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Stuart Bedford, Christophe Sand and David Burley (eds), *Fifty Years in the
Field: Essays in Honour and Celebration of Richard Shutler Jr's
Archaeological Career***



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FIFTY YEARS IN THE FIELD. ESSAYS IN
HONOUR
AND CELEBRATION OF RICHARD SHUTLER JR'S
ARCHAEOLOGICAL CAREER

Edited by Stuart Bedford, Christophe Sand and David
Burley

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NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION
MONOGRAPH

FEA SITE, BODUNA ISLAND: FURTHER INVESTIGATIONS

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and Robin Torrence

The research on Boduna Island reported here was sparked by local collector John Ray's finding of three moulded pottery faces decorated with dentate stamping (Torrence and White 2001). These were found in the shallow sandy lagoon on the southwest side of the Island. Ray's pottery collection from the lagoon also contained some large sherds with very fine and complex decoration more appropriately assigned to early "Far Western" Lapita as defined by Anson (1983; see also Summerhayes 2000a:7-8) than the "Western" designation ascribed to their dry-land surface collected and excavated sample by Ambrose and Gosden (1991). Given that other "Far Western" sites occur on small islands like Boduna, and that obsidian from mainland flows nearby was prominent in other "Far Western" sites such as ECA and SEE, it seemed that this site might yet contribute substantially to the study of the Lapita phenomenon, as Ambrose and Gosden suggested (1991:187). Additionally, Gosden (pers. comm.) suggested that the island's sandy lagoon might once have had stilt-houses built over it, and

might preserve archaeological materials in a relatively original state similar to those found elsewhere.

BODUNA ISLAND

Boduna Island (150° 04.3'E, 5° 16.6'S) is located about 2km north of Garua Island and 800 m from the eastern side of the Willaumez Peninsula (Figure 1). It is about 0.6ha in area (130 by 80m) and rises no more than 2m above sea level. From the southeast round to the north sides are extensive exposures of reef flat, while on the southwest there is a lagoon of about the same dimensions as the island, with a fringing reef. There is good access to the lagoon from the west. There are at least three areas of hot water vents around the island, including one at the southern end of the lagoon. The island is today covered with secondary bush and some coconut trees, but gardens have been made there in the remembered past. Our Pangalu assistants said that a megapode still lived on the island.

Although there have been several visits by archaeologists to the island, the only published account is by Ambrose and Gosden (1991), there as part of the Lapita Homeland Project. They collected pottery and obsidian along a surface transect and showed that the "site" was coterminous with the island. They excavated two shovel holes and two 1 by 1 metre squares. In the shovel holes they report evidence of a buried soil, but this is not mentioned as part of their excavation stratigraphy. In their excavations, pottery occurred throughout, but sherds are said to be larger and less rolled in the lowest level, the c.30cm of "beach sands" overlying the basal coral rock. They also collected a bifacially flaked obsidian tang, now known to be pre-Lapita in date (Araho 1996; Araho *et al.* in press). They do not refer to pottery in the lagoon. They concluded that the site was rich but disturbed.

Our research was in two stages in July 2001. White, Coroneos and Ken Mulvaney carried out three days of survey and excavation both underwater and on land. Neall and Boyd studied the landscape history for one day, necessarily but unfortunately on a separate visit. Pangalu

