

MID-SEQUENCE ISOLATION IN FIJI 2500-1000 BP

Geoffrey Clark

Department of Archaeology and Natural History, Research School of Pacific and Asian Studies,
The Australian National University, ACT 0200, Australia

ABSTRACT

The reduction in imported materials found in the Lakeban sequence between 2500 and 1000 BP has been thought to represent diminishing areal contact within the Fiji archipelago. Declining interaction appeared to fit an isolation-by-density model where increasing population and settlement densities led to deepening community isolation. Analysis of ceramic attributes and a review of the interarchipelago transfer of materials 3000-1000 BP indicates that there is little evidence for isolation during the mid-sequence. In fact, continued contact is attested for the period ca. 2000-1000 BP. The finding suggests that the socio-cultural variation found in Fijian society at European contact was not solely caused by the radiation of isolated communities and that social diversification in an environment of continued archipelago interaction is a viable alternative to the isolation-by-density model.

INTRODUCTION

Establishing the amount of interaction taking place within and between Oceanic islands during prehistory is important for understanding the development and transformations of societies in the region. Patterns of interaction are particularly useful in informing prehistorians about the frequency of voyaging, episodes of gene flow between islands, and as a factor affecting rates of material culture and socio-linguistic change.

In Near Oceania (New Guinea to the Solomon Islands) the transfer of animals and other items has a considerable antiquity, reflecting the age of human occupation there and the relatively small distances between islands. The development of the Lapita cultural complex around 3200 BP in Near Oceania was marked by a significant increase in the movement of items, the most visible being ceramics and obsidian, over longer distances and in greater quantity than

had occurred previously (Kirch 1997). East of the Solomon Islands, in Remote Oceania, the Lapita culture marks the first human settlement of islands in the area from Vanuatu to Tonga. In both Near and Remote Oceania longitudinal studies of interaction have demonstrated a decline in communication-exchange networks following Lapita settlement (Green and Kirch 1997). This paper is concerned with evidence for a post-Lapita communication decline in Fiji.

For the Fijian archipelago, Best's extensive study of Lakeban prehistory (Lau Group) showed temporal fluctuations in the island's communication network (1984). The work showed that Lapita-age sites contained the greatest number of imported items, including volcanic glass, basalt and other kinds of stone, along with non-local ceramic tempers. Post-Lapita, the number and quantity of imported items declined, as did the distance over which the imports travelled.

The Lakeba data were used as a proxy for the Fijian archipelago by other researchers, who summarised Fijian interaction as beginning with a set of wide-ranging and frequent interactions during the first 300-500 years, marked by Lapita assemblages. This was followed by 1500 years of deepening community isolation, that was then succeeded by large-scale and frequent interactions during the past 1000 years. From 2500 to 1000 BP the Lakeba data have been interpreted as fitting an isolation-by-density model (Hunt 1987; Rechtman 1992). The model predicts that as a population grows isolation within a system increases as the density of separate places multiplies. The development of communication boundaries leads to areal diminution in interaction and socio-cultural divergence. These processes correlate archaeologically with the cessation or reduction of imported items in the prehistoric record.

A 1500-year period of isolation in Fiji constitutes a useful hypothesis about the kinds of physical evidence that should be found in the Fijian landscape, including site-age densities, diversity in material-culture sets and the range and frequency

of imported and exported items found in the archaeological record. It also provides an explanation for the social and linguistic diversity found in Fiji at European contact. Overall, though, the existence of mid-sequence isolation is not well attested and rests largely on the interpretation of the Lakeba data.

Before accepting a one and a half millennia episode of relative isolation, a period of time accounting for half of the archipelago's human history, there are two issues to address. The first is the interpretation of the imported items found during the first 2000 years of the Lakeba sequence. These underpin the case for mid-sequence decline but are they consistent with other lines of evidence, particularly with the ceramic record? Secondly, has the contrast between rates of interaction in the Lapita phase and those of the mid-sequence been exaggerated in favour of an interaction versus isolation dichotomy? If interaction rather than mid-sequence isolation is evidenced then alternative models for Fijian prehistory may need to be considered.

