characteristic Lapita decoration on a number of them. Palmer visited the site in 1966, and realised that it was seriously threatened by erosion. Arrangements were made for a rescue excavation, funded by the National Science Foundation as part of a larger research programme administered by the Bishop Museum. The excavations were carried out in August and September 1967 by Elizabeth Hinds (nee Shaw) with the assistance of Moce Qalo from the Fiji Museum.

At the conclusion of the fieldwork, the excavated material was deposited in the Fiji Museum with a manuscript catalogue of finds. The excavation records were taken to New

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Zealand. An analysis of the decoration on Lapita sherds from the site was incorporated into a wider study of Fijian Lapita decoration (Mead *et al.* 1973).

In 1978 Terry Hunt visited the site, made a collection from the eroding foreshore and dug a 1 m test excavation. He recovered two complete pots which are now on display in the Fiji Museum, but did not find dentate-stamped sherds in primary position.

In 1981, the Natunuku assemblage excavated in 1967 was sent to the Anthropology Department, University of Otago, where Hinds was then working, for further study. When Hinds took up a new appointment at the Otago Early Settlers Museum at the end of 1983, Holdaway agreed to complete the analysis and write the report. Holdaway's commitments demanded that the final analysis concentrate on a sample of the total material, as outlined below. The present paper is based on a longer report which was close to completion when Holdaway left Dunedin in 1984 for study in the United States. The material from Natunuku was returned to the Fiji Museum in September 1984.

THE SITE AND ITS SETTING

The Natunuku site (VL1/1) is situated on the north coast of Viti Levu. Its position was incorrectly shown by Frost (1979: Fig. 3.1), and this mistake has been repeated by others (e.g., Pietrusewsky 1989). The site is on a small sandy beach between the Ba River delta to the west and Vatia headland to the east. This is one of the few areas of beach on this coastline, most of which is bordered by mudflats and mangroves (Fig. 1).

The site was named after the present village of Natunuku, which is approximately 500 m inland to the southwest. It had formerly been on the site, and the remains of house mounds, often sectioned by the eroding beach front, were clearly visible at the time of excavation. They extended for approximately 300 m along the beach front to a graveyard, dotted with trees and used until recent times, which extended a further 100 m along the beach to a stream bed. Beyond this, sugar cane fields bordered the beach.

At the time of excavation, the beach front was actively eroding (Fig. 2). Pot sherds and shell midden were exposed beneath the old village and burial ground to depths of between 1.5 and 2 m. Much material had fallen from the section and lay scattered over the tidal flats.

In 1967, local residents claimed that the beach front had eroded back some 80 m in the previous 40 years. Certainly only one line of partially eroded house mounds remained of the old Natunuku Village. Moreover, the cultural deposits did not extend back very far, for there was little sign of them in a wide trench dug by the sugar company in the 1920s which ran parallel to the beach a short distance behind it. However, comparison of the 1954 and 1967 aerial photographs and recent inspection suggest that the rate of erosion since 1954 has not been great (Rodda 1989: 6; P. Rodda pers. comm. 1990).

THE EXCAVATIONS

A series of 2 x 1 m rectangles were excavated at three locations, designated A, B and C (Fig. 3). At Location A, two rectangles were excavated between house mounds. The pottery recovered showed carved-paddle impressed or incised decoration, but little recognisable Lapita decoration. Four rectangles were excavated at Location B. Again, pottery with carved-paddle impressed or incised decoration was found, but no primary concentration of Lapita sherds.

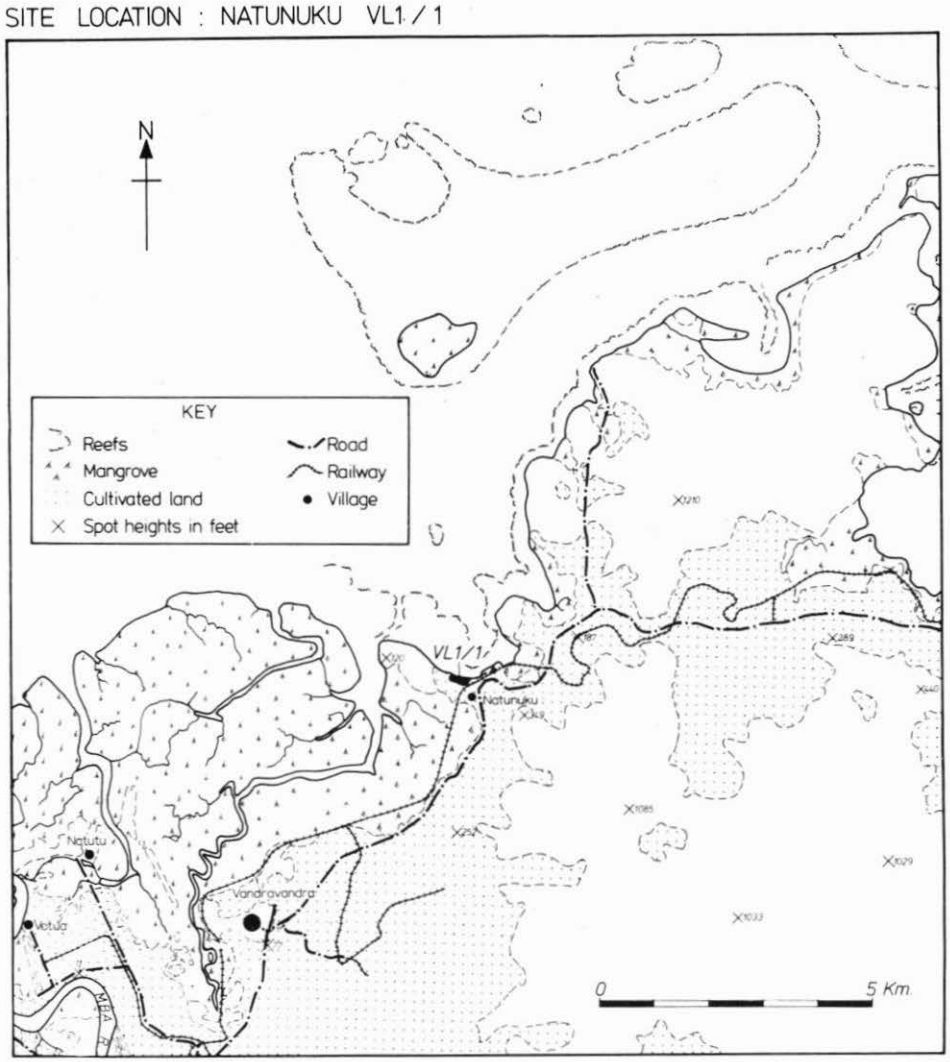

Figure 1: The location of the Natunuku site, VL1/1.

Five stratigraphic layers were identified at Location A, the lowest of which was natural yellow coral sand. Four layers were recognised at Location B. However, the difficulty of defining these layers during excavation led Hinds to assign all material recovered to 10 cm arbitrary levels. A large number of structural features (mainly postholes) were encountered in both areas but in the limited time available it was not possible to undertake the sort of area excavation needed to understand their significance. It seemed probable that there had been considerable disturbance from the digging and filling of structures. Moreover, material had probably been redeposited in Location B as a result of repeated grave digging in the adjacent burial ground.

Figure 2: The eroding beach front looking east from Location C in 1967.

Because of the lack of Lapita sherds and the uncertainties of sherd provenance from these two areas, they have been excluded from the analysis. The remainder of this paper is concerned with Location C, where a primary Lapita deposit was encountered.

LOCATION C

Six 1 x 2 m rectangles and a smaller 1 x 1 m square were excavated at Location C (Fig. 4). The presence of modern stone-lined graves, trees, and a path meant that the rectangles could not be set out systematically (Figs 5 and 6). Square B and Rectangles F and G had to be abandoned at an early stage of excavation because modern graves were revealed. The remaining rectangles were excavated to the base of the cultural deposits at a depth of about

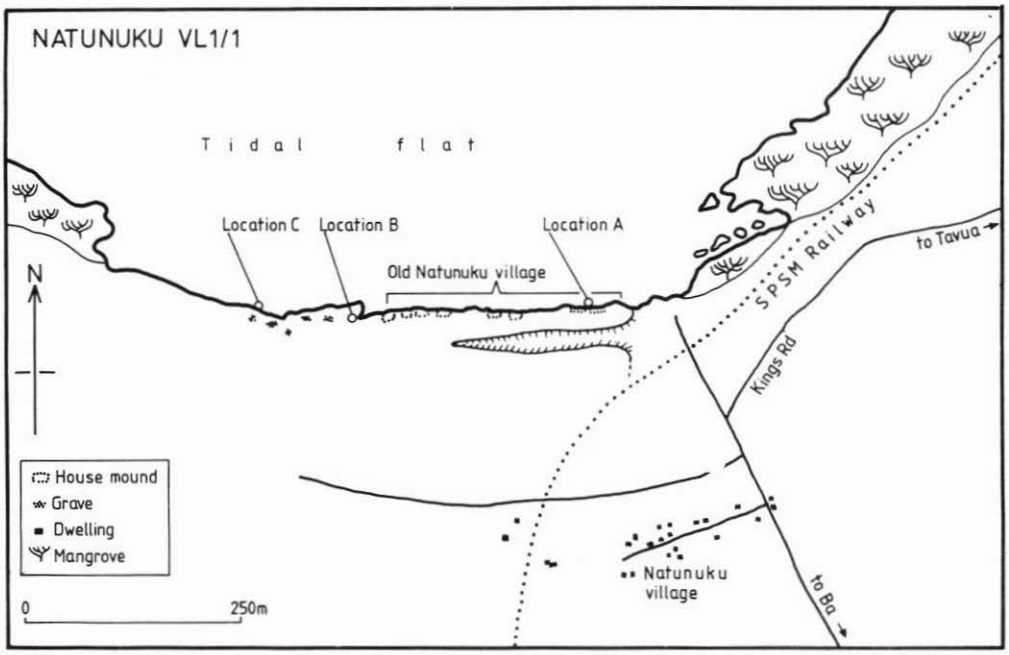

Figure 3: The Natunuku site and the locations of the excavations.

1.5 m. However, there was insufficient time to excavate the baulks between the adjacent Rectangles C, D and E. Clearly, the layout was far from ideal and interpretation of features is difficult. However, since the site was still in use as a cemetery, no other layout was practical.

Throughout Location C, excavation was by natural layer rather than arbitrary level. All material recovered was bagged according to rectangle and layer.

STRATIGRAPHY

Rectangles A, C, D and E were excavated through six layers to a sterile yellow sand. The two uppermost layers contained a variety of objects of various ages ranging from bottle glass, bottle tops and coins, to turquoise coloured stone (probably dacite tuff from the Yasawa Islands) brought in to place on the graves. There were also sherds representing the whole known range of Fijian pottery types. These layers probably resulted from activities connected with the old Natunuku Village, particularly the digging and filling of graves. Layers 4 to 6 represented an old sand dune and contained a number of potsherds, many of which carried recognisable Lapita decoration.

