Post-Lapita Evolutions or Revolutions? Interaction and Exchange in Island Melanesia: The View from the Tanga Islands

Part I

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Except where otherwise acknowledged in the text, this thesis represents the original research of the author.

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ABSTRACT

The focus of this thesis is the period of apparent cultural ‘transition’ or transformation in the archaeology of Island Melanesia in the closing centuries of the third millennium BP. This transformation has long been tied to an ill-defined and much debated ‘Incised and Applied Relief’ ceramic tradition, and in the western part of this region is seen as marking the ‘end’ of Lapita in the transition from the ‘Late Lapita’ to ‘Post-Lapita’ periods. I examine this ‘transition’ by taking a multi-pronged approach to the consideration of social interaction and exchange, in particular in terms of cultural continuities (‘evolutions’) and discontinuities (‘revolutions’) across it. Based on new research in the Tanga Islands and supplemented by the further examination of a group of sites on the New Ireland mainland, the thesis employs two broad types of data to track interaction—compositional and stylistic—which are gleaned from the analysis of pottery, obsidian and red ochre. Its aim is to tease out the complexities of interaction and cultural change at the ‘transition’ indicated by both the match and mismatch of the evidence from these different archaeological data sets. The thesis concludes that Tanga and other ‘transitional’ sites from the Bismarck Archipelago to New Caledonia were embedded in a number of different overlapping and interconnected interaction networks of different spatial and temporal scales and likely cultural significance. These networks reflected webs of relationships and aspects of shared identity and history on both more localised and broader regional levels, and incorporated elements of both stylistic similarity and difference, and cultural continuity and discontinuity with Lapita. It finds that there is indeed some utility to a considerably revised notion of the ‘Incised and Applied Relief Tradition’: one that is both more and less strictly defined.
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CHAPTER 1—
Evolutions or Revolutions? The Post-Lapita Transition Debate in Relief

1.1 INTRODUCTION

The focus of this thesis is the period of apparent cultural ‘transition’ or transformation in the archaeology of Island Melanesia in the closing centuries of the third millennium BP—a transformation that has long been tied to an ill-defined and much debated ‘Incised and Applied Relief’ (IAR) ceramic tradition, and which in much of Near Oceania is seen as marking the transition from the ‘Late Lapita’ to ‘Post-Lapita’ periods (Fig. 1.1). With a particular focus on the Bismarck Archipelago of Papua New Guinea and within that the Tanga Islands of New Ireland Province—and the somewhat elusive ‘end’ of Lapita there—I aim to contribute to our understanding of the nature of this ‘transition’ and its wider articulations by looking specifically at archaeological evidence for social interaction or exchange.

In particular, I address the current debate over the relationship between the two ‘sides’ of the ‘transition’ in the Bismarcks and beyond—with ‘Late Lapita’ or Lapita-derived assemblages on one side and sites bearing elements of the so-called ‘IAR Tradition’ on the post-Lapita side, and ‘transitional sites’ straddling the two. This debate has tended to be polarised around whether there are continuities or discontinuities evident between the Lapita cultural complex and what came after, and whether internal or external processes were responsible. What these archaeological signatures of continuity or discontinuity may mean in terms of regional or inter-regional interaction is crucial to this debate. In particular, the issue of whether the ‘IAR Tradition’ is reflective of continuing inter-regional connections in Island Melanesia is intrinsic to the debate. Put simply, I ask whether different strands of archaeological evidence of interaction at this ‘transition’ indicate evolution from Lapita (reflected in cultural continuities and allied with the ‘internal processes’ camp) or revolution (reflected in discontinuities and often allied with the ‘external processes’ camp) in the form of radically new intrusive and/or innovative elements. I use these data to assess both the nature of changes in interaction and the validity of the concept of an ‘IAR Tradition’.

To this end, I bring to the debate a regional analysis, comprising much needed new research from the Tanga Islands, New Ireland Province, and a re-analysis of ceramics from a set
of open sites on the New Ireland mainland. I attempt to trace interaction using two broad types of data—compositional and stylistic—gleaned from the analysis of three different archaeological assemblages: two ‘old school’ (pottery and obsidian) and one novel (red ochre). This exercise is not intended to produce a neatly dichotomised explanation of cultural transformation at the post-Lapita transition. Rather, I hope to contribute to a fuller understanding of the complex nature of interaction at this time, in a region where not only do long-standing indigenous populations produce inherent cultural ‘complications’ not encountered in Remote Oceania, but where interpretations have been predominantly gleaned from pottery and obsidian. I aim to tease out the complexities indicated by both the match and mismatch of the evidence of different types of interaction from these archaeological data sets.

In this chapter, I first set out the background to the post-Lapita ‘transition’ and ‘IAR Tradition’ debate and look at how the period has been described, and the types of models that have been used to explain the evident changes. This is followed by a discussion of the ways that stylistic and compositional data have been used to reconstruct interaction across this period, and some of the pitfalls and conundrums that must be confronted. I then introduce the Tanga Islands, providing details of both the natural and cultural geography of the island group. Finally, I set out the specific approach that I take in this thesis, the methodology employed with regard to each set of data, and give an outline of the overall structure of the thesis.

1.2 ENDS AND BEGINNINGS

1.2.1 When does Lapita become not Lapita?

Roger Green (pers. comm. 2006) recently summed up the conundrum in these terms: ‘... no one can explain to me the cross-over point at which Lapita becomes not Lapita’. Indeed, after over half a century of archaeological research into the Lapita phenomenon there is still no real consensus as to the definition or timing of its ‘end’ and there are good reasons why we should not expect one. The main obstacles to definitively identifying Lapita’s ‘end’ manifest themselves in the debates over what constitutes Lapita in the first place,1 whether what came after evolved from Lapita in a continuous sequence (i.e. there was no real ‘end’ to it) or was unrelated (i.e. it ended abruptly with a subsequent discontinuous sequence), and the requisite associated archaeological marker(s) of these things (cf. Spriggs 2003).

1 See, Green (2003), Felgate (2003: Ch. 2) and Anderson et al. (2001) for detailed recent discussions of how ‘Lapita’ is defined, and Golson (1971) for an early treatise.
First, to briefly illustrate the way that perceptions of what Lapita was affect the identification of its ‘end’ in the archaeological record and the debate about the post-Lapita, I give voice here to proponents from different corners of the Lapita origins debate. As supporters of an origin that privileges dynamic, internal, indigenous processes within the Bismarck Archipelago, Specht and Gosden (1997: 188-90) suggested that the ‘end’ of Lapita should not be regarded as an ‘event’—something that could be easily defined and circumscribed in time—but rather as ‘an outcome of several processes’. In some areas, this saw Lapita transform into another style (e.g. in the Northern Solomons), in other areas (e.g. Manus) it was ‘followed by a distinctively different style’, and in yet other areas the use of pottery ceased altogether (e.g. sites near Talasea). They saw no a priori reason why any of these processes should have occurred simultaneously throughout the archipelago, and expected the terminal date to vary from one area to another. Specht and Gosden’s view on the nature of Lapita’s ‘end’ is particularly informed by their perception of Lapita itself as a ‘series of elements of life in which there was different participation’ (1997: 190) rather than a coherent, culturally unified package, which was part of an ‘overall sequence of change’ (Gosden & Specht 1991: 279). Consequently, they infer that both the disappearance of dentate-stamped pottery and in some cases of pottery itself at different times across the archipelago reflect the different roles that pottery had in different areas. That is, the use of pottery as both ‘a container and a medium of symbolism and exchange’ (ibid.) was just one social option and not a necessity. Similarly, Terrell (1999: 57) urged Lapita researchers to accept that Lapita was not a ‘single or a simple story’ but rather a mosaic of Oceanic cultural traits, which had lots of stories to tell depending on the time and place.

In response to the inflated importance given to the Lapita period in the 30,000 year plus span of the Bismarck Archipelago’s prehistory, and emphasising the agency and culture of its indigenous populations, Gosden and Specht (1991: 279-80) point out that the regional ‘stage’ of cultural flux and population movement—which included sailing technology, the movement of raw materials, stone and shell technology, and environmental manipulation—was well and truly set before Lapita ‘entered’ onto it (see also, Gosden 1991a, 1991b; Allen 1996: 25, 2000; Allen & Gosden 1996; Terrell et al. 1997). That is, the importance of Lapita should be put in proper perspective. One is reminded of Mark Twain’s observation on the importance of humans in the face of geological deep time:

Man has been here 32,000 years. That it took a hundred million years to prepare the world for him is proof that that is what it was done for. I suppose it is, I dunno. If the Eiffel Tower were now representing the world’s age, the skin of paint on the pinnacle-knob at its summit would represent
man’s share of that age; and anybody would perceive that that skin was what the tower was built for. I reckon they would, I dunno (in Gould 1990: 2).

Terrell (1999: 54-5) has also discussed what he believes is the misplaced perception of the importance of the Lapita phenomenon—the belief that ‘big’ things (i.e. pottery widely distributed over the southwest Pacific) require equally big social explanations and must have had big import in the past. In particular, he sees this perception as being manifested in the notions of ‘long distance exchange’ and widespread interaction spheres that have long been associated with Lapita, when much of the archaeological evidence could more easily and plausibly be interpreted in terms of simple down-the-line exchange between more closely linked communities.

This perceived ‘importance’ of Lapita as a radically new and different phenomenon—the skin of garish, highly visible, red-ochred paint in the prehistory of the Bismarck-Solomons region—also had the effect of stymieing the investigation of continuities between the Lapita period and what went before (Gosden & Specht 1991: 278). In a similar way, I think the idea of Lapita’s social and cultural ‘importance’ has to some degree affected our perceptions of what happened at its ‘end’, though here it appears to have produced an implicit bias towards interpretations of continuities with what came after in the ‘post-Lapita’. Gosden and Specht (1991: 279) were similarly unhappy with the ‘rather straightforward notions of cultural continuity implied by the view that Lapita represents a discrete social unit which maintained its essential features over 3500 years’. As I argue below, this sense of inexorable continuity is implicit in the language archaeologists use to describe Lapita’s gradual ‘decline’ and eventual fall, which could be biasing our assessments of what constitutes the post-Lapita and how it got to be there. If we see Lapita as being only one of the many social options available in the Bismarck-Solomons region at the time, we are perhaps less inclined to worry as much about the impact of its loss.

Exemplifying a strain of the more accepted view (see also, Bellwood & Koon 1989; Bellwood 1996, 1997, 2002a, 2002b; Kirch 1997; Best 2002), Spriggs (1997, 2003) sees Lapita as a new ethnic identity in the western Pacific forged around the language of Proto-Oceanic Austronesian, representing groups of people of formerly disparate geographical (though most likely deriving from parts of Island Southeast Asia) and genetic origins, who were the bearers of an elaborate pottery style that encoded religious or ideological beliefs. Given the potentially more unified cultural significance attached to the pottery, the ‘end’ of this type of Lapita phenomenon is more likely to have a more archaeologically visible and definable end than Specht and Gosden’s view. Although, even in this case it is likely that the timing of Lapita’s last dance, or what is commonly called its ‘demise’ or ‘decline’, varied across its entire areal extent. As Sand (2001a: 73) notes, differences evident between the southern (i.e. southern Vanuatu-New Caledonia) and
eastern (Fiji-West Polynesia) Lapita ‘provinces’ at the end of the Lapita period—where there were no pre-existing indigenous populations to interact with—suggest that there were different mechanisms of change operating (e.g. socio-economic and environmental pressures) and therefore divergent reasons for the loss of dentate-stamped pots.

Green’s (1991b, 2000b, 2003: 109-10) ‘Triple I’ model provided a kind of ‘middle way’ to understanding the nature and development of the Lapita phenomenon, which probably comes closer to capturing the true complexity of the period. The model acknowledges the likely composite nature of Lapita, incorporating intrusive (Island Southeast Asian and Near Oceanic), integrative (e.g. indigenous influences within the Bismarck-Solomons region) and innovative elements. It thus emphasises the complex and evolving nature of the behaviour that produced the archaeological record—and thus of the record itself—and requires that each aspect be subjected to detailed scrutiny and assessment.

The notion then of this complex entity as an enduring ‘tradition’ or set of regional traditions (see Green 2003: 103-11; and discussion in Golson 1971, Anderson et al. 2001: 2), which implies that its development over the long-term (potentially up to a thousand years in Near Oceania) can be traced back to an original, ancestral culture(s), also poses challenges to the archaeological identification of its ‘end’, because it can seemingly accommodate both minor and major cultural permutations (see e.g., Gosden’s 1992a: 25 concept of Lapita’s long-term ‘dynamic traditionalism’, i.e. ‘tradition’ [continuities and similarities] combined with ‘enormous diversity and dynamism’). How big a change from the original qualifies as a break (or discontinuity) with tradition? What are the criteria? At what point do you eventually stop calling something ‘Lapita sensu lato’ (e.g. Anderson et al. 2001: 2), ‘Lapitoid’, ‘Lapita-like’, or ‘Lapita Plainware’, or eventually stop seeing ‘generic connections’, ‘associations’ or ‘affiliations’ (see e.g., Golson 1971: 70, 75; Kirch 1978, 1981, 1982; Clark 1999: 249; Bedford 2006: 20, 24, 35, 118, 131)? While not denying the likelihood that some traits/practices were indeed inherited (e.g. pottery making or adze technology), we need to make sure that the notion of a ‘tradition’ does not lead us to assume rather than prove a high degree of cultural continuity. It has the potential to gloss over what may have been significant cultural changes, in particular of the social meanings attributed to items of material culture such as decorated pottery.

In terms of dating, Spriggs (2002) has stated that ‘Lapita everywhere seems to be over by about 2750–2650 B.P.’, though he conceded that an argument might be made for 2500 BP in some cases. Using a definition of Lapita based strictly on the presence of ‘dentate-stamped pottery carrying a formal design system’, Kirch (1997: 126) dates Lapita’s ‘end’ (i.e. the disappearance of the dentate) throughout its entire range somewhat later than Spriggs, to
between the middle and the end of the first millennium BC (ca. 2500–2000 BP). In the Bismarck Archipelago, Summerhayes (2003a & b, 2004) defines the ‘Late Lapita’ period as terminating at around 2200 BP and the ‘Post-Lapita Transition’ period as extending from 2200 to around 1600 BP.² This is similar to Wahome’s (1997: 119) definition of the ‘early post-Lapita’ within the Admiralty Islands ceramic sequence from 2100–1650 BP. Clearly, more tractable obstacles to identifying Lapita’s ‘end’ (and also complicating its relationship with post-Lapita and an ‘IAR Tradition’) are manifested in claims that Lapita ceramic production was extremely long-lived and that Lapita and post-Lapita styles were contemporaneous (Anson et al. 2005; see further discussion in Chapter 2).

Despite these complexities, because pottery is the most archaeologically visible and prolific artefact across the region at this period, the debate over what happened at the ‘end’ of Lapita and the nature of the transition into the post-Lapita—the beginning of ‘something else’ (cf. Green & Anson 2000a: 188)—in both Near and Remote Oceania has been dominated by ceramic research, and in particular has been inextricably tied to perceived changes in pottery style. In essence then, but perhaps over-simplistically, the post-Lapita transition has been seen as involving the disappearance of elaborate dentate-stamped, complex Lapita vessel forms (Lapita sensu stricto)—although this is believed to have occurred much earlier in Remote Oceania than in Near Oceania—and the efflorescence of a variety of decorative techniques gathered under the rubric of the ‘IAR Tradition’ (see Clark 2003 and Spriggs 2004 for detailed potted histories of the development and assumptions of this tradition since its inception).

1.2.2 The rise and rise

Pottery decorated with distinctive incised and applied relief decoration, as well as a range of other techniques, is now generally conceded to have flourished towards the end of the Lapita ceramic sequence across a wide geographic range, extending from the Bismarck Archipelago to Fiji. Despite a number of earlier, seminal investigations (Specht 1968, 1969; Garanger 1972; Golson 1972; Kennedy 1981) and some notable recent additions to the corpus (Bedford 2000, 2006; Clark 1999), this type of decorated pottery has for many years been the poor, less glamorous cousin of Lapita dentate-stamped pottery on the regional stage of Island Melanesian prehistory, with it receiving far less research attention. Though a sequence or continuity between Lapita and

² Felgate (2003: 97-102) has criticised Summerhayes’ ‘Early/Middle/Late Lapita’ construct in the Bismarcks. It is not within the scope of this thesis to stringently assess the breadth of this construct (see my approach to dating in Chapter 2). However, the implications of my results in relation to it are discussed in Chapter 9.
the post-Lapita decorated wares has often been recognised, it has usually been couched in terms of ‘decline’, seen in both a deterioration of the design system and the reduction and contraction of interaction and exchange networks (see further discussion below).

Theories to account for this ‘decline’, however, have generally been more dynamic than the purported archaeological signature, ranging from in situ cultural and linguistic diversification to socio-political transformation (see summaries of all models and their main proponents in Spriggs 1992, 1997: 152-61). Other theories attempting to account for the changes in pottery style suggested that the ‘poor cousin’ was not so firmly related as once thought, more of an adopted child or the ‘new and/or old-kid-on-the-block’. These theories involved models of a secondary migration (perhaps of another wave of Western Oceanic Austronesian speakers (e.g. Ross 1988, 1989) out of the New Britain area), or the creolisation of the culture of the Lapita peoples through extended contact with the existing Non-Austronesian speaking peoples. In Vanuatu, the later emergence of the incised and applied relief Mangaasi style was initially seen as possibly representing an intrusive population or the resurgence of the pre-Lapita inhabitants’ culture, following a brief Lapita ‘stopover’ (Spriggs 1984; Spriggs & Wickler 1989: 83). Opting for a form of creolisation, Kirch (1997: 77, 2000: 126) sees no abrupt ‘end’ to Lapita in the Bismarck Archipelago, instead proposing a gradual ‘settling in’ process, which eventually culminated in the development of local or regional cultural spheres. He suggests that changes in Lapita pottery style within the Mussau ceramic assemblages represent style changes produced by the same people, not an incoming one (Kirch 2000: 127). 3 Gorecki (1992: 42) takes the ‘old-kid-on-the-block’ theory to the extreme (and perhaps with some unsound chronological assumptions to back him up), suggesting that the incised and applied relief wares from the Bismarcks, Solomons, and even Vanuatu and New Caledonia, may derive from an earlier ‘Sepik’ tradition, dating back to around 5500 years ago. To explain the presence of incised and applied relief styles beyond the Bismarcks and Solomon Islands chain, that is, in areas where Lapita potters are generally believed to have been the first inhabitants, a combination of the above models has been proposed: the new pottery styles may have had their origins in Lapita (continuity), but had become progressively ‘Melanesianized’ in appearance through contact with Non-Austronesian groups (absorption) in the Bismarcks, before spreading out (secondary migration) through parts of the Solomons and into Vanuatu, New Caledonia and Fiji (Spriggs 1997: 159).

3 In fact, the Mussau sequence lacks the ‘end’ of the Lapita sequence as it is perceived elsewhere in the Bismarck Archipelago (see Chapter 2, fn. 8).
Clark (2003) has recently questioned the way in which the competing Lapita and post-Lapita decorative traditions have become tied to notions of ethnicity. He argues that following the inversion of the original ‘two population’ or ‘two-stratum model’ made popular by Dumont d’Urville in 1832, which viewed Melanesians and Polynesians as having separate origins and the Melanesian pottery tradition as the earliest, Lapita has come to represent the earlier Austronesian ‘away’ team and ‘Incised and Applied Relief’ the later ‘home’ Melanesian side (cf. Garanger 1972) in an inflexible dichotomy.

1.3 TRACING INTERACTION WITH STYLE

1.3.1 The decline and fall of Lapita

Interpretations of post-Lapita interactions are forced by association to contend with the tremendous weight of notions of cultural decline that are purported to describe the end of the Lapita period. This conceptual leap is predominantly inferred from a gradual deterioration in the Lapita decorative system and a reduction in the number of vessel forms. Kirch (1997: 161) highlights the perception that the contraction of once prolific and widespread interaction and exchange played a pivotal role in Lapita’s decline: ‘Changing external exchange networks are indeed the most likely explanation for the gradual decline and loss of the decorated component of Lapita pottery’.

Examples of references to Lapita’s decline and fall from greatness abound in the literature. The use of particular language to describe this ‘decline’ or ‘demise’ has helped to develop a robust narrative of the transition from Lapita to post-Lapita. Many accounts speak of a gradual progression from ‘fine’, ‘complex’, ‘intricate’, ‘ornate’, ‘elaborate’ or even ‘flamboyant and vibrant’ decoration in early Lapita pottery, to more ‘open’, ‘simpler’, ‘coarser’, ‘clumsy and haphazard’ dentate-stamping in late Lapita, to ‘crude’, ‘simple’ undecorated plainware, and finally to ‘coarse’ incised and applied decoration in post-Lapita pottery (see e.g., Kirch 1978: 12; Green 1979: 42-4; Kirch 1991: 151; Wahome 1997: 121; Best 2002: 17, 24, 50, 93; Summerhayes & Scales 2005: 15, 17; Sheppard & Walter 2006: 68). Lapita vessel forms are said to have undergone a marked ‘simplification’ in form and the number of vessel shapes reduced significantly (e.g. Green ibid.; Best 2002: 9, 24). Best (2002: 50) describes Lapita motif analyses

4 Authors tend not to comment on the application—well-executed or otherwise—of non-dentate decorative techniques such as appliqué, even if certain examples are considered unique (e.g. Summerhayes & Scales 2005: 17).
as being concerned with understanding a system in decline, where the rationale behind the
decoration has changed and the original meanings have been lost. The simpler designs at the
late end of the Eastern Lapita sequence were the ‘relicts’ of the former more complex designs
(Best 2002: 44). Best (2002: 41-4, 49-50, 53, 55, 62, 64, 93) has gone as far as proposing
‘devolution’ or ‘reduction’ sequences to describe the gradual ‘design decay’ of the Lapita
decorative system (see also, use of the concepts of gradual ‘devolution’ [linked to ‘transitional
believes there is convincing evidence that the Western Lapita system followed the ‘same
devolutionary path as that for other Lapita regions, although possibly at a different rate’ (Best
2002: 93). Furthermore, that this ‘devolutionary process’ within Eastern Lapita was inexorable
seems logical according to Best (2002: 44, 55): ‘Once started, why should it stop?’

Best’s (2002: 24-6) summary of the archaeological evidence for the first half of the
Lakeba sequence of Fiji (Lapita to Polynesian Plainware), is a good example of the narrative of
decline. Of the nine main aspects of technological change he outlines, five are specifically
described as involving ‘decline’ (the number and complexity of pottery vessel shapes, pottery
decoration, black sand tempers, and the manufacture and use of both flake tools and fish-hooks),
one involves ‘reduction’ (in the amount of temper used), another ‘stylisation’ (from complex to
simple decorative designs), some categories just disappeared altogether (e.g. certain shell
ornaments), and only adzes simply ‘change’ over this period. Settlements fragmented and rapidly
increased in number as people literally headed to the hills to seek refuge, and by the end they
were eating each other. These were apparently bleak times at the end of Lapita. Best, who to his
credit is looking specifically for the social implications of artefactual change (ceramics in
particular), interprets these trajectories as clear evidence of a society in decline; a formerly
hierarchical social system that had either fragmented or completely lost its socio-political focus.

In another example, Kirch (1997: 244-5) describes changes in the content, quantity and
diversity of exchange across the ‘Early’, ‘Late’ and ‘post-Lapita’ phases at the Talepakemalai site
in terms of a simple, progressive decline in ‘system complexity’ from ‘High’, ‘Reduced’ to ‘Simple’
respectively, in spite of the number of gaps and ‘?/unknowns’—particularly within the post-Lapita
phase—in the cultural sequence.

Intentionally or not, these narratives have the effect of casting aspersions on post-Lapita
pottery. A lingering ‘tut-tut’ can almost be heard, of the ‘she’s-really-letting-herself-go-these-days’
kind, manifested in the continued emulation of some of Lapita’s more homely traits (in particular
her range of plain ware), with far less time spent at the dressing table. Poor post-Lapita has even
been accused of not having the ‘aura’ of Lapita (Spriggs 1993b: 197). As Spriggs (1997: 118)
remarked, the overwhelming of the dentate-stamped component by predominantly incised designs on simple globular pot forms in the Mussau assemblages from around 2300 years ago was ‘simply the unfolding of a pottery sequence where less and less effort was being invested in making and decorating pots’. This general slackening off was to be ‘repeated again and again over the entire area from New Britain to New Caledonia’ (ibid.; see also, Spriggs 1992). Indeed, Sheppard and Walter (2006: 68) perceive this process of ‘systematic simplification’ as being an almost targeted slackening off, with complex Lapita decorative techniques disappearing ‘in the order of effort of execution’. Kirch (2000: 162) also pondered the seeming unwillingness or disinterest of the post-Lapita potters to invest long hours in decorating their pots.

My point here is that these characterisations have very serious implications for our perceptions of the nature of post-Lapita society and interaction, especially for those who view post-Lapita assemblages in the context of a continuous evolutionary sequence of development from Lapita (e.g. Kirch 1978, 1997; Spriggs 1984; Bedford 2006; Clark 1999). I do not dispute the evidential base of these ‘Lapita decline’ scenarios. It is clearly the case that dentate-stamped motifs do change, ‘simplify’ or become increasingly ‘abstract’ or stylised towards the end of the sequence (cf. Spriggs 1990; Kirch 1997: 133-8, 160; Best 2002: 44). But was the suite of post-Lapita decorative motifs—utilising a variety of techniques including incision, applied relief, paddle impression, fingernail impression and punctation—simply the design leftovers? The by-products of an inexorable trajectory of decline? (cf. Best 2002: 55) The stubborn stains left behind when all the ‘good stuff’ had dwindled and disappeared? Did the so-called ‘IAR Tradition’ ‘rise and rise’ (cf. Bedford & Clark 2001) phoenix-like out of the ashes of Lapita’s decay? Why do we not instead talk of the enduring strength of certain techniques and their application in new forms in the decorative system? What is of concern is that there appears to be an implicit value judgement being insinuated into the discussion of post-Lapita decoration and by inference to post-Lapita society and interaction. If one takes the evolutionary perspective vouched for by some researchers—whereby post-Lapita decorative styles mark the next stage in the long, continuous evolution of Lapita—and compounds it with a simple equation between stylistic decline and societal decline, we are surely predisposed to thinking that the post-Lapita pottery styles (and possibly other art styles) are vestigial relics rather than innovations and/or intrusions, and that the society that produced them was also characterised by decline and in situ (de-)evolution and perhaps an incapacity for long distance interaction and mobility. Similarly, Clark (2003: 206) has

5 Or as Clark and Murray (2006: 113) put it, describing the ‘simplicity’ of Late Lapita ceramic decoration at the end of the ‘design decay’ process: ‘the design “packing” once the culturally “significant” designs had been lost’.
described how under the implicit hierarchy of the ‘two-stratum concept’, which viewed Melanesians as less advanced than Polynesians (see also, Spriggs 1984: 222), the post-Lapita ‘Melanesian ceramic style’ was characterised as being typified by simple forms of decoration.

Countering this notion of ‘decline’, Ambrose (1997: 535-6) has proposed that the incised and applied relief ware in fact represents a transition to a technologically more advanced and durable form of pottery. Far from trying to emulate Lapita’s style (and not getting it quite right due to a lack of concerted effort), this feisty new Island Melanesian-born ware overthrew the ‘shackle’ of the emblematic design system of Lapita pottery. This change saw a consequent reduction in the number of places making pottery and generated greater regional stylistic diversity. Others have also noted a distinct difference in composition between Lapita pottery and incised and applied relief ware (e.g. Anson 1999).

Burley and Dickinson (2004: 12, 22-3) have also argued against the ‘long assumed position’ of the Late Lapita (Level I) occupation at the Sigatoka Sand Dune site as an intermediate phase in the ‘devolution’ of Lapita ceramics in Fiji. Rather than reflecting Best’s ‘devolutionary spiral’, they argue that even in the absence of complex decorative designs the Sigatoka assemblage represents a ‘highly viable industry’, with new vessel forms indicative of ceramic innovation rather than degradation (see also, Burley & Clark 2003: 238).

Furthermore, the equation of art-style-in-apparent-decline with society-in-decline may not always be accurate. Without intending to be too glib, while some might have been tempted to view abstract and stylised forms of Modern Art such as Cubism as having ‘devolved’ from the realism of high Renaissance period art, the post-Industrial Revolution society that produced Cubism was definitely not on a decline trajectory in a socio-economic sense.

A more concrete, archaeological example comes from North America, where until relatively recently, the ‘stylistic decline = societal decline’ notions that pervade the end of Lapita were also entrenched in interpretations of the transition from the Middle to Late Woodland period. As Braun (1991: 371-2, 383) explains, the reduction in the production and exchange of presumably ‘prestige’ items, the decreased differentiation in burials, together with a decline in the amount of decorative effort that appeared to have been invested in household pottery at this time, were orthodoxy interpreted as a decline or simplification in social interaction between neighbouring communities and a concomitant increase in localism and social isolation. Clearly, this rings a number of bells with the end of Lapita. However, subsequent research on the Woodland period highlights the need for western Pacific researchers to proceed with caution. Later research revealed ‘considerable evidence against this notion of a simplification in social
relations within and among settlements’ (ibid. 373). While the amount of decoration on Late Woodland pottery decreased markedly there appeared not to have been a coincident breakdown in either cultural interaction or inter-generational transmission of knowledge and skills. Furthermore, the decline in decoration did not appear to be correlated with a decline in its significance. On the contrary, there was an increased use of minimally decorated, domestic pots as burial accompaniments, suggesting they had become more culturally significant (Braun 1991: 384).

Similarly, drawing in part on Morphy’s (1977) research of the artistic systems of the Yolngu of northeast Arnhem Land, Chiu (2005: 32) argues that simplicity of Lapita design may not equate with simplicity of expression, symbolism or contingent interactions. Like Yolngu geometric art, in which simplicity is a tool that permits multiple meanings to be incorporated and conveyed at once—thus increasing the design’s power—while naturalism reduces this multivalency, Chiu suggests that stylised Lapita motifs may have been a social means of emphasising hierarchy in interactions. Furthermore, she questions the ‘logical sequence’ (cf. Spriggs 1993a; Ishimura 2002) from complex, highly elaborated, anthropomorphic designs to more simplified, geometric designs in Lapita dentate-stamped motifs, finding that both complex and simplified versions of motifs coexist in the same phase of occupation in some sites.

The narrative strengths of the decline storyline therefore have the potential to prevent a more nuanced consideration of post-Lapita decorative techniques and motifs, and more importantly the mechanisms involved in producing cultural change (including interaction) in the post-Lapita period. It may also be leading to the easy acceptance of ‘decline’ across the spectrum of cultural circumstances that no doubt were present in Near and Remote Oceania at the time. Surely, at least in the Bismarck-Solomons region, the situation at the end of Lapita was very much about gain rather than loss—as it was also at the beginning of Lapita (cf. Spriggs 1984; Wickler 1990: 143; Kirch 1997: 116)—as a result of interaction with existing indigenous communities.

There is also a certain underlying passivity implied by Lapita’s relentless stylistic descent and the implicit associated notions of (de-)evolutionary continuity, which has the effect of denying the agency of cultural groups in the post-Lapita period. It would appear then, that the same passivity that Kennedy (1982: 30) saw as falsely being used to characterise Island Melanesia’s response to the beginning of Lapita—that is, as a ‘passive recipient of influences’ rather than as ‘an active participant in contact with a Southeast Asian world of islands’—is also present at its ending. Certainly, it was in opposition to these notions of stylistic decline at the end of Lapita, and the associated inferences about the decline of widespread interaction, that the ‘incised and
applied relief tradition' found its initial strength in attempting to explain the observed present-day cultural diversity in Melanesia. As Kennedy (1982: 24) commented over two decades ago, the writing on Melanesian culture history of the time 'easily leaves one with the impression that the decline of the Lapita style in Melanesia marks the end of widespread pottery styles there, and by inference, the beginning or reassertion of Melanesian local isolation and resulting cultural diversity'.

Torrence (2003: 292) has used examples of what could be described (in the parlance of social evolutionary theory) as ‘devolution’ in the archaeological record of the New Guinea Highlands to highlight the inappropriate use of unilineal models for understanding prehistory. Torrence emphasises the ‘nonsense’ of reducing complex history to simple evolutionary terms. I would argue that perceiving the transformation of early or ‘classic’ Lapita (*sensu stricto*) to its various post-Lapita incarnations in terms of a unilineal, inexorable trajectory of ‘devolution’ or (more nebulously) ‘evolution’, is similarly reducing our understanding of the complexity of the social and historical processes and interaction involved. Surely ‘forward’ and/or ‘backward’ on the arrow of progress were not the only alternatives. Similarly, Trigger’s (1978: 12) description, some thirty years ago, of one of the objections to evolutionist trends in American archaeology, is still highly relevant to the current discourse regarding the nature of Lapita’s end, the drivers of cultural change in this period (usually dichotomised between external and internal), and how we perceive post-Lapita phenomena. The objection was that:

... the current view of evolutionary processes, as being almost exclusively *internal* to societies and superorganic, has resulted in cultural development being interpreted in terms of gradually unfolding cycles of development and decline [emphasis added].

This evolutionist view did not account for the precipitous and drastic transformations that cultural systems sometimes experienced.

Finally, the concept of ‘design decay’ can also be problematic in regard to what ‘similarity’ of design *means* in terms of interaction. For example, on the one hand, Clark and Murray (2006: 108) note that ‘style decay is countered by inter-archipelago interaction which promotes style homogeneity and synchronized changes in pottery style’ (i.e. similarity is produced by interaction), while on the other hand they argue that ‘in a design system in decay … the design

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6 In a different take on the matter, Bedford (2006: 264) sees the continual drawing of post-Lapita ceramic parallels between archipelagos as *contributing* to notions of post-Lapita as a devolved entity. As he states: ‘Pacific archaeologists who deal with ceramics need to stop packaging the post-Lapita period as a devolved and reduced version of Lapita by making connections between island groups on the basis of individual ceramic traits.’
similarity of Late Lapita assemblages is in part a function of style decay ...' (2006: 114) (i.e. similarity is due to decay not interaction). The vexatious question of identifying interaction through ‘similarity’ (or difference) is further explored below.

1.3.2 That old chestnut: same or different, analogous or homologous, and from what tree did it fall?

As Spriggs (2004) has noted, recent challenges by Clark (1999) and Bedford (2000, 2006) to his claims of parallel, pan-Island Melanesia stylistic changes in post-Lapita pottery, which he argued represented continued connections between the regions, have sharply focussed the post-Lapita debate on the question of the nature, levels and meaning of similarity of the pottery styles of this period. What Spriggs describes as potentially the next big debate in western Pacific archaeology can be simply put as: how similar are the immediate post-Lapita pottery styles? And what does it mean if they are similar? This age-old conundrum at the crux of stylistic studies continues to plague our understanding of whether there was continuing inter-regional interaction or a lack of it at the post-Lapita ‘transition’. To debate similarity issues, archaeologists have peppered their discourse with terms borrowed from biology—the ‘meta-language and concepts of biological evolution’ (Tuzin in Terrell et al. 1997: 167). The questions then become: do assemblages (e.g. pottery [decoration, motifs, and vessel forms] or rock art styles) look the same because they were made by descendants of historically and culturally related groups who may have been in contact or at least originally connected (i.e. homologous similarities)? Or, do they look the same by coincidence having, in fact, been produced by historically unrelated (or at least very distantly related) and unconnected groups in isolation (i.e. analogous similarities as a result of convergent evolution)? Homologous traits are the lynch-pins of phylogenetic models of Pacific prehistory (e.g. Kirch & Green 1987), which view cultural diversity as stemming from the tree-like branching of groups from a common origin.

In cultural contexts, however, difficulties arise concerning the distinction between, and identification of, so-called analogous or homologous traits in ceramics or other artefacts that do not hinder biologists. These complications relate to the types and levels of connection or interaction that are possible between cultural groups, be they either closely or distantly related. For example, Bedford and Clark (2001) argue for Vanuatu and Fiji that while post-Lapita pottery styles had their roots in the Lapita cultural complex—i.e. they were descended from the same culturally related groups—they independently evolved in situ into these forms, that is, with very little in the way of inter- (or intra-) regional interaction. Their argument for a kind of parallel evolution of ceramic styles—occurring at roughly the same time but independent of each other—implies that there is continuity from Lapita ceramics reflected in homologous traits within each
archipelago, but effectively analogous similarities (if indeed similarities are conceded at all) between archipelagos.

Alternatively, similarities in artefact assemblages may arise as a product of the diffusion or exchange of ideas (and potentially by the physical exchange of both the pots and the potters themselves) resulting from a high level of interaction or contact between groups that are closely related or possibly unrelated, that is, with different cultural backgrounds, languages and origins. Cultural diversity arising from this kind of continuing diffusion and exchange between cultural groups is the basis of reticulate models of Pacific prehistory (see Bellwood 1996 for a summary of the use of phylogenetic and reticulate models).

Bellwood (1996: 883, 888) points out that both phylogenetic and reticulate processes are important parts of ethnogenesis and interaction at different scales, with phylogeny more appropriate to large-scale patterns and reticulate processes more appropriate to small-scale, ethnic group-forming. Similarly, Clark (1999: 252) concluded that his model for prehistoric cultural transformation in Fiji (but equally applicable to all Remote Oceania) combined support for both phylogenetic and reticulate processes. That is, Fijian culture is essentially based on an independent branching or diversification from a common, founding Lapita population, and was subsequently transformed (towards the end of the ‘mid-sequence’) by reticulate processes (i.e. interaction) within the archipelago.

The type of artefact may also have a huge bearing on the identification of both interaction and homologous/analogous similarity. Clark (1999: 247) has pointed out that utilitarian ceramics made by household groups are possibly inappropriate for the study of low levels of interaction, a point which may well apply to other types of artefact. Consequently, low levels of continued interaction may simply not be visible in some artefact forms.

