

Pre-Lapita Valuables in Island Melanesia

ROBIN TORRENCE

Anthropology, Australian Museum,
6 College Street, Sydney NSW 2010, Australia
robint@austmus.gov.au

ABSTRACT. An unusual obsidian stemmed tool found by Jim Specht at Boku Hill, West New Britain, Papua New Guinea, provides evidence for the existence of valuables in the pre-Lapita period. The large amount of skill, care, and effort invested in the manufacture of this large artefact combined with its symmetry and fragility imply that, unlike the other stemmed tools found at the site, Specht's find was not used in an utilitarian context. As in the case of axes in the Highlands of New Guinea, stemmed artefacts were therefore both useful tools and non-utilitarian objects which circulated in some form of ceremonial exchange system and for which control of the Kutau/Bao obsidian sources may have been important. The occurrence of valuables pre-dating Lapita pottery demonstrates that social systems based on ceremonial exchange and prestige goods were not imported, but developed *in situ*.

TORRENCE, ROBIN, 2004. Pre-Lapita valuables in island Melanesia. In *A Pacific Odyssey: Archaeology and Anthropology in the Western Pacific. Papers in Honour of Jim Specht*, ed. Val Attenbrow and Richard Fullagar, pp. 163–172. *Records of the Australian Museum, Supplement 29*. Sydney: Australian Museum.

It is well known among Melanesian archaeologists that Jim Specht has an uncanny ability to find important sites, often those with the early dates that are highly prized in this discipline. He excavated Misisil Cave, which for many years represented the earliest occupation of the Papua New Guinea islands (Specht *et al.*, 1981; 1983); he began work in the Yombon area and found pottery (probably Lapita plainware) far inland of its normal distribution (Specht *et al.*, 1981); he led Christina Pavlides to sites near Yombon mission where she found the earliest evidence for colonization of New Britain (Pavlides, 1999; Pavlides & Gosden, 1994); and he also began work at Kilu Cave on Buka, which later produced the earliest date for the Solomon Islands (Wickler & Spriggs, 1988). Although his achievements are perhaps not unexpected, since he has been exploring Melanesia for many years, I believe he has a gift. Not only did he, “by accident,” find obsidian stemmed tools in the base of a new latrine at Bitokara Mission, an event which led to the excavation of the type site for the region and set the basis for the use of volcanic stratigraphy within landscape archaeology (cf. Specht *et al.*, 1988; Specht *et al.*, 1991;

Torrence *et al.*, 1999a, 2000), but recently he also made a find with much significance for Melanesian prehistory, as I hope to demonstrate in this paper.

A remarkable discovery

During the 1999 field season, Jim and I visited the newly developed Garu Plantation, part of the Numundo Group owned by New Britain Palm Oil Ltd (Torrence *et al.*, 1999a) with a number of team members. The manager, Kefu Boromana took us to the top of Boku Hill where he had observed obsidian artefacts in an area recently levelled by bulldozer for a new house (Fig. 1). The hill is approximately 80 m a.s.l., overlooks an extensive peat swamp and has views stretching to the sea on the west side of the Willaumez Peninsula (about 10 km away). A small raised area on the north west side had been pushed over the edge of a steep cliff to provide the required level surface. As a result, most of the archaeological material dating to at least the past 6,000 years had been removed. Obsidian flakes were thinly

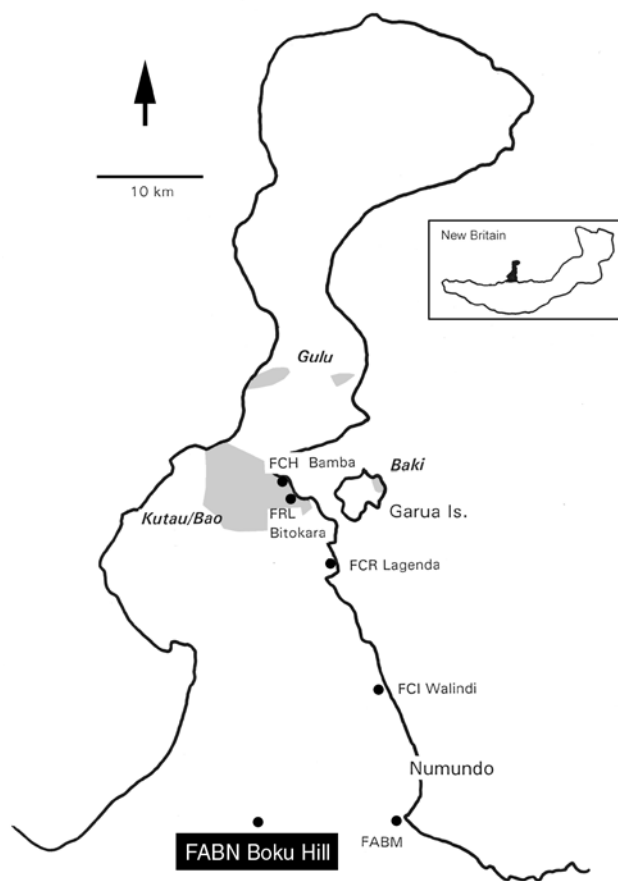


Fig. 1. Location of the Willaumez Peninsula and sites mentioned in the text. Obsidian sources are in italics. Shaded area shows distribution of obsidian outcrops.

scattered over the damaged area and careful survey also produced several pieces of Lapita pottery and a small stemmed tool (Fig. 2).

Jim found a patch where the bulldozer had removed the distinctive W-K2 tephra dated to c. 3,600 B.P. (Torrence *et al.*, 2000) revealing the red-brown clay beneath. He targeted this area for his search and before long had recovered most of a second and very distinctive stemmed tool with a fresh break. The remainder was found by Leigh Jago a week later in spoil about 100 m away. The artefact has since been restored by the Materials Conservation Division at the Australian Museum and returned to the National Museum and Art Gallery, PNG (Fig. 3). About a month later, one of the workmen sold a third stemmed tool, supposedly found at the same location, to a local collector (Fig. 4). All in all, then, three stemmed tools with widely ranging shapes and sizes have been found in the disturbed area of Boku Hill.

Jim's discovery of a highly worked stemmed tool on Boku Hill (FABN) on Garu Plantation, West New Britain (Figs. 1 and 3) has opened up new possibilities for understanding the nature and evolution of prehistoric societies in Melanesia. In this paper I argue that the three stemmed tools provide significant new information about this enigmatic class of artefact and that these new data raise important questions about the nature of society in West New Britain prior to Lapita pottery. On the basis of this new find combined with recent research, I conclude that the concept of "special artefacts" or "valuables" was present in West New Britain in the period before 3,600 cal. B.P. (cf. Araho *et al.*, 2002).

Boku Hill

The Boku Hill site represents an unusual environmental setting for both Lapita pottery and stemmed tools. Along with the three stemmed tools, eight potsherds (five plain and one each dentate-stamped, incised rim and notched rim) were found in the bulldozed area. We can only provide a dated archaeological context for these surface finds by correlation with similar material recovered in the local region. Using this approach, summarized below, it is clear that the stemmed tools derive from a context which precedes that of the Lapita pottery which is clearly separated from it at this site by the distinctive W-K2 tephra.

