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– ARTICLE –

Exploring Lapita Diversity on New Britain's South Coast, Papua New Guinea

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ABSTRACT

Variability in material culture at Lapita pottery sites has long been recognised, but is rarely discussed. Here we explore differences between two Lapita sites on Apugi Island near Kandrian and two in the Arawe Islands on the south side of New Britain, Papua New Guinea. In the Arawes, the Apalo and Makekur sites have rich assemblages with shell fishhooks, and coral and shell discs similar to those found in Lapita and later contexts across Oceania. In contrast, the less rich assemblages of the Rapie/Iangpun and Auraruo sites on Apugi Island lack similar fishhooks or discs. Three possible explanations for these differences are discussed: sample bias, environmental constraints, and cultural factors. While each may have contributed to some degree, we propose two scenarios involving cultural choices for further consideration: the selective uptake and transfer of new ideas between communities, and contrasting site functions between central places for ritual or trading activities (Arawes) versus unspecialised residential locales (Kandrian).

Keywords: Lapita, New Britain, Near Oceania, cultural variability, material culture

INTRODUCTION

Variability of material culture between sites has long been recognised as a feature of the Lapita cultural complex (Green 1979; Kirch 1997). This gave rise early to a view of the complex as a polythetic set of traits (Bellwood 1975: 13; Green 1992, 2003), with the distinctive Lapita pottery as the common denominator across its distribution. While other aspects of material culture and site location frequently recur at sites in Near Oceania and parts of Remote Oceania (Green 2003: table 5), there is no consistent suite of traits present at every site. Explanations for this variability have invoked geographical and temporal factors and, in Near Oceania, the influence of populations occupying the region before the introduction of pottery production (e.g., Green 1991, 2003). Here we consider differences in material culture assemblages between Lapita sites on the south coast New Britain, Papua New Guinea, where two of the authors conducted research on the Arawe Islands (CG, with CP and GS) and around Kandrian and adjacent islands (JS) (Figure 1). The focus is on shell fishhooks and coral and shell discs that occur in the Arawe sites, but not in the Kandrian area. The paper considers several possible explanations for these differences for further exploration. The topic is particularly pertinent to this issue of *JPA* in honour of Herman Mandui as his first exposure to the Lapita cultural complex was at these New Britain sites.

The paper focuses on four sites: Auraruo (FFS) and Rapie/Iangpun (FFT) on Apugi Island, and Makekur (FOH) on Adwe Island and Apalo (FOJ) on Kumbun Island, in the Arawe Islands of West New Britain Province, Papua New Guinea (Figure 1). The sites are located on beaches of small islands formed by uplifted coral reefs, with breaks in their fringing reefs that permit canoe access. None has access to surface fresh water, which is obtained from seeps at the base of the uplifted coral limestone or from wells dug into the Ghyben-Herzberg aquifer. Radiocarbon dates place the sites around 3200–2800 cal BP, with Makekur assigned to an early stage of Lapita pottery on stylistic grounds (Summerhayes 2000, 2001). There are no secure dates for the Apugi sites, where reworking of deposits by human and other agencies raises doubts about the context of dating samples (Specht & Gosden 1997: 178–179).

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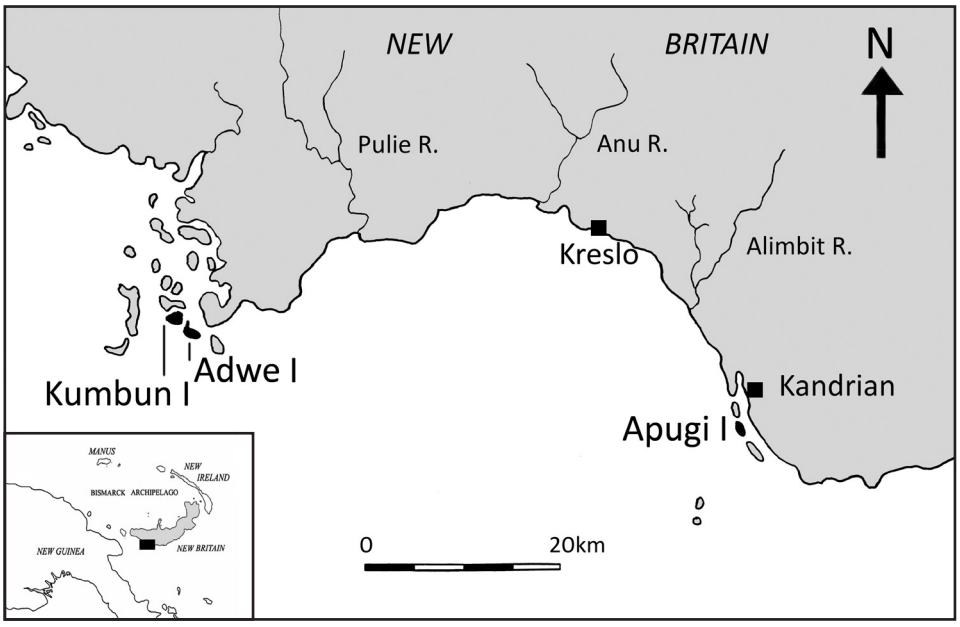