Based on their belief in the primacy of internal, local processes in producing changes in their respective ceramic sequences, both Bedford (2006: 174-92) and to a lesser degree Clark (1999: 238-47, 252) may have been predisposed to applying perhaps overly stringent tests of similarity when making comparisons with other southwest Pacific, post-Lapita assemblages. Bedford is dismissive of ‘broad parallels’ and the ‘extrapolation of somewhat vague homologous ceramic traits’ to explain change in the ceramic sequences of islands separated by thousands of kilometres. And Clark’s review failed to find ‘any close stylistic analogues’ to the Fijian assemblages and did not ‘reveal a single case where interaction was sufficient to cause ceramic convergence’. He therefore concluded that the sequences of ceramic change from Lapita to post-Lapita were highly variable in Remote Oceania—though this no doubt also reflects the very broad
period of the ‘mid-sequence’ (from 2500–1000 BP) that he was considering—and there was ‘no convincing evidence for anything other than in situ ceramic development in the post-Lapita period’. Clark (2003: 206-9) may also be partly motivated to highlight regional differences based on his views of the unshakable longevity of the ‘two-stratum’ population model. He argues that this model has inflexibly linked post-Lapita incised and applied relief pottery styles with population movements of Melanesians, and in doing so obfuscated both the variability amongst pottery assemblages and the potentially more complex historical reality. Bedford’s (2006: 190) championing of the differences between the Vanuatu and other post-Lapita assemblages that various researchers have drawn parallels with, also appears to be part of a (justifiable) reaction against the careless use of ‘Mangaasi’ or ‘Incised and Applied Relief Tradition’ as blanket terms for virtually any non-dentate-stamped (or paddle impressed) ceramic, which as mentioned above ‘homologised’ collections rather than highlighting their differences. These motivations are very good ones. The events of the post-Lapita were no doubt much more complex than the models being critiqued allow for.

However, with Bedford and Clark’s (2001) almost exclusive insistence on the primacy of local processes operating in relative isolation, I have the distinct impression that instead of providing a well-weighted counter to the previous imbalance (in which external influences were over-emphasised), they have in fact tipped the scales too far. I think we need to be careful that in the pursuit of the ‘real’ complexity we do not fall into the trap of seeing external/internal processes or the similarities/differences of post-Lapita ceramics in terms of a rigid and inflexible either-or. In the extreme version, such dichotomising would produce a debate in which only a ‘perfect [stylistic] match’ between pottery assemblages would be permissible ‘proof’ of interaction between communities, and in which any differences are viewed as automatically discrediting the case for the affirmative and as deriving only from local processes in isolation. But the correlation of both similarity and difference to interaction is not so clear-cut.

The opposite side of the argument then, of what difference in ceramic styles might mean in terms of interaction, has received less intense scrutiny. It is often interpreted as straightforward evidence of either a lack of interaction or historical relatedness between cultural groups (or at least a significantly lesser amount of interaction between them) and as supporting the primacy of local processes. Importantly, however, this may not be the case. Ethnographic examples provide important insights into the way that difference can operate amongst interacting communities. On the Sepik coast of northern New Guinea, Welsch and Terrell argue that the extraordinary diversity of material culture (including pottery styles and forming methods) and languages belies a high level of continuing trade and interaction between villages through a network of inherited
relationships. This network unites them in a resilient and overarching ‘community of culture’ with a ‘common pool’ of material culture (Terrell et al. 1997: 167-8; Welsch & Terrell 1998: 68-9). Similarly, Schwartz (1975: 108-10) has described the way that cultural differences were perceived of and used—and often amplified—by the many mutually identifying ethnic groups of the Admiralty Islands (a practice that he calls ‘cultural totemism’) that make up the broader ‘areal culture’. In spite of these differences, the areal culture maintained a high degree of linguistic and cultural commonality, in which all groups were linked by direct and indirect interaction. In this context, differences were not the result of separation or communicational gaps, but signalled individual or group identity and proprietary ownership. For example, while manufactured objects such as pots, baskets and spears may have been ‘completely characteristic of particular ethnic groups’, other cultural institutions (e.g. social and political organisation, marriage, dance styles, ceremonial exchange etc.) were uniform throughout the island group (Schwartz 1975: 112). In addition, Schwartz (1975: 117-8) notes that there may be a culturally perceived—but difficult to define—threshold that constrains differences within certain limits. In this way, the Admiralties’ cultural system inseparably accommodated both atomism (of political/ethnic groups, i.e. cultural ‘difference’) with socio-economic/ceremonial integration (i.e. cultural ‘similarity’) (Schwartz 1975: 117). In Peru, modern Shipibo-Conibo potters of the Ucayali Basin also fuse similarity (or a set of consistent style ‘rules’) and difference within their pottery style. While emblematic styles representing ethnic boundaries are ‘almost inviolable’—though in practice these same boundaries are quite permeable in relation to marriage and exchange—they still possess ‘an astonishing amount of variability’ (DeBoer 1990: 102-3). DeBoer (ibid.) found that no two artists ever produced identical designs and that ‘slavish imitation’ of designs was likely to mark an unskilled or socially marginal artist. Rather, the style itself was complex enough ‘to ensure endless novelty’ and provided ample room for individual artistic expression or ‘assertive’ style (cf. Wiessner 1990).

Importantly, these examples indicate how elements of both similarity and difference—as the products of both local processes and interaction—might be incorporated into designs/motifs used by interacting cultural groups, producing somewhat divergent but broadly similar pottery (and other) styles. As Kennedy (1997: 95) has discussed, referring to Schwartz’s research, while the recognition of differences are the basis of proprietary ownership, specialisation and group/individual identity, the similarites ‘may be crucial in maintaining the communicative network through which difference comes to be accepted as culturally significant’. In other words, similarity at some level—although it is often ignored by the participants—may be the crucial medium of the interaction, which acts as the gauge through which certain differences are contrasted, recognised, accepted and given meaning. Consequently, some amount of difference within a
perhaps overarching style must be allowed for if we are to acknowledge and accept (the inevitable) local and individual agency in stylistic expression.

These examples also highlight that cultural differences (material or otherwise) do not necessarily attest to a lack of interaction, or conversely, that interaction between communities necessarily leads to cultural similarities. As Kennedy (1977: 13-15) has argued in reference to Southeast Asian cultural differentiation (drawing on the work of Barth 1969 and others), even quite dramatic cultural differences ‘of sufficient magnitude to place groups … at quite distinct “stages” of development, do not necessarily imply lack of social interaction’. In turn, ‘interaction does not necessarily lead to a loss of ethnic diversity’, and ‘groups with distinct ethnic identities may nonetheless belong together in complex social, economic, and political interdependence’ (ibid.).

Barth (1969: 9-10, 14-16) made a number of important points on the nature of social boundaries between cultural groups and the persistence of cultural diversity in the context of interaction that are relevant to the discussion of post-Lapita interaction, in particular given the assumed entrenched localism of groups at this time. He described ethnic distinctions or boundaries (or ‘cultural difference’) as persisting despite ongoing mobility, interaction and the exchange of information. Rather, boundaries are maintained through internally mediated processes of exclusion and incorporation of discrete categories—criteria for ‘membership’ and ways of signalling it—occurring in the course of interaction, which is governed by a systemic set of rules. Put simply, if social groups agree on the conduct of interactions—the ‘rules of the game’—they do not need to compromise their own identity. Indeed, not only do cultural differences not depend on an absence of social interaction, to the contrary, they are ‘often the very foundations on which embracing social systems are built’ (ibid. 10).

In essence, the social significance of material culture similarities and differences, and what these mean in terms of interaction, form very real and complex conundrums for archaeologists. As Kennedy (1977: 13) points out (again drawing on Barth), one of the ‘most difficult aspects’ of socio-cultural diversity emerging from her review of Southeast Asian ethnographic data is that:

... continuity of a cultural tradition over time, and continuity of a group constituted by social networks and a distinct identity are two separate things. Changes in cultural inventory are not

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7 See also, Welsch and Terrell’s (1998: 68) discussion of the implicit understandings and expectations of ‘friendship’ that govern interaction on the ‘social [playing] fields’ of the Sepik coast.
necessarily reflected by changes in social organisation and group identity, and vice versa. The establishment of cultural continuity over a period of time cannot be used as evidence for a continuing social unit. [emphasis added]

The potential therefore, for interpreting the (same) archaeological signature of ‘difference’ by means of different causal processes is as large then as for ‘similarity’. An archaeological case in point is the cause attributed to what are agreed differences in the ceramic sequences of Vanuatu and Fiji in the post-Lapita. While Best (2002) sees ‘difference’ as indicating new, external cultural influences, probably a migration of people into Fiji, both Clark (1999: 251, 253) and Bedford (2000, 2006) see emerging differences in their ceramic sequences as evidence of dramatic, punctuated, internal change, that is, a form of ‘punctuated’ cultural evolution or interaction, in the broader context of a continuous and unbroken cultural development. Clark builds an argument that even minor socio-economic changes in cultural groups can cause major changes in pottery style. He therefore concludes that the ‘relatively rapid’ (1999: 253) change in the ceramic series in Fiji from about 2300 BP, which marks the end of the Lapita ceramic sequence and the emergence of the relief-marked Navatsu phase ceramics, most likely indicates a significant socio-economic change related to population density, horticultural development and increased sedentism. For Vanuatu, Bedford emphasises that the evidence from Efate highlights the ‘ever-changing and complex nature’ of the development of ceramics, even within one island. He states: ‘Rarely are they static or unchanging with both form, decorative techniques and motifs often changing quite dramatically over short periods of time’ (2006: 191; emphasis added). In regard to the objection discussed above by Trigger, Bedford and Clark clearly allow for the possibility of dramatic change within their respective records, even though they are seen as being primarily driven by internal evolutionary processes.

So, how do we identify whether similar traits are homologous or analogous? And how do we distinguish whether difference is the result of ‘dramatic’ internal or externally influenced change? And how do we infer interaction from all this?

In a recent review, Cochrane (2005: 409-10) claimed that the reason Pacific archaeologists are still asking ‘how do we explain artefact similarities and differences within and between islands and archipelagos?’ is because they currently lack a general explanatory theory that is explicitly and systematically linked to ‘particular kinds of observational units or classes used to tabulate archaeological phenomena’. In his thesis, Cochrane (2004) proposed just such an explanatory framework to investigate the evolution of material cultural diversity in the Yasawa Islands of Fiji, which specifically focussed on distinguishing homologous similarity. Fuelled by the tenets of Darwinian/evolutionary archaeology, Cochrane wields a haul of biological evolutionary-
based concepts in an attempt to construct ‘scientific explanations’—those allowing for the generation of testable hypotheses, rather than the ‘commonsense’ ones of culture historical archaeologists which lack an explanatory framework—for similarities in the Yasawa ceramics. In true New Archaeologist style, Cochrane (2004: 72, 75, 83, 368) criticises both Best and Clark for their culture historical leanings and for not putting all their theoretical cards on the table. In fact, for failing to have an explanatory framework, using empirically derived units of measurement in their ceramic analyses instead of ‘ideational classes that link explanatory theory to the empirical world’ (ibid. 50) and for conflating homologous and analogous similarity, in Cochrane’s opinion they do not have much of a hand at all.

Cochrane’s (2004: 9) explanatory framework explicitly employs the mechanisms of natural selection and ‘sorting’8 (as well as ‘drift’), which act upon certain faithfully reproduced, ‘fecund’, long-lived and advantageous cultural trait classes within (Darwinian-style) ceramic ‘populations’. In a kind of survival-of-the-fittest-rim-form way, ‘successful’, ‘selectively-neutral’ or functional cultural/ceramic traits are inherited (a form of ‘copying-success’) via cultural transmission, which enables the construction of ‘ceramic transmission lineages’ or ‘cultural phylogenies’ tracking ‘heritable’ homologous similarity (Cochrane 2004: 11-12, 21, 89, 95-6, 101-7).

Presumably, all this would make Stephen Jay Gould roll in his grave. The eminent evolutionary biologist and geologist despaired deeply of the common usage of the term ‘cultural evolution’ to describe the history of human artefacts and social organisations, feeling that it ‘obfuscates far more than it enlightens’ (Gould 1996: 219). He would probably have equally despaired at the use of natural selection as the mechanism of cultural processes and diversity. Although Gould conceded that some aspects of the two phenomena must be similar—‘for all processes of genealogically constrained historical change must share some features in common’ (ibid.)—he argued that the differences far outweighed the similarities, and that human ‘cultural change’—the term he advocated—was an entirely distinct process operating under ‘radically different principles’ (ibid.) to natural, Darwinian evolution. Gould (1996: 220) stated that the

8 In stating that ‘Sorting mechanisms explain the differential persistence of cultural traits over time and space’ (2004: 11), Cochrane references Hurt and Rakita’s (eds.) (2001) volume on conceptual issues relating to style and function in evolutionary archaeology, as well as Vrba and Gould (1986). Cochrane goes on to state that: ‘The most well-known sorting mechanisms [sic] is natural selection’. In fact, Vrba and Gould (1986), who confine their discussion only to genes, organisms and species (not culture), clearly state that ‘sorting’ is a simple description of differential ‘success’ (i.e. not a mechanism), whereas selection is a causal process.
obvious, main difference between Darwinian evolution and cultural change lay in the ‘enormous capacity that culture holds—and nature lacks—for explosive rapidity and cumulative directionality’. The rate of cultural change can vastly outstrip the maximal rate of natural Darwinian evolution. Furthermore, he noted that among the many differences in deep principle between them, two factors stood out as the ‘motors of cultural rapidity and directionality’ (ibid.). Whereas natural evolution is a process of constant and irreversible separation and distinction (between species), cultural change is always open to the amalgamation and anastomosis (union through intercommunication or interconnection) of different traditions or lineages—a potentially ‘explosively fruitful (or destructive)’ mechanism unknown in the ‘slower world of Darwinian evolution’ (ibid. 221). Secondly, the mechanism of inheritance is fundamentally different. Whereas Darwinian evolution works by the ‘indirect and inefficient’ (ibid.) mechanism of natural selection—with the summation of favourable variants over many generations leading to evolutionary change—and Mendelian inheritance, the basic mechanism of cultural change operates in a potentially Lamarckian fashion, where cultural knowledge can be passed via education directly to (and accumulated in) offspring in the next generation. Gould stresses that the potential for inherent ‘progress’ via this kind of Lamarckian inheritance by no means guarantees its realisation in actuality, and that the ‘radical contingency of all history can intervene in a thousand potential ways’ (ibid. 222). However, the fundamental difference of cultural change is its potential for a ‘general and driven trend’, which is most unlike the ‘minor and passive trend that Darwinian processes permit in the realm of natural evolution’ (ibid. 223).

Although Cochrane (2004: 10, 15) concedes that cultural transmission is ‘considerably more complicated’ than biological, given the potential to transmit across lineages—i.e. in reticulate processes—he shores up the successful identification of phylogenetic, cultural transmission lineages by adding a dash of economic rationalism and island isolation to the mix. The transmission of culture by humans, he argues, tends to be spatially constrained due to distance-costs—all geographic paths for cultural transmission are not of equal cost (2004: 126)—and therefore the frequency of transmission tends to be inversely proportional to distance. Certain types or ‘dimensions’ of ceramic decoration (‘selectively neutral’ trait classes) such as lip termination, paddle-impression, incising, and dentate-stamping, are conceived of as ‘equal-cost

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9 Atholl Anderson (ANH, RSPAS, ANU, pers. comm. 2006) notes, however, that distance by itself is a relatively poor predictor of the cost of marine transport, which is more greatly influenced by wind direction.
alternatives in the overall budget of human cultural expenditure’ (2004: 76).\textsuperscript{10} In this way, he proposes that cultural transmission will produce localised patterns of homologous similarity, which can be successfully distinguished if populations are carefully defined relative to a problem.

There is a whiff of self-fulfilling prophecy in the three-step process Cochrane uses to supposedly target only homologous similarity and construct his cultural transmission lineages. First, his identification depends on classifying his ceramics into a series of ‘selectively neutral’ ‘cultural trait classes’. These trait classes, ‘purposely built to track homologous similarity’, exhibit the characteristics of fidelity, fecundity and longevity, which are assumed to capture the kind of similarity only explicable by cultural transmission within a population (2004: 102-4). The second step involves using both occurrence and frequency seriation to assess the heritability of classes and therefore their ability to track homologous similarity. The order of his groups must match a set of expectations for phenomena that share heritable similarities, such as Dunnell’s distribution (i.e. it must be continuous and overlapping) and frequency laws (i.e. they must conform to lenticular or battleship-shaped distributions). Though in a somewhat circular manner, he also states that the method of seriation he employs ‘tracks heritable continuity by using theoretically constructed classes [see step one] to arrange empirical groups’ (2004: 105). The third step in the process arranges these established homologous trait classes into a series of hypothesised historical relationships or transmission lineages using cladistics, a method which specifically (and only) constructs phylogenetic trees.

Throughout his thesis Cochrane (e.g. 2004: 275, 311) appears to rely somewhat heavily on asserting that any spatial or temporal patterning in ceramic variation (e.g. surface modification, fabric composition)—i.e. in a ‘non-random’ distribution—can be taken as evidence of cultural transmission and therefore homologous similarity. In a good illustration of his reasoning, Cochrane states that the spatial and temporal patterning evident amongst his 14 jar rim-temper classes ‘may describe homologous similarity as a consequence of cultural transmission’. He then stipulate(s), prior to evaluation by seriation, that convergence and parallelism can be ruled out as explanations based on ‘geographic propinquity’ (2004: 318).

It is not my purpose or intention in this thesis to provide an exhaustive critique of Darwinian/evolutionary archaeology or the use of natural selection as a mechanism to explain cultural patterns, nor to wade too deep into the long-standing tussle between culture historical

\textsuperscript{10} Cochrane does not appear to explain how dentate-stamped motifs can be considered ‘neutral’ nor how they might be ‘equal-cost’ alternatives to paddle-impression or incising.
approaches and evolutionary ones. However, it seems apparent that despite the explicitness of Cochrane’s theory-driven framework and its guise of certainty, a degree of speculation regarding the identification of homologous similarity is still required. I am also sceptical of the ability of jar-rim classes on their own to adequately measure cultural diversity, particularly if pots are not good indicators of interaction or ‘cultural transmission’. Indeed, Cochrane (2004: 368, 378-9) himself suggests that similarly constructed transmission lineages for vessel forms, subsistence systems and other artefact forms could produce similar or contrasting diversity patterns. These problems of style will not be resolved on the basis of the analysis of single artefact types.

1.4 TRACING INTERACTION WITH COMPOSITION

1.4.1 The proof is in the pudding, but what does the pudding mean?

Despite an increasing amount of research on the characterisation of other materials (such as stone adzes and cherts), pottery and obsidian are still the ‘big guns’ of compositional analysis, and have perhaps contributed the most to our reconstructions of past interaction ‘spheres’ or networks in both Near and Remote Oceania. Compositional analyses are particularly alluring in investigations of interaction because they appear to offer the promise of ‘hard proof’ of an object’s movement or lack thereof, in other words ‘definitive physical evidence of either migration or culture contact’ (Dickinson & Shutler 2000: 209, emphasis added). While there is no denying the amenability of either of these two materials for the task—with geochemical and petrographic analyses of pottery sometimes allowing clear allocation to a region or procurement zone, and obsidian permitting the even finer scaled allocation to source—there are emerging interpretative ‘blocks’ associated with both, in regard to their (compositional) ability to provide evidence of culturally significant (or socially meaningful) interactions between communities.

There are clearly a number of different types of interaction or exchange involving material objects—with different social meanings and values attached—that could have occurred in the past in this part of the Pacific. Regarding modern Pacific systems, Thomas (1991: 7) states, ‘exchange is always, in the first instance, a political process, one in which wider relationships are expressed and negotiated’, so that particular characteristics of transactions ‘at once reflect and constitute social relationships between both groups and individuals’. However, he further notes

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11 Trigger’s (1978) discussion of these trends in American archaeology nearly thirty years ago is still very relevant today.
that the importance of the social relationships expressed and constructed through exchange should not necessarily take precedence over the importance of the thing itself that is being exchanged, which lends an even greater degree of diversity and contingency to the exchange act (Thomas 1991: 17-20). Thomas notes that the ‘exchangeability’ of a specific type of material object is culturally constructed and dependent upon the specific intrinsic and attributed properties of the object. There are culturally specific ‘rules’ and restrictions governing the appropriateness of the prestation or exchange of a particular type of thing embedded with a particular history and value. That is, is the object appropriate to being sold/traded to anyone, anywhere, or can it be given only at certain times, or is it always improper to give or sell (Thomas 1991: 18, 73)?

The large number of modern Tangga (ttg) terms that are used to discriminate between forms of exchange reminds one of the potentially large exchange vocabulary and associated forms that may have been present at the post-Lapita ‘transition’. Modern vocabulary on Tanga indicates that there is no clear division between economic and ceremonial/ritual exchange. Tangans conceive of a number of different forms within these two broad ‘types’ though there is sometimes an overlap between the two, and a single form may involve a number of different types of objects, acts or people. Indeed, Thomas (1991: 4) has noted that a conceptually ‘broad continuum’ between the systems for the exchange of commodities and gifts is characteristic of many indigenous Oceanic societies today. This enmeshing of the social and economic values of trade or exchange is seen in historic Manus trade, where Ambrose (1978: 329) describes trade as having a clear social imperative: ‘The driving force for maximising external trade advantage was the desire to succeed in socially internal ceremonial distributions of wealth’ (emphasis in the original). A similar rationale prevailed amongst the Tolai of the Gazelle Peninsula, whose major preoccupation with commerce was tied to a desire to accumulate wealth in the form of shell money (tambu) and, by this means, social influence and power (Epstein 1969: 14-5). This situation is also apparent today on the Lihir island group to the north of Tanga (pers. observ.), where the money derived from recent gold mining royalties, compensation and employment opportunities has provoked a tremendous wave of internal ceremonial activity, which is being fed by external trade. For some time now, Lihiran clan leaders have been attempting to out-compete each other in the abundance of their customary exchanges, and as a consequence, Tangans are

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12 The language spoken on the Tanga and Anir Islands, and in locations on the east coast of New Ireland (see below).
making a lucrative killing from the supply of pigs to Lihir for this purpose.13 These examples also illustrate how internal and external processes of interaction and exchange may be interconnected and operate concurrently. Epstein’s (1969: 14) observation of the Tolai is particularly pertinent in this regard. He noted that although the social life of the Tolai was marked by an ‘intense parochialism’, other equally deep-rooted institutions such as marriage and trade, created more widespread links to neighbouring areas.

On Tanga, all forms of exchange are driven by what Foster (1995: 145) describes as the culturally dominant definition of Tangan exchange, where the equivalence of the things to be substituted or exchanged is axiomatic. Regarding forms of economic transaction, Foster describes the term fapik (tgg) as meaning to barter local specialities by journeying to another district of the island(s), for example to swap coconuts for leafy greens—a practice that his Tangan informants said they rarely engaged in nowadays.14 While on Tanga, I was informed that the term umat, meaning to sell something at a market (maket long en, Tok Pisin (TP)), stood in direct opposition to the term fapik. The Tangan term for ‘buying’ (fil) can apply to purely economic, cash transactions (buying things at a tradestore or paying tax) as well as to more ritual ‘repayments’ of shell valuables and cash to a bride’s parents for the nurture and hard work of child-rearing (Foster 1995: 146). Other fil exchanges are a means of ‘buying’ an obligation from someone. For example, fil taufi (buying a clan leader) involves the presentation of a large cooked pig to another leader, which obligates him to provide pigs for related upcoming feasts. The words ting or lulu can also describe ceremonial ‘buying’. For example, the host lineage will (symbolically) ‘buy’ (tinge) the baskets of yams and other food delivered to a mortuary feast with 10-toea coins, and recipients will ‘buy’ pigs (tinge or lulu am bo) from the contributors with shell valuables (ibid. 150). Kos transactions (bekim, TP) imply the strict return of like for like; a form of exact, cooperative reciprocity as in kos bo, which is the return of a pig for one previously given. Kos fang represents repayment ‘in kind’, where shell valuables, other goods and cash are given to one’s father in repayment for his nurture and care. A more encompassing notion of exchange is found in the term pilis or kilis, meaning ‘replacement’ (ibid. 148). This term can be used in the same way as

13 Tangans spoke of this ceremonial competition between Lihirans as being like a race (‘ol i resis nau’). Pigs could command between 300 to 1000 kina depending on their size on Lihir. Two pigs being raised by the son of my host family in Taonsip for sale on Lihir were named ‘Copper’ and ‘Plank’ in anticipation of the building materials that their sale would be able to provide.

14 My own experience of a fapik in Kamgot village on Anir in 1995 was very different. This fapik was a scripted, ritualised exchange of baskets of yams, coconuts etc. between members of different clans, and could suggest that what was originally a ‘trade’ transaction has been subsequently memorialised in a kastam (TP) ceremony.
the TP word *senis* to connote simple exchange (e.g. a pig for a chicken) (ibid. 144), as well as to describe substitution (e.g. the redistribution of a pig to a man who originally contributed a same-sized pig) or succession (e.g. of old leaders by the next generation).

It is increasingly becoming apparent that compositional analyses of Lapita and to a more limited degree post-Lapita ceramics—in terms of the characterisation of their component sands and clay—may not be the most appropriate vehicle for tackling questions of social interaction, be they culturally significant ones or not. In her plenary address to the 2005 *Australasian Archaeometry Conference* in Canberra, Professor Julie Stein (University of Washington) summed up this dilemma facetiously but well. To paraphrase, she complained of the plethora of recent ceramic sourcing studies that combined to reveal little more than that ‘people made pots from the sand they were standing on’. Within the Bismarck Archipelago, a number of studies have shown that Lapita period pottery production was predominantly local, there was generally only a limited amount of trade or exchange of pots or raw materials between communities, and that when exchange did occur it was generally over short distances (Anson 1983; Dickinson 1998; Thomson & White 2000; Summerhayes 2000a). Dickinson and Shutler (2000) have gone further, and extend this conclusion to the Pacific as a whole. On the basis of extensive petrographic studies of temper sands within 110 earthenware sherd suites from Near and Remote Oceania, they concluded that: ‘the bulk of the Lapita and Lapitoid sherds found at most Oceanian archaeological sites, as well as Pre-Latte and Latte Mariana sherds, represent wares made locally using indigenous temper sands’ (Dickinson & Shutler 2000: 211).

So, on the basis of compositional analysis alone, both Lapita and post-Lapita pottery are failing to provide abundant ‘definitive proof’ of interaction. On the contrary, the *stylistic* analysis of this pottery has been used by some to argue for a high degree of interaction. For example, Summerhayes has proposed that the homogeneity evident in Lapita pottery motifs, decorative techniques and vessel forms, and in particular the apparently synchronous changes in these elements in Lapita pottery assemblages across the Bismarck Archipelago over time, is evidence of an active, broad scale, ‘elaborate and cohesive social interaction’ between ‘socially related groups with strong communication ties’ (2000a: 232, 235, 2001b: 131, 2001c: 62). The similarities in assemblages are the product of ‘information exchange, which requires the movement of ideas’ (Summerhayes 2001b: 130). Further afield, Prior (1998) came to a similar conclusion in relation

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15 The exception being some coral atolls where some of the raw materials for pottery manufacture may not be available.
to Chinese and Indian-style ceramics from Tra Kieu in central Vietnam. Petrographic analysis indicated that with the exception of a single sherd none of the ceramics were directly imported wares. Instead, these Chinese and Indian-style wares may have been inspired by ‘the transportation of ideas which were then adopted by local potters’ (Prior 1998: 106).

A number of researchers have proposed that the dentate-stamped motifs on Lapita pots were social/ideological signifiers, which encoded highly socially significant information such as clan affiliations (Spriggs 1990: 119; Chiu 2005), maintained social boundaries (Summerhayes 2001b: 130), and were used in ritual or religious functions. Spriggs (1990, 1993a, 2002) has highlighted the importance of the anthropomorphic face motif in the Lapita design system across its geographical extent and has suggested that these motifs may have represented deities, chiefs or clan ancestors. Kirch (1997: 140, 143-4) noted that anthropomorphic motifs occurred exclusively on a restricted range of probably high value or ‘prestige’ vessels—those best suited for display or serving as opposed to cooking or storage. He suggested that these Lapita vessels might have been used in the worship or ritual recognition of ancestors; similar to the way carved, iconic representations of ancestors are used by modern Austronesian ‘house societies’ (see also, Kirch 1984; Kirch & Green 1987, 2001; Green 2002). Expanding on these ideas, Chiu (2005: 6, 25) has recently argued that Lapita vessels bearing human face motifs—which may have functioned like ‘house crests’—were ritual items and inalienable heirlooms that provided a material means by which an ancient house society could proclaim title to its territory and the legitimacy of its authority. The main effect of this pottery was as a ‘symbol of unity’ to ‘signify a house’s social relations with its founding ancestors and neighbors, to represent and regenerate its present and anticipated future social, economic, spiritual, and political resources and powers in exchange networks, and thus to ensure its prosperity for generations to come’ (Chiu 2005: 5).

Somewhat like Ambrose’s (1991a: 104) description of Lapita outposts as ‘cargo cult-like’, Best (2002: 63-4, 100) boldly interprets the earliest incarnations of the Lapita design system as the expression of the religious ideology of a hierarchical social system, whose expansion across the southwest Pacific was more akin to a crusade. He argues that the anthropomorphic designs may have performed the metaphysical function of interfacing between the corporeal and spiritual realms. Bedford et al.’s (2006; see also, Bedford & Spriggs 2007) recent finds of multiple human burials both associated with and inside of highly decorated, dentate-stamped Lapita vessels at

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16 Spriggs (2002: 53) also notes the association of face motifs with particular vessel forms amongst Summerhayes’ pottery assemblages from the Arawe Islands.
the Teouma site in Vanuatu, leave no doubt about the ritual importance of these vessels or their links with the realm of ‘spirit’.

Recalling Thomas’s (1991) concept of the culturally determined ‘exchangeability’ of particular objects, Clark (1999: 252) has also questioned the ability of post-Lapita ceramics—in particular utilitarian wares—to ‘record inter-archipelago interaction at low levels’. Perhaps we are simply asking the wrong questions of the wrong object. Clark emphasises the need to examine other artefact categories, such as stone adzes, to gauge the nature and extent of post-Lapita interaction, which is assumed to have operated in more localised spheres.

On the other hand, compositional studies of obsidian have clearly demonstrated that obsidian moved vast distances around the Pacific in the past, from a number of chemically defined sources. Small amounts of West New Britain obsidian have been found over an area of 6500 km, as far as Fiji in the east and Sabah in the west (Best 1987; Bellwood & Koon 1989; Summerhayes 2004: 146), and Lou Island obsidian from the Admiralties has also been found in Sabah and as far as Malo Island in Vanuatu to the southeast (Ambrose 1978: 331). However, somewhat inversely to ceramics, it is less clear whether as a material obsidian was part of culturally significant interactions. Anderson (2000: 121) has suggested that the quality of the material itself may have most influenced its distribution. Technological studies of Lapita period obsidian to date overwhelmingly suggest that it was not a prestige good, but was used in an almost purely expedient or ‘wasteful’ fashion (see review in Summerhayes 2003a: 138, 2004: 152).

If so, was obsidian part of a purely economic type of transaction with little social value attached to it? Was it simply an adjunct to the exchange of more socially valuable items (cf. Sheppard 1993: 127) or picked up in the course of performing other activities (cf. Torrence et al. 1996)? Or—even harder to detect—was it a socially meaningful ‘symbol of exchange’ first and utilitarian commodity second (Sheppard 1993: 135)? There are clearly some examples of the choice and use of non-local obsidian sources when local sources were readily available (e.g. Torrence et al. 1996; Kennedy 1997; Torrence & Summerhayes 1997), which seem best explained in terms of the maintenance of social relationships. However, it is remains unclear what these entailed or what their significance was. Specht (2002: 44) has proposed that ‘profligacy’ may in fact be more apt to describe the use of obsidian in early Lapita sites, reflected in consistently high mean weights (≥2.5 g). He proposes that obsidian may indeed have been a valuable, prestige good to colonising Lapita groups that was used in displays of wealth, success and power, in which overt consumption was far more important than economical use. In this way,
Lapita communities were using obsidian to ‘replicate’ their ancestral societies in social and material terms (Specht 2002: 44-5).

In summary then, if we are looking to investigate culturally meaningful interactions in the past via compositional or provenancing studies, and not purely economic transactions—though from the above discussion it is clear that there is no simple division between the two—there appear to be two key requirements. First, there is the need to provide physical, definitive ‘proof’ of the movement of materials (e.g. obsidian flake ‘x’ from a site on Tanga is chemically provenanced to volcano ‘y’ in West New Britain), as opposed to the more intangible, inferred movement of ‘ideas’ or people, which requires other data sets. Second, if the movement of materials can be definitively established, there is the question of what kind of social relationship this movement constituted and whether or not it was a socially significant exchange or interaction. So, while the results of compositional studies may be failing pottery in the hard ‘proof’ department (i.e. they were predominantly produced and used locally), other lines of evidence indicate that decorated pottery (especially dentate-stamped) was indeed culturally significant. But if pottery was generally not transferred, then this also suggests that particular attention needs to be paid to cases where there is definitive evidence of its movement. The transfer of pottery could effectively be the ‘tip of the iceberg’ of more meaningful interactions, in which it was involved incidentally. Obsidian gets a big thumbs-up for the provision of definitive proof, but a bit of a vacillating hand on the question of the significance attached to its movement.

1.5 Tanga Takes to the Stage

Archaeological research conducted on the Tanga Islands forms the basis of this thesis. Fieldwork I carried out in 2001 and 2003 as part of my doctoral research comprised the first comprehensive archaeological investigation to be undertaken on Tanga. In this section, I set the scene by providing some details of Tanga’s geography, geology, and present-day and historical cultural associations and interactions.

1.5.1 Location and landscape

The Tanga Island group is located within the chain of inter-visible islands off the east coast of New Ireland, in New Ireland Province, Papua New Guinea (3° 28’ 0” South, 153° 14’ 0” East; 17 ‘Tanga’ is the local spelling for the island group, though it is pronounced with a hard ‘g’ like the language (see below).

17 ‘Tanga’ is the local spelling for the island group, though it is pronounced with a hard ‘g’ like the language (see below).
Fig. 1.2). Tanga is approximately 65 km from the Lihir Islands to the northwest and 70 km from the Anir or Feni Islands to the southeast. New Ireland lies about 60 km to the west.

Tanga is made up of four main islands—Boeng, Maledok, Lif and Tefa—and a number of smaller, uninhabited islands. Boeng (ca. 27 km²) consists entirely of a raised, relatively flat-topped plateau of Pleistocene, coralline limestone, which rises up to 170 m above sea level (asl.) and has sheer cliffs around a large part of its perimeter (Wallace et al. 1983). It has no large, permanent streams, but numerous freshwater springs occur level with the fringing reef. The entire island is comprised of cultivated land interspersed with scattered hamlets. As on the other islands in the group, a variety of tree and root crops are planted, including coconut (Cocos nucifera), sago (Metroxylon sagu) and betel nut palm (Areca catechu), banana (Musa cultivars), bread fruit (Artocarpus altilis), galip nut (Canarium indicum), sugarcane (Saccharum officinarum), ton (Pometia pinnata), pawpaw (Carica papaya), guava (Psidium guajava), yam (Dioscorea alata), mami (Dioscorea esculenta), sweet potato (Ipomoea batatas) and taro (Colocasia esculenta and Xanthosoma sagittifolium). Yams (buk or sinam, tgg) are the most important vegetable food in both an economic and social sense. Indeed, Bell (1946: 157) described the whole cycle of Tangan horticulture and its associated rituals as being driven by their production. Yams also play an integral role in mortuary feasting, a defining feature of Tangan culture (Foster 1995: 113-4).

Maledok, Lif and Tefa, collectively referred to as am bit (the islands, tgg) by the residents of Boeng, are all volcanic islands. Together, they are the remnants of the former Tanga, Plio-Pleistocene, strato-volcano, with their steep fault escarpments forming the rim of the collapsed and submerged caldera. The two small islands at the centre of the caldera, together called Meliaw,¹⁸ are cumulodomes built up on the caldera floor, and are the youngest (at over 1 million years old) extrusive rocks on Tanga (Wallace et al. 1983: 32). Maledok, its name literally meaning ‘big place’, is the largest (ca. 35 km²) and highest (ca. 440 m asl.) of the volcanic islands, and it is possible that some primary rainforest still exists in its interior. It has ample fresh water resources, including a number of large, permanent or semi-permanent streams, in particular in the vicinity of Nonu, Fang and Kiam hamlets (Fig. 1.2). Excluding the former caldera rim in the south, the perimeter of Maledok is encircled by raised reef limestone up to 80 m high. Lif and Tefa are small (both ca. 2 km²), lower islands (peaks of ca. 280 m and 150 m asl. respectively), both of which are intensively cultivated and settled. Fringing reef is found on all the islands.

¹⁸ Meliaw is the proper place name, though some maps and authors refer to the islands as Bitlik and Bitdok (the latter sometimes spelled incorrectly as Bitbok), literally meaning ‘small island’ and ‘big island’ respectively.
Geologically, Tanga lies within the same andesitic, dominantly alkaline, volcanic arc that includes the Tabar, Lihir and Anir (a.k.a Feni) Islands—generally referred to as the ‘TLTF’ (Tabar, Lihir, Tanga, Feni) island chain—though there are also a number of distinctive rock types that differentiate the island groups (Wallace et al. 1983; McInnes et al. 1997; Dickinson & Shutler 2000; Dickinson 2006). The main bedrock types on Tanga are trachybasalt and phonolitic tephrite (confined to Maledok, Lif and Tefa), ne-trachyte (confined to Maledok), and quartz trachyte (confined to Meliau). The alkaline lavas on the volcanic islands are typically fine-grained and studded with tiny clinopyroxene minerals (Wallace et al. 1983: 29). McInnes et al. (1997: 106) found that the eastern outer flank of the Maledok caldera consisted primarily of weathered to glassy alkali basalt and trachyandesite, which contained phenocrysts of clinopyroxene and plagioclase. Unlike the Anir Islands, however, the trachyandesite lacked olivine. The quartz trachyte on Meliau is composed predominantly of feldspar (anorthoclase) together with small flakes of biotite (Wallace et al. 1983: 31).