Three small test pits (a total of 2.5 sq m) were excavated on Boku Hill, but these produced disappointing results. Within the most successful test pit (XXV), a good sequence of Holocene tephras derived from the Witori volcano was preserved *in situ*, thereby providing an excellent source for relative dating using reference to the well-studied tephra stratigraphy of the region (e.g., Machida *et al.*, 1996; Torrence *et al.*, 1999a, 2000). Obsidian artefacts were recovered from soil underneath the W-K1 tephra as well as on soils developed on the following tephras: W-H4/5; W-K4; W-K2; W-K1. The relative age of the artefacts can be determined with reference to the dates for the tephras listed in Table 1. No stemmed artefacts or pottery were recovered from the test pits. The data nevertheless demonstrate that the site had been used periodically through much of the Holocene with a significant break between the W-K3 and W-K4 tephras.

Table 1. Approximate dates for Witori tephras (in calendar years) based on radiocarbon dates presented in Torrence *et al.* (2000) and Machida *et al.* (1996).

tephra	date (cal. B.P.)
W-K1	5,900
W-K2	3,600
W-K3	1,700
W-K4	1,400
W-H4/5	500

Obsidian from test pit XXV has been characterized using PIXE-PIGME with the machine conditions described in Summerhayes *et al.* (1998: 139). Thirty-five artefacts within soils on the W-K4 and W-K2 tephras and under the W-K1 tephra were assigned to the Kutau/Bao source group (Fig. 1). One piece from the earliest sample was sourced to Gulu and one from the most recent context to the Baki source. The dominance of the Kutau/Bao source during the Holocene fits what is known elsewhere in this region (Summerhayes *et al.*, 1998; Torrence & Summerhayes, 1997).

It seems reasonable to suppose that the ceramics at Boku Hill were derived from the soil formed on the W-K2 tephra and sealed by the W-K3 tephra, as is the case in all known excavated cases in the region: e.g., at the nearby Numundo sites (Torrence *et al.*, 1999a) and FRI at Walindi (Specht *et al.*, 1991). This would place the pottery at between 3,600 and 1,700 cal. B.P., which seems reasonable given radiocarbon dates for the Willaumez Peninsula (Specht & Gosden, 1997; Torrence & Stevenson, 2000). The finding of Lapita pottery 10 km inland and adjacent to an extensive swamp raises interesting issues about the kind of subsistence patterns at this time and the nature of recolonization of inland regions

following abandonment caused by the W-K2 volcanic event.

In contrast, the stemmed tools most likely derive from the preceding, pre-W-K2 contexts. It is therefore relevant that the stemmed tool which Jim found was lying on pre-W-K2 clay soils, whereas most potsherds were found in other parts of the disturbed area. Within the vicinity only one stemmed tool has been found *in situ*, at site FABM. It was found in a clay soil stratified underneath the W-K2 tephra, which means it would pre-date 3,600 cal. B.P. The absence of the W-K1 tephra at FABM, however, leaves us with only the youngest date for the artefact. Stemmed tools have been recovered at Bitokara Mission (FRL) from below both the W-K2 and W-K1 tephra and on Garua Island from below the W-K2 tephra (Specht *et al.*, 1988; Torrence *et al.*, 1990; Kealhofer *et al.*, 1999; Torrence *et al.*, 2000), but we lack radiocarbon dates for the oldest contexts. Only two fragments have been found in younger layers (Ambrose & Gosden, 1991; Torrence, 1993) and so these are now thought to have been scavenged from earlier sites rather than in original contexts.

Given the previous findings on the Willaumez Peninsula, we can confidently conclude that stemmed tools date to only the early to mid Holocene period, beginning sometime before the W-K1 eruption at 5,900 cal. B.P. and terminating with the W-K2 eruption at about 3,600 cal. B.P. Ceramics, however, belong to the period between the W-K2 and W-K3 tephra. We can safely conclude that the Lapita pottery and stemmed tools from Boku Hill were derived from different contexts and that the stemmed tools definitely pre-date the ceramics.

Stemmed tools

All three stemmed tools found on Boku Hill belong to Araho's (1996) type 2 which includes retouched flakes (Figs. 2–6). Within this general group many stemmed artefacts are made from kombewa type flakes (Inizan *et al.*, 1992: figs. 18, 19). These are made by striking a blow across the ventral side of the flake to remove a portion of the bulb of percussion which was then retained as the dorsal side of the resulting flake. Consequently, the distinctive kombewa flake had smooth, rounded surfaces on both sides. Next, the flake blank was bifacially retouched to form the distinctive stem (Araho *et al.*, 2002).

The Boku Hill stemmed tools are quite important because very little is known about these distinctive retouched forms from contexts outside the immediate periphery of the obsidian sources at Mopir (Fullagar *et al.*, 1991) and the Willaumez Peninsula (e.g., Araho, 1996; Araho *et al.*, 2002; Fullagar, 1992; 1993; Kealhofer *et al.*, 1999; Rath, 2000; Specht, 1973; 1974; Specht *et al.*, 1988; Swadling, 1981; Torrence *et al.*, 1990). The stemmed tools found at the obsidian sources, production sites, and other sites assumed to represent tool use are extremely variable in shape and size with few clear cut distinctions that might indicate well-demarcated functional categories (e.g., Araho, 1996). The large variability is not surprising, however, given that many were probably rejected during manufacture and that standards of acceptability may have been higher at places where raw material was abundant.

What were stemmed tools used for? What was their role within society? Three hypotheses have been put forward to explain the function of stemmed tools in prehistoric societies in West New Britain (Araho *et al.*, 2002). Firstly, I have proposed that they were utilitarian tools with an important

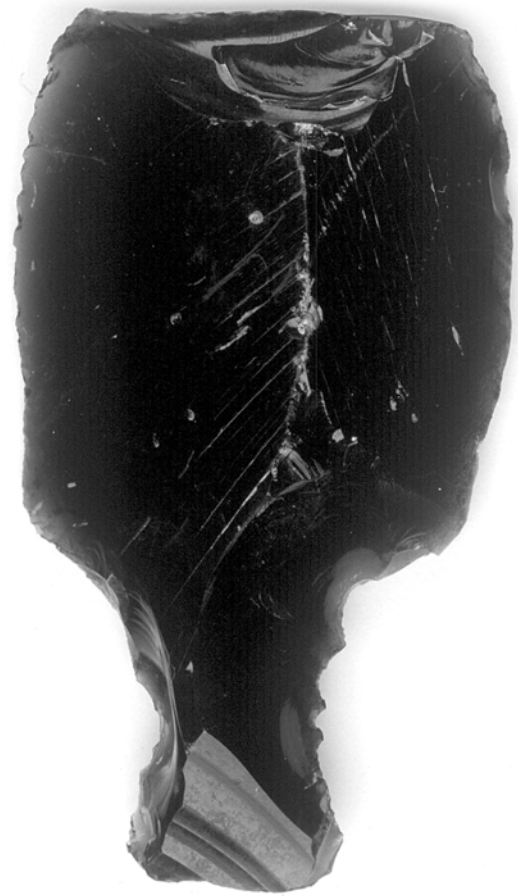


Fig. 2. Stemmed artefact FABN-M001. Original length is 5.6 cm. (Photo by Robin Torrence).

role for a highly mobile society (Torrence, 1992; 1994). In this view, stemmed artefacts were portable, general purpose tools that were used and reworked so that they lasted a relatively long period of time. These curated tools would have enabled the users to carry out tasks without needing fresh supplies from the obsidian sources. Occasionally, people would return to the sources to replenish their obsidian tools, but in the meantime they could tolerate prolonged absences from the sources and did not have to make trips to obtain needed material. Support for this model has been provided by use-wear and residues studies (Fullagar, 1992; 1993; Kealhofer *et al.*, 1999) which show that the stemmed tools were used in a wide range of tasks mostly involving plants, although some blood residues are also preserved on them. A second hypothesis was put forward by Araho (1996) who argued that the finished tools were highly distinctive trade goods. Araho was not explicit whether the trade was utilitarian or ceremonial. He also made the useful observation that since raw lumps of obsidian were the main source of trade in recent times (cf. Specht, 1981), the stemmed tools must have circulated in a different type of exchange system in which added value was invested into finished products.