Figure 1. Location map of the Arawe Islands and Kandrian, West New Britain Province, Papua New Guinea.

THE ARTEFACTS

The excavations at Makekur yielded a rich array of shell artefacts and manufacturing waste indicative of on-site production, whereas the Apalo site was less productive. The Arawe assemblages are dominated by *Tectus niloticus* arm rings, small discs made from various *Conus* species and *Tridacna* spp. adze blades and blanks, with occasional worked *Cypraea* spp. and *Anadara antiquata* shells. In contrast, the Kandrian sites yielded very few shell artefacts and little definite production waste. Here we focus on two categories of artefact that occur in the Arawe Islands, but have not yet been found at the five Lapita sites recorded in the Kandrian area: shell fishhooks and discs of coral and shell. Tables 1 and 2 provide details of their recovery contexts and summary descriptions (shell data from Smith 1991: appendix A). Provenance data provide site (FOH, FOJ), test pit (TP or a single letter) and excavation unit (e.g., FOH/TP27/16). Table 3 lists ^{14}C dates relevant to the recovery contexts or comparable nearby contexts, calibrated with Calib 7.0.2 (Reimer *et al*. 2013). With one exception (Beta-54164), all the dates fall between 3215–2700 calBP at 2σ (p=≥0.900).

Fishhooks

Ten broken fishhooks and six blanks are reported from the Lapita levels of the Arawe sites (Smith 1991: appendix A, 2001: table 1), and another six possible blanks were noted among the shell waste (Table 1). With one exception, one-piece fishhooks of the jabbing type are represented; the exception is a possible lure shank, probably

Table 1. *Summary descriptive data for shell fishhooks found at Makekur and Apalo, Arawe Islands, West New Britain, Papua New Guinea. Data from Smith (1991: appendix A). All measurements are in mm.*

Context	Material	L.	W.	Th.	Description	Smith ID
FOH/TP21B/17	*Tectus niloticus*	33	12	9	blank	132
FOH/TP21B/16	*Tectus niloticus*	43	6	5	shank only	134
FOH/L/13	*Tectus niloticus*	29	19	9	n/a	147
FOH/L/14	*Tectus niloticus*	29	14	3	n/a	189
FOH/F3/14	*Tectus niloticus*	60	10	8	point broken	207
FOH/TP14/16	*Tectus niloticus*	38	5	4	shank, line attachment broken	208
FOH/H1/6	*Pinctada* sp.?	59	5	8	broken	214
FOH/G1/7	*Tectus niloticus*	62	8	10	shank complete, point broken	227
FOH/H2/7	*Tectus niloticus*	42	6	4	shank, point broken	230
FOJ/Z4/17	*Tectus niloticus*	36	10	5	shank broken, line attachment end only	419

Table 2. *Summary descriptive data for coral and shell discs found at Makekur and Apalo, West New Britain, Papua New Guinea. Weight is in grams, other measurements are in mm.*

Context	Material	Wgt (g)	Diam.	Th.	Cross-section	Comments
Discs						
FOH/S/15	coral	16.2	45×45	8 to 10	rectangular	ground, irregular patches
FOH/S/15	coral	24.3	52×53	10 to 11	rectangular	ground, irregular margin
FOH/S/16	coral	41.1	60×58	15 to 16	biconvex	ground, rough margin
FOJ/T3/9	coral	60.7	53×55	19 to 23	rectangular	ground all over
FOH/H2/18	*Tridacna gigas*?	72.8	55×56	13	rectangular	ground all over
FOH TP27/16	*Tridacna maxima*	34.5	60×65	5 to 6	irregular	unfinished? not ground, flaked
Tridacna waste						
FOH/TP6/14	*Tridacna gigas*?	272.8	70×75	32 to 35	irregular	not drilled, flaked margin, ground; waste from ring production?
Buka-DAI/F surface	*Tridacna gigas*?	379.7	70×72	43 to 47	irregular	flake scars on underside; drilled, not ground; waste from ring production