While Lihir and Anir were both volcanically active during the Holocene (Licence et al. 1987), the Tanga volcano was last active during the early Pleistocene, when the summit is thought to have collapsed and the caldera formed (Wallace et al. 1983). Interestingly, however, oral history records the sudden emergence of the Meliau islands, which are said to have come into existence following an earthquake and volcanic explosion that filled the air with dust and smoke. This could possibly indicate that while the rock forming the islands was extruded over a million years ago, it did not emerge above sea level to form the islands until a more recent period of volcanic and/or seismic activity, at least prior to 1886 when the islands were plotted on a British Admiralty chart (Smithsonian Institution 1999).

Sarawang, a man of the Amfatnasargai people from the interior of Lif, is said to have been the first to canoe around the newly emerged islands, which he claimed for Lif (Lepan, pers. comm., late Korofi clan leader, Angkitkita, 2001). According to the stories Kamdamut (Korofi clan leader, Luangki, pers. comm. 2003) heard from clan elders in his youth, the Meliau Islands were put in their current position by three successive waves (‘si i sindaunim desela tupela siton’, TP)—possibly a tsunami associated with the seismic activity of the other story—which inundated the base of Ngusunsu Point on Lif. The first wave nearly reached the middle of the ‘saddle’ in the volcanic range (i.e. the caldera rim of the former volcano) between the mainland and its extension on the Point; the second wave almost broke over the top; and the third wave broke right over the

19 It is not clear to me whether this volcanic event occurred on Tanga itself or somewhere else in the region.
top of the saddle, ‘breaking the island’ in two (‘brukim ailan’, TP) with a continuous stretch of water.

The only signs of latent volcanic activity on Tanga today are thermal springs in the intertidal zone on the southern side of Maledok and the eastern side of Lif. However, residents of Lif have noticed a conspicuous uplift of the island in the last two decades (John Guaupet, pers. comm.; see also, Smithsonian Institution 1999), as it is now possible to see Boeng from the peak of Lif, which was previously obscured by Maledok. The Meliau islands are also uplifting and becoming increasingly ‘dry’, and beaches have developed within living memory (Kamdamut, pers. comm. 2003).

1.5.2 People, culture and language

Today, the majority of Tangans live on Boeng, which at around 162 persons/km² has one of the highest population densities in New Ireland Province (Hanson et al. 2001: 247). On Boeng, the main areas of present-day settlement are in the villages of Sungkin at the western end of the island, Amfa/Sasa in the southern central area (the administrative centre where the airstrip, local government offices, clinic, a school, church and a number of small trade stores are located), Taonsip at the southeastern end, and Fonli in the northeastern part. The majority of Maledok’s population lives around the perimeter of the island, though there are a number of scattered inland hamlets between Fang and Emo on the west coast.

Tangans orient themselves to the urban centres of Rabaul in East New Britain Province and Namatanai on the east coast of the New Ireland mainland, from which they receive the majority of their consumer goods and supplies. Rabaul is the closest urban job market (Foster 1995: 33), although some Tangans are now employed at the gold mine on Lihir to the north, which began operations in 1995. Tanga’s cash economy formerly depended on the sale of copra, however, since the national decline in this industry the majority of Tangans now significantly rely on the produce of their own gardens and domesticated pigs and chickens, which they supplement with fish, shellfish and other wild foods such as cuscus.21

Tangan culture and society has been the subject of three detailed anthropological studies, beginning with Bell (1934) in 1933 (who published prolifically on a variety of aspects of

20 According to the 1990 Census, the population of Boeng was 5083, Maledok’s population was 795, Lif’s was 196, and Tefa’s was 143 (in Foster 1995: 28).

21 Some individuals are also involved in procuring and drying sea cucumbers (beche de mer) for external sale.
Tangan culture) and followed by Foster (1988, 1995) (focusing on mortuary ritual and gift exchange) and Holding (2000) (focusing on perceptions of illness). Tangans belong to a cultural and linguistic group that includes the people of the Anir Islands to the south, as well as groups on the east coast of southern New Ireland around the villages of Siara (or Siar) and Mulama (Bell 1962: 477). Parkinson (1999[1907]: 117) noted that the related southern New Ireland groups were colonies founded by Anir and Tanga many years ago, and oral history recorded by Bell (1949d: 100) indicates that Siara was settled from Boeng. About 100 years ago, Parkinson (1999[1907]: 135) described this cultural bloc as a ‘unique division’, made up of groups quite distinct from southern New Ireland people in terms of language, traditions and customs. These groups were said to ‘interact freely’ with each other, undertaking usually peaceful trading relations. Bell (1962: 477) describes Tangan’s social organisation and rules of matrilineal descent and inheritance as being ‘similar to those of other Melanesian peoples occupying the chain of islands extending from Bougainville Island in the Northern Solomons to the Tabar Islands off the northern tip of New Ireland’. Nearly all of the matrilineal clans on Tanga are also represented on Anir. The largest of these *funmat* (tgg) include: Filimat (*ang kika*/parrot is the totem), Fasambo (*bo*/pig), Ku (*am bal*/pigeon), Tassik (*manlam*/kosor*/sea eagle), Tunaman (*ang kel*/chough), and Korofi (*porot*/chicken) (in order of size, Foster 1995: 70).

As Green (2002: 26) describes for the central Solomons (see also, discussion in Chiu 2005: 4), Tangan society could be considered an Austronesian ‘house society’ in that there is a clear association between house structures (i.e. *bia* (tgg) or *haus boi* (TP), the ceremonial men’s house) and matrilineal descent lineages of a particular clan or *matambia* (tgg) (with *matam* probably best glossed as ‘coalition’ of houses/lineages (*bia*), i.e. a corporate descent group, cf. Foster 1995: 67, 73).

The people of Tanga, Anir and Siara/Mulama speak mutually intelligible dialects of what has been called the ‘Tangga’ language (Maurer 1966; Beaumont 1976: 387; Bell 1977; Ross 1988: 258, Fig. 11, Map 13), though Tangans themselves refer to their language as *niwer* (Foster 1995: 31) records three New Ireland villages with links to Tanga and Anir: Sena, Warangansau and Mulama.

Unlike the Tolai of the Gazelle Peninsula in East New Britain Province, the people of Tanga and Anir do not perceive these clans as being part of a moiety system (Foster 1995).

On Tanga today, the *bia* is not strictly reserved for ceremonial purposes and unlike the old days, women may freely enter it.
Tangga is an Austronesian language that forms part of the ‘South New Ireland/North-West Solomonic network’ in the ‘Meso-Melanesian cluster’ of Oceanic languages (see Ross 1988: 257-8, Fig. 11, Map 12). This network is made up of 11 ‘New Ireland languages’ from southern New Ireland, offshore islands and East New Britain—including Tangga; Patpatar, Sursurunga, Konomala, Kandas, Label and Siar (southern New Ireland); Duke of York (a.k.a. Ramoaaina, Duke of York islands); Tolai (a.k.a. Kuanua), Bilur and Minigir (Gazelle Peninsula, East New Britain)—and Proto North-West Solomonic (ibid.). Ross (1988: 262, 280, 293) feels that there is strong linguistic evidence that Proto North-West Solomonic was originally a member or an offshoot of the network of ‘New Ireland languages’, its speakers subsequently moving southeast via Nissan Island to Buka, Bougainville and the western Solomon Islands (including Vella Lavella, Choiseul, New Georgia, northern Rendova, and the major part of Santa Isabel). It is generally believed that the present-day Tolai of the Gazelle Peninsula and Watom Island moved there from southern New Ireland some 600–700 years following a devastating eruption of the Rabaul volcanoes at around 1400 BP, which would have killed or forced out any previous inhabitants (Spriggs 1997: 9, 123, 167-9; Green & Anson 2000a: 193; Specht 2003: 123-4; Anson et al. 2005: 34-5). Oral traditions of the Tolai also attest to early waves of migration from southern New Ireland, some via the Duke of York Islands (Epstein 1969: 13-4; Salisbury 1970: 110, 286; Neumann 1992: 142, 145-6).

It can be seen, therefore, that Tangga’s present-day links to Namatanai and Rabaul (Patpatar and Tolai speakers respectively) are not purely economic or expedient but are also based on strong linguistic and historical ties. Both Foster (1995) and Bolyanatz (2000: 29-30, 39) have remarked upon the cultural cohesiveness of speakers of these related languages. Foster (1995: 32) sees them as linked ‘into a regional culture’, and Bolyanatz (2000: 45) perceives a southern New Ireland-Duke of Yorks-Gazelle ethnographic region that has Rabaul as its...

25 Bell (1977) recorded that ‘Tangga’ was a Lihir word meaning the group of islands as a whole, though as Foster (1995: 250) notes, people on Tanga are not clear about its derivation or meaning. Interestingly, though perhaps fortuitously, in Bahasa Indonesia tangga means stairway or steps and batu tangga means stepping stones, which is appropriate to such a ‘stepping stone’ island group. The naming of all the adjacent island groups/localities in this region appears to depend on your point of origin. Parkinson (1999[1907]: 135) noted that the people of Siar used the terms ‘Tànga’ and ‘Aneri’ (for Tanga and Anir), while Tangans called Siara ‘Baraff’, and Nissan islanders called Anir ‘Wuneram’. Today, the people of Anir refer to the Tanga Islands as ‘Nisnum’ and Tangans generally use ‘Feni’ for Anir.

26 Ross (1988: 257, 261) believes the languages of the Gazelle Peninsula are descended from those of peoples who migrated from New Ireland, consequently, they are considered ‘New Ireland languages’.

27 Following Beaumont (1976), both Foster (1995: 31) and Bolyanatz (2000) describe the Tangga language as a member of the ‘Patpatar-Tolai subgroup’ of Austronesian languages. Ross (pers. comm. 2007; and see discussion above), however, does not think that this putative larger subgroup has any validity.
contemporary focus and is bonded by a matrilineal descent system and the practice of mortuary feasting.

1.5.3 Historical trade, exchange and interaction

Numerous early historical and ethnographic accounts attest that Tanga was part of an inter-island exchange network that connected it to the other island groups in the TLTF chain, to areas on the east coast of southern New Ireland, and to Nissan and Buka in the south (e.g. Bell 1950; Kaplan 1976; Wickler 1990; Spriggs 1991; Parkinson 1999[1907]) (see Fig. 1.3). Tanga may have acted as one of the ‘stepping stones’ in this network, linking the Bismarck Archipelago with the northern Solomons. In Parkinson’s (1999[1907]: 117-18) words, Tanga formed part of ‘the bridge’ between the New Ireland mainland, the Nissan group, Buka and the Solomon islands generally, across which there was ‘a steady connection for commerce and trade’.

A variety of goods were exchanged in this regional network, including pigs, kemetas (shell money), canoes, pigment (see further discussion in Chapter 8), pipes, pottery and shell arm-rings (see summaries in Kaplan 1976: 80-4; Spriggs 1991: 224) (Fig. 1.3). Despite the distances some items travelled from their source, items were usually exchanged by means of direct reciprocity between nearest neighbours via a series of short, inter-locking trading voyages, rather than by a process of long-distance voyaging (Kaplan 1976: 80).

Schlaginhaufen (1959: 82) mentions other types of exchanged goods in this regional network. In 1908, he noted that a particular type of basket (‘found in every house on Tanga’) and ‘double-headed clubs’ were obtained through trade from Muliama on New Ireland. He also observed a Tridacna sp. arm-ring from Feni, spears from Lihir and the Gardner Islands (Tabar), and an oar from Buka.

In particular, historic accounts attest to Tanga’s pre-eminence in the local region for the production and distribution of Tridacna gigas arm-rings or amfat (ltgg), which is the generic Tangan name given to a set of different sizes and types of rings. Indeed, Lewis (1929: 10) suggested that Tanga was probably the most important centre for arm-ring manufacture, whose products were highly valued. As he noted on New Ireland: ‘The best Tanga arm-rings would … buy a wife or one or two large pigs, and the finest pieces of money (angfat [sic]) had an equal or greater value’. Tangan arm-rings were found as far afield as the Solomon Islands. Here Parkinson (1999[1907]: 214) noted a ‘broad thick armband with a deeply incised groove on the
outside that had been ‘imported via Pinepil and Nissan, and produced on the island of Tanga in particular’. Schlaginhaufen (1908: 168, 1959: 81) observed a number of arm-ring ‘workshops’ on Tanga at the turn of the last century, and rings were still being manufactured during Bell’s (1935) anthropological fieldwork in 1933. Bell (1935: 104) also noted that particular types of highly valued amfat (including an simpendalu, an oton siksik, an tut burungis, afatengteng) were obtained from Anir and used exclusively by the kaltu dok (‘big men’/clan leaders, tgg) in the community. Today on Tanga, though the traditional knowledge of their manufacture has been virtually lost, amfat are still the most important exchange valuable, particularly in regard to mortuary and marriage practices (see Foster 1995; and further discussion in Appendix 9).

Wickler (1990: 151) concluded from archaeological evidence from Buka Island that aspects of this historically recorded exchange network had been in existence for at least eight hundred years. However, the lack of archaeological data from some of the other island groups in the TLTF chain, in particular Lihir and Tabar, forms a large gap in our knowledge of its antiquity and the role that each island group played.

That Tangans had some form of contact with Polynesians—possibly of the Polynesian outliers to the east such as Nuguria—could be suggested by the use of the word tatau for tattooing on Tanga, Anir and the Siar/Muliama district (Bell 1949a: 30; Parkinson 1999[1907]: 135). Historical accounts attest to the expertise of Anir/Feni women as tattoo practitioners in the region (Schlaginhaufen 1959: 107; Bell 1949a: 30). Bell describes (1949a: 30) tattoos as the most popular ‘souvenir’ of a visit to Anir, and people from both Tanga and the east coast of southern New Ireland (e.g. Muliama) would sometimes specifically travel to Anir to acquire facial tattoos.

Given the seeming simplicity of the tattooing process and technology, Schlaginhaufen (1959: 108) was amazed that people undertook such sea voyages to Anir, when to his mind local women could easily have learnt the skill. This practice suggested to Schlaginhaufen that there was a

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28 Tangans call this type tintol.

29 During my 2001 fieldwork (28/5/01), I met Alois Fang at Fit hamlet on Maledok, who was attempting to revive and to some extent reinvent the practise of making amfat (there are no men remaining with the traditional knowledge of the process). Through experiment, Alois had successfully produced a small number of rings that he had ground re-using historic volcanic grinding slabs that he had found in the bush. One ring of the amfatmil type had taken him nearly a year to complete.

30 The word tatau is still in current use at least on Tanga and Anir, where tattooing is still very popular, in particular on the face. Another potential link to Polynesians is a story that tells in part of the rat’s journey in a canoe with various other animals and its subsequent saving by a turtle when it was abandoned at sea, which I was told by Partui Bonaventura (Korofi clan leader, Taonsip, 2003) while on Tanga. Lisa Matisoo-Smith (The University of Auckland, pers. comm. 2007) has recorded numerous Polynesian versions of this story, though extending only as far west as Western Polynasia.
long-standing tattoo tradition associated with Anir. Bell (1949a: 30) notes that local tattoo practitioners on Tanga used obsidian to incise the skin. Obsidian would presumably have been acquired through exchange from either the New Britain or Admiralties sources, although Bell does not mention its derivation or how it was acquired. Parkinson (1999[1907]: 136) also found it ‘remarkable’ that elements of the Siara-Anir-Tanga tattoo design system were present on the Gazelle Peninsula, though he was not aware of any contact between them at the time.

Canoe technology and possibly also the naming of a particular tattoo/scarification design are indicative of either direct or indirect contacts between Tanga and the northern Solomon Islands (and perhaps by extension the southern Solomons). Parkinson (1999[1907]: 133) noted that the ‘great voyaging canoe without outrigger’ of southern New Ireland was ‘a copy of the Buka vessels, transplanted via St John [Anir] to the coast of the main island opposite, and from there to the west coast, and as far as the Duke of York Islands’. Friederici similarly concluded that this type of large, plank canoe or mon of southern New Ireland is a descendant of the mon of the Solomons (in Haddon & Hornell 1991: 120). Blackwood (1931/1932: 205) described the mon of Buka and north Bougainville as ‘similar to those used in the Southern Solomons, but less ornate and of ruder workmanship’. Schlaginhaufen (1959: 82) observed these ‘boats made of boards’ on Tanga in 1908, which he noted were similar to those from Mulia. Mon were still found on Tanga up until relatively recent times and were used for inter-island voyaging, in particular to Anir (see Bell 1949b, 1950 for a detailed description of its construction and use).

The pangomgom (lit. leaf fern, tgg) facial tattoo design from Tanga (Bell 1949a: 30, Fig. 1, 1977) may have something of a parallel in a scarification design from the north coast of Bougainville, where Blackwood (1935: 431) recorded gom as meaning ‘marks cut on the face’.

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31 Indeed, a tattooing chisel made of shell (cf. Trochus niloticus) that was discovered on Anir at the Kamgot (ERA) site is the earliest known example in the Pacific, dating to the late fourth millennium BP (Szabó & Summerhayes 2002: 95, Fig. 6b).

32 Despite Bell’s extensive publications about Tangan social life, he in fact makes relatively few mentions of inter-island exchange and interaction. Barneecutt (2000: 67-9) describes Bell as being somewhat ambivalent and often contradictory in his recording of Tanga’s external relationships. She suggests that this was due to his bias towards describing the internal functioning of the island’s society and his desire to portray Tanga as an isolated, ‘untouched and pristine’ island culture. Barneecutt notes that this bias is also reflected in the collections Bell made of Tangan artefacts. The only item involved in inter-island exchange that Bell collected (and curiously the only item he did not note in his Specimen Diary) was a bag of red ochreous pigment acquired from Anir (see further discussion of this ochre in Chapter 8).

33 The mon was still being built on Tanga during Bell’s fieldwork in 1933, when there were five expert builders remaining on the island group (Bell 1949b: 215). It is no longer built on Tanga or Anir, and only a few elderly men from each island group (such as Kosmas from Kamgot village, Babase Island, Anir) have travelled in them.
referring to cicatrice patterns. Men from Petats Island off the west coast of Buka are also said to have recognised a carved design on a stone pillar from Iltopan as gōm, a design that in the old days was cut on their faces (Blackwood 1935: 533). Though Blackwood (ibid.) thinks the word gōm simply means ‘a design of any kind’, perhaps it is more accurately glossed as an incised design, which could reflect the linguistic membership of these groups in the South New Ireland/North-West Solomonic network.

1.6 OUTLINE OF THE THESIS

1.6.1 The approach taken

This thesis examines the ‘transition’ from ‘Lapita’ to ‘post-Lapita’ on the Tanga Islands and elsewhere in Island Melanesia by taking a multi-pronged approach to the consideration of interaction and exchange. It uses a range of methods to analyse both the style and/or composition of three different data sets—earthenware pottery, flaked obsidian and red ochre. The insights from the results of each of these analyses are combined from the perspective that these material things articulate the social relationships or interactions—both facilitating and constraining them—between communities and individuals (cf. Foster 1995 for Tanga; Thomas 1999: 93-4, 125). In this way, I will attempt to investigate the complexity of both continuity and change in interaction at this transition via each data set, which may reveal what sort of ‘unit’ (cf. Gosden & Specht 1991: 279-80) the Bismarck Archipelago was at this period of prehistory, and the nature of ‘transitional’ changes from the perspective of the Tanga Islands and select sites on New Ireland. As Gosden and Specht (1991) suspected, this endeavour may not produce as ‘easy’ or strong a narrative, but a much needed and I hope an interesting one nevertheless.

My approach bears some similarities to the ‘genealogical approach’ advocated by Thomas (1999) as a means of more fully understanding southern Neolithic Britain, except that it is much more tightly defined in its temporal scope. Thomas (1999: 5, 97, 225-9) builds a ‘contrastive history’ by attempting to isolate both ‘similarity and difference … considering contextual association and genealogical contrast’. This involves the assembling of unique histories or ‘parallel accounts’ for each different aspect of the archaeological record and subsequently noting their points of intersection and contrast. Importantly, this approach accepts that each of

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34 Scarification was also practiced on Tanga (see Bell 1949a: 31).
35 In ‘Thomas’ (1999) case this includes pottery, monument building, depositional and funerary practice, and subsistence.
these different 'stories' or aspects of cultural change may have had a degree of autonomy from the others, which allows for both homogeneity and dissonance. The 'stories' of interaction gleaned from each data set and type may also be at multiple (and therefore differing) and cross-cutting scales (see e.g., Lightfoot & Martinez 1995: 474, 477; Stein 2002: 907). As Welsch and Terrell (1998: 68-9) found on the Sepik coast, different objects can travel different social pathways in many directions, each with a somewhat different distribution.

Cochrane (2005: 409) has argued that Thomas still fails to develop specific methods that are able to 'differentiate artefact similarities representing historical relatedness of populations from those similarities that may arise in populations that are not in contact'—in other words, the homologous/analogous conundrum discussed above. I suspect that if the question of whether certain traits are homologous or analogous continues to be debated on the basis of ceramics only, and not in the context of other data, then the debate is likely to continue to be inconclusive. It is only when such issues are appraised more holistically outside of a ceramic interpretative vacuum, that is, with the addition of information or social 'histories' or 'biographies' from other artefact classes or forms of data, that the plausibility of different scenarios or models will be able to be assessed. As Thomas (1999: 124) states, 'It is the set of relations in which an artefact is embedded which renders it intelligible'. At the post-Lapita 'transition', as with the Lapita period itself, we need to shift some of the 'interpretative load' from ceramics (cf. Golson 1971: 75; Green 1991b: 303; Spriggs 2003). The construction of stories about prehistory is always one of weights and balances, of balancing the plausibility of certain claims against the available and ever-changing evidence (cf. Spriggs 1987: 282), and I am deeply sceptical of so-called transparent, testable, methodological frameworks such as Cochrane's that purport to be able to solve such conundrums definitively and deductively once and for all.

As Thomas' (1999: 221) genealogical approach was intended, I aim to contribute to debate rather than bring some sort of finality or closure to it. It is specifically the multi-pronged data approach that I will use to endeavour to address the conundrum of 'what does similar or dissimilar really mean?' and consequently, what discontinuity and/or continuity in interaction might mean in the context of the post-Lapita 'transition'. Using a chain of inferences or 'nested' set of plausibilities gleaned from these different data sets, my final interpretation should ideally be left groaning under the combined weight of plausibility. In this sense, I am an avid supporter of 'holistic archaeology' (e.g. Trigger 1991) and Green's multidisciplinary 'anthropology of long term history'. Both of these approaches attempt to construct richer stories about the past by making use of the variety of data sources that are available to archaeologists in the Pacific and elsewhere—genetics, linguistics, written and oral history, anthropology, and environmental
science—and thereby ‘making it possible to explain the past in more of its contingent complexity’ (Trigger 1991: 562). While Cochrane may certainly feel that this approach is lacking in scientific rigour of the type he propounds, I would direct him to Trigger (1978: 7) who states (emphasis added):

> The collection of facts with broad problems rather than specific hypotheses in mind often has resulted in the production of extremely important theories, including Darwin’s concept of Natural Selection. An unwarranted stressing of the formulation of deductive hypotheses as a pre-condition for research indeed may constrain and limit research to an unwarranted degree.

### 1.6.2 Research questions

The core research questions of this thesis can be summarised as follows:

- What does archaeological evidence for social interaction or exchange tell us about the nature of the post-Lapita ‘transition’ and cultural change on the Tanga Islands?
- What evidence is there of either continuities or discontinuities between the ‘Lapita’ and ‘transition’ periods?
- Is there evidence that Tanga was involved in intra- or inter-regional exchange or interaction at the ‘transition’? Were communities on Tanga part of a ‘transitional’ interaction sphere (or ‘Incised and Applied Relief Tradition’) that incorporated key sites on the New Ireland mainland and beyond?
- What is the nature and timing of the ‘transition’ in the Bismarck Archipelago and beyond in Island Melanesia? Is there any validity to the so-called ‘Incised and Applied Relief Tradition’? and
- How does the evidence from Tanga and New Ireland compare to other so-called ‘transitional’ assemblages in the Bismarck Archipelago and the broader southwestern Pacific?

These research questions are investigated by means of a specific regional case study that incorporates material I excavated from the Tanga Islands and similarly dated material from four key New Ireland ‘transitional’ sites—the Dori (ELS) and Mission (ELT) sites at Lasigi, and the Fissoa (ENX) and Lossu (EAA) sites. These New Ireland sites, considered by White and Murray-Wallace (1996) to form an ‘Incised and Applied Relief Tradition’ on the east coast of New Ireland, are an ideal choice for reassessment as they have been held up as exemplars of both discontinuity (White & Murray-Wallace 1996: 43) and continuity (Wahome 1997) from the Lapita cultural complex. Through the re-analysis of a sample of the recovered pottery and other published information from these New Ireland sites, I will investigate whether or not together with
Tanga they form a cohesive group in material culture terms, which could be indicative of regular cultural interaction.

### 1.6.3 Summary of methods used in the research

In this section, I give an overview of the methods that I will use in this thesis in an attempt to recover evidence of interaction or exchange at the post-Lapita ‘transition’. Detailed descriptions of each method are provided in Appendix 3. Interaction or exchange is investigated via two main types of data:

- **compositional data**—through the analysis and characterisation of pottery tempers and fabric, the sourcing of obsidian, and the characterisation of red ochre, and
- **stylistic data**—through the description and analysis of pottery vessel forms, decoration and motifs.

**Pottery**

- Compositional groupings of pottery from Tanga and New Ireland are established on the combined basis of macroscopic (binocular light microscopy) and petrographic examination of temper sands, and the elemental analysis of temper sands and clay fabric using Scanning Electron Microscopy and Energy Dispersive X-ray Analysis (SEM-EDXA). Oxide data from the clay fabric are assessed using multivariate techniques.
- Compositional groups are subsequently correlated with stylistic data gained from an analysis of vessel form, decorative techniques, and design elements and motifs. The subsequent stylistic-compositional groups form particular ‘local’ and ‘exotic’ (i.e. imported) ceramic wares.

**Obsidian**

- Preliminary source attribution is carried out using the Proton Induced X-ray Emission–Proton Induced Gamma-ray Emission (PIXE-PIGME) technique on a sample of obsidian from excavated and surface sites of Tanga.
- Secondary source attribution is carried out using density analysis on a larger sample from the same sites.

**Red ochre**

- Ochre samples from sites on Tanga and elsewhere in the western Pacific (including some ‘transitional’ sites) are chemically characterised using Instrumental Neutron Activation Analysis (INAA) and the results are assessed using multivariate techniques.
• The mineralogy of a sub-sample of the INAA samples is determined using X-Ray Diffraction (XRD).

1.6.4 Chapter outline

In Chapter 2, I build the foundation for addressing my research questions. The post-Lapita ‘transition’ is explored and defined in detail through a close analysis of its archaeological expression and chronology at key sites across Island Melanesia. I establish a temporally circumscribed set of ‘transitional’ sites—thus producing a considerably unpacked ‘IAR Tradition’—that provides a more plausible basis to draw intra- and inter-regional comparisons. This chapter also includes details of the four New Ireland ‘transitional’ sites that comprise part of my regional case study, and which form the crux of comparisons with the Tanga sites in terms of pottery and obsidian.

Chapter 3 presents the archaeology of the Tanga Islands. In particular, it details the stratigraphy, content and chronology of the two excavated ‘transitional’ assemblages—from the open beach site of Angkitkita (ETM) and the Lifafaesing (EUV) rockshelter—that I employ to address my research questions.

The following three chapters focus on pottery. In Chapter 4, I distil and analyse the findings of detailed overviews of both pottery composition and style at the key ‘transitional’ sites that were discussed in Chapter 2, and examine what can be inferred about ceramic transfer and interaction at the ‘transition’ from these lines of evidence. I also examine the implications of compositional change and some pottery style-based arguments that are central to the assessment of the so-called ‘IAR Tradition’ and to the post-Lapita interaction debate. I conclude by discussing whether there is indeed a case for broad stylistic parallels at these sites—a broad ‘transitional style’—that are indicative of interaction, and whether there is some basis to a redefined notion of an ‘IAR Tradition’.

In Chapter 5, I present the results of the characterisation of pottery composition—both temper sands and clay—from Tanga and the New Ireland sites and discuss whether there is any compositional evidence for interaction between or beyond these sites. These results form the foundation for my analysis of pottery style in the next chapter.

In Chapter 6, I present the results of the analysis of pottery style (including vessel form, decoration, and motifs) from Tanga and the four New Ireland sites. Importantly, these stylistic data are assessed on the basis of the compositional groupings established in Chapter 5. This permits the division of the assemblages from each site into local and exotic ceramic ‘wares’ (i.e.
stylistic-compositional units), which can then be correlated with chronological evidence. This provides a firm foundation for the examination of stylistic similarity/difference and continuity/discontinuity. These findings are then compared with the pottery styles of other ‘transitional’ sites in the region.

In Chapter 7, I focus on the ‘hard’ evidence of exchange and interaction provided by the compositional analysis of obsidian. I overview the nature and source attribution of obsidian assemblages at the key ‘transitional’ sites and then present the results of the source attribution of obsidian from surface and excavated assemblages from Tanga. These results, which include indications of temporal change in source distribution patterns, are compared with the ‘transitional’ sites of New Ireland and the broader Bismarck-Solomons region. The findings are specifically assessed in light of Summerhayes’ (2003a & b, 2004) model of obsidian exchange in the Bismarck Archipelago across the Lapita and post-Lapita periods.

Turning from the ‘big guns’ of Pacific prehistory, the final data chapter travels down a refreshingly less well-trodden path. In Chapter 8, I explore the possibilities of using red ochre to open a new, similarly ‘hard’ but perhaps more culturally significant compositional window on interaction and exchange during this period. I present the promising results of a preliminary characterisation study of red ochre from Tanga and a range of archaeological sites (as well as two modern ochre samples) from the western Pacific.

In the concluding chapter, Chapter 9, I draw together the different strands of evidence and overlay the ‘transitional’ interaction spheres indicated by each data set—pottery composition and style, obsidian source attribution, and red ochre characterisation—of varying scales and likely cultural significance. By teasing out the points of intersection and opposition, the continuities and discontinuities, and the evolutions and revolutions in the data, I try to construct a more complex and nuanced picture of interaction and cultural change at the post-Lapita ‘transition’ in Island Melanesia.
CHAPTER 2—
The Nature and Timing of the Post-Lapita Transition

2.1 INTRODUCTION

This chapter acts as the backbone of my consideration of interaction at the post-Lapita ‘transition’ throughout the thesis. Here, I establish exactly what I mean by the ‘transition’—its naming, its archaeological expression, and all-importantly, its chronology. The latter is crucial to the assessment of similarity and difference within and between assemblages, and to the evaluation of synchronous change across archipelagos. I use a select set of sites across Island Melanesia—including the four New Ireland ‘transitional’ sites that comprise part of my regional case study—to overview the nature of the ‘transition’ and ‘transitional’ sites, questions of continuities and discontinuities with Lapita, and arguments regarding the nature of the ‘Incised and Applied Relief (IAR) Tradition’ and inter-archipelago interaction. I then use this same set of ‘transitional’ sites to closely examine the timing of perceived changes in the archaeological record. This forms a framework for the discussion and analysis in the following chapters.

2.2 THE NATURE OF THINGS

2.2.1 What’s in a name?

The naming of what came after the ‘end’ of Lapita is still problematic. Most researchers have over the years resorted to calling these something-new/something-old ceramic phenomena ‘post-Lapita’. While this is certainly an adequate chronological descriptor, as discussed in Chapter 1, it again gives precedence to the Lapita phenomenon and imparts perhaps a stronger sense of cultural connection between Lapita and later ceramic styles than may be warranted (cf. Spriggs 2003; Wal Ambrose, pers. comm. 2003). As Spriggs (2003: 210) has remarked, labels such as ‘post-Lapita’ are perhaps also preventing us from appreciating archaeological material in properly cultural terms. It is also clear that the term ‘post-Lapita’ can be used to describe very different temporal periods in Near and Remote Oceania. That is, some see ‘post-Lapita’ as beginning significantly later in the Bismarck Archipelago due to the apparent longevity of Lapita (i.e. pottery styles including ‘incised and applied relief’ are more immediately ‘post-Lapita’), whereas in Remote Oceania, ‘post-Lapita’ is seen as beginning much earlier, after only a few centuries of initial Lapita (sensu stricto) occupation (i.e. styles including ‘incised and applied relief’ are very
‘post-’) (see further discussion below). The term ‘Post-Lapita’ is therefore dependent on how one defines and archaeologically recognises ‘Lapita’, which as I also discussed in Chapter 1, is fraught with difficulties.

Terms such as ‘Mangaasi’ or ‘IAR Tradition’ are just as potentially misleading and restrictive. As Bedford and Clark have noted (Bedford & Clark 2001; Bedford 2006: 263; Clark 2003), from their originally specific usages both rubrics grew nebulously to encompass virtually any non-dentate-stamped (or paddle impressed) ceramic. In Bedford’s opinion, these terms gained currency partly as a result of ‘the continuing need to explain the ever vexatious question of human diversity (biological, cultural, linguistic) in the region’. Or perhaps less coyly: why do the indigenous Ni-Vanuatu, Kanaks of New Caledonia and indigenous Fijians ‘look’ Melanesian when there is no evidence for pre-Lapita indigenous inhabitants (see also, Spriggs 2003: 207, 2004: 142)? However, as discussed in Chapter 1, this practice had the effect of homologising collections rather than highlighting differences between them. So, as Garanger originally claimed (1971: 65), ‘Mangaasi’ still best describes pottery from the Mangaasi site and nearby sites in Vanuatu. Clark (2003: 211) has also argued that the definition of the ‘IAR Tradition’ in terms of a set of decorative techniques and motifs associated specifically with Melanesian population movement is untenable given ‘direct parallels’ in Island and Mainland Southeast Asia (see further discussion of this argument in Chapter 4).

On the other hand, if there is indeed some common decorative thread (reflecting interaction) binding sites of a certain period, then the name ‘IAR Tradition’ is clearly not encompassing enough, leaving out reference to a host of other important regional decorative techniques—such as fingernail pinching and impressing, punctuation and paddle-impressing—that flourished following the disappearance of dentate-stamping. Green and Anson (2000a: 188) agree that there should be another archaeological term (other than something-Lapita or the overly descriptive ‘incised and applied relief’) to describe the ‘something else’ that happened with the later efflorescence of non-dentate decorative techniques. They concur with White and Murray-Wallace (1996: 43) that whatever it was, it was ‘an expression of a different cultural pattern and set of associations, the nature of which still needs to be explored’.

The term ‘transitional’ as a basis for describing these sites is still probably the best option. The Oxford English Dictionary (OED) defines ‘transition’ as a ‘passing or passage from one condition, action, or (rarely) place, to another; change’; ‘the passage from an earlier to a later

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stage of development or formation’. In archaeological terminology, the OED defines it as: ‘Change from an earlier style to a later; a style of intermediate or mixed character’; and in the philological sense it is the ‘historical passage of language from one well-defined stage to another’. I feel the sense of having undergone a historical passage or process of change, and being of a mixed character is appropriate to the period. However, the implication of being ‘intermediate’ in nature is probably too biased towards an interpretation of continuous, evolutionary development from Lapita (see discussion in Chapter 1), which may not have been the case in all regions of the western Pacific. Indeed, it was exactly this inherent implication of cultural continuity that Spriggs (1984: 216-17) was after when he first coined the term ‘transitional’ to describe a host of Island Melanesian sites. Perhaps, in the interests of neutrality, a ‘modulation’ in the musical sense of ‘transition’—the passing from one key to another—would be the most appropriate, fitting best with White and Murray-Wallace’s interpretation of the apparent ‘discontinuity’ of the cultural associations of the period. If indeed the ‘transition’ was not a totally new song in Island Melanesia, it seems clear that the ‘same old song’ was now being sung in a different key and with a different meaning. The nature of these ‘transitional’ sites is explored below.

2.2.2 Transitional sites and the web of continuities, discontinuities and interaction

The analysis of ‘transitional’ sites, containing evidence of continuity (or an overlap) in ceramics between the Lapita and post-Lapita periods, has been integral to the ‘IAR Tradition’ debate. Spriggs (1984: 216) understood these sites as containing both ‘Late Lapitoid’ and ‘Mangaasi-like’ elements suggestive of a ‘transitional’ nature between the two, but with ‘a basic overall [cultural] continuity’ (ibid. 218) from Lapita. In these sites, dentate-stamped pottery had been replaced by pottery decorated predominantly with incision and appliqué, techniques that were present but rare in Lapita assemblages. Continuities from Lapita were also perceived in the importation of obsidian and in a range of portable, non-ceramic artefacts (e.g. shell and stone adzes, fish-hooks, shell beads and arm-bands) (ibid. 218, Table 1). Spriggs (1984) originally identified a number of ‘transitional’ sites stretching from the Admiralty Islands to New Caledonia. These sites offered the potential to address questions of the relationship between the two traditions through archaeological signatures of continuity or discontinuity. Spriggs (1984: 220-3) felt that a case for cultural continuity between Lapita and successor traditions could be made throughout the area of its distribution, that is, including Island Melanesia as well as western Polynesia where this was already generally accepted. He considered that while this ‘provides us with a simpler framework of Southwest Pacific prehistory’ it was a no less interesting one. The problem remained, however,
that the signatures for a single model or combination of models were not necessarily mutually exclusive (Spriggs 1997: 152).

