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– ARTICLE –

Exploration as a Strategic Process in the Lapita Settlement of Fiji: the Implications of Vorovoro Island

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ABSTRACT

Intentional exploration as a systemic and strategic process in the Lapita settlement of Oceania is difficult to identify in archaeological context. An early Lapita site on Vorovoro Island, off the northeast coast of Vanua Levu, Fiji, provides potential insight in this respect. The island has only limited economic resources to support a colonizing group, suggesting a strategic role for Lapita occupation. This role, it is hypothesized, was as a landmark and base for exploration of the northern Vanua Levu coast. Radiocarbon dates indicate this took place contemporaneous with, and probably as an extension of first Lapita settlement in western Viti Levu *c.* 3000–3100 calBP.

Keywords: Lapita, Oceania, Fiji, colonization, exploration

> 'Survival is a question of method, but is commonly muddled with motive, which is symptomatic of a tendency to gloss over the weak points in existing theories of Pacific colonization with metaphor and romance. There has been the explicit assumption that, to an early voyager, a watery grave was the acceptable alternative to a successful landfall, and even scholars with a pragmatic view of the realities of voyaging have accepted a high rate of attrition' (Irwin 1992: 54).

INTRODUCTION

The settlement of Near and then Remote Oceania by 'Lapita peoples' is by all accounts a maritime achievement of significant proportion. Inter-archipelago sailing distances are substantial, maritime related risks would be high, and the probabilities for success or failure in the discovery and colonization of newfound islands unknown. It is easy for archaeologists to draw arrows across a map illustrating direction, temporal intervals, linguistic associations and Lapita ceramic provinces. It is far more difficult to convincingly examine the motivations, processes and strategies behind these migrations. Irwin (1992, 2008), in response to the introductory quote, logically contends that voyaging strategies were systematic and well developed while risk-reduction concerns were of utmost priority. Save for exile (Anderson 2006) or very grave circumstances in a homeland, one does not place their family in a sailing canoe to head off into the horizon with an uncertain outcome. Risk reduction strategies thus beg the question of intentional exploration by Lapita colonists, return voyaging to the homeland, the spread of geographic knowledge as new islands were discovered and, potentially, longer-term retention of homeland relationships. Accumulating archaeological data across the Lapita expanse seem suggestive for each.

The notion of intentional and strategic (safe) exploration by Lapita seafarers is, in Irwin's (2008: 24) view, a common principle across major theories of Lapita migration in Oceania. Anderson and O'Connor (2008: 7) are supportive in noting, the '… probability that migration was seldom a single movement, and much more often a phase of movements back and forth …'. Lapita exploration, thus, did not need nor was it likely a family affair. An unencumbered and well-experienced sailing crew in advance of planned migration significantly lessens group risk and greatly enhances the probability of success. Spriggs' (1995: 124–125) underscores this assertion, emphasizing Anthony's (1990) principles for migratory processes drawn from studies in demography and geography. Advance 'scouts', it is proposed, collect information on resource availability and existing populations, and they send or take that information back to the group about to migrate. Migrating populations are able to avoid areas where resource potentials are low or where conflict with pre-existing peoples may be incurred. A leapfrog pattern in settlement expansion potentially results, one leaving 'significant expanses of unsettled, less desirable territory' (Anthony 1990: 903). Sheppard and Walter's (2006) inferences of leapfrogging around the central Solomon Islands by migrating Lapita groups expanding eastward, and recent suggestions for leapfrogging around an earlier colonized Fiji in the Lapita settlement of west Polynesia

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(Burley *et al.* 2010) seem concordant. Lilley (2008:80–81) characterizes these types of jumps as 'Lévy flights', a pattern of movement resulting in 'surprisingly long leaps' and in contrast to a wave of advance model for Oceanic settlement.

A leapfrog pattern for Lapita colonization within Oceania may reflect the logistics of exploration, but archaeological data corroborating strategic processes are more elusive. Spriggs (1995:125) avers that 'anomalous Lapita assemblages', especially those occurring in rock shelters, might be attributed to the advance scouts. Green (2003) specifically argues a case for the Qaranipuqa rock shelter on Lakeba, in the Lau group of Fiji. In the following paper, I too argue for an early Lapita exploration site, in this case a landfall and base camp on Vorovoro Island off the north coast of Vanua Levu, Fiji. Positioned on a tombolo on a very small island without apparent resources to support settlement, the site can be explained only by its strategic location at the head of Mali Passage on the inner lagoon of *Cakaulevu*, the Great Sea Barrier Reef. The age of this site and its context have important implications for current understandings of Lapita settlement in Fiji, as well as the process by which it was carried out.

THE VOROVORO LAPITA SITE INVESTIGATIONS

It seems an archaeological truism that the most exciting discoveries will be made in the final hours of the final day of one's project. Such was the case during an archaeological survey on the north coast of Vanua Levu, Fiji in mid-November, 2009 (Burley 2010)(Figure 1). Vanua Levu is the second largest island in the Fijian archipelago, but with very little known of its archaeological record. A single ceramic sherd with dentate stamp decorative application dredged from the Qawa River bank at Vaturekuka on the island's north coast represented the sole bit of archaeological data for the earliest settlement period (Parke 2000). On that last day of the 2009 project, a second Lapita site was recorded on Vorovoro Island, 15 km northwest of Vaturekuka. A small assemblage of decorated Lapita ceramics was collected from a garden in which the site was located. The lateness of the discovery precluded any means of site assessment, but the ceramics had a western Lapita design aspect identical to the earliest recorded Lapita sites in Fiji (see Nunn 2007, Nunn *et al.* 2007). The project report, accordingly, predicted 'an occupation beginning no later than 2900 BP and possibly as early as 3000 BP' (Bur-