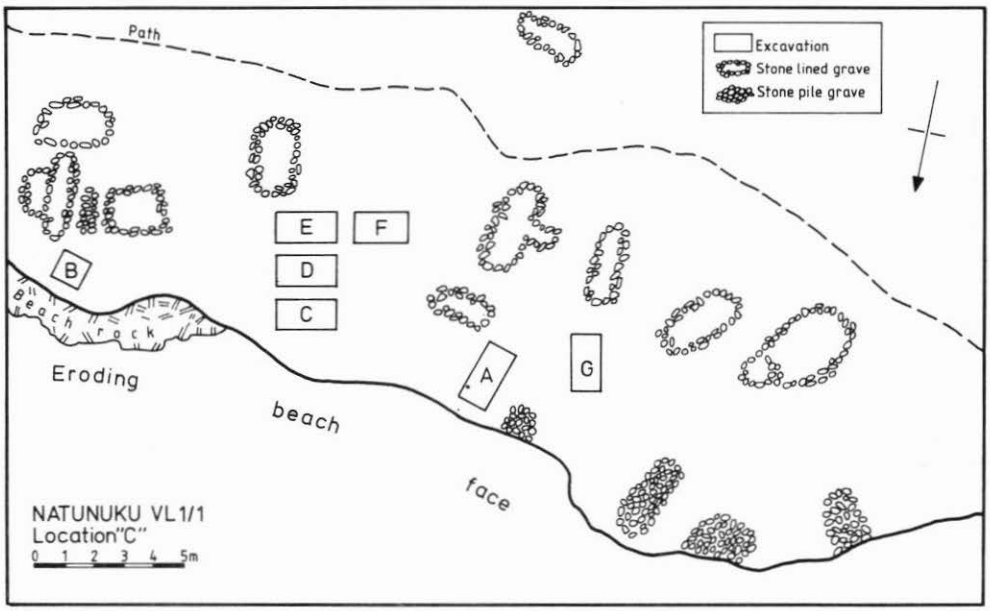

Figure 4: The position of excavations at Location C. A number of coconut palms in the excavated areas are not shown.

Stratigraphic sections from Rectangle D are shown in Figure 7. These are typical of the stratigraphy throughout Location C. The layers were as follows.

Layer 1. A thin layer of fine black soil containing much crushed shell. This layer was often removed with the turf.

Layer 2. A coarse lumpy black soil containing small oyster shells and much crushed shell which the excavator thought belonged to small tidal mudflat species. It is likely that this shell was deliberately strewn along the paths and about the graves.

Layer 3. Dark brown soil mixed with sand. This layer may have formed before the construction of the old Natunuku Village and may be partly a result of forest clearance and erosion from the surrounding country.

Figure 5: Path, trees and recent grave at Location C at the time of excavation.

Layer 4. Light brown soil with more sand than layer 3. This layer represents a soil which probably formed under vegetation on the surface of the old sand dune.

Layer 5. Pale grey, fine powdery sand, structureless. A distinction was made between 5a and 5b, which was lighter in colour than 5a, but was not present in all areas. Both 5a and 5b contained large whole shells of species which today are obtained from the edge of the coral reef and the deeper water three kilometres from the present shore.

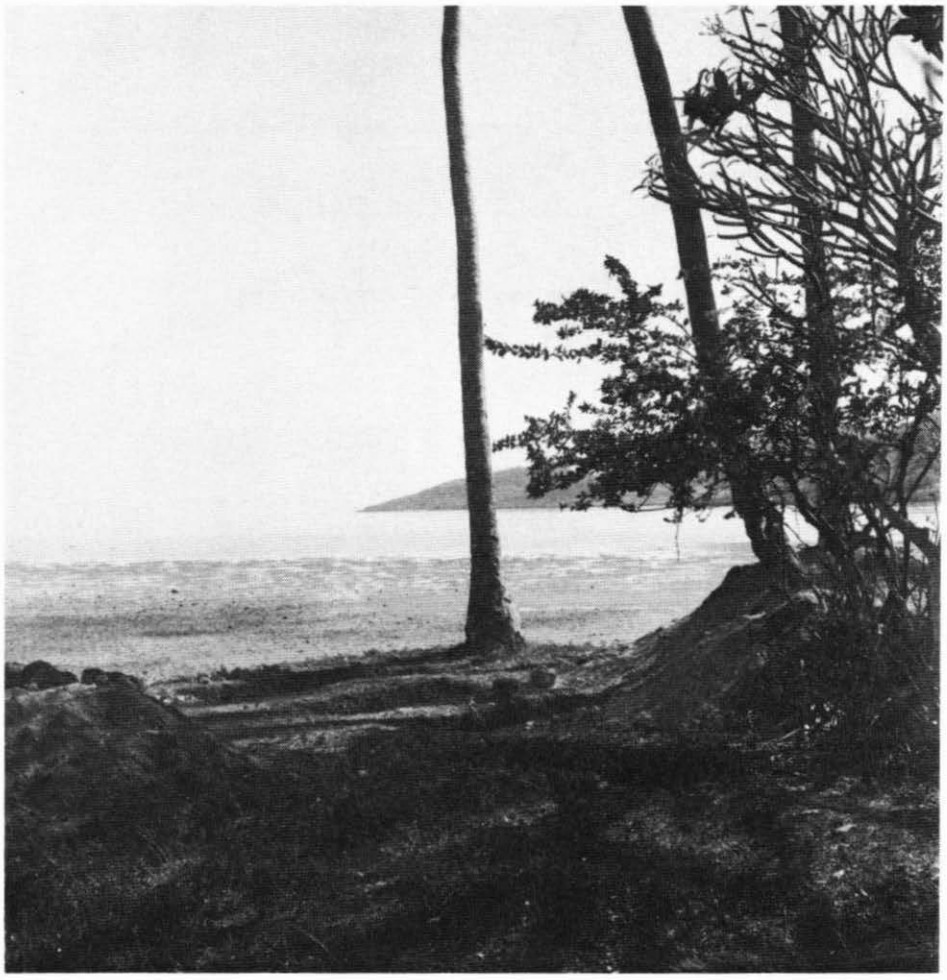

Figure 6: The excavations at Location C.

> Layer 6. A solid, damp, yellow coral sand, coarser than layer 5a or 5b. The layer included lumps of consolidated coral sand and beach rock, some of which were too large to excavate. Dentate-stamped sherds were numerous in this sand and some were embedded in more indurated sand.

Underlying layer 6 was an irregular surface of 'beach rock' (cemented beach sand). This usually forms just above or below mean sea level. At the time of excavation, however, the beach rock formed a 1.5-m-high cliff above high water mark, suggesting a change in land/sea relationship since its formation. Two types of beach rock were observed during the excavations, an upper slab of cemented beach sand and another layer of cemented shingle and sand.

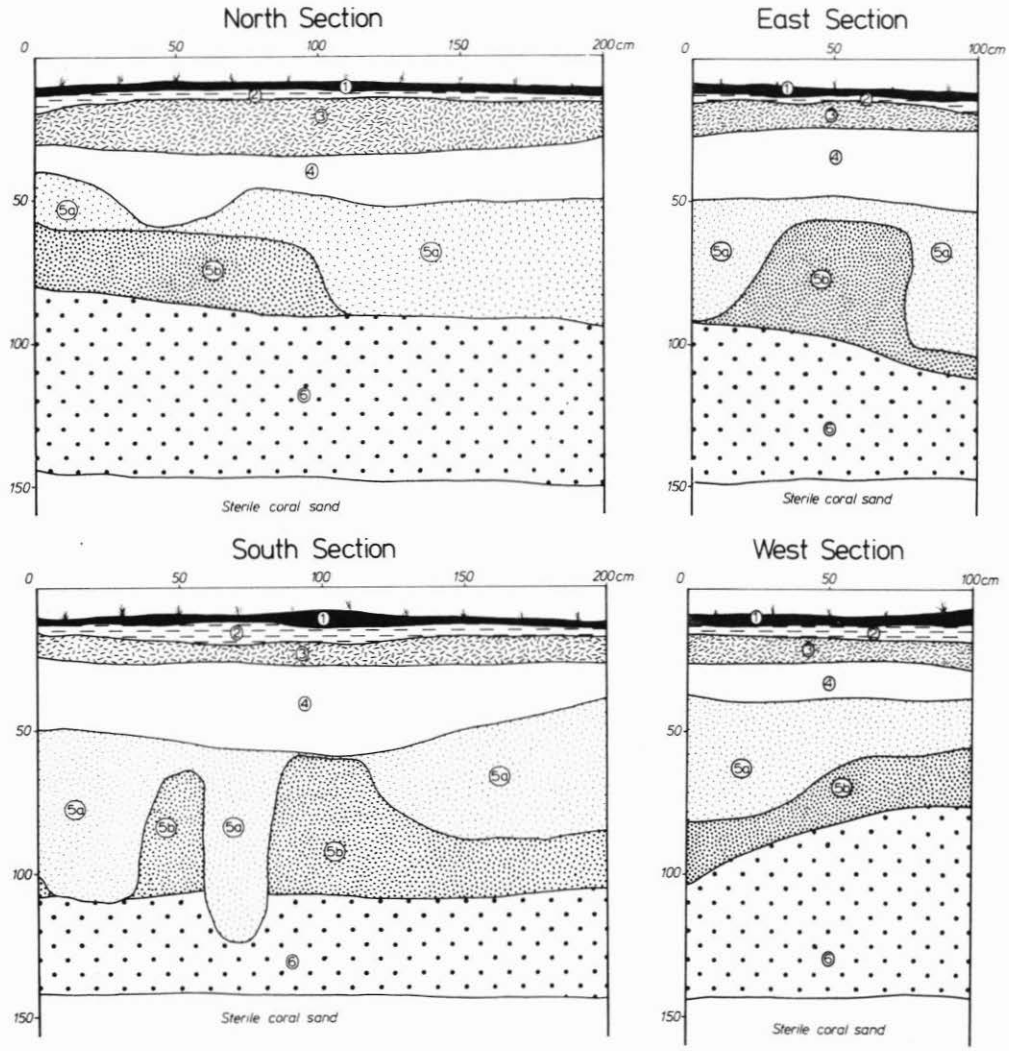

Figure 7: Stratigraphy of Rectangle D, Location C.

The beach rock at Natunuku has recently been described by Rodda (1989), who did not, however, make a detailed inspection of Location C. Changes in sea level are characteristic of the environment of Lapita sites, many of which have been substantially altered as a consequence (Green 1979: 34). Nunn (1990) has recently summarised the current state of knowledge about Holocene sea level changes in Fiji (including archaeological evidence), concluding that the Holocene transgressive maximum reached 1–2 m above present mean sea level some 3,000–2000 years ago. However, he also emphasises the complexity of local tectonic movements, which must be taken into account in considering evidence of sea level change. He regards Natunuku as an interesting case study in an area of Fiji whose tectonic history is not yet established.