Thirdly, Araho *et al.* (2002) have proposed that both hypotheses are correct, but incomplete. In their view, stemmed tools are a highly variable class of objects that incorporates both utilitarian objects and valuables. As with stone axes in recent New Guinea Highlands societies, which have been variously categorized as work, bride price, or

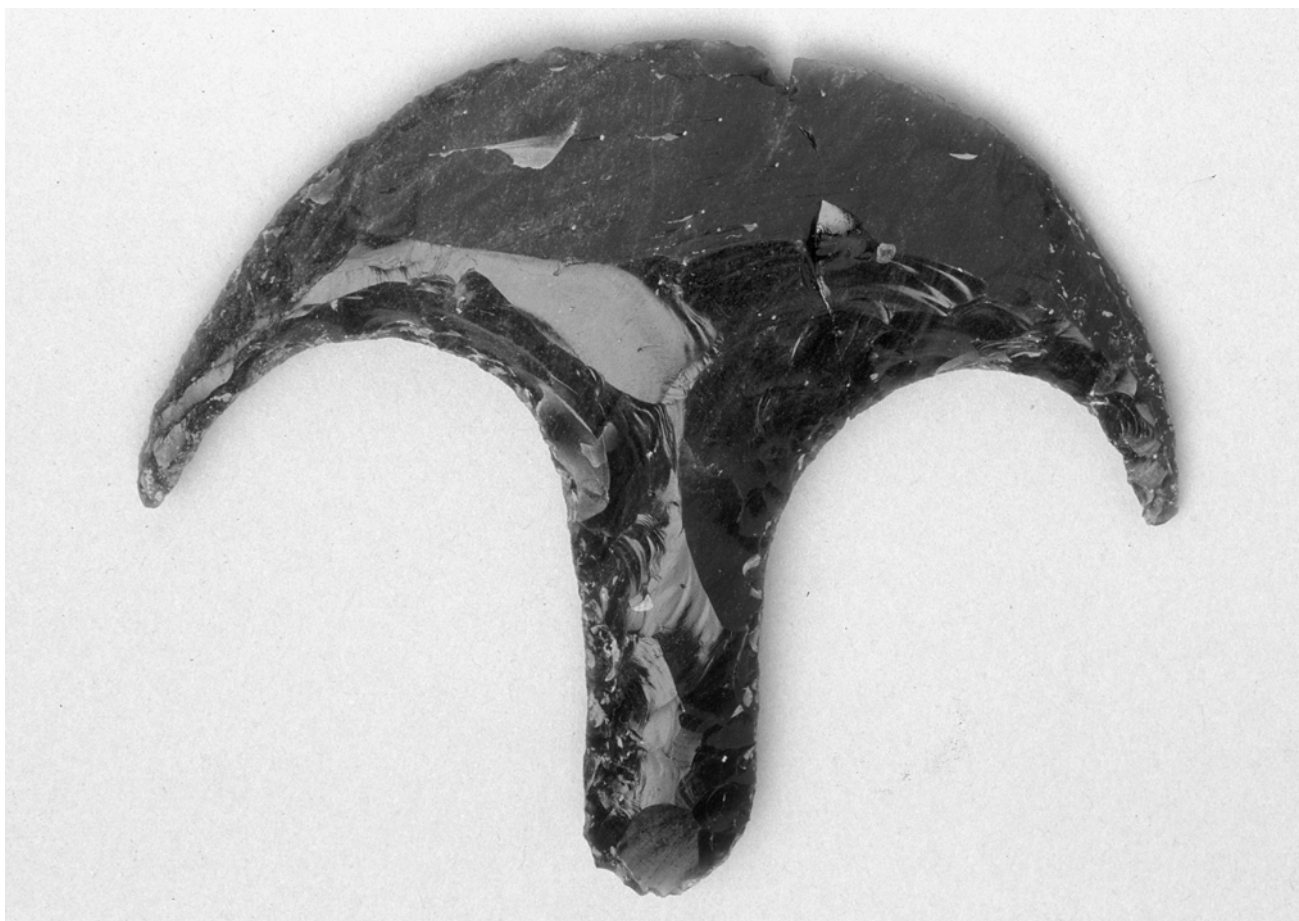


Fig. 3. Stemmed artefact FABN-M002. Original length is 10.7 cm. (Photo by Paul Ovenden).

ceremonial axes depending on their size and shape and/or the social context in which they were used (e.g., Burton, 1984, 1989; Strathern, 1969: 320–323; White & Modjeska, 1978), we suggested that the West New Britain obsidian stemmed tools were also multi-purpose. The implication of the hypothesis for stemmed tools as valuables is that ceremonial exchange or something like a prestige-goods economy, possibly one which revolved around the existence of differential status categories, operated in this area before the time of Lapita pottery.

Boku Hill artefacts

The three Boku Hill stemmed tools provide support for the Araho *et al.* (2002) hypothesis because both utilitarian and “special” kinds are represented at a single locality. It seems very unlikely that they were made at the site because the appropriate cores and debitage have not been found. From test pit XXII only a small number of flakes were recovered from under the W-K2 tephra (4) or beneath the W-K1 tephra (9). A summary of the dimensions of the three Boku Hill stemmed artefacts is provided in Table 2.

FABN-M001. The smallest of the three stemmed tools (Fig. 2) is not made on a kombewa flake. Although it resembles a blade, since it has long, parallel sides and a central straight dorsal arris, the ridge is an accidental product of irregular flaking on the core. The flake scars on both sides of the ridge show that the previous flakes had been struck almost perpendicular to the direction of this flake. In other words, the maker took advantage of the configur-

ation of flake scars on the core to remove a flake with straight parallel sides. The flake terminates with a large hinge fracture which created a smooth dull edge that would not be very useful for cutting or scraping, but a few small patches of polish from indeterminate use are nevertheless preserved. The focus of use appears to have been the two sharp margins. A stem was formed at the proximal end of the flake with bifacial retouch made up of a combination of steep, abrupt, direct flaking (dorsal side); flat, invasive, inverse retouch (ventral side); and some steep, marginal retouch on the original flake platform. Direct percussion is the most likely method for flaking. Evidence for hafting is preserved on the tool in the form of microscopic polishes on the small ridges created by the retouch. Inserting the stem into a haft would have enabled the users to access both sharp, unretouched flake margins without damage to their hands. The tool was probably discarded when the edges were no longer sharp enough for the intended function. Both edges are now dulled and bear macroscopic edge damage, especially on the left dorsal side. Kononenko (pers. comm.) conducted a use-wear analysis of the tool. She found very bright patches of polish and parallel striations on both edges and perpendicular striations on the duller left side. She hypothesizes that the artefact was used in a limited range of light woodworking tasks, such as putting the finishing touches on a wooden tool by whittling and making small cuts or notches.

FABN-JR. The second stemmed tool was also probably a utilitarian implement (Fig. 4). It was made on a very large kombewa flake. Originally it would have had a flat smooth surface on the dorsal side, but as can be seen in Fig. 4, it has

Table 2. Comparison of dimensions for stemmed tools. Data for FCR and FCH are from Araho (1996: table 5.9).