Kirch (1997: 78), also a strong proponent of continuity with Lapita, has argued that it is ‘abundantly clear that in most local archaeological sequences there is continuity between Lapita and those archaeological assemblages that immediately succeed it’. Noting the Mussau, Buka and Watom islands, he remarks that ‘the dominant dentate-stamped decorated wares increasingly are replaced by ceramics decorated with incised and appliqué designs, but often continuing many of the original Lapita motifs’. Given the apparently ‘overwhelming’ archaeological evidence for continuity, Kirch states that the ‘end’ of Lapita ‘was simply a change in one aspect of material culture—ceramics’.

With notions of continuity/discontinuity on one side, the flip side of the ‘transitional sites’ coin has been competing views about what these archaeological signatures mean in terms of inter-regional interaction. Complicating our understanding of interaction at this period are the very different circumstances under which it would have operated in Near and Remote Oceania. As Kirch (1997: 78) notes, in Near Oceania, continued interaction with indigenous populations no doubt resulted in ‘complex cultural, linguistic, and genetic exchanges’, while in Remote Oceania ‘increased distances’ between pioneering Lapita communities may have led to decreased communication and increased differentiation over time.

As I discussed in Chapter 1, a particularly important component of the debate surrounding ‘transitional sites’ has been—and remains—the question of what similarities between pottery styles tell us about interaction. In a key paper, Kennedy (1982: 30) suggested that: ‘The widespread similarity in incised and applied relief pottery in Melanesia ... may signal, as does the distribution of Lapita style, a complex intercommunicating world’. From the evidence available at the time, Kennedy saw the apparent similarities between the early Mangaasi style from central Vanuatu, the Sohano and Hangan styles from Specht’s Buka sequence, sherds from the New Guinea coast, and the pottery from Kohin cave and other sites in the Admiralties, as evidence that the widespread ‘communicative linkage’ that was apparent between potting communities of the Lapita period must have continued in some form, and over a similarly broad area, after the disappearance of dentate-stamped pottery. Importantly, Kennedy (1982: 26-8) proposed that a chain of contacts may have continued to the west that indirectly linked the Admiralties with southeast Asia, suggested by the similarity of the double-spouted pots from Lou Island (at the
time thought to date to around 2000 BP)\(^2\) with those recovered from Niah Cave in Sarawak. Spriggs (1984, 2001: 242-3) further claimed that with few exceptions (such as perhaps New Caledonia) the post-Lapita pottery styles appeared to display a common chronological sequence across island groups, which could be taken as support for a post-Lapita ‘community of culture’ over much of Island Melanesia.

More recently, Wahome (1997, 1998) argued on the basis of statistical similarities\(^3\) that the incised and applied relief styles from various parts of Island Melanesia were indeed related, and that changes occurred roughly at the same time across all of its component archipelagos (or ‘regions’) (but see further discussion below). This, he argued, indicated that a ‘wide network of contacts was maintained in the post-Lapita period’ (1998: 189) up until around 800 BP, when it appears to have broken down. Based on this research and following on from his earlier claims, Spriggs (2000b: 355, 357) proposed that changes in pottery style continued ‘in step’ up until at least 1500 BP, from Manus and New Ireland in the north as far as central Vanuatu in the south. He interprets the similarity between the New Ireland incised and applied relief pottery and similarly incised and applied wares from Manus (ca. 1500 BP), the ‘Sohano’ and ‘Hangan’ style pottery from Buka (ca. 2200–700 BP), and the Central Vanuatu ‘Mangaasi’ style (2000–1200 BP) (but see below), as indicating that communities from the Bismarck Archipelago and as far away as Vanuatu, across the Remote Oceania barrier, were still in at least occasional contact until about 1500 BP. It was only after this time that archipelago- or regionally-specific systems increasingly developed—i.e. ‘regionalisation’, and indeed, within these regions more localised differences (‘localisation’) between islands also emerged—which was reflected in increased differentiation in pottery style.

‘Incised and applied relief’ may therefore have shared more with her dashing cousin than meets the eye: perhaps another facet of continuity with Lapita, with pottery styles (i.e. form and decoration) changing at roughly the same time at widely, geographically separated settlements. As Summerhayes (2000a, 2001b) has argued for the Lapita period, an apparent degree of synchronous change within the ceramic assemblages of various ‘transitional’ communities could indicate that there was close interaction, where ‘shared innovations’ arose from ‘the exchange of

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\(^2\) Ambrose (2002: 62, see Fig. 4) thinks these double-spouted pots most probably derive from the pre-Rei ash soil surface on Lou, which is dated to the later age of around 1640 ± 40 BP (i.e. 1620–1410 cal BP, 0.975, 2\(\alpha\); or 1570–1510 cal BP, 0.644; CALIB Rev 5.0.1). He describes the Borneo specimens, which are seemingly earlier, as poorly dated.

\(^3\) Wahome (1998) made use of correspondence analysis and hierarchical clustering.
information and people’ within a large social interaction network. However, Anderson et al. (2006: 3, 5) have recently argued that the tempo of Lapita migration—and presumably also of ‘post-Lapita’ migration and mobility—was substantially driven and constrained by climatic influences, tending to coincide with major El Niño frequency peaks. Consequently, they argue that there was a more limited capability to develop long-distance interaction networks in the Pacific than is commonly assumed. And indeed, Sand (2000) has argued that some regionally-specific differences were already developing during the Lapita period.

So, was there some form of post-Lapita ‘community of culture’, signified by incised and applied relief pottery styles, to rival that of the Lapita period? Did an inter-regional interaction sphere, of some 2000 plus years’ longevity, stretch over some 3000 kilometres, in which cultures changed roughly synchronously? A challenge to the notion of a long term, Island Melanesia-wide, broadly synchronous, ‘IAR Tradition’ has come from Bedford and Clark (2001; Bedford 2000; Clark 1999). Their research suggests that some regions, such as Vanuatu and Fiji, may have quite literally missed the boat(s) in terms of inter-regional interaction at the ‘transition’, with increased interaction between archipelagos only appearing in the last 1000 years. They argue that while initial continuity from the Lapita cultural complex can be observed, the type of long-distance interaction this may have represented was short-lived, with the archipelagos developing their own regionally (and in some cases locally) distinctive ceramic styles not long after first colonisation (Bedford & Clark 2001: 66). Bedford’s conclusions for Vanuatu have found further support in Wilson’s (2002) analysis of western Pacific rock-art assemblages. Among her results, Wilson found that especially between the period ca. 2300–1000 BP, rock-art production in Vanuatu was for the most part ‘following its own regional [i.e. regionally-specific] trajectory’ (2002: 223) rather than participating in a broader western Pacific-wide network.

However, before Wahome’s work can be held up as the pan-Island Melanesian, post-Lapita, interaction sphere straw man, it should be noted that his results indicated both continuity and change between Lapita and post-Lapita ceramics (1997: 118), which could be interpreted as the emergence of some forms of regionalisation and localisation during the post-Lapita period. He noted a ‘progressive decline’ in the range of inter-regional contacts from the Lapita period through to the Late Prehistoric period. This was seen as being symptomatic of the cessation of potting and pottery use in several areas, either during or at the end of the Lapita period (e.g. central and southern Vanuatu, the Banks Islands, and New Ireland), which created large gaps between previously contiguous pottery areas (Wahome 1998: 189). This decline in numbers of pottery centres and interaction contributed to a process of cultural diversification through increased isolation. Wahome’s (see 1998: Fig. 7.3 & 7.5) statistical analysis produced three distinct clusters
of sites: Fiji clustered tightly with New Caledonia (which he believed was indicative of continued interaction between the two and ‘their isolation from the rest of Island Melanesia’); a second cluster, ‘characterised by diversification’, comprised the central Vanuatu sites of Mangaasi (a ‘regional variant’) and Erueti which clustered with the Banks Islands and some Manus sites; while the third and most widespread cluster included Buka and Nissan (Hangan phase), New Ireland (Lossu and Lasigi), Buka (Sohano phase), Tikopia, Manus, and southern Vanuatu (Ifo on Erromango). Though he considered that the separation of the last two clusters may have been as a result of subtle temporal differences, the outstanding result was the suggestion of a rapid stylistic change across almost the entire former Western Lapita area (Wahome 1998: 187-8).

Bedford (2006: 175-80, 188-9) has since rightly critiqued Wahome’s conclusions and clusters, arguing that their reliability must be questioned considering that his data were drawn from a ‘widely disparate set of often mixed ceramic assemblages’ with poorly defined chronologies, which in some cases covered a very large time span. Bedford’s own reanalysis of Wahome’s site data as a single group (using Proximity Analysis) showed that a number of sites and assemblages group together that are ‘known to have little association both in terms of chronology or homologous ceramic traits’ (ibid. 175).

While Bedford (2006: 187, 191) allows that there are some instances of similarities in motifs, decorative techniques and vessel forms in post-Lapita sequences—in particular amongst sites in the Bismarck Archipelago and Northern Solomons where they could attest to some sort of connection—he believes these ‘might equally be explained as continuities from the founding ceramic tradition rather than requiring any need to invoke continued high levels of interaction’ (ibid. 191). Indeed, he sees the argument for ‘a basic cultural continuity’ from the Lapita tradition

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4 Bedford’s (2000, 2006) critique was based in particular on his own research, which through further excavation of larger samples had refined the Vanuatu ceramic sequences following Wahome’s research. For example, in the case of the Ifo site on Erromango, Wahome (1998) only had access to Spriggs’ earlier excavated sample (see Spriggs & Wickler 1989), which was small and somewhat mixed (Matthew Spriggs, pers. comm.).

5 Viewed with appropriate grains of salt, Bedford’s reanalysis of Wahome’s data still reveals some interesting groupings. For example, the simple matching-average linkage analysis clusters a group of Manus ceramics dated to between 2100–1900 BP with ceramics from Erueti and the Banks Islands, which are relatively close in age to the early end of this range. Also in this primary cluster, but located on further divisions or ‘branches’—suggesting a more remote (but possibly related?) association—are the later Mangaasi wares and (separately again) the sequentially later Manus wares. This primary cluster is also present using Jaccard Average Linkage (Bedford 2006: 177). Modern Manus pottery is not contained in this cluster and occupies a branch all of its own as one would expect. The Fijian and New Caledonian wares form a sub-cluster of a larger cluster that on another branch incorporates two sub-clusters of sites from the northern Solomons region, including Nissan (late styles of Buka-made pottery) and later pottery from Bougainville, Teop, and the Buka Malasang and Mararing styles.
through to the later ceramic traditions as looking ‘increasingly secure’ for the whole of Melanesia. (ibid. 190).

Though dents have therefore begun to appear in the armour of the ‘IAR Tradition’, with researchers rightly questioning the validity of its nebulous all-inconclusiveness and its simplistic ethnically divided movements of population, as Spriggs has noted there are still a number of outstanding issues that need to be accounted for. Spriggs (2003: 207-8, 2004: 142) remains convinced of some form of continued inter-regional interaction in the post-Lapita period and maintains that certain intriguing connections and conundrums have still not been convincingly explained away. Foremost, he notes the outstanding need to explain the stark difference in appearance between the assumed descendants of Lapita peoples in Tonga and Samoa, and the appearance of the indigenous peoples of the southeast Solomon Islands, Vanuatu, Fiji and New Caledonia. This appears to require either that Lapita was not the first culture present in eastern Remote Oceania—which is most unlikely on the basis of current evidence—or that there was ‘significant post-Lapita gene flow’ between parts of the western Pacific and regions further to the north (Spriggs 2003: 207). These ‘periods of post-Lapita interconnectedness’ may yet ‘turn out to be tracked in part by similarities in post-Lapita pottery styles’ (Spriggs 2003: 208).

Also, there are increasing indications from a range of other types of evidence that significant changes were occurring throughout Island Melanesia and Island Southeast Asia in exchange networks, social development, and probably population mobility and size at around 2000 BP. That is, roughly coincident with the ‘transition’ and the emergence of the so-called ‘IAR Tradition’. These changes were in part associated with the appearance of metal in Island Southeast Asia and its spread into western Melanesia, where it is linked by a number of bronze artefacts and art-styles to the Dong Son tradition of mainland northern Vietnam/southern China (see e.g., discussion in Badner 1972; Golson 1972; Spriggs 1989: 590, 607-8; Spriggs & Wickler 1989: 83; Ballard 1992: 98; Swadling 1996: 53-4; Bellwood 1997; Spriggs 1997: 152, 185; Ambrose 1998: 1084-6; Kirch 2000: 143-4; Spriggs 2000a: 68-9; O’Connor 2003: 97, 122-3; Lape et al. 2007: 249-51). Spriggs (2000a: 68) notes that the initial appearance of metal in Island Southeast Asia and Island Melanesia ‘is an archaeological “event”’, with the earliest dates forming ‘a tightly dated series around 2300–2100 BP’ (see also, Spriggs 1989: 607) across its entire areal distribution. Indeed, in Wallacea through to Island Melanesia, radiocarbon determinations associated with a copper-bronze ornament from Uai Bobo 1 in East Timor (Glover 1987: 153, Pl. 36) and a piece of bronze from Sasi (GDY) on Lou Island (Ambrose 1988, 1998: 1082-4) (see further discussion below)—the only metal artefacts recovered from stratigraphic contexts—produce statistically identical results, indicating a common age of between around
2150–2000 cal BP. Allen and Gosden (Gosden 1992b: 61; Allen & Gosden 1996: 193) see the presence of this bronze on Lou Island and of Talasea obsidian on Borneo (Bellwood & Koon 1989)—the former dating to around 2000 BP and the latter beginning earlier but present until at least that time—as the first real evidence for two-way interaction between Island Southeast Asia and areas to the west. Such evidence was part of the basis for Gosden’s (1992b: 57, 61) suggestion that the area encompassing Island Southeast Asia to the end of the Solomons represented a ‘melting pot’ of different influences affecting subsistence, trade and social groupings. Wilson (2002: 212-5, 223, 2003: 274-5, 277, Fig. 20) also proposes that the period from around 2000 BP marked the efflorescence of spiral-based and curvilinear red rock-art traditions in parts of eastern Indonesia, West Papua (in particular the MacCluer Gulf), the Highlands of Papua New Guinea and Island Melanesia. She sees these traditions as being associated with the cultural transformations of the Southeast Asian Metal Age and the growing participation of the western Pacific in an expansive ‘world trading system’ (cf. Swadling 1996). Furthermore, transformations are also evident around this time in charcoal rock paintings. Recent extensive AMS dating of rock-art from Malakula Island in Vanuatu has shown that there is a major but short-lived peak in the frequency of radiocarbon dates—representing a fivefold increase in the number of paintings and painted sites—between 2200 and 2000 BP (Zoppi et al. 2004: 77-9, Figs. 3-4). There is also an apparent peak in the presence (or at least archaeological visibility) of some commensal animals around this time. Based on a detailed review of the evidence for animal translocation in the Pacific, Matisoo-Smith (2007: 350, 355, 357, 366, Table 1) concludes that large numbers of pig bone do not generally occur until late in the Lapita chronology (in particular, at Kainapirina (SAC) on Watom Island). Furthermore, it is not until 2000 BP that there is indisputable evidence for dog ‘suddenly throughout the Pacific’ (ibid. 367), which she argues could possibly represent the introduction of at least one dog lineage from Southeast Asia. Finally, palaeoenvironmental evidence from Guadalcanal in the Solomon Islands also suggests that sustained slash and burn horticulture did not occur until just before 2100 BP, when there is a significant influx of charcoal in sedimentary cores (Haberle 1996 in Sheppard & Walter 2006: 63).

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6 When calibrated with CALIB Rev. 5.0.1, the pooled mean conventional date from Sasi (GDY) and the determination (ANU-237) associated with the Timor artefact (Glover 1986: 153) are statistically identical at 95 per cent confidence. They pool to produce a conventional date of 2114±39 bp, which calibrates to 2160–1990 (0.915, 2σ) or 2140–2040 cal BP (0.942, 1σ).

7 Smith’s (2000: 138-9, Tables 1-2) analysis of pig remains from Kainapirina (SAC) shows that in terms of the minimum number of elements present, pigs would appear to have been considerably more abundant in Zone C1 (ca. 84% of total) compared to Zone C2. If the minimum number of individuals present is considered the disparity is not so great, but Zone C1 still has double the number. The dating and so-called ‘Late Lapita’ association of these Zones is discussed in detail in Appendix 1.
But wherein lies the ‘transition’? What does it actually consist of? In the next section, I look at its archaeological expression across Island Melanesia.

2.2.3 Regional expressions

While there are clearly a number of difficulties involved in defining exactly when the ‘Lapita’ phenomenon was ‘over’ or what its relationship was to later phenomena (see Chapter 1), Pacific archaeologists appear significantly more at ease—even those who favour an essentially continuous evolutionary sequence—in identifying the existence of significant, sometimes dramatic, ceramic ‘transitions’ in the post-Lapita period. As I illustrate below, the most dramatic of these ‘transitions’ is consistently associated with the emergence and efflorescence of compositionally distinct ceramics bearing a suite of pottery decoration that included applied relief (in particular), incision and a range of other techniques.

Stretching from the Bismarck Archipelago to Fiji, a number of key sites containing highly visible ceramic (and associated) ‘transitions’ and diverse expressions of so-called ‘incised and applied relief’ pottery have been variously interpreted as representing either continuity or discontinuity with Lapita. In turn, there are also a variety of interpretations of what caused these signatures and what they indicate in terms of inter-regional and/or intra-regional (‘Melanesianised’) interaction. The nature of the ceramic ‘transitions’ at these sites—in both style and technology—and their associations is overviewed below. In the interests of rigor and brevity, rather than attempting an exhaustive survey, in the following discussions of archaeological expression and chronology, as well as in subsequent detailed reviews of pottery style and composition and obsidian distribution (see Chapters 4 and 7 and Appendices 4, 5, and 8), I limit myself to key sites (and locales). These sites are ones that I have selected as having the most potential to inform us about the beginning of the ‘transition’ in Island Melanesia, given their particular combination of materials, stratigraphy and dating (see Fig. 2.1). For example, assemblages from the Mussau Islands are excluded because the available radiocarbon chronology indicates that there is currently a lack of evidence of occupation during the ‘transition’ from Late Lapita to post-Lapita. Kirch (2001: 217-19) feels that this ‘missing middle segment’ of the Mussau cultural sequence, at present representing a hiatus of up to 13 centuries following the Lapita occupation (e.g. demonstrated at both the Epakapaka (EKQ) and Bolui Island (EKE) sites), may potentially remain undetected on the large main island. Similarly, I have not made reference to a number of late third millennium BP ceramic assemblages on Garua Island in West New Britain (such as Walindi (FRI); see, Specht & Gosden 1997; Torrence & Stevenson 2000; & discussion in Summerhayes 2007: 138) or on Nissan Island (Spriggs 1991), because detailed information regarding stratigraphy, distribution of archaeological materials, and/or the ceramics themselves is not available. Certain other sites are mentioned where relevant but not in detail.
dates where a specific argument requires them in the area summary that follows. The many problems of site chronologies are discussed in detail in Section 2.3 and Appendix 1.

**Admiralties**

On the Admiralty Islands, establishing the nature of the ‘transition’ from Lapita to post-Lapita, in particular via pottery, is stymied by a number of factors, the primary one being the dearth of evidence from the Lapita period itself. As Kennedy (2002: 24) recently described, on current evidence the Lapita period is ‘so nearly empty’—comprising 11 decorated sherds (around half of them dentate-stamped) from one surface and two excavated sites—that it is difficult to define. Kohin Cave (GDN) on Manus Island and Mouk Island (GLT) are the only sites in the Admiralties containing excavated archaeological evidence representative of some form of ‘transition’ from Lapita to post-Lapita (i.e. with elements from both sides).

On the basis of her early excavations at Kohin Cave, Kennedy (1981, 1982) argued for slow change and continuity in the Manus ceramic tradition across into the post-Lapita period. But importantly, unlike Bedford and Clark (2001) (see below), Kennedy (1982: 24) emphasised that such continuity was ‘not to be taken as evidence for local isolation’. This continuity was manifested in the apparent continuation (in addition to new forms) of particular rim forms and shell-impressed, incised and plain wares in the upper levels of this site—styles that were originally found in the lower levels associated with four dentate-stamped Lapita sherds. Wahome’s (1997: 121, 1998) later analysis of the Mouk Island pottery also indicated continuity in decoration and vessel form between the apparent Lapita and ‘post-Lapita’ ceramics (but see Chapter 4).

Ambrose’s (1991: 105, 2002) work on Lou Island, however, revealed archaeological deposits sealed between successive volcanic tephra layers, demonstrating the clear temporal separation of distinctive, post-Lapita pottery styles. The earliest site, Sasi (GDY), contained highly distinctive pottery vessel forms (a compositionally distinct type was decorated with incision, applied relief and punctation), a new form of triangular-sectioned obsidian point, and famously, as mentioned above, the only piece of prehistoric bronze so far recovered from a dated context in Papua New Guinea, which is tangible evidence of contact with Island Southeast Asia to the west.

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9 Alphabetic site codes are given by the National Museum and Art Gallery in Port Moresby for sites registered within Papua New Guinea.

10 Wahome (1997, 1998) refers to the Sasi site and its ceramics using the code ‘GEF’, reflecting an accidental duplication of the PNG National Museum and Art Gallery site code in reference to excavated and surface collected assemblages from the site (Wal Ambrose, pers. comm.).
In light of his Lou evidence, Ambrose (1991: 109) suggested that the Kohin deposit might be disturbed and have falsely juxtaposed separate pottery styles that are in fact separated in time by hundreds of years. In particular, he noted that the shell-impressed sherds from Kohin closely match—and in the case of one rolled rim, are seemingly indistinguishable from—the ‘Puian’ style ware from the Pisik School site (GBC) on Lou, which sealed between tephra layers dated to around 1650 bp (Ambrose 1991: 107, 109, 2002: 62-3). Therefore, contrary to Kennedy’s earlier interpretation, he proposed that there was a ‘clear discontinuity [or hiatus] between Lapita and later wares on Manus’ (ibid; and see Ambrose 2002: 66 for a similar conclusion), although particular vessel forms may have had Lapita connections (see Chapter 4).

Watom

In the cultural sequence of the Reber-Rakival site on Watom Island, Green and Anson perceive a distinct ‘ceramic transition’ (or ceramic ‘Trend Four’), manifested in the emergence of a ‘separate set’ of compositionally distinct vessels decorated with nail impressions and applied relief techniques, which occurred in the end stages of ‘Event Phase III’ (Anson et al. 2005: 24; see also, Anson 1999, Green & Anson 2000a: 188). However, they argue not only that Lapita style ceramics were contemporaneous with these later nail impressed and applied wares—therefore the latter did not necessarily mark the ‘end’ of Lapita—but that there was a slow, continuous, ‘transitional change in style’ between them through time, ‘rather than an abrupt break in ceramic continuity’ (Green & Anson 2000a: 188; see also, Anson et al. 2005: 28-9). While they cannot fully evaluate ‘just how abrupt culturally that style change really was’ (ibid.), the apparent continuity of both sets of ceramics suggests to them that there are no overwhelming reasons to see the new style as signalling the cultural replacement of one group by another, or as forming a separate cultural tradition (Green & Anson 1991: 180, 2000a: 188, 192).

New Ireland

It was the apparent geographical concentration of sites with similar styles of decorated pottery and non-ceramic artefacts—and the paradigm of the day—that led White et al. (White & Downie 1980; White & Murray-Wallace 1996) to propose that an ‘IAR Tradition’ had been present on the central east coast of New Ireland, incorporating Lasigi (the Dori (ELS) and Mission (ELT) sites), Lossu (EAA), and Fissoa (ENX), as well as a number of other surface sites (see Table 2.1 for

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11 Four pooled radiocarbon determinations on charcoal date the buried soil beneath the Rei tephra at the Pisik site to 1640 ±40 bp (Ambrose 2002: 61-2). This calibrates to 1620–1410 cal BP (0.975, 2σ) (CALIB Rev 5.0.1).
summary characteristics of the excavated assemblages). These sites were seen as predominantly having ceramics that were characterised by elaborate incised and applied relief styles of decoration, which occurred together with a handful or less of ‘classic’ Lapita, dentate-stamped sherds. However, unlike Green and Anson, White and Murray-Wallace (1996) perceived a discontinuity between this ‘IAR Tradition’ and pottery in the Lapita tradition, both in terms of decoration and chronology. While they conceded that the ‘IAR Tradition’ might potentially be derived from Lapita, they saw it, as noted earlier, as the expression of a ‘different cultural pattern and set of associations, the nature of which still needs to be explored’ (ibid. 43). Wahome (1997: 121), on the other hand, has since described the New Ireland sites as showing exemplary continuity between the Lapita and post-Lapita styles, and no evidence for a total break with classic Lapita. White and Murray-Wallace also emphasised that these New Ireland sites were likely to be contemporaneous with sites on Manus—noting also the presence of Manus-style obsidian point fragments at Lossu (but see discussion in Chapter 7)—though they do not go into detail about what this might mean in terms of interaction.

At Lossu, though the single dentate-stamped rim sherd that was recovered from the surface of the site afforded them little basis to argue for an association between ceramics of an ‘IAR Tradition’ and Lapita pottery, White and Downie (1980: 214) nevertheless proposed that ‘an approximate contemporaneity’ seemed likely on account of the radiocarbon dates and ‘the incorporation of Lou Island obsidian into the wider trading system’. They proposed that Lossu had an extensive trading network that included the Admiralty Islands (for obsidian and pottery), the offshore islands (in the TLTF chain) or southern New Ireland (for stone, pottery or temper), and to a lesser extent the Talasea region (obsidian). Amongst the ceramic assemblages available for comparison at the time, White and Downie saw Lossu’s pottery as having its closest links, in terms of decoration, with Garanger’s assemblage from Vanuatu. What this ‘similarity’ meant however, ‘remains to be discovered’ (ibid. 215).

12 Only the assemblages from Lossu (White & Downie 1980), Lasigi (Golson 1991, 1992) and Fissoa (White & Murray-Wallace 1996) have been published in any detail.


14 White and Murray-Wallace (1996) specifically note the later Emsin (GEB) and Pisik School (GBC) sites, which are dated to some time around 1650 BP. It is unclear why they neglected the Sasi (GDY) site.
Based on his work at Lasigi, Golson (1992: 155) attempted to tackle the issue of the New Ireland pottery’s relationship with ‘classic’ Lapita on the one hand and an ‘ill-defined applied and incised decorative style’ on the other, apparently stretching from the Admiralties to Vanuatu and New Caledonia. Golson (1992: 163) saw close similarities between the Lossu and Lasigi ceramics in terms of rim form and the richness of applied decoration. He also noted further parallels with Lasigi in decorated rim forms (crenated, scalloped and wavy) and applied relief and fingernail-impressed decoration amongst the Watom and Ambitle (on Anir) assemblages analysed by Anson (1983), and perceived striking parallels with rim modifications amongst the assemblage from Epakapaka Rockshelter (EKQ) on Mussau (Kirch et al. 1991). However, Golson (1992: 164) argued that wholly endogenous stylistic change—of the kind that Kirch et al. (1991) proposed for the Mussau ceramic sequence—could not wholly explain the ceramic complexes of Lossu and Lasigi, given the prominent presence of applied decoration. While he was loathe to ‘make too much of the matter of applied decoration’ (1992: 164), he felt that it remained notable for its widespread distribution, forming a prominent component within parts of Specht’s (1969) Buka sequence, Garanger’s (1972) Mangaasi ceramics of central Vanuatu, and in assemblages of New Caledonia and Fiji. Indeed, as he states, it was this widespread distribution that led him to propose an ‘incised and applied’ pottery tradition in the first instance (see Golson 1968, 1972), which was parallel to Lapita and overlapped its later stages (1992: 165). In a concluding comment that remains relevant some 14 years later, Golson (1992: 165) stated that although he did not pretend to know the culture-historical or other significance of these decorative features—which required much more focussed research—they still represented ‘a marked phenomenon over a vast area of the Southwest Pacific from late Lapita times and there are some interesting articulations with the Lapita tradition’.

Unfortunately, site disturbance, poor chronology, and ceramic assemblages made up of highly fragmentated and weathered sherds are among the characteristics of these so-called ‘IAR Tradition’ sites of New Ireland (see further discussion below). All these factors have hindered a fuller assessment of the articulations (or lack of) with Lapita in terms of continuities or discontinuities, and have also to varying degrees prevented fuller understanding of the ‘incised and applied relief’ wares themselves and the nature of the interaction that they may represent. Despite these problems, however, much research remains to be done on these assemblages, which I will endeavour to remedy in this thesis. In particular, there has been limited detailed research on pottery composition (especially clay fabric; see Chapters 4 and 5) and style (especially of incised and/or applied relief decorative motifs or the combinations of different decorative techniques; see Chapters 4 and 6).
On Buka and Sohano Islands in the northern Solomons, Specht (1969: 228-30, 257-9) perceived a conspicuous discontinuity or lack of relationship between ceramics of the clearly Lapita-derived ‘Buka Style’ (which in his opinion were undoubtedly similar to the ceramics he excavated on Watom) and the later ‘Sohano Style’. This discontinuity was manifested in pottery composition, technology and style (both vessel forms and decoration), with incurving pottery of the Sohano Tradition characteristically decorated with punctation, incision and applied relief. Specht found no firm evidence for the evolution of the Sohano Style from the Buka Style. Instead, he proposed that the Sohano Tradition probably represented the intrusion into the Buka area of ‘new arrivals’ who brought with them a different ceramic tradition as well as artefacts of exotic stone materials, and whose settlement may have completely replaced the pre-existing culture and former pottery tradition (Specht 1969: 307, 316). Although Specht (1969: 257, 308-9) was unclear as to the origin of Sohano ware, he suspected external influences and proposed that the ‘Incised and Applied Relief Sub-style’ represented the amalgamation of the Sohano Tradition and elements of the Mangaasi Tradition.

On the contrary, Wickler (2001: 168) felt that his subsequent results suggested ‘a high degree of continuity in the ceramic record extending from the Late Lapita Buka style through to the modern pottery industry’. In Wickler’s opinion, his later research revealed no ‘convincing evidence for non-local introductions or replacement in the form of pots, or by extension, populations’ (ibid.), and he preferred to see the changes in ceramics as deriving from continuous local processes. He did, however, make particular note of the ‘distinctiveness’ of the style of pottery from a surface reef assemblage (Sohano Wharf, DAF) that he attributed to the ‘Late Lapita’, which aside from ‘general similarities’ with other ‘Lapita’ assemblages could ‘prove to be characteristic of Lapita in the northern Solomons region’ (Wickler 2001: 122). The nature of this intriguingly distinctive assemblage is explored further in Chapter 4.

In the New Georgia group of the Solomons islands, a series of intertidal zone sites around Roviana Lagoon appear to be ‘transitional’ from Lapita. Reeve (1989: 53) suggested that a collection of unusual ceramics from Paniavile,15 decorated in large part with elaborations of existing incised and applied relief techniques, could represent ‘a related tradition, possibly derived

or descended from Lapita. The people that produced this pottery (‘Lapita without dentate-stamping’), however, had clearly abandoned whatever socio-symbolic significance the earlier design system may have once held. With its very different set of design motifs, the Paniavile assemblage was the crux of Reeve’s (1989: 55) objection to seeing the Sohano and Mangaasi wares as part of a ‘pan-Melanesian incised and applied relief pottery tradition’ (cf. Spriggs 1984: 216)—wares that he otherwise believed had ‘enough shared motifs to be considered as belonging to roughly the same ceramic tradition’. In essence, Paniavile stuck out like the proverbial sore thumb in the middle of them. However, Reeve suggested that this problem could be resolved by thinking of Paniavile as more of a ‘missing link’ between the type of ‘Late Lapita’ material found at Watom (noting its higher incidence of incision and appliqué) and the ‘Mangaasi/Sohano ceramic traditions’. However, Felgate’s (2003: 497-500) later detailed research on this and other Roviana Lagoon assemblages, indicated that there was a temporal gap or missing ‘transition’ between the clearly Lapita-derived ceramics of Honiavasa (probably dating to no younger than 850 BC) and the later ‘post-Lapita’ Miho and Gharanga/Kopo style ceramics from Paniavile and other sites. Furthermore, the relationship of these later wares to Lapita was tenuous. As Felgate (2003: 502) suggests, Roviana pottery ‘may have changed beyond recognition as Lapita by 800 BC.’

**Tikopia**

On the island of Tikopia, to the southeast of the Reef-Santa Cruz Islands, another abrupt, post-Lapita ceramic transition or discontinuity in the cultural sequence is seen (Kirch 1982; Kirch & Yen 1982). The ‘major break’ between the Kiki and Sinapupu Phases, which was ‘marked by the “sudden” cessation of the local manufacture of Lapitoid plain ware [i.e. late in the ceramic series of the ‘Lapita Cultural Complex’] and the appearance of [technologically distinct] ceramics bearing decorations in the Mangaasi style’, was described as ‘the most abrupt in the entire Tikopia sequence’ (Kirch 1982: 71; see also, Kirch & Yen 1982: 323, 329, 341). The Sinapupu ceramics, predominantly decorated with incision and applied relief, were interpreted as being almost certainly imported and as forming a ‘northern extension of the Mangaasi cultural tradition’ of Vanuatu (Kirch & Yen 1982: 191, see also, 205). Coinciding with this ceramic transition was the abandonment of certain Kiki phase shell ornaments and the introduction of new types; the disappearance of sharks, rays and turtle from the diet (possibly reflecting food prohibitions) and a dramatic increase in the consumption of pig; and an increase in erosion indicative of more intensive horticulture (Kirch & Yen 1982: 329-31, 356-7). At the same time, however, ‘obvious continuity’ (ibid. 329) was also seen in *Tridacna* sp. adze types, one-piece fish-hooks, certain ornament styles, coastal settlement location, and subsistence, and they stopped short of
interpreting the changes as cultural replacement. Rather, Kirch and Yen (1982: 341) saw the Sinapupu phase as marking a time of increased contacts with and influences from the south, possibly including the arrival of immigrant groups. Overall, Tikopia cultural history ‘owed as much to external factors of immigration or exchange relations as it does to internal adaptation in response to environmental and sociodemographic pressures’ (ibid. 335).

Vanuatu

In both Vanuatu and Fiji, Bedford and Clark (2001) argue that regionally distinct post-Lapita ceramic styles developed in parallel in a continuous, evolutionary way from their respective Lapita ceramic ancestors in relative isolation, with increased inter-archipelago interaction only becoming apparent in the last 1000 years. But at the same time, however, as I discussed in Chapter 1, both Bedford (2000, 2006) and Clark (1999) see this continuous, evolutionary framework as being capable of accommodating sometimes dramatic or rapid changes in their respective ceramic sequences.

In Vanuatu, therefore, while the ceramic sequences are considered to demonstrate a continuous, unbroken, evolutionary ‘development trajectory’ from the earliest Lapita to latest phases, the ceramic sequence of Efate, for example, was ‘dynamic and changing throughout’ (Bedford 2006: 168), and distinctive motifs came to characterise the sequence of Erromango, which appeared to be following ‘its own largely independent trajectory’ (ibid. 169) (see also, Bedford & Spriggs 2000: 124; Bedford 2006: 103, 260). Underlying, long-term continuities were also perceived in coastal settlement patterns and in non-ceramic artefacts (especially shell arm-rings and *Tridacna* sp. adzes) (Bedford & Spriggs 2002: 149; Bedford 2006: 217, 261-2).

However, aside from the disappearance of the relatively short-lived early Lapita dentate-stamped and calcareous wares (ca. 3000–2800 BP; Bedford 2006: 173), the most dramatic changes in the ceramic sequences of Efate and Erromango respectively can be seen in the transitions from the Late Erueti to Early Mangaasi phases and the Early Ifo to Late Ifo phases. Though Bedford first sees perceptible changes beginning prior to (and indeed between) these transitions (e.g. 2006: 103, 161-3), both exhibit dramatic changes in pottery vessel forms and decoration. Linking both transitions was the ultimate emergence of incurving globular vessels as the predominant form. On Efate, these replaced Erueti-style vessels that are seen as clearly deriving from the Lapita ceramic series. Some vessels with ‘clear Lapita prototypes’ (Bedford & Spriggs 2000: 124) and some incised motifs with ‘generic connections’ to Lapita incised motifs, further confirmed the nature of Erueti ware as ‘Lapitoid’ (Bedford 2006: 131). Early Mangaasi also marked the first appearance of distinctive applied relief decoration amongst a range of techniques.
that included incision (ibid. 123)—which were overwhelmingly associated with incurring vessel forms—and the Erromango transition marked a change in pottery technology and the culmination of fingernail decoration, which was first present in earlier Lapita assemblages (ibid. 95-9).

Bedford (2006: 191) argues that local processes are fundamentally responsible for the development of distinctive, regional, post-Lapita ceramic traditions in Vanuatu and elsewhere. These local processes may have included rapidly changing social or population dynamics in association with changing environmental conditions, which triggered increased territorial signalling or group identification in pottery styles (ibid. 103).

