

CAUTION BAY STUDIES IN ARCHAEOLOGY 2

THE ARCHAEOLOGY OF TANAMU 1

A PRE-LAPITA TO POST-LAPITA SITE
FROM CAUTION BAY, SOUTH COAST OF
MAINLAND PAPUA NEW GUINEA



Edited by

Bruno David, Katherine Szabó, Matthew Leavesley,
Ian J. McNiven, Jeremy Ash and Thomas Richards



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This volume is dedicated to our dear friend and colleague Ken Aplin (1958–2019). His vast knowledge and experience, along with his collaborative spirit, humour and friendship, are dearly missed.



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Excavation in progress of 2750-2800 cal BP Late Lapita inverted pot, Tanamu 1, Caution Bay, south coast of Papua New Guinea.

Cover drawing:

2750-2800 cal BP Late Lapita sherd from Square AC XU2 at Tanamu 1, south coast of Papua New Guinea. Drawing by Cathy Carigiet.



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Chapter 1.

Emerging Out of Lapita at Caution Bay

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Introduction

The discovery in 2010 of stratified Lapita assemblages at Caution Bay near Port Moresby, south coast of mainland Papua New Guinea (PNG) (David *et al.* 2011; McNiven *et al.* 2011), brought to the fore a series of important questions (Richards *et al.* 2016), many of which also apply to other parts of Island Melanesia where Lapita sites have been known for many decades. Unlike other parts of Melanesia, however, at Caution Bay some of the Lapita sites also have pre-Lapita horizons. A number are culturally very rich. At Caution Bay, where the oldest confirmed Lapita finds date to no earlier than c. 2900 cal BP (McNiven *et al.* 2012a), the major questions do not concern the earliest expressions of Lapita around 3300–3400 cal BP. Rather, here we are concerned more with identifying how assemblages associated with the Lapita cultural complex arrived and transformed along the south coast, after a presence in coastal and island regions to the northeast over the previous 400 years. These concerns contain both spatial and temporal elements: how and when, as a prelude to why, particular cultural traits continued and changed across Caution Bay. Tanamu 1 is the first of 122 archaeological sites excavated in Caution Bay upon which we will report. As a site, it represents the ideal entry point, as being a coastal site which contains pre-Lapita, Lapita and post-Lapita horizons it encapsulates many of the signatures, trends and transformations seen across the >5000 year Caution Bay sequence at large. Of special note in the wider context of Lapita archaeology, the presence of rich pre-Lapita horizons is what makes Caution Bay so important both in and of itself and for the Lapita story.

Defining Lapita

Discussions of transformations into, within and out of Lapita first require an explicit definition of what Lapita is. Since the first recognition of Lapita ceramics from different parts of the western Pacific in the 1900s (for reviews, see Sand 2010; Spriggs 1997), Lapita sites have been associated with the initial colonisation of Remote Oceania in the South Pacific. Most models have favoured a proximate Melanesian homeland in islands of Near Oceania (see especially Allen and Gosden 1991; Spriggs 1991), with some arguing for earlier origins in Island Southeast Asia and ultimately Taiwan (e.g., Bellwood 1997) or, as more recently argued, via western

Micronesia and the Philippines (e.g., Carson *et al.* 2013). Regardless of routes and ultimate origins, the diaspora that carried people, traditions and objects across much of the western Pacific left behind a material record that is collectively referred to as the Lapita cultural complex (see Green 1992). Lapita peoples carried with them the capacity and technology for horticulture—but whether pigs, dogs and chickens were introduced by early or later Lapita peoples, or immediately post-Lapita is still being debated—and they are generally accepted to have spoken a proto-Oceanic language ancestral to contemporary Austronesian languages of the region (Bellwood 1979). Upon arrival in new locations they built coastal settlements, usually on small unoccupied offshore islands and along sand spits, often over the intertidal zone (Kirch 1997: 162–191; 2000: 106–107; Summerhayes *et al.* 2019). Lapita peoples also produced pottery with iconic dentate-stamped motifs with a highly regulated design structure possibly drawn from other, perishable media (Green 1979). Within 200 years or less of the first dentate-stamped ceramics being made in the Bismarck Archipelago, north of the New Guinea mainland, they appear across Near Oceania and thence into the nascent archaeological record of parts of Remote Oceania (Specht and Gosden 2019).

The primary manifestation of the Lapita cultural complex is earthenware pottery with indented designs stamped with comb or comb-like (tined) tools. On some islands and archipelagos, Lapita assemblages also include motifs made by incision using a sharp-edged tool, and applied relief otherwise known as appliqué (Spriggs 1997: 67). In addition to the decorated pottery, Lapita sites also contain much plainware, but sherds of these do not of themselves usually allow us to definitively identify an assemblage as Lapita. Other artefact classes are also part of the Lapita material repertoire. Most notable are the distinctive axe/adzes commonly made of the hinge section of *Tridacna* sp. clam shells, shell arm bands, and a range of shell fish hooks. Some of these shell artefacts exhibit discrete technologies that are exclusive to, and therefore diagnostic of Lapita (such as *Tridacna* biperforate units in Remote Oceania) (Szabó 2010). Obsidian is also a highly visible part of many Lapita assemblages. Examples originating from sources primarily in the Bismarck Archipelago have been identified at a number of Lapita sites across the western Pacific region and provide evidence of long-