	Boku Hill-FABN M001	JR ^a	M002	Bamba FCH ^b	Lagenda FCR
sample size	1	1	1	83	1
length maximum (cm)	5.6	18.0	10.7	5.3 (1.1)	14.2
width maximum (cm)	3.2	13.0	12.9	2.6 (0.8)	14.0
thickness maximum (cm)	1.2	—	1.8	—	—
length of stem (cm)	2.1	6.0	6.6	2.1 (0.7)	6.0
thickness of stem (cm)	0.9	3.6	1.3	1.1 (1.9)	3.0

^a Measurements taken from photo only.

^b Means for the sample and standard deviation in brackets.

been flaked subsequently. A stem was formed at the proximal end of the flake using steep, marginal, bifacial percussion flaking. The original platform of the flake is still intact at the end of the stem. Shallow, but well defined notches were also created on either side of the stem using invasive bifacial retouch. The thick points on either side of the notch are still intact.

Since the periphery of the flake bears very heavy edge damage in the form of irregular, steep flake scars, mostly on the dorsal side of the flake, it was probably used. The scars are not fresh as would be expected with recent damage from the bulldozing. On one margin (right side in Fig. 4) use and retouch have combined to create a prominent notch in the edge. A large flake scar on the dorsal side was created by a blow to the distal end of the flake. It is possible that this flake was deliberately removed and so the JR tool was used both as a tool and as a core.

Artefacts M001 and JR support the original Torrence hypothesis that stemmed artefacts were multi-purpose tools and cores that fitted neatly into a highly mobile economy. The amount of edge damage on the JR artefact is much heavier than observed on most stemmed tools found in the vicinity of the obsidian sources, supporting its relatively heavy use at distance from the sources. The Boku Hill material is quite important because it represents a later stage in the use-life of these tools after they had been transported away from the place of production.

Were the utilitarian tools discarded because their useful lives had ended? This question cannot be answered sufficiently since their original use is unknown and their recently disturbed context means use-wear/residue analysis is not appropriate. M001 could easily have been thrown away because the unretouched edges were no longer sharp enough. Retouching the edge may not have been appropriate because it creates a thicker, much less uniform cutting surface than the original unretouched edges. The cutting edge of JR was also very battered and dulled, but it could have continued to serve as a core. Given the small number of obsidian flakes in the soils on top of W-K1 and W-K2 in test pit XXV, obsidian may have been in relatively short supply at this site. The quantities are far below those typically recovered on Garua Island or at Bitokara Mission (cf. Therin *et al.*, 1999: fig. 23.3). Although some stemmed tools were probably made to be used, as I hypothesize was the case for M001 and JR, their role in conserving raw material for mobile users cannot be adequately tested merely on the basis of the Boku Hill finds.

FABN-M002. The third stemmed tool from Boku Hill, found by Jim Specht, is quite different from the other two (Figs. 3, 5 and 6). The high level of workmanship invested in its manufacture raises questions about the sole function of

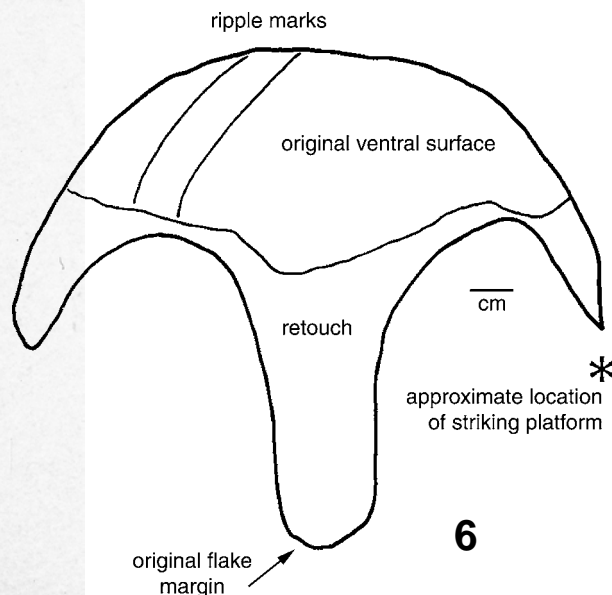
stemmed artefacts as utilitarian tools. Although slightly smaller than the JR artefact, M002 is still larger than the majority in the Araho (1996) sample of type 2 artefacts collected from the Bamba Beach site (FCH) (Fig. 1) (cf. Table 2). Although it resembles many stemmed tools made on circular kombewa flake blanks (e.g., FABN-JR, Fig. 4), this example has a much more symmetrical cross-section than most because the knapper removed the flake by striking quite close to the bulbar surface on the flake core. The direction of the blow was almost exactly parallel to the flake blank from which the M002 Kombewa flake was removed. This procedure resulted in the smooth, flat, unflaked surfaces on both the dorsal and ventral side of the finished artefact. The maker also took advantage of the original shape of the core face to create a perfectly flat, longitudinal cross-section. For the vertical cross-section there is a nearly 45 degree angle between the area of the flake that was subsequently transformed into the handle and the rest of the surface. Furthermore, the nature of the force exerted has resulted in a termination such that the intersection of the dorsal and ventral surfaces at the distal end of the flake ends in a



Fig. 4. Stemmed artefact FABN-JR. Original length is 18.0 cm. (Photo by J.Peter White).



Figs. 5 and 6. (5) Close up of the retouch on the notch of FABN-M002. Width of the stem is 2.2 cm (photo by Paul Ovenden). (6) An outline drawing of FABN-M002 showing the rings of force on the ventral side of the kombewa flake and the original position of the flake platform, which was removed to create a notch. Note that the unretouched distal end of the stem is part of the feather termination of the original flake. In contrast, the distal end of the FABN-M001 stem (cf. Fig. 2) is the original striking platform of the flake, which is much thicker and stronger than the FABN-M002 stem.



M002 is highly unusual when compared to the many type 2 stemmed tools that have been found near the obsidian sources, as well as the other two examples from Boku Hill. Much careful and skilful flaking has gone into making the stem, deep notches and delicate points. I estimate that nearly half of the original flake was removed during this process. Not surprisingly, given it is so thin for its size and weight, it broke during the bulldozing, unlike the more robust JR tool which survived. Taking all these factors into consideration, it seems very unlikely that M002 was made to be used in utilitarian tasks.

strong, sharp edge around the entire periphery, rather than a hinge or a feather-thin, fragile termination. The M002 artefact is much thinner than the JR tool or the majority of those found at FCH (Table 2).

The stem and notches of the M002 tool were formed by very regular, neatly aligned, steep, invasive bifacial flaking (Fig. 5). The stem is longer and more highly retouched than most artefacts of this type and the notches are also very deep. The ends of the notches have been carefully retouched into fragile points which are c. 0.8 cm in diameter and c. 2.5 cm long. The end of one tip is broken. As shown in Fig. 6, the original platform of the flake was located in an area which is now inside one of the notches and was removed to form the notches with their long points, leaving the central stem. Since the platform and much of the bulb has been flaked away, the stemmed tool is uniformly thin throughout. The base of the stem, where a small portion of the original ventral surface of the flake has been preserved, is extremely thin and sharp since it is the original margin of the flake. No attempt was made to strengthen the tip of the stem through retouch.