This paper examines the case for mid-sequence isolation in Fiji. Ceramic attributes from assemblages dated to 2500-1000 BP were analysed for evidence of divergence. Ceramics were used, as they constitute the primary material-culture resource recovered from Fijian archaeological sites. The plasticity of the medium, and the large array of potential manufacturing options open to a prehistoric potter, suggest that if Fijian society followed an isolation-by-density path then ceramic assemblages from the archipelago should vary in their form, type and frequency of surface modification. Secondly, archipelago isolation during the period 3000-1000 BP is examined by reviewing items imported into Fiji and exported from Fiji to other islands. Isolation-by-density operates at two scales; within Fiji as increasing settlement density leads to reduced contact within the archipelago, and between Fiji and other archipelagos. The decline or absence of long-distance voyaging during the mid-sequence would be consistent with a reduction in the geographic scale of interaction from the interarchipelagic to the local level. Therefore, a review of portable items transferred between 3000 and 1000 BP provides a test of the isolation-by-density model.

CERAMIC EVIDENCE FOR DIVERSIFICATION

The Lakeban sequence established by Best (1984) is used here as the basis to assess ceramic variation within Fiji. The first 2000 years of the Lakeban ceramic sequence were based on collections from two highly stratified and well-dated rockshelters (Qaranipuqa and Laselase) which have a relatively consistent set of 19 radiocarbon determinations. The only other sequences which rival Lakeba for time-depth and dating are those from Yanuca, excavated by the Birks (Hunt 1980), and Beqa (Crosby 1988). However, both of

these sequences are deficient. Yanuca suffers from having potentially unreliable Gakushuin radiocarbon determinations (Spriggs 1990) and evidence of deposit mixing (Prescott *et al.* 1982). The Beqa assemblages were dated by few radiocarbon determinations from small excavations. Most Beqa ceramics were collected from surface contexts. Further, the Lakeba ceramics were described in greater attribute detail than those from other sites and tied to a stratigraphic provenance.

PRESENCE/ABSENCE OF SURFACE MODIFICATION

Nine decorative types were used by Best (1984: Fig. 3.55) to summarise ceramic change on Lakeba from 2500 to 1000 BP. These are red slip and burnishing (2500-2000 BP), followed by different types of paddle impressing (parallel rib, cross-hatch, cord, wavy), incising (asymmetric), finger pinching/gouging and rim notching (2000-1000 BP). The presence or absence of these Lakeban decorative types was recorded in assemblages from six locations; a south coast Viti Levu sample from two sites and one island (Sigatoka, Yanuca and Beqa Island); a north coast Viti Levu sample from Navatu site 17A excavated by Gifford (1951) and the author in 1996; a southern Lau sample from Totoya Island (J. Clark and Cole 1997); and the Taveuni ceramics recorded by Frost (1970).

Assemblages decorated exclusively with burnishing and a red slip are only recorded from Lakeba and little can be said about the geographic distribution of these traits except that they are present in Lapita ceramic collections and appear, on limited evidence, to continue after the demise of dentate-stamping on Lakeba (Table 1). Ceramics from ca. 2000-1000 BP are more common. Sherds marked with parallel ribs, cross-hatching, finger pinching/gouging and incision (asymmetric or symmetric) are found in all sites, with cord-impressed sherds occurring in excavations at Lakeba (Qaranipuqa and Laselase), Navatu Site 17A, Beqa (Rukua rockshelter) and as surface finds on Totoya. At Navatu and Rukua the cord-wrapped technique dates from 1700 to 1000 BP, which is in agreement with its presence on Lakeba, although the technique may persist after 1000 BP.

FREQUENCY OF SURFACE MODIFICATION

The frequency of a decorative type in ceramic collections is useful to establish as frequency similarity can indicate prehistoric contact. However, the absence of rare or low frequency decorative types cannot necessarily be taken as evidence for diverging ceramic assemblages because of unequal sample sizes. Small collections are less likely to contain low-frequency decorative types than large. Further, site disturbances through digging various types of pits and the construction of house platforms and fortifications, along

CLARK: MID-SEQUENCE ISOLATION IN FIJI 2500-100 BP

Table 1. Comparison of main decorative types found in the Lakeba sequence 2500-1000 BP with other mid-sequence assemblages.