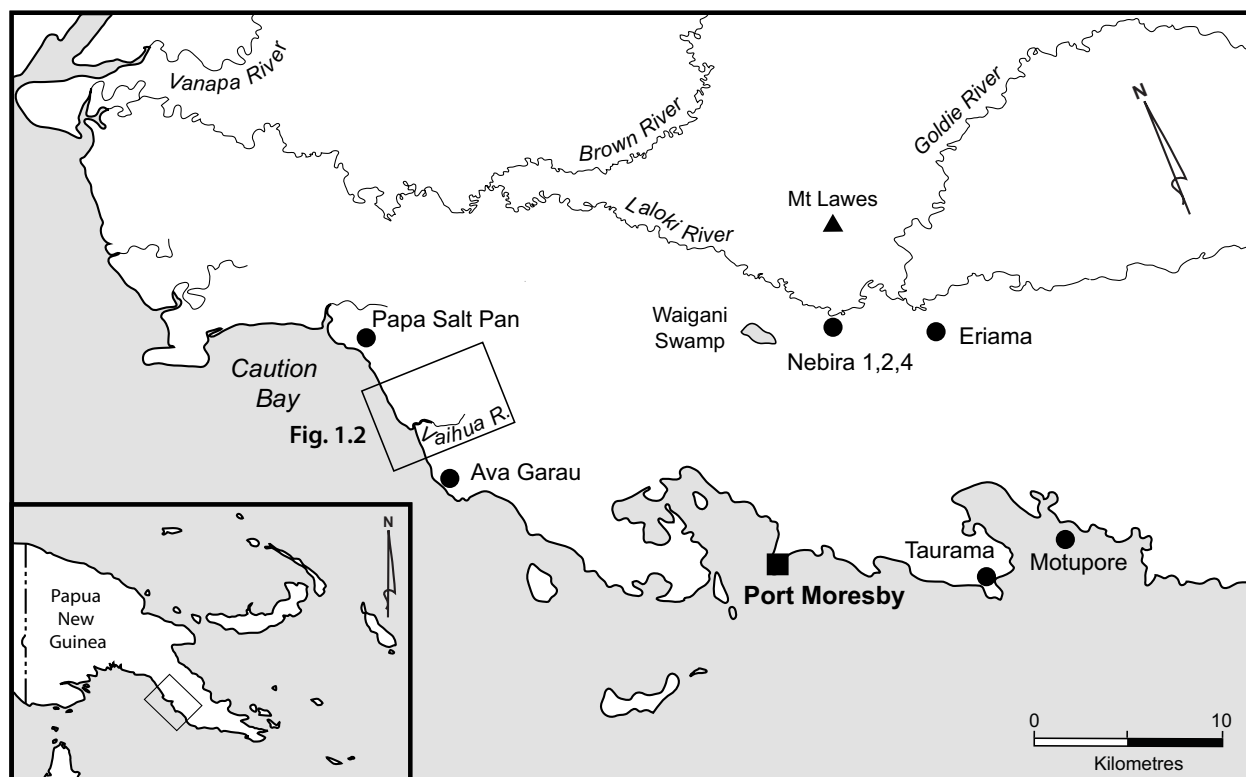


Figure 1.1. Location of Cautious Bay showing previously excavated sites in the broader Port Moresby region.

distance travel and contacts. Considered alongside the distribution of dentate-stamped motifs, it is clear that Lapita peoples engaged in large-scale long-distance two-way voyaging (Irwin 1992; Summerhayes 2009) connected as part of what Golson (1961: 176) termed a ‘community of culture’.

Following decades of debate as to whether the Lapita cultural complex represented an extension of the Southeast Asian Neolithic (Bellwood 1997) or an *in situ* cultural development in the Bismarck Archipelago (see Allen 1984), Roger Green (1991) developed a framework to conceptualise the origins of Lapita in the Bismarck Archipelago. Termed the Triple-I model, it presupposes that Lapita emerged out of a combination of intrusion from Southeast Asia, innovation within the Lapita cultural complex itself and integration of pre-Lapita Near Oceanic traditions.

For Green’s model of intrusion, innovation and integration for the origins and spread of the Lapita cultural complex to be tested, detailed archaeological records are required from sites or site complexes that span periods of time from before Lapita through to its arrival, establishment and florescence. At the opposite chronological end of the Lapita phenomenon, questions regarding the fate of the Lapita cultural complex—whether it underwent breakdown and/or transformation, and whether this occurred in different ways and at different times in different places—once

again require cultural deposits that span Lapita to post-Lapita times. Archaeological discoveries at Cautious Bay during 2009 and 2010 present regionally unique opportunities to study all of these elements.

To develop our narrative of the Lapita cultural complex at Cautious Bay, we need to begin with archaeological assemblages that can unambiguously be identified as Lapita. Archaeological signatures and chronology represent the dual keys. Throughout this monograph we identify demonstrably Lapita sites and Lapita conventions from archaeological objects directly associated with comb dentate impressions applied in bands around ceramic vessels (we sometimes stress both the tool—comb—and the dentate impressions rather than the more conventional term ‘dentate stamped’ when referring to Lapita, because along the south coast of PNG other forms of [shell] dentate stamping on pottery also exist in much later pottery [see below]. We distinguish between the two to avoid confusion). Our narrowly focused initial characterisation of Lapita on the basis of dentate-stamped ceramics is a necessary first step that enables us to then track how various associated characteristics of Lapita practice transformed through time within the Cautious Bay landscape. Of course, Lapita is far more than a ceramic style or tradition; however, what we need is an archaeological definition that enables us to say without ambiguity or doubt from a given site’s material record: ‘this is Lapita’. Nevertheless, we must