The extraordinary care and effort invested in its manufacture along with its symmetrical shape; large, flat shiny surfaces; and, most importantly, its fragility mean that

Non-utilitarian artefacts

Only one other stemmed artefact known from the Willaumez Peninsula is as regular in shape and cross-section as M002, but it lacks the elaborately flaked points on the notches (illustrated in Swadling, 1981: 67, no. 4). It was found by Specht on the surface at the Lagenda site (FCR), which is located several kilometres south of the Kutau obsidian outcrops (Fig. 1). As with M002 the original flake platform of the FCR example has been removed and the stem is quite fragile. It is also larger than most of the FCH finds (Table 2).

These two extraordinary examples demonstrate that there was a distinctive class of non-utilitarian obsidian stemmed tools. Although the finding of immense skill in obsidian working within the Willaumez Peninsula prehistoric communities is not surprising given the great length of time over which obsidian has been utilized in this region (e.g., Torrence *et al.*, 1999b) and the ease of knapping this glass,

it seems unreasonable to think that so much effort would have been invested into objects that were mainly utilitarian. Within a stone-using society, people would have been well aware of the complex steps taken in stemmed tool production. They would have been able to distinguish between the more expedient manufacture of the stem in the JR tool, which took advantage of the thickest and strongest part of the flake (bulb and platform) to make the stem, as opposed to the more risky method which was used in creating the stem and notches for M002 in order to insure an overall even thickness of the tool and perfect symmetry. Furthermore, it is hard to imagine what tool-using function the long, thin points could have served (e.g., Fig. 5), other than to be aesthetically pleasing or to show off prowess in flaking. The same could be concluded for the long, thin stem with its very fragile base. If it had been incorporated within a binding or haft, the base would probably have shattered if much force was applied during use. I suspect that the tool was made for display and not meant to be hafted for use. Finally, unlike the other two stemmed tools found at Boku Hill, the quality of workmanship, the effort invested, and the fragility of the M002 tool is quite unusual: it sits far outside the normal variation for type 2 stemmed tools.

I therefore propose that the M002 stemmed tool from Boku Hill was made not as a work tool but instead had a non-utilitarian role within society. Perhaps it was made to display symmetry, perfection, fragility, shininess (cf. Taçon, 1991) and/or the skill and effort invested in its manufacture. As such, this stemmed tool could have served to symbolize status of some kind and may have circulated within a system of ceremonial exchange similar to what Dalton (1977) has termed a “primitive valuable”. As a status item it might have represented a trait, such as an obsidian knapper, good hunter or taro grower; a gender; or a social position within the local group or wider community. As a valuable it could have had roles both within and between groups in one, or more likely, all of the following described by Dalton (1977: 202–203): settling feuds, making peace, establishing or cementing social links (e.g., between affines, allies and trading partners), or creating and affirming status.

The consequence of this hypothesis is that the broadly defined type 2 stemmed artefacts had multiple, overlapping roles within society, as both mundane and non-utilitarian objects. It may even be that some people (perhaps one gender or age class) chose to make and use tools in their daily lives which resembled the valuables in shape and mode of manufacture. In discussing axes in Highland New Guinea, Strathern (1969: 323) states that “one effect that the production of these ceremonial axes perhaps had was to enhance the value of the whole category of ‘axe’.” This may explain why care in the production of kombewa flakes and/or the retouching of stems was also invested into the manufacture of ordinary tools such as M001 and JR as well as for valuables such as M002. Another possibility is that the blurring of differences between artefacts with different roles was intentional because it enabled multiple readings of the artefacts. These in turn created status differences but also ensured a broad participation in social life and integrated daily activities with ceremonial life.

It is likely that, as with the New Guinea Highlands axes, there were no clear-cut boundaries between stemmed tools used in a utilitarian context and valuables. Instead, some artefacts held both roles simultaneously or shifted from one to the other depending on the social context. For example, a

stemmed tool obtained as bride price might have been used later for social display to enhance status or in daily activities. It is also possible that there was a hierarchy of objects such that all people in a particular social category used the possession of a stemmed tool to symbolize membership in this group, but that some objects were ranked differentially, were related to higher status individuals, and circulated in different spheres.

Although archaeologists have often focused on “ornaments” as candidates for valuables, following ethnographic analogies to Melanesian exchange systems such as the *kula* (e.g., Kirch, 1988: 107; 1997: 236; Shackleton & Renfrew, 1970), ethnography provides us with cases in which utilitarian objects also played this role and where there was variation in the function of objects within a broad, general class. New Guinea Highlands axes are a well-known local example. Axes were exchanged in various contexts, including feasts, as bride price, or as work axes. The largest and most unique tended to be reserved for ceremonial exchange, whereas work axes were smaller and often bore evidence of heavy use and reworking (e.g., Burton, 1989; Strathern, 1969; White & Modjeska, 1978). Strathern (1969: 321) speaks of “axes which were deliberately fashioned as objects of beauty” and notes that among shells as with axes that the “value” of objects used in the exchange system was related to their individual excellence. Thus the most prized shells were those of a certain shape or sheen; size was a factor in assessing equivalences, but other aesthetic criteria might also be important. The same was true of the stone axe (Strathern, 1969: 321).

Archaeological studies of Neolithic stone axes in Great Britain also illustrate the many ways that axes were used and valued (e.g., Bradley & Edmonds, 1993; Edmonds, 1995). At great distances from the axe quarries some artefacts were used heavily and resharpened, whereas other axes imported from known quarries were deposited at ceremonial sites (e.g., causewayed enclosures) or in graves in a pristine condition.

Determination of the exact roles that stemmed tools played within prehistoric society in West New Britain demands much better data than currently available since the majority are surface finds found at a few places close to where they were manufactured. Stray finds of obsidian stemmed tools on mainland New Guinea, New Ireland and Manus suggest they circulated widely as valuables (Araho *et al.*, 2002: table 1), but even within West New Britain, far too little is known about their distribution outside the immediate environs of the obsidian outcrops, at places such as Boku Hill. As argued by many archaeologists, an important test of how objects were valued and conceived of, particularly those that have been transported from a quarry source, is the context of deposition (e.g., general rubbish or “special” place) and association with other material, rather than simply their physical attributes (e.g., Hodder, 1982: 207; Edmonds, 1995: 68–73; Bradley & Edmonds, 1993). Sadly, these data are not available for the Boku Hill finds.

The three Boku Hill stemmed tools, especially when combined with what we know about stemmed tools found near the obsidian sources (e.g., Araho, 1996; Fullagar, 1993; Rath, 2000; Torrence, 1992), therefore provide a tantalising hint, rather than water-tight proof, that this type of artefact had multiple roles within society and that one of these functions was non-utilitarian and symbolic. Furthermore, without a great deal more excavation and analysis, we cannot yet describe with confidence their likely multiple functions. What the Boku Hill stemmed tools do indicate, however, is

that in this region at this time (pre 5,900–3,600 cal. B.P.) highly distinctive and elaborate objects which might have circulated as valuables were being produced and transported. This finding has important implications for the evolution of society in island Melanesia.

Social evolutionary models

The early Holocene, pre-Lapita, period of Melanesian prehistory has been seriously neglected. The paucity of information about lifeways during the crucial time immediately before Lapita pottery has made it very difficult to differentiate between indigenous and foreign-induced change. As a consequence, the model based on migration of Austronesian speakers and the introduction of new forms of subsistence patterns, material culture, and social forms has been widely promoted (e.g., Kirch, 1997; Spriggs, 1997), although most authors suggest that some local practices (notably use of obsidian) were adopted by the immigrants on their way through to Remote Oceania. Green (1991) proposed a complex model in which local and foreign elements were integrated.