**New Caledonia**

The situation in New Caledonia now appears to have been far more complex than originally perceived, with rapid, localised diversification of pottery styles within only a few centuries of initial Lapita occupation indicating a number of ‘important internal evolutions’ (Sand 1996a: 143, 1996b: 50-1, 1999a: 142; Sand et al. 2003: 508, 2005). Sand and colleagues now believe that the Lapita ceramic tradition *sensu stricto*, as well as a set of Lapita-related objects (including types of adze, shell tools and ornaments) (Sand 2001b: 86-7), had completely disappeared by sometime between 800–750 BC. It was replaced by three major ceramic traditions within the span of the first millennium BC or Koné period, beginning with the characteristically paddle-impressed Podtanéan ceramic tradition, and followed early on by the more coarsely incised ware of the Puen tradition in the southwest of the Grande Terre. The second half of this millennium (i.e. between ca. 2500–2000 BP), however, saw the emergence of ceramics decorated with a set of techniques that included incision and appliqué. Puen ware became dominated by chevron-incised decoration (Sand 1996b: 51) and applied relief also occurred, and in the north (including the Loyalties) the finely incised, shell-impressed and applied relief decorated wares of the Pindaï tradition emerged.16 While Podtanéan pottery was clearly part of the same series and ‘cultural sphere’ as Lapita pottery (most likely its domestic, utilitarian component) and the northern tradition also appeared to have its roots in the Lapita series, Sand saw no ‘direct typological link’ between the Puen tradition and the Lapita series and suggested that its origins could be linked to a ‘new cultural influence’. However, he also notes that overall the Puen tradition has not been

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16 In a recent conference paper, Sand et al. (2005) propose a revised set of chronological periods for the prehistory of New Caledonia. The ‘Lapita’ period consists of the initial few centuries of settlement and the ‘Koné’ period consists of the remainder of the first millennium BC, comprising the immediate ‘post-Lapita’ paddle-impressed and incised-applied ceramic traditions (including the Podtanéan, Puen, and the newly proposed northern ‘Pindaï’). The ‘Naia’ period (formerly Naia-Oundjo) is proposed for the first millennium AD. I use the former chronological terminology of previous publications in this thesis.
well characterised, dated or excavated, and that the potential 'cultural links' between it and Lapita are not yet clearly established or understood (Sand 1996a: 138-40, 1999a: 145-6, 148-9, 151, 153).

Following these earlier post-Lapita evolutions or transitions, Sand (1999a: 147) considers that the beginning of the first millennium AD—i.e. around 2000 BP, the same time represented by the Navatu phase in eastern Fiji (see below)—marked ‘a major ceramic evolution’ in New Caledonia. This was manifested in the apparently simultaneous and marked divergence of ceramic traditions between the northern (i.e. ‘Balabio’ ware at the beginning of the ‘Oundjo’ period) and southern regions of the Grande Terre (i.e. ‘Plum’ ware at the beginning of the ‘Naïa’ period), and also saw the somewhat later construction of fortifications on Maré Island (see also, Golson 1972; Green & Mitchell 1983: 57-8). While Galipaud originally thought that the Balabio ceramics had evolved from the Lapita-derived Podtanéan tradition, Sand et al. (2002: 184, 2005) now perceive a discontinuity between the Balabio and Podtanéan traditions. Rather, they see the distinct, predominantly incurving form of Balabio pots, bearing ‘new sets of decorations’ including incision, punctation and appliqué, as related to the older Pindaï tradition. Rather than indicating cultural replacement, the handled Plum pottery appeared to have rapidly evolved from the related (but poorly defined) Puen tradition, though perhaps under the influence of new populations (Sand 1996a: 148, 1999a: 153; Sand et al. 2005). However, certain continuities in non-ceramic artefacts are seen across the Podtanéan to Puen and Plum phases, such as lenticular adzes, polishing stones and types of shell armbr...
archipelagos, Sand et al. (2002: 186) remain convinced that there is a ‘set of striking features that need deeper consideration, in terms of typological forms as well as decorative techniques and motifs’.

**Fiji**

In Fiji, like Vanuatu and New Caledonia, the initial phase of occupation associated with Lapita colonisation is interpreted as having been relatively short-lived, possibly lasting only a few centuries (most likely ca. 2900-2700 BP, Anderson & Clark 1999; Best 2002; Burley 2003: 309; Burley & Clark 2003: 235). Much later, around 2100 BP, Best has interpreted the appearance of pottery bearing new carved paddle-impressed decoration\(^\text{17}\) on Lakeba Island in the Lau Group of eastern Fiji, as marking a clear discontinuity or transition in the ceramic sequence. This type of pottery constituted the ‘only major ceramic change in the Fijian sequence’ in which ‘every aspect of the ceramics changes, including the temper’ (Best 2002: 28), and dramatically cut short the continuous development evident between early Lapita ceramics and the subsequent ‘Polynesian Plainware’ (ibid. 17; see also, Best 1984: 654). Best’s (1984, 2002) ‘Cluster III’ (or Period III), which equates to Green’s original Navatu Phase, was characterised by a ‘totally new vessel shape and rim form’, with ‘new decoration’ that was dominated by carved paddle-impression. Though this change was abrupt, Best (1984: 23, 190, 196) emphasises that there was no instantaneous and complete replacement, and indeed, continuities in particular shell tools and ornaments were evident. Rather, there was an archaeologically short period when both types of pottery were in use (i.e. Polynesian Plainware and carved paddle-impressed pottery), before the carved paddle-impressed style attained ‘absolute dominance’.

In Best’s (2002: 29) view: ‘Carved paddle-impressing appeared throughout Fiji and West Polynesia at (archaeologically) the same time’. Though he admits there is no ‘hard evidence’ to support it, like Frost (1979: 78-80) before him, Best (2002: 29-30, 62) proposes that the carved paddle impression technique (in particular the parallel-rib form) is probably best explained as being ‘part of the culture of new arrivals’ from the west, most probably New Caledonia, rather than as a result of (isolated) local development. Notable additions to the decorative suite of Period III ceramics some centuries later (an ‘end-tool’ subset, including incision, fingernail pinch and punctation), as well as the presence of obsidian derived from the Banks Islands (but see Appendix 8), were interpreted as indicating later connections with Vanuatu, most probably the northern part (Best 1984: 493, 656, 2002: 30-1).

\(^\text{17}\) This decorative technique produces relief by means of impression rather than application.
Based on his evidence from the ‘mid sequence’ of the Sigatoka site on Viti Levu in western Fiji, Burley (2003, 2005) argues that there is a similarly distinct and abrupt break between paddle-impressed ‘Fijian Plainware’ (which shows clear continuity from the earliest Lapita ceramics) and later ‘Navatu’ phase ceramics, which is also reflected in subsistence economy. These two types of ceramics are highly ‘distinctive [in both technology and style] and unrelated to each other’ (2003: 311-12; see also, 2005: 320, 327-8, Table 3), with the Navatu phase ceramics decorated with distinctive end and side tool impressions, finger pinches and gouging, incision and appliqué, as well as hatched and parallel-ribbed paddle impression. Like Best, Burley et al. believe the Navatu ceramics are best explained—in fact, ‘alternative explanations are difficult to fathom’ (Burley 2003: 312)—as being the product of interactions with and probable migration(s) from central Island Melanesia, although they do not make explicit comparisons with particular styles (Burley 2005: 339, 344; Burley & Clark 2003: 239). Burley and Clark also suggest that decorative elements found amongst Fijian Plainware (e.g. lip notching, punctation, parallel rib and crosshatched carved paddle impressions) potentially illustrate connections with central Island Melanesia (Burley & Clark 2003: 238; Burley 2005: 330-31). In particular, Burley (ibid.) describes distinctive punctate decoration on an incurving bowl form of the Fijian Plainware as having ‘its closest similarities in Mangaasi ceramics’, which he says are of a ‘comparable age’ in Vanuatu (but see dating discussion below).

Focussing specifically on ceramic change in Fiji’s ‘mid sequence’ (ca. 2500–1000 BP), Clark (1999: 219) found that ceramic, and by inference, cultural change was continuous and occurred incrementally over time. Like Best, however, he also perceived a major ceramic transition in Fiji’s ceramic sequence coinciding with the later flourishing of paddle-impressed pottery. Clark found that the rate and type of ceramic change was greatest in the period between 2300–1900 BP. During this ‘major shift’, clearly Lapita-derived vessel forms and decorative techniques gave way to ‘new traits’. Failing to find any closely similar traits of this time period outside of Fiji, Clark (1999: 219-20, 236, 227, 253) felt that migration or diffusion were insufficient explanations for the shift and favoured internal processes such as a socio-economic transformation within Fijian society. He suggested that this transformation might have been linked to increased population density, which resulted in the fragmentation or factionalisation of large communities as they moved to inland areas, became increasingly sedentary and reliant on horticultural foods, and reduced their interaction with other communities.
2.2.4 Discussion

All of these sites contain highly archaeologically visible ‘transitions’, marking the emergence (and in most cases dominance) of often technologically distinct ceramics, bearing varying elements of a suite of decorative techniques—the core techniques include applied (or impressed) relief, incision, fingernail impression and pinch, and punctuation. In the cultural sequence of the site and/or area, these ceramics replaced (or as some argue, were added to) ones that have been described as ‘Lapita’ or seen as clearly derived from the Lapita ceramic tradition. Dentate-stamped decoration is absent or at least minimal and in many cases such ‘transitions’ mark the emergence of applied relief as a dominant decorative technique. These ‘transitions’ often coincided with both changes and continuities in non-ceramic artefacts and subsistence economy. Within the Bismarck Archipelago, changes are also perceived in obsidian distribution networks across the Lapita to ‘post-Lapita’ periods (Summerhayes 2003a & b, 2004) (see Chapter 7).

In what would appear to be a form of ‘guilt by association’ at some of the Bismarck Archipelago’s ‘transitional’ sites, there seems to be a tendency amongst researchers to perceive continuities (i.e. ‘guilt’) at sites that contain a significant Lapita component somewhere in their sequence (i.e. not necessarily in the same units), and discontinuity at those sites where Lapita is lacking or is more minimally represented. But continuity and/or discontinuity within sites need to be carefully assessed using a range of evidence in tandem with good stratigraphic and chronological resolution. Chronological resolution is also an imperative basis from which to make comparisons—and highlight similarities and differences—between sites. Both of these factors motivate the next section.

2.3 Timing is Everything and Good-byes are the Hardest

2.3.1 The chronology of post-Lapita ‘transitions’

As I discussed in Chapter 1, the ‘end’ of Lapita is a slippery beast, with diverse perceptions of it leading to diverse archaeological signatures of varying detectability and timing. Therefore, rather than the elusive end (or last ‘good-bye’) of Lapita, in this section I attempt to track and define chronologically the more tractable beginnings of the sometimes-dramatic ceramic ‘transitions’ described above. That is, I will assess whether it is possible to define the parameters of a ‘transitional’ pulse across Island Melanesia—a period, within the limitations of the radiocarbon calibration curve, at which ‘transitional’ sites reach a critical mass in terms of archaeological visibility.
The following discussion is based on a detailed review and critique of the chronology of these post-Lapita Island Melanesian ‘transitions’, which is presented in Appendix 1. This review has many similarities to one undertaken by Spriggs (1984) more than twenty years ago. However, a thorough reassessment of the dating of post-Lapita ‘transitions’ is timely considering newly available evidence from the re-dating and reconstruction of cultural sequences for some of the key sites/areas (e.g. Watom and Vanuatu). As well, new $\Delta R$ values for the southwest Pacific are now available, which allow marine shell dates to be calibrated more accurately. This reassessment is fundamental to theory building about this pivotal period (cf. Spriggs 2001). In particular, recent criticisms of Wahome’s (1997, 1998) research highlight the importance of, and need for, chronological resolution in making comparisons between sites. Such resolution is therefore crucial to the assessment of one of the key claims of supporters of a pan-Melanesian, post-Lapita interaction sphere (or so-called ‘IAR Tradition’), that is, the apparent synchronicity of apparently similar changes.

Except where specified, for ease of comparison all determinations in Appendix 1 and throughout this thesis have been calibrated with CALIB Rev 5.0.1 (Stuiver and Reimer 1986–2005, in conjunction with Stuiver & Reimer 1993), using the atmospheric calibration data set for charcoal and wood (intcal04.14c, Reimer et al. 2004), or the marine calibration data set—with appropriate $\Delta R$ value as indicated$^{18}$—for marine shell (marine04.14c, Hughen et al. 2004), and a laboratory error value of 1. The calibrated age ranges of these determinations at both $1\sigma$ confidence (68%) and $2\sigma$ confidence (95%), as well as the ranges within areas of the probability distribution are presented in Table 2.2.

2.3.2 Discussion

The reassessment of the chronology of post-Lapita ‘transitions’ in Island Melanesia shows that when the highest area under the probability distribution is considered the vast majority of the determinations from the sites discussed above fall within a core calibrated age range of ca. 2350–1900 cal BP (Figs. 2.2–2.4) (see full references in Appendix 1). This age range is compatible with both Summerhayes’ and Wahome’s estimation of the beginning of the ‘post-Lapita’ in the Bismarck Archipelago (see Chapter 1). Included in this core age range are the dates from:

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18 Recent research by Petchey et al. (2004) demonstrates how variable and locally specific $\Delta R$ values in the southwest Pacific can be, depending on variations in seasonal ocean currents, local upwelling and geology.
- Sasi and Kohin (Layers 4 and 5; with the Layer 5 date (ANU-2212), representing a *terminus post quem*, overlapping the early end of the range) in Manus
- Kainapirina Zone C2 (one of the three dates (Beta-16853) overlaps the late end of the range only) and Vunavaung Zone C3 on Watom
- Fissoa (SUA-2803), Dori (Phase 4) and Mission (Phase 3) on New Ireland
- Sohano (Sohano style) and Paniavile (either Miho or Gharanga/Kopo style) in the northwestern Solomon Islands
- the Sinapupu and late Kiki Phases (Zone C1, Beta-1227) on Tikopia
- Mangaasi and Aropus on Efate (Early Mangaasi phase, including Layers 3a, 3b and 5i), and Ifo and Ponamla on Erromango (*both* Early and Late Ifo phases) in Vanuatu
- Yaté, Naïa, Ongoué, Podtanéan, Baye and Pindaï on the Grande Terre in New Caledonia (Late Podtanéan, Puen, Early Balabio, and Pindaï styles), and
- Qaranipuqa and Laselase on Lakeba in eastern Fiji (Period III, paddle-impressed), and Karobo (lower Layer 5) on Viti Levu in western Fiji (paddle-impressed).

While there would appear to be a tendency within the core age range for determinations from the Bismarck-Solomons region and Tikopia to lie at the younger end and those from Vanuatu, New Caledonia and Fiji to lie at the older end (Figs. 2.2–2.4), all of the determinations broadly overlap each other. Furthermore, it is likely that this distributional spread is in fact more an artefact of the calibration curve and does not indicate significant differences in timing. The relative flatness of the calibration curve for this period (see Fig. 2.5) makes it difficult to give any exactitude to the calibrated ages.

What is also clear across the Bismarcks-Solomons-Tikopia area is the still fairly weak basis of the chronology. In Near Oceania in particular, there is a relative dearth of well-dated, stratigraphically secure, single phase or at least clearly defined ‘transitional’ sites dating from around 2300/2200–2100 BP. Furthermore, at many of the existing sites there are clear indications that materials from temporally distinct phases (i.e. from a Lapita-aged and possibly ‘transitional’ occupation) have been mixed to varying degrees (e.g. Kohin, Mouk, Watom, and Lossu). These sites require careful consideration. In the Bismarck Archipelago, only two sites, Sasi (GDY) and Dori (ELS), have relatively firm contexts and chronologies.

Considering the highest area under the probability distribution, the two Kainapirina dates from Zone C1 and the single date from the corresponding Vunavaung Zone C2 are clearly much later—at ca. 1850–1500 cal BP and ca. 1600–1350 respectively—than the majority of other
‘transitional’ dates. This suggests that not only are they the ‘cuckoos’ in the Lapita nest as Best puts it (2002: 93), but that the determinations are unlikely to be useful to date the longevity of Watom’s ceramic ‘transition’ either (see further discussion in Appendix 1).

While two of the Sinapupu phase dates from Tikopia appear to overlap the late end of the core age range (Beta-1225, I-10702), the other date (Beta-1224) is considerably later (ca. 1750–1600 cal BP) and may not accurately date Sinapupu style ceramics. It is interesting to note that a date (Beta-1227) for ‘Lapitoid’ ceramics of the Kiki phase falls within the core ‘transitional’ age range. However, with decoration known to have included some incision and appliqué, it may be that Kiki ware is the product of more than one phase of occupation and needs to be deconstructed as a single style (see further discussion in Chapter 4).

In Vanuatu, it would appear that in terms of timing, the late ceramic sequence of Erromango may not have been on such an ‘independent trajectory’ in the region after all. The available determinations indicate that the highly visible ceramic transitions to incurving, highly decorated vessels occurred roughly around the same time on Efate and Erromango. Furthermore, calibration using the new Solomon-Coral Seas $\Delta R$ value indicates a significant degree of temporal overlap between the Early and Late Ifo phases (i.e. largely fingernail decorated outcurving and incurving pots) on Erromango.

In New Caledonia, dates for Puen-style incised and applied relief decorated ceramics in the south of the Grande Terre overlap with those for incised, Pindai, and Early Balabio ceramics in the north, as well as with some dates for Late Podtanéan paddle-impressed pottery in both the north and south. That is, a number of major ‘ceramic evolutions’ across the Grande Terre appear to have been roughly coincident. One date (Beta-62763) for the beginning of the southern Plum ware overlaps with the later end of the core ‘transitional’ age range but is clearly somewhat later, most likely dating to around 1870–1730 cal BP.

In eastern Fiji, the chronology indicates that the carved paddle-impressed wares of Lakeba (Period III) emerged roughly around the same time as decoration involving incision, appliqué and fingernail impression/pinch etc. flourished in archipelagos to the west. The Lakeba dates are also clearly overlapping or roughly contemporary with some for the end stages of paddle-impressed ceramics in New Caledonia, which could lend support to Best’s suggestion that the latter is the origin of the carved paddle-impressed technique. However, the relative dearth of ‘transitional’ period assemblages in Fiji to date is notable. It is also clear that the decorative techniques that flourished in ‘transitional assemblages’ to the west between around 2350–1900 cal BP did not appear in either eastern or western Fiji until significantly later. Therefore, these
later manifestations are not directly comparable. As Best (2002: 30) notes, the revision of the central Vanuatu ceramic sequence (Bedford 2006) has ‘considerably weakened if not demolished’ the case for connections with his ‘end-tool’ decorated ceramics on Lakeba (dated to around 1750 BP), although he remains optimistic that stronger connections with northern Vanuatu may be established with future research. At best, this ‘end tool’ subset overlaps with the late (and at present less well defined) stages of Mangaasi style ceramics on Efate, at which point they are stylistically distinct. At Sigatoka in western Fiji, the key ceramic transition (and apparent discontinuity) between Lapita-derived ‘Fijian Plainware’ and the ceramics of the ‘Navatu’ phase—and the appearance of end-tool and carved paddle impression techniques in both phases—dates to a similar, significantly later period. That is, punctate-decorated Fijian Plainware is not of a comparable age to similar Mangaasi style ceramics as Burley (2005: 330-1) has claimed.

Furthermore, there are important points of difference between Best’s and Burley’s interpretations of the significance of carved paddle impression in Fijian culture history. On the one hand, Best sees the emergence of carved paddle-impressed decoration as marking the end of a Lapita-derived ceramic tradition (see above). On the other, Burley (2005: 336-8) sees the technique as first appearing on ‘Fijian Plainware’ vessels (together with punctate decoration). These vessels are thought to constitute the latest component of a ‘Sigatoka Tradition’ that is derived from earlier Lapita ceramics, and thus show cultural continuity from the earliest Lapita phase of occupation, that is, over a period of some 1400 years. Burley suggests that these temporal, decorative and historical differences could indicate the former existence of an east-west dichotomy in Fiji, representing a different west-Fijian interaction sphere and an east to west ‘ceramic transmission’ and/or settlement and expansion of Navatu related groups (Burley & Clark 2003: 239; Burley 2005: 342). Like Best, however, Burley et al. (2005: 339; Burley & Clark 238-9) see the carved paddle impression technique as most likely the result of occasional contacts with central Island Melanesia through inter-island voyaging, reflecting a probable long-standing tradition of contact, interaction and exchange with the west.

2.4 Conclusion

In this chapter, I have established that it is possible to broadly define the timing of a ‘transitional’ pulse at around 2350–1900 cal BP extending across Island Melanesia. From the Bismarck Archipelago as far to the east as New Caledonia, this pulse was associated with the efflorescence of new styles of ceramics with decoration characterised by incision, applied relief, fingernail impression/pinch, and punctuation. In eastern Fiji alone it was associated with the emergence and dominance of carved paddle impression. Notably, the ‘end-tool’ decorated wares
of western and eastern Fiji (including incision, fingernail pinch, punctation and appliqué), clearly post-date this phenomenon, and cannot be used in direct comparative assessments. In many cases, these ceramic transitions appear to have coincided with both changes and continuities in other items of material culture, art and/or subsistence economy. Consequently, it would appear that there is indeed some basis for arguing for a degree of synchronicity in the timing of related changes in ceramic sequences across much of Island Melanesia in the late third millennium BP and therefore also a basis from which to make informed comparisons between sites. It remains to be argued in subsequent chapters how similar and/or different these changes were across regions and what this may have meant in terms of interaction. Throughout this thesis, I will specifically make use of the term ‘transition’ (and ‘transitional’) as an analytical tool to investigate more objectively—without overt ‘Lapita’ or ‘IAR Tradition’ connotations—that period in Island Melanesia in both Near and Remote Oceania, when sometime around 2350–1900 cal BP trends associated with, or arguably derived from, the Lapita tradition were dramatically transformed into and/or were replaced by something quite different.

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19 Exceptions being where I am quoting or referring to the work of others.
CHAPTER 3—
Archaeological Survey and Excavation on Tanga

3.1 INTRODUCTION

In this chapter, I give an overview of the findings of the archaeological surveys and excavations that I carried out on Tanga in 2001 and 2003, as well as of the limited previous investigations that have been undertaken on the island group. The diverse surface finds and sites that were recorded provide a broader picture of the archaeology of the island group. In the main part of this chapter, I detail the stratigraphy, content and chronology of the two excavated sites that form the foundation of my research on Tanga and which I employ to address interaction and exchange at the ‘transition’: the open beach site of Angkitkita (ETM) and the Lifafaeing (EUV) rockshelter. I show how these sites have the potential to make a significant contribution to the ‘transitional’ debate.

3.2 ARCHAEOLOGY OF TANGA

3.2.1 Previous archaeological investigations

Only a limited amount of archaeological research had been carried out on Tanga prior to my research.

In 1933, Bell (1940: 80) briefly recorded rock-art in Linatiftif (the ‘cave of love-magic’ (EAC)) on Boeng, which he described as comprising ‘hundreds of paintings in red ochre’ on the walls and central limestone column of the cave. At the time of his recording, men were still painting pictures as part of love-magic rites, and Bell saw no reason to believe that the rest of the corpus was prehistoric, although it was also clear that the practice itself had existed for generations. All of the paintings in Linatiftif were described as being human figures (both male and female) or ‘herringbone’ patterns, made by applying a mixture of saliva and ochre by hand.

Ambrose (1978) was the first archaeologist to visit Tanga, but only briefly. He made a small surface collection of obsidian, which he later sourced to Lou Island in the Admiralty group.

Over two decades later, Summerhayes (1999) carried out limited archaeological survey in the western part of Boeng Island in the vicinity of Sungkin village, which resulted in the recording of five sites. These sites included two small surface scatters of pottery fragments at
Matampul (ERP) and Sungkin (ERS), and three caves/rockshelters containing surface material and archaeological deposit (Linafis (ESZ), Lumpangkik (ERQ), and a small, unnamed shelter).¹

In 2000, Summerhayes and I (Summerhayes & Garling 2000) returned to Boeng to consult with local clan and community leaders in preparation for my planned PhD research. In the course of this visit, we made a small collection of shell and stone artefacts from the surface of Linafis cave during a field inspection. Part of a thin-bodied, dorsal region *Tridacna maxima* shell adze was also found in a cultivated garden area (known as Warangkifil (EUR)) on the upper hillslope below Linafis. A fragment of a ‘pineapple’ stone club, which local resident Peter Netuk had found while gardening at Balanm (EUS) in the southwest of Boeng, was also collected during this period of fieldwork (for further details see Garling 2002, 2004).

### 3.2.2 The 2001 and 2003 investigations

Fieldwork I carried out in 2001 and 2003 as part of my doctoral research therefore comprised the first broad-scale, systematic archaeological investigations to be undertaken on Tanga. Maledok, Lif and Tefa islands were the focus of the preliminary investigation in 2001 and Boeng was the main focus of the second stage of fieldwork. Detailed descriptions of the community consultation undertaken, fieldwork methodology, personnel, archaeological sites, isolated artefacts, excavations and surface collections carried out for the purposes of the research (including site cards, field recordings, sketch plans, photographs, and a complete catalogue of collected surface artefacts) can be found in the fieldwork reports produced following both seasons (Garling 2002, 2004).

During my first phase of research, which was carried out between May and August 2001 (Garling 2002), a total of 39 archaeological sites and isolated artefacts were recorded across Maledok, Lif and Tefa Islands (Fig. 3.1). These included over 20 open artefact scatters (mainly coastal sites), three standing stones, three stone mortars, a stone bowl, remnant stone walls made of limestone blocks, and at least three sites that could be described as grinding ‘workshops’ (cf. Schlaginhaufen 1908, 1959; Bell 1935), possibly for *Tridacna gigas* shell ring (*amfat*, tgg) manufacture. The surface artefacts recorded at the open sites included: fragments of pottery (over 500 sherds were collected); flaked obsidian (n=155); stone adzes (n=8); *Tridacna cf. maxima* shell adzes (n=32); stone club heads (n=6, including biconvex discs and an ovoid

¹ The Matampul (ERP) and Lumpangkik (ERQ) sites were erroneously recorded as ‘Matamput’ and ‘Lumpakit’ (Summerhayes 1999).
specimen); volcanic abraders; and a small number of ground ochre fragments (see examples of these sites and artefacts in Fig. 3.2).

In 2001, small-scale, test excavation was carried out at four coastal, open sites on Maledok—Matangkipit (ETS), Nonu (ETR), Amfuli (ETZ) and Salkangkis (EUA) (Fig. 3.1)—where surface pottery fragments, obsidian and other artefacts had been found. However, no substantial or stratified archaeological deposits were identified at any of these sites and they will not be discussed further in this thesis (see Garling 2002 for details). Test excavation undertaken at the Angkitkita (ETM) site on Lif Island, however, revealed a deep, stratified, relatively undisturbed deposit with a range of artefacts that were later dated to the ‘transition’.

The 2003 fieldwork season, undertaken from February to April, resulted in the recording of 25 new archaeological sites and isolated artefacts, all but one of which was located on Boeng Island (Garling 2004). These included: five open artefact scatters at Matampul (ERP), Poktanli (EUY), Toubo (EVE), Partes (EVF), and Olmat (EVN); one site with surface artefacts in association with ancient stone walls at Matansalnapolpol (EVD); six caves or overhangs containing archaeological deposit and/or rock-art known as Linamel (EUU), Linaukuksabel (EUZ), Linabuf (EVA) (Fig. 3.2), Limatakmam (EBV), Matambek (EUX) and Lifafaesing (EUW); a rock-art site on a sea-cliff at Point Sunepep (EVC); and a possible limestone mortar at Nessiu (EUW). The open artefact scatter recorded at Partes (EVF) contained a fragment of a large stone pestle (see Fig. A2.2 in Appendix 2), while the Poktanli (EUY) open site was clearly the former location of another ‘workshop’ for the manufacture of amfat. A number of isolated surface artefacts found by locals were collected, including: stone and shell adzes (e.g. Anis (EVM) and Olmat (EVN)); a stone club head from Lundan (EVL) (Fig. 3.2); an unusual fragment of carved volcanic stone that may be a pestle fragment found at Amfabubis (EVK) (Fig. A2.2); a couple of small pieces of obsidian at Luangki (EVP) and Batkon (EVQ); and two fragments of Buka pottery at Piklinlumfe (EVH) and Piklinkamu (EVI). Three further fragments of Buka pottery were found amongst the open artefact scatters at Taonsip (EVG) and Toubo (EVE) (Fig. A2.1). During this season, test excavations were carried out at Matambek (EUX) cave and Lifafaesing (EUW) rockshelter on Boeng, and further excavation was undertaken at Angkitkita to recover a larger sample of pottery.

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2 Reinspection of this site first recorded by Summerhayes (1999) resulted in the finding of a larger number of pottery sherds, as well as obsidian, a piece of ground ochre, a stone adze, and volcanic stone manuports.

3 I intend to publish the corpus of painted rock-art that I recorded on Tanga in due course.
Limited testing was also carried out at the Matampul (ERP) open site, although very little archaeological material was recovered and this site will not be discussed in further detail.

Combining the results of both field seasons and the previous investigations a total of 70 archaeological sites and isolated artefacts have now been recorded on Tanga—65 of which I recorded in 2001 and 2003 (Table 3.1, Fig. 3.1)—covering each of the four main islands in the group. The majority of these sites (n=29) are low-density, surface scatters of pottery, obsidian, and other shell and stone artefacts, although as detailed above, a range of different site types and artefacts were encountered (Table 3.2, Fig. 3.2). Summaries of the main surface site types and artefacts that were identified on Tanga are given in Appendix 2 (for full details see Garling 2002, 2004).

**Discussion**

Though representative in many ways of the broader region, fieldwork on Tanga has shown that its archaeology is also distinctive on a number of counts, in particular in comparison to the Anir Islands to the south. I will briefly highlight only the main points here. Foremost, given the abundance of both early Lapita period and late period Buka-style sherds at surface sites on Anir (see e.g., Summerhayes 2000b; Glenn Summerhayes, pers. comm.; pers. observ. 1995, 2000–01), the relative dearth of both types of pottery amongst the Tangan surface material is notable. Furthermore, unlike Anir to date, but like a number of other sites in the Bismarck-Solomons region (see Allen 1996, 2000 for a review), there is clear evidence that Tanga was occupied prior to the Lapita period. This evidence comes mainly from the excavation of Matambek (EUX) cave, where one of the occupation layers is dated to the mid-Holocene (ca. 6000–5000 cal BP), but is also indicated by the small number of stone mortars and pestle fragments, tanged implements and also possibly by the standing stones found at surface sites (see discussion in Appendix 2). The high likelihood that Tanga was already inhabited could possibly even help to explain the relative dearth of archaeology related to early Lapita colonising groups. The large corpus of predominantly red painted and stencilled rock-art on Tanga also stands in contrast to Anir, where only one site (ERD – Melele) with red-stencilled rock-art is known (pers. observ.; Summerhayes, pers. comm.). However, this could simply reflect the abundance of suitable surfaces for rock-art production amongst the many limestone caves and shelters of Boeng. Similar red painted rock-art to Tanga’s has been recorded on the east coast of New Ireland (Peterson & Billings 1965), on

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4 Matambek (EUX) is not discussed further in this thesis. This site, in particular its faunal assemblage, will be the subject of a future publication.
Tabar Island to the north (Gunn 1986), in the Admiralty Islands, in West and East New Britain (including Watom Island and on the Beehive Rocks near Rabaul), and on Piliilo Island in the Arawes (see Wilson 2002: 65-74 for a review). Lastly, the large number of volcanic grinding slabs and stone abraders (or grinding tools) recorded at surface sites, and in particular the seven ‘workshop’ sites, most probably attest to Tanga’s historically recorded pre-eminence in the local region in the manufacture of *amfat* (see Chapter 1). Some of these grinding slabs may have also been used in the manufacture of the many dorsal region *Tridacna maxima* adze blades that were found at surface sites. These mostly tapered, subtriangular-shaped adzes with a sharply rounded to pointed butt are very similar to the ‘Type 4’ adzes that characterise the Sinapupu and subsequent aceramic Tuakamali phases of Tikopia—which Kirch and Yen (1982: 232) argued were ‘closely associated with the Mangaasi cultural tradition’—as well as examples possibly dating from the Sohano to Recent phases on Buka (see Kirch & Yen 1982: 212, 222, 226, Table 20, Fig. 89; Kirch 2000: Fig. 5.18; Wickler 2001: 194-5). Three complete, dorsal region *Tridacna* adzes with pointed butts were also recovered from the two upper horizons of Mound V at Lossu, where they are associated with incised and applied relief pottery (White & Downie 1980: 202).

This background to the broader archaeology of Tanga provides important contextual information for understanding the potential dynamics and specificities of interaction and exchange at the ‘transition’. Importantly, the implications of a long-standing indigenous population on Tanga should be borne in mind.

### 3.2.3 Excavations at the Angkitkita (ETM) site

**The site, layout and methodology**

The Angkitkita (ETM) site is located within Angkitkita village at the base of Ngusunsu Point, a narrow promontory on the northern end of Lif Island (Figs. 3.2–3.3). This generally low-lying area (between around 2–4 m asl.) is the site that oral history records as once being inundated by tidal waves (see Chapter 1). However, water was still running across the area until relatively recent times. As a child, sometime prior to World War II, Kamdamut (Korofi clan leader, Luangki, pers. comm. 2003) remembers seeing a small amount of water flowing across the neck of the point (‘*wara i wok long ron isi*’, TP) and no soil had yet developed over the sand. Following the war, people reinhabited the now ‘dry’ area and began to plant coconuts. Angkitkita is known to be an ancestral village site (*as ples*, TP) and prior to the present-day village it was a *Kiap* (TP, field officer during the period of Australian administration) outpost (Angkitkita residents, pers. comm.).

Six test squares and two shovel test pits were excavated at Angkitkita in 2001 and 2003 (Figs. 3.4–3.5). The test squares consisted of one 2 x 1 m trench (Squares 1A and 1B), one 3 x 1
m trench (Squares 3A, 3, and 3B), and three 1 m² dispersed test squares (Squares 2, 4 and 5). Squares 3A and 3B were excavated in 2003 on either side (i.e. the western and eastern sides) of Square 3; all other squares and test pits were excavated in 2001. These additional test squares were separated from Square 3 by baulks of 20 cm width to avoid mixing the newly excavated deposit with the 2001 back-fill. There was no baulk separating Squares 1A and 1B, both of which were excavated in 2001. A combined total volume of 7.69 m³ of deposit was excavated from the test squares: approximately 3.8 m³ in Trench 3A-3-3B; 1.83 m³ in Trench 1A-1B; 1 m³ in Square 2; 0.5 m³ in Square 4; and 0.56 m³ in Square 5.

Trenches 1A-1B and 3A-3-3B and Squares 2 and 4 are all located on the narrow, coastal plain on the western side of Ngusunsu Point. Trench 1A-1B was specifically located adjacent to the place where a large, outcurving, plain rim sherd had been found eroding from a cutting during the initial survey of the area (see Fig. 6.2, Chapter 6). The other squares were located so as to test as representative a sample of the landscape as possible, while avoiding residences and thoroughfares, and given time and other constraints. Trench 1A-1B, comprising the southernmost test squares, was located at the base of the moderate to steep hillslope behind Ben Fomen’s boatshed, within Matakena hamlet. Square 2 was located 20 m to the northeast of this trench on flat ground beside an abandoned house. Trench 3A-3-3B was located 30 m to the northeast of Square 2 directly behind Ingkom’s house. This trench is situated on the southern edge of the ‘neck’ of land joining Ngusunsu Point to the mainland, on land that slopes both gently northward to the base of the opposite hillslope and westward down to the beach (Figs. 3.6–3.7). Tidal movements recorded in living memory and oral history would presumably have affected this area. The two small (ca. 50 x 50 cm) shovel test pits (S.p. 6 and 7) were excavated at two 10 m intervals to the northwest of this trench. Square 5 was located another 20 m to the northeast of Trench 3A-3-3B on the same bearing, not far from the northern edge of the village and the base of the hillslope on Ngusunsu Point. Square 4 was located 30 m to the southeast of Square 5 in Balantengkeng hamlet. This area is on slightly higher ground (ca. 3–4 m asl.) on the saddle in the volcanic range that extends from the mainland of the island across Ngusunsu Point (Fig. 3.6). With the exception of Square 4, all squares are located within around 40 m of the high-tide mark.

All the test squares were excavated in 10 cm spits. The deposit was excavated into plastic buckets and weighed using a 10 kg weighing-hook prior to sieving. All natural volcanic rocks and pebbles remaining in the sieves or encountered during excavation were similarly

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5 Ben Fomen is the Korofi clan leader and landowner of Angkitkita.
weighed on site and discarded. In 2001, all deposit from the test squares (i.e. 1A, 1B, 2, 3, 4 and 5) was dry-sieved through 3 mm mesh sieves. In 2003, as the deposit of Squares 3A and 3B became damper (nearing the in situ artefact-bearing horizon and as a result of rain) it was wet-sieved (3 mm mesh) using saltwater carried up to the beach. Charcoal was collected both in situ during the course of the excavation and from the sieves. At the end of the excavation the squares were lined with plastic bags and back-filled using stones, sieving spoil, and white sand from the beach.

**Stratigraphy**

The archaeological deposit at the Angkitkita site, contained within a fine, black sand matrix (or placer concentrate) dominated by pyroxene (Dickinson 2004a, see Appendix 7), has a superficially uniform colour and texture throughout its depth (Fig. 3.8). Stratigraphic units could, however, be differentiated in the field based on perceptible changes in the clay content of the sand and the amount and type of water-worn volcanic pebbles and pumice from the former beach(es) and larger rubble from the island’s bedrock. Due to the challenging nature of the deposit, it is likely that some of the excavated spits contain a degree of overlap between what I have defined as the stratigraphic units, and indeed, within some of the units there is evidence of mixing of cultural materials associated with different layers (see discussion below). Following further excavation at the site in 2003 and the analysis of the excavated finds—in particular taking into consideration the artefactual and natural rock densities within the profile—I revised the published stratigraphic units (Garling 2003) somewhat to reflect what was evidently a broader, concentrated, artefact-bearing occupation layer at the site (i.e. Unit II-III).

The stratigraphy showed a consistent profile in Trenches 1A-1B and 3A-3B and in Square 2, which is characterised by five main layers—Units I, II, II-III, III and IV (Figs. 3.9–3.10). Not all of these units are represented in each test square. The site is interpreted as representing one main phase of occupation in Unit II-III, with a comparatively poorly represented, earlier phase of occupation within part of the lower Unit III and Unit IV.