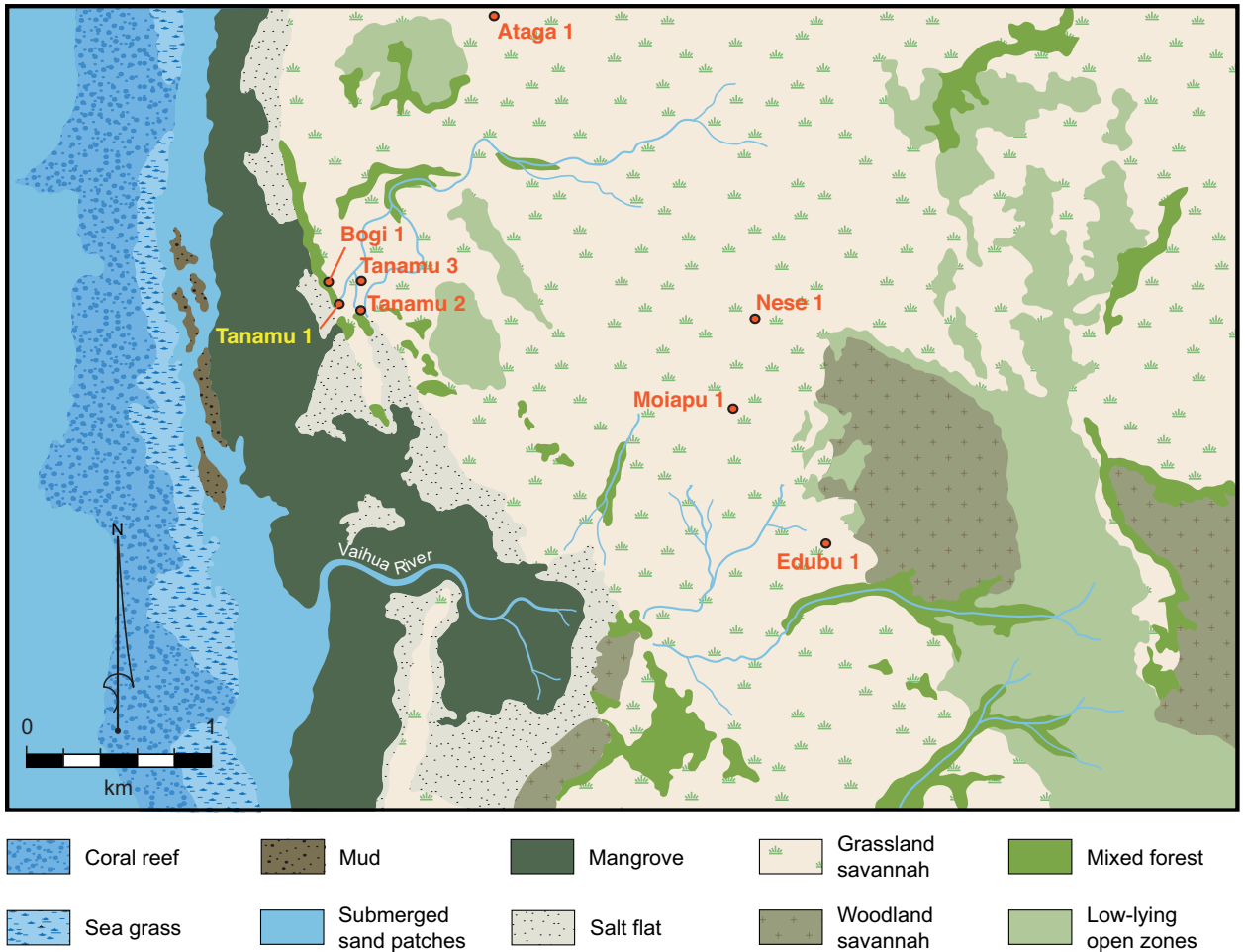


Figure 1.2. Location of Tanamu 1 and other excavated sites mentioned in the text relative to marine and terrestrial environmental zones.

also entertain a range of possible explanatory scenarios into our thinking. One very real possibility is that some archaeological assemblages may have come from Lapita peoples but may not be readily identifiable as such, purely because the traits of the recovered material (e.g., exclusively plainware ceramics; narrow *Rochia* sp. [formerly *Trochus* sp.] shell arm bands) are shared with non-Lapita cultural practices and therefore not singularly ‘Lapita’. By taking the only exclusively Lapita material evidence known from Caution Bay as our starting point, we essentially begin with a behavioural datum point evident from the material record—a set of design conventions involving structured comb dentate stamping on ceramics—by which related cultural practices can be seen to have originally been associated and, in some cases, changed through time while others were added or dropped out entirely. Another possibility is that some archaeological assemblages that include some dentate-stamped ceramics were produced by people who were culturally distinct but acquired these objects through local trade or other means. To test for this possibility, for each site we categorise the entire suite of archaeological remains, including

lithics, other kinds of artefacts, and all classes of food remains, thereby optimising our chances of identifying contrasts or discontinuities in wider and longer cultural traditions.

Tanamu 1

Tanamu 1, the first site we have chosen to publish in this monograph series, has rich pre-Lapita, Lapita and post-Lapita horizons. It was initially identified from surface archaeological evidence during intensive and systematic pedestrian surveys covering an area 10km², spanning a length of 4.4km east-west (largely perpendicular to the coast) by 4.3km north-south (largely parallel to the coast) (for details, see David *et al.* 2016b). The full set of 122 excavated sites recorded during these surveys was entirely contained within an area 3.1km east-west by 2.8km north-south, set inside this survey area (see David *et al.* 2016a). Upon excavation, some sites (such as Tanamu 1) were found to contain a palimpsest of more or less distinctive layers each representing a relatively discrete period of occupation; some sites had a single cultural (artefactual) horizon containing intermixed



Figure 1.3. Location of Tanamu 1 and other nearby excavated sites mentioned in this volume.

cultural deposits spanning a reasonably broad period of time; and some were single-occupation sites with narrow, well-defined calibrated age ranges.

Tanamu 1 was chosen for this monograph because it characterises well the archaeology of a Caution Bay pre-Lapita to post-Lapita sequence. It includes a Late Lapita horizon dating to c. 2850–2700 cal BP but also contains a very rich pre-Lapita cultural horizon dating to c. 4350–4050 cal BP.

Geography of the Caution Bay sites

Following Aplin *et al.* (2016; also see Mabbutt *et al.* 1965), the environmental zones of Caution Bay incorporate several partly discontinuous land-systems, parallel with the open coast. Progressing inland from the coast, these are a Littoral Plains Zone, an Alluvial Plains Complex and a Coastal Lowlands Complex, and a Hill-Ridge Complex. Tanamu 1 is positioned at the lowest part of the Alluvial Plains Complex, where this environment merges with the seaward Littoral Plains Zone (Figure 1.2) (see Mabbutt *et al.* 1965; Pajmans 1976;

and Aplin *et al.* 2016 for detailed descriptions of Caution Bay landforms, ecology and the general environment in wider Port Moresby and lowland PNG context).

The Alluvial Plains Complex of Caution Bay occurs as a narrow coastal terrace and branching inland tracts. A Quaternary geology of fine-textured alluvium predominates, derived from ephemeral streams (typically ill-defined) and the occasional larger perennial stream with associated silty flood zone. The seaward margin of the Alluvial Plain is gently sloping and well drained; by contrast, the central portion of the Alluvial Plain is comparatively poorly drained and prone to seasonal flooding (Aplin *et al.* 2016; Mabbutt *et al.* 1965; Speight 1965). Mabbutt *et al.* (1965) indicate that the sediments of the Alluvial Plain are partly of marine origin, overlain with fluvial deposits.