Table 3. *Radiocarbon dates (Summerhayes 2001: table 3) on plant samples for excavation units relevant to the shell fishhooks calibrated using the Calib 7.0.2 program (Reimer* et al. *2013).*

Context	Lab No.	Material	CRA	ΔR	1σ	Prob.	2σ	Prob.
FOH								
TP21B/17	Beta-54166	charcoal	2730±70	n/a	2917–2913	0.022	2991–2744	1.000
					2880–2759	0.978		
TP21B/13	Beta-54165	charcoal	2850±80	n/a	3072–2860	1.000	3205–3205	0.001
							3179–2780	0.999
TP21H/14	Wk-32734	Canarium	2730±32	n/a	2850–2785	1.000	2916–2914	0.005
							2880–2760	0.995
G2/13	Beta-54164	charcoal	2640±90	n/a	2872–2700	0.885	2959–2458	1.000
					2631–2617	0.037		
					2585–2575	0.021		
					2563–2540	0.058		
D3/9	ANU-11187	charcoal	2730±100	n/a	2944–2932	0.044	3157–2700	0.986
					2930–2753	0.956	2631–2618	0.005
							2583–2577	0.001
							2562–2541	0.007
E2/9	ANU-11186	charcoal	2800±110	n/a	3056–3051	0.012	3215–2740	1.000
					3034–3012	0.064		
					3008–2781	0.924		

from a composite fishhook (Figure 2). Seven hooks from Makekur were concentrated in three areas: two each in consecutive excavation units of squares 21B and L, and three in consecutive excavation units of the G–H squares adjacent to L. The only definite hook found at Apalo was the line-attachment end of the possible lure shank that was recovered near the base of square Z4.

All the hooks except one were made from the keel of the body whorl of *Tectus niloticus* (Linnaeus 1767) shells (Smith 1991: appendix A, 2001: figure 5 right). The exception was made from a *Pinctada* sp. shell (Smith 2001: table 1; this is probably the specimen identified as *Conus* sp. in Smith 1991: appendix A item 214). All have been extensively ground, though the original form of the keel is still recognisable in cross-section. The minimum shank lengths range from 42 mm to 62 mm. The jabbing hooks are uniform in shape with slightly inward curving shanks and marked external angles at the bend between shank and point-leg. Four hooks, including the lure shank, have pairs of notches or grooves as line-attachment aids that extend over the exterior or inner face and sides to form a knob (Figure 2).

