

Lapita Settlement to the East: New Data and Changing Perspectives from Ha`apai (Tonga) Prehistory

David V. Burley
Archaeologist

■ Introduction

Archaeological research in the Kingdom of Tonga began in 1920 with the pioneering studies of W. F. McKern (1929). McKern's survey and test excavations on the principal island of Tongatapu produced a small number of ceramic assemblages within which 11 sherds were found to be decorated with dentate stamped designs. The significance of these sherds for understanding first settlement of Tonga went unrecognized until four decades later when Golson and others began to formulate a conceptual framework for the Lapita cultural complex (see Kirch 1988b). Extensive excavation at Lapita sites on Tongatapu in the mid-1960s by Poulsen (1987), and other projects by a variety of researchers since that time (Groube 1971, Davidson 1971, Dye 1988, Kirch 1988a, Spenneman 1989), have been instrumental in the definition of correlates, processes, and consequences of Lapita colonization in the western Pacific region as a whole. Tongan Lapita materials have also figured prominently in the recognition of an eastern Lapita province, the boundary being drawn through the 950 km open ocean gap between Vanuatu and Fiji (Green 1979).

Between 1990 and 1992, I initiated an intensive archaeological survey in the northern Ha`apai island group of Tonga (Figure 1, Burley 1994). Although this survey was predominantly concerned with the local development of the late prehistoric chiefdom, sites of the earlier ceramic period could not be ignored. This survey led to the recording and test excavation of two early Lapita sites on Foa and Ha'ano islands as well as numerous sites of the Polynesian plain ware phase. Combined with the results of earlier studies of Ha'apai ceramic period sites by Dye (1988), an intriguing picture of settlement and

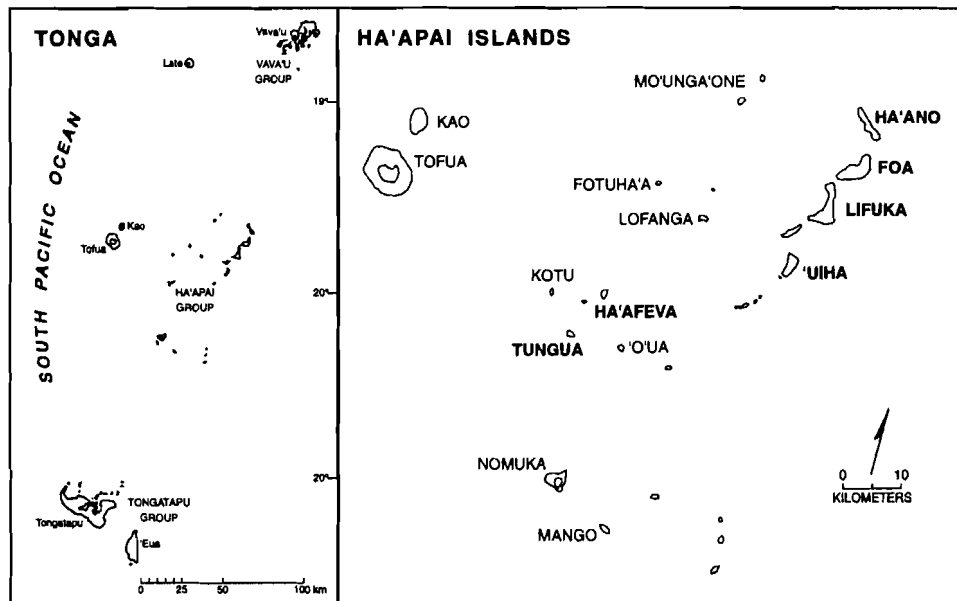


Figure 1.

The Kingdom of Tonga and Ha'apai Island group. Highlighted island names are those on which Lapita sites have been found. Not shown on the Tonga map are the northern outliers of Niuatoputapu and Niuafu'o and the southern outlier of 'Ata.

adaptation in central Tonga began to emerge (see Shutler et. al 1994). As a consequence of these discoveries, a more focused study of Lapita settlement in Ha'apai was initiated in 1995, and will continue through a 1997 field season. The intent of this paper is to provide an overview of the Ha'apai study and its results, especially as the latter may challenge or add to existing knowledge of the Lapita cultural complex in Tonga, and the eastern Lapita province as a whole. This paper is tendered with a caution that interpretations may change, as the vast majority of existing data are in the beginning stage of analysis and further excavations are to be implemented.