Decoration type	2500-2000 BP		2000-1000 BP							Reference
	red slip	burnish	parallel rib imp.	cross- hatch imp.	cord imp.	wavy imp.	rim notching	finger pinching	incising	
Lakeba, Qaranipuqa.	X	X	X	X	X	X	X	X	X	Best 1984
Lakeba, Laselase.	X	X	X	X	X	X	X	X	X	Best 1984
Totoya Island.	X	X	X	X	X	X	X	X	X	J. Clark & Cole 1997
Beqa Island.	X	X	X	X	X	X	?	X	X	Crosby 1988
Yanuca, Zone 2.			X	X	-	-	X	X	X	Hunt 1980
Sigatoka, Level 2.			X	X	-	X	X	X	X	Birks 1973
Navatu 17A, Layer 4.			X	X	X	X	X	X	X	Clark n.d. Gifford 1951
Taveuni Island			X	X	-	X	X	X	X	Frost 1970

with horticultural practices, have disturbed many Fijian archaeological deposits, making the comparison of low and high frequency decorative types problematic.

Frequencies of three decorative types were calculated using data from sites or levels that appear to have been minimally disturbed, or from sites where the degree of disturbance does not appear to have obscured the integrity of the ceramic sequence. The ceramic assemblages have experienced different site formation processes and were accumulated through diverse collection methodologies. These factors are likely to contribute an unquantifiable amount of inter-assemblage variation.

Best (1984:594-617) records another factor that might confound an inter-assemblage comparison of decorative traits. In the recent past, vessel forms associated with decorative types were linked to high-status areas. If this were true for the period 2000-1000 BP then variation in excavated assemblages could represent difference in social status.

Percentages of parallel rib relief were calculated for sites from Lakeba, Yanuca, Navatu and Beqa. Chronological comparison was made using radiocarbon dates from Lakeba and Navatu 17A and interpolation between determinations from stratified Beqa assemblages. The Yanuca chronology was reassessed using radiocarbon results from the Karobo site where a ceramic assemblage similar to that found at

Yanuca was found. A distinctive ceramic marker in the Yanuca sequence was the flat-bottomed platters with leaf or mat impressions. This vessel was prominent in Ceramic zone 2 with a basal date of 2660 ± 90 (GaK-1227) and a mid-zone 2 determination of 2060 ± 100 (GaK-1228). However, at the nearby Sigatoka and Karobo sites these vessels are found in contexts dated to 1700-1400 BP, providing a more reliable indication for the age of the Yanuca mid-levels.

Frequencies of parallel-rib relief in Lakeban and Viti Levu assemblages display similar changes. Rising to c.25-33% at about 1650 BP, the quantity of relief sherds decreases to under 11% by 1300 BP before declining, in all sites, to levels below 5% or so during the last 500 years (Figure 1).

Frequencies of cross-hatch impressions are more variable. At Lakeba a maximum of 18% of the assemblage was decorated, but on Beqa the frequencies from excavated levels range from 23% to 36%, and at Yanuca up to 56%. The Lakeba frequency distribution is more even through time than Yanuca and Beqa, both of which showed a rapid decline in the amount of decoration after 1650 BP. By 1300 BP, frequencies have fallen to 10% or less and in all sites low percentages persist after this time (Figure 1).

Low frequencies of rim notching showed a small increase between 1700 and 1450 BP at Lakeba, Yanuca and Navatu but apparently did not occur on Beqa (Figure 1).