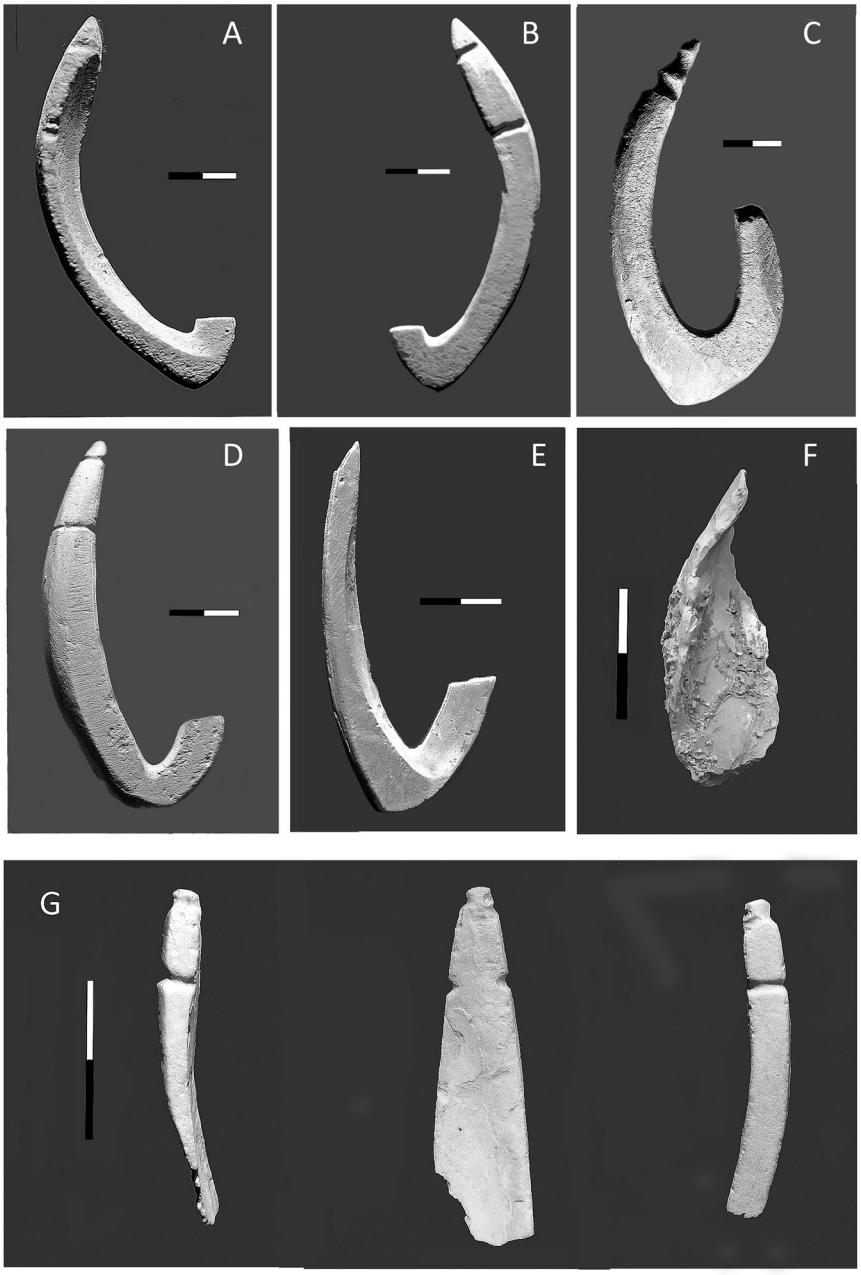

Figure 2. Five shell fishhooks and a fishhook blank from excavations at the Makekur (FOH) and Apalo (FOJ) sites, Arawe Islands. A-F: Makekur, G: Apalo. A, B: two views of FOH, uncertain ID; C: FOH/G1/7; D: FOH/F3/14; E: FOH/TP14/16; F: FOH/TP21B/17; G: FOJ/Z4/17. Scale: A–E: 10 mm; F–G: 20 mm. (Photos: A–E by R. Frank, La Trobe University; F–G by J. Specht).

The jabbing hooks are consistent in raw material, form and size with those from Lapita pottery sites throughout the western Pacific from the Mussau Islands in the north to New Caledonia in the south (Kirch & Yen 1982: 239, figure 95f; Kirch 1987: figure 7; Green & Anson 2000: figure 12a; Szabó & Summerhayes 2002: figure 5; Szabó 2007: figures 15.2, 15.3; Sand 2010: Figure 134a). The form of line-attachment with an externally-projecting knob that occurs at Vunaburigai (SAB) on Watom (Specht 1969: figure 14m) and on Anuta and Tikopia Islands (Kirch & Rosendahl 1973: figure 18J–R; Kirch & Yen 1982: 239) is not represented in the Arawes' samples. The possible lure shank appears to be unique at this stage.

Coral and shell discs

Five disc-shaped objects in coral (3) and shell (2) were found at Makekur, and one of coral at Apalo (Table 2). Those of coral are all made from *Porites* species. Shell disc FOH/H2/18 displays no features to confirm the mollusc

species used, but it is likely to be from a *Tridacna gigas* (Linnaeus, 1758) valve (Figure 3E). The second shell disc (FOH/TP27/16) is made from the smaller and lighter *Tridacna maxima* (Röding, 1798) (K. Szabó, personal communication) (Figure 3F).

Five discs are fully ground and complete (Figures 3A–E). Disc FOH/TP27/16 was flaked to a rough circular form but not ground, possibly because the *T. maxima* shell from which it was made was too thin (Figure 3F). Three coral discs and the finished shell disc have flat, parallel faces and straight sides that form rectangular cross-sections, whereas coral disc FOH/S/16 has a biconvex cross-section. The discs range in diameter from 45 mm to 60 mm, and from 8 mm to 23 mm in thickness. This variation is reflected in their respective weights, with three coral and one shell disc being considerably lighter than the other discs.