One aspect of Lapita culture often assumed to be totally novel in the region is social differentiation. For example, drawing on a combination of “linguistic clues, ethnographic analogy, general principle and common-sense” (Spriggs, 1997: 102), Kirch (1988: 112–113; 1997: 254–255) proposed that Lapita society was characterized by status differences supported by the exchange of prestige-goods or valuables (cf. Friedman & Rowlands, 1977; Friedman, 1981). In contrast, Hayden (1983) and Spriggs (1997: 103) see status differences arising from the need for leadership and direction in order to support long-distance voyages and new settlements. Since linguistic information has been at the forefront of these reconstructions, the implication has been that status differentiation arrived in the region with Austronesian languages and therefore that pre-Lapita societies lacked these characteristics.

On a slightly different subject, Kirch (1988: 103–104) proposed that a wide range of ethnographic trading systems in Near and Remote Oceania may have been derived from Lapita exchange as well:

Perhaps the most provocative implication of these archaeological advances is that the historical roots of many of these diverse long-distance JR tool was used both as a tool and as a core instance exchange networks may ultimately be traced to the Lapita Cultural Complex (3,600–2,500 B.P.)

(Kirch, 1988: 104).

In particular, Kirch emphasises the exchange of obsidian from both the New Britain and Manus sources and trade of shell valuables which were manufactured at a limited number of sites and then widely dispersed. The relatively long-distance movement of obsidian does not begin at the time of Lapita pottery, but has a very long history within Near Oceania (Summerhayes *et al.*, 1998). The presence of shell valuables, however, may support the proposal that a new form of social system was introduced by Austronesian speakers.

In contrast, the data from Boku Hill suggest that the use of valuables, like the practice of obsidian, played a role in the mid-Holocene societies on the north coast (and perhaps over a wider area) for at least 2,500 years before the arrival of Lapita pottery. It seems very likely that stemmed tool M002 (and the artefact from FCR) represent non-utilitarian objects which functioned as “valuables”. The further implication is that social systems which used objects to create and cement social relationships and possibly status differences and which also

exchanged obsidian within New Britain and beyond to New Ireland and the Papua New Guinea mainland (cf. White, 1996) developed *in situ* within West New Britain.

Were the users of stemmed tools primarily agriculturalists, low level forest managers, or hunter-gatherers? Although systems of exchange involving valuables are not unknown among hunter-gatherers (e.g., NW Coast of North America as well as a number of Californian groups), it is often assumed that prestige goods economies are only associated with hunter-gatherers living in resource rich areas or societies which depended on agriculture (e.g., Hayden, 1990, 1995). This does not fit what is generally assumed about the low intensity of subsistence patterns in the Willaumez Peninsula at this time (e.g., Therin *et al.*, 1999; Torrence *et al.*, 2000), although we have very little primary data.

Situations where there was an opportunity for monopoly of exchange items have also been proposed as contexts in which prestige goods circulate (e.g., Friedman, 1981; Friedman & Rowlands, 1977). One might therefore question whether ownership and control over the obsidian sources themselves, particularly the Kutau/Bao outcrops which dominate assemblages at this time, even near the Baki obsidian sources on Garua Island (Rath, 2000; Summerhayes, *et al.*, 1998; Torrence & Summerhayes, 1997), had a role to play in the development of pre-Lapita societies in this region and particularly in the use of valuables. Along these lines, it is very interesting to compare the archaeological record of the major obsidian quarry site at Bitokara mission (FRL) for the periods before and during Lapita pottery. During the time when stemmed tools were manufactured, there is abundant evidence at Bitokara for quarrying of obsidian in the form of pits and production waste as well as spatial segregation in different stages of the process (Torrence, 1992). In contrast, following the W-K2 eruption there is no evidence for the extraction and manufacture of obsidian at the outcrops themselves and the site itself appears to have been abandoned from c. 3,600 cal. B.P. until long after Lapita pottery had ceased to be used in this region (Torrence & Stevenson, 2000). Furthermore, evidence from a number of sites locally and also in the Reef Santa Cruz islands show that during the time of Lapita pottery, nodules of obsidian rather than pre-forms were the major form of export and that many of the unworked pieces were gathered from beaches rather than quarried from the outcrops (Sheppard, 1993; Torrence, 1992). It therefore seems possible that not only was the utilitarian role of obsidian very different in the pre-Lapita period, but also that obsidian artefacts may have ceased to be valuables after the W-K2 eruption. Consequently, the nature of ceremonial exchange during the time of Lapita pottery, if present at all (cf. Sheppard, 1993), was much transformed.

The choice of one end of a continuum in the size, workmanship and fragility of the stemmed tools as a distinctive non-utilitarian item is also interesting because it allowed latitude in how objects were used and enabled people to shift meanings and roles depending on social context, as was the case with Highland New Guinea axes. This property is quite different from many other objects which have served as valuables, such as coppers on the NW Coast of North America or Trobriand *kula* necklaces and armbands. These had no counterparts among utilitarian objects. The stemmed tools highlight the need for a better understanding of the relationship between the physical properties of valuables and their social roles.

Conclusions

The presence of three different forms of stemmed tool at Boku Hill is a powerful indication that archaeological research within West New Britain has much potential for revealing new and unexpected information about societal forms that existed during the early Holocene period. The nature of society at this time seems to have differed from what has previously been expected of groups believed to lack full agriculture (e.g., Spriggs, 1997). These three artefacts, along with their counterparts found in the vicinity of the obsidian sources on the Willaumez Peninsula, encompass a range of forms that include both utilitarian tools (as determined by use-wear/residue analyses and by inference, e.g., FABN-M001, FABN-JR) and “special” artefacts that were too fragile to have been used in ordinary tasks (e.g., FABN-M002, FCR artefact). The presence of artefacts that might have circulated as valuables in the period from sometime before 5,900 cal. B.P. up to 3,600 cal. B.P. is surprising since it has been thought that the conditions under which prestige economies developed did not occur until some 200 or so years later during the time of Lapita pottery. These new finds raise doubts whether valuables and the particular form of society that used them were imported. It seems more likely that the social and ceremonial systems in which the stemmed tools circulated developed *in situ* within West New Britain and had been maintained over quite a long period of time prior to the putative introduction of domesticated plants and animals, sedentary patterns of settlement, and other characteristics of life that have been associated with Lapita pottery and/or Austronesian languages.

Clearly, a great deal more research is needed to reveal the history of stemmed tools and associated social forms and to understand the broader context in which they operated. The situation is also complicated because the kinds of stemmed tools found at Boku Hill are only one of Araho’s (1996) types. Another contemporary form, called type 1, is made on large prismatic blades. In this case, the proximal end of the blade was retouched to create elaborate and fragile forms which also may have been used as valuables (cf. Araho, 1996; Rath, 2000). Characterization studies of type 1 artefacts from Garua Island suggest that the Kutau/Bao obsidian source was preferred (Araho *et al.*, 2002). Control over access to the means of production of valuables may have been integral to their role as prestige goods, as suggested for the Boku Hill examples.

At this stage the social roles of these two types of valuable are purely hypothetical. Nevertheless, the possibility that there were several sets of objects potentially used in ceremonial exchange raises important questions about the nature of the society that made and used them as well as the relationships between local and long distance obsidian exchange and the low intensity subsistence system that has been proposed for the region at this time. We need to find stemmed tools in secure archaeological contexts and should also expand the search beyond the immediate environs of the obsidian sources.

The archaeology of the Willaumez Peninsula is producing a number of tantalizing facts and finds, as exemplified by magnificent stemmed tools found at Boku Hill and Legenda by Jim Specht. The research on obsidian trade and Lapita sites which Jim initiated in this region is ongoing, fortunately with his continued participation, since we need more discoveries to help better understand the social systems that produced and used stemmed tools.