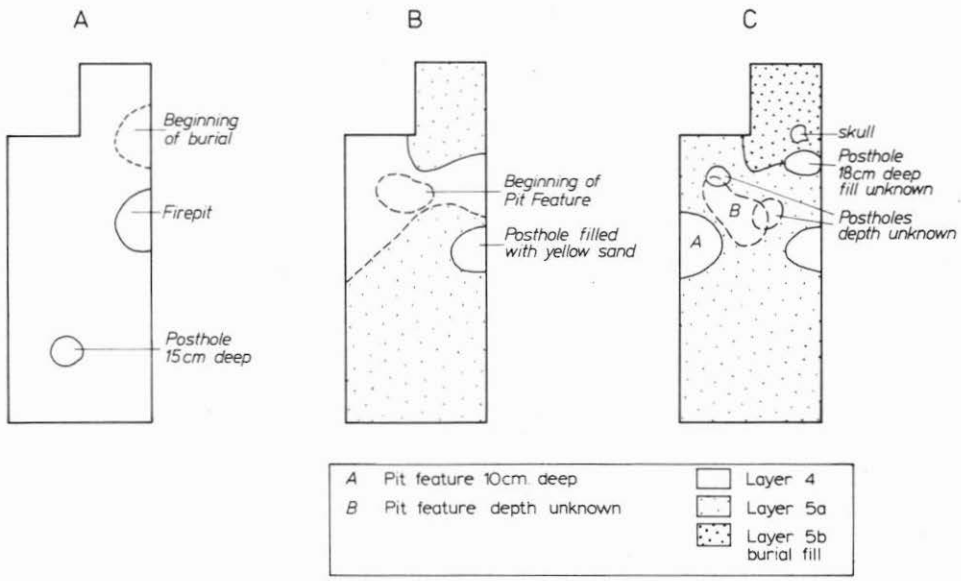

Figure 8: Features in Rectangle C, Location C.

STRUCTURAL FEATURES

Features were identified in both the upper and lower layers of Location C. Three postholes were found in the upper layers. A large pit had been cut into layer 2 of Rectangle F. This proved to be a modern grave and led to the abandonment of the rectangle.

Of particular interest were the features cut into the sand layers. Rectangle C revealed the most complex series of features, including a burial stratigraphically earlier than the modern burials (Fig. 8). A posthole and a fire pit containing blackened earth, small broken shells and large lumps of charcoal had been cut into layer 4. Two depressions had been cut from layer 4 into layer 5a. Beneath one of these, two postholes were found cutting from layer 5a into layer 5b. Two other postholes had been cut into layer 5.

These features were matched in other squares. Rectangle D revealed four postholes. The first, cut into layer 5 and filled with layer 4, was 20 cm deep. Two were cut into layer 5b and filled with layer 5a, while a 47-cm-deep posthole was cut through, and filled with, layer 5, continuing into layer 6. Rectangle E produced six postholes with depths ranging from 20 to 30 cm, all cut into layer 5b and filled with layer 5a. A single posthole in Rectangle A was cut into layer 5 and filled with layer 4.

Postholes and small scoop depressions are found in many Lapita sites. At Natunuku, the layout of the excavation precluded any analysis of posthole patterns. However, their presence suggests a succession of structures in this part of the site.

The presence of these features is a clear indication that there will have been some disturbance of the pottery. The digging of pits and postholes can result in considerable movement upwards of sherds but also provides some opportunity for downwards movement.

BURIAL

The burial was first noticed at the base of layer 4 at the southeast corner of the rectangle. It was covered with a thin deposit of layer 5a (Fig. 8b). Excavation revealed fragmented human remains, including a jaw and crushed skull. The body appeared to be in a crouched position. The remains were surrounded by a deposit of pale grey sand and shells, similar in appearance to layer 5b. No grave pit could be detected. Although most of the small number of burials so far found in Lapita sites have been in shallow pits, several examples have been reported in which no grave pit was evident (Green *et al.* 1989: 220).

Although the original field sections of Rectangle C have not survived, a redrawn cross-section shows the burial resting within layer 5b. The description above and the plans in Figure 8 are derived from Hinds' field notes and sketches. The most important point to note is that the burial appeared to be associated with layer 5 and can probably therefore be assigned to a Lapita context, although not to the earliest occupation of the site.

The human remains have been described elsewhere (Filler 1971; Pietrusewsky 1989).

DATING

Material for a radiocarbon sample was obtained by collecting flecks of charcoal from layer 6 at the base of Rectangle E. The sample was submitted to Gakushuin University, and a result of 3240 ± 100 BP (GaK 1218) obtained. This has been cited as a calendrical age of 1590 ± 100 B.C. using the 1972 MASCA correction for secular effect (Green 1979: 33). However, it is now recognised that this correction was inappropriate for the sample in question. We have re-calculated the age using the Stuiver and Reimer method to Cal 1623–1404 B.C. (68%) and 1736–1266 B.C. (95%)[2]

Insufficient charcoal was found to date any of the other lower layers and, in the late 1960s, any attempt to date the burial would have required destruction of a significant part of the remains. Now, however, it may be possible to obtain further dates for the site using accelerator mass spectrometry.

MATERIAL RECOVERED

Although a large number of stone adzes and flakes were collected from the eroding beach front by Hinds, none were actually excavated from the site. This material was deposited in

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[2] Kunihiko Kigoshi at Gakushuin University kindly provided the original count rates and temperature/pressure information relating to this sample, and the comment that "the reported age is not corrected for isotope fractionation" (pers. comm. 1990). Hugh Melhuish at the Institute of Nuclear Sciences, D.S.I.R. has re-calculated the age from this data and obtained the result 3629 ± 74 if $\delta^{13}C = 0.0$, and 3223 ± 70 if $\delta^{13}C = -25.0$. Unfortunately it is uncertain how the count rate was reduced to standard conditions of temperature and pressure. The values given above appear to have been corrected to 100 cm pressure, but not to 0°C. If the standard conditions were 0°C and 100 cm then the calculated Conventional Radiocarbon Age would be 2800 ± 90 B.P. The age was reported to Bruce Palmer on March 30, 1967 as 3240 ± 100. With rounding, this corresponds to the second age cited above.

the Fiji Museum but was not sent to New Zealand. The assemblage from the excavations consisted largely of pottery. The historic and recent artefacts from the upper layers in Location C were also not included in the material sent to New Zealand.

Apart from pottery, the only prehistoric artefacts excavated were shell ornaments. A broken 63-mm-long fragment of a ring made from a large *Conus* shell was found in Rectangle E, layer 6. The complete ring probably had a diameter of about 80 mm. It had been finely worked leaving no obvious grinding marks visible under a low powered microscope. It is interpreted as an arm ring. A plain, unperforated, nearly circular, shell disk was also found in layer 6, Rectangle E. It is 3.5 mm thick and varies in diameter from 32 to 35 mm. In addition to these two items, another *Conus* shell ring fragment and a perforated shell unit from a strung ornament were noted during excavation, but did not arrive in New Zealand.

Only a small amount of shell and bone was excavated. Most of the bone was too fragmentary for identification. Shaw noted during excavation that whereas the shells from the upper layers were predominantly small oysters and crushed small intertidal species, those from the sand layers were reef and deep water species available on the coral reef three kilometres off-shore. Unfortunately, specific identifications supporting this impression were not recorded at the time.

POTTERY

METHOD OF ANALYSIS

The main aim of the present study was to provide a basic descriptive analysis of sherd numbers and weights by layer, and an indication of the vessel forms present. The entire pottery assemblage from all layers at Location C was sorted by decoration into plain, dentate-stamped, carved-paddle impressed, incised and tooling categories, and by shape into rim, shoulder, neck, base, attachment (legs, handles, spouts, etc.), flange and other categories. The 'other' category are referred to as unshaped body sherds.

Analysis of unshaped body sherds concentrated on presence of decoration and measurement of sherd thickness. Shaped sherds, consisting of rims, shoulders, necks and bases, were used to reconstruct the form of the vessels from which they originated.

Selected examples of shaped sherds from each form were drawn. All shaped sherds for which a vessel form could be determined were listed and the decoration was described following Mead *et al.* (1973). The full list is included in the larger report on which the present paper is based. Several of the sherds classified as attachments were also drawn. The numbers and weights of shaped sherds which could not be allocated to a vessel form were recorded.

Hinds (Mead *et al.* 1973) has already discussed the Lapita decoration found on sherds from Natunuku. However, to aid any further analysis which might be carried out, a photographic album of Lapita decorated sherds was compiled showing rectangle and layer. Again, these photographs will be presented in the larger report. Although both unshaped and shaped sherds were photographed, only those which clearly showed Lapita dentate-stamped and related decoration were included. A number of sherds too small or too weathered to show a pattern clearly were excluded.

PHYSICAL AND PETROGRAPHIC ANALYSIS

Analysis of both the unshaped and shaped sherds was primarily directed toward vessel form. However, physical analysis was carried out by Intoh (1982, 1989) on three small samples of sherds selected by Hinds. Intoh's comparison of a number of Pacific assemblages shows that the porosity of both Lapita and later sherds from Natunuku is towards the lower range of Pacific porosity values, and similar to the values from other Fijian assemblages (Fig. 9; see also Intoh 1989).

Mason (n.d.) subsequently carried out physical analysis of 100 plain body sherds from layer 6 using the methods described by Intoh (1982). Mason found no significant differences between the 'thick' and 'thin' sherds in her sample (arbitrarily defined as having a thickness greater or less than 8mm). Moreover, her results were very similar to those obtained by Intoh for her sample of 'Lapita plain' sherds.

Hinds had submitted a number of sherds to W. R. Dickinson for petrographic analysis at the completion of her excavations. Dickinson (1971) examined 11 sherds, attributing the sand temper of all but three to a local source. The three 'foreign' sherds had a temper consistent with the indigenous Sigatoka temper. Dickinson (1978) subsequently found two highly decorated sherds from Yanuca to have tempers closely resembling the indigenous Natunuku tempers. As he pointed out, this suggests some movement of vessels between the two areas.

UNSHAPED SHERDS

The weights and numbers of unshaped body sherds in each decorative category were recorded separately and used to calculate the percentage decoration by layer in this group of sherds. Obviously neither measurement is ideal; however, a combination of the two gives the best indication of the amount of pottery in each category.

The number and weight of unshaped body sherds are given in Table 1. This summarises a more detailed analysis by rectangle and layer in the larger report. Pottery was not evenly distributed in any layer. For example, roughly half of all plain and Lapita decorated sherds from layer 6 were found in Rectangle E, while a disproportionately large amount of the pottery from layers 2, 3, and 4 came from Rectangle G. The relative percentages of each decoration type by layer are shown in Figure 10. In layer 6, 23 percent by weight and 22 percent by number showed Lapita decoration, whereas the figures dropped to 10 and 7 percent respectively for layer 5.