Smith (2001:153) reports that discs made from the umbo of *T. gigas* shells were 'common in Lapita deposits but rare in post-Lapita,' listing one *T. maxima* and 11 *Tridacna* sp. discs in Lapita pottery contexts and two in post-Lapita contexts (Smith 2001: table 1). Figure 4A shows one such disc made from a *T. gigas* valve that was found with Lapita pottery in FOH/TP6/14. It is flaked around the margin, not ground and weighs nearly four times shell disc FOH/H2/18 (cf. Smith 1991: Figure 4.4). Smith (2001:153) suggests that these heavy discs might have been used as

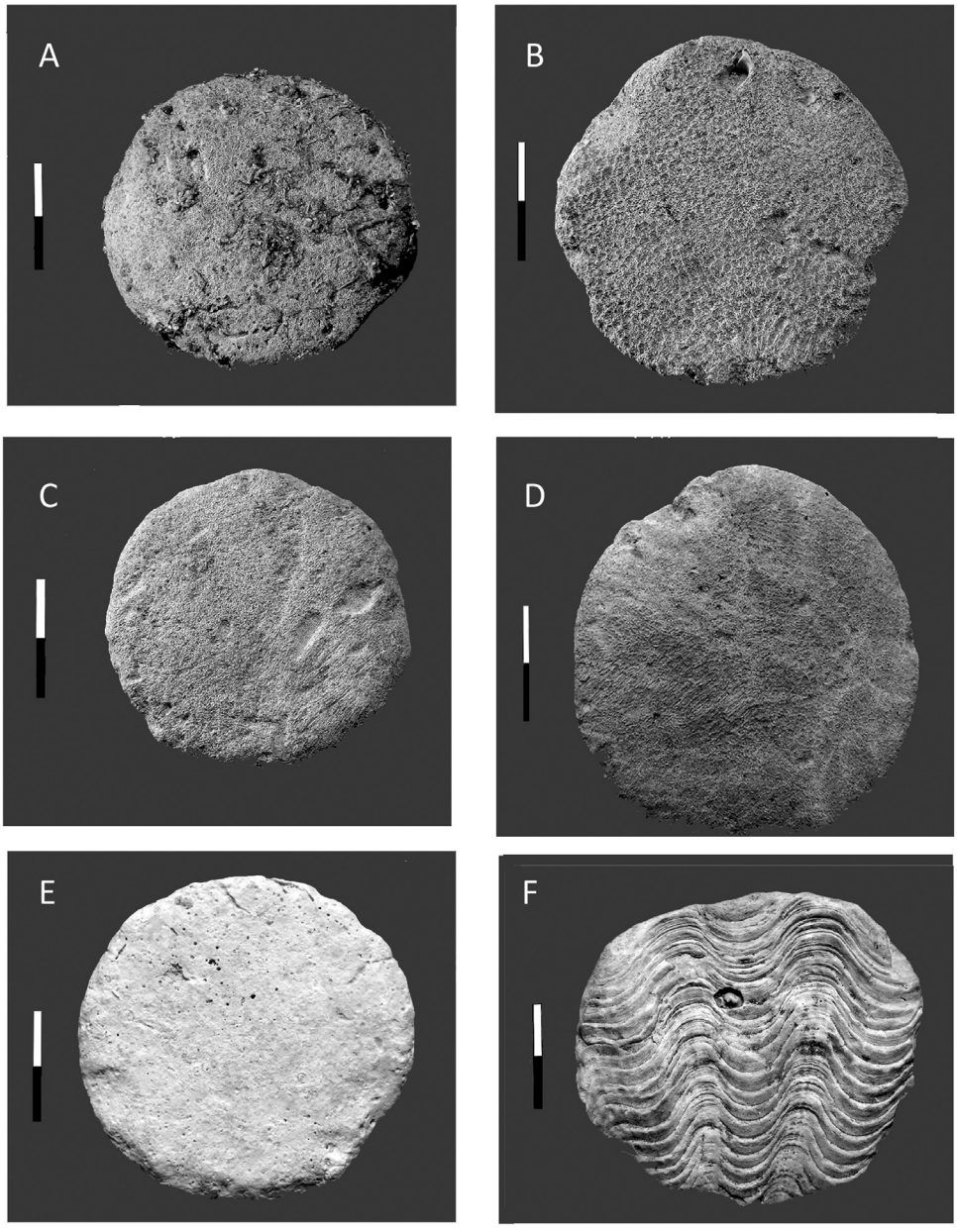

Figure 3. Coral and shell discs from Makekur (FOH) and Apalo (FOJ), Arawe Islands. A: Apalo T3 spit 9; B: Makekur S spit 15; C: Makekur S spit 15; D: Makekur S spit 16; E: Makekur H2 spit 18; F: Makekur TP27 spit 16 (*Tridacna* sp. shell). (Photos: J. Specht).