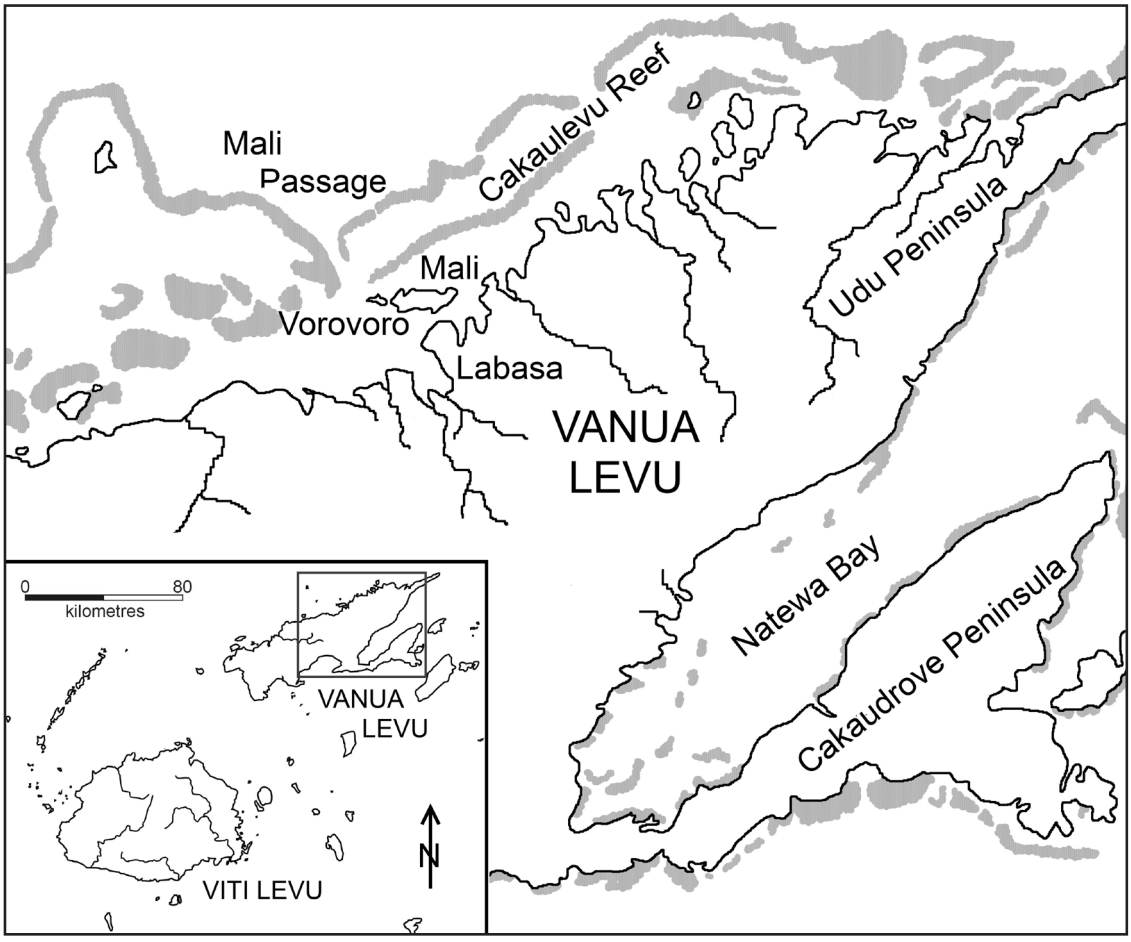

Figure 1. Fiji and eastern Vanua Levu showing location of Vorovoro Island. Shaded areas are reef systems.

ley 2010: 28). The site was returned to in July 2010 when test excavations were undertaken to determine integrity, site extent, age and context (Burley 2011).

Vorovoro Island is located near the mouth of the Labasa River off Vanua Levu's north central coast. It is separated from the larger Mali Island on the east by a shallow channel of approximately 400 m width (Figure 2). Vorovoro has a maximum length of 1.75 km, a width of no more than 300 m in most cases and a total land base under 0.75 km^2. Three major escarpments formed of andesite breccia are equally positioned along the island's length, rising to a maximum of 60 m elevation. Low-lying intervening areas dominantly consist of calcareous sand mixed with reef detritus and organic debris. Limited tephra-based soils occur on sloped areas and in higher rocky elevations, but are restricted in distribution and potential for agricultural planting. A small but high headland divides the leeward northern shore into eastern and western halves, with the latter having an open bay, submerged reef, and coral sand beach. Tui Mali, high chief of the Mali Island *vanua* (integrated people/land) has his residence on this bay with members of his extended family. The Vorovoro Lapita site occurs 60 m inland of this residence.

Diagnostic ceramic sherds representing all periods of Fijian prehistory are found scattered on the immediate back-beach and inland gardens of the western leeward bay. The distribution of Lapita and mid-sequence sherds is restricted to the latter however, defining the original site landscape as a 40 to 50 m wide sand tombolo extending between the western and central escarpments. Paleoshoreline data for northern Vanua Levu indicate higher sea levels of *c.* 1 m or slightly greater for the intial Lapita occupation on Vorovoro (Nunn and Peltier 2001). With current topography of the site having a maximum elevation of 5.25 m above high tide, a tombolo elevation of *c.* 3.25–3.75 m is calculated for the interval 3000 to 1000 BP (Burley 2011). Decorated Lapita sherds concentrate in an area 30 x 30 m on this tombolo near the eastern escarpment. A beach strand on the site's northern periphery defines a high tide mark for first Lapita landfall.

The 2010 archaeological project on Vorovoro included recording and select collection of surface ceramics, systematic excavation of test probes with a 6.4 cm diameter bucket auger, and controlled trowel excavation of nine systematically spaced 1 x 1 m units (Figures 3 and 4). The latter specifically was to record stratigraphy, integrity, cultural features and extent of the Lapita occupation zone. A north/south elevation profile across the tombolo also was prepared. Auger tests indicate a shallow depth for cultural matrices ranging from 40 to 67 cm below surface. As illustrated in Figure 5, test excavations exposed a straightforward stratigraphy. This includes Stratum I, an upper disturbed agricultural zone underlain by Stratum II, a 20 to 25 cm thick cultural deposit with ceramics representing all periods of the Fijian past. The Lapita occupation occurs at the base of Stratum II where it interfaces with a sandy turbation zone defined as Stratum III. Lapita ceramics and a small assemblage of lithic debitage are present in the lat-

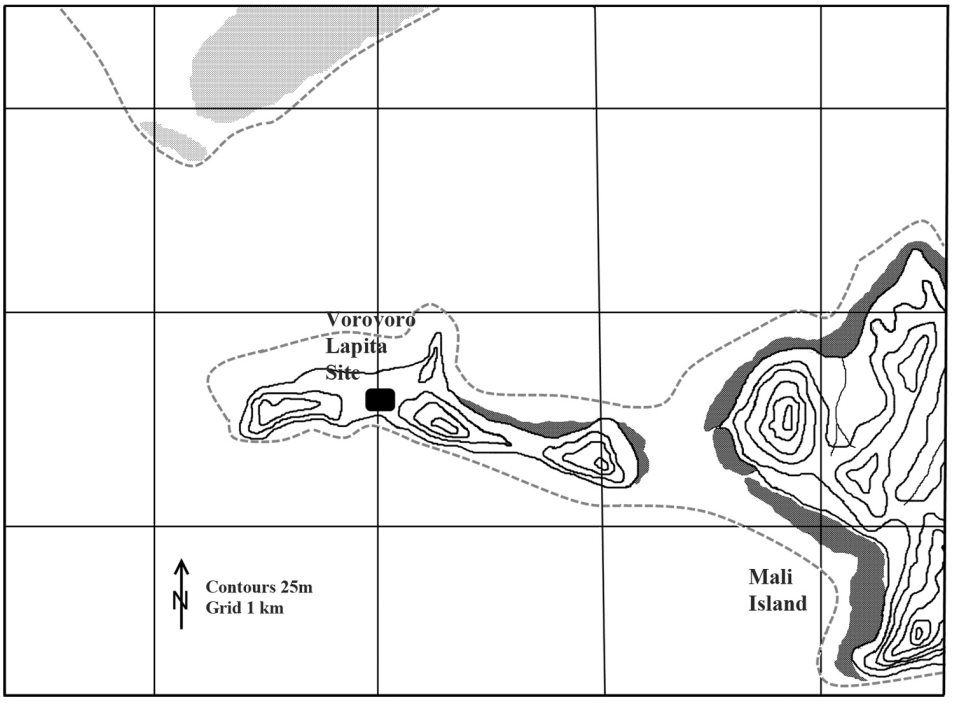

Figure 2. Lapita site location on Vorovoro Island. Dotted lines indicate submerged reef limits. Dark shaded areas are contemporary mangrove forests while light shaded area to north is Cakaulevu barrier reef exposed area at low tide.