ACKNOWLEDGMENTS. The research was funded by the Australian Research Council, Australian Museum, Papua New Guinea Biological Foundation, and New Britain Palm Oil Ltd. At NBPOL I especially thank Nick Thompson, Ron Senior, Mike Hoare, Bob Wilson, and Kefu Boromana. Further support was provided by the West New Britain Provincial Government and Cultural Centre, National Research Institute, National Museum and Art Gallery, Mahonia Na Dari Research Station, and Walindi Resort. The contributions of the hard working overseas volunteers are much appreciated. I am also indebted to our local volunteers Brenda Senior, Diana Hart, Jarmaine Boromana and especially Allison Spence. Obsidian characterization was supported by a grant to Peter White from AINSE and assisted by Ed Stelcer, Rainer Siegele, and Glenn Summerhayes. This paper could only have benefited from discussions with Nick Araho, Chris Gosden, Pip Rath, Jim Specht, and Peter White. Nina Kononenko of the Institute of History, Archaeology and Ethnography, Russian Academy of Sciences, Vladivostok, conducted a high power analysis of use wear on M001 and Peter White made the line drawings.

References

- Ambrose, W., & C. Gosden, 1991. Investigations on Boduna Island. In *Report of the Lapita Homeland Project*, ed. J. Allen and C. Gosden, pp. 182–188. Canberra: Department of Prehistory, Research School of Pacific Studies, Australian National University.
- Araho, N., 1996. *Obsidian Stemmed Tools from West New Britain, Papua New Guinea*. Unpublished M.Phil. thesis, University of Sydney.
- Araho, N., R. Torrence & J.P. White, 2002. Valuable and useful: stemmed obsidian artifacts from West New Britain, Papua New Guinea. *Proceedings of the Prehistoric Society* 68: 61–81.
- Bradley, R., & M. Edmonds, 1993. *Interpreting the Axe Trade. Production and Exchange in Neolithic Britain*. Cambridge: Cambridge University Press.
- Burton, J., 1984. *Axe Makers of the Waghi: Precolonial Industrialists of the Papua New Guinea Highlands*. Unpublished Ph.D. thesis, Australian National University, Canberra.
- Burton, J., 1989. Repeng and the salt-makers: “ecological trade” and stone axe production in the Papua New Guinea Highlands. *Man* (N.S.) 24(2): 255–272.
- Dalton, G., 1977. Aboriginal economies in stateless societies. In *Exchange Systems in Prehistory*, ed. T.K. Earle and J.E. Ericson, pp. 191–212. New York: Academic Press.
- Edmonds, M., 1995. *Stone Tools and Society*. London: Batsford.
- Friedman, J., 1981. Notes on structure and history in Oceania. *Folk* 23: 275–295.
- Friedman, J., & M. Rowlands, 1977. Notes towards an epigenetic model of the evolution of “civilisation”. In *The Evolution of Social Systems*, ed. J. Friedman and M. Rowlands, pp. 201–276. London: Duckworth.
- Fullagar, R., 1992. Lithically Lapita. Functional analysis of flaked stone assemblages from West New Britain Province, Papua New Guinea. In *Poterie Lapita et Peuplement: Actes du Colloque Lapita, Nouméa, Nouvelle-Calédonie, Janvier 1992*, ed. J.C. Galipaud, pp. 135–143. Nouméa: ORSTOM.
- Fullagar, R., 1993. Taphonomy and tool-use: a role for phytoliths in use-wear and residues analysis. In *Archaeometry: Current Australasian Research*, ed. B.L. Fankhauser and J.R. Bird, pp. 21–27. Canberra: Department of Prehistory, Research School of Pacific Studies, Australian National University.
- Fullagar, R., G. Summerhayes, B. Ivuyo & J. Specht, 1991. Obsidian sources at Mopir, West New Britain Province, Papua New Guinea. *Archaeology in Oceania* 26(3): 110–114.
- Green, R.C., 1991. The Lapita cultural complex: current evidence and proposed models. In *Indo-Pacific Prehistory 1990*, vol. 2, ed. P. Bellwood, pp. 295–305. Bulletin of the Indo-Pacific Prehistory Association 11. Canberra and Jakarta: IPPA and Asosiasi Prehistorisi Indonesia.