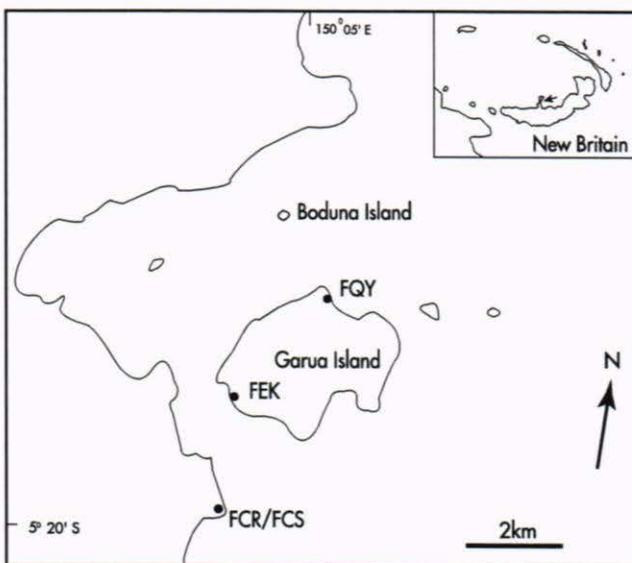


FIGURE 1. Boduna Island and its environs, with sites marked.