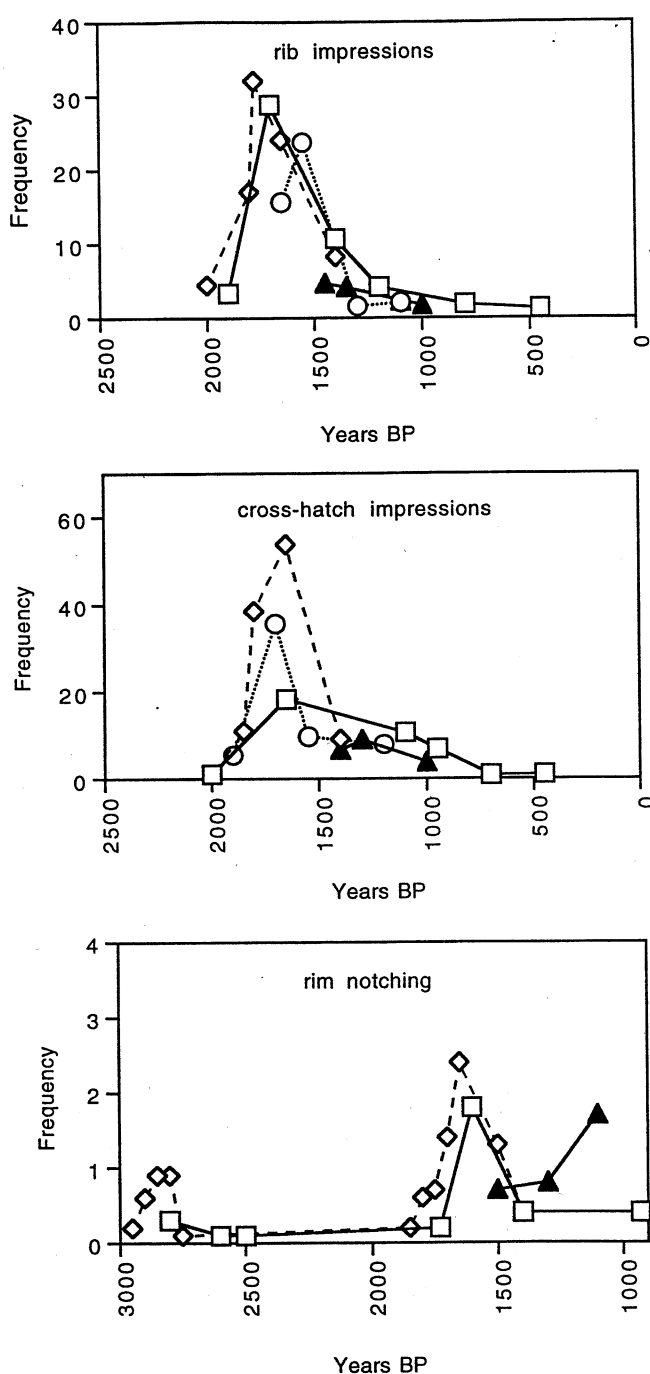


Figure 1: Decorative frequencies in Fijian ceramic assemblages. Squares = Lekeba; diamonds = Yanuca; circles = Beqa; triangles = Navatu 17A.

VESSEL FORMS

The plain-ware phase at Lakeba (2500-2000 BP) was characterised by bowls, and sub-globular jars with expanded and small collar rims with flat or rounded lips. Large vessels

with inverted rims, vessels with sharp body carinations and narrow orifices were present in small numbers (Best 1984: Fig. 3.54). These rim forms and vessels occur on Beqa Island and possibly at other sites such as Natunuku and Yanuca (Hunt 1980), but there is little information on these vessel forms elsewhere in Fiji.

Lakeba vessels from 2000 to 1000 BP were described as cooking-pot forms with everted rims, concave or straight rim courses, and flat or flat-rounded lips. Similar vessels were recorded from Sigatoka, Yanuca, Beqa, and Navatu. Not found on Lakeba were the large flat-bottomed dishes with impressed leaf and mat impressions known from the south coast of Viti Levu (Green and Palmer 1963), or the double-spouted vessel with a stirrup handle first recorded by Gifford (1951). The absence of double-spouted vessels on the south coast of Viti Levu and of the flat-bottomed dishes from the north coast suggested the presence of two contemporaneous ceramic traditions on Viti Levu (Palmer 1965; Shaw 1967). However, double-spouted vessels have since been identified from south-coast sites (Karobo and Beqa Island) and Natunuku, in addition to Taveuni and Cikobia (Clark and Sorovi-Vunidilo 1999; Sand pers. comm.). Flat-bottomed leaf or mat-impressed vessels are certainly found in greater numbers on the south Viti Levu coast but there are records of this form from the north coast of Viti Levu and from the Yasawa Group (Palmer 1965; Lambert 1971).