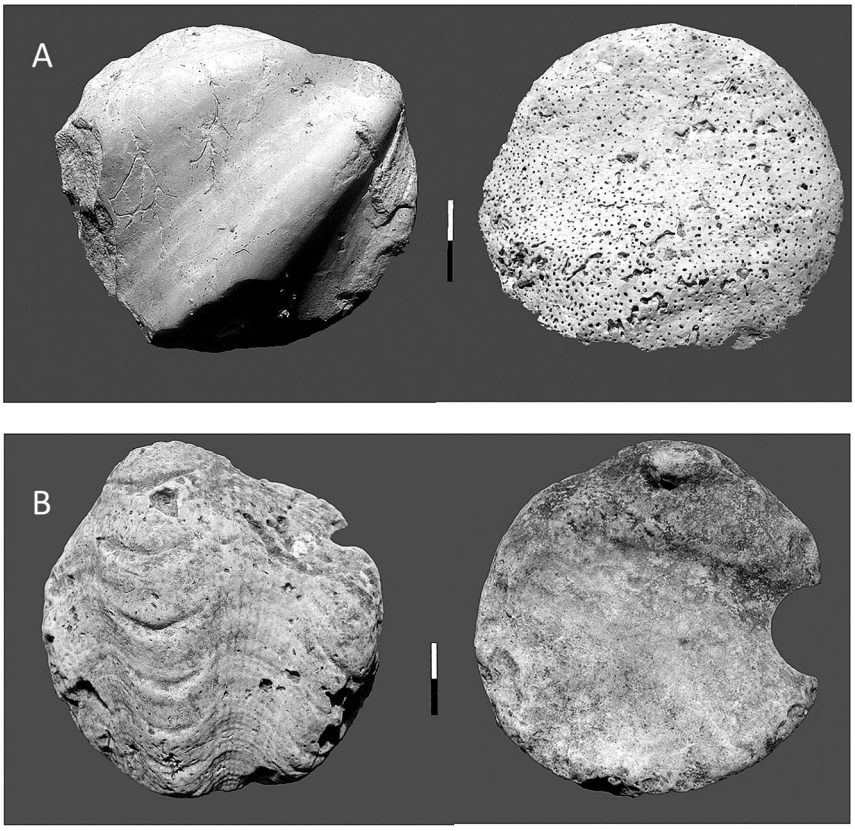

Figure 4. Probable *Tridacna gigas* waste from arm ring or ring valuable production. A: Makekur, TP6 spit 14; B: site DAI/F, surface, Buka Island, Bougainville Autonomous Region. Note the drill hole on the right-hand margin. (Photos: J. Specht).

hammer stones. Item FOH/TP6/14, however, is similar in size to a *T. gigas* disc found on the surface of site DAI area F on Buka (Table 2, Figure 4B). This has a conical drill hole that suggests the disc was removed from the valve by drilling a hole and then cutting out the disc by abrasion. We interpret this disc as a waste by-product from production of a *T. gigas* arm ring or valuable, and suggest that FOH/TP6/14 similarly may be a waste product from such shell-working rather an early stage in producing a disc like FOH/TP27/16 or FOH/H2/18.

Coral discs have not been reported from any other Lapita site in the Bismarck Archipelago, though shell discs are present in the Mussau sites (P.V. Kirch, personal communication). Further afield, discs and discoid items of coral, shell and stone occur on many islands from Micronesia (Davidson 1971:78), through island Melanesia and into Polynesia (see reviews in Poulsen 1987:208–209; Bedford and Spriggs 2002:142–143; Sand 2010:188–189). These discs are often interpreted as ancestral forms of discs for various bowling competitions that were widespread in Polynesia at the time of European intrusion (e.g., Hiroa [Buck] 1930:663, 1944:252–253, 1957:372, figure 30d). Kirch and Green (2001:190–192) attribute forms of these games to ancestral Polynesian culture. Such games have not been recorded among recent societies in the Bismarck Archipelago. The possibility that some discs were used as anvils in pottery making (cf. Birks 1973:49, plate 49k for a stone example) seems unlikely, as in recent times such anvils are naturally rounded, water-rolled pebbles and not specially manufactured items (e.g., May & Tuckson 1982:39, figures 6.7, 8.18).