Underwater inspection, 11-13/7/01 Boduna Island, West New Britain

by: Cosmos Coroneos

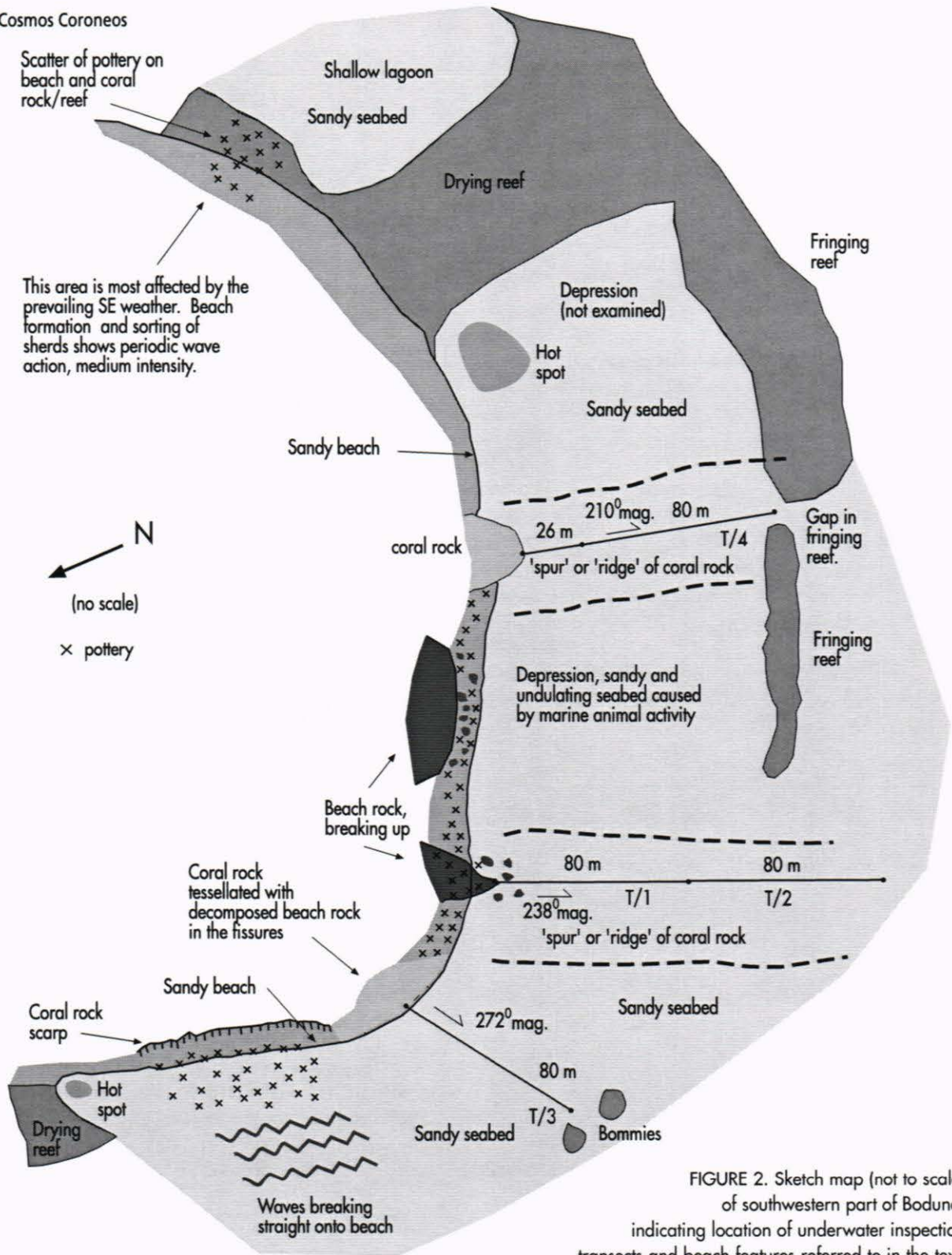


FIGURE 2. Sketch map (not to scale) of southwestern part of Boduna, indicating location of underwater inspection transects and beach features referred to in the text.

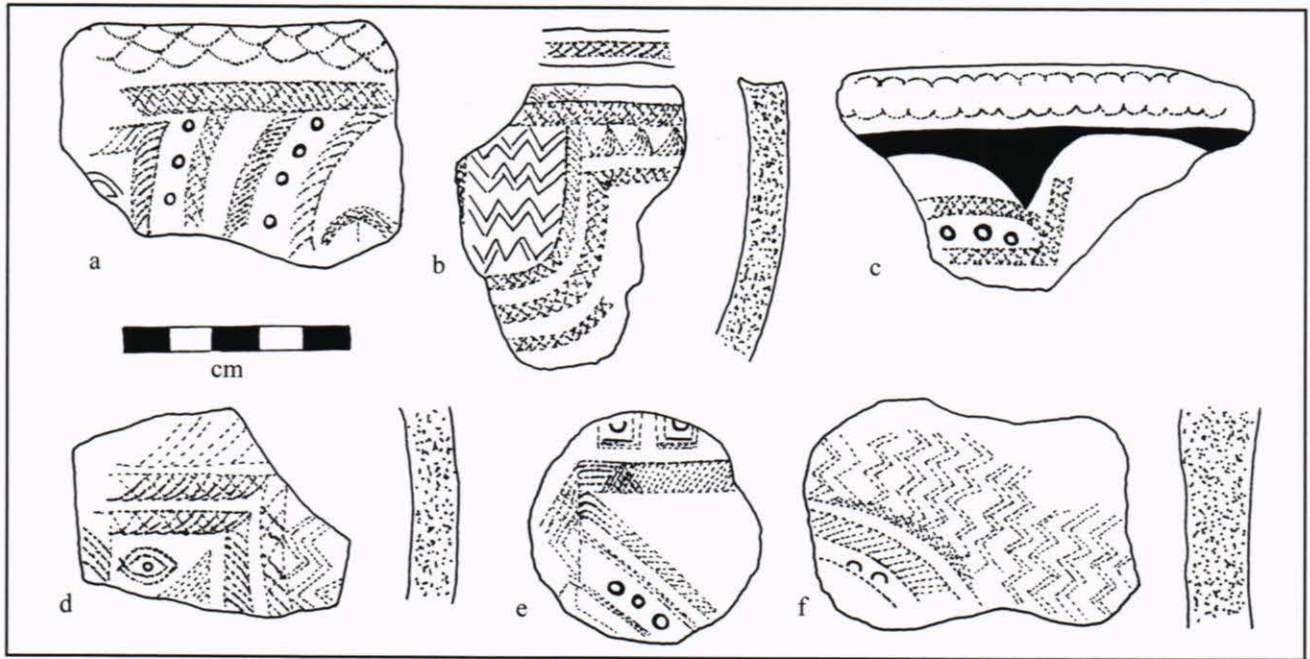


FIGURE 3. Six dentate stamped sherds, three with face motifs, from Boduna Lagoon. Sherds with sections drawn from originals, others from photos of Ray's collection (sections not recorded). Drawn by Karen Coote.

villagers, the island's owners, gave permission for research on the island, for which payment was negotiated.