- Hayden, B., 1983. Social characteristics of early Austronesian colonisers. *Bulletin of the Indo-Pacific Prehistory Association* 4: 123–134.
- Hayden, B., 1990. Nimrods, piscators, pluckers, and planters: the emergence of food production. *Journal of Anthropological Archaeology* 9: 31–69.
- Hayden, B., 1995. Pathways to power: principles for creating socioeconomic inequalities. In *Foundations of Social Inequality*, ed. T. Price and G. Feinman, pp. 15–16. New York: Plenum.
- Hodder, I., 1982. Toward a contextual approach to prehistoric exchange. In *Contexts for Prehistoric Exchange*, ed. J.E. Ericson and T.K. Earle, pp. 199–211. New York: Academic Press.
- Inizan, M.L., H. Roche & J. Tixier, 1992. *Technology of Knapped Stone*. Prehistoire de la Pierre Taillée, Tome 3. Meudon: CREP.
- Kealhofer, L., R. Torrence & R. Fullagar, 1999. Integrating phytoliths within use-wear/residue studies of stone tools. *Journal of Archaeological Science* 26(5): 527–546.
- Kirch, P.V., 1988. Long-distance exchange and island colonization: the Lapita case. *Norwegian Archaeological Review* 21(2): 103–117.
- Kirch, P.V., 1997. *The Lapita Peoples: Ancestors of the Oceanic World*. Oxford: Blackwell.
- Machida, H., R.J. Blong, J. Specht, H. Moriwaki, R. Torrence, Y. Hayakawa, B. Talai, D. Lolok & C.F. Pain, 1996. Holocene explosive eruptions of Witori and Dakataua caldera volcanoes in West New Britain, Papua New Guinea. *Quaternary International* 34–36: 65–78.
- Pavlidis, C., 1999. *The Story of Imlo: The Organization of Flaked Stone Technologies from the Lowland Tropical Rainforest of West New Britain, Papua New Guinea*. Unpublished Ph.D. thesis, La Trobe University, Melbourne.
- Pavlidis, C., & C. Gosden, 1994. 35,000-year-old sites in the rainforests of West New Britain, Papua New Guinea. *Antiquity* 68(260): 604–610.
- Rath, P., 2000. *Stemmed Obsidian Artefacts from Garua Island: A Case of Coals to Newcastle?* B.A. (Hons) thesis, University of Sydney.
- Shackleton, N., & C. Renfrew, 1970. Neolithic trade routes re-aligned by oxygen isotope analyses. *Nature* 228: 1062–1065.
- Sheppard, P.J., 1993. Lapita lithics: trade/exchange and technology. A view from the Reefs/Santa Cruz. *Archaeology in Oceania* 28(3): 121–137.
- Specht, J., 1973. Prehistory poses many problems. *Australian Natural History* 17(12): 445–451.
- Specht, J., 1974. Lapita pottery at Talasea, West New Britain, Papua New Guinea. *Antiquity* 48(192): 302–306.
- Specht, J., 1981. Obsidian sources at Talasea, West New Britain, Papua New Guinea. *Journal of the Polynesian Society* 90(3): 337–356.
- Specht, J., R. Fullagar, R. Torrence & N. Baker, 1988. Prehistoric obsidian exchange in Melanesia: a perspective from the Talasea sources. *Australian Archaeology* 27: 3–16.
- Specht, J., R. Fullagar & R. Torrence, 1991. What was the significance of Lapita pottery at Talasea? In *Indo-Pacific Prehistory 1990*, vol. 2, ed. P. Bellwood. *Bulletin of the Indo-Pacific Prehistory Association* 11: 281–294.
- Specht, J., & C. Gosden, 1997. Dating Lapita pottery in the Bismarck Archipelago, Papua New Guinea. *Asian Perspectives* 36(2): 175–199.
- Specht, J., I. Lilley & J. Normu, 1981. Radiocarbon dates from West New Britain, Papua New Guinea. *Australian Archaeology* 12: 13–15.
- Specht, J., I. Lilley & J. Normu, 1983. More on radiocarbon dates from West New Britain, Papua New Guinea. *Australian Archaeology* 16: 92–95.
- Spriggs, M., 1997. *The Island Melanesians. The Peoples of Southeast Asia and the Pacific*. Oxford: Blackwell Publishers.
- Strathern, M., 1969. Stone axes and flake tools: evaluations from two New Guinea Highlands societies. *Proceedings of the Prehistoric Society* 35: 311–329.
- Summerhayes, G.R., J.R. Bird, R. Fullagar, C. Gosden, J. Specht & R. Torrence, 1998. Application of PIXE-PIGME to archaeological analysis of changing patterns of obsidian use in West New Britain, Papua New Guinea. In *Archaeological Obsidian Studies: Method and Theory*, ed. M.S. Shackley, pp. 129–158. New York: Plenum Press.
- Swadling, P., 1981. *Papua New Guinea's Prehistory: An Introduction*. Boroko, Port Moresby: National Museum and Art Gallery, Papua New Guinea.
- Taçon, P.S.C., 1991. The power of stone: symbolic aspects of stone use and tool development in western Arnhem Land, Australia. *Antiquity* 65(247): 192–207.
- Therin, M., R. Fullagar & R. Torrence, 1999. Starch in sediments: a new approach to the study of subsistence and land use in Papua New Guinea. In *The Prehistory of Food. Appetites for Change*, ed. C. Gosden and J. Hather, pp. 438–462. London: Routledge.
- Torrence, R., 1992. What is Lapita about obsidian? A view from the Talasea sources. In *Poterie Lapita et Peuplement: Actes du Colloque Lapita, Nouméa, Nouvelle-Calédonie, Janvier 1992*, ed. J.C. Galipaud, pp. 111–126. Nouméa: ORSTOM.
- Torrence, R., 1993. Archaeological research on Garua Island, West New Britain, PNG. June–July 1993. Report submitted to the PNG National Museum and Art Gallery and other government agencies in Papua New Guinea.
- Torrence, R., 1994. Strategies for moving on in lithic studies. In *The Organization of Technology: North American Prehistoric Chipped Stone Technologies*, ed. P. Carr, pp. 123–131. Ann Arbor, Michigan: International Monographs in Prehistory.
- Torrence, R., C. Pavlidis, P. Jackson & J. Webb, 2000. Volcanic disasters and cultural discontinuities in Holocene time in West New Britain, Papua New Guinea. In *The Archaeology of Geological Catastrophes*, ed. W.G. McGuire, D.R. Griffiths, P.L. Hancock and I.S. Stewart, pp. 225–244. London: Geological Society Special Publication 171.
- Torrence, R., J. Specht & B. Boyd, 1999a. Archaeological fieldwork on Numundo and Garu Plantations, West New Britain, PNG. Report submitted to the PNG National Museum and Art Gallery and other government agencies in Papua New Guinea. Copies held in Australian Museum and at Southern Cross University, Lismore.
- Torrence, R., J. Specht, H. Davies, P. Ainge & P. White, 1999b. A Pleistocene landscape in West New Britain, P.N.G. *Australian Archaeology* 49: 44–45.
- Torrence, R., J. Specht & R. Fullagar, 1990. Pompeiis in the Pacific. *Australian Natural History* 23(6): 456–463.
- Torrence, R., & C.M. Stevenson, 2000. Beyond the beach: changing Lapita landscapes on Garua Island, Papua New Guinea. In *Australian Archaeologist: Collected Papers in Honour of Jim Allen*, ed. A. Anderson and T. Murray, pp. 324–345. Canberra: Coombs Academic Publishing, Australian National University.
- Torrence, R., & G.R. Summerhayes, 1997. Sociality and the short distance trader: intra-regional obsidian exchange in the Willaumez region, Papua New Guinea. *Archaeology in Oceania* 32(1): 74–84.
- White, J.P., 1996. Rocks in the head: thinking about the distribution of obsidian in Near Oceania. In *Oceanic Culture History: Essays in Honour of Roger Green*, ed. J. Davidson, G. Irwin, F. Leach, A. Pawley and D. Brown, pp. 199–209. Dunedin North: New Zealand Journal of Archaeology Special Publication.
- White, J.P., & N. Modjeska, 1978. Acquirers, users, finders, losers: the use axe blades make of the Duna. In *Trade and Exchange in Oceania and Australia*, ed. J. Specht and J.P. White. *Mankind* 11(3): 276–287.
- Wickler, S., & M. Spriggs, 1988. Pleistocene human occupation of the Solomon Islands, Melanesia. *Antiquity* 62(237): 703–706.

Full-text PDF of each one of the works in this volume are available at the following links :

Attenbrow and Fullagar, vol. eds, 2004, *Rec. Aust. Mus., Suppl.* 29, pp. i-v
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1483>

Taçon et al., 2004, *Rec. Aust. Mus., Suppl.* 29: 1-8
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1396>

Khan, 2004, *Rec. Aust. Mus., Suppl.* 29: 9-14
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1397>

Athens, 2004, *Rec. Aust. Mus., Suppl.* 29: 15-30
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1398>

Bolton, 2004, *Rec. Aust. Mus., Suppl.* 29: 31-36
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1399>

Bonshek, 2004, *Rec. Aust. Mus., Suppl.* 29: 37-45
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1400>

Denham, 2004, *Rec. Aust. Mus., Suppl.* 29: 47-57
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1401>

Galipaud, 2004, *Rec. Aust. Mus., Suppl.* 29: 59-64
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1402>

Knowles, 2004, *Rec. Aust. Mus., Suppl.* 29: 65-74
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1403>

Lentfer, 2004, *Rec. Aust. Mus., Suppl.* 29: 75-88
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1404>

Lilley, 2004, *Rec. Aust. Mus., Suppl.* 29: 89-96
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1405>

Pavlidis, 2004, *Rec. Aust. Mus., Suppl.* 29: 97-108
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1406>

Sand, 2004, *Rec. Aust. Mus., Suppl.* 29: 109-122
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1407>

Sheppard, 2004, *Rec. Aust. Mus., Suppl.* 29: 123-132
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1408>

Smith, 2004, *Rec. Aust. Mus., Suppl.* 29: 133-138
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1409>

Spriggs, 2004, *Rec. Aust. Mus., Suppl.* 29: 139-144
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1410>

Summerhayes, 2004, *Rec. Aust. Mus., Suppl.* 29: 145-156
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1411>

Swadling, 2004, *Rec. Aust. Mus., Suppl.* 29: 157-161
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1412>

Torrence, 2004, *Rec. Aust. Mus., Suppl.* 29: 163-172
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1413>

Wilson, 2004, *Rec. Aust. Mus., Suppl.* 29: 173-186
<http://dx.doi.org/10.3853/j.0812-7387.29.2004.1414>