Pre-existing Views of Lapita in Tonga

Tonga is positioned on the western flank of the Polynesian triangle and, with Fiji, forms a gateway for Lapita migration into Polynesia from Vanuatu or New Caledonia. The

kingdom today is an expansive archipelago of 160 or more islands that are clustered into three general groups - Tongatapu, Ha`apai and Vava`u. Added to these groups are the northern outlier islands of Niuafo`o, Niuatoputapu and Tafahi, as well as `Ata to the far south. Geologically, the archipelago is composed of two parallel chains of islands, a high volcanic chain to the west (Tofua Volcanic Arc) and a low coral limestone chain to the east. The coral limestone islands have been the focus for human settlement throughout prehistory. These islands have rich agricultural soils and are contained within a complex and resource productive network of fringing, apron and off-shore barrier reefs. Perhaps the only limitation to human settlement on these islands is an absence of freshwater and, for some, an extremely limited land base. Colonization and political integration of the Tongan islands were greatly enhanced by southeast trade winds that, seasonally, facilitated travel throughout the length of the archipelago.

The several projects conducted on the Lapita period of Tonga have resulted in a series of interpretations related to chronology, settlement process, adaptation, and ceramic technology (see Shutler et. al 1994 for a review). The timing of initial Lapita settlement is contentious with suggested dates for first land falls ranging from as early as 3500 BP to as late as 2950 BP (Spenneman 1988: 10; Kirch 1984: 219, 1988a: 241, Dye 1988: 5; Spriggs 1990: 21). Less contentious is the origin of settlement, Fiji being the logical source based on the simple facts of geography, and as supported by a high degree of similarity in ceramic decorative motifs in early Lapita sites (Best 1984: 619-620; Burley et. al in press). As for the dispersion of Lapita migrants throughout Tonga, Groube (1971: 303-304) and Poulsen (1987: 141) have argued that the island of Tongatapu was settled first with expansion occurring later, at a time when decorated ceramics were on the decline. Kirch's (1988a: 186-188) comparative study of ceramic motifs from Niuatoputapu, `Uvea and Samoa supports this delay, there being a notable decrease in the diversity and complexity of Lapita decorative design in the northern assemblages (also Best 1984: 621-627 for a similar result). Such a temporal lag, as implied by Groube (1971: 303), might be explained by a settlement strategy in which the small coral islands of Ha`apai and elsewhere were initially ignored, they being considered impoverished of resources.

Lapita chronology in Tonga has been defined by its ceramic assemblage and, in this, it mirrors general interpretations of the eastern Lapita province as a whole (see Davidson 1979; Green 1979). Early eastern Lapita ceramics are highly varied with a range of jar, bowl and cup forms, many being decorated with dentate stamping and other applications. Diversity in this assemblage is lost over time with fewer vessel forms being produced, and decoration restricted to notching of the rim or shoulder. After approximately 2500 BP, decoration disappears altogether, this transition marking an onset of the Polynesian plain ware ceramic period (see Kirch 1988b: 242-243). The overall trend of ceramic degradation, as elsewhere in the eastern Lapita province, cannot be disputed for Tongan prehistory. Temporal estimates for the loss of dentate stamped ceramics, and the disappearance of notched wares, have been subject to query (for example Sand 1992).

In his 1960s comparison of ceramic site contexts on Tongatapu, Groube (1971: 312) observed that each was contained within a midden, and middens were rare without the presence of ceramics. Relative to the initial settlement of Tonga, therefore, he was able to postulate a subsistence strategy predominantly centred on reef/lagoon resources. Extending the argument beyond Tonga, he developed one of the earliest models to account for the rapid expansion of Lapita peoples throughout the Pacific. This migration, in his words, was a consequence of "Oceanic strandloopers" who, "like the sealers and whalers in the European period, expanded ahead of colonization by agriculturalists"(ibid.). The strandlooper model has been largely discredited in favour of other explanatory frameworks (see Green 1991), and few archaeologists now doubt the presence of a horticultural base for early Lapita economy. Other projects in Tonga (Dye 1988; Kirch 1988a) and the Lau group of Fiji (Best 1984), nevertheless, continue to illustrate the significance of natural resources to eastern Lapita subsistence.