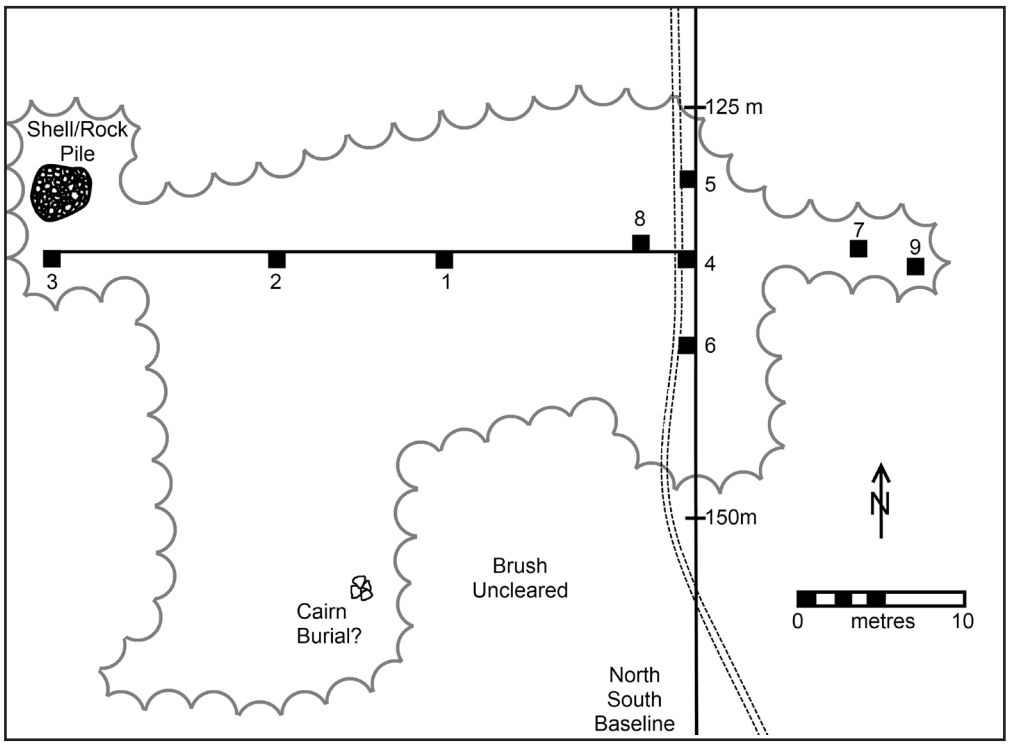

Figure 3. Vorovoro Lapita site, excavation units and garden area

Figure 4. Vorovoro Lapita site view to south along baseline. Units 5, 4 and 6 are from bottom to top respectively (see Figure 3).

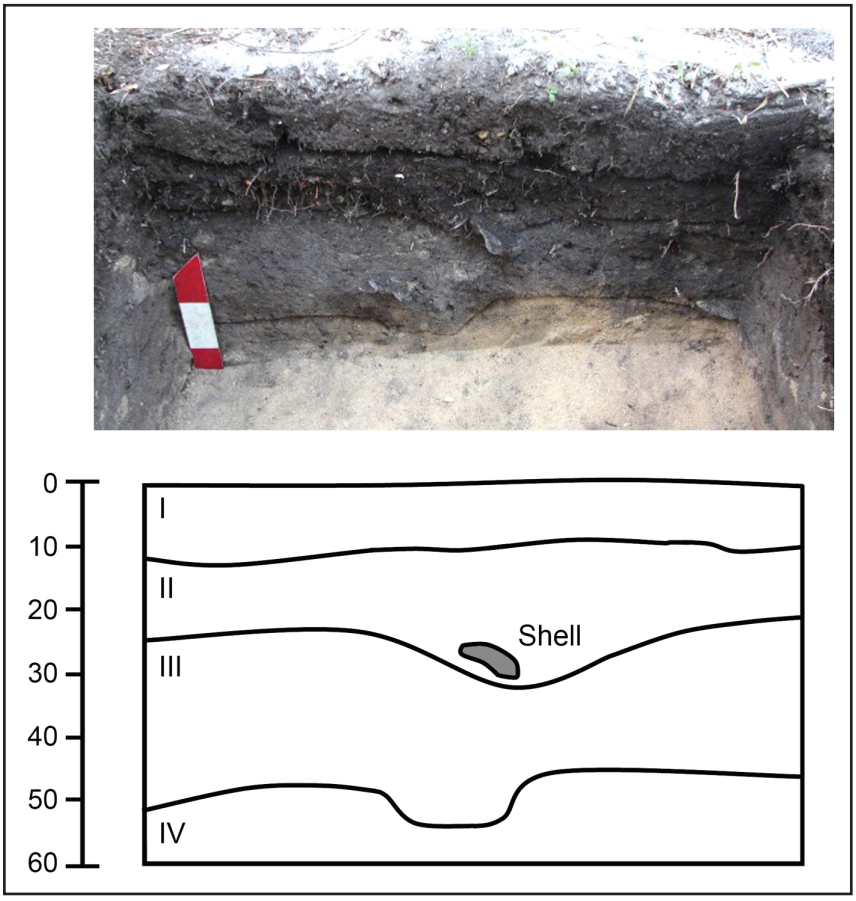

Figure 5. Stratigraphic section Unit 4 south face. Stratum I – very dark gray sandy loam (7.5 YR 3/0), Stratum II – black sandy loam with some silt (5 YR 2.5/1, Stratum III – olive brown sand 2.5 Y 4/3), Stratum IV – pale yellow coral sand (2.5 Y 8/3).

ter. Strata I and II are heavily disturbed and there appears little opportunity to identify micro-strata or individual occupation floors related to temporally discrete occupations. Much of this is a consequence of agricultural planting by digging stick/spade over the course of centuries. In fact the organics derived from archaeological deposition is the primary constituent of garden soils. Mixing has also resulted from excavated features originating in Strata I and/or II, in some cases extending into or through Stratum III.

The limited test excavations and surface collection recovered a large assemblage of ceramics (n = 6,741) with scattered other artifacts and fauna. Representing all periods of Fijian prehistory, the ceramic assemblage gives the impression of a 3,000 yearlong continuous occupation of the island. The thinness of archaeological sediments associated with Strata I and II appear anomalous in this respect however. One would expect a much greater buildup (depth) of deposits over such a lengthy period of time, especially shellfish and other midden related debris. It seems appropriate, then, to suggest a continuous but intermittent occupation of the island by small groups of people throughout Fijian prehistory, perhaps in the same fashion Tui Mali and his family occupies Vorovoro today. The ceramic assemblages from Strata I and II are inextricably mixed and provide little insight beyond broad chronological association.