Lagoon survey

Coroneos and Mulvaney swam three transects across the lagoon, starting from points off the sandy beach on the southwest side of the island where Ray had collected most material (Figure 2, Transects T/1-T/4). The outer reef surface and its outer edge were also surveyed. Only occasional surface sherds were noted near the beach and none in the half of the lagoon nearer the reef or on or beyond it.

While the floor of the lagoon was mostly sandy, small holes dug by hand into it showed that the sand was mostly less than 20cm deep and was usually underlain by coral rubble. Pottery and obsidian collections were made from a systematic series of holes (which were perforce shaped as tapered cones, c.30cm diameter at the top decreasing to 10cm at base) along Transect T/1. Nearly all the material came from within 20m of high water mark (Table 1). Only a few sherds displayed visible decoration but, as nearly all sherds were heavily rolled, how many were originally decorated cannot be determined.

An important observation is that rounded chunks of weakly cemented shelly sand containing some tephra were found in the lagoon some 6m from the current shoreline (c.60cm underwater at high tide). Although none of the

chunks found included sherds, they are clearly detached from deposits on the shore which do (see below), and we suggest that this consolidated sediment is the original source of the pottery found in the lagoon.

Following this survey, we inspected some 400 sherds collected by Ray, nearly all from the lagoon. A very few

Distance	Sherds			Obsidian
	Large	Medium	Small	
2	6	7	3	4
4	10	18	32	15
6	11	25	42	5
10	11	25	14	16
18	10	29	14	18
22	2	5	6	5
46	4	3	2	0
50	2	1	0	0
54	0	1	0	0
66	0	2	3	0

TABLE 1. Pottery and obsidian (number) from holes in the lagoon bed. Sherds: Large - >4 x 4cm; Medium; Small - <2 x 2cm. Distance in metres from high water mark along Transect T/1.

Reference	Material	Delta 13C (‰)	C14 y b.p.	Cal B.P.
ANU 5071	marine shell	n/a	2050 ± 90	1820 - 1400 2SD
ANU 5072	marine shell	n/a	3090 ± 80	3059 - 2719 2SD
ANU 5073	marine shell	n/a	3130 ± 90	3169 - 2729 2SD
Beta 41578	marine shell	+1	3330 ± 60	3260 - 2880 2SD
Wk 9936	marine shell	2.9 ± 0.2	3211 ± 52	3160 - 2850 2SD
Wk 9935	egg shell	-10.0 ± 0.2	572 ± 56	660 - 510 2SD
Wk 10235	egg shell	-9.8 ± 0.2	485 ± 65	650 - 420 2SD

TABLE 2. Radiocarbon dates from FEA.

(c.5%) of these appear quite fresh with sharply defined decoration and very slightly rounded edges. Some others are lightly rounded, with fainter decoration, apparently because of an eroded surface, but the great majority have well-rounded edges, thin cross-sections and no visible decoration.

From Ray's collection it appeared that sherds from the lagoon might contain more larger sherds than those from the excavations and collections on land (J. Specht, pers. comm.). This would not be surprising, since Ray was collecting well decorated pieces in good condition. The samples from our transect holes show that small sherds were in fact very common (Table 1).

However, as noted earlier, dentate stamped decoration on some pottery from the lagoon (Figure 3), as well as incised decoration (Figure 4), seems to us to be rather different from the somewhat casual and erratic decoration on sherds figured by Ambrose and Gosden (1991: Figs. 3 - 6). It is thus possible that this area which, as we discuss below, may not then have been dry land, was occupied first, with later occupation extending further north and east onto what is now dry land. But we have found no evidence that the lagoon - or indeed anywhere else - was an aggrading environment with consequent preservation of the remains of an *in situ* settlement.