Seaward of Tanamu 1, the Littoral Plains Complex is represented by sandy beach spits and barrier beaches of combined littoral and aeolian origin. Tanamu 1 is positioned on a sand dune ridge (Figure 1.5). Tidal flats occur in the vicinity of the site. Sediments within



Figure 1.4. Tanamu 2 looking inland towards the hills, excavations in progress 28 November 2009 to provide a visual idea of environmental setting.



Figure 1.5. Oblique landscape view of the relationship between Bogi 1 and Tanamu 1, 2 and 3 in their environmental setting. Image sourced from Google Earth.

this zone are differentiated by the nature of tidal inundation; related sediments range from sandy to clay-dominated. Wave scour and tidal currents tend to remove finer materials where outer inundation is common, and inland-upland-derived detrital material is laid down on, and reworked by, shallower inner inundation, fluvial, and estuarine agents (Aplin *et al.* 2016; Mabbutt *et al.* 1965; Speight 1965).

The Coastal Lowland Complex is an uplifted marine plain, weakly dissected to create low plateaux and undulating surfaces. Soils are predominantly brown lithosols and texture-contrasted. Geology is typically a coarse conglomerate of mixed lithology, but with strong silicification, significant amounts of limestone and soft marl, all of late Tertiary age. Surficial coral rubble of Pleistocene age, presumably derived from uplifted and now degraded reef complexes, also occurs in the area (Löffler 1985; Mabbutt *et al.* 1965; Speight 1965).

Two mangrove communities are found in the vicinity of Tanamu 1. An inner mangrove zone is dominated by *Avicennia* which gives way to *Rhizophora* at greater inundation depths. Hyper-saline mudflats typically occur between the mangrove forest and the terrestrial habitats; these are sparsely vegetated with a hummocked, salt-marsh plant community. The border between mangrove and mudflat is typically abrupt. Landward of the mud flats is a zone of mixed dune scrub and evergreen-deciduous thickets. This grades into grassland that initially provides a dense groundcover, broken in places by moist depressions with herb and shrub recruitment and fringing *Pandanus*. Further inland, the groundcover thins and becomes drier and lower in stature (Aplin *et al.* 2016; Helyligers 1965; Mabbutt *et al.* 1965). Patches of savannah occur across a range of Caution Bay landforms, but it is most typically observed on well-drained Alluvial Plains Complex interfluves, extending up to the low coastal hills. *Eucalyptus* woodland savannah predominates, with a mixture of *E. alba*, *E. confertiflora*, *E. papuana*, and with a grass layer variously dominated by *Themeda*, *Heteropogon* and *Imperata* (Aplin *et al.* 2016; Helyligers 1965).

The problem of dating Lapita

The Caution Bay sites enable us to ask how the Late Lapita designs on ceramics, how the shell and lithic artefacts, and how the pattern of habitat exploitation each compare and contrast with those elsewhere in the Lapita world. Summerhayes (2000) has argued against geographically-based variations in Lapita styles (e.g., Anson 1983), suggesting instead that transformations in decorative style and vessel form are dominantly chronological. This provided a more robust interpretation of the progressive simplification of

designs, opening-up of motifs, and the use of coarser-tined tools as one progresses from Early to Late Lapita across the cultural complex's geographical range (see Best 2002 for an alternative, geographical interpretation of variability). Despite this intensive research, there is room for considerable refinement of our understanding of temporal and spatial variation in design structure within and out of Lapita. Interpretations are currently compromised by the small number of published detailed site reports (see also Kirch 2000: 117) and by the poor chronological resolution of many excavated sites. In some places, considerable strides have been towards refining and solidifying radiocarbon sequences (e.g., Bedford 2006). Nevertheless, there are a number of obstacles which require ongoing work and further thought, including problems with post-depositional disturbance; issues of inbuilt age, especially problematic in unidentified charcoal dates (e.g., Allen and Wallace 2007; Nunn and Petchey 2013); the unknown ΔR values that should be applied to local shell species to calibrate radiocarbon determinations (which could vary by >100 years between species within any given region) (Petchey *et al.* 2012, 2013); and coarse-grained excavation methods (especially those applied during the early years of investigation) that limit our ability to refine taphonomic and chronostratigraphic interpretations. For some sites, '[t]he start and end dates for pottery use can only be defined by comparisons with other sites' (Specht 2007: 105), giving potential rise to problems of circular chronological reasoning. Archaeologists across the Pacific are keenly aware of these dating limitations, leading many to review, rethink and in some cases resolve (and in rare cases even reverse) previously established but problematic regional chronologies within and out of Lapita, such as the relationship of Mangaasi to Lapita wares in central Vanuatu (e.g., Bedford 2006; Spriggs and Bedford 2001).

One of the most problematic regional sequences of this kind, chronologically speaking, is also one of the most important and extensive, from the Talasea area of West New Britain Province (Specht and Torrence 2007a). Despite the recording of some 15,000 ceramic sherds from 23 ceramic find-spots with dentate-stamped pottery in this part of the Willaumez Peninsula, including the excavation of 69 test pits on Garua Island alone, uncertainties about the dating of particular finds and layers within individual sequences have led Specht and Torrence (2007a: 147) to conclude that '[t]here are undoubted difficulties with interpreting the relationship between ^{14}C dates and many pottery contexts, particularly for the end of the main part of the Talasea sequence'. The main Lapita pottery sequence 'probably began ca. 3370–3140 cal. BP and ended during the period 2350–1850 cal. BP', as bracketed by the W-K2 and W-K3 tephras aided by a sequence of radiocarbon determinations (Specht and Torrence 2007a: 131).

Considerable post-depositional disturbance is evident at many sites across this tectonically active landscape, and the dating of the end of Lapita is particularly compromised (see also Spriggs 2001a: 240–241). As Specht and Torrence (2007a: 149) point out, '[s]etting a firm end-date for this part of the Talasea pottery sequence is problematic, particularly as we do not know whether it was an event or part of an extended process. Pottery probably ended during the period 2350–1820 cal. BP, before the W-K3 event at 1810–1620 cal. BP'. The dating uncertainties here are symptomatic of similar ambiguities surrounding the chronology for the ending of Lapita elsewhere in the Pacific.