Measurements of maximum thickness to the nearest millimetre were taken for each unshaped body sherd and recorded by decorative type and layer. A histogram of this information for sherds from layers 4, 5 and 6 is provided in Figure 11. The graph shows a unimodal distribution for plain unshaped body sherds, suggesting that the majority of vessels had walls varying from 3 to 10 mm in thickness.

DECORATION

The figures given above for unshaped body sherds are not directly comparable to figures used by other researchers, since not only rims, but shaped body sherds from parts of pots which are are often decorated, such as necks and shoulders, are excluded.

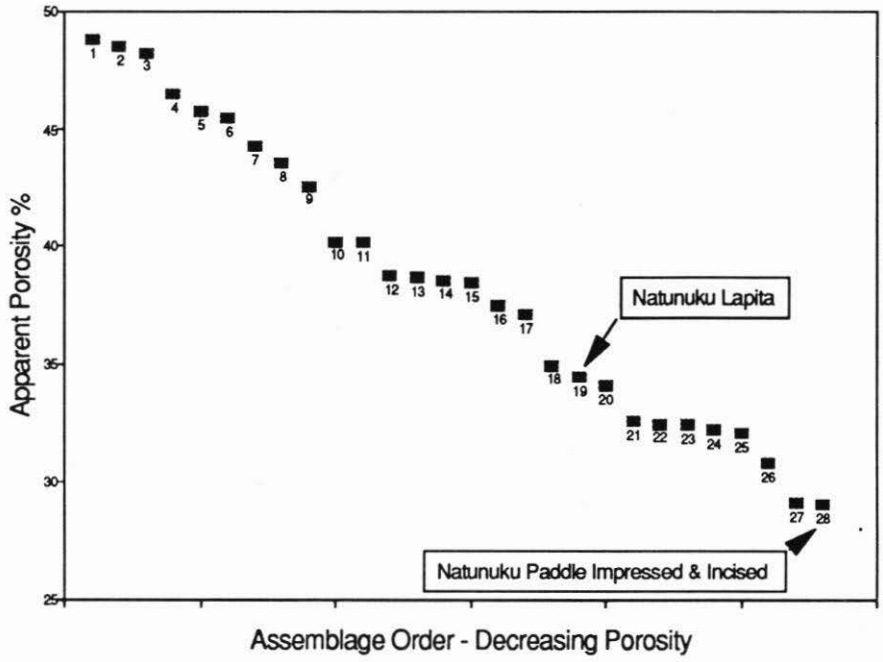

Figure 9: Apparent Porosity of Natunuku pottery compared with other Pacific Island wares. The mean value is given in brackets. 1=Sasoa'a Thin Fine (48.809), 2=Marianas Red Mochong (48.456), 3=Yap CST Pemrang (48.232), 4=Nan Madol Plain (46.497), 5=Reef Islands Lapita (45.746), 6=Fefan Island CST (45.443), 7=Yap Plain Pemrang (44.272), 8=Ngulu Island (43.531), 9=Marianas Plain Mochong (42.509), 10=Yap Laminated Pemrang (40.129), 11=Taumako Andesitic (40.084), 12=Palau Plain (38.696), 13=Sigatoka Paddle Impressed (38.600), 14=Taumako Pyroxenic (38.484), 15=Banks Islands (38.395), 16=Mulifanua Lapita (37.435), 17=Lakeba Lapita (37.066), 18=Sasoa'a Thick Coarse (34.934), 19=Natunuku Lapita (34.456), 20=Lakeba Paddle Impressed plus Plain (34.077), 21=Yanuca Middle Plain (32.558), 22=Yanuca Middle Cross Hatch (32.506), 23=Yanuca Middle Parallel Rib (32.463), 24=Vailele Thick Coarse (32.215), 25=Yanuca Late Plain (32.081), 26=Yanuca Early Plain (30.811), 27=Yanuca Early Lapita (29.098), 28=Natunuku Paddle Impressed plus Incised (29.054). After Intoh 1989: 144.

After the Natunuku assemblage had been returned to Fiji, the numbers of decorated and plain sherds from the lower layers at Location C were calculated from a computerised inventory compiled by Hinds and Holdaway. A few sherds have been excluded, as their provenance or type of decoration were not certain.

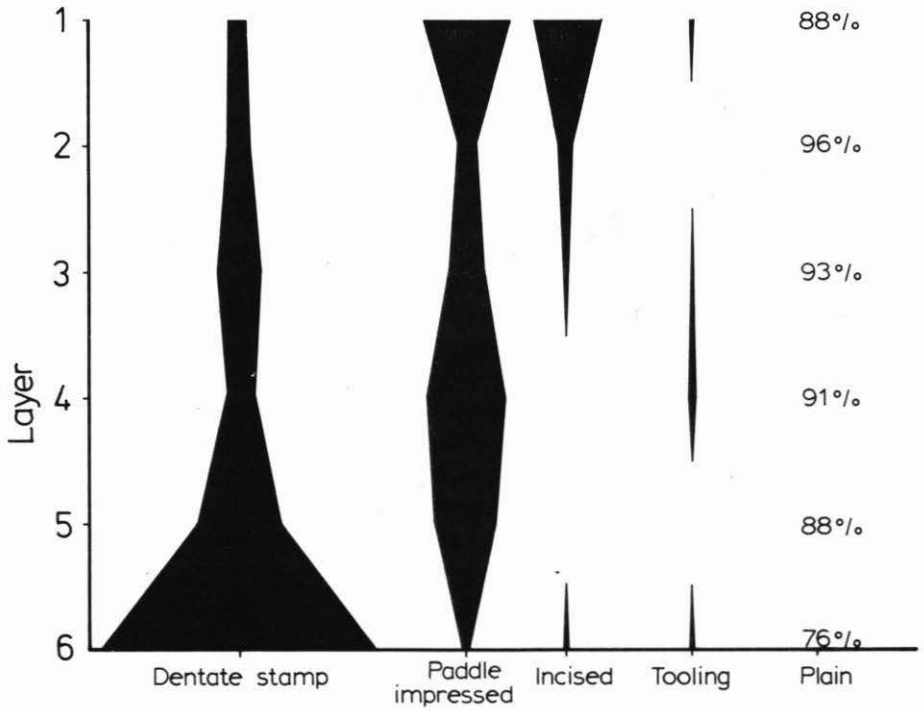

Figure 10: Percentage of decorated unshaped body sherds, based on sherd numbers given in Table 1. Note: the scale is indicated by layer 6 dentate-stamped = 22%.

TABLE 1
DISTRIBUTION OF UNSHAPED BODY SHERDS BY LAYER

LAYER	PLAIN		DENTATE		IMPRESSED		INCISED		TOOLING		TOTAL	
	wt*	no	wt	no	wt	no	wt	no	wt	no	wt	no
1	1211	320	64	3	95	25	69	12	4	1	1446	361
2	5976	1371	114	16	91	22	187	16	-	-	6368	1425
3	7376	1627	330	53	310	60	9	2	11	3	8036	1745
4	3688	740	183	14	222	52	-	-	44	4	4137	810
5	2153	463	276	39	99	24	-	-	-	-	2528	526
Total	23118	4806	1674	208	835	185	283	32	75	9	25985	5240

*weight in grams

In layer 6, 68 percent by number of all rims were decorated, and 68 percent of other shaped sherds (necks, shoulders, bases). When the three groups of sherds (rims, other shaped sherds and unshaped sherds) are combined, decorated sherds constitute 40 percent of the total. This figure includes all forms of decoration, not only dentate-stamped sherds.

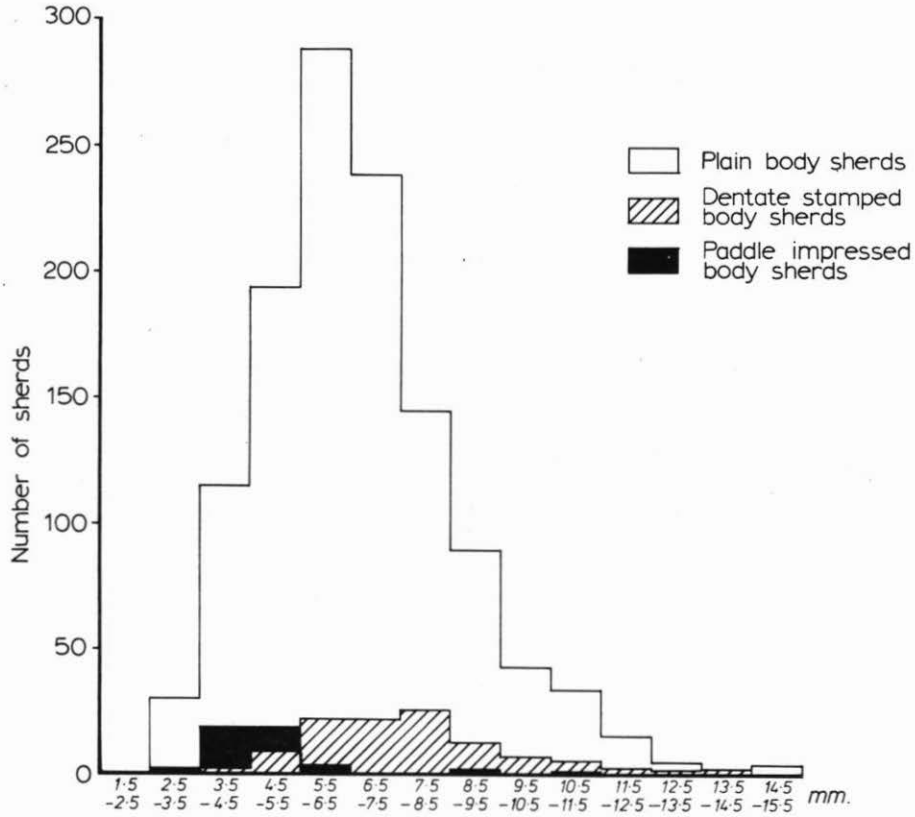

Figure 11: Thickness of unshaped body sherds from location C, layers 4, 5 and 6.

Among the rims, in particular, other forms of decoration are represented. The great majority of decorated sherds from layer 6, however, carry decoration compatible with the Lapita style as it has been recognised elsewhere.

In both layers 4 and 5, decorated rims and decorated shaped sherds other than rims comprise about 62 percent. The proportion of decorated sherds in the total assemblage, however, drops to 28 percent in layer 5 and 20 percent in layer 4. Carved-paddle impressed sherds are significantly represented in both these layers.