THE VOROVORO LAPITA ASSEMBLAGE AND RADIOCARBON CHRONOLOGY

The initial settlement period in Fiji is defined by a distinctive suite of Lapita ceramics, one incorporating a range of jar and bowl forms where complex decorative designs are applied through dentate stamp, incision, appliqué modeling and shell impression (Mead *et al.* 1975). The complexity of design application and the detail with which it is accomplished in Fiji tie this assemblage to other Lapita assemblages in central island Melanesia, including the Reef/Santa Cruz Island group of the eastern Solomon Islands, Vanuatu and New Caledonia (Nunn *et al.* 2007a). This is not surprising given the west to east migration of Lapita peoples across Oceania, and the expectations of a central island Melanesian homeland for the Fijian founder colony. That colony, at least as it is currently interpreted, occurs at Bourewa on the western coast of Viti Levu (Nunn 2009).

On Viti Levu and in central Fiji, Lapita ceramics were

produced over a 550–600 year period ending *c.* 2450 BP (Burley and Connaughton 2010). Transitional change in decorative motifs, vessel form morphologies and other aspects of ceramic manufacture between early and late Lapita in Fiji is not well understood. It is hypothesized by Best (2002) that a degradation process was underway, ultimately leading to a late Lapita ceramic assemblage dominated by vessels with thickened collar-like rims that are notched. Dentate stamped vessels continue to be produced in limited numbers, but the designs are highly simplified and crudely applied. Late Lapita wares are found throughout Fiji, including southern Vanua Levu (Burley 2010).

The Lapita ceramic assemblage at Vorovoro includes 184 sherds defined by decorative design or application (Table 1). Of these, 91 have dentate stamp application,[2] 72 are incised, 19 are notched on the rim or shoulder and two have shell impressions (Figures 6–8). A majority of the sherds are small fragments with limited opportunity to identify design motifs or vessel form. The assemblage, however, can be characterized as to its overall nature. The dominant vessel form is an everted rim subglobular jar (n=15). At least five are sharply everted with decoration on the inside rim; three of these have outside neck decoration as well. Carinated shoulders with decoration are common, and carination is assumed to be the dominant shoulder

Table 1. *Vorovoro site decorated Lapita sherds by Unit and type*

Lapita Decorated	Rim	Neck	Shoulder	Body	Total
Unit 1	7	1		2	**10**
Unit 2			1	8	**9**
Unit 3	1			1	**2**
Unit 4	9	7	1	4	**21**
Unit 5	4	3	2	7	**16**
Unit 6	3	1	1		**5**
Unit 7	2	1	6	4	**13**
Unit 8	10	3	1	16	**30**
Unit 9	3	1	2	6	**12**
Surface	20	17	14	15	**66**
Total	**59**	**34**	**28**	**63**	**184**

2 Sherds identified here as having dentate stamp application in some cases might also integrate incision or appliqué modeling. Incised sherds similarly might have appliqué but are exclusive of dentate stamp.

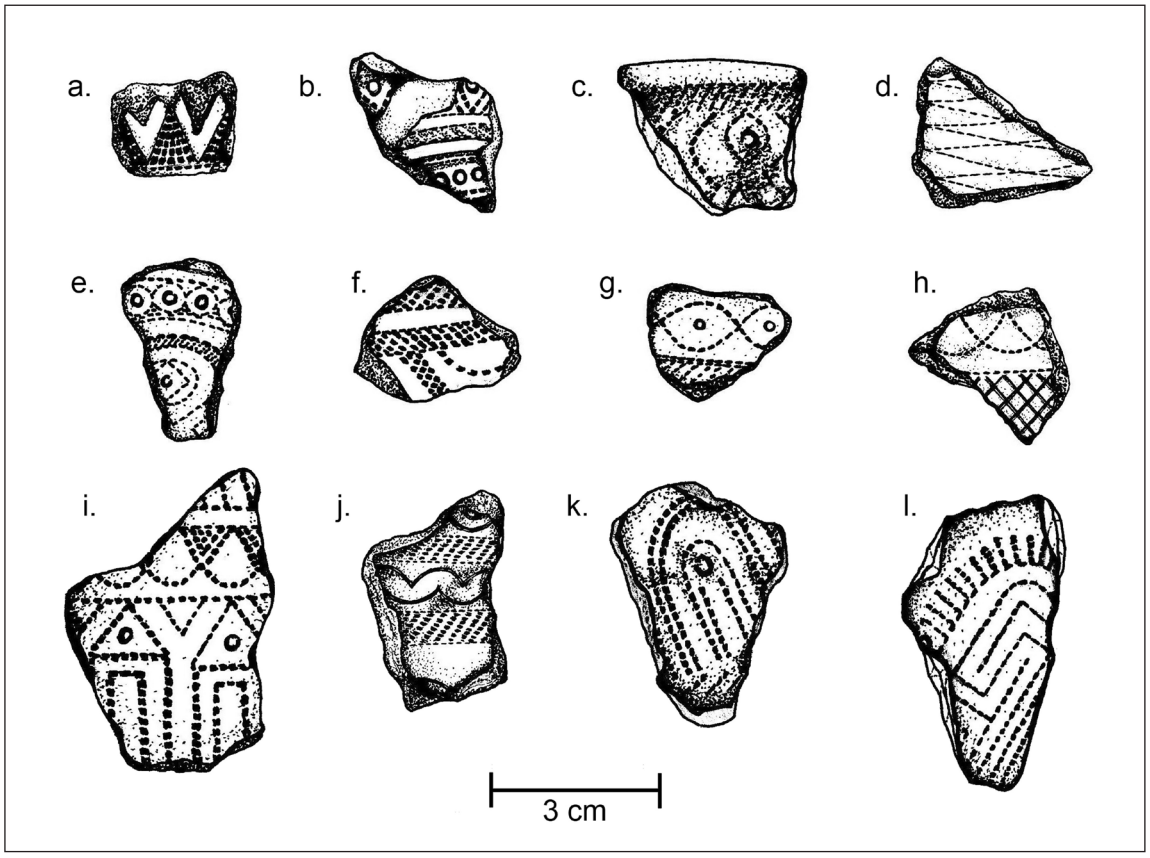

Figure 6. Vorovoro Lapita sherds with dentate stamp application. Sherds b, e are probable fragments of head dress motifs, i is a house motif, l is a variation of the labyrinth pattern.