A recent general overview concludes that '[t]he term 'Lapita' is not used for sites or assemblages that continue beyond about 2,000 years ago, but this is not a matter of an abrupt change so much as a gradual transformation' (Bolton 2012: 43). However, most archaeologists working in Island Melanesia would consider an age of 2000 years ago to post-date the end of Lapita by hundreds of years, despite fine-grained uncertainties. The question thus remains as to precisely when, and how, individual recognisably Lapita practices end (i.e., including how they transform out of recognisably Lapita forms) within each site and region, and how each of these local sequences articulates across progressively broader spatial scales to enable a general history of Lapita practices to be developed (see also Sheppard 2009). As emphasised by Spriggs (2003), it is only by accurately depicting archaeological discontinuities and transformations that we may then reach a better understanding of historical trajectories eventually leading into the ethnographic period. Only with better chronostratigraphic resolution of Lapita and descendant sites will we be able to determine whether cultural changes across Island Melanesia took place synchronously within and between Lapita phases (implying widespread cultural influence through renewed contacts between Lapita communities), or establish precisely when they became increasingly isolated or independent as they moved out of Lapita (as would be implied by increasingly regionalised archaeological signatures). The detailed publication of site sequences that include the minutiae of both chronostratigraphy and cultural materials is critical to the determination, independent assessment by researchers, and general acceptance of archaeological patterns and trends. Interpretations that are accountable through the transparent presentation of the evidence is at key.

Dating the Caution Bay Sites

The excavated sites from Caution Bay reported here and elsewhere include several deeply stratified sites such as Tanamu 1 (this volume) and Bogi 1 (McNiven

et al. 2011), among others. These sites feature excellent stratigraphic separation between major occupation phases—typically due to the accretion of culturally sparse or sterile units—and this makes them particularly useful for cultural sequence-building. In addition, there are a large number of single-occupation sites that appear to be the result of relatively short-term occupation (e.g., Ataga 1, Tanamu 2), most of which were occupied for less than a century and frequently under 50 years. Finally, there are sites with multiple occupations (e.g., Tanamu 3) that are not as well separated vertically as Tanamu 1 or Bogi 1, but where the application of relatively thin excavation units have allowed the separation of different occupations and their secure dating. As a rule these latter sites with narrowly separated or slightly overlapping sequential occupations have been employed only with great caution for sequence-building purposes, as they have a greater potential for mixing than the well-separated deeply stratified or single-occupation sites.

All of the radiocarbon dates reported in this volume were determined by the accelerator mass spectrometry (AMS) method. Typically, we have dated single specks of charcoal or individual marine shells, and aimed for sufficiently dense sample coverage and replication to confidently understand occupation and sediment chronologies. Our objective both with radiocarbon dating, and with other site and artefact analyses, is to try to reach points of redundancy of results so as to be in a position of greater surety of interpretation to enable us to find repeated patterns that satisfy repeated interpretation. Furthermore, the dating of samples every few centimetres vertically allows both a clear characterisation of occupation duration while also alerting us to the presence of possible disturbances through the presence of dating inversions and other out-of-sequence dates. Wherever this occurs, the data from such levels are not used as the primary basis for sequence-building, a luxury we can afford for Caution Bay due to the presence of alternative squares or sites with higher levels of integrity in our large sample of excavated occupation deposits.

From the end of Lapita to the EPP

Prior to the Caution Bay discoveries, the earliest decorated ceramics known from along the southern mainland of PNG were dated somewhat short of 2000 cal BP (e.g., Allen 1977a; Kirch 2000: 121–122; Vanderwal 1973). These were characterised by impressed shell indentations somewhat reminiscent of much earlier comb dentate-stamped Lapita ceramics found in archipelagos hundreds of kilometres to the east and northeast. Ceramics of this kind were recorded by a number of researchers working in different parts of the south coast, separated by hundreds of kilometres of

coastline. In each area, subsequent ceramic traditions featured progressive series of new decorative types appearing apparently contemporaneously between regions.

Building on Irwin’s (1991) Early Papuan Ware, Summerhayes and Allen (2007) established the concept of Early Papuan Pottery (EPP) to represent the sum of all ceramic styles along the south coast of PNG, from the start of the then-known ceramic sequence at c. 2000 years ago to c. 1200 BP (see Allen *et al.* 2011 for a re-dating of the beginning of the Oposisi sequence on Yule Island to slightly earlier times). Subsequent to the ‘ceramic hiccup’—a phase variably dated within the period c. 1200–800 BP, when ceramics appear to have largely ceased being exported to much of the Gulf of Papua west of Port Moresby—ceramic traditions along the south coast of PNG enter a period of pronounced regionalism that leads into the diversity observed in ethnographic times.

The discovery of substantially earlier ceramic traditions at Caution Bay, including both hallmark Lapita wares and others that demonstrate the subsequent transformation of Lapita into later archaeological phases (McNiven *et al.* 2011), led us to pose numerous new questions regarding the meaning and significance of the EPP (David *et al.* 2012). The radiocarbon determinations from the Caution Bay sites bridge the entire period from the newly found Lapita phase through to the production of the shell-impressed decorations at the start of the EPP at Oposisi and Nebira 4. We have previously presented a detailed description of Linear Shell Edge-Imprinted ceramics dating to c. 2150–2100 cal BP at two squares from Bogi 1 at Caution Bay (David *et al.* 2012). Many other, as yet unpublished sites (and other hitherto unreported squares from Bogi 1) at Caution Bay also have large assemblages of Linear Shell Edge-Imprinted ceramics of comparable age (to be reported in forthcoming monographs). The narrow age range of this ceramic tradition at Caution Bay,

and the identification of rare sherds of this kind from at least one other previously excavated site near Port Moresby, albeit in association with sherds of other and later styles/traditions (e.g., Nebira 4, Allen 1972: figure 7 item 18 [see Figure 1.6A]), together serve to highlight the potential difficulties of identifying and dating such important but short-lived traditions prior to the application of fine-scale excavation methods and the availability of AMS radiocarbon dating. We also note that the Vanderwal (1973) Style 1 decoration on Type A shell-impressed sherds from Zone IIC at Oposisi—representing the previously oldest known ceramics from the south coast of PNG approaching 2000 cal BP—is akin to that of Caution Bay only in the sense that they are both shell impressions; the technical application of the shell to make an impression, and the designs, are quite different. In fact, these Style 1 shell body and umbo-impressed decorative designs from Yule Island are arguably as different from the Caution Bay Shell Edge-Imprinted designs as they are from Lapita comb dentate impressions (Figure 1.7). This leaves open the question as to whether these two types of shell impressions represent regional variations of a common contemporaneous theme, or descendant developments, or more or less independent styles. It also prompts the question as to whether developmental sequence(s) within the EPP (i.e., of all the ceramic styles between c. 2000 years ago and c. 1200 BP along the south coast of PNG) represent parallel developmental sequences occurring concurrently across regions, or alternatively, incoming traded sherds from a more limited number of manufacturing centres.