Land-based survey

In 1985, near the centre of the island, Ambrose and Gosden excavated a stratigraphy of about 70cm of reworked tephra with heavily abraded pottery overlying "beach sands" with less heavily rolled pottery. White excavated one square metre in the same area of the island, finding a similar stratigraphy. He noted, however, that the upper layer contained some whole megapode eggs, the transition from upper to lower stratum was only 40cm below surface and the "beach sands" included shell grit mixed with a considerable body of tephra and small broken shells. This pit reached coral rock at 90cm, where the ground temperature was 42°C. Very little pottery or

obsidian was found in this pit and there was no evidence of the lower stratum containing larger or less rolled sherds.

At the coast, a somewhat different stratigraphy was noted. On the southwestern shore two units overlie dead coral which forms the base of the island. The lower of the two is a cemented coralline limestone which is cut by a series of sub-parallel fractures up to 20cm wide and tending northwest-southeast. Filling the cracks and lying in places beside the limestone, the upper unit is a weakly cemented, coarse sandy and shelly deposit, dark brown to grey in colour, and containing rolled pottery and obsidian artefacts, together with whole fossil megapode eggs. Two of these eggs (Wk 9935 and Wk 10235) have been dated, both to about 500-600 years ago (Table 2): we do not believe this date applies directly to the pottery. The unit containing these eggs is similar to the lower deposit inland and, as noted earlier, has been somewhat eroded by the lagoon.

White also dug a line of 8 small (20 by 20cm) shovel pits at irregular intervals from the beach to a point 50m inland. These showed that beyond 18m inland the shelly sand was not consolidated, though it continued to contain rolled pottery and occasional marine shells. From this point, which also marks the edge of the treeline for at least the last decade, the sand is overlain by c.50cm of fine light brown tephra similar to that identified elsewhere as from the Dakataua eruption dated to c.1150 years ago (Machida *et al.* 1996, Torrence *et al.* 2000). This continues further inland with intermittent occurrences of rounded sherds and chalky shells. The seaward edge of the tephra was sharply truncated and undercut 50cm some 18m from the shore by a deposit of large cobbles and *Tridacna* shells banked up against it to a height of about 50cm, the coral bedrock at this point being about 85cm above sea level.

Neall and Boyd observed a similar deposit within their spade pit excavated about 10m inland from the western shore of the island. There, beneath topsoil and c.35cm of loamy tephra they found 30cm of semi-cemented limestone boulders with pockets of grey sand between them. Just above the boulders were traces of lapilli which

can be confidently identified as deriving from the Dakataua eruption. The boulders sat on a brown to reddish brown tephra, but the thickness of this and its relation to the shelly sands found elsewhere remains undetermined. Neall and Boyd consider that both the boulder and cobble/*Tridacna* deposits described above are probably evidence of a tsunami rather than a cyclonic storm, since the latter are extremely rare in this region.

The other evidence of disturbance consists of the cracks in the limestone on the southwestern shore described above. These are too large to be caused by desiccation and are similar to tensional faulting in earthquakes. Given their orientation Neall suggests that there could be either a northeast-southwest graben structure between Boduna and the mainland or a curved boundary fault to a caldera to the west or north. The hot water vents suggest the area is part of an active geothermal field.

THE HISTORY OF BODUNA ISLAND

There are several aspects to be considered in determining the history of the island and its archaeological resources from Lapita times until the present.