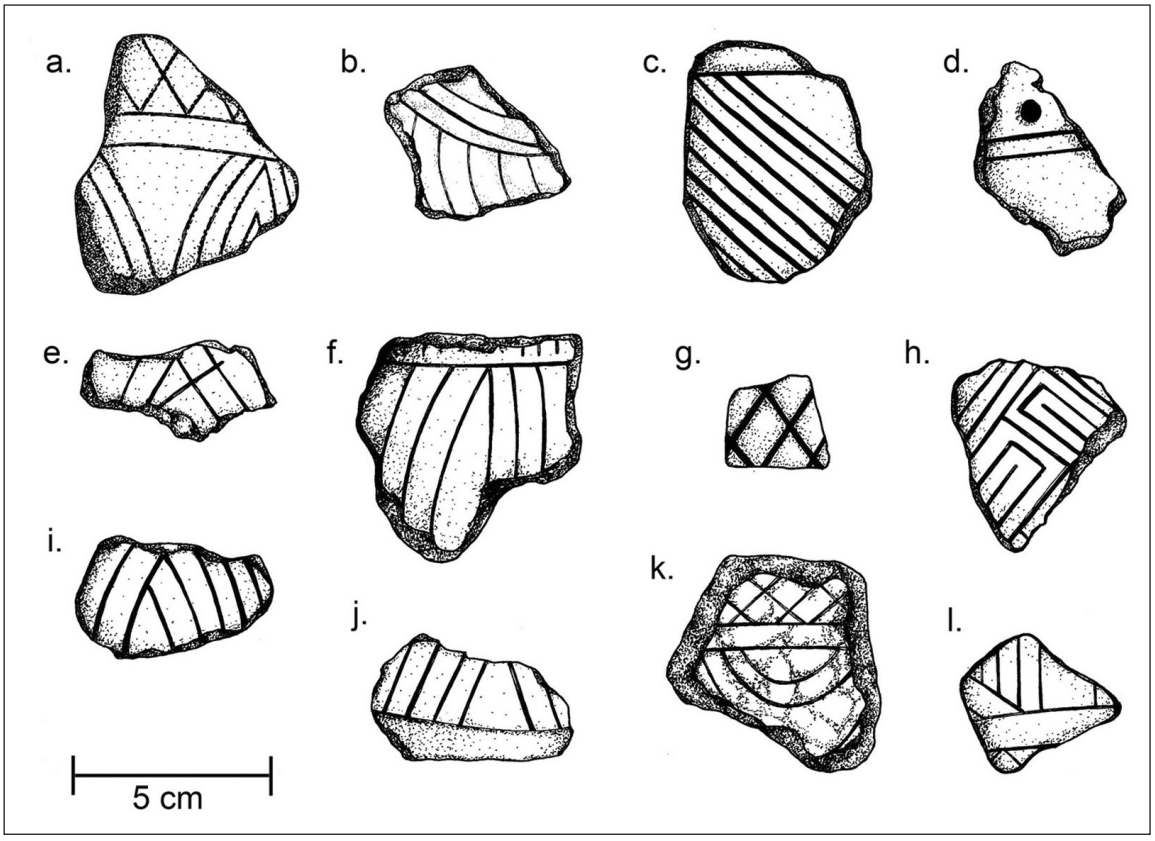

Figure 7. Vorovoro incised Lapita sherds. Sherds b, f, i and j probable joined triangular motif, h is a variation of labyrinth pattern

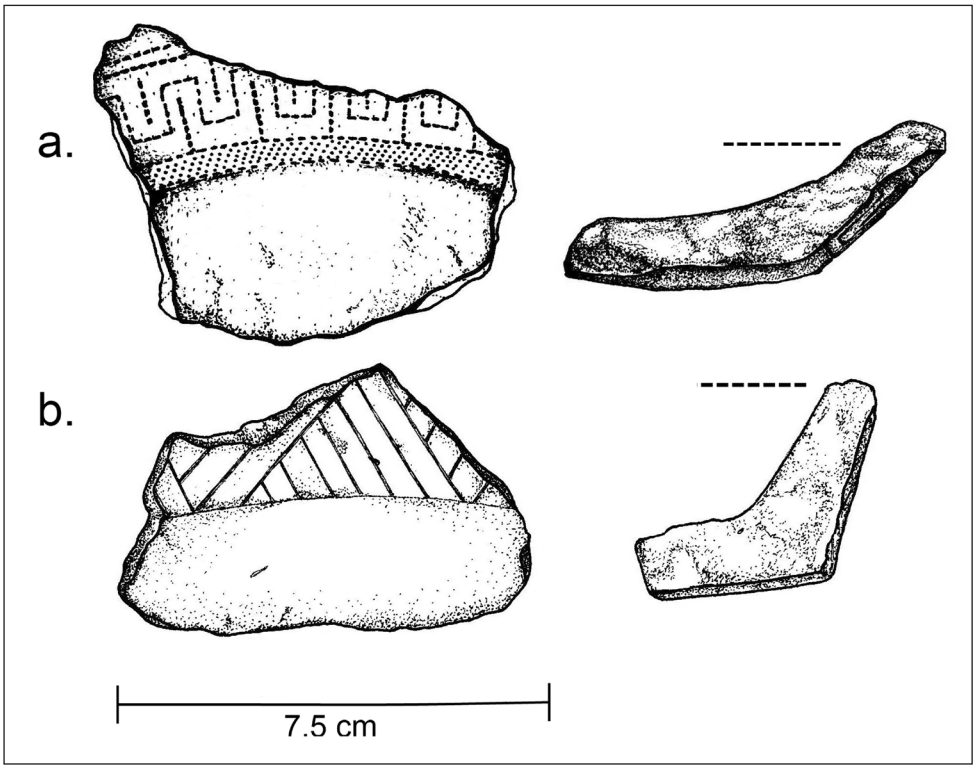

Figure 8. Flat bottomed dish-like vessels.

form. Identified bowls are limited to four, of which three are small flat-bottomed dish-like vessels. Ceramics are hearth-fired earthenwares with paste characteristics and colour similar to later period pottery from the site. A petrographic examination of temper inclusions in ten Lapita sherds by Dickinson (2011) found two principal types, a hybrid felsic temper and a pyroxenic placer temper. The former, also including calcareous grains of reef detritus and some quartz, seemingly derives from the Udu volcanic group, within which Vorovoro bedrock falls. The latter originates from andestic rock of the Natewa volcanic group, indicating ceramic or ceramic temper transfer to the island. This need not be from a substantial distance as the Labasa and other rivers of the Labasa Delta drain the Natewa volcanic highlands to the south. Delta sands opposite Vorovoro Island, thus, could be the temper source.

The Vorovoro Lapita assemblage is characteristic of the western Lapita style found in early sites elsewhere in Fiji as well as central island Melanesia (Kirch 1997). Dentate stamp applications are finely done and applied in complex fashion. Restricted zone markers with overlapping or tightly spaced dentate lines occur on seven sherds. Several sherds have in-filled radiating triangles, systematically integrate small circles impressed with a hollow tube, or have motifs typical of western Lapita assemblages. Of the latter, the 'house' motif, labyrinth motif (both incised and dentate stamp) and abundant examples of incised joined triangle patterns are most notable. Additionally, three decorated sherds fall within Chiu's (2007) category of 'head dress motifs', a type associated with the central frieze dominated vessels of central island Melanesia.