■ The Ha'apai Lapita Project. Objectives, Field Results and First Considerations

The above summary of Tongan Lapita archaeology is far from complete, but it does provide a framework from which to outline the objectives and results of the more recent Ha'apai project. As its broadest goals, this project is attempting to 1) define and refine Lapita chronology in these islands, 2) determine the Lapita colonization strategy and the processes by which it was accomplished, 3) delineate the economy and adaptation of the colonizing groups, 4) identify the ecological impacts of this economy on small island eco-systems, and 5) outline as fully as possible technological, settlement and social systems of these first communities. Aspects of these questions require specialized study, and a multidisciplinary research team has been assembled for implementation. Included here are W.R. Dickinson (geology, petrography), R. Shutler jr (comparative ceramic studies), E.D. Nelson (AMS radiocarbon dating), J.R. Flenley (palynology), D.W. Steadman (bird/reptile fauna) and A. Cannon (fish fauna). It is important to also note that the study builds upon earlier results of T.W. Dye (1988) who undertook survey for ceramic sites on 11 islands in Ha'apai, and who conducted excavations at two early Lapita components on Tungua (Fakatafenga site) and Lifuka (Tongoleleka site) islands.

Survey efforts have been successful in finding early Lapita settlement locales in Ha'apai (Figure 1). Prior to 1990, colonizer sites were known for Lifuka and Tungua islands only. The 1990 to 1992 project, as noted, was able to locate similar sites on Foa (Faleloa

site) and Ha'ano (Pukotala site) islands. And in 1995 and 1996, reconnaissance of 'Uiha and Ha'afeva islands was able to document two more early Lapita components (Vaipuna and Mele Havea sites respectively). Significantly, of the coral limestone islands in Ha`apai that have been examined during the present project, only Nomuka is without a recorded Lapita site, and survey here has been limited to a total of two days work. From each of these sites attempts are being made to recover a range of comparable data by which to assess intersite relationships and discern repetitive patterning. This has and will continue to involve 1) full delineation of site size through test excavation and auger probes, 2) the acquisition of representative and similar sized excavation samples, 3) an emphasis upon stratigraphic control of recovered assemblages, 4) an overall concern with precision in faunal recovery including the use of fine-meshed sieves, and 5) the employment of various sampling strategies for the collection of ancillary data bearing upon site formation and content. Related studies, including a paleoshoreline survey throughout Ha'apai, a widespread survey for source locations of mineral sand ceramic tempers, and palynological coring at wetland sites on Foa and Ha'afeva islands have also been conducted.

Preliminary results and interpretations for 1990 to 1992 research have been published previously (Shutler et. al 1994; Dickinson et. al 1994; Burley 1994; Burley et. al 1995). More recent data strengthen some of these initial impressions and modify others.

Paleoshorelines and Land Sea Relationships

To interpret Lapita sites on their landscape, one must have a clear understanding of what that landscape consisted of. The 1992 excavation of the Faleloa site on Foa Island emphasized the importance of this for, while now situated 200 m from the present shore and over 4 m elevation above mean sea level, the site's original occupation was fronting a low degrading sea cliff on a sand beach immediately above high tide. Paleoshoreline survey by Dickinson, and consideration of other Lapita site contexts in northern Ha'apai, Tongatapu, Niuatoputapu and elsewhere, suggest the lingering presence of mid-Holocene high stand sea-levels (+2 m) during the Lapita period. This residual, as theoretically modeled, would be a consequence of hydro-isostatic effects throughout the Pacific region (Dickinson et. al 1994). The recognition of higher sea levels in northern Ha`apai has been crucial for reconstructions of island size, interpretation of Lapita site context, and the development of reconnaissance strategies for site discovery.

Recent extension of survey work to central Ha`apai has illustrated a more complicated geological picture than presented above. Basal Lapita deposits at sites on Tungua and Ha'afeva islands are situated at elevations only slightly above contemporary mean sea level, and paleoshoreline indicators representing a mid-Holocene highstand are absent. This situation can be related to a series of transverse structural faults that cross the

Tongan archipelago at regular intervals of 30 to 35 km, and that break the Ha'apai group into three separate blocks. These blocks have been likened to a series of piano keys that are subject to differential rates of upward and downward movement resulting from forearc tectonics (Taylor and Bloom 1977; also see Dickinson *et. al* 1994: 87). Lapita sites on Ha'afeva and Tungua, simply put, are on a key that is now depressed.