The figures from layer 6 suggest that the proportion of decoration in the earliest pottery at Natunuku is high compared with other Eastern Lapita sites. Best (1981: 9) reported that 33.5 percent of sherds from undisturbed deposits at the Fijian site of Naigani were decorated. Poulsen found that decorated rim sherds conmprised 33 percent of total rims by both weight and number, although decorated sherds contributed only 12 percent by weight of total pottery from his important early site of To-2 (Poulsen 1987 (I): 113–14).

VESSEL FORMS

Five broad categories of vessel were defined as follows.

i) Flat bottomed dish. A small shallow dish with flat base and widely flaring sides.

ii) Round based globular or ovoid pot. This category includes the modern Fijian *kuro* or cooking pot (Birks 1973: 19).

iii) Water vessel. A pot characterised by an extremely narrow neck.

iv) Shouldered vessel. The sides meet the base at an identifiable point on the body of the pot.

v) Straight sided bowl. Vessel with straight or slightly incurving sides.

Hinds (Mead *et al.* 1973) had originally identified eleven forms with Lapita decoration from Natunuku. Three of these were similar to vessel forms found at Yanuca (Mead *et al.* 1973), and the remaining eight were defined according to the Sigatoka classification of vessels (Birks 1973). For the present study, Hinds combined these forms with several others, characteristic of more recent vessels, to define 15 forms which describe the variation found at Natunuku. These forms are grouped according to the vessel categories. The terminology used to describe the forms is drawn from Shepard (1956).

Wherever possible, shaped sherds were assigned to one of the vessel forms. Where the shape of the vessel was not immediately apparent from the actual sherds, they were if possible allocated to a form by comparison with similar, more complete, shaped sherds from other Fijian assemblages. However, the very fragmentary nature of the collection meant that many shaped sherds could not be classified.

Category i

Form I: Flat bottomed dish. An unrestricted, simple, flat bottomed vessel with straight sides flaring out at a wide angle from the base and ending in a strongly everted rim. The most substantial piece of this vessel form and examples of other rims attributed to it are shown in Figure 12. The distribution of sherds assigned to this form is given in Table 2.

Category ii

Form II: Large globular vessel. An independent (using the terminology of Shepard), restricted, spherical, composite vessel, with a wide mouth and everted rim. The rim flares outward a little above a small constriction at the neck. Two examples of this form were excavated by Hunt at Natunuku in 1978 (Hunt 1980: 128) and are on display in the Fiji Museum. No examples were confidently identified from Location C, so the form is not illustrated. However, it is likely that some of the shaped sherds not allocated to forms are actually from this form.

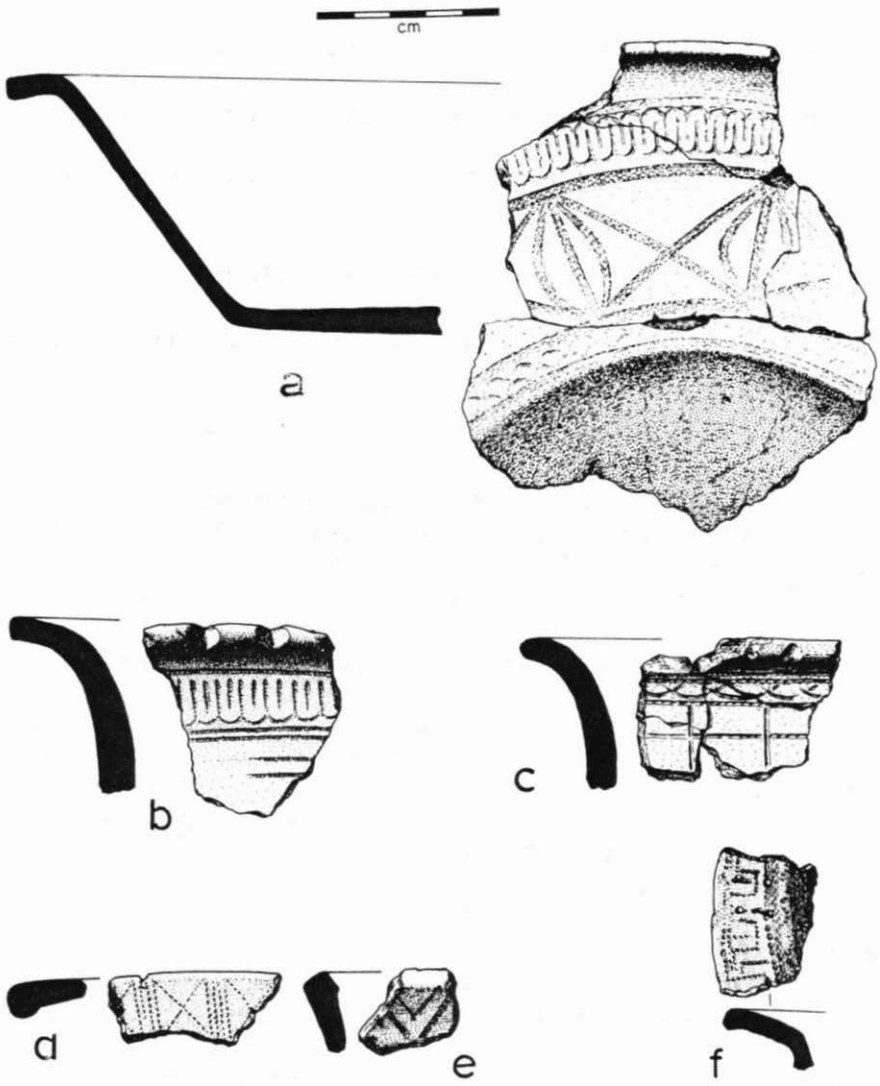

Figure 12: Sherds attributed to Vessel Form I, Category i. a, rim body and base; b–d, f, rims; e, shoulder. a,b,d,f, layer 6; c, layer 5; e, layer 2.

Form III: Vessel with straight everted rim. An independent, restricted, spherical, composite vessel, with outward flaring rim jutting from a marked neck angle. This form is typical of the most recent Fijian pottery and may be equated with the typical *kuro* or cooking pot. The majority of the 39 sherds assigned to this form were from the upper layers. However, there were five from layer 4, and one sherd, comprising both rim and neck, from layer 6.

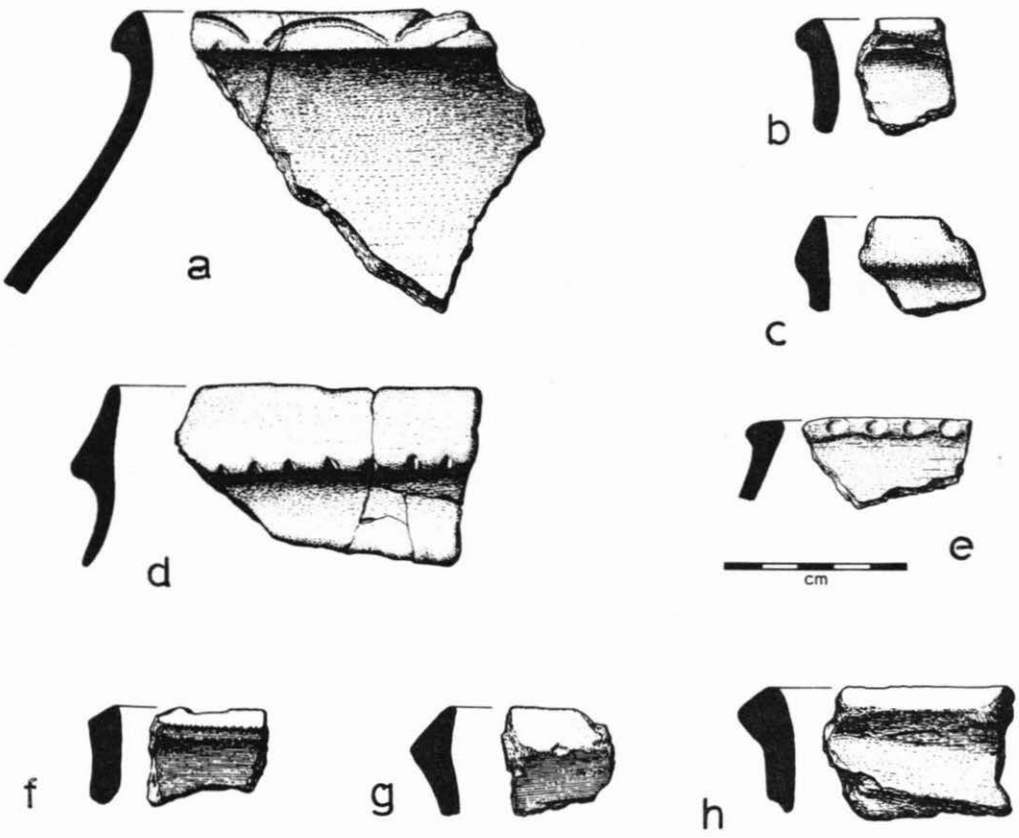

Figure 13: Collar rims attributed to Vessel Form IV, Category ii. d, layer 2; b,h, layer 4; a,c,f,g, layer 5; e, layer 6.

Form IV: Collar rim. Eight subforms of this rim are shown in Figure 13. However, none can be clearly associated with a particular vessel form. The form is characterised simply as rims to which a variously shaped strip of clay has been added. The majority of collar rims were plain, but some were decorated by various techniques. The distribution of these collar rims is shown in Table 3.

Form V: Collar rim. Hinds described a rim similar to one figured by Poulsen (1987 (II): Fig. 52.19). This is an elongated rim, drawn up for 3 cm before turning horizontally outwards and then rising vertically to end in a rounded lip. No rims of this form were found in Location C so it is not illustrated.

Form VI: Everted rim with widened lip. This rim flares widely at the lip edge which has an outward bevel. The lip surface is sometimes convex and may be over twice the thickness of the rim itself. The lip surface is commonly decorated with a vertical line of tool impressed grooves (Fig. 14a–c). The distribution of these rims is shown in Table 4.