In the mid-1970s, Mead *et al*. (1975) developed a system to record decorative motifs for Lapita pottery in Fiji. Applying this system, they then developed an inventory of zone (boundary) markers, zone types, design elements, motifs and motif variations (alloforms). Table 2 provides a list of the 17 decorative motifs identified at Vorovoro as classified within the Mead (1975) system. It also identifies the distribution of these motifs at four other Lapita sites in Fiji–Yanuca, Naigani, Natunuku and Lakeba. Notably fourteen of the 17 Vorovoro motifs are present at the western Viti Levu sites of Yanuca and Natunuku. Both are among the earliest dated Lapita settlements currently documented in Fiji (Clark and Anderson 2009).

It earlier was stated that ceramic transition from early western Lapita decorative style to the late Lapita notched rim/shoulder type in Fiji is poorly understood. The latter assemblage, however, is well reported at the Sigatoka Sand Dunes site in western Viti Levu where radiocarbon dates place it between 2450 and 2500 BP (Birks 1973, Burley and Dickinson 2004). This assemblage includes several different carinated and subglobular jar forms, many with collar-like expanded rims as well as narrow neck water jars, everted and inverted rim bowls, pot lids, oddly constructed pot stands and ceramic disks. Two collared rims with notches, nine other rim fragments with notching, and three carinated shoulder sherds with notches represent this type of assemblage at Vorovoro. Five leg or other fragments thought to be parts of pot stands, three collar rims without notching, and a pot lid might also be included. Parke (2001) reports the collection of similar legs and handles from surface collections at Malau, located opposite Mali Island on the Vanua Levu coast.

Table 2. *Vorovoro Lapita decorative motifs and their occurrence in other Fijian sites. Decorative motifs are illustrated in Mead* et al. *(1975, also see Clark and Murray 2006).*

Vorovoro	Yanuca	Natunuku	Naigani	Lakeba
M 1	××	××	××	××
M 3	××	××	××	××
M 5	××	××	××	
M 6	××	××		
M 8	××	××	××	××
M 14	××			
M 18	××	××	××	
M 19	××	××	××	
M 22	××			
M 24	××	××	××	××
M 26	××	××	××	
M 29	××	××	××	××
M 32	××			
M 33				××
M 35		××		
M 37		××	××	
M 45		××		

The Lapita occupation occurs at the Stratum II/III interface on the former surface of a sand tombolo. Much of this is disturbed by or mixed with later components but Lapita ceramics and other artifacts are present in Stratum III as a result of occupation-induced turbation. This kind of context is documented in other Lapita sites where initial settlement is established on looser sand surfaces (Burley *et al*. 2010). In excavation Units 4 to 7 at Vorovoro, Stratum III is relatively undisturbed by intrusive features from above. The Stratum III ceramic assemblage includes 204 sherds, representing only 8.8% of the total excavated ceramic assemblage from the units (Table 3). It is, nevertheless, an informative assemblage in a comparative sense. Diagnostic rim, neck and shoulder sherds are characteristically Lapita in form with over half of these being decorated. Thus, while the overall site deposit in Strata I and II is mixed, Stratum III has at least a limited *in situ* Lapita component. Lapita decorated sherds, account for 14.2% of the Stratum III assemblage. Beyond ceramics, lithic debitage, including cores (n=4) and flakes/shatter (n=37) are present in Stratum III, albeit all but one was recovered from Unit 5. Lithic material is dominantly quartz (n=38) with two flakes of red and one flake of grayish chalcedonic chert

Table 3. *Ceramic sherd distribution by strata for excavation units 4-7. Lap = Lapita, Ne = neck and Sh = shoulder. Plain means the sherd does not have a decorative application. Plain rims in Stratum III incorporate styles that, seemingly, represent the undecorated component of Lapita ceramics.*

	Lap Rim	Lap Ne/Sh	Lap Body	Plain Rim	Plain Ne/Sh	Plain Other	Plain Body	Total
ST I	5	5	6	52	15	3	1190	**1278**
ST II	2	8	3	53	7	1	770	**844**
ST III	12	9	8	13	6		156	**204**
Total	**19**	**22**	**17**	**118**	**28**	**4**	**2116**	**2326**

being the exceptions. Both materials are available within the immediate region. All specimens are small (< 3 cm in length) with direct percussion and indirect bipolar percussion technologies represented. Clarkson and Schmidt (2009) identify similar reduction strategies in their analysis of lithics from several sites in western Fiji.

Small charcoal samples in association with Stratum III ceramics were collected for radiocarbon dating. Two, one from Unit 5 and one from Unit 6 were submitted to Waikato for AMS measurement. The samples are spatially separated by 10 m and assumed to derive from separate events. As indicated in Table 4, the dates are all but identical. The pooled mean age for the two is 2907 ± 19 BP which, after calibration, provides a two sigma (95.7% confidence) range of 2960–3140 calBP. These radiocarbon dates position the Vorovoro site as one of the earliest Lapita settlements in Fiji. The oldest uncalibrated radiocarbon date based on charcoal for Bourewa, the assumed founder settlement for Fiji, is 2920 ± 30 BP (Wk-17542) with five additional charcoal-based dates ranging downward to 2867 ± 40 BP (Wk-14236) (Table 4).

VOROVORO AND THE LAPITA EXPLORATION OF NORTHERN VANUA LEVU

The island of Vanua Levu has a landmass of 5,600 km². A mountainous interior core feeds several river drainages as well as provides an orographic precipitation pattern where the leeward north coast is far drier than the south windward one. The island's shoreline is highly varied, with large and small coastal bays, fringing reefs, expansive coastal plains, steeply sloped or cliffed shorelines and numerous offshore islands. Because little archaeological survey has been undertaken on Vanua Levu, inferential discussion of the island's ancient past is tentative. The scale and geography of Vanua Levu, nevertheless, is the type of uninhabited landscape that Lapita peoples presumably would be attracted toward in the early colonization phases of Fiji (Nunn 2009). The Vorovoro Lapita site attests to this. Radiocarbon dates from Vorovoro indicate an immediate and contemporaneous exploration of the Fijian archipelago following first landfall in western Viti Levu. This seems a critical recognition for any determination of the processes of Lapita settlement and expansion across Fiji.