Site	Lab no.	Date	13C	Comments
Holopeka	CAMS 12918	2800 ± 70	-22.1	charcoal, Unit 96N/100W, Stratum III
Holopeka	CAMS 12919	2590 ± 60	-23.9	charcoal, Unit 97N/100W, Stratum III
Faleloa (Foa)	CAMS 7145	2940 ± 60	-27.4	charcoal, Unit 7, Stratum III
Faleloa (Foa)	CAMS 7146	2560 ± 70	-25.3	charcoal, Unit 10, Stratum III
Faleloa (Foa)	CAMS 8074	2560 ± 60	-27.1	charcoal, Unit 12, Stratum III
Pukotala (Ha'ano)	CAMS 7147	2630 ± 60	-22.4	charcoal, 1992 Unit, Stratum III
Pukotala (Ha'ano)	CAMS 7148	2870 ± 60	-27.5	charcoal, 1992 Unit, Stratum IV
Tongoleleka (Lifuka)	AA 1921	2960 ± 120	-17.9	turtle bone, from Dye (1990: 146)
Tongoleleka (Lifuka)	AA 1923	2960 ± 60	-17.9	turtle bone, from Dye (1990: 146)
Tongoleleka (Lifuka)	AA 1920	3660 ± 190	-17.0	turtle bone, from (Dye 1990: 146). (1)

(1) sample yielded insufficient carbon for routine analysis and was diluted 2:1 with $^{12}\text{CO}_2$ (*ibid.* 144).

Table 1

Uncalibrated radiocarbon dates for Ha'apai ceramic period sites. Faleloa, Tongoleleka and Pukotala have early Lapita components overlain by Polynesian plain ware and later occupations. Holopeka has Polynesian plain ware and later materials only. Because of the insufficient carbon in AA 120, the reliability of the sample has been previously questioned (Shutler *et al.* 1994:59).

Lapita Chronology

Radiocarbon dating of colonizer sites in the eastern Lapita province has been problematical, and the date of origin for Lapita settlement remains in question. Spriggs (1990: 20) has suggested that Tongan radiocarbon dates greater than 3000 BP are of dubious merit, as most others in Fiji/west Polynesia. A principal problem for radiocarbon dating of Tongan Lapita deposits is the high level of intercomponent mixing that is present in open air sites, and the difficulties of obtaining sufficient size charcoal samples with undisputed context (for example see Dye 1988: 119-120, 144-145). To provide a greater number of potential charcoal samples for measurement and, hence, a better selection

of context, accelerator mass spectrometry has been exclusively employed in dating efforts (also Dye 1990). The results have been satisfactory (Table 1), and they lend support to Sprigg's suggestions for late colonization. Several additional samples are now being processed or will be submitted following 1997 field work, and these should help to further delimit temporal origins for the Lapita cultural complex in Ha'apai.

A question no less pressing than the date of origin, is the length of time over which decorated Lapita wares persist in Tonga. On Tongatapu, Poulsen (1987: 123-129) has argued for its continuance until 2300/2200 BP. As Sand (1992: 210) states, this date is an exception when compared to those from other island groups of west Polynesia. A possible resolution of this problem comes not from a Ha`apai Lapita site but, rather, from excavations of a Polynesian plain ware site at Holopeka on Lifuka island. This site is totally without decorated ceramics and its faunal assemblage suggests an occupation after the initial impact of Lapita subsistence strategies on land bird and herpetofauna populations (Steadman *et. al n.d.*). Radiocarbon dates place Holopeka site origins, and the associated loss of early Lapita pottery, at between 2800 and 2600 BP (a full discussion for this claim is found in Burley *et. al* 1995).

Analysis of early Lapita ceramic assemblages from Ha`apai sites has not yet progressed to the point of a refined stylistic chronology. What can be said with certainty is that the range of decorative motifs and vessel forms is great, and they are hardly representative of a simplified or impoverished collection as has been proposed for the northern Lapita subgroup. The Ha`apai collections, in fact, appear to have as much variation and complexity as the combined Lapita assemblages from Tongatapu. Elsewhere it has been suggested that the northern subgroup is a result of sampling skew based on assemblage size (Burley *et. al* in press). The most recent excavations in Ha`apai continue to support this claim. Finally, it must be noted that the transition to a Polynesian plain ware assemblage, as represented at the Holopeka site, was dramatic. Not only was there a total loss of decoration, but vessel form became dominated by a restricted series of subglobular pots. A lengthy and ordered period of ceramic change, including a later Lapita phase with notched rims/shoulders, has not yet appeared in Ha`apai.