The importance of this latter question has long been recognised in the context of archaeological research on the south coast of PNG (e.g., Allen and Duerden 1982; Allen and Rye 1982; Bickler 1997; Irwin 1985; Summerhayes and Allen 2007), with simultaneous developments being critical to (and defining) the full EPP model. However, as Bickler (1997: 152) has noted in relation to south coast ceramic sourcing

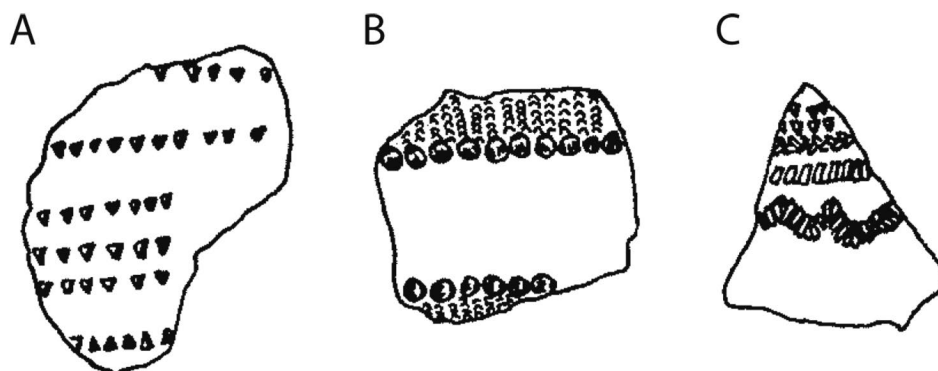


Figure 1.6. Style H ceramics from Nebira 4 (after Allen 1972: figure 7).

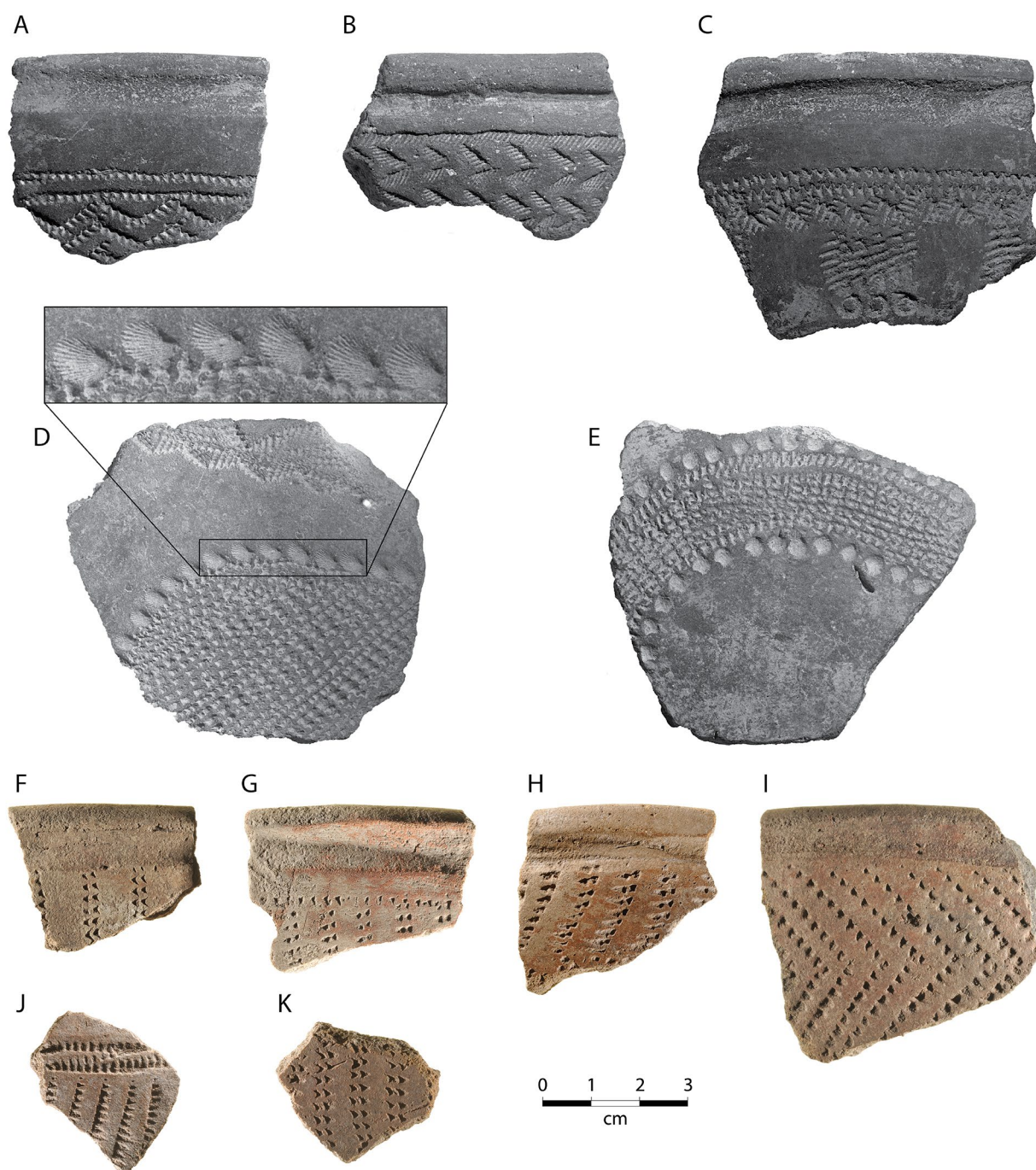


Figure 1.7. Examples of shell-impressed sherds from Oposisi, Yule Island (A-E) and Caution Bay (F-K). Photographs: A-E courtesy of the School of Culture, History and Language, College of Asia and the Pacific, Australian National University Ron Vanderwal photographic archive; F-K: Steve Morton.