The coastline of northern Vanua Levu is protected by the *Cakaulevu* barrier reef. This complex reef system runs along the shelf edge in a near continuous chain for over 200 km. It is the third longest barrier reef in the world, providing a protective rampart for inner lagoons, patch reefs, fringing reefs, offshore islands and the north coastal margins of Vanua Levu. Equally important it substantially enhances marine biodiversity and maritime subsistence potential. A 2004 reef survey, for example, estimates that 80% of all reef fish species in Fiji can be found within its limits with additional habitat for a substantial range of invertebrates, crustaceans and other marine resources (Jenkins *et al*. 2004). The richness of *Cakaulevu* without 3000

Table 4. *Radiocarbon dates for the Vorovoro site compared with select charcoal-based radiocarbon dates for Bourewa (taken from Clark and Anderson 2009: 163–164). All radiocarbon dates are calibrated using Calib Radiocarbon Calibration Program 5.1 employing the IntCal 04 calibration curve (Reimer* et al. *2004) without correction for southern hemisphere terrestrial samples. Vorovoro samples are both AMS radiocarbon dates based on charcoal. Wk-29330 was excavated from Unit 5, 78cm dbs, Stratum III context while Wk-29329 is from Unit 6, 56 cm dbs, Stratum III context. The Vorovoro pooled mean was calculated as a Calib option based on Wk-29330 and Wk-29329.*

Site	Lab No.	^{14}C Date	^{13}C	1 σ Range	2 σ Range
Vorovoro	Wk-29330	2918±27	–25.4	3000–3140	2970–3200
Vorovoro	Wk-29329	2896±27	–26.4	2980–3070	2950–3160
Vorovoro	pooled mean	2907±19		3000–3080	2960–3140
Bourewa	Wk-17542	2920±30	–24.4	3000–3140	2960–3200
Bourewa	Wk-14595	2915±40	–23.5	2990–3140	2950–3210
Bourewa	Wk-14235	2896±40	–27.4	2960–3140	2890–3200
Bourewa	Wk-14599	2894±40	–24.7	2960–3140	2890–3200
Bourewa	Wk-17973	2870±30	–25.8	2950–3060	2880–3140
Bourewa	Wk-14236	2867±40	–25.0	2930–3070	2870–3140

years of human predation can only be imagined. Once encountered, it must have presented a significant inducement to colonization. Vorovoro island is located immediately to the inside of this reef facing Mali Passage, a 5 km long by 1 km wide deepwater channel giving access into the inner lagoon system as well as Vanua Levu shoreline.

The Vorovoro Lapita site is a small, hamlet-sized occupation estimated as no more than 30 x 30 m in size. It was located on a low (3.25–3.75 m above msl), narrow (40–50 m wide) coral sand tombolo connecting rocky outcrops on either side. The orientation of the paleo-beach strand suggests a curving bay to the leeward. With sea level 1 m higher than present at 3000 BP, the fringing reef would have restricted exposure at low tide, if it was exposed at all. Nunn and Heorake (2009) provide a review of geographic and resource features associated with select Lapita sites across Oceania, including most early Lapita sites in Fiji (Figure 9). Noteworthy for Fiji, two of their sites (Naigani and QoQo) are positioned on tombolo in a pattern similar to Vorovoro. In their view (2009: 246) sites occurring on tombolo as well as those on sand spits, provide 'optimal access to reef/nearshore resources on both their ocean and land-facing sides'. Surrounded by submerged reef, the Vorovoro tombolo presents an exception. Without potable water and only negligible agricultural soil, Vorovoro also contrasts markedly with the results of a Lapita site catchment analysis conducted by Lepofsky (1988: 46). Her data indicate Lapita settlement locations were influenced specifically by a fresh water source and nearby land for cultivation.

The Vovorovo site location provides no immediate economic benefit, at least in the sense of easily exploited resources. Consequential subsistence pursuits for a population of any size would need to focus on the offshore *Cakaulevu* reef. Giant clam, *trochus* and other shellfish species observed in garden collection piles and within site matrices indicate this to a degree (Burley 2011). A dense and concentrated shellfish midden is the expected correlate for an intensive reef-centred subsistence economy. This is the pattern at Bourewa (Nunn *et al.* 2004) and elsewhere, where reef resources were essential to first colonizers (see Nunn 2009). The excavated matrices for Lapita and later occupations at Vorovoro cannot be so characterized. Shellfish occurs, as earlier described, but deposits are scattered without substantial buildup (see Figure 5). The size of the hamlet at Vorovoro also has no recognizable growth over the initial 500 years of occupation, a circumstance no doubt reflective of the site's marginal economic potential. Vorovoro Island must have had a strategic as opposed to long-term settlement role for Lapita expansion into northeastern Vanua Levu. In this, I suggest, it served as a possible base for exploration of the northeast Vanua Levu coast.

For an early Lapita canoe on its voyage of discovery into northern Fijian waters, the *Cakaulevu* reef is a formidable barrier yet holds strategic advantage. Entry to its

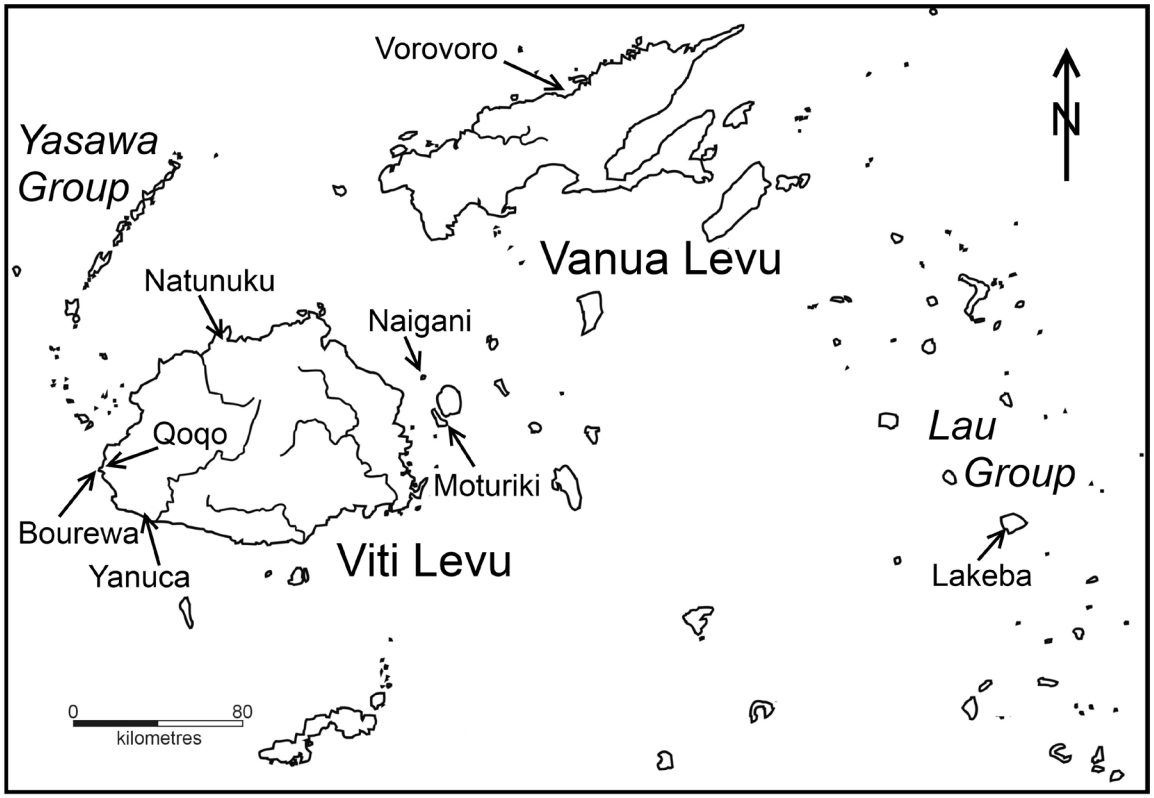

Figure 9. Location of early Lapita sites across Fiji.