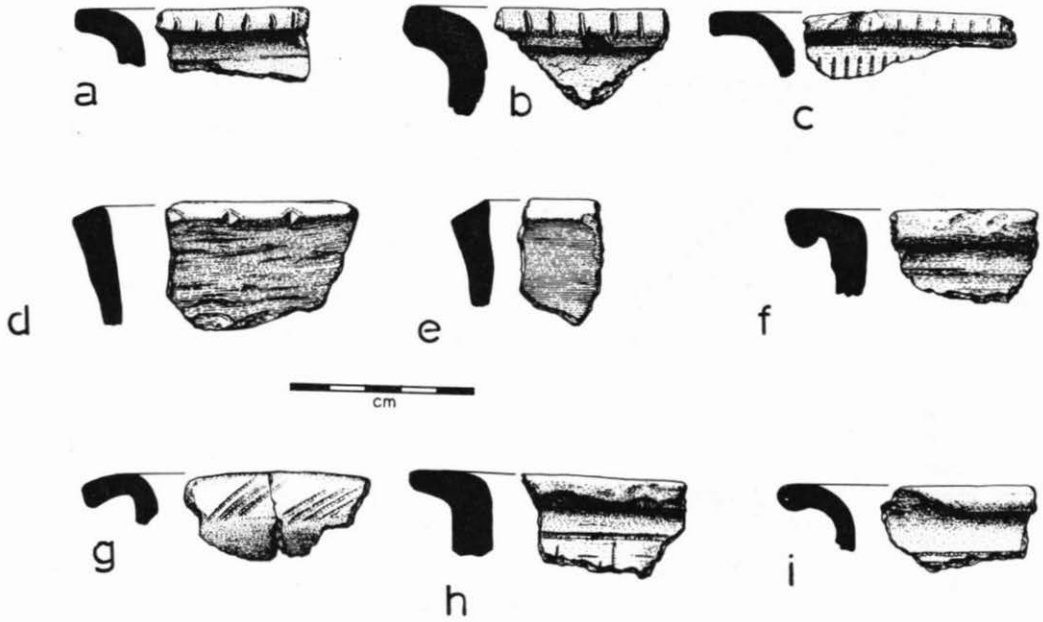

Figure 14: Rim sherds attributed to Vessel Forms VI, VII and VIII, Category ii. a–c, Form VI; d–e, Form VII; f–i, Form VIII. b,f, layer 6; a,d,e,i, layer 5; g, layer 4; c,h, layer 3.

TABLE 2
DISTRIBUTION OF SHERDS ASSIGNED TO VESSEL FORM I

LAYER	RIM		SHOULDER		BASE		NECK		TOTAL	
	pl	d	pl	d	pl	d	pl	d	pl	d
2	-	2	1	2	-	-	-	-	1	4
3	-	1	-	2	1	-	-	-	1	3
4	-	2	-	7	1	1	-	1	1	11
5	1	8	-	-	-	-	-	-	1	8
6	1	9	2	7	2	-	-	1	5	17
Total	2	22	3	18	4	1	-	2	9	43

pl = plain d = decorated

TABLE 3
DISTRIBUTION OF PLAIN AND DECORATED COLLAR RIMS

Layer	Plain	Notched	Shell Impressed	Dentate	Grooved	Total
1	2	1	-	1	-	4
2	-	2	-	-	-	2
3	8	1	-	-	1	10
4	5	-	-	1	-	6
5	8	1	2	4	-	15
6	7	2	2	-	2	13
Total	30	7	4	6	3	50

Form VII: Everted rim with slightly widened lip. The rims show a slight curvature at the neck and a slight but steady thickening above the neck curve to reach a maximum at the lip. This form is essentially similar to Form VI, but the curvature is less, and the thickening of the neck steady, rather than suddenly flaring. The majority of these lips are plain but several from upper layers are decorated (Fig. 14d–e; Table 5).

Form VIII: Flat everted rims. These are also similar to Form VI, but the rim is at a right angle to the neck and ends in a wide lip. Most are plain, but examples of dentate-stamped, and incised or tooled vertical decoration are found (Fig. 14f–i; Table 6).

TABLE 4
DISTRIBUTION OF RIMS ASSIGNED TO FORM VI

Layer	Tool Impressed	Plain	Tool Impressed plus Dentate	Total
2	2	-	-	2
3	5	-	-	5
4	1	-	-	1
5	4	-	-	4
6	10	1	2	13
Total	22	1	2	25

TABLE 5
DISTRIBUTION OF RIMS ASSIGNED TO FORM VII

Layer	Plain	Shell impressed	Notched	Applique	Total
2	-	2	-	-	2
3	3	1	1	1	6
4	3	-	-	-	3
5	4	-	-	-	4
Total	10	3	1	1	15

TABLE 6
DISTRIBUTION OF RIMS ASSIGNED TO FORM VIII

Layer	Plain	Incised	Tooled	Dentate	Total
2	2	-	-	-	2
3	2	1	1	-	4
4	1	-	-	1	2
5	3	-	-	1	4
6	1	-	1	1	3
Total	9	1	2	3	15

Category iii

Form IX: Water jar. This vessel is characterised by a very narrow neck, having an orifice with a very small diameter. No shaped sherd from this vessel could be identified from Location C, although a possible handle from such a vessel was found (Fig. 18a).

Category iv

Form X: Shouldered pot. An independent, restricted, composite vessel with a marked shoulder. The sides are curved steadily from the lip edge to the point of the shoulder where they join the base. No sherds were found in Location C with both the rim and the shoulder intact, so the allocation of five rim sherds to this form must remain tentative. Two from layer 6 are plain; there is one plain rim and one with dentate-stamped decoration from layer 4; and one from layer 3 carries whole shell impression.

Form XI: Shouldered pot. An independent, restricted, composite vessel with a marked shoulder. Two thirds of the vessel probably consisted of a deeply rounded base, and the straight sides are oriented inwards above a shoulder which is set at an angle a little wider than 90 degrees. A number of sherds of this form show a particular combination of zoning and dentate-stamped decoration on the upper surface adjacent to the shoulder (Fig. 15). Eight decorated sherds were assigned to this category: four from layer 3, one from layer 5, and three from layer 6. There is also one plain sherd from layer 6.

Form XII: Vessel with rounded shoulder. Several sherds show a rounded shoulder which bulges out below a more vertical section of the pot and continues almost vertically down towards the base (Fig. 16a). Three from layer 5 carry dentate-stamped decoration; one plain and one dentate-stamped sherd came from layer 6.

Form XIII: Vessel with double everted rim. The two rims are strongly everted and set at right angles to the vessel wall, with wide, squared lip edges (Fig. 16c). Sherds assigned to this form all carry dentate-stamped decoration. There are two from layer 3, one from layer 4, and two from layer 6.

Form XIV: Inverted rim. The rim turns sharply inwards from the side of the vessel (Fig. 16b). One of the two rims assigned to this category has incised decoration, the other dentate-stamped. Both are from layer 6.

Category v

Form XV: Straight sided bowl. An unrestricted, simple, open bowl, the sides of which are either straight or curve inwards a little at the mouth, and end in a lip edge having no distinguishable rim form (Fig. 17a). Most examples are plain (one from layer 2, three from layer 3, one from layer 4, two from layer 5), but one dentate-stamped example was found in layer 6.

Flanges

Twenty-three sherds were classified as flanges. Apart from three whose structure is not clear, they are characterised by transverse bars, mostly plain but sometimes notched (Fig. 17b, c). The distribution of flanges is given in Table 7.

Unclassified shaped sherds

As mentioned above, a number of shaped sherds could not be assigned to the vessel forms described above. The distribution of these sherds is given in Table 8.

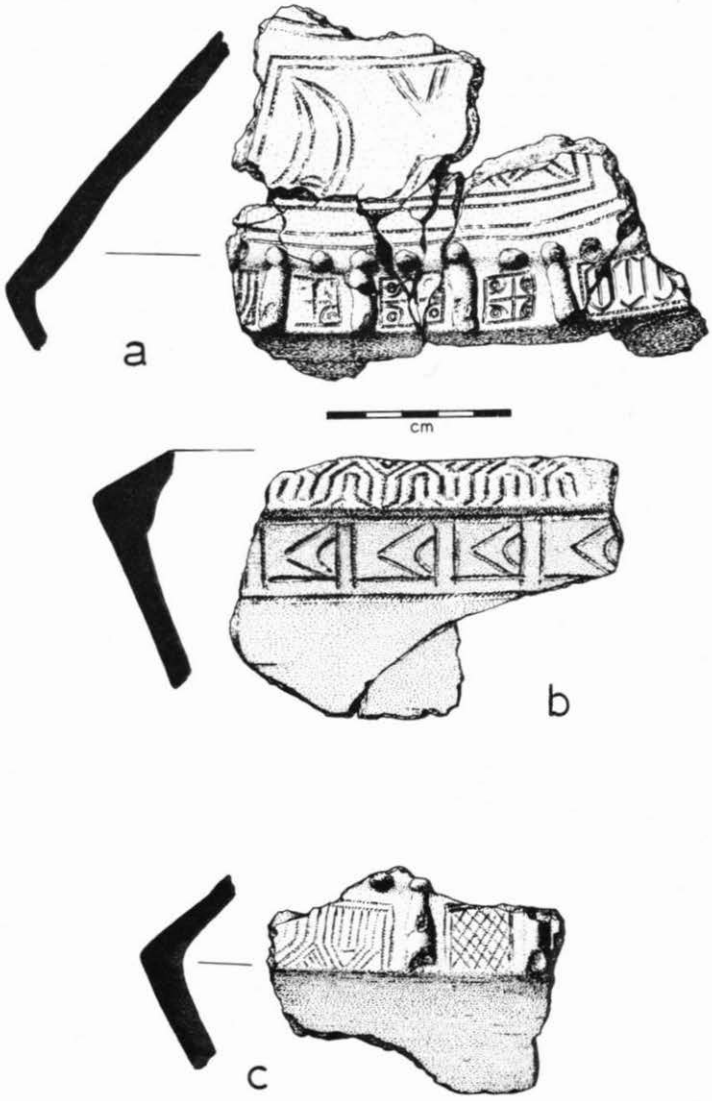

Figure 15: Shoulder sherds attributed to Vessel Form XI, Category iv. a, layer 6; b, no context given; c, layer 5.

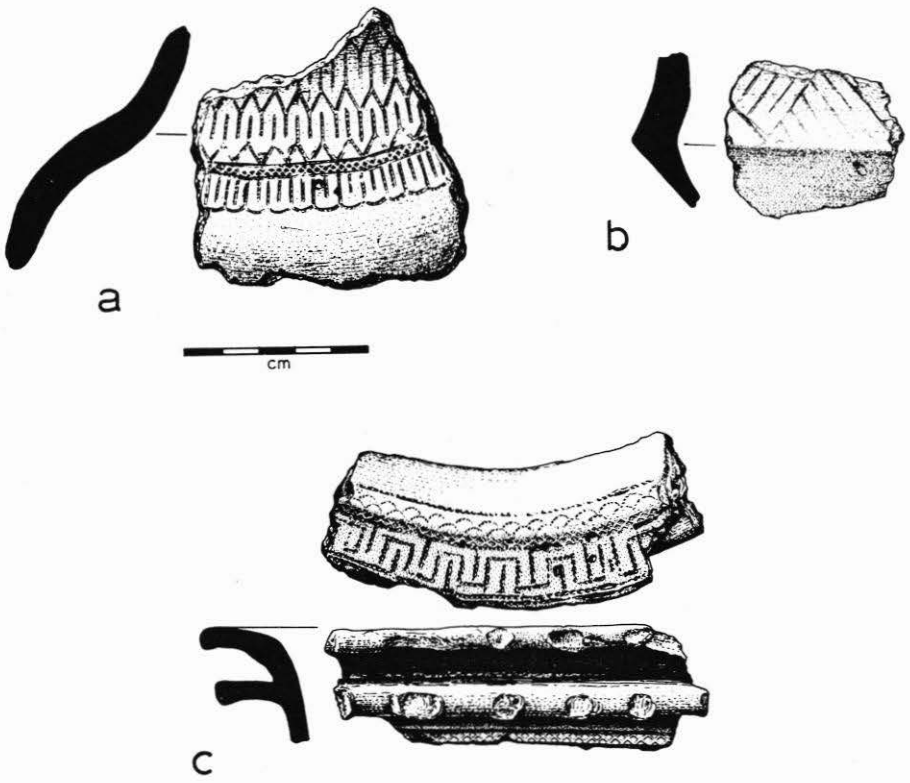

Figure 16: Sherds attributed to Vessel Forms XII, XIII and XIV, Category iv. a, Form XII, layer 5; b, Form XIV, layer 6; c, Form XIII, layer 6.