studies prior to the Caution Bay finds, '[l]ack of both tight chronological control and fine-grained stylistic information was a major problem ... as most sherds came from surface collections'. Furthermore, these prior attempts at ceramic sourcing have been based on small archaeological sample sets and limited reference source clay and temper collections. It is thus still uncertain whether the earliest, shell-impressed sherds of Vanderwal's Style 1 of Zone IIC at Oposisi and Allen's

Style H of Horizon 3 at Nebira 4 are local productions or, in one or both cases, represent goods imported from further afield. This problem is further compounded by the fact that the purported stylistic commonality of shell-impressed designs across regions is by no means established. In this context, Summerhayes and Allen (2007: 112–113) note that 'all the shell impressed samples and the two grooved lip samples' analysed by them from Oposisi and Nebira 4 had comparable

fabrics, indicating that the ‘seven samples from Nebira ... reflect a similar production to Oposisi and for which the most parsimonious explanation is that the raw materials or much more likely the finished pots came from the Oposisi area’. However, without confirmed sources, all of the vessels in question might have come from elsewhere. What is under consideration here is the possibility that this early phase of the EPP was typified not by a shared tradition of ceramic production from one region to the next across the broader landscape, but rather the movement along the south coast of PNG of ceramic vessels produced in a common source area. This hypothesised movement of shell-impressed ceramics along the south coast at the very onset of the EPP might formerly have made sense if the initial ceramic ‘colonisation of the Papuan coast’ (Summerhayes and Allen 2007: 98) was around 2000 years ago as originally thought. However, this option for the EPP is now placed in some doubt by the discovery that the EPP was preceded by another 900 years of ceramics at Caution Bay in the Port Moresby area, with no evidence to suggest that any of the decorative styles prior to c. 1700 cal BP (i.e., from Lapita to the most recent shell-impressed styles) developed in tandem as locally manufactured products wherever they are found. This leaves open the possibility that these widespread ceramic styles were traded over long distances from a small number of manufacturing centres, so that the spheres of influence do not so much inter-connect the entire coastline in chains of connection, but rather link individual locales to manufacturing centres as wheel-spoked connections. As is the case for ethnographic times, where long-distance maritime (e.g., Motu *hiri*, Mailu) and networked trade resulted in widely distributed ceramic trade wares of common origin, the emerging picture of widespread ceramics of similar style and fabric spread along the south coast some 2000 years ago might be better viewed as evidence of widespread direct or down-the-line trade (but see Summerhayes and Allen 2007; Irwin 1985 for a different view for Mailu to the east of Port Moresby). These widely different potential interpretations of the EPP highlight the great importance of sourcing studies for the Caution Bay ceramics, and therefore for a detailed characterisation of their tempers and clays; a task we do not undertake in the present monograph but which forms the subject of a separate, specialist study through the University of Otago, New Zealand. A detailed understanding of the chronostratigraphy of the Caution Bay sites, as presented here for Tanamu 1, forms a critical prerequisite for the sourcing study.

Some of the Lapita ceramics we have previously published from Caution Bay have raised debate, especially as they relate to Lapita and post-Lapita designs elsewhere in Island Melanesia and the south coast of PNG. Understanding the chronological context

of Lapita in multiple sites across Caution Bay is of significance to these debates. For example, the question of the relationship between Lapita and the EPP at Caution Bay is highlighted by questions raised by Specht (2012: 4) about the age of a Bogi 1 sherd (Square K XU13 sherd #1) reported in McNiven *et al.* (2011: figure 5L) (Figure 1.8). This sherd has square comb dentate-stamped designs, a Lapita motif that is highly reminiscent of a similar, apparently later EPP shell-impressed motif (Figures 1.9C, 1.9D). Similar comb dentate-stamped square motifs are known from Lapita sites elsewhere in Island Melanesia, such as the distinctive sherd from Kamgot on Anir (reproduced in Specht *et al.* 2014: figure 3A). The Bogi 1 sherd in question comes from 127.1cm below surface in excavation Square K and is stratigraphically the lowest comb dentate-stamped sherd from that square. It lies 2.3cm below a typical Lapita sherd (Square K XU13 sherd #2) which has two rows of comb dentate impressions above paired arcs of comb dentate impressions. For Squares C and E–Q as a whole (the only squares from Bogi 1 analysed to this depth so far, with excavation of Squares A and B ceasing prior to the Lapita levels), the highest comb dentate-stamped sherd occurs at 109.9cm below the surface, and the deepest occurs at a depth of 144.0cm.

The Bogi 1 Square K XU13 sherd #1 with the comb dentate-stamped square design is firmly located within the well-defined Lapita horizon at that site which does not contain any sherd belonging to any other decorative style (i.e., it does not contain any shell-impressed sherds). We agree with Specht that this particular sherd is highly reminiscent of similar but later shell-impressed sherds attributed to the earliest phase of the EPP from other parts of the south coast of PNG (Bulmer 1978: figures 5.3, 5.4 [see Figures 1.9C, 1.9D]; Vanderwal 1973: figures VI-6, VI-1, VI-9). However, in light of its chronostratigraphic positioning, and of a total absence of other kinds of ceramics in this part of the Bogi 1 sequence, we do not see any reason to question its age. The Bogi 1 sherd unambiguously came from a Lapita comb dentate-stamped ceramic chronostratigraphic context. It is well bracketed by radiocarbon determinations of c. 2600 cal BP. As Specht notes, this sherd is thus ‘earlier than the current date adopted for EPP by Allen *et al.* (2011)’, and its age and characteristics beg elucidation of the cultural relationships between terminal Lapita and the earliest shell dentate-stamped ceramics (and the beginning of the EPP) at Caution Bay.