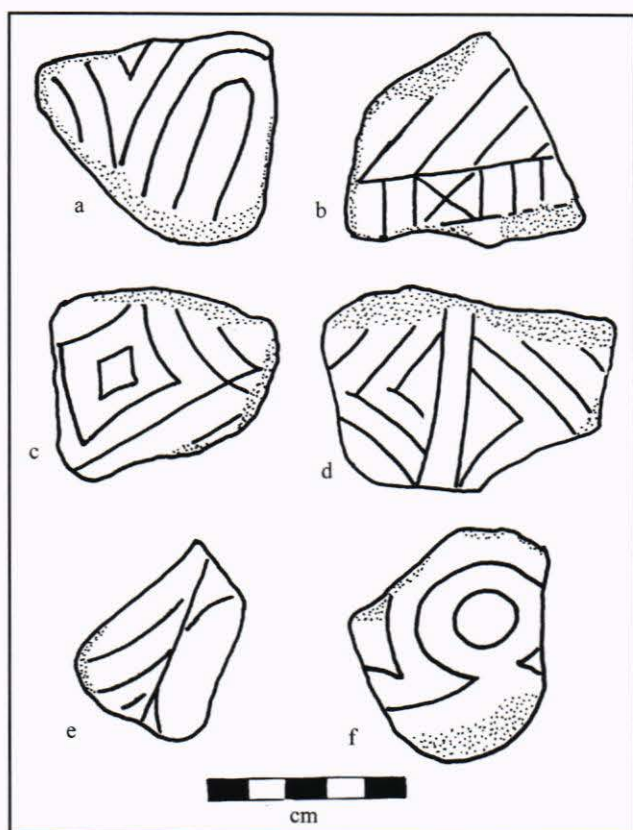


FIGURE 4. Six sherds with incised decoration from Boduna Lagoon. Drawn by White.

There are now five radiocarbon dates, all on marine shell, associated with the pottery at FEA (see Table 2). Four of the dates, namely ANU 5072 and ANU 5073 (Ambrose and Gosden 1991: Table 1), Beta 41578 (Specht and Gosden 1997: Appendix 1) and a more recently dated *Anadara* shell (Wk 9936) taken from the cemented matrix containing pottery suggest an age of around 2800 - 3000 years ago, despite different calibration protocols. The fifth, ANU 5071 (2050 ± 90 b.p.), was obtained by Ambrose and Gosden from the same pit and level as ANU 5072, and below ANU 5073. While it suggests that the site was disturbed, it is consistent with the late survival of Lapita pottery recorded in this region (Torrence and Stevenson 2000) and may document long continued occupation.

The matrix in which the archaeological material is found firmly suggests an inter-tidal or shallow water environment. However, it is not certain whether the occupation occurred while this sediment was being laid down or immediately following its raising above sea level. If the former, then the process which fragmented and rolled the sherds might have included tidal and marine organism (e.g. crab) activity as well as subsequent human and other animal reworking of the ground. These effects must have occurred prior to cementation: they are not the result of recent gardening.

The shells of whole megapode eggs cemented into the archaeological deposit on the southwestern shore raise several pertinent matters. We note first that we assume the eggs were laid there and remained unhatched, rather than being survivals of some other process such as people discarding them while whole. If so, at the time of laying the ground was soft enough for the eggs to be buried in and was also vegetated since the birds do not lay in open terrain. This suggests a period after human occupation of the island ceased, confirmed by the egg dates cited above. The matrix must also have been loose and not cemented at the time of the earthquake, since it fell into the cracks opened by it in the underlying coralline limestone.

It seems likely that the quake occurred earlier than the tsunami since the coral and shell deposited by the latter on the southern shore, as well as the sandy interstices on the western, do not appear to contain archaeological material. This could be taken to imply that the deposit was already hardened and thus not redeposited. However, not very much of the tsunami deposit was exposed, so such a conclusion must be very tentative.

Further, while the date of the tsunami appears from Neall and Boyd's pit to be earlier than the Dakataua tephra, White's observation that the tsunami deposit slightly undercut the tephra may be relevant – Neall and Boyd's pit may have been located at the same point inland. While the egg dates suggest the tsunami occurred well after the earthquake, this matter cannot be resolved with present data.

In the central area of the island, some 50cm of tephra above the archaeological matrix also contains pottery and obsidian. Ambrose and Gosden's observations and Specht's data on sherd size (pers. comm.) suggest that this upper level contains pottery derived from below by tree, crab and gardening activity, all of which served to fragment the sherds. It would go against all current data from the region to claim pottery was made later than 1150 years ago, which is the date of the Dakataua tephra in which it is now found: it must have been redeposited.