INTER-ARCHIPELAGO CONTACT 3000-1000 BP

Green (1996) summarises the evidence for the movement of items, such as lithics and ceramic tempers, into and out of Fiji during the Lapita period. From Fiji, two flakes of volcanic glass found on Naigani Island originated from Talasea (the flakes probably arrived via Reef/Santa Cruz), and two of the five flakes from the Lapita component of Qaranipuqa-Wakea are from Tafahi, in northern Tonga. Found with the Mulifanua pottery was one sherd with a quartzose temper from Fiji, possibly Viti Levu. Five Fijian sherds from two sites in Ha'apai are likely to be imports from the Lau Group. However, the Lapita association is uncertain as the excavator notes that: "the stratigraphic case for the association of the exotic sherds with Lapitoid era deposits is extremely weak" (Dye 1988:246). From Poulsen's Tongatapu excavations two sherds may have a Fijian origin but one is a surface find and the other is described as dating to the late ceramic period (Key 1987: 274-275). Of probable northeast Viti Levu origin are a sandstone file and an adze made from green dacitic tuff found on Tongatapu, and an adze fragment made from a coarse-grained blue-green rock from Ha'apai (Green 1996). These specimens are, however, poorly provenanced and may not according to the excavators be associated with Lapita

deposits (Dye 1988:130; Poulsen 1987:172-3, 211). Adzes made of a green metamorphic rock occur as surface finds on Tongatapu and Samoa (Green *et al.* 1988; Spennemann 1989:160) and siliceous materials from Tonga and Samoa are potentially of Fijian origin (Clark 1996; Green 1996). *Rattus praetor* also appears to have been introduced into Fiji during the Lapita phase deliberately or accidentally (White *et al.* in press).

During the mid-sequence, volcanic glass from northern Vanuatu enters the Lakeba sequence of two rockshelters around 1500 BP and continues until 1100 BP. A paddle-impressed sherd with a Fijian temper from Tikopia may date to this period (Kirch and Yen 1982), as might a paddle-impressed sherd from a surface context in Ha'apai (Dye 1988:214). Sherds from northern Viti Levu dating to approximately 1000 BP have been found on Tuvalu, Tokelau, and Rotuma (Best 1988; Dickinson *et al.* 1990; Ladefoged *et al.* 1998). Adzes of Samoan origin and with a distinctive morphology have been documented in the Fijian record of Lau and Taveuni (Best *et al.* 1992; Clark and Cole 1997) and no doubt occur in other parts of Fiji. The antiquity of these imports is known to be 900-450 BP (Best 1984: 401, 411) but their absence from mid-sequence deposits contexts could be misleading, as hinted by their earlier presence in Samoa (Green 1974:265) and considering the small number of Fijian adzes recovered in contexts dating to 2000-1000 BP. A single piece of obsidian from the fortified site of Ulunikoro is sourced to Tonga or Vanuatu (Best 1984:434, 628). This piece may have been brought in as fill during fortification construction or transferred in some other manner from the Qaranipuqa-Wakea Lapita site to the nearby fort.

DISCUSSION AND CONCLUSIONS

Ceramic diversification in the mid-sequence is difficult to evaluate for the period 2500-2000 BP. Intact deposits were found on Lakeba, but in other Fijian sites such as Natunuku and Beqa the plain-ware component is mixed with earlier and later ceramics. Until further assemblages are excavated and compared with the Lakeban pottery the ceramic data must be considered neutral and of little use in identifying patterns of ceramic similarity and divergence. The interpretation of plain-ware sequences from the Fiji-West Polynesian area has also proven problematic, with both divergence and homogeneity regarded as fitting the ceramic data (Davidson 1979; Dye 1988).