Unit II-III is the main artefact-bearing unit across the site—consistently containing the highest densities of artefacts—and is relatively in situ. The highest densities of artefacts were recovered from Unit II-III of Trenches 1A-1B and 3A-3B, which appeared to contain the least disturbed deposits. This unit, comprising up to three or four spits (i.e. 30–40 cm), is interpreted as

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Dickinson analysed a thin-section of a sample of sand from Unit II-III.
being the remains of a relatively stable land (and living) surface, built up over a relatively circumscribed period of time. The black sand matrix of Unit II-III is somewhat more compact and clayey than either the overlying Unit II or underlying Unit III, and is characterised by dense volcanic pebbles and rubble (Fig. 3.11), and scattered pumice nodules. As Spriggs (1986: 9) noted for sites in southern Vanuatu, it seems likely that occupation at Angkitkita and in surrounding areas at this time accelerated sedimentation and erosion rates, particularly if the surrounding volcanic hillslopes were cleared for horticulture. Though originally perceived to be more of an interface zone, and named accordingly, Unit II-III should rightly be thought of as representing the relatively in situ, main cultural horizon at Angkitkita. What could be identified of Unit II-III in Square 2 was significantly thinner—this square appears to have undergone greater geomorphological disturbance, probably during the formation of Unit II—and it was not identified in Squares 4 or 5. Both of these latter test squares had markedly different stratigraphic profiles as a result of differences in landscape unit and geomorphological history. In Square 4, located on the elevated ‘saddle’ in the volcanic range, a dense layer of volcanic rubble from decomposing bedrock was encountered at around 40–50 cm below ground surface. In the case of Square 5, its different profile could possibly be explained by its low-lying position near the foot of the hillslope (see Fig. 3.7), which may have been subject to tidal movements that impeded the accumulation of deposit.

The deposit resulting from the main phase of occupation at Angkitkita by a pottery-using community (i.e. Unit II-III) was built up on top of a sandy beach. This beach is represented in Unit III and consists of fine, loose, black sand with comparatively sparse volcanic rubble and cobbles. This deposit probably represents a period of slower deposition and beach formation related to reef development (Geoff Hope, pers. comm. 2002) and could be associated with mid-Holocene sea level decline (see further discussion below). I interpret the majority of artefacts recovered from the upper part of Unit III as most likely rightfully belonging to the Unit II-III phase occupation, having moved downward or been mixed into the otherwise culturally sterile, loose beach deposit. The amount of both pottery and obsidian within Unit III was consistently highest in the uppermost spits of the test squares—that is, beneath the very high artefact densities of Unit II-III—and diminished towards the base of the unit (Fig. 3.11). This interpretation is also backed up by a small number of conjoining diagnostic pottery sherds from Units II-III and III (see below).

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7 While ‘cobble’ sized, I use the term ‘rubble’ to convey the angular, not overly water-worn nature of many of the rocks in the deposit, which are probably present as a result of hillslope erosion.
However, the distribution of flaked obsidian by source does indicate that some material within Unit III could reflect an earlier phase of occupation to that in Unit II-III (see Chapter 7).

The underlying Unit IV, consisting of a dense layer of volcanic cobbles, was identified in Squares 1A, 2, and 3 (and possibly also 5), though was mostly clearly associated with artefacts in Square 2. This unit is possibly the surface of an older, pebbly beach, which was deposited during a high-energy phase of erosion. Unit IV was not fully reached in either Square 3A or 3B, however the last spit of Unit III of both squares contained an increased density of water-worn pebbles and cobbles. Furthermore, at the base of Square 3A (approximately 131–4 cm depth) two small pockets of grey-ish, possibly ashy-looking sand were excavated in the northeast corner of the square. These contained very small amounts of shell, pottery, and fish and other bones, possibly from a similarly early occupation phase. These features extended into the north and east sections. However, given time constraints and the low recovery of artefacts at this depth, further excavation in these squares was abandoned. A possible Unit V, comprising another fine, loose black sand layer with sparse volcanic debris, was only identified in Square 1A.

Unit II consists of fine black, slightly clayey sand, with a relatively high density of small volcanic pebbles and rubble, and scattered nodules of pumice (but generally at lower densities than Unit II-III, Fig. 3.11). I interpret this unit as representing a new, high-energy system or possibly an event that truncated and partially eroded and re-deposited deposit from the in situ cultural horizon of Unit II-III through wave action. Consequently, I consider that the majority of the archaeological materials recovered from Unit II—pottery and obsidian pieces are noticeably more eroded and water-worn in appearance—most probably derive from Unit II-III. Artefact numbers within Unit II are generally highest near the interface with Unit II-III and diminish with distance up the profile (Fig. 3.11). Modern materials were found in Spits 1 and 2 of this unit in Square 1A. Unit II may represent a period of island subsidence (Geoff Hope, pers. comm. 2002), or possibly even disturbance by a tsunami. Indeed, both of these conjectures are compatible with the oral history of the area (see Chapter 1).

Squares 2 and 5 and Trench 3A-3-3B, located somewhat downslope from Squares 1A and 1B, are all capped by Unit I, which contains re-deposited artefacts together with scattered volcanic rubble and pebbles, and modern materials such as glass and metal. Unit I was also identified in Square 4, with modern materials in the top spit.

Shovel pit 7 (S.p. 7), located 10 m northwest of Trench 3A-3-3B, was excavated to a depth of around 70 cm, that is, to approximately the depth of the artefact-bearing Unit II-III in this trench. The deposit in this pit, however, consisted only of culturally sterile, fine, black sand to the
base, which contained scattered water-worn pebbles and small nodules of bright yellow-orange pumice that seemed to increase in density at around 60 cm depth. Only one bucket of this deposit was sieved, the remainder was checked through by hand. This pit appears to signal the western limit of the cultural deposits or alternatively the cultural horizon could be at greater depth here. A further 10 m to the northwest, Shovel pit 6 (S.p. 6) contained sterile deposit related to the modern beach. The upper layer (ca. 0–20 cm) consisted of fine black sand mixed with coarse, white, shelly beach sand. The lower portion (ca. 20–70 cm) consisted of more or less homogeneous, coarse, white beach sand, containing numerous shells and coral fragments.

**Occupation and archaeological material recovered**

Trenches 1A-1B and 3A-3B and Square 2 contained significant amounts of a range of artefacts. The variety of artefacts, and therefore of activities represented, is characteristic of a village site. No structural features such as postholes or pits were encountered. However, the total area excavated was small. The largest numbers of artefacts were consistently recovered from Unit II-III (Fig. 3.11, Tables 3.3–3.4). Very little archaeological material was recovered from Squares 4 and 5; these areas were clearly not a focus of occupation and/or their location did not lead to the preservation of cultural material. Therefore, the focus of the main phase of prehistoric occupation at Angkitkita (Unit II-III) appears to have been on the southern edge of a black sandy beach (Unit III) located at the neck of Ngusunsu Point, at the base of the hillslopes of the Lif mainland. The lower, northern part of the beach was possibly a low-energy, inter-tidal zone at this time. The presence of considerable amounts of fine charcoal fragments throughout the Unit II-III deposit suggests that the higher, southern part of the beach was not intertidal. The evidence of this occupation phase was truncated, either gradually or abruptly, possibly by a period of island subsidence and/or a tsunami, which may have been related to tectonic processes and/or volcanic activity. This had the effect of eroding and re-depositing some of the artefactual material from the main occupation phase to form the upper units. Consequently, it seems most likely that the bulk of the cultural remains from Units I and II, as well as the bulk of the artefacts from the upper spits of the loose black sand of Unit III, derive from the main phase of occupation at Angkitkita. Only the artefacts within Unit II-III are relatively *in situ*. Limited artefacts from the very base of the main excavations, and in part mixed into the upper units, represent an earlier phase of occupation (see further discussion below and in Chapters 5 and 6).

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8 The post and posthole indicated in Square 3A, Unit I (Fig. 3.10), are most probably the remains of a shade screen erected during the excavation of Square 3 in 2001.
Ceramics

Numerous earthenware pottery sherds (n=4775, ca. 11.1 kg) were recovered from the Angkitkita site as a whole, comprising 4102 plain body sherds (8.1 kg) and 673 diagnostic sherds (3.0 kg), including 143 decorated sherds (Tables 3.4–3.5; the complete data set is given in Appendix 6). Decorated sherds comprise approximately three per cent of the total assemblage. The majority of all sherds, both plain (75%) and diagnostic (78%), came from the relatively in situ main cultural horizon (Unit II-III).

Considering all the test squares, the overall density of pottery at the site was 621 sherds (or 1.45 kg) per cubic metre of deposit (Table 3.5). Discounting the squares that were not a focus of occupation (i.e. Sq. 4 and 5),\(^9\) the density of pottery in the main occupation area is somewhat higher. Within the total volume excavated from Square 2 and trenches 1A-1B and 3A-3-3B, 617 plain body sherds and 101 diagnostic sherds (including around 22 decorated sherds) were recovered per cubic metre—i.e. a total of 718 sherds or 1.67 kg/m\(^3\). Squares 3A and 3B each contained over 2 kg of pottery per m\(^3\); Squares 1A, 1B and 3 each contained over a kilogram of pottery per m\(^3\); and Square 2 contained 768 g/m\(^3\).

The high level of fragmentation of the pottery has, however, bolstered the density figures based on counts, which is reflected in the relatively low, mean sherd weights. The average weight of all the plain body sherds recovered was 2.5 g, while the average for diagnostic sherds was somewhat higher at 4.5 g (Tables 3.6–3.7). I further assessed the fragmentation of the assemblage by applying a simple measure of sherd size. Each sherd was assigned to one of four size categories (<2 cm, 2–4 cm, 4–6 cm and >6 cm), considering their maximum dimension in any direction. This indicated a high level of fragmentation, with 68 per cent of plain body sherds and 37 percent of diagnostic sherds less than 2 cm in size. The highest percentage (49%) of diagnostic sherds was in the 2–4 cm size category. The highest numbers of larger sherds (in the 4–6 cm and >6 cm categories, and with the highest average weights), both plain body and diagnostic, came from the in situ Unit II-III. The percentage of small (<2 cm) plain body sherds was slightly higher in Unit II than Unit II-III, which no doubt reflects the higher degree of taphonomic disturbance in this layer. Trampling under foot (during the former village occupation) may possibly have caused the high fragmentation in Unit II-III. The majority of sherds from this unit show little or no signs of abrasion or water-rolling.

\(^9\) No decorated sherds were recovered from Squares 4 and 5.
The relatively *in situ* layer also contained the highest number of sherd conjoins.\(^{10}\) Sixty-eight diagnostic sherds—four from Unit II, 53 from Unit II-III, and 11 from Unit III—could be conjoined along old, weathered breaks in 29 small conjoin sets, generally consisting of two or three sherds.\(^{11}\) The majority of these sets (n=22) consisted of sherds recovered from the same square, unit and spit, but a small number of sets (n=4) conjoined sherds across spits within the same unit (e.g. in Square 3A, Sets 13, 15 and 16 conjoined sherds from Spits 7, 8 and 9 of Unit II-III; and Set 19 conjoined sherds from Spits 11 and 12 of the underlying Unit III); two sets (Sets 8 and 21) conjoined sherds from adjacent units (i.e. a sherd from Spit 8 (Unit II-III) conjoins a sherd in Spit 10 (Unit III) in Square 3, and in Square 3A a sherd from Spit 11 (Unit III) conjoins a sherd in Spit 13 (Unit IV); and the final set (Set 4) consisted of sherds from Spits 4 and 3 of Unit II-III in the adjacent Squares 1A and 1B respectively. A total of 14 plain body sherds were also conjoined in Unit II-III, comprising four sets of sherds from Square 3B (in Spits 7 and 8), one set from Square 3 (in Spit 8), and one set in Square 2 (Spit 7) (see Appendix 6). This conjoining exercise provides further indication that Unit II-III represents a relatively intact, single phase of occupation, and also provides some evidence of the movement of sherds from this layer down into Unit III. No conjoins were made of sherds from Unit II and Unit II-III, presumably because of the greater disturbance that the material in Unit II has undergone.

The most common decorative techniques were incision on its own or coupled with applied relief. Only two dentate-stamped sherds\(^{12}\) were recovered from the excavations at Angkitkita, both from the lowest two spits (Unit III and IV) of Square 2 (see Chapters 5 and 6 for the results of ceramic analyses).

**Obsidian**

A total of 993 pieces of flaked obsidian were recovered from the excavations, 58 per cent of which derived from Unit II-III (see Chapter 7 for the results of obsidian sourcing) (Fig. 3.11, Table 3.4). Only a comparatively small number of pieces were recovered from the underlying beach units (Unit III and IV). The quite high total number of obsidian pieces represents only 282.5 g of material (Table 3.8), reflecting the fact that the majority of the assemblage consists of very small

\(^{10}\) Sherd conjoining was not a major focus of the ceramics analysis; it was carried out incidentally to temper, form and decorative analysis.

\(^{11}\) Five plain body sherds conjoined in two sets from Unit I (Square 2 in Spits 2 and 4), and two sherds conjoined in Unit III (Square 3B, Spit 11).

\(^{12}\) A second dentate-stamped sherd, further to the single sherd reported in Garling (2003), was later discovered having been originally mistaken for a plain body sherd.
pieces of flaking debitage (with a mean weight of only 0.3 g). The highest densities of obsidian were recovered from Trench 3A-3-3B, followed by Square 2 and Trench 1A-1B. Square 3B contained the highest density, with 303 pieces (or 83.4 g) per m³.

Stone adzes

Ten complete and two partial stone adze blades were recovered from the excavations. All except one of these (from Square 5) were from Trenches 1A-1B and 3A-3-3B (Tables 3.9–3.10), and eight were recovered from the most securely in situ context of these trenches, that is, Unit II-III (Table 3.4).

Most of the Angkitkita adzes (n=7, including one adze fragment) are oval in cross-section and a smaller number are planilaterial or planoconvex (Fig. 3.12, Table 3.9). Most have a curved cutting edge, are either sub-triangular or triangular in form (only one very small, oval-section adze has parallel sides, see Fig. 3.12), and there is a variety of butt forms. Professor Dickinson (The University of Arizona) analysed the petrography of seven of these adzes in thin-section (Dickinson 2005a, see Appendix 7). Three consist of cemented volcaniclastic rock (ETMa3, 13, 14); three are of fine-grained volcanic rock with a matrix of altered volcanic glass imbedded with plagioclase and clinopyroxene microphenocrysts (ETMa4, 10, 11); and one (ETMa8) is of fine-grained, volcaniclastic rock with a clayey matrix. Though the precise origin of these rock types is not certain, Dickinson considered they could well have derived from the interbedded lavas and volcaniclastic strata of the collapsed Tanga stratocone.

Anvil or polishing pebbles

Thirteen anvil and/or polishing pebbles were recovered from Trenches 1A-1B and 3A-3-3B (Fig. 3.13, Table 3.11). The majority (n=11) of these are oval-shaped, flattish pebbles that fit in the palm of your hand. Over half of them have moderate to high or complete use-wear polish on their surface; the remainder are very smooth but without a visible polish. Use-wear striations are also visible under low magnification (particularly on the edges and the flatter, more highly polished surfaces) and are associated with areas of dark, reddish-brown, gritty-looking residue. These stones have most probably been used for smoothing or polishing the exterior of earthenware.

13 A technological analysis of the ETM obsidian assemblage was not within the scope of this thesis. However, my own general observations indicate that the assemblage consists mostly of flakes, flake fragments, and flaked pieces. There appear to be very few cores and no formal tool types (such as gravers) were noted.

14 The single adze (ETMa7) from Square 5 is made of an unusual, light-weight material (not analysed by Dickinson), which appears almost like vitreous porcelain. Alternatively, it could be a weathered carbonate, though it does not react to hydrochloric acid (10%).
ceramics during their manufacture, and may also have been used as anvils on the interior of the pots using a paddle and anvil technique (cf. Shepard 1985[1956]: 59, 66-7).

Most of these oval-shaped anvil/polishing pebbles are of the same rock types identified in the stone adzes (Dickinson 2005a). However, three pebbles, all from Unit II-III, consist of fine-grained volcanic rock that contains microphenocrysts of hornblende, which could possibly indicate that they derive from the Anir Islands (Dickinson 2005a: 1).

The remaining two excavated pebbles are different in form to the others (Fig. 3.13). One is a large, elongated, triangular-sectioned pebble, with numerous reddish-brown, clay-like residues and use-wear polish all over it, but particularly on two flat surfaces. The other is a cobble of white-ish, chalcedonic chert, which derives from an unknown location (Dickinson 2005a). This cobble has slight use-wear polish on one flattish surface, associated with numerous dark brown, soil or clay-like residues. It has also probably been used as a hammerstone given the evidence of crushing on one end. The rock type of this cobble provides further support to its use as a hammerstone. Dickinson (2005a: 2) describes it as probably being harder and more resistant than any of the other anvil/polishing pebbles.

**Other non-ceramic artefacts**

Other excavated artefacts include 50 nodules of red ochre with abraded facets on their surface (see Chapter 8), a fragment of a Tridacna sp. arm-ring (Sq.3A/II/Spit 2), a perforated Conus sp. shell disc (Sq.3/I/1), a shell bead (Sq.3B/I/1), two pieces of flaked chert (one red-yellow and one red, from Units II and II-III of Square 3A respectively), a biconical sling-stone made of barite (Sq.1A/II-III/4), four fragments of volcanic stone files or abraders (which appear to be made from local lava; Units I, II and II-III) (Fig. 3.14), and flakes removed from the edges of stone adzes/axes. Unfortunately, none of the shell ornaments are in situ.

**Faunal material**

Only a small amount of bone (397.41 g) and even less shell material was recovered from the excavations. This is most likely due to poor preservation conditions at the site. Most of the shell and bone is very weathered and friable, probably due to the constant movement of water through

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15 Dickinson (2005) analysed the petrography of ten of these pebbles in thin-section (see Appendix 7).

16 The mineral composition of the sling-stone was analysed using a form of x-ray diffraction known as General Area Detector Diffraction System (GADDS) at James Cook University (Dr Alan Watchman arranged the analysis). With a specific gravity of 4.5, this barite sling-stone is probably the ‘prehistoric equivalent of a spent uranium bullet’ (W.R. Dickinson, pers. comm. 2002). The source of this mineral is at this stage unclear, although it was possibly available within the Bismarck Archipelago.
the generally damp deposit and the effects of leaching. The bone is currently being analysed by Ken Aplin (CSIRO) and the shell midden and artefacts have been analysed by Katherine Szabó (ANH, ANU). Lyn Schmidt (formerly ANH, ANU) undertook a preliminary analysis of the fish bone. The results of these analyses will not be reported on in this thesis and will form a separate publication.

Preliminary analysis of the bone assemblage indicates that fish (180.47 g) and pig bone (Suidae, 99.8 g) are the most prevalent (Table 3.12). The fish bone reflects the targeting of inshore reef species, including Scaridae, Lethrinidae, Labridae, Serranidae and Carcharhinidae (reef shark). The distribution of both pig and fish throughout the stratigraphy is similar, with the largest amounts of both recovered from Unit II-III. Fish bone was also recovered from Unit III in a comparable quantity. The amounts of both fish and pig peak again in the modern Unit I. The very small amount of phalanger recovered is also distributed in a similar pattern. A portion (13.39 g) of turtle plastron (the flattish part of the lower body shell) was recovered from Unit II-III (Spit 8) in Square 3A. Dog bone (0.31 g) was only recovered from modern levels (as was skink) and small pieces of both rat and bat bones were found at the base of Square 3B (Unit III).

**Chronology**

Eight conventional radiocarbon determinations, all on charcoal fragments found *in situ* or dispersed through a spit, date Units II, II-III and IV at the Angkitkita site (Fig. 3.15, Table 3.13).

A single determination (ANU-12147) on dispersed charcoal from Spit 4 of Square 3B dates the bottom of Unit II to well within the post-Lapita period between around 1400–800 cal BP (2σ), although it is most likely to date between 1290–1050 cal BP (0.912, 1σ). This spit lies immediately above what is considered to be the core extent of the main occupation horizon in Unit II-III, but comprises a form of interface zone containing a certain amount of mixed materials. This determination could possibly date the beginning of the events (i.e. island subsidence and/or tsunami) that formed Unit II, which eroded and re-deposited the older cultural materials.

Six determinations date the main occupation horizon of Unit II-III. Two of these determinations (ANU-11608 and ANU-11605) on dispersed charcoal produced somewhat

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17 The pH of the deposit when measured in 2001 was only slightly acidic. In three spits from Unit II-III and Unit III (Sq. 1A and 3) the soil pH was consistently 6–6½.

18 Small quantities found in Square 3B/II-III/8 are possibly from the same specimen.

19 One highly anomalous determination on charcoal from the re-deposited Unit II of Square 1B produced a conventional age of 28,480±2180 bp (ANU-11606). Whatever this may be dating—and it was most certainly charcoal (Abaz Alimanovic, Radiocarbon Dating Laboratory, ANU, pers. comm.)—it is clearly not the occupation of the site.
younger calibrated age ranges than the other four determinations for this unit, and are statistically the same (at the 95% confidence level). These two determinations are statistically different to both the determination from Unit II above (ANU-12147) and to the other determinations from Unit II-III. The determination (ANU-11608) from the top of Unit II-III (Spit 6) in Square 3 returned a calibrated age of 1990–1540 cal BP at 2σ, but has a high probability (0.844, 1σ) of dating to the middle of this age range, between around 1880–1690 cal BP. Given the location of this charcoal in Spit 6 at the interface with Unit II it is possible that some degree of mixing is present. All of the decorated sherds in Square 3, including those with incision and/or applied relief, were found at depths below this spit. The determination (ANU-11605) from Spit 5 of Square 1A, in the mid-level of Unit II-III, calibrates to 2050–1710 years cal BP (2σ), and most likely dates to the middle of this range around 1950–1820 cal BP (0.881, 1σ). While statistically different from the somewhat older determinations from Spits 4 and 6 of the adjacent Square 1B—which was excavated in corresponding spits—there is a small degree of overlap between them at the 2σ range. Given the flatness of the calibration curve at this period (see Fig. 2.5 in Chapter 2), all these determinations could be approximately the same age. These two statistically identical determinations (ANU-11608 and ANU-11605) pool to indicate a more restricted calibrated age range of 1950–1710 cal BP (0.973) at 2σ and 1900–1810 cal BP (0.749) at 1σ, which could possibly date the end stage of the main occupation phase at Angkitkita.

Four statistically identical determinations from Unit II-III (ANU-12075, ANU-11607, ANU-11609 and ANU-11793), including two on in situ charcoal, squarely date the main occupation phase at Angkitkita to within what I defined in Chapter 2 as the ‘transition’ period—that is, ca. 2350–1900 cal BP. The determination (ANU-12075) on a sample of the in situ charcoal fragments from Spit 7 of Square 3A calibrates to 2340–2010 cal BP at 2σ, and 2310–2130 cal BP at 1σ. The other determination (ANU-11607) on in situ charcoal from Spit 6 of Square 1B produces virtually identical calibrated age ranges, though it most likely dates to 2270–2150 cal BP given the probability distribution (0.699, 1σ). The other two determinations (ANU-11609 and ANU-11793) from Squares 1B and 3 had somewhat larger conventional age uncertainties. Both these dates consequently produce large calibrated age ranges at 95% confidence—2690–1990 cal BP and 2740–2010 cal BP (2σ) respectively—reflecting the flatness of the calibration curve at this period. At 68% confidence, however, both give similar, more restricted, likely calendar age ranges of 2360–2120 (ANU-11609) and 2500–2290 cal BP (ANU-11793; 0.554, 1σ). More

20 A total of 23.6 g of in situ charcoal was recovered from Spit 7 and 17.9 g from Spit 6, Unit II-III of Square 3A. Some of these fragments are potentially identifiable and could represent Cocos nucifera and Canarium sp.
resolution to the age of the Unit II-III cultural horizon can be gained when all four statistically identical results are pooled together (Table 3.13). The group mean conventional radiocarbon age for these four results is $2236 \pm 44$ bp, which calibrates to 2340–2150 cal BP ($2\sigma$). However, the highest area under the probability distribution indicates a more likely age towards the younger end of this range, of 2250–2180 cal BP ($0.632, 1\sigma$).

The final radiocarbon determination (ANU-12144) from the site is on dispersed charcoal found in association with one of the two dentate-stamped sherds recovered from the site (ETM996, see Fig. 6.14, Chapter 6). This sherd is from the lowest level of Square 2 (Unit IV/Spit 10A),21 where an apparent layer of dense volcanic cobbles possibly represents the surface of an older, pebbly beach, beneath the sandy beach that was occupied in Unit II-III. The other dentate-stamped sherd (ETM985, see Fig. 6.15) was recovered from the spit above this (Sq.2/Unit III/Spit 9). This determination produced a significantly older calibrated age of 3270–2840 cal BP ($0.959, 2\sigma$) and most likely dates to the middle of this range (i.e. 3160–2930 cal BP ($0.932, 1\sigma$)). This age overlaps what Summerhayes (2001b: Table 9, 2003a, 2003b, 2004: Table 2) defines as the end of the ‘Early Lapita’ period (i.e. 3500–3000/2900 BP) and the beginning of the ‘Middle Lapita’ period (i.e. 2900–2700/2600 BP) in the Bismarck Archipelago.

**Discussion**

In summary, the evidence indicates that the main phase of prehistoric occupation at Angkitkita was by a pottery-using community that occupied the area during the ‘transition’, most probably between around 2300/2250–2150 cal BP. Their pottery was predominantly plain, though a small percentage was decorated with elaborate mostly incised and applied relief designs. Reef fishing and pigs appear to have been important aspects of their subsistence economy. The suggestion of higher erosion rates in Unit II-III probably indicates that horticulture was also an important aspect of their subsistence—though there is no direct evidence of tuber or other crops—and limited charcoal evidence suggests that arboriculture involved at least coconut and Canarium sp. Two radiocarbon determinations (ANU-11608 and ANU-11605) suggest that this period of occupation possibly lasted until around 1900–1800 cal BP, though the nature of the calibration curve hinders finer resolution of the chronology. Consequently, the evidence could represent at most a few centuries of occupation during the ‘transition’, or may have been even more circumscribed.

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21 The dentate-stamped rim was found with a rim (ETM999) of another non-local, exotic-tempered vessel (see Fig. 6.14, Chapter 6).
Some 500 years later, possibly around 1300–1100 cal BP, the archaeological deposit remaining from the main occupation phase was either gradually or abruptly truncated by a period of island subsidence and/or a tsunami, which may have been related to tectonic processes and/or volcanic activity.

There is more limited evidence, coming in particular from Square 2 (where two dentate-stamped sherds were among those recovered from the basal levels) and to a much lesser extent Square 3A, of a considerably earlier phase of occupation (basal Unit III and Unit IV) during the Early-Middle Lapita period, most likely between around 3150–2950 cal BP. This evidence suggests that there was a hiatus of some 650 years at least between the two phases of occupation by pottery-using communities at Angkitkita. Unfortunately, Square 2 has clearly suffered greater disturbance (probably due to the Unit II events) than Trench 1A-1B or 3A-3-3B, and there is likely to be a degree of mixing present between the assemblages of the Early-Middle Lapita and ‘transitional’ phases.

A few points can be made at this point about the Angkitkita artefact assemblage overall. Importantly, while the pottery recovered from Angkitkita is highly fragmented, the sherds are on average somewhat larger than those from the New Ireland ‘transitional’ sites, and most of them—in particular from the main occupation horizon Unit II-III—show little or no sign of abrasion or water-rolling. Furthermore, even taking into account the high level of fragmentation, the density of pottery recovered from Angkitkita is high compared to other ‘transitional’ sites in the region. For example, at the Reber-Rakival site complex on Watom, none of the trenches Specht (2003: 126-7) excavated in 1966 at Kainapirina (SAC) or Maravot (SAD) contained a weight of pottery exceeding 250 g/m³. The average at Angkitkita is about six times this. In the later Watom excavations, maximum sherd densities ranged from 47 sherds per m³ (rectangles III and IV) at Kainapirina to 143 sherds per m³ at Vunavaung (Green & Anson 1991: 175; Anson 2000: 109; Green & Anson 2000b: 72; Anson et al. 2005: 45). A similarly high degree of sherd fragmentation was also reported at the Watom sites (Green & Anson 2000b: 77; Specht 2003: 127).

The very low mean weight of excavated obsidian at Angkitkita is characteristic of other ‘post-Lapita’ sites in the Bismarck Archipelago. Specht (2002: 42) notes that in this period there is a distinct change towards uniformly small mean weights, irrespective of distance to sources.

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22 Sherd weights were not reported.
The number of stone adzes recovered from Angkitkita significantly boosts the small, existing corpus of excavated adzes from Lapita and post-Lapita aged contexts in both the Bismarck Archipelago and across Near Oceania as a whole (see Felgate 2003: 398-9 for a review). Green (2003: 110) considers the oval-sectioned type of stone adze—the predominant form at Angkitkita—to be a core intrusive component of the Lapita cultural complex, while he classes both the planilateral and planoconvex types—seen in smaller numbers at Angkitkita—as Lapita innovations. The presence of both these forms at Angkitkita therefore suggests some form of cultural continuity with the Lapita horizon. Angkitkita’s adze assemblage is comparable to that recovered from the Reber-Rakival site on Watom. Specht (2003: 124-9) and Anson (2000: 104) excavated oval-sectioned adzes from Maravot (SAD) and Vunavaung (SDI) respectively, from what were described as Late Lapita contexts. At Vunavaung, the bevel from a planilateral adze and a complete adze with a planoconvex section are possibly also derived from this context (Anson ibid.). Four adzes (in including one poll fragment) were recovered from Kainapirina (SAC), including two described as planilateral from Zone C1, and one planoconvex and one triangular-sectioned adze from Zone C2. Two oval-sectioned adzes were also recovered from Lossu (White & Downie 1980: 203).

Artefacts similar to Angkitkita’s anvil or polishing pebbles have been recovered from a number of other Pacific sites. The examples that are possibly most comparable in age come from southwest New Caledonia. Sand and Ouétcho (1993: 122, 125) found smooth oval pebbles amongst their surface collections at the Ongoué (WPT148) site, which they interpreted as being either anvils used in pottery manufacture or sling-stones. Associated with Lapita period ceramics, as well as paddle-impressed and later chevron-incised pottery, these stones are thought to date to sometime between the first millennium BC and the beginning of the first millennium AD. Green (1974a: 151) recovered ‘flat, circular stones’ from the post-Lapita Sasoa’a village site (SU-Sa-3) in Western Samoa, which he interpreted as ‘polishing stones or anvil stones for the manufacture of pottery’. On Buka, Wickler (2001: 193) found a number of highly polished pebbles in both Pleistocene and Holocene deposits at Kilu and Palandraku Caves. Historically, Blackwood (1935: 397-8) observed pottery being made at Malasang village on Buka using a ‘smooth flat stone (rako)’ to carry out the initial moulding of the pot base and also as an anvil (using a paddle and anvil technique) during a later stage of the process. While Specht’s (1969: 95, 270-1) excavations on Buka did not recover smoothing stones exactly like the modern ones, he did find a number of ‘small sub-spherical’ stones with smooth surfaces, frequently of volcanic rock.

The small amount of flaked chert recovered at Angkitkita is consistent with the findings from a number of Lapita and post-Lapita aged sites in Near and Remote Oceania, and possibly
reflects the low abundance and significance of this probably dispersed resource (see Sheppard 1996). Amongst ‘transitional’ sites in the local region, a small number of siliceous flakes and cores—including some red-coloured material like that found at Angkitkita—from an unknown, exotic source were recovered from Kainapirina (SAC) (Green & Anson 2000b: 62) and Vunavaung (SDI)(Anson 2000: 106).

Two biconical or ‘pointed end’ sling-stones, made from basalt and Tridacna sp. shell, from the Nenumbo Village Lapita site (SE-RF-2) in the Main Reef Islands (Green 1979: 39, Fig. 2.5) are very similar in form to the barite sling-stone found at Angkitkita. Indeed, the Tridacna sp. specimen is almost exactly the same length as the one recovered from Angkitkita’s main occupation layer (Unit II-III), although in age they are probably separated by at least 600 years.23 Sling-stones were also recovered from two of the New Ireland ‘transitional’ sites that I focus on in this thesis. At Lossu, seven sling-stones, ranging in size and shape (from biconical to spheroidal) and described as being made of coralline limestone,24 were recovered from the upper horizons of Mounds V and VI where pottery decorated with incision and appliqué was concentrated (White & Downie 1980: 202-3, Fig. 5). At Fissoa, a single biconical sling-stone (the material is not described) was recovered from Pit 3 (White & Murray-Wallace 1996: 37-8, Table 1). While the Lossu sling-stones could possibly also be ‘transitional’ in age, it is unclear how old the Fissoa sling-stone is considering the significant disturbance to the site.

Comprised predominantly of pig and fish, the ‘transitional’ faunal assemblage of Angkitkita is also very similar to that found at Lasigi and Lossu, which indicates that these communities had a similar subsistence economy. Abundant pig bones were also recovered from Kainapirina Zone C1 and to a lesser extent Zone C2 (Smith 2000), which fits the same pattern. As I have argued in Chapter 2 (and Appendix 1), the upper part of Zone C2 and much of the material in Zone C1 are probably dated to (and/or displaced from) the ‘transition’ period.

23 Green et al. (Green 1986, 1991a; Sheppard & Green 1991: 89; Jones et al. 2007: 99-100) argue that the cultural material recovered from Nenumbo reflects a fairly brief, single occupation event, possibly within the course of a single generation. Statistically identical radiocarbon determinations on charcoal (n=4) and marine shell (n=2) (Jones et al. 2007), each pool to give near identical calibrated age ranges of 3060–2870 cal BP and 3080–2850 cal BP (1,000, 1σ) respectively. Pooled dates calibrated by Garling using CALIB Rev 5.0.1. Shell dates calibrated using the ∆R suggested by Jones et al. (2007).

24 The drawings of two sling-stones (White & Downie 1980: Fig. 5) appear to indicate that they are made from very solid, non-porous material. Could white-coloured barite have been mistaken for ‘coralline limestone’?
3.2.4 Excavations at the Lifafaesing (EUV) rockshelter

The site, layout and methodology

Lifafaesing is a large overhang located in the Warangkabong area of southeastern Boeng Island, lying east of Taonsip village and north of Suntaufi Point (Fig. 3.1). It contains both archaeological deposit and rock-art in red pigment. Owned by the Tassik clan, Lifafaesing is at the base of the raised limestone cliff, approximately 1–2 m above the present beach, at the northern end of a stretch of narrow coastal plain. Two large, free-standing, limestone blocks, known as Funpen and Funfatpokpanelo, are located about 30 m to the south of Lifafaesing at the edge of the beach. Funfatpokpanelo has a clear wave-cut paleoshoreline notch around its girth, about 1–2 m above the present day level of the reef platform and beach (Fig. 3.16; W.R. Dickinson, pers. comm. 2004). A paleonotch is also visible within Lifafaesing itself, protruding above the present floor level (Fig. 3.16, see view to the southeast). These notches probably record the paleo-high-tide level of the mid-Holocene hydro-isostatic highstand in relative sea level between around 6000–4000 years ago (Bard et al. 1996; Dickinson 2001, 2003).25

Lifafaesing overhang is approximately 16 m long and 14 m high at the dripline and faces east-southeast (Fig. 3.17). The most habitable part is at the southern end of the overhang and has a flat floor area of around 6 x 8 m. In 2003, this main living area was being used to cook kabeng (betel lime, tgg)—as it had been for many years—and there was a large fireplace covering over 3 m². Residents of Taonsip occupied the overhang during the two years of Japanese occupation on Tanga during World War II. According to Partui Bonaventura, a Korofi clan leader who lived there as a young boy, a low mound of soil at the front of the main chamber was constructed at this time using deposit removed from the back of the overhang, to form a screen from passing ships. Another mound of soil on the northern edge of the main living area (see view to the northeast, Fig. 3.16) was possibly also constructed at this time. Oral history also records Lifafaesing being used as a refuge during the era of civil warfare and cannibalism (toui, tgg)26 on Tanga. One story records that the last two people killed (a man and a young boy) from

25 The exact timing of the peak and duration of the mid-Holocene highstand in the tropical Pacific is uncertain, and it is clear that there was variable regional timing. Global calculations indicate a putative hydro-isostatic highstand at 4000 BP, though observational data from tropical Pacific islands indicate that the onset of the highstand may have been somewhat earlier in the range of 5000–4000 BP, and may have occurred at least in some regions in the period 6000–5000 BP. Emergent paleo reefs in nearly all tropical island groups indicate the lingering effects of the highstand between around 4000–3000 BP (Dickinson 2001: 203-4). Along the fringing island arcs of the northwest and southwest Pacific, post-mid-Holocene sea level began to decline by around 3200 BP (Dickinson 2003).

26 This is usually translated as ‘tairn belong kaikai birua’ (TP).
the Tassik clan during *toui* were taken to Lifafaesing. However, it is not clear whether their remains were buried in the cave (Taonsip residents, pers. comm.).

During the initial survey, two small plain body pottery sherds and pieces of obsidian were collected from the surface of the mound at the front of the overhang, and shell midden and two fragments of probable human bone (part of a rib and a phalange) were also noted. A dorsal region *Tridacna maxima* adze, which has been ground flat on both sides (i.e. planilateral), was found by Selewar amongst the boulders in front of the overhang (Fig. 3.20, Table 3.4).

All of the rock-art recorded at Lifafaesing consists of linear and figurative paintings in red pigment. Three pictures are located within the overhang itself but the majority of the art is on the cliff-face immediately to the north, above the small beach called Pukinkanman. The art is positioned at heights ranging from around two to five metres above the current level of the beach and is arranged in three main panels. Most of the art is very faded and has been damaged by rainwater and plant and fungal growth. Recognisable motifs amongst the more than twenty or so pictures include a ‘snake’, ‘sun’, and human figures. Numerous red ‘blobs’ of pigment are also present. The most northerly panel of art consists of around fifteen closely spaced, parallel, red painted lines, which run along the underside of the rim of a ledge in the cliff, around 5 m above Pukinkanman.