DISCUSSION

One-piece fishhooks have long been acknowledged as a core component of the Lapita cultural complex (Green 2003:103, table 5; cf. Kirch & Green 2001:132). This is not so for the coral discs and shell lure shank, which are not formally reported at other sites in the Bismarck Archipelago. Several reasons can be proposed to explain the absence of both categories from the Kandrian sites, such as sample bias, differing environmental conditions, differences in cultural practices and/or choices, or some combination of these.

Sample bias is possible, as excavated areas at the Kandrian sites represent less than one-third of the Arawe excavations. The four sites are similar in size (10,000–15,000 m^2), but only 25 m^2 were excavated on Apugi, compared to 39 m^2 and 45 m^2 at Apalo and Makekur. On the other hand, the absence of coral and shell discs from the Rakival-Re-

ber and Kamgot sites is likely to be real, since their excavated areas total 140 m² and 49 m² respectively (Anson *et al*. 2005; Szabó 2005: Figure 5.2).

Environmental factors may have played a role in the distribution of fishhooks. The Kandrian and Arawe Islands differ in the extent of uplift of coral reefs that formed the various islands as a result of New Britain's position on a subduction zone (Johnson 1976). The islands and adjacent mainland at Kandrian rise almost vertically to 80–155 m above sea level indicating extremely rapid and massive uplift events, with the last significant event occurring within the last two millennia (Boyd *et al*. 1999). Both the islands and mainland have limited fringing reef development. In contrast, the Arawe Islands and the adjacent mainland do not exceed 30–45 m in elevation and appear to have been stable since the mid-Holocene high sea-stand (Gosden & Webb 1994). There is extensive reef development around and between the islands, and the adjacent mainland is dominated by extensive low-lying swamps that formed after the mid-Holocene. While it is tempting to suggest that this swamp development contributed nutrients to support larger fish stocks around the islands, thus encouraging the use of fishhooks, this would not explain the apparent absence of hooks there during the historic period. Fishhooks are not represented in museum collections from the south coast of New Britain (Welsch 1998; Gosden & Knowles 2001: appendix), and apart from the comment that fishhooks of an unspecified type were made in the Kandrian area 'in the old days' (Todd 1934–35: 194), there are no reliable records for the use of fishhooks in ethnographic writings, which refer only to various forms of nets, spears and poisons for fishing (e.g., Pavlides 1988; Todd 1934–35: 194–195; Turner 1990: 57).

As discussed above, the function of the coral and shell discs could be linked to throwing or bowling games such as were once played throughout Polynesia. In some parts of the western Pacific this function might have been served by shaped potsherds that have been found in Lapita and post-Lapita contexts from the Bismarck Archipelago to Tonga, though some have been interpreted as lids or stoppers for narrow-mouthed pottery vessels (see discussions in Poulsen 1987: 206, figure 55.7; Sand 2010: 106–107; Specht & Torrence 2007: 143; Summerhayes 2000:119, table 7.24).

Cultural factors may also have contributed to the uneven distribution of coral and shell discs among Lapita pottery sites. In his mineralogical and chemical analyses of south coast New Britain Lapita pottery and river sands, Summerhayes (2000: 172, 204) identified likely pottery imports from the Arawe Islands into the Kandrian area, though much of the pottery was locally produced using sands from Alimbit River. This is supported by analysis of sherds from the Kreslo site between Kandrian and the Arawe Islands (Specht 1991). Most Kreslo sherds are likely to have been made with sands from the nearby Anu River, but four sherds had pyroxene sands 'suggestive of a source further west (Pulie or Adi Rivers)' (Summerhayes 2000: 171). The social and economic interactions along the south coast implied by this transport of pottery perhaps reflect cultural factors in the selective movement of goods between the various communities. In light of these results, the burden of explanation for the absence of fishhooks and discs from the Kandrian area should not be placed solely on sample bias and/or environmental constraints.