From 2000 to 1000 BP, ceramics from sites representing the approximate eastern and western extents of the Fijian archipelago indicate that ceramic change took place within similar time frames. Common kinds of surface modification, like parallel rib and cross-hatch impressions, are found in all sites and even rare types (cord-wrapped relief and finger

pinching/gouging) have a wide spatial distribution. Frequency comparison of three decorative types showed that parallel rib and cross-hatch impressions, the two most popular kinds of surface modification, followed similar developmental trajectories in sites, increasing from small amounts to comprise the majority of decorated sherds, before declining after 1300 BP. Little evidence for diversity in vessel form was found and specialised vessels like the double-spouted form with a stirrup handle have a Fiji-wide distribution, although leaf and mat-impressed trays may be spatially limited and have not been recorded, so far, from the Lau Group.

Similarities in mid-sequence ceramic attributes indicate that interaction was sufficient for the transfer of stylistic features and therefore that isolation was not as pronounced as suggested by the isolation-by-density model. This indicates either that ceramic attributes, as they have been recorded, are too coarse to measure socio-cultural divergence or that there are alternative explanations for the Lakeban data used as evidence for isolation. The description of Fijian ceramic assemblages does require further development if questions relating to socio-cultural variation within the archipelago are being examined. However, there is little reason to suggest that the picture of ceramic similarity was not caused by continuing contact, even though the type of interaction, whether the transfer of potters by marriage or the movements of a mobile population, is not yet understood.

Turning to the Lakeban record of imports from 3000 to 1000 BP, there are 12 items including ceramic tempers, two sorts of adze material, a species of freshwater shellfish and siliceous coral and jasper from Lapita contexts. From 2500-1000 BP the imports consist of three or four ceramic tempers, one adze material, and siliceous coral and possibly jasper. The discrepancy in the number of items has been interpreted as reflecting a contraction in communication networks and therefore relative isolation. However, a reduction in the number of imports might be connected to sample size. Two of the exotic ceramic tempers from Lapita deposits are represented by few sherds in a collection of about 70,000. The smallest ceramic sample (under 12,000 sherds) is from the 1500 years of the mid-sequence, which also has the smallest number of imported tempers. Differences in sherd numbers are reflected in the size of the areas excavated. Excavations of over 50 square metres sampled Lapita deposits and the ceramic and artefactual items were augmented by surface collections. This compares to around 19 square metres of excavated mid-sequence deposits from the Lakeban rock shelters and in one shelter (Qaranipuqa) deposits dating to 1700-1000 BP had been removed.

Sample size might effect the number of imported materials found but does not explain why the quantity of imports decreases. Early Lakeban ceramics are over 30%

imported, while percentages drop to under 10% in the mid-sequence. An important point here is the longevity of the Lapita cultural complex. A lengthy Lapita tenure, marked by long-distance interaction, stresses the role of communication in maintaining cultural homogeneity, with declining imports symptomatic of cultural breakdown and diversification. A Lapita chronology spanning one or two centuries has recently been suggested for Fiji (Anderson and Clark 1999.). Evidence for the greater quantity of imported materials during the Lapita phase on Lakeba could therefore be the result of direct procurement during the colonisation phase instead of long-term communication networks that declined during the mid-sequence (see also Sheppard *et al.* 1997).

A decline in inter-archipelago contact during the mid-sequence is difficult to establish. At least half of the Fijian import-exports attributed to the Lapita phase are poorly provenanced and some of these may record post-Lapita transfers. Vanuatu volcanic glass continues in the Lakeban sequence for around 400 to 600 years during the mid-sequence. As Best (1984: 493) notes, it is likely that the obsidian arrived on Viti Levu before being moved to the Lau Group. This glass may have arrived in Fiji via Tikopia rather than from the Banks Islands in northern Vanuatu. On Tikopia there is Vanuatu volcanic glass through the sequence and a Fijian sherd in layers dated from 2000 to 1000 BP. Whether the obsidian was obtained from Tikopia or Vanuatu, voyages of around 1000 km in length were made during the Fijian mid-sequence.