Lapita Settlements and Archaeological Context

The most striking aspect of early Lapita sites in the Ha`apai island group is their almost identical form and context. Site sizes are small, being limited to spatial areas under 1000 m². As such they are believed to represent a hamlet-sized occupation of no more than two or three residential groups and a total population in the range of 30 to 40 individuals. These hamlets were consistently located on leeward facing sand beaches to the front of a lagoon or reef flat. Each of the islands selected for settlement has well developed agricultural soils, and there is but one Lapita site on each of these islands.

Contrary to Groube's suggestions for a lack of settlement on small coral islands, the islands of Tungua and Ha'afeva have respective land areas of but 1.5 and 1.8 km².

The archaeological contexts for Ha'apai Lapita sites are also identical. Each of the sites is a multicomponent midden ranging in depth between 1.2 and 2.5 m. The Lapita component, in every case, is overlain by a substantial plain ware occupation as well as a later aceramic component. Each of the recorded sites, in fact, occurs within or immediately adjacent to a contemporary village, a situation suggesting settlement continuity over a 3000 year time span. A variety of pit and other features characteristically intrude into the early Lapita levels and complicate analysis. In this respect, the Holopeka plain ware assemblage stands as an important control by which to differentiate early Lapita and plain ware phase assemblages. The limited area being excavated at each of the Lapita sites (9-12m²) has not allowed for the full exposure of architectural remains. Recorded post hole features that originate in the early Lapita level do indicate the presence of such structures.

A Strandlooper Subsistence Economy (?)

Definitive interpretation of early Lapita subsistence is a task made all but impossible by the near invisibility of agricultural production in the archaeological record. In response, most archaeologists emphasize the indirect evidence of historical linguistics, a field whose practitioners have reconstructed "an extensive set of Proto-Oceanic terms for cultigens and gardening" presumably in use by Lapita horticulturalists (Kirch 1988c: 159). Limited other evidence, such as marine shell vegetable peelers, is also cited (Green 1979: 37). Based on his research of the Lapita period of Lau, Fiji, Best (1984: 650-653) has raised the possibility of a lagoon/reef dominated adaptation for early eastern Lapita, a subsistence economy in full support of Groube's original proposition of a strandlooper model. Best challenges those who argue otherwise, observing that there continues to be a lack of evidence for pig (a presumed marker for horticulture), sites are found in specific coastal locations, and in the Lau group, inland settlement expansion (as might be expected for agriculturalists) did not occur for the first 500 years (ibid.: 650). To the extent that analysis has progressed, the immediate impression of Ha'apai archaeofaunas is sympathetic to Best's argument for a heavy reliance on natural resources. We, too, have yet to find indisputable evidence for pig or dog.

Lapita vertebrate faunal assemblages in Ha'apai have two characteristics that differentiate them from later periods - a comparatively heavy emphasis on the taking of sea turtle, and an intensive exploitation of avifauna, with a catastrophic and immediate impact on land birds. In the case of turtle (predominantly green and hawksbill), it is a principal constituent of early Lapita faunas throughout Ha'apai, and its presence has served as a predictive marker for Lapita occupation in auger testing programs. The rela-

tive importance of turtle has yet to be quantified for the present study but Dye and Steadman (1990: 210) have estimated its contribution to diet (compared to shellfish, bird, fish and mammal) at the Fakatafenga and Tongoleleka sites. In the former, turtle provided over 50% of dietary meat weight while at the latter it ranked second only to the shellfish resource. It is also emphasized that each of the Ha`apai sites is situated on and adjacent to extensive sand beaches well suited to turtle nesting. This consideration may have influenced the decision-making process in site location, if not being the dominant factor.

Like turtle, the Lapita bird story is one that is consistent throughout Ha`apai with almost the total range of sea and land birds being utilized. Land bird exploitation, as emphasized by Steadman (this volume), was more akin to gathering than hunting, and the ease by which this could be accomplished no doubt accounts for the numerous documented extinctions and localized extirpations (Steadman 1989, 1993). The abruptness with which this occurred is illustrated in a comparison of bird assemblages from the Faleloa (Lapita) and Holopeka (Polynesian plain ware) sites (Steadman *et. al n.d.*). At Faleloa, 24% of the identifiable native bird bones (NISP=139) are from fully extinct species or species extirpated from Ha`apai. At Holopeka, a site post dating Faleloa by only 200 or so years, that number is reduced to 2% (NISP 109). A similar predation of large bodied iguanas led to their extinction as well (see Pregill and Dye 1989).