Two 1 x 1 m test squares (Sq. 1 and Sq. 2) were excavated near the centre of the main floor area—beneath the modern *kabeng* cooking area, which was cleared away—to maximum depths of around 44 cm and 90 cm respectively to limestone bedrock and/or sterile beach deposit. A combined total volume of around 0.92 m$^3$ of deposit was excavated from these squares: approximately 0.305 m$^3$ in Square 1 and 0.614 m$^3$ in Square 2.

Both squares, oriented north-south, were excavated in 5 cm spits and/or natural stratigraphic layers—whichever was the smaller unit as excavation proceeded. All of the deposit was dry-sieved through nested 3 and 5 mm sieves. A sample of around 2 kg of deposit was wet-sieved from most spits using the 3 mm sieve, following the removal of any plant and/or fine charcoal material using flotation. The deposit was excavated into plastic buckets and weighed using a 10 kg hand-held weighing-hook prior to being sieved. All limestone pebbles and coral found within the deposit and the small amount of unsorted material (mostly very fine shell fragments from the 3 mm sieve) were collected and weighed before being discarded. At the end of the excavation both squares were lined with plastic bags and back-filled using sieving spoil and white sand from the beach below the shelter.
Stratigraphy

As the deposit in Square 1 was thinner and more disturbed than Square 2—it's stratigraphy was not entirely comparable—and it contained only a small number of artefacts, I will only use the results from Square 2 in this thesis.

Square 2 contained seven distinct, seemingly largely undisturbed stratigraphic layers (Units I-VII), which slope down to the east, towards the front of the overhang (Fig. 3.18). However, some disturbance was evident along the western and northern perimeters of the square, to approximately the level of Unit V, and in the northeastern corner to below this level. Unit I consisted of the modern *kabeng*-cooking layer, which contained a high density of both burnt limestone fragments and charcoal, within coarse, loose, grey-brown sand. The most recent prehistoric layer at the site, Unit II, consisted of dark brown-black, more compact, slightly clayey sand, which contained shell midden (including some worked *Turbo marmoratus*), fish bone, and a small amount of human bone. A high density of fragmented human skeletal material was found in Unit III, together with small, possible nodules of red-brown iron oxide and midden material. The human bone could represent burials and/or cannibalistic activities (during *toui*). Unit IV below this ‘burial’ layer consists of a thin layer of coarse, loose, shelly, grey-brown sand, which also contained a few fragments of human bone. Unit V is a fine, loose, grey-brown to black sand, which contained shell midden, numerous pebbles, some human bone (possibly intrusive from Units III and IV), a single piece of red ochre with ground facets (see Chapter 8), and a number of limestone *mumu* stones (TP, ‘ground oven’; *funfat na arar*, tgg). An important transition in the occupation and use of the site appears to have occurred between Units V and VI. The top of Unit VI (i.e. at the interface with Unit V) appeared to be a slightly undulating ‘living floor’ (first visible in part of Spit 9) made up of a thin lens (ca. 1–2 cm thick) of highly compacted deposit overlying fine, loose, grey-brown sand with water-worn limestone gravel and occasional pieces of pumice. The living floor extended across most of the test square, but was not clear in the northeastern corner.

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27 Tangans recognise these layers as *nin len* (tgg); periods or layers of time and occupation related to past generations. *Nin len* are also visible as growth rings in trees and in the flesh of fish.

28 A shell fish-hook fragment (possibly *Turbo* sp.) recovered from this Unit in Square 1 is not *in situ*. It may have been brought to the surface layer from one of the lower units when soil was dug out from the back of the shelter during World War II.

29 Dr Hallie Buckley’s (Department of Anatomy and Structural Biology, School of Medical Sciences, University of Otago, New Zealand) preliminary skeletal report (May 2005) indicates that a number of the human bone fragments are burnt, including one piece of cranial bone and possibly some long bone fragments. The remains of at least two adults, one child (under 12 years old), and one infant (under 1 year old) were identified in Units II and III; at least two adults, one child, and one infant were also identified among fragments from Unit IV and V (these remains are possibly from the same individuals identified in Units II and III).
corner.\textsuperscript{30} Within Unit VI, limestone bedrock (or possibly a large boulder) was reached at the base of Spit 11; this feature took up half to just over half (with increasing depth) of the area of Unit VI in the test square. Unit VII was visible in the southeastern portion of Square 2 at the base of the excavation. This basal unit consisted of a culturally sterile deposit of loose, coarse, shelly sand and beach gravel with mostly large (on average 5–10 cm) pieces of water-worn coral and limestone, and water-worn shell. The last excavated spit (Spit 15) of Unit VI consisted of a somewhat mixed interface zone with the underlying sterile beach deposit (Unit VII).

**Chronology**

Four conventional and two AMS radiocarbon determinations have been processed from Units II, III, V and VI (Fig. 3.19, Table 3.14).

Given the lack of a specific $\Delta R$ value for the Tanga Islands, the single determination (ANU-12143) on shell\textsuperscript{31} from Unit II was calibrated using the two $\Delta R$ values from Anir (Summerhayes & Petchey in prep.), as they are more appropriate than the Kavieng Harbour value (Petchey et al. 2004). The two Anir values produce comparable calibrated age ranges. The Kamgot (ERA)\textsuperscript{32} value indicates somewhat more restricted age ranges of 2280–1880 cal BP (1.000, 2$\sigma$) and 2150–1940 cal BP (1.000, 1$\sigma$). The dated shell from this unit clearly represents intrusive material from the lower levels of the site, probably as a result of the WWII disturbance.

A determination on in situ charcoal (ANU-12077) dates the underlying ‘burial’ layer of Unit III to 1220–690 cal BP at 2$\sigma$, but an age of between around 1020–790 cal BP (0.877, 1$\sigma$) is most likely.

A statistically identical calibrated age range of 1240–740 cal BP (2$\sigma$) (or 1090–900 cal BP, 0.800, 1$\sigma$)\textsuperscript{33} was produced from a determination (ANU-12076) on dispersed charcoal from Spit 8 of the underlying Unit V, lying directly above the thin, compact, ‘living floor’, which is the surface of Unit VI. These two determinations (ANU-12077 and ANU-12076) could indicate that Units III–V developed in relatively rapid succession, possibly only separated in time by a couple of centuries at the most.

\textsuperscript{30} As noted above, there is some disturbance in this area; it was also the least visible given the orientation of the square and poor light conditions.

\textsuperscript{31} *Turbo setosus* opercula (30 g).

\textsuperscript{32} Kamgot is an Early Lapita open beach site (see Summerhayes 2000b).

\textsuperscript{33} The pooling of ANU-12077 and ANU-12076 produces an almost identical calibrated age range of 1060–910 cal BP (0.893, 1$\sigma$) (Table 3.14).
Radiocarbon dating also supports the stratigraphic interpretation of a transition in the site’s use or occupation between Units V and VI. A determination on dispersed charcoal from Spit 10 (ANU-12146), located near the top of Unit VI, dates to 2340–1740 cal BP (2σ), or most likely to between around 2160–1880 cal BP (0.894, 1σ). Consequently, these determinations suggest that there is an occupation hiatus (or perhaps a lack or loss of accumulated deposit) of some 800 years between Units V and VI. An AMS determination (Wk-14864) on partly in situ charcoal from a small hearth feature near the base of Unit VI at around 75 cm depth (below ground level) indicates a likely age of 2160–1990 cal BP (0.903, 2σ). When pooled, these two statistically identical determinations (ANU-12146 and Wk-14864) produce a calibrated age range of 2150–2040 cal BP (1.000, 1σ). The final AMS determination (ANU-12073) on in situ charcoal from the base of Unit VI has a large conventional age error and consequently gives a large calibrated age range of 3200–1950 cal BP at 2σ. Given the highest area (0.981) under the probability distribution at 1σ, an age of between around 2860–2310 cal BP is more likely, some time within what Summerhayes (2001a, 2003a, 2003b, 2004) defines as the ‘Middle’ (i.e. 2900–2700/2600 BP) to ‘Late’ (2700/2600–ca. 2200 BP) Lapita periods.

**Occupation and archaeological material recovered**

In the following section, I discuss in detail the nature of the occupation and finds from Unit VI of Square 2 (Table 3.15). Only this occupation layer, dated to the ‘transition’ period, is relevant to the focus of this thesis.

Unit VI contained nearly all of the small number of pottery fragments recovered from Square 2, as well as the highest density of flaked obsidian (Table 3.16). It also contained a larger amount of fish bone and shell midden than other units. The only feature found in Unit VI was the small hearth near the base, which extended for a depth of around 20 cm. This consisted of a discrete area of grey, ashy-looking deposit containing a small amount of burnt shell and charcoal. A phalanger mandible was found at the very base of this hearth in the final spit (Spit 15).

The small number of artefacts recovered from Spit 9 in the Unit designated ‘V?’ were located at the interface with Unit VI. In the areas of Square 2 lacking the compact living floor

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34 The two determinations from Units V and VI (i.e. ANU-12076 and ANU-12146 respectively) are statistically different at the 95% confidence level (CALIB Rev 5.0.1).

35 A single small plain body sherd was found in both Unit II/Spit 2 and Unit V/Spit 7. I regard neither as in situ; they most probably derive from Unit VI.
surface (see above), in particular the northeastern corner, the division between the two stratigraphic units was not clear. Consequently, these artefacts could derive from the upper portion of Unit VI and so will be discussed where relevant below.

**Ceramics**

Only 14 pottery sherds (22.9 g) were recovered from Unit VI in Square 2, comprising 11 plain body sherds (12.2 g) and three diagnostic sherds (10.7 g) (Tables 3.16–3.17; Appendix 6). None of these sherds is decorated. All of the recovered sherds, both plain body and diagnostic, are small fragments less than 4 cm in size (maximum dimension), which is reflected in the low mean weight of 1.1 g for plain body sherds and 3.6 g for diagnostic sherds (Table 3.17). The extrapolated density of pottery in Unit VI is relatively low at 65 sherds (or 107.0 g) per cubic metre of deposit, and this count is bolstered by the very small size of most sherds.

**Obsidian**

Thirty pieces of obsidian—comprising only 5.8 g—were recovered from Unit VI of Square 2 (Table 3.18). A further six pieces excavated from Unit V? may also derive from Unit VI. All of these pieces are small flaking debitage and have a very low mean weight of 0.2 g. The extrapolated density of obsidian in the Unit VI deposit is 70 pieces (or 107 g) per cubic metre.

**Stone adze**

A small plano-convex stone adze with flattened sides (i.e. planilateral as well) was excavated from Spit 9 at the Unit V-VI interface (Unit V?) in the northeastern corner of Square 2 (Fig. 3.20, Table 3.19). Given the unclear stratigraphy in this area, it may actually derive from Unit VI. The adze is made from dark grey, fine-grained volcanic stone. Flake scars on the ventral and dorsal surfaces near the butt are probably related to hafting.

**Other non-ceramic artefacts**

Other artefacts excavated from Unit VI include two fragments of shell fish-hook (a shank is possibly of *Turbo marmoratus*, Fig. 3.20), a number of pieces of worked shell (also mainly of *T. marmoratus*) that could possibly indicate the manufacture of fish-hooks (Kath Szabó, ANU, pers. comm.), a number of pieces of pumice with ground or abraded surfaces (possibly also related to shell artefact manufacture), and a number of limestone mumu stones, one of which has a greasy-looking surface.

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36 A further two plain body sherds and one diagnostic sherd were recovered from Square 1.
Human skeletal remains and faunal material

The human skeletal material from the site has been analysed by Dr Hallie Buckley (Department of Anatomy and Structural Biology, School of Medical Sciences, University of Otago, New Zealand). The animal bone assemblage from Lifafaesing is currently being analysed by Ken Aplin (CSIRO) and the shell midden and shell artefacts from Square 2, Unit VI have been analysed by Dr Katherine Szabó (ANH, ANU). Lyn Schmidt (ANH, ANU) undertook a preliminary analysis of the fish bone. The results of these analyses will not be reported on in this thesis and will form a separate publication.

Buckley’s preliminary report indicates that the human skeletal remains within Unit VI consist of the tooth of a child (aged under 12–14 years), and a toe bone and fragment of a leg bone from an adult (none of which show signs of burning).

Only a small amount of animal bone (47.48 g) was recovered from Unit V? and VI, the majority (81%) of which is fishbone (Table 3.20). Aplin’s preliminary analysis identified a small amount of phalanger (7.67 g), rat (0.78 g) and bat (0.12 g) in Unit VI. Like Angkitkita, the fish bone reflects the targeting of in-shore reef species—in particular Serranidae, Acanthuridae, Labridae and Lethrinidae—all of which can be caught by hook.

Discussion

Given the stratigraphy and dating of the site, and the associated paleonotches in the limestone cliff, I interpret Unit VI of Lifafaesing as representing the use of a newly emerged paleoshoreline (i.e. Unit VII) at the base of an overhang in the limestone cliff, which was formed as a result of progradation on an emergent coastal flat following mid-Holocene sea-level decline.

The radiocarbon chronology for Lifafaesing indicates that the first use of this new shoreline occurred sometime during the Middle–Late Lapita period, most likely between 2850–2300 cal BP. The bulk of Unit VI, however, probably represents use of the overhang by a pottery and obsidian-using community around 2150–2050 cal BP, during the ‘transition’. The date (ANU-12146) from near the top of Unit VI could possibly indicate that this period of use of the overhang extended up until around 1900 cal BP, at which point the shelter appears to have been abandoned (or no deposit accumulated) for a period of some 800 years. Frequent use of the site appears to have recommenced by around 1100–900 cal BP (i.e. Unit V), by which time obsidian

37 The determination on disturbed shell (ANU-12143) from Unit II has an almost identical calibrated age range of 2150–1950 cal BP at 1σ.
appears to have still been in use (though some pieces may have been displaced from the lower layer through disturbance) but pottery had disappeared.

As a whole, the ‘transitional’ archaeological assemblage at Lifafaesing represents a different type of occupation and use to the village occupation seen at Angkitkita. Rather than being a permanently occupied site, it seems likely that Lifafaesing has always been used—as it has been in living memory—for particular or specialised activities, ranging from burials (or cannibalism) to the production of rock-art. During the ‘transition’ (Unit VI), people in the area probably made regular use of Lifafaesing when fishing and shellfish gathering—cooking and eating their catch inside the shelter and also manufacturing shell fish-hooks or other shell artefacts. This specialised use of the site also explains the relative dearth of recovered pottery, which may have been confined to a nearby domicile.

While Lifafaesing’s chronology is not an exact mirror of Angkitkita’s, there are a number of close similarities between the two (Table 3.21). Both sites follow the same overall sequence: beginning with an early phase of occupation during the Lapita period (of which there is comparatively limited archaeological evidence); followed by a hiatus of at least a few centuries (or ca. 650 years in Angkitkita’s case); followed by a main occupation/use phase during the ‘transition’ some time between around 2250–2000 cal BP (and possibly extending up to 1900–1800 cal BP); followed by another hiatus representing abandonment (possibly reflecting a broad-scale environmental event as indicated in Angkitkita’s case?); and lastly, reoccupation of both sites some time between around 1300–900 cal BP. Indeed, the lack of precise chronological ‘fit’ between the two sites may in fact be more of an artefact of the radiocarbon calibration curve. Consequently, the occupation at Angkitkita and Lifafaesing may have been roughly contemporaneous.

3.3 Conclusion

In Chapter 2, I established that within Island Melanesia, and considering the limitations of the radiocarbon calibration curve, a ‘transitional’ pulse could be dated to approximately 2350–1900 cal BP. In this chapter, I have shown that the main phases of occupation by pottery-using communities at both Angkitkita (ETM) and Lifafaesing (EUV) on Tanga also date to within this period—most likely between around 2250–2000/1900 cal BP—and that the sequence of occupation at both sites was similar. This included an earlier, possibly short-lived occupation phase during the Lapita period, which appears to have been followed by a lengthy hiatus, prior to the main phase.
On the east coast of New Ireland, the most reliable dates for the cluster of ‘transitional’ sites that form a case study in this thesis—and which White and Murray-Wallace (1996) assigned to an ‘IAR Tradition’—come from the Dori site at Lasigi. My reassessment of these dates in Chapter 2 (Appendix 1) indicates that the main phase of occupation at Dori most likely occurred at approximately the same period as on Tanga, at around 2250–2050 cal BP. Interestingly, the Lasigi chronology also suggests that a more ephemeral, earlier phase of occupation occurred some time during the Middle Lapita period, which was separated from the main ‘transitional’ occupation phase by at least 300 years. While the chronology of the Lossu site is weak, the distribution of the ceramics through the deposit also suggests a similar occupation pattern. That is, a minor earlier phase—possibly associated with Middle-Late Lapita period pottery (like the dentate-stamped surface sherd) if the Gakushuin determination is to be believed38—is followed by a later main phase that is associated with abundant, decorated (including incision and applied relief) pottery similar to that at Lasigi.

The New Ireland sites make an ideal comparative case study for the Tanga sites given their evidently similar and overlapping chronologies and occupation sequences, and the apparent similarities in material culture (e.g. pottery styles, oval-sectioned stone adzes, dorsal region Tridacna adzes with pointed butts, and sling-stones) and subsistence economy (i.e. the importance of pigs and fishing). The New Ireland sites are also prime candidates for reassessment considering the conflicting opinions that researchers have expressed concerning their continuity or discontinuity with the Lapita ceramic tradition, as well as the presence of certain gaps in the analysis of the archaeological materials (see Chapter 2). In Chapters 5 and 6, I focus on filling in some of these gaps (in particular, temper, fabric and decorative motifs) using a sample of ceramics from the Fissoa, Lossu and Lasigi sites. But most importantly, I also focus on ‘disentangling’ the pottery assemblages of Tanga and New Ireland into their respective occupation phases, by combining compositional (temper and clay fabric) and stylistic (form and decoration) data. Only once this has been achieved can comparisons be properly made within and between sites. This will also provide a stronger basis for examining interaction between the ‘transitional’ communities of New Ireland and beyond, and for assessing the notion of a potentially interactive ‘IAR Tradition’ (or ‘something else’).

The new, well-dated and relatively undisturbed assemblages from Tanga, in particular the comparatively rich assemblage from Angkitkita, have the potential to make an important

38 See, Spriggs (1998) for a critique of early Gakushuin Laboratory dates.
contribution to our understanding of interaction at the ‘transition’. In the following chapter, I further explore the nature of pottery composition and style at the ‘transitional’ sites of Island Melanesia in general and closely assess what can be gleaned about interaction on a broader scale before presenting my regionally specific data.
CHAPTER 4—
The Fabric and Style of Interaction and Exchange at the Transition

4.1 INTRODUCTION

Despite the recognition that the ‘biographies’ of other cultural items and remains sorely need to be taken into account (e.g. Spriggs 2003 suggests shell and stone ornaments, rubbish pits, middens, burials, and monumental construction), pottery style is still the primary basis of constructions and assessments of a southwest Pacific-wide, interaction network at the ‘transition’—or of a so-called ‘IAR Tradition’. However, in some respects this over reliance on pottery style may be a necessary evil, with some non-ceramic artefact types (e.g. shell arm-rings and Tridacna sp. adzes) showing little variation in form over time and therefore proving to be less suitable indicators of social interaction and transformation (e.g. Bedford & Spriggs 2002; Bedford 2006: 217, 261-2). Furthermore, as I discussed in Chapter 1, it is becoming increasingly apparent that compositional analyses of pottery temper and clay may not be the most appropriate vehicles for tackling questions of social interaction and exchange either. An inherent contradiction exists (cf. Ambrose 1997: 530). That is, compositional studies of pottery fabric are generally failing to provide much ‘hard proof’ of the movement of pottery or its materials and consequently could be interpreted as tipping the scales in favour of only a minimal amount of interaction occurring between potting communities. But on the contrary, stylistic studies of the form and decoration of the pots can arguably provide a weighty counterbalance, indicative of continued, regular interaction through time. Indeed, given the overwhelming evidence for the predominantly local production of Lapita and other pottery, have ‘transitional’ ceramics been able to tell us much at all about interaction? Do ‘transitional’ ceramics continue in much the same vein as Lapita? Or is there any evidence for changes in modes of production and distribution at this time? Where is pottery moving to/from?

In this chapter, I sequentially investigate what studies of the composition and style of earthenware ceramics have been able to tell us about the nature of ceramic transfer and interaction between communities at the ‘transition’. To do this, I have undertaken detailed separate overviews of pottery composition and style at key ‘transitional’ sites in the southwest Pacific (see Appendix 4 and 5 respectively), the distilled findings of which I present here. These
are the sites that I established in Chapter 2 as fitting the ‘transitional’ chronology (i.e. 2350–1900 cal BP), which also contain sufficient materials to address my research questions. As I noted in that chapter, such chronological resolution is an imperative basis from which to make comparisons—and highlight similarities and differences—between sites. However, it is not my ultimate purpose in this chapter to provide exacting comparisons of the specificities of either composition or style of different regional assemblages as others have attempted. Foremost, my focus is on an intra-site level, where I investigate whether there were dramatic changes in the composition or styles of pottery over the ‘transition’ and whether they appear to be indicative of either continuity or discontinuity with the preceding ceramics of the Lapita tradition. These overviews are also the basis for later comparisons with the composition and style of Tanga and New Ireland ceramics in Chapters 5 and 6.

I also discuss the implications of compositional change in ceramic records, and examine in further detail some of the pottery style-based arguments that are central to the debate and to the assessment of interaction. In conclusion, I discuss whether there is a case for broad stylistic parallels—which might be indicative of interaction—at these ‘transitional’ sites, and also whether these ‘transitional’ pottery styles can be viewed as the end-products of ‘devolution’ and ‘decline’ (as per my discussion in Chapter 1). Of course, Wahome’s (1997, 1998) previous research tackled the former issue using a broad spectrum of post-Lapita pottery assemblages from various parts of Island Melanesia and answered it largely in the affirmative (see Chapter 2). But as recent critiques have rightly pointed out (see Bedford 2006: 175-80, 188-9), his chronological parameters were exceedingly broad and the chronology of some assemblages was poor. Therefore, the important difference in this chapter is that unlike Wahome, I confine my discussion to the key sites (and periods of those sites) that fit the more circumscribed ‘transitional’ chronology. Though a detailed comparison of ‘transitional’ decorative motifs on pottery across the southwest Pacific is needed—similar to the research that Wilson (2002, 2003) undertook on rock-art motifs—it is beyond the scope of this thesis.¹ I do, however, undertake a comparison of recorded motifs/motif elements on a much more limited geographical scale within my own research of the assemblages from Tanga and New Ireland in Chapter 6.

¹ Wahome’s (1998: 209-10) analysis considered broader ‘decoration types’ (or motif elements) rather than detailed motifs, e.g. shell or fingernail impressions; types of applied decoration, including ‘knobs’ and ‘bands’; types of incision, including ‘simple linear’, ‘chevron’, ‘wavy’, ‘crosshatch’, ‘Y pattern’; types of punctate, including ‘linear’ and ‘chevron’; and lip notching.
4.2 GETTING AT THE FABRIC OF INTERACTION

Given the anticipated difficulties of reconstructing interaction with ceramic composition, a key focus of the overview in Appendix 4 is on whether the compositional character of ‘transitional’ pottery is indicative of either continuity or discontinuity with Lapita or clearly Lapita-derived ceramics, in particular in those sites where both types of ceramics occur.

But what does a change in temper and/or clay composition mean? It is to be expected that changes in the composition of ceramics will occur over time, for a variety of reasons, even within the same group of producers. For example, changes in raw materials may be indicative of: the introduction of a new ceramic tradition through trade or exchange; the arrival of a new group of potters (with different skills and techniques, who may utilise different local materials to those used by former or existing groups); the death or loss (e.g. moving to another community) of skilled potters with particular manufacturing preferences; the innovation of new manufacturing techniques; the restriction of access to formerly used, distinctive local resources (and opening up of new resources) as a result of socio-political factors (e.g. possibly arising from increases in demand and/or population, changes in political alliances between groups, or prohibitions, see e.g., Gosselain 1999; Bowser 2000; Costin 2000: 380-1; Neupert 2000: 250, 270; Stark et al. 2000: 308); or even the physical loss of the clay or temper source itself perhaps as a result of a natural disaster such as a volcanic eruption, or simply because it becomes exhausted.

However, an important consideration when attempting to understand the nature and causes of the type of technological change in pottery production that appears to have taken place at the ‘transition’ is the potentially different value and therefore ‘biographies’ of the separate raw materials—sand temper and clay. As discussed by Dickinson (1979: 1663) and Ambrose (1992: 170, 1993: 209), we should probably expect the analysis of temper and clay to tell us different stories, comprising two independent but complementary lines of evidence, because there is significantly greater latitude for variation amongst tempers compared to clays. Whereas virtually any type of close-at-hand temper—including grog, beach and stream sands derived from a wide range of geological settings, or even opportunistically crushed rock—can be used to produce ‘serviceable’ earthenware, there is likely to be a much smaller number of suitable clay sources

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2 Primarily due to social factors, modern Kalinga potters of the northern Philippines had lost access to around 65 per cent of their usual clay sources over a period of about 26 years (Stark et al. 2000: 308). In one case, a disgruntled landowner had banned access to the popular clay source on his land.

3 See also, Stoltman et al. (1992) for a similar example of clays and tempers providing different, independent information.
available in an area, which in turn are likely to be under the control of particular groups or individuals. Consequently, as a raw material, clay has a higher relative cultural value than temper, and potters are likely to expend much more effort to procure it through negotiation or trade (Ambrose ibid.). This higher ‘inherent value’ of clay sources ‘ensures their prolonged use’ (Ambrose 1992: 170). Similarly, while Stark et al. (2000: 307) found that modern Kalinga potters considered a wide latitude of clay sources to be ‘usable’, some were ‘better’ than others, and social relations between the potter and the custodian of the clay source mattered as much as—if not more than—the quality or distance of the resource. Other ethnographic cases also indicate the greater symbolic value and potency of clay. For example, many groups in sub-Saharan Africa explicitly link clay and its formation into pots to human beings, creation and procreation, and thus the transformations experienced in life. Many more of the common and long-held social prohibitions surrounding the process of pottery making in this region relate to the extraction and manipulation of the clay rather than the temper, the neglect of which have the potential to cause illness, miscarriage, infertility, menopause, sexual impotence or even death (see Gosselain 1999: 209-14).4

Perhaps then, more so than temper, clay holds the key to discerning cultural continuity or discontinuity in a ceramic tradition, as disjunctions in clay resource use probably had greater cultural import. A change in the use of a particular clay source—assuming that sources are generally of a volume that will not be rapidly exhausted5—could imply movement or social change of some form, not just regarding the physical distance involved to a different source but the likely realignment of social relationships. As Peacock (1970: 375) also notes, because the mixing of a clay paste was likely to have been ‘dictated by tradition’, a ‘rather more dramatic influence may be needed to change basic technological processes such as clay preparation and firing’.

While sand tempers may have less cultural significance than clays, their origin is considerably more transparent, allowing archaeologists to track more concrete movements of materials across the landscape.

Distinct or dramatic compositional changes could therefore be important indicators of social change that could support other lines of evidence of interaction, especially if they occur coincidently on a broad scale and in concert with other technological, economic or stylistic

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4 See also, Chiu’s (2005) review of the symbolic association between pots and humans (and social structure) in the Pacific and on Lapita pottery.

5 Particularly intensive mining can of course exhaust clay sources over some years of use (see e.g., Stark et al. 2000: 308).
changes. As Costin (2000: 387) concluded in her detailed review of the uses of ethnoarchaeological studies of pottery production for archaeology: ‘there are meaningful social units consistently associated with compositional groups.’ That is, the groups identified by the compositional analysis of pottery in some ways reflect the social ‘reality’ of groups of practitioners (or production units) with particular modus operandi. Importantly, it is the relationship of compositional groups to particular pottery styles that has the potential to provide even greater insights into the actuality of social interaction (and of continuities or discontinuities in this) and which in some cases may also provide a means of untangling temporally mixed assemblages (see this in practice in Chapter 6).

4.3 POTTERY COMPOSITION AT KEY ‘TRANSITIONAL’ SITES

The detailed overview of the nature of pottery composition at the key ‘transitional’ sites is presented in Appendix 4. The findings of this overview are discussed below (see Appendix 4 for full references).

4.3.1 Discussion

The overview of pottery composition at the ‘transition’ highlights three main findings, the first two of which perhaps sit a little uneasily beside each other. First, it is clear that there are varying degrees of evidence for change or discontinuity (sometimes significantly so) occurring across the ‘transition’ in terms of clay and/or temper at nearly all of the sites discussed, stretching from the Bismarck Archipelago to Fiji. Second, it is also clear that much vital compositional research still remains to be done on some of the key ‘transitional’ sites that are integral to the debate. This latter finding must necessarily ‘temper’ the conclusiveness of the former for the time being.

The evidence for discontinuity in terms of ceramic temper across the ‘transition’ includes:

- sherds from sites in the Admiralties (i.e. Mouk (GLT) and Sasi (GDY)) change from fine/medium to coarse texture
- dentate-stamped and fingernail-impressed/applied relief sherds at Maravot (SAD) on Watom Island show distinct mineralogical differences

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See also, Stark et al. (2000: 325), and discussions of ‘technical/technological style’, ‘technical behaviours’ and ‘technical identity’ in the formation of social boundaries in Stark (ed.) (1998).
- an apparent trend in which the dominant temper type changes from calcareous to volcanic lithic types, e.g. on Buka Island (i.e. the Buka–Sohano style transition), Tikopia (i.e. Kiki–Sinapupu style transition), and the Ifo site on Erromango (i.e. Early Ifo (Layers 3 and 4)–Late Ifo (Layers 1 and 2) transition)
- the mineral content of Naïa period ceramics in New Caledonia is distinct from Koné period ceramics, and
- on Lakeba in eastern Fiji, the dominant temper type changed from lithic to calcareous (i.e. Period II–Period III).

In terms of clay composition, which is generally less well researched than temper, evidence of change across the ‘transition’ includes:
- the indications from Sasi that the clay used to manufacture the possibly Lapita-derived fine ware was different to that used for the coarse-tempered decorated ware
- nail-impressed and applied relief sherds at Maravot were made from a different, probably local clay source to the (earlier) dentate-stamped sherds
- on Buka there is some indication that Buka and Sohano style pottery was manufactured using different clay sources (although Summerhayes 1987, 1997 argues against this). Furthermore, there are also indications at the Sohano Wharf surface site (DAF) that the clay of pottery decorated with distinctive incision and applied relief from the central reef area is compositionally distinct from the earlier Lapita assemblage (including dentate-stamped and double-rimmed vessels) of the outer reef area
- some pottery in southern New Caledonia was manufactured using clay from different depositional environments (i.e. Koné period ceramics have clays derived from swamps and Naïa period ceramics tend to employ inland sedimentary clays), and
- there is some indication, albeit tentative, that shell-tempered and lithic tempered sherds from Lakeba in Fiji (i.e. Period II–Period III transition) were manufactured using different sources of clay.

While present, the evidence of compositional continuity across the ‘transition’ is considerably more limited. For example, a small number of ‘transitional’ and Lapita-derived sherds from Buka and Lakeba share the same temper.

As discussed above, if we assume that clays had higher inherent cultural value and their preparation was dictated by perhaps long-standing traditional practice, then the dramatic changes in pottery technology as represented in such transitions as Buka–Sohano, Koné–Naïa, and
Lakeba Period II–Period III, could imply a dramatic social change, either internally or externally influenced.

So, while there is a fairly robust body of evidence for widespread compositional or technological change in pottery production at the ‘transition’, unfortunately there is still insufficient or inconclusive data from some of the key sites. Though in part for good reasons (as outlined in Appendix 4), detailed compositional analysis has not been undertaken of pottery from either of the two key sites in the Admiralties—Kohin and Mouk—with evidence spanning the transition from the (minimally represented) Lapita to post-Lapita periods. Though as I also noted in Chapter 2 (and Appendix 1), both of these sites appear to contain evidence of mixing and their post-Lapita components could in part (or largely) post-date the ‘transition’ as I have defined it. The pottery assemblages of both Lossu and Lasigi (including the Dori and Mission sites) indicate that at least two technologically distinct types of pottery are present—a calcareous beach temper and a mineral stream temper (as common to many of the ‘transitions’ mentioned above). However, the chronological relationship of these types cannot be determined on the basis of existing research owing in part to the disturbed stratigraphy (especially at the Mission) and to the need for more detailed compositional analysis (particularly of clay) that is related to pottery styles. As it stands, the composition of the pottery from Fissoa is a virtually unknown quantity. Regrettably, the chronology of the two types of pottery technology evidently used to manufacture dentate-stamped and nail impressed/applied relief wares at the unstratified Maravot site cannot be determined. The clay composition of a larger sample of pottery of the Buka Style, the Sohano central reef area (DAF), and early Sohano style needs to be analysed in order to resolve ambiguities in the current data. Importantly, as I noted in Appendix 4, the DAF central reef assemblage may in fact represent an early ‘transitional’ site between the rather ill-defined ‘Buka’ (possibly containing a temporal mix of Lapita pottery) and later ‘Sohano’ traditions—not a ‘Late Lapita’ site as Wickler (2001: 6, 122, 241) has defined it (and see further discussion of style below). The lack of detailed research of pottery temper and clay composition at the Mangaasi site hinders a proper assessment of compositional continuity or discontinuity across the important transition from Late Erueti to Early Mangaasi styles. The Mangaasi site also highlights that it is essential to look for proportional differences in the abundance of mineral types through time—as well as differences in grain size and texture/form (i.e. degree of rounding or angularity of grains)—when relatively widespread (e.g. archipelago-wide), generically similar, indigenous mineral suites are used to
temper clay,\textsuperscript{7} which is indeed the norm at most sites in the southwest Pacific. It is this level of detail that can point to continuity or discontinuity in the use of particular local resources. It is also clear that there is much greater research needed of clay composition across the relevant transitions in both New Caledonia and Fiji.

The third, somewhat predictable finding of the overview conducted for this chapter was that pottery compositional data, specifically that provided by the petrographic analysis of the temper, provides relatively little information regarding the nature of interaction at the ‘transition’. As with Lapita pottery, this is largely the result of the overwhelming use of local raw materials in pottery manufacture, and it suggests that pottery itself played only a limited role in exchange at this time. It appears that it is the \textit{discontinuities} in the use of particular local sources of materials that are the most informative or indicative of change, and it must fall to another class of data to fill in the gaps of what this means. However, what little evidence there is does not fit completely comfortably with notions of ‘regionalisation’ and ‘settling down’, that is, of communities confining their interactions to localised areas in relative isolation, and like the clay data it is also suggestive of movement. Limited evidence so far suggests some form of interaction between the Lasigi and Lossu sites on New Ireland (separated by over 40 km) and between Lasigi and unknown sites/communities on the TLTF chain (but see Chapter 5). While evidence from Watom indicates that there was likely to have been some interaction with nearby New Britain (as one would expect) it also indicates possible interaction with populations further afield in the Bismarck Archipelago (possibly Manus or New Ireland-New Hanover) or Bougainville. Evidence from Roviana Lagoon is suggestive of even longer distance, possibly trans-Solomon-Sea interaction with coastal areas on the New Guinea mainland, as well as widespread interaction throughout the New Georgia Island group. Importantly, the possible evidence for interaction with the New Guinea mainland is present amongst the earlier, Lapita-derived wares (i.e. Honiavasa) and later ‘transitional’ wares, indicating likely continuity in long-distance interaction. On Tikopia, tempers within Sinapupu phase sherds are suggestive of perhaps regular interaction with either Vanikoro in the Santa Cruz Islands to the northwest or the Banks Islands to the southwest, as well as possible, limited, long-distance interaction of some form with Santo in northern Vanuatu. A single ‘transitional’ sherd recovered from Ifo on Erromango in southern Vanuatu may bear testimony to interaction with New Caledonia. And finally, evidence from the Karobo site on Viti Levu in Fiji may also suggest limited interaction or the movement of materials or people from Kadavu Island,

\textsuperscript{7} See e.g., Stoltman et al. (1992: 91) for a similar finding.
around 65 km to the south. In summary, some indication of continuing long-distance interaction, possibly including the movement of populations, is indicated by the pottery data, which may effectively be the ‘tip of the iceberg’ given the likely evidential constraints of this type of data.

4.4 Interacting With Style

For the purpose of the discussion here and in Chapter 6, I follow Wiessner (1990: 107-8) in seeing style as ‘a form of [non-verbal] communication through doing something in a certain way that communicates [or negotiates] information about relative identity’. In turn, actors use these identities to ‘categorize themselves and others for the purposes of interaction’ (Barth 1969: 14).

In this view, pottery style can be seen as signifying or conveying information about a specific group and/or individual identity, a comparison of which between assemblages may provide some indication of how or whether the communities that produced the assemblages interacted with each other. If elements of ‘transitional’ pottery style are shared between sites does this suggest some form of shared cultural identity and/or membership of a communicative network? Are there radical changes in the way that identity is signified at the ‘transition’? Does the signifying of identity retract or proliferate? And what does this mean in terms of interaction?

As I discussed in Chapter 1, these questions are complicated by the lack of simple correlation between cultural similarity or difference with either ethnic identities or patterns of interaction between ethnic groups. Differences do not necessarily imply a lack of social interaction; nor does interaction necessarily lead to homogenisation and the loss of difference (cf. Barth 1969: 9-10, 14-16; Kennedy 1977: 13-15). This issue is discussed further below.