There were fluctuations in the amount of contact within Fiji and between Fiji and other islands during prehistory. There is evidence, for example, of substantial interaction taking place within the last 1000 years, especially between Fiji and Tonga-Samoa but also including islands such as Rotuma and Tuvalu. However, fluctuations do not necessarily represent isolation and the case for mid-sequence isolation appears over-extended in light of the ceramic comparison, the reconsideration of the Lakeba data and the prehistoric import-export record of Fiji. These indicate that the isolation-by-density model does not provide a good explanation for the mid-sequence archaeological record, although further work, particularly detailed studies of ceramic assemblages, should be undertaken.

An alternative model for the Fijian mid-sequence posits a degree of areal homogeneity in material culture, underpinned by a loosely integrated communication network. It is useful to contrast the ceramic record of Fiji – with its similar decorative repertoire and range of vessel forms – with ceramics from New Caledonia and Vanuatu, that display contemporaneous ceramic styles suggestive of communication boundaries or evidence of localised group affiliation. The geography of the Fiji Islands may well have

contributed to the small component of areal ceramic variation. The Fijian Group has a distinctive shape, compared to the linear forms of neighbouring archipelagos, with chains of small islands to the east and west flanking the large land masses of Viti Levu and Vanua Levu. Within this amphitheatre-like space, contact rather than isolation was a factor during the Fijian mid-sequence. Irwin (1980) argued that socio-cultural divergence in Remote Oceania took place in a context of continuing communication and such a view may be applicable at least to Fiji. The dynamics of the contact need further study. The detailed analysis of ceramic attributes from mid-sequence assemblages will allow Fijian interaction to be better understood, as will the growing body of information on the movement of artefacts within the Remote Oceanic region.

REFERENCES

- Anderson, A. and G. Clark. 1999. The age of Lapita settlement in Fiji. *Archaeology in Oceania* 34:31-9.
- Best, S. 1984. Lakeba: the Prehistory of a Fijian Island. PhD thesis, Department of Anthropology, University of Auckland.
- Best, S. 1988. Tokelau archaeology: a preliminary report of an initial survey and excavations. *Bulletin of the Indo-Pacific Prehistory Association* 8:104-18.
- Best, S.B., P. Sheppard, R.C. Green and R. Parker. 1992. Necromancing the Stone: archaeologists and adzes in American Samoa. *Journal of the Polynesian Society* 101:45-85.
- Birks, L. 1973. *Archaeological Excavations at Sigatoka Dune Site, Fiji*. Suva: Bulletin of the Fiji Museum No.1.
- Clark, G.R. and T. Sorovi-Vunidilo. 1999. Fijian double-spouted vessels. *Domodomo* 11(2):6-14.
- Clark, J.T. and T. Cole. 1997. Archaeological and palaeoenvironmental investigations on Totoya Island, Fiji. Report to the Fiji Museum, Suva.
- Crosby, A. 1988. Beqa: Archaeology, Structure and History in Fiji. MA thesis, Department of Anthropology, University of Auckland.
- Davidson, J. 1979. Samoa and Tonga. In J.D. Jennings (ed.), *The prehistory of Polynesia*, pp. 82-109. Cambridge: Harvard University Press.
- Dickinson, W.R., J. Takayama, E.A. Snow and R. Shutler Jr., 1990. Sand temper of probable Fijian origin in Prehistoric potsherds from Tuvalu. *Antiquity* 64: 307-12.
- Dye, T.S. 1988. Social and Cultural Change in the Prehistory of the Ancestral Polynesian Homeland. Ph.D thesis, Yale University, New Haven.
- Frost, E.L. 1970. Archaeological Excavations of Fortified Sites on Taveuni, Fiji. Ph.D thesis, University of Oregon, Oregon.
- Gifford, E.W. 1951. Archaeological Excavations in Fiji. *University of California Anthropological Records* 13:189-288.
- Green, R.C. 1974. A review of portable artifacts from Western Samoa. In: R.C. Green and J. M. Davidson (eds), *Archaeology*