TABLE 7
DISTRIBUTUTION OF FLANGES

Layer	Unclear	Plain	Vertical Groove	Shell Notch	Dentate	Total
2	-	1	-	-	-	1
3	1	5	1	-	-	7
4	-	4	1	-	-	5
5	1	-	-	1	-	2
6	1	4	2	-	1	8
Total	3	14	4	1	1	23

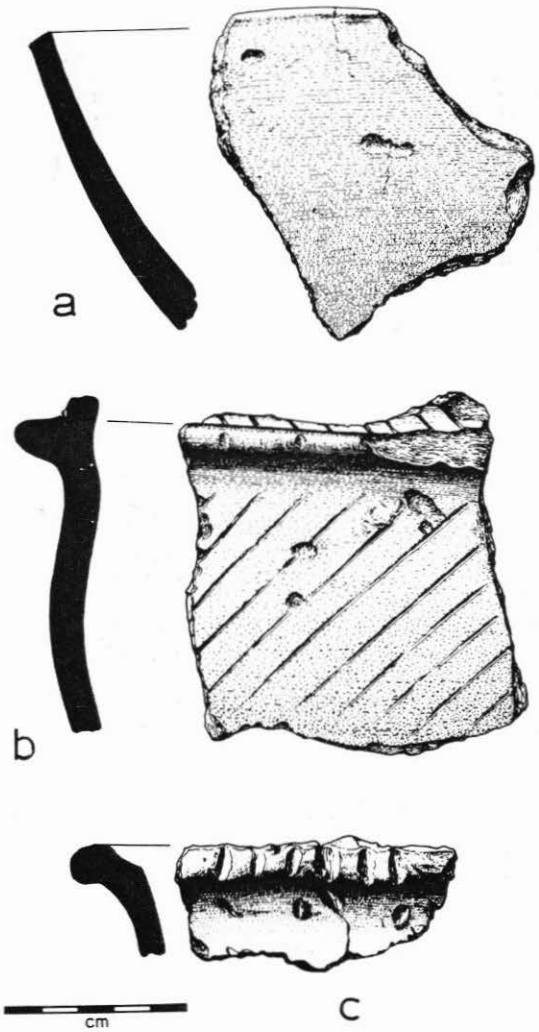

Figure 17: Miscellaneous shaped sherds. a, Vessel Form XV, Category v, layer 5; b-c, flanges, layer 6.

TABLE 8
DISTRIBUTION OF ATTACHEMENTS

Layer	Foot	Handle	Stand	Spout	Total
1	-	1	-	-	1
3	-	1	-	-	1
4	1	-	1	1	3
5	1	3	-	-	4
6	-	1	3	-	4
Total	2	6	4	1	13

Attachments

A number of pottery legs, handles and a spout were found (Fig. 18). Their distribution is given in Table 9. One handle from layer 5 has been tentatively reconstructed as part of a water jar (Form IX) similar to those found at Sigatoka, on the basis of its marked curvature (Fig. 18a). The spout (Fig. 18f) is from layer 4. It is not possible to tell from the sherd alone whether it comes from a Lapita decorated pot. Several fragments are thought to be the feet from pot stands. One unusually robust piece may have come from a pot similar to one figured by Birks (1973: Fig. 36).

TABLE 9
DISTRIBTUTION OF UNCLASSIFIED SHAPED SHERDS

Layer	Rim	Neck	Shoulder	Total
1	7	1	1	9
2	40	14	3	57
3	59	36	6	101
4	38	28	14	80
5	52	19	8	79
6	31	13	11	55
Total	227	111	43	381

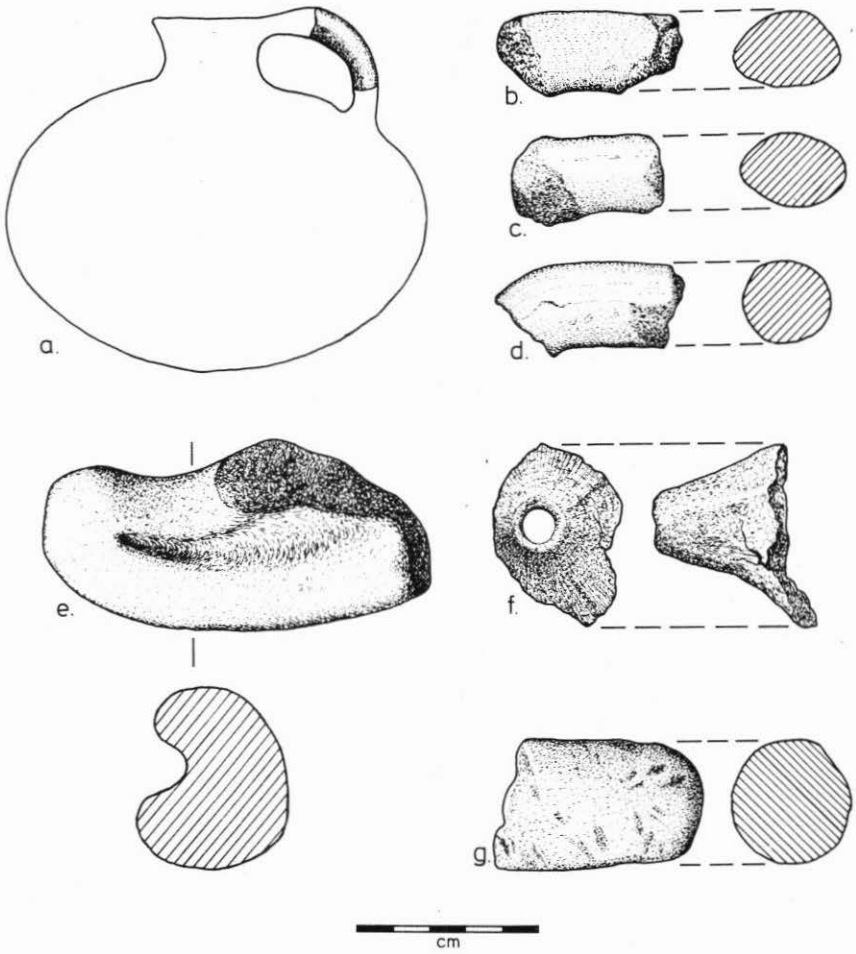

Figure 18: Attachments. a–d, handles; e, g, legs; f, spout. a–c, layer 5; d,e, layer 6; f, g, layer 4.

Discussion

The distribution of shaped sherds allocated to vessel forms is shown in Figure 19. In this graph the number of sherds of a particular form in a particular layer is shown as a percentage of the total number of classifiable shaped sherds from all layers combined.

As Hinds noted in her earlier paper (Mead *et al.* 1973), the most common vessel form at Natunuku was the flat bottomed dish (Form I), over 50 fragments of which were found. These were most prevalent in layer 6, with fewer in layers 5 and 4, and only a small number in layers 1 to 3.

The Form III vessels concentrated in the upper layers, as might be expected, as this form is similar to the modern cooking pot (*kuro*). However, one definite Form III rim with the characteristic sharply angled neck came from layer 6.

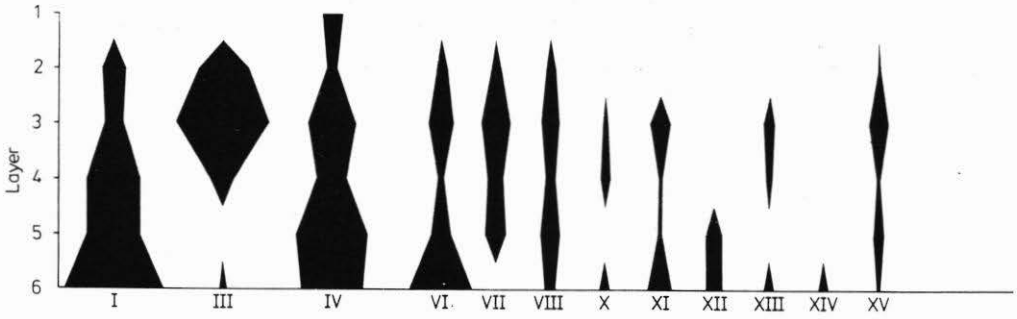

Figure 19: Percentages of shaped sherds according to Form and layer.

Form IV vessels are slightly more plentiful in the lower layers, but occur throughout the site. Form VI shows a sharp decline after its initial importance in layer 6, but continues in small numbers in the soil layers.

Forms XII and XIV are found only in the lower layers, although their absence from the upper layers could be due to sampling error. The other numerically small forms are all represented at least as high as layer 3 and sometimes as high as layer 2.

Comparison of the Natunuku vessel forms with those from other sites is hindered by the tentative nature of many vessel reconstructions (with the conspicuous exception of those from Sigatoka illustrated by Birks (1973)). Most of the Natunuku reconstructions are themselves similarly tentative. It is probable that such reconstructions are easily influenced by other comparable reconstructions, particularly where sherds are predominantly small and shapes are largely derived from rims. Under these circumstances, inter-site comparisons of the distribution of vessel forms should be treated with caution.

Green (1974: Fig. 90) has published a table comparing vessel forms from Natunuku (derived from Shaw 1973), Yanuca, Sigatoka, To-1 to To-5, To-6, Vuki's Mound and SU-Sa-3, which places Natunuku in his Early Eastern Lapita Phase. More recently, he has compiled a similar chart of Western Lapita vessel forms (Green in press), following work by Parker (1981) on vessel forms from the Lapita sites of the Reef Islands-Santa Cruz Group. These comparisons and reports on other sites in Fiji and Tonga provide information for comparisons with Natunuku.