Specht and Gosden (1997: 190) noted that 'Lapita assemblages represent not a single package, given unity by a unique commonality of culture, but a series of elements of life in which there was differential participation' (cf. Green 1992). Such 'differential participation' might be expressed in the establishment of production controls or monopolies that served to create and maintain social-economic relationships between communities (cf. Harding 1967; Specht 1974). In doing so, this could have led to or extended the mutual exchanges of people, pots and other goods and resources between pottery producers and non-producers (e.g., Green 1991). Not all communities, however, were necessarily receptive of new ideas, goods and practices. Perhaps the material culture suites of the Kandrian sites reflect the rejection of angling with fishhooks and the use of coral and shell discs.

There is a further possibility. The admittedly limited evidence available from the Bismarck Archipelago indicates the possibility of a settlement pattern or modes of activity quite different from those of the present, when villages are spread fairly evenly along coastal areas. The contrast between Kandrian and the Arawes in the Lapita period might be indicative of this broader pattern. Despite considerable work in the Kandrian area over 35 years there is no sign of stilt structures out over reefs in Kandrian as is found in the Arawes. Recent tectonic uplift would have drained waterlogged sites in Kandrian, so that the preservation of organics would not occur as we have noted. But there is a lesser range and density of material in Kandrian than in the Arawe Islands, where there are three and possibly four major Lapita sites: the two discussed here, one at Amalut on adjacent New Britain, which probably also had stilt structures, and another on Pililo Island which did not, but produced good assemblages of cultural items (Gosden & Webb 1994; Summerhayes 2000). Two further sites on Maklo and Kauptimete islands have much more limited Lapita evidence. Amalut was encountered late in the Arawes project and has not been extensively excavated, but enough was seen to indicate extensive deposits associated with wooden structures over a reef. The site is directly visible from Adwe and Kumbun and almost in shouting distance. The sites were occupied for several centuries and would have had constant interaction, as shown by similar patterns of acquisitions of pottery and obsidian. Important questions arise from this pattern of evidence: were these separate communities, dispersed parts of a single community or something more akin to a ritual and trading centre with no ethnographic parallels? Similar close and

long-lived agglomerations of sites occur in the Mussau Islands (Kirch 2001), the Talasea area (Specht & Torrence 2007) and possibly on the Duke of York Islands (White 2007). In situations of smaller populations than those of the present and recent past, with considerable mobility there may have been a need for people to meet, interact and transact at particular known spots on the landscape, of which the Arawes formed one. Occupation occurred in Kandrian and persisted for some time, but possibly never at the same intense level as in the Arawes.

We have concentrated on items of shell and coral drawn from the sea. The stilt structures of the Lapita period were positioned between sea and land, over shallow waters above the reef but within metres of islands or New Britain. They combined materials from land and sea, as one would expect. The material from the sea that we have recovered was partly functional (fishhooks) and partly ornamental or for competitive activities (discs). We cannot know what values these objects held, but for these communities the sea was important in many ways, as were the materials drawn from it. The shell and coral discs might indicate some of these values and their importance.

CONCLUSIONS

This paper has drawn attention to the little-discussed issue of diversity within the Lapita cultural complex that merits more detailed consideration. We have canvassed three main possible explanations (sample bias, environmental factors, and cultural choices) to explain the apparent differences between the Kandrian and Arawe Island Lapita sites, though the paper is an exploratory step without necessarily preferring one explanation over the others. The Bismarck Archipelago is generally regarded as the Lapita 'homeland' (Allen 1984; Green 2003), but much of the discussion about Lapita sites there has been within the context of the settlement of Remote Oceania. Rather than view the study of Lapita sites exclusively or primarily in terms of this migration narrative, we emphasise the need for explanatory models for the Archipelago to address other aspects of the social dimension. This is particularly important when we turn our attention to the post-Lapita period. Lapita pottery is known from roughly 100 localities within the Bismarck Archipelago, though at some it is represented by only a handful of sherds. While pottery production persisted in some localities for several hundred years after the end of the dentate-stamped phase (Anson *et al*. 2005; Garling 2003, 2007; Torrence & Stevenson 2000), only in the Manus and Buka areas did production continue through to present times (May & Tuckson 1982). Clearly, pottery 'as both a container and a medium of symbolism and exchange was an option and not a necessity' (Specht & Gosden 1997:190). Perhaps in the Arawe Islands this applied also to shell fishhooks and discs, neither of which persisted into the post-Lapita period.

Acknowledgments

In dedicating this paper to the memory of Herman Mandui, we acknowledge his significant contributions to the local and international understanding and appreciation of Papua New Guinea's cultural heritage, and his years of collaboration, friendship and camaraderie with foreign researchers. Herman, you are sorely missed.

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