- in *Western Samoa*, pp. 245-75. *Bulletin of the Auckland Institute and Museum* Number 7.
- Green, R.C. 1996. Prehistoric transfers of portable items during the Lapita horizon in Remote Oceania: a review. *Bulletin of the Indo-Pacific Prehistory Association* 15:119-30.
- Green, R.C. and J.B. Palmer, 1963. Two collections of pottery from Sigatoka, Fiji. *Journal of the Polynesian Society* 72:261-4.
- Green, R.C., S.B. Best and R. Richards. 1988. Exotic adze types from Tonga and Western Samoa. *Archaeology in New Zealand* 31:215-21.
- Green, R.C. and P.V. Kirch. 1997. Lapita Exchange systems and their Polynesian transformations: seeking explanatory models. In M. I. Weisler (ed.), *Prehistoric Long-distance Interaction in Oceania: an Interdisciplinary Approach*, pp. 19-37. Auckland: New Zealand Archaeological Association Monograph 21.
- Hunt, T.L. 1980. Toward Fiji's Past; Archaeological Research on Southwestern Viti Levu. MA thesis, Department of Anthropology, University of Auckland.
- Hunt, T.L. 1987. Patterns of human interaction and evolutionary divergence in the Fiji Islands. *Journal of the Polynesian Society* 96:299-334.
- Irwin, G.J. 1980. The Prehistory of Oceania: colonization and cultural change. In A. Sherratt (ed.), *The Cambridge Encyclopedia of Archaeology*, pp. 324-332. Cambridge: Cambridge University Press.
- Key, C.A. 1987. Appendix 5: The petrology of some Tongatapu pottery. In J. Poulsen Early Tongan Prehistory, Vol. 2, pp. 274-7. *Terra Australis* 12. Canberra: Department of Prehistory, Research School of Pacific Studies, Australian National University.
- Kirch, P.V. 1997. *The Lapita Peoples*. Oxford: Blackwell.
- Kirch, P.V. and D.E. Yen. 1982. *Tikopia: the Prehistory and Ecology of a Polynesian Outlier*. Honolulu: Bernice P. Bishop Museum Bulletin 238.
- Ladefoged, T.N., J. Wall, R. Black and W.R. Dickinson. 1998. Exotic and indigenous: ceramic sherds from the island of Rotuma. *Journal of the Polynesian Society* 107(3):301-11.
- Lambert, R. 1971. Botanical identification of impressions on archaeological potsherds from Sigatoka. Final Report No. 3. *Records of the Fiji Museum* 1:124-148.
- Palmer, J.B. 1965. Excavations at Karobo, Viti Levu. *New Zealand Archaeological Association Newsletter* 8:26-33.
- Poulsen, J. 1987. Early Tongan Prehistory. (2 volumes). *Terra Australis* 12. Canberra: Department of Prehistory, Research School of Pacific Studies, Australian National University.
- Prescott, J.R. G.B. Robertson and R.C. Green. 1982. Thermoluminescence dating of Pacific Island pottery: successes and failures. *Archaeology in Oceania* 17:142-7.
- Rechtman, R.B. 1992. *The Evolution of Socio-Political Complexity in the Fiji Islands*. Ph.D thesis, University of California.
- Shaw, E. 1967. A Reanalysis of Pottery from Navatu and Vuda, Fiji. MA thesis, Department of Anthropology, University of Auckland.
- Sheppard, P., R. Walter and R.J. Parker. 1997. Basalt sourcing and the development of Cook Island exchange systems. In W.I. Weisler (ed.), *Prehistoric Long-distance Interaction in Oceania: an interdisciplinary approach*, pp.85-110. Auckland: New Zealand Archaeological Association Monograph 21.
- Spennemann, D.R. 1989. *Ata a Tonga Mo Ata o Tonga*. Early and Later Prehistory of the Tongan Islands. Ph.D thesis, Department of Prehistory, Australian National University, Canberra.
- Spriggs, M. 1990. Dating Lapita: another view. In M. Spriggs (ed.), *Lapita design, form and composition*, pp. 83-122. Canberra: Department of Prehistory, Australian National University, Occasional Papers in Prehistory, No. 20.
- White, P., G. Clark, and S. Bedford. In press. Distribution, present and past, of *Rattus praetor* in the Pacific and its implications. *Pacific Science*.