Category i, the flat bottomed dish, is a confirmed vessel which has been recognised in a number of other sites. It is apparently present throughout the Western Lapita range in both early and late sites (Green in press). In the east, it is well represented at Yanuca as well as Natunuku (Mead *et al.* 1973; Hunt 1980), but is unimportant or absent at Sigatoka, Lakeba (Best 1984), and Niuatoputapu (Kirch 1988). At Naigani this vessel is possibly represented by one partial base only (Kay 1984: 53). Although Poulsen (1987 (II): Fig. 57) illustrates flat bottomed base sherds from Tongatapu, these are not decorated on the base, and it is not clear whether they belong to vessels of the same kind as the Natunuku and well known Reef Island examples. They are rare and exclusively early in the Tongan sequence (Poulsen 1987 (I): 86). The flat bottomed dish at Natunuku and Yanuca, therefore, provides a clear link to

the west, although not necessarily a confirmation of the early ages of the two Fijian sites, since the form has a long history in the west.

Category ii, round bottomed ovoid pots without shoulder, encompasses considerable morphological variability and is represented in some form or another throughout the Fijian ceramic sequence. Unfortunately, this broad category includes some of the more tentative forms, and precise comparisons are not easy.

Vessel Form II, not certainly identified at Location C, is more characteristic of Late Eastern Lapita and Polynesian Plainware than of Early Eastern Lapita in Green's (1974) terms. The two examples excavated by Hunt were probably from a Polynesian Plainware context (see below). Hunt (1980: 128) compared them with vessels from Sigatoka Level I and Yanuca. Vessels of this form are tentatively reconstructed from Tongatapu and Niuatoputapu (Poulsen 1987; Kirch 1988).

Vessel Form III, the Fijian *kuro*, has not been recognised in Eastern Lapita assemblages. In Lakeba it is strongly represented during the latter two thirds of the sequence, but not earlier (Best 1984: 293). The sherd attributed to this form from layer 6 at Location C could therefore be considered intrusive. It is worth noting, however, that a similar vessel form with both plain and decorated variants seems to be well represented throughout the Western Lapita area (Green in press).

The remaining forms in Category ii are based on rims only, and are not particularly useful for comparisons with other sites. However, some of them show striking parallels to actual vessels from Sigatoka. They suggest that there is a significant Late Eastern Lapita or Plainware component in the Natunuku assemblage.

The Category iii water jar with and without handle is well known from Sigatoka (Birks 1973) and the handled form is present in Best's Period II in the Lau Islands (Best 1984: 301). It is apparently also present in Futuna and Niuatoputapu (Kirch 1981, 1988). There is no evidence that it was present in the earliest ceramic assemblage from Natunuku; the possible handle from layer 5 may be another indication of a Late Eastern or Plainware component at Location C.

Category iv, shouldered vessels, is a broad group which, like Category ii, encompasses a number of different tentative forms. It is difficult to determine which of the numerous shouldered vessels proposed for other Lapita sites in both Eastern and Western spheres are represented at Natunuku. Hinds in her earlier study (Mead *et al.*1973) recognised Yanuca vessel Forms B and E at Natunuku, but noted that a number of other angled sherds were present, which might belong to other shouldered vessels.

Vessel Forms X and XI are probably similar to vessels found in Tongatapu and Niuatoputapu as well as at Yanuca. Kay has argued for similar forms at Naigani (Kay 1984). However, many Western Lapita forms are not dissimilar, and without more secure reconstructions, it is difficult to say much more than that shouldered vessels are typical of Early Eastern and much of Western Lapita ceramics. Vessel Form XII might not be classed by other researchers as a shouldered pot, although Kay (1984: 47) illustrates similar sherds. Its relationships are therefore difficult to determine. Although it does not appear in the simplified comparative charts of Western vessel forms, it can readily be compared with a vessel from the Reef Islands illustrated by Green (1976: Fig. 77).

The other vessel forms proposed for this Category are rather different from the main group of shouldered (or carinated) Lapita pots. Vessel Form XIII is a very unusual rim, rather than a clearly defined shouldered vessel. It does not seem to have been published before, although Best (pers. comm.) has one example from Lakeba. Its existence is not surprising in view of the widespread occurrence of flanges and applied horizontal bands on Lapita

pots. Vessel Form XIV is probably a bowl with inverted rim. This has close parallels at Sigatoka and in Tongatapu, but also occurs sporadically in the Western Lapita province.

One of the notable features of the Natunuku assemblage is the relative unimportance of Category v, simple bowls. That they were certainly present in the Lapita inventory is shown by the existence of a dentate-stamped sherd from a straight sided bowl in layer 6 and by another dentate-stamped example collected at Natunuku by Hunt (1980: 76). Plain bowls of at least two sizes were present at Yanuca in association with dentate-stamped Lapita sherds, although it is not clear how common they were. Bowls assume considerable importance in most other Eastern assemblages. Plain bowls were particularly numerous at Naigani (Kay 1984: 50–52), and bowls are well represented at Sigatoka, throughout the Lakeba sequence, in Tongatapu and in Niuatoputapu. They are the only vessel form known in the Samoan manifestation of Polynesian Plain Ware (Green 1974). On the other hand, they are not common in Western Lapita and reported examples were apparently always decorated (Green in press). This may be another indication of the western affiliations of the early ceramics at Natunuku, but it is surprising that more bowls were not identified from the deposits above layer 6 that seem to have a Late Eastern Lapita or Plainware component.

Effective intersite comparison of vessel forms really requires detailed information on the size of vessels, and their relative proportions in the various assemblages. Such information is not usually available. Moreover, there is uncertainty about vessel function. Is it possible, for instance, that some of the plain bowls of Naigani were performing a similar function to the flat bottomed dishes of Yanuca and Natunuku? If so, is the difference chronological, as present evidence might suggest, regional, or a reflection of different origins?

Despite such uncertainties, the present analysis has highlighted some distinctive features of the Natunuku vessel forms. Some of these have clear parallels in the Western Lapita province. Other aspects of the ceramics do not necessarily point in the same direction, however. For example, incised decoration was rare in the lower deposits at Natunuku, although it does occur (e.g., on Form XIV, Fig. 16b). Its unimportance in the early deposits at Natunuku contrasts with the figures given for the Santa Cruz sites by Donovon (1973: Tables 5,7,9), and also with the Fijian site of Naigani, where about 28 percent of decorated sherds were incised (Best 1981: 9; Kay 1984: 62). Incised decoration was also a significant component of the Lapita pottery of New Caledonia (Green and Mitchell 1983).

RESIDUES

Ten potsherds and two samples of carbonised residues from Natunuku were examined as part of a study of organic residues (Hill *et al.* 1985). Preliminary results suggested that the pots had been used for cooking plant materials and in one case possibly also fish, but not meat. Two of the sherds examined in this study came from Locations A and B (P1 and P2). The remaining eight sherds and two samples of residue were from Location C, but from different layers and rectangles. P4 and P8 were from layer 5, P5 from the fill of a feature below layer 5, and R1 from layer 6.

DISCUSSION AND CONCLUSIONS

Although Natunuku has been regarded as a Lapita site, the excavations produced a considerable quantity of pottery from later Fijian wares. The deposits at Localities A and

B were laid down largely, if not entirely, in post Lapita times. Even at Location C, where the lower layers have been interpreted as primary Lapita deposits, the largest quantities of pottery came from layers 2 and 3, and consisted of a mixture of later wares and some dentate-stamped sherds, almost certainly derived from underlying layers. Both dentate-stamped and carved-paddle impressed sherds were recovered from all layers and there appears to be some continuity in vessel form throughout the deposits. There is an element of uncertainty, therefore, about the Lapita association of any sherd, even from the lowest layers, which does not actually carry recognisable Lapita decoration.

The restricted nature of the excavations, and the lack of a series of radiocarbon dates, make it difficult to estimate the duration of the Lapita occupation at Natunuku, or to say much about the nature of that occupation. The decline in the proportion of flat bottomed dishes after the earliest layer may indicate a fairly lengthy occupation, but could also represent a change in the function of this part of the site over a short period. A series of radiocarbon dates is needed, not only to show how much reliance can be placed on the one existing date, but to indicate how long the Lapita occupation may have been, and whether the Lapita pottery recovered can be treated as a single, tightly controlled assemblage, or should be regarded as a long accumulation within which change in vessel form and decoration is to be expected.

The most likely interpretation is that only layer 6 represents an Early Eastern Lapita deposit, and that the material in layer 5 derives mainly from a Late Eastern Lapita or Plainware occupation. Limited intrusion in layer 6 would be represented by the Form III rim and carved-paddle impressed sherds, while some mixing of sherds from both earlier and later occupations is apparent in layer 5. Alternatively, however, layers 6 and 5 may reflect continuous occupation and changes in decoration and vessel form over quite a long period.

It is obvious that there have been considerable environmental changes at Natunuku, some of which, at least, have taken place during the occupation of the site. The earlier occupations appear to have been on a sandy surface, although one sufficiently stable to support a series of structures. If the assemblage from layer 6 is seen as the debris from a discrete, earlier occupation than that represented by layer 5, questions must be asked about the nature of that occupation, for layer 6 was apparently yellow beach sand with no features and no cultural material other than potsherds and flecks of charocal.

It has been suggested that the soil layers 4 and 3 at Location C formed at least partly as a result of erosion in the surrounding area. This may reflect population growth and increasing human impact on the surrounding region comparable to that documented in the Lau Islands by Best (1984). The change in shellfish species, observed by Hinds during the excavation, may be another indication of human impact on the coastal environment. Further study of the environmental history of the site would improve our understanding of its human history.

It is unfortunate that the excavations recovered very little other than pottery. More recent work in Fiji (Best 1981, 1984; Kay 1984) has shown that the early occupants of Lakeba and Naigani had access to a range of exotic material, not only stone of various kinds, but also shells of limited distribution. Changing patterns of external contacts have been documented for Lakeba. The Natunuku excavations have contributed nothing to this field of enquiry.

The Natunuku assemblage also contributes very little to the question of the relationship between Lapita and carved-paddle impressed pottery in Fiji. Hunt (1980) suggested that carved-paddle impressed pottery may have been contemporary with Lapita at Yanuca, as it was in New Caledonia (Green and Mitchell 1983). However, Best (1984) demonstrated conclusively that in the Lau Islands, carved-paddle impressed pottery appeared as a new

ware at a later date. Although the Natunuku data might at first glance seem to lend support to Hunt's view, the amount of disturbance of the deposits, even in layer 6 and certainly in layer 5, is probably sufficient to account for the apparently overlapping distributions of carved-paddle impressed and dentate-stamped sherds. The Natunuku evidence cannot be used as positive evidence of overlap.

The amount of Lapita pottery from Natunuku is not very great, and the number of shaped sherds which can be used to reconstruct vessel forms is actually quite small. Even so, it is possible to point to some aspects of the Lapita assemblage from Natunuku which may be useful in future comparative studies. The importance of Form I flat bottomed dishes at Natunuku was recognised at an early stage by Hinds, and has been confirmed by this study. Some of the other shaped sherds and their putative vessel forms are also easily recognised and very distinctive.

ACKNOWLEDGEMENTS

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