Finally, we note that the bifacially flaked tang found by Ambrose and Gosden (1991: Fig. 7) could imply an existence for the island prior to the Lapita-age settlement, but the apparent absence of the major W-K2 ashfall dated to 3600 years ago (Torrence *et al.* 2000) suggests otherwise.

In the light of this discussion we suggest that the sequence of events on Boduna Island was possibly as follows: it starts with Boduna Island existing as an intertidal or exposed sandy cay from about 3000 years ago or a little more. Human settlement, perhaps in a stilt village, resulted in the deposition of pottery in soft shelly sand (?underwater). This deposit was reworked by natural and human activity, and then raised tectonically. Subsequent events included earthquake, Dakataua tephra fall, emplacement of dated megapode eggs, cementation of deposit, tsunami, probably but not certainly in this order.

DISCUSSION AND CONCLUSION

The complex history of Boduna Island and the effects of this on the FEA site materials draws attention to the importance of understanding dynamic landscape histories in interpreting archaeological records. We suggest this has particular implications for the interpretation of the early Lapita phenomenon.

At the local level, landscape history affects both the nature of individual sites – as seen with FEA – as well as the current disposition of sites within an area. Pottery of "Far Western" style has been recovered from at least four sites in the Willaumez locality – FCR/FCS on the mainland of New Britain (Specht 1974), FEK and FQY on Garua Island (Torrence and Stevenson 2000:33) and FEA (this report) (Figure 1). All these sites are on or right beside a beach. FCR/FCS was bulldozed out of existence shortly before 1974, FEK and FQY are totally redeposited. Only FEA is sufficiently in place to be reliably radiocarbon dated. Were these the only early sites, or were there others now totally destroyed? From the extensive sampling of Torrence and her co-workers we know that "Western" and later Lapita sites occur on higher ground both near the sea and further inland (see e.g. Torrence and Stevenson 2000; Torrence 2000, 2001). Buried by

considerable deposits of tephra and thus preserved, they are nonetheless sufficiently accessible to allow interpretations of changing patterns of land use. But if all the earliest Lapita sites were at beach level they are not so protected, are much more vulnerable in this tectonically active landscape, and may well be under-represented in the total corpus.

The same is true on a broader scale. Beachside settlements seem to be typical of early "Far Western" sites throughout the Bismarcks (Gosden and Webb 1994; Kirch 2001; Summerhayes 2000a, 2001; White and Harris 1997). Each of these suites of early sites has been highly susceptible to a range of natural processes including sea level change (Boyd *et al.* 1999), tectonic activity (Boyd *et al.* 1999; Summerhayes 2000b) and volcanism (Torrence *et al.* 2000). These processes may impact on sites at any time from during occupation until the present. For example, some sites in the Duke of Yorks found by Lilley in 1985 were no longer apparent in 1993 (White and Harris 1997:98). Indeed, it may well be the case that whole groups of sites have disappeared, as is possible for the Rabaul area (Thomson and White 2000).

Similar implications regarding site modification and possible destruction occur throughout the area over which Lapita pottery is found. Erosion by the sea of Site 13 (WKO013/WKO013A) in New Caledonia was noted by Gifford and Shutler fifty years ago (1956:7), and has continued until the present (Sand 1998:13). Nearly all the early deposit found by the Birks at Sigatoka in Fiji has now been eroded away by the sea (Dickinson *et al.* 1998).

The important conclusion we draw from this discussion is that the archaeological record of the early Lapita period may be more changed than later records, when more material is found inland. The history of the FEA site has shown how such changes can occur. Ambrose and Gosden's suggestion (1991:187) that the site "definitely merits further investigation" has been borne out, if not in the way they, or we, originally hoped.

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