Exchange and Trade

Of other issues possibly relevant to current interpretations of the early eastern Lapita phase in Ha`apai, the subject of long distance exchange needs mention. Exchange, as a possible stimulus for Lapita expansion, and as integrative mechanism for Lapita society in general, has been forwarded and emphasized by several researchers (in particular Green 1979, 1987; Kirch 1988d, 1990). Possible exchange goods that have been identified range from exotic lithic materials (obsidians, chert), to imported ceramics, to a variety of shell valuables. Examination of the Ha`apai data, at least for the present, do not support such claims. First, lithic materials are rare in the Lapita assemblages of Ha`apai, and they appear to be largely derived from local sources. If long distance trade for lithic material did take place, it was but a minor transaction. Second, extensive petrographic analysis of Ha`apai ceramic samples by Dickinson has failed to find irrefutable evidence for imported goods. With consideration of similar results elsewhere in the eastern Lapita province, the concept of a Lapita tradeware and its postulated role has been seriously questioned (Dickinson *et. al* 1996). Finally, in the case of shell valuables (as defined by Kirch 1990: 124), these items do dominate the non-ceramic assemblages of early Lapita sites in Ha`apai. Included here are a range of disk beads, pendants, rings, armlets, perforated plates, and long units. However, evidence for a single or limited

number of production centres for these materials has yet to be found, and they are most simply explained as a product of local manufacture. Identification of shell valuables as a central commodity in an integrative exchange network for Tonga, therefore, would be spurious.

Lapita Settlement Process

A variety of models for Lapita expansion and settlement have been proposed, and to a limited extent operationalized (in particular Clark and Terrell 1978; Green 1982). Two of these, the strandlooper and trader model, have been briefly touched upon in preceding discussion, with some sympathy expressed for a strandlooper-like adaptation. In spite of this sympathy, aspects of the strandlooper model, including a migratory population, do not fit the archaeological data for Ha`apai. Rather, these data clearly indicate long term continuity in site occupation from early Lapita through to the present. Linguistic reconstructions for Lapita agricultural practice are also compelling, as earlier noted, and it is hard to view the colonizing group without a limited horticultural endeavour. Consequently, an earlier review of the Ha`apai data argued for a premeditated and systematic strategy in the settlement of Tonga, if not elsewhere in the eastern Lapita region (Shutler *et. al* 1994: 66). This strategy involved the intentional maintenance of small Lapita settlements on individual islands with even minor population growth siphoned off to form new communities on adjacent islands having suitable features (agricultural soils, fringing reefs, accessibility by watercraft). Such a process would result in a rapid movement throughout Tonga and beyond, a situation that is amply recorded in the radiocarbon record of early Lapita sites. It also would create an integrated system of overlapping kin relations, and this helps to explain the relative homogeneity in eastern Lapita ceramic design. More recent data from Ha`apai, in that it has documented additional and isolated hamlets on Ha`afeva and 'Uiha islands, strengthens these arguments.

■ Conclusions

Any presentation based on partially analysed data is subject to revision, this being especially the case with further field work pending. When supplementary studies and comparative analysis of Ha'apai sites are fully accomplished, it is anticipated that entirely new insights will be forthcoming. The Ha`apai situation is nevertheless informative, and preliminary impressions of the recovered data have been offered. Above all else,

these interpretations not only imply a high degree of similarity in ceramic design and technology, but virtually all other site characteristics. The conformity is striking for it indicates a repetitive pattern in settlement process and adaptation. A majority of these features are also consistent with Lapita site data from Viti Levu, Lau, Tongatapu, and Niuatoputapu. Thus they not only support the conceptual framework for an eastern Lapita province, but suggest an ethnic and social integration of Fiji/west Polynesia for the period 3000 to 2800 BP. This community, as also reflected in its archaeological record, was different from ones to the west and far west of the Lapita realm. Future models and interpretations of the Lapita complex as a whole must recognize and accommodate these variations.

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