The discovery of previously unknown Lapita-into-EPP ceramic assemblages at Caution Bay demands a new interpretation of the past 2000 years of occupation along the south coast of PNG. The shell-impressed decoration reported by David *et al.* (2012) is essentially the only kind of ceramic decoration found at Caution

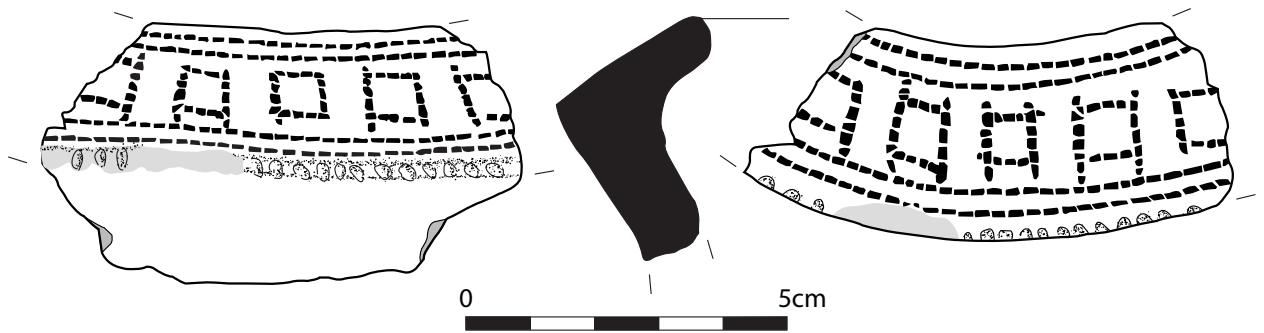


Figure 1.8. Bogi 1 Square K XU13 sherd #1.

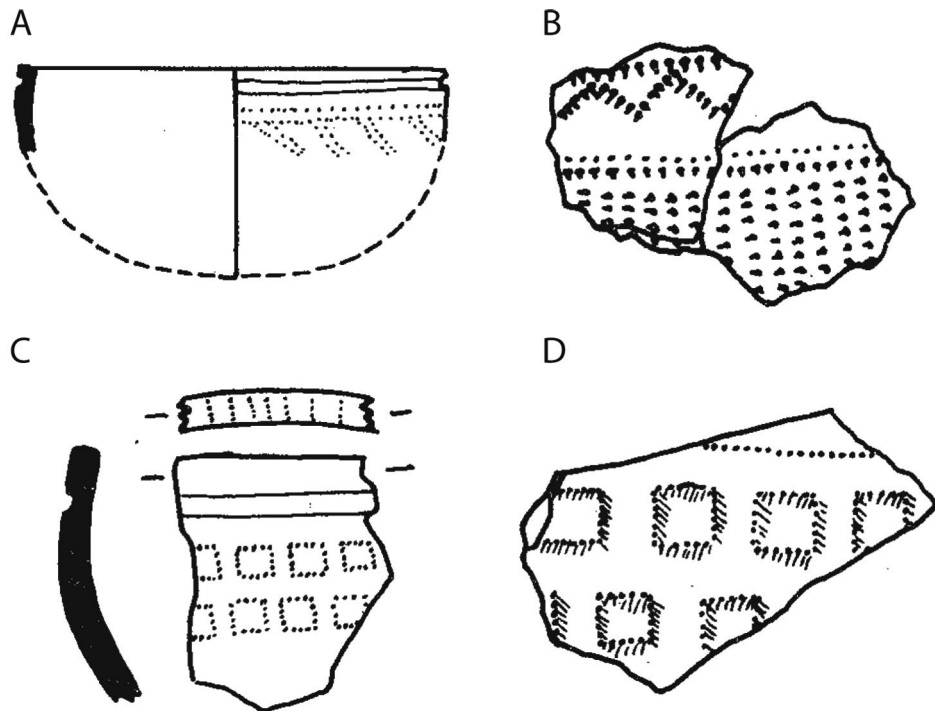


Figure 1.9. Non-Motu pottery of industry B5 from Port Moresby surface sites (after Bulmer 1969: figure 4).

Bay between c. 2150 and 2100 cal BP (with red slipping and a finger groove below the lip also occurring on some sherds), and it arguably forms a good precursor style for the previously oldest-known shell-impressed wares of the EPP tradition, beginning some 2000 years ago. The question is now as to whether the shell-impressed decorations found at Caution Bay between c. 2150 and 2100 cal BP, and again in the early EPP tradition, represent direct developments out of earlier Lapita traditions along the south coast of PNG, or whether the two are somehow independent. Irwin (2012: 10) appropriately asked for clarification of the ‘developmental pottery sequence at Caution Bay from Late Lapita to EPP’. This prompts the research question: ‘What is the stylistic and temporal relationship between

terminal Lapita dentate-stamped and subsequent shell-impressed ceramics at Caution Bay?’.

In this monograph we contribute to the issue by reporting on Late Lapita at Caution Bay, so as to be in a position in later monographs to investigate how ceramics change between the end of Lapita and the start of the Linear Shell Edge-Imprinted ceramics dating to c. 2150–2100 cal BP, as described by David *et al.* (2012).

What is also evident from the excavated sites is that the establishment of one or more Lapita colonies at Caution Bay c. 2900 cal BP was not a brief, localised or unsuccessful attempt at colonisation. Rather, it resulted in long-term settlements and led to a pattern of landscape change with ramifications that lasted

millennia. As Specht (2012: 5) notes in relation to Kasasinabwana (a site on Wari Island in the Massim to the east; see Negishi and Ono 2009) though with broader applicability, 'we enter a controversial field about defining the end of Lapita pottery, and how to subdivide ... EPP into a time-series of styles'. Yet a reliable spatial history for the south coast of PNG as an interconnected region requires a finer-grained picture than is currently available on cultural landscapes and their associated material culture, including ceramics. This is a focus of both this and future Caution Bay monographs currently in progress.

Conclusion

In this monograph we report on the first of many excavations in sufficient detail for independent

researchers to know what we found, and to assess for themselves the chronostratigraphic associations of individual finds. In turn, this will allow inter-regional comparisons of pre-Lapita, Lapita and post-Lapita assemblages to be made, the historical tracking of descendant assemblages, and comparisons of temporal trends across space. We begin with a detailed site report of Tanamu 1, followed respectively by specialist chapters on its ceramics, stone artefacts, molluscan remains, non-molluscan faunal remains, and worked shell so that the evidence can be made available to researchers.