inside passage northwest of Vanua Levu provides a sheltered coastline for shoreline exploration, notwithstanding a complex system of offshore patch reefs as well as fringing reefs fronting small islands. *Cakaulevu* further provides a range of reef and marine resources accessible for exploitation during the exploration process. To skirt outside *Cakaulevu*, on the other hand, presents a lengthy barrier but one where occasional reef breaks allow entry to and departure from the inner lagoon. Mali passage is among the widest and deepest of these channels on the northern Vanua Levu coast (see Figure 1). Any use of this passage notably guides a sailing canoe directly into the shore of Vorovoro Island where the coral sand beach and tombolo form an attractive landfall. The limited size of the island may have been an important consideration for landfall as well (Nunn 2009, Nunn and Heroake 2009). Indeed, most other early Lapita settlements in Fiji occur on smaller offshore island contexts. Why this is the case is not well understood, but a small tombolo, such as the one present at Vorovoro, has little coastal forest to impede initial occupation. It is also possible to quickly circumnavigate the island and identify the presence/absence of existing inhabitants.

Clark and Anderson (2009: 415) recently have questioned the difficulty of recognizing exploration voyaging in the archaeological record. To this I must agree. As they note, intentional exploration parties are briefly situated in a locale, 'probably carried little pottery and conserved what they had'. Exploration sites become all but invisible as a consequence. It is naive to assume that the Lapita ceramic assemblage at Vorovoro represents the first landfall. What I suggest, nevertheless, is that a first landfall on Vorovoro identified a locale to which return voyaging could take place, and a locale with strategic and endearing importance through the ensuing colonization period. Speculative as it may be, this site potentially had a number of roles to play. In its position at the end of Mali Passage, the island visibly identifies the channel from outside of the barrier reef, providing a directional marker to the inner lagoon and outer ocean passage. For all later migrations, the settlement is quickly and safely located, and its inhabitants represent a source of information for local navigation, local resources, and the location of other Lapita settlements. And perhaps as important over the longer term, the hamlet presents a statement to newly arriving seafarers that the Vanua Levu coastline is colonized with a resident population. The site in all of these respects forms a gateway through which maritime traffic could pass, be informed, or be monitored.

Interpretation has focused on Vorovoro as a potential locale for staged exploration of northern Vanua Levu by Lapita peoples. This is presumed to be part of a larger strategy to gain geographic knowledge for population expansion across Fiji. In earlier discussions of site deposits, I preclude detailed examination of post Lapita assemblages because of inherent mixing of collections from Strata I and II matrices at the site. Vorovoro Island, however, has an occupation spanning the entirety of Fijian prehistory extending into the present (Burley 2011). This continuity is striking for its persistence in the face of marginal resource potential. It also is striking for the traditional history of the Tui Mali title (paramount chief) and his *vanua* identify Vorovoro as their place of origins, the founder colony to which they trace ultimate ancestry. Only after the population on Vorovoro grew, as I (Burley 2010: 28) was told, were the villages on Mali Island established. Colourfully characterized by Keene (2006), Vorovoro is 'the oracle from which the *mana*, pride and sense of belonging of the people of Mali are derived'. Tui Mali and members of his *mataqali* (clan) are traditional landholders of Vorovoro; the present Tui Mali and his immediate family form a hamlet as the island's contemporary residents. Anderson (2008) has cautioned against the uncritical acceptance of traditionalism as a literal basis for interpretation (in his case, seafaring capacity). That being said, one must query how such a diminutive and geographically insignificant island could become so integrated into the ideological belief system of a people who heretofore lacked knowledge of its three millennia long archaeological record. And not insignificant to this query is *Dave'alevu,* the name of Tui Mali's *mataqali.* Coincidence or not, the literal translation is big (*levu*) channel (*dave'a*) in obvious reference to Mali passage and, presumably, its ancient role in *mataqali* history. The island's traditional recognition as founder settlement and home for its chief provides an intangible value for settlement, potentially outweighing the limitations of its geography from the early Lapita period through to present.

CONCLUSION

The introduction to this paper raises the question of logistical exploration as a component of the Lapita expansion process across Oceania. Setting sail into an unknown horizon with family on board may be implicit in early archaeological inference for Lapita expansion, but it has neither evidential support nor a rational basis in logic or evolutionary principles as Irwin (1992: 60–61) suggests. Rather, intentional exploration by well-experienced seafarers, knowledge of seasonal winds, possibilities and abilities for return voyaging, gateway communities, and a myriad of other risk reduction strategies are anticipated if not yet illustrated by archaeological data. The Lapita site on Vorovoro Island off the northern coast of Vanua Levu, I suggest, gives additional insight in this respect.

The Vorovoro site is a small, hamlet-sized occupation positioned on a narrow sand tombolo facing Mali Passage and the *Cakaulevu* barrier reef. Limited excavations in 2010 indicate initial settlement early in the Lapita phase of Fijian colonization. This is supported by the presence of western aspect Lapita ceramics as found at other early Lapita sites in Fiji combined with two charcoal-based AMS radiocarbon dates. The dates identify a site occupation si-

multaneous with the Lapita settlement at Bourewa, the currently interpreted founder colony for Fiji in western Viti Levu (Nunn 2009). Contemporaneous Lapita sites in western Viti Levu and northeast Vanua Levu occurring between *c.* 3000 and 3100 calBP are significantly informative, for they suggest an immediate exploration of the archipelago by a founding propagule.[3] Intentional exploration, it is concluded, was part of a logistical strategy for Lapita peoples in Fiji, one potentially leading to replacement or expansion from the founder colony. The sailing distance of 400 km from Bourewa to Vorovoro is extreme, and it requires negotiation of very long stretches of offshore barrier reefs fronting Viti Levu and Vanua Levu (Nunn 2009). This type of voyage bespeaks of sea faring capabilities and expertise in the exploration process.

Finally, it is difficult if not impossible to rationalize Lapita settlement on Vorovoro Island strictly through the lens of subsistence economy or resource benefits. There exist restricted agricultural soils, no potable water and a limited fringing reef for exploitation. A heavy reliance on the offshore *Cakaulevu* reef is similarly not apparent. The consequence is a constrained population size, both initially and over the long term. The first Lapita settlement of Vorovoro represents a strategic rather than colonizing role. Admittedly the argument is speculative, and an alternative logic may be lost to archaeological theorizing. Yet the position of Vorovoro at the head of Mali passage is without question, and the importance of Mali passage for sailing canoes as an access through the *Cakaulevu* barrier reef cannot be challenged. This role, and the integration of Vorovoro into the traditional history and ideology of the Mali people as a founder settlement, may have ensured occupation continuity from first Lapita landfall into the present.

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3 Alternatively it might indicate independent and multiple founder settlements for Fiji. Given the known evidence for early Lapita sites in Fiji (n = 7, Figure 9), this seems unlikely at present.

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