In the context of the ‘transition’, it may be useful to consider two aspects of variation in style in particular: symbolic (in which variations represent personal and group identity, and may encode information to reproduce, alter, disrupt or create social relations) and iconological (a specific use of symbolic variation, in which variation carries a clear, conscious, purposeful message aimed at a specific target population) (see Wiessner 1985; Plog 1990). Much of the Lapita period pottery style, in particular the earlier specialised vessel forms with anthropomorphic face motifs, had clear ritual or religious significance and belongs in the second category of

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8 See also, Wobst’s (1977) ‘information exchange’ theory of style; and Sackett’s (1989: 36) ‘active’ style, in which the iconic properties of style are seen as constituting ethnic ‘messaging’, i.e. self-conscious, deliberate behaviour on the part of artisans, ‘primarily with the intent of identifying and maintaining boundaries between social groups’.

9 See also, Summerhayes’ (2000a: 30) discussion of this point.
variation. The strong narrative of the ‘devolution’ and ‘decline’ of Lapita style over time, as I discussed in Chapter 1, perhaps developed as a direct consequence of this early striking iconography. This has had the effect of maligning post-Lapita styles, which in turn has had negative and perhaps unwarranted ramifications for how symbolling behaviour and interaction is viewed.

4.5 NEW DECORATIVE THREADS OR THREADBARE EVIDENCE?

There appear to be three main stylistic arguments posed by critics of a post-Lapita interaction network (and/or migration scenario) that is reflected in the efflorescence of pottery styles that included incised and applied relief decoration (i.e. a so-called ‘IAR Tradition’) from around the end of the third millennium BP, within what I have defined as the ‘transition’ (i.e. 2350–1900 cal BP). These critics instead favour a largely continuous, localised, in situ ‘evolution’ of ceramics of the Lapita tradition to post-Lapita or ‘transitional’ forms, which was largely independent of new or changed external relationships or social networks. These arguments are:

1. **There are no significant stylistic similarities:** The differences in the styles of post-Lapita (or ‘transitional’) vessels (in terms of decorative technique, motifs and vessel forms) between archipelagos far outweigh the similarities.

2. **Stylistic similarities are residual:** Decorative techniques (and some motifs) and vessel forms commonly ascribed to the supposedly ‘new’ post-Lapita ceramic styles or ‘IAR Tradition’ are already present in Lapita assemblages, therefore they are more likely to represent residual elements of continuity with Lapita rather than new relationships.

3. **Stylistic similarities are a more widespread areal phenomenon:** Decorative techniques and motifs commonly ascribed to the ‘IAR Tradition’ are also found in many Southeast Asian ceramic assemblages; therefore, the ‘Tradition’ cannot be strictly linked with an expansion of Melanesian populations as far to the east as Fiji.

4.5.1 There are no significant stylistic similarities

As I discussed in Chapter 1, incumbent on this first argument is a certain inflexibility in the perception and assessment of similarity and difference in stylistic behaviour as it relates to interaction. The tendency towards an overly simplistic equation between cultural ‘similarity’ (material and otherwise) and interaction on the one hand, and ‘difference’ and lack of interaction on the other, does not stand up to scrutiny, in particular in view of numerous ethnographic examples of the construction of identity and the maintenance and permeability of social
boundaries. The types of dichotomy implicit in this argument, between similarities/differences and internal/external processes, are deficient and largely untenable. I argued in Chapter 1 that it was possible for elements of both similarity and difference—as the products of both local processes and interaction—to be incorporated into designs/motifs used by interacting cultural groups, which could produce pottery styles with certain broader areal commonalities in tandem with more divergent localised expressions. In doing so, I am not making a case for the outright acceptance of ‘broad similarities’ or ‘broad parallels’ in pottery styles as evidence of interaction between groups. Rather, I am proposing that at plausible geographic and temporal scales there is no valid reason for them to be considered impermissible evidence, especially when combined with other indicators. Some might complain that the type of evidence this alternative permits is too broad or elastic, permitting the gross ‘inflation’ of the defining characteristics of pottery style in this context, to the point where almost anything could qualify and a ‘clearly recognisable’ post-Lapita pottery style cannot be ‘reliably extracted’ (cf. Clark 2003: 210-11). In a related argument, Bedford and Clark have emphasised the ubiquity or universality of some decorative motifs—producing ‘superficial’ similarities—which are potentially so widespread in time and space that their distribution need not (or indeed cannot) demonstrate either interaction/direct connections or the significant movement of people in prehistory (Bedford & Clark 2001; Bedford 2006: 186; Clark 2003: 209-10). But scale is the key. Certainly, in the absence of a plausible relationship in time and space—such as concentric circle or spiral motifs amongst the rock-art of Neolithic Britain and Holocene Australia—one would have to agree that such similarity is indeed meaningless.

If we accept that the historical reality of social interaction at the ‘transition’ was indeed more complex than the two main competing models allow—i.e. dominant external versus dominant internal influences/drivers of change—then the material evidence of such complexity is unlikely to be clear-cut. Complexity by its very nature inhabits the ‘grey zone’. Braun’s (1991: 378, 388) notion of scales of decorative style might be an appropriate alternative to exacting assessments of similarity or difference. Braun proposes that on a local scale potters are able to produce different decorative expressions (i.e. ‘micro-style’ zones) while still adhering to a single overall repertoire (i.e. a geographically broader ‘regional repertoire’ or ‘macro-style’ zone) of decorative techniques and rules of composition.

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10 See Clark (2003: 213) for a similar argument concerning the ‘binary constructs’ of Melanesia-Polynesia and Near-Remote Oceania.
4.5.2 Stylistic similarities are residual

In regard to this second stylistic argument, there is no doubt that a range of techniques used to decorate ‘transitional’ ceramics was also used on Lapita ceramics. As Summerhayes and Scales (2005: 17-8; see also, Summerhayes 2001c: 57, 62) recently emphasised, decorative techniques such as applied relief, incision, stick and fingernail impression (in particular opposed or ‘pinched’ fingernail impressions) are ‘typical’ of Lapita assemblages in the Bismarck Archipelago and the Solomons ‘at all periods of time’, and have been present ‘albeit in minor amounts’ since the earliest period.\(^{11}\) Chiu (2003a: 174) also found this to be the case outside of the Bismarck Archipelago at the eponymous Lapita Site 13 in New Caledonia, where she found a ‘very small’ number of sherds with incision, shell-impression, and punctate or piercing techniques in the earliest layers.

Especially important to this argument are the number of sherds—though still generally a minority in their respective assemblages—that have been recovered from Lapita sites bearing dentate-stamping in combination with decorative techniques that are commonly ascribed to post-Lapita ceramics. For example, dentate-stamping is found in combination with: fingernail impression on a sherd from Kreslo (Specht 1991: Fig. 7c); applied relief nubbins on a sherd from Vunavanga (SDI Zone C3) on Watom (Anson 2000: 112); nubbins and perforations (often combined on the lip) on ceramics from reef sites on Buka, Sohano and Nissan Islands (DJQ, DAF and DES respectively; Wickler 2001: 108-9, 111, Fig. 5.3); incision and/or applied relief on ‘Late Lapita’ ceramics from Kolombangara in the Solomons (Summerhayes & Scales 2005: Fig. 3); vertical fingernail pinch and deep incision on a sherd from Nusa Roviana (Felgate 2001: Fig. 3, NR.34); applied relief at the Teouma Lapita site on Efate in Vanuatu (Bedford et al. 2006); applied relief and shell impression in several sites in Fiji (Clark 1999: 136; Best 1984); and horizontal,\(^{11}\)

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\(^{11}\) For example, amongst the ceramic assemblages of West New Britain thought to date to the Early (i.e. Adwe (FOH, Sqs. D/E/F) and Middle Lapita periods (i.e. Adwe (FOH, Sq. G); Apalo (FOJ) of the Arawe Islands; FLF of the Kandrian district; and FSZ of Garau Island, Talasea district), there are examples of sherds with fingernail pinch (with and without lip notching), crosshatch linear incision, appliquë, and shell and stick impression (see Summerhayes 2000a: 71, 97, 115, 114, 117, 122, 145-6). As Summerhayes (2000a: 27) notes, however, the radiocarbon chronology at many of these sites is poor, unpublished (i.e. FSZ), or unreliable (i.e. FOH-D/E/F). Furthermore, some assemblages may be mixed. Fingernail pinch and impression, and applied knobs also occur on some sherds from Kreslo (FNT), although there are no available radiocarbon dates for this site (Specht 1991: 192-6; Summerhayes 2000a: 27). Crosshatch incision, appliqué nubbins and plain bands, and stick and shell impression are also present on some sherds from the Malekolen (EQA), Balbalakin (ERC) and Feni Mission (ERG) sites on the Anir Islands (Summerhayes 2000b, pers. comm. & unpublished data; Wal Ambrose, unpublished data). These sites are thought to date to the Middle to Middle-Late Lapita (i.e. ca. 2900/2700-2600 to ca. 2200 BP), though again, poor chronology and stratigraphic disturbance (at EAQ and ERG) hinder finer resolution of the age (and possibly temporal separation) of these techniques (Summerhayes 2004: 147).
notched applied bands (forming zone markers) or vertical, plain applied bands at Lolokoka on Niuatoputapu (NT-90)\(^{12}\) (Kirch 1988b: Figs. 104, 110-11) and on Tongatapu (Sites To.1 and To.2; Poulsen 1987: Vol. II, Fig. 48, Plates 44-9, 51-2, 54-6) in Tonga, and at Mulifanua on Upolu in Western Samoa (Green 1974b: Fig. 71).

However, there are two possible dangers inherent in this type of argument. One is the potential for the assumption of cultural stasis (in the meanings attached to style) and lack of agency in the ‘transition’ period. That is, that the presence of these (‘transitional’) decorative techniques in earlier assemblages—undeniably in low (often very low) frequencies and sometimes also in questionable stratigraphic contexts—somehow negates the possibility of their being able to represent changed communication or interaction in later assemblages, where they undeniably occur in much greater frequencies, are combined into different types of motifs, and are likely to encode new/different meanings. It is not simply the presence of particular decorative techniques or vessel forms that is meaningful, it needs to be established whether or not the ‘same’ things were being used in the ‘same’ way in different periods and in different places.\(^{13}\)

Similarly, Burley (2005: 338) has argued that the simple continuation of carved paddle-impressed pottery from the Fijian Plainware to Navatu phases at the Sigatoka site, ‘does not corroborate continuity in ceramic tradition’, which appears to have changed abruptly, possibly as a result of external influences. Like the previous stylistic argument—which promotes overly stringent tests of similarity—this argument also seems to rely on the quite unrealistic requirement that evidence to disprove its case should be in the form of a neat, unmuddied, ‘all-or-nothing’ divide between Lapita and post-Lapita.

Furthermore, as I also argued in Chapter 1, there is an implicit assumption of decorative ‘decline’ in this argument and a contingent, unwarranted association of decorative decline and societal decline. That is, if we consider the transition from Lapita to post-Lapita to be at the end of a long, continuous, in situ, downward spiral of (de)evolution and decline, then we are predisposed to thinking of post-Lapita style as the eroded remnants of a ‘once great’ style, and the social processes that were responsible for its maintenance as similarly lacklustre. Thus, our perceptions of post-Lapita ‘transitional’ society are tainted and we are prevented from gaining more nuanced understandings of interaction at this time.

\(^{12}\) Dentate-stamping and appliqué occur at Lolokoka predominantly on sherds tempered with calcareous sand, which is considered to be an ‘early trait’ (Kirch 1988b: 175).

\(^{13}\) As Bedford (2006: 183) states in regard to the characterisation of post-Lapita assemblages, ‘rarely is decorative technique alone sufficient to define ... assemblages.’
4.5.3 **Stylistic similarities are a more widespread areal phenomenon**

Linked to the concepts of (meaningless) universal similarity in the first argument, this third argument hinges on definitions of the 'IAR Tradition', and is one most recently put forward by Clark (2003). As he states:

Support for an incised and applied relief ceramic and a specific [Melanesian] population responsible for it might still be plausible if the traits defining it had a restricted distribution within Melanesia ... However, many of the incised and applied relief designs found in Melanesia also occur on prehistoric ceramics from Island and Mainland Southeast Asia ... [e.g. ceramics from Sulawesi, Timor, the Philippines, southwest Korea and Japan] (Clark 2003: 211).

The 'direct parallels' between Southeast Asian and Pacific decoration that Clark cites include 'crosshatch incision, incised triangles infilled with punctate or incision, chevrons, leaf, decorated applied bands and nubbins, finger-nail impression and punctuation' (ibid.).

Clark's contention is *strictly correct*: if the so-called 'IAR Tradition' is *strictly* defined by a set of decorative techniques/motifs that are taken to exclusively represent (a purely?) Melanesian population movement, then the 'Tradition' is debunked by the presence of this set in Southeast Asia. As Clark (ibid.) goes on to emphasise, the 'validity of a hypothesis in which a coherent population expansion or the presence of a widespread Melanesian interaction network is demonstrated ceramically must, therefore, also be questioned'. Maybe so, but what about a hypothesis involving a *not* so strictly defined decorative style or tradition, signalling the complex interaction of *not* so strictly defined ethnic populations? While Clark (2003: 215) states that 'Melanesian-isation' is better construed archaeologically as an 'interactive process rather than a dispersal event', I think the really important point that he does not make is that the definitions being employed in this debate are overly strict and inflexible and do not adequately allow for the social complexity of the period to be captured. If alternatively, we *move on* from such narrow definitions and view the ‘something else’ (cf. Green & Anson 2000a: 188) that was going on around 2000 BP as apparently coinciding with an efflorescence of a range of non-dentate-stamped decorative techniques and motifs (or 'macro-style'), which signalled the emergence or realignment of both internal *and* external relationships and was *not* exclusively linked with Melanesian groups, then the presence of similar pottery decoration in Southeast Asia just makes

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14 Solheim (1966: 208-9) drew early parallels between Southeast Asian and early Pacific pottery decoration. In particular, he noted an apparently ‘striking similarity’ between the Sa-huyhn-Kalanay Pottery Tradition and Lapita dentate-stamped pottery recovered by Meyer (1909) from Watom (or Vuatom), which he felt was pivotal in ‘bridging the gap’ between the then known (and dated) decorative styles of southern Melanesia and Southeast Asia.
things more interesting. The chronology of these Southeast Asian ceramics would of course need careful scrutiny before comparisons could be made, which is not within the scope of this thesis. But as originally put forward by Golson (1972: 579-82) and later Kennedy (1982: 26), pottery style could potentially provide further evidence—together with the piece of bronze excavated at the Sasi site (Ambrose 1988)—of on-going links with the west at this time. Detailed research similar to that undertaken by Pétrequin and Pétrequin (1999) on pottery manufacturing techniques, which ranged across the illusory Southeast Asia–New Guinea divide and found indications of intensive maritime interactions, still needs to be carried out on pottery style using well dated assemblages.

### 4.6 Pottery Style at Key ‘Transitional’ Sites

The detailed overview of pottery style at the key ‘transitional’ sites is presented in Appendix 5. The findings of this overview are discussed below (see Appendix 5 for full references).

#### 4.6.1 Discussion—New styles make a big splash?

So, is there a case for broad stylistic parallels across these ‘transitional’ sites? Can a broad ‘transitional style’ indicative of interaction between sites be identified? Is there indeed some basis to the ‘IAR Tradition’?

Foremost, one thing at least is clear. The overview of ceramic style clearly shows that—to follow Best’s (2002: 32) analogy—stylistic ‘stones’ were thrown into the ceramic pools of each of the sites that I discussed across Island Melanesia dating to the pivotal period 2350–1900 cal BP. Significant changes in the type and/or proliferation of particular vessel forms and decorative techniques and motifs occurred at all of these sites.

But how comparable or parallel were these stylistic transitions? Before I attempt to identify what I consider to be the main stylistic trends of the ‘transition’ I should reiterate—as discussed in section 4.5—that my measure of commensurability does not require ‘perfect fits’. Rather, it is more in keeping with Best’s view. In defending his argument for derivation of Fiji’s carved-paddle impression technique from New Caledonia, Best makes an important point regarding the transfer of style through interaction and the issue of ceramic similarity and its stringent assessment. As he states: ‘Any contact between the two areas … would presumably have involved ideas rather than strict rules on how to make pots’, with such things as ‘decorative technique and possibly the overall vessel shape, [are] likely to have travelled as information and not real items’. Consequently, we should not expect ‘close typological similarities between Fijian and New Caledonian assemblages’ (Best 2002: 28, 30). That this expectation is also unrealistic across the breadth of ‘transitional’ Island Melanesia is backed up by the compositional evidence.
that overwhelmingly suggests ceramic production was predominantly local and the movement of pots minimal. The local decorative ‘signal’—i.e. encoding cultural information related to identity—may have been picked up and transferred when interactions between groups occurred. To use my ‘transitional’ musical analogy of Chapter 2 (section 2.2.1), people may have listened to the music (i.e. style) on the radio (pot) but not taken the radio itself with them. Rather, individuals from interacting groups may have remembered their favourite songs (designs/motifs) and sung them in their own key (i.e. not reproducing them exactly) amongst their own community.

I propose that at the ‘transition’ there are elements of both locally specific ‘micro-style’—expressing divergent local identity—and more regionally applicable ‘macro-style’ (cf. Braun 1991)—expressing a broader, cultural identity, perhaps forged through interaction and/or the movement of populations. That is, there is clear stylistic ‘difference’ at the local scale (i.e. reflective of intra-regional and local processes), which appears to articulate with some aspects of broad ‘similarity’ on the macro or inter-regional scale. It is the potential aspects of ‘macro-style’ that I focus on below.

There appear to be broad aspects of ‘macro-style’ manifest in the predominant vessel forms and in the predominant suite of incised motifs/motif elements and decorative techniques present in the ceramic assemblages of ‘transitional’ sites (see Table 4.1). However, these apparent stylistic trends in vessel form and decoration are not completely homogeneous nor do they apply to all of the sites under discussion in Island Melanesia. That is, there are intriguing patterns within patterns.

First, there appear to be two main trends in vessel form apparent, with some indication that they were (closely?) sequential in time—the radiocarbon calibration curve at this period makes fine resolution of timing difficult—and that Buka Island was something of a lynchpin. The possibly earlier ‘transitional’ vessel form is a globular, round-based jar/pot with a restricted neck and outcurving or more sharply everted rim. This often-decorated form is dominant in assemblages stretching from the Bismarck Archipelago (Sasi, Watom) to the Northern and Western Solomons (Sohano central reef (DAF), and the Miho and Gharanga/Kopo styles of Roviana Lagoon), Tikopia (Sinapupu) and Fiji (Period III, Lakeba). There is clear continuity of this early ‘transitional’ form from assemblages dating immediately prior to the ‘transition’ at Roviana Lagoon (Honiavasa), Mangaasi (Late Erueti) and Ponamla (Early Ifo) in Vanuatu, in New Caledonia (Late Podtanéan), and in Fiji (Late Polynesian Plainware). The possibly later emerging ‘transitional’ vessel form, which represented a significant stylistic divergence, was a generally incurving spherical to ovoid pot, either with a direct incurving or short everted rim. On present evidence, this broad trend most clearly links the Buka-Sohano islands (Sohano Style) with
Vanuatu (Early Mangaasi and Late Ifo) and New Caledonia (Late Puen, Early Balabio and possibly Early Plum). The Buka-Sohano islands mark the westernmost extent of incurving ‘transitional’ vessels as the dominant form, which may have replaced the possibly earlier dominant outcurving ‘transitional’ form (i.e. on the DAF central reef). Decorative evidence also points to these islands as being at the cross-roads (see below).

Strongly associated with these trends in vessel form (and in some cases linking the two) is a clearly dominant suite of largely unbounded incised motifs/motif elements and decorative techniques (Table 4.1). Particularly significant appear to be incised motif elements such as chevrons, herringbone, zigzag, and crosshatch, as well as various forms of asymmetric or simple rectilinear incision. These incised motif elements are seen most clearly in sites of the Bismarck Archipelago (Sasi), Northern and Western Solomons (DAF central reef, Sohano Tradition, Roviana Lagoon), Vanuatu (Early Mangaasi, Early Ifo), and New Caledonia (Puen and Plum styles). In the assemblages of the Buka-Sohano islands, similar incised motif elements (in particular chevron, herringbone and crosshatch) are found on both outcurving (DAF central reef) and incurving ‘transitional’ vessels (Sohano Tradition), therefore showing continuity between the possibly ‘early’ and ‘late transitional’ vessel forms. A distinctive incised and infilled triangle motif, pendant from the rim of incurving vessel forms, is present on ceramics of the Sohano (filled with rows of punctations), Early Mangaasi (parallel oblique incised lines), Late Ifo (crosshatch incision), Puen (parallel oblique incised lines) and Plum (rows of chevrons) styles (Fig. 4.1).

The fingernail-pinch decorative technique appears to have been a distinctive feature of a more limited group of ‘transitional’ assemblages. While single fingernail impressions or single rows of fingernail pinch are often found in earlier assemblages, amongst ‘transitional’ wares fingernail pinch is characteristically used to form designs made up of double or multiple rows. This type of decoration is seen in the assemblages of Watom, DAF central reef, Roviana Lagoon (Gharanga style), and Erromango (Early and Late Ifo), where it reaches its (micro-stylistic) zenith. With the exception of Late Ifo ceramics, outcurving-rimmed vessel forms dominate all of these assemblages, indicating that it was amongst the possibly early types of ‘transitional’ decoration.

15 Small numbers of sherds representative of incurving vessels, an apparently minor vessel form, were identified in the Admiralties in the ‘transitional’ Sasi (Unit GEF2) assemblage, as well as in a possible ‘transitional’ context at Mouk (Unit GLT3) (Wahome 1998; see Appendix 5).

16 These incised motif elements are also present amongst the small ‘end-tool’ decorated sub-group from Lakeba in eastern Fiji dated to around 1750–1700 BP (Best 1984: 288, 635, 643, 2002: 17, 29-31, Plate 1).

17 Applied relief bands (or potentially pinched bands; Stuart Bedford, pers. comm.) form the outer edges of the main triangle in the Early Mangaasi motif.
With the notable exception of Fiji, the emergence and blossoming of new forms of applied relief decoration—in particular nubbins and straight or curvilinear bands or strips, which were often combined with incision and other techniques (Table 4.1)—was a pivotal feature of the style of the key ‘transitional’ assemblages. Notched applied bands, which were often vertical and included some curvilinear forms, are a distinctive feature of predominantly outcurving-rimmed (i.e. possibly ‘early transitional’) vessels from Watom, Sohano (DAF central reef), Roviana Lagoon, and Tikopia (Sinapupu phase). Interestingly, this type of decoration is the ‘modal attribute’ (Bedford 2006: 167) of the similarly outcurving but apparently much later Late Mangaasi style vessels (thought to date to between 1600–1200 BP). Only future excavation (of less disturbed deposits) and dating of this style will resolve the tantalising possibility of its closer association with earlier ‘transitional’ assemblages.18

Punctation in some form is represented in a majority of the assemblages, although it is most distinctively used (i.e. a micro-stylistic feature) as an infill and/or in multiple rows on incurving vessels of the Sohano, Early Mangaasi and Late Ifo styles.

With the exception of the Kohin assemblage in the Admiralties and the Puen and Pindai styles in New Caledonia, shell-impressed decoration is conspicuously missing from other ‘transitional’ sites (Table 4.1). In the case of Kohin, this could support Ambrose’s (1991a) suggestion (see Chapter 2) that the ‘transitional’ (Layer 4) assemblage is later than the radiocarbon dates indicate. However, given that on some Kohin sherds shell-impression is teamed with crosshatch incision or used to form chevron/herringbone motifs—decorative elements that are characteristic of other ‘transitional’ assemblages—shell-impression could possibly constitute a ‘transitional’ micro-stylistic element in all these assemblages.

If one (very loosely) visualises a Venn diagram of the distribution of ‘transitional’ pottery styles across Island Melanesia dating within 2350/2300–1900 cal BP (Fig. 4.1), made up of sets of decorated predominantly outcurving (most strongly associated with islands at the western end of the spread) and incurving-rimmed decorated vessels (associated with the eastern end, from Buka-Sohano as far as New Caledonia), the Buka-Sohano islands clearly lie within the intersection of these spheres, providing the key link to sites in Vanuatu and on to New Caledonia. With assemblages containing both dominant outcurving (i.e. DAF central reef) and incurving ‘transitional’ vessel forms, and overlaps in decorative elements on these vessels, on present

18 If Spriggs’ (2006: 5) estimate that Late Mangaasi dates from about 1800 BP proves to be correct, there could indeed be some relationship with ‘transitional’ assemblages.
While Bedford (2006: 185-7) has critiqued the suggestions of Specht (1969) and others of parallels between the Buka ceramic sequence and that of Vanuatu ('more than 2000 kilometres distant'), he does concede that one Sohano Incised and Relief Substyle motif that 'does demonstrate intriguing similarities with motifs from Vanuatu' is the 'incised pendant triangle or alternating oblique parallel incision which creates a large zigzag motif' (see Bedford 2006: Fig. 8.11; Specht 1969: Plates IV-11, XI-12e–m (Motifs #18-19); Garanger 1972: Figs. 117 (no. 16), 121 (nos. 5 & 7), 123 (no. 15), 125 (no. 23), 129). However, he goes on to question whether these ‘relatively minor’ stylistic similarities (between somewhat generic or universal types of motifs) warrant an interpretation of contact with central Vanuatu. But what Bedford appears to overlook is the similarity (and temporal comparability) between the dominant incurving vessel forms in these two areas and the similar changes in the decorative repertoire as a whole (see above). The Buka-Sohano and Vanuatu sites show a similar transition in vessel form (from predominantly outcurving to incurving) and decorative suite (in particular the emergence of appliqué as a popular technique) at approximately the same period—therefore appearing to be stylistically and chronologically in tune. In Vanuatu, the perceived lack of synchronism in the changes in Efate and Erromango’s ceramic sequences (Bedford 2006: 158-61) may have been largely an artefact of the absence of an appropriate ΔR value to interpret some dates (see discussion in Chapter 2 and Appendix 1). I also think there is persuasive similarity between Mangaasi and Sohano style motifs that employ spaced or continuous applied nubbins or short, plain applied bands/strips in a narrow zone below the lip of incurving vessels (see Garanger 1972: Figs. 131-2; Specht 1969: Plate XI-11, Motif #22).

The overwhelming predominance of carved paddle-impressed decoration in Period III on Lakeba in eastern Fiji is clearly tangential to the ‘transitional’ decorative trends occurring in the rest of Island Melanesia at this time. Crosshatch infill was incised on paddles not pots; bas-relief decoration was created through the impression of clay rather than its application. Was this some kind of related transferral and transformation of decorative techniques? Just grasping at straws? What currently seems most certain is a lag of at least a few centuries (and in western Fiji even longer) before decorative techniques and motif elements similar to those that characterise the ‘transition’ in the west (e.g. incision, punctuation, applied relief, fingernail etc.) take off in Fiji (see discussion in Chapter 2). However, the comparability of dates for some parallel-rib paddle-impressed Late Podtanéan wares and the Period III ceramics at Lakeba (see Chapter 2), could support Best’s (1984, 2002) proposal that carved-paddle impression originally derived (and/or
arrived) from New Caledonia. But it is the distinctiveness of this technique that possibly offers the most definitive—albeit minimal—stylistic evidence of interaction at the ‘transition’. The single sherds with crosshatch paddle-impression found in the Sinapupu phase on Tikopia (‘lozenge-shaped’ relief) and at the Podtanéan site (WKO014, in a context dating to between 2200–2000 cal BP) in New Caledonia could suggest that there was some form of broad-reaching interaction with communities of Fiji at this time.19

The broad review of ‘transitional’ ceramic style in Appendix 5 also demonstrates that in the Bismarck Archipelago in particular the case for clear stylistic continuity from the Lapita to post-Lapita periods is particularly weak. This is due in large part to the questionable stratigraphic integrity and contingently weak chronology of relevant layers at three of the small number of key ‘transitional’ sites in this region20—including Kohin, Mouk and Watom—but probably also due to the presence of significant occupation hiatuses at most sites, that is, the absence of cultural horizons containing ceramics intermediate in age between ‘classic’ Lapita and ‘transitional’ styles.

Stronger evidence of stylistic continuity is seen in regions with more comprehensive, ‘historically complete’ (cf. Felgate 2003: 497, 503) ceramic sequences such as Vanuatu (e.g. particularly between Late Erueti and Early Mangaasi motifs) and New Caledonia, although in the case of New Caledonia it is somewhat complicated by issues of dating, particularly in the south. The style of the Honiavasa assemblage from the Western Solomons also appears more intermediate in nature, with its slab-built carinated vessel forms—clearly relating it to the Lapita ceramic tradition—bearing motifs that include vertical plain and notched applied bands, applied nubbins, and horizontal rows of single fingernail impressions. There could also be some evidence of stylistic continuity between the calcareous-tempered Kiki ware and the mineral-tempered Sinapupu ceramics in the shared presence of sherds that combine incision and applied relief (including notched applied relief) and the outcurving-rimmed globular jar form. However, given both the very small component of the Kiki phase that is ‘Lapita’ sensu stricto (i.e. the dentate-stamped and carinated sherds) and the similarity of the notched, generally flat-lipped (including one ‘crenate’ lip), outcurving vessels of the Kiki Phase to those from the DAF central reef area (with its stylistically and compositionally distinct ceramics), Watom ‘transitional’ assemblage, and

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19 Cord-wrapped paddle-impressed sherds from New Caledonia’s Pindaï site (Sand 1996a, 1999a, 2000) may also be linked with similarly impressed sherds amongst Best’s (2002) later ‘end-tool’ subgroup (i.e. dated to ca. 1750-1700 BP) on Lakeba (see Appendix 5).

20 See also, Bedford and Clark (2001: 71) for a similar conclusion about the need to establish detailed post-Lapita sequences in the Bismarck Archipelago.
Roviana Lagoon post-Lapita sites, it is tempting to suggest that the ‘Kiki’ phase might in fact be the conflation of two similarly tempered but distinct temporal phases of pottery. Indeed, the radiocarbon date (Beta-1227) from the upper zone of the Kiki Phase indicates a compatible transitional age of around 2160–1990 cal BP (0.756, 1σ) for the late Kiki assemblage (see Chapter 2). Unlike the DAF reef site, where similarly calcareous-tempered but temporally distinct pottery assemblages are spatially separated—or temporally ‘amplified’ (cf. Felgate 2003: 5001)—on the outer (i.e. ‘Lapita’) and central reef (likely ‘transitional’), the Kiki ‘Lapita’ phase could be lumping them together. This speculation could possibly be resolved through the analysis of the chemical composition of the clays in these sherds.

I should emphasise that while stating that the case for continuity across the ‘transitional’ period is generally weak, I am not trying to argue that there was no form of continuity (stylistic, cultural or ‘heritable’) from Lapita. There clearly is and indeed it should be expected. Rather, I emphasise its weakness because of the way that ‘continuity’ has come to be used to imply a lack of interaction between communities and the relatively gradual, isolated, independent ‘evolution’ of ceramics that bear only ‘residual’ similarities. I believe that the considerably greater indications of stylistic ‘discontinuity’ within the assemblages of these sites, together with the elements of macro-style identified above, suggest instead that some form of interaction of a much more complicated and interesting nature was occurring. Nor do I wish to be taken to imply that local processes played no significant role in this. Indeed, such processes are reflected in the evident and equally important micro-stylistic differences between sites. But by considering ceramic macro-style as an overlay—with other types of evidence forming other layers—we might get closer to the actual complexity of interaction at this time.

Rather than ‘devolved’, ‘simplified’ or predominantly ‘utilitarian’ end-products of the Lapita ‘decline’, the decorative styles of ‘transitional’ ceramics seem to accord well with definitions of ‘symbolic’ style, in which dramatic changes to—and variations within—the decoration suggest the emergence and maintenance of group/island-specific identities. But perhaps as Kennedy (1977: 16) suggested for Southeast Asia, this diversity may have emerged under the umbrella of an overarching, cultural macro-style, which signalled ‘a period of conjoined growth rather than separate histories of groups in isolation’. In the albeit gap-toothed ceramic sequences of the Bismarck Archipelago and western Solomons that I have discussed (see Appendices 4 & 5), where lengthy temporal hiatuses often separate ‘classic’ Lapita and ‘transitional’ assemblages (and deposits often mix them together), the clear change from ‘bounded’ to largely ‘unbounded’ design structure or composition at ‘transitional’ sites is highly significant, representing a change at the fundamental core of style. But the ‘shackles’ of the emblematic or iconographic Lapita design
system (cf. Ambrose 1997) were probably long since abandoned or overthrown. To the east of the Solomons, ‘transitional’ styles burst onto already considerably changed and often plainer ceramic canvases. Craig (2005: 502-3) considers design structure to be the least mutable component of style when subject to external or foreign influences—less mutable than the techniques that designs are rendered with, which are in turn less mutable than the design motifs/elements themselves. So, while foreign motifs may be readily incorporated into local traditions, they may be carried out using (the more ‘durable’) local techniques and inserted into the local design structure, where subtle changes in composition may result. ‘Transitional’ decorative style(s) had therefore undergone radical transformations at each of these three levels of style—that is, in both the ‘vocabulary’ (i.e. decorative elements employing a repertoire of techniques) and more importantly ‘grammar’ (i.e. composition) of style (see references in Braun 1991: 363). Of course, not only was the whole structure of the design system overhauled but also the canvas (pot) itself.

4.7 CONCLUSION

Craig (2005: 505) proposed that if the designs on objects that are ‘regionally contiguous but temporally separate’ are found to use ‘the same structural principles … to order more-or-less the same “vocabulary” of design elements’, then ‘there is some reason to suggest a “genetic” relationship rather than the operation of chance.’ Similarly, I would argue that if roughly contemporaneous (i.e. ‘transitional’) pottery styles extending from the Bismarck Archipelago to New Caledonia use more-or-less the same vocabulary of design elements and structure on similar dominant vessel forms, then there is good reason to suspect a cultural relationship and/or interaction of some kind rather than the operation of chance (de)evolution into similar forms. Coupled with the widespread evidence of compositional and technological change in the emergent ‘transitional’ ceramics, as well as the more limited indications of continuing long-distance interaction (and possibly population movement) at this period, the cultural significance of the stylistic ‘splashes’ in these ‘ceramic pools’ (cf. Best 2002) is even greater—probably more on the scale of waves than ripples. The ceramic evidence suggests that we are dealing with

21 Indeed, in the Bismarck Archipelago the Mussau cultural sequence is significant in indicating that the ‘end’ stages of Lapita occupation occurred at least a few centuries prior to the ‘transition’ as I have defined it. Two statistically identical determinations on dispersed charcoal samples (ANU-5075 and ANU-5077) from Area B at Talepakemalai (ECA), which are interpreted as post-dating the ceramic transition from primarily dentate-stamped ceramics to incised and plain wares (Kirch 2001: 207), indicate a most likely age of 2510–2340 cal BP (0.677, 1σ) (CALIB Rev 5.0.1).
interaction that involved ‘meaningful social units’ (cf. Costin 2000: 387) in which the ceramics themselves served ‘some new and socially defined purpose’ (cf. Thomas 1999: 118). Fiji’s participation in this possible ‘transitional’ (ceramic) network is clearly enigmatic. On current evidence, there appears to have been a lag of at least a few centuries before decorative ‘splashes’ similar to those that characterised the ‘transition’ to the west were felt in the ‘ceramic pools’ of Fiji.
CHAPTER 5

Transitional Pottery Composition in Tanga and New Ireland

5.1 INTRODUCTION

In this chapter I present the results of the characterisation of the composition of pottery from the Tanga and New Ireland ‘transitional’ sites. This involved the analysis of both temper sands and clay fabric using a variety of techniques. One of the goals of this characterisation exercise was to attempt to differentiate, through the analysis of the temper sands in particular, between locally produced and ‘exotic’ or imported (non-local) wares, which might aid in tracking interaction through the transfer of pottery materials or the pots themselves (cf. Dickinson 1998; Dickinson & Shutler 2000). In particular, the ‘exotic’ vessels would help to assess White and Murray-Wallace’s (1996) purported ‘IAR Tradition’ amongst communities on the central east coast of New Ireland at the ‘transition’, and whether communities on Tanga—producing similarly decorated pottery at approximately the same time—were also involved in some form of interaction with them.

As discussed in the previous chapter, however, for a number of reasons the reconstruction of an interaction network using compositional data was not the main goal of the analysis. I anticipated the percentage of exotic pottery present to be small, and furthermore, the information able to be gleaned about pottery ‘source’ is by nature somewhat imprecise, generally limited to a sometimes broad, geological region or ‘procurement zone’ (cf. Dickinson 1998: 272-3). It is also important to bear in mind that pottery itself may not have played a substantial, physical role in any such interaction for culturally determined reasons, particularly if the interaction was at low levels (cf. Clark 1999: 252; see discussion in Chapter 1). Consequently, the main goal of the compositional analysis was more pragmatic: to characterise each site’s pottery assemblage in detail, bearing in mind the potentially different ‘biographies’ of sand temper and clay (see Chapter 4). Specifically, I aimed to ascertain how many mineralogically, chemically and perhaps spatially distinct materials (i.e. tempers and clay bodies) were being used in pottery production, and how they might combine to form compositionally distinct groups. In this way, the internal make-up of the assemblages could be teased out so that sound assessments could be made of intra-site continuity or discontinuity in pottery composition at the ‘transition’, and importantly, so that a firm foundation could be built for the assessment of style in the following
That is, the results of this chapter should not be viewed independently. Only once the compositional results are married with the results of the stylistic analyses in Chapter 6 will firmer assessments of interaction or continuity/discontinuity be able to be made (cf. Specht 1969; Galipaud 1990).

5.2 APPROACH TO CHARACTERISATION OF POTTERY FROM TANGA AND NEW IRELAND

The characterisation of pottery composition in this thesis involved a sequence of analyses. With the aim of establishing temper groups, the first stage of analysis involved the megascopic examination of the temper sands in a large or complete sample of pottery sherds using binocular light microscopy, followed by the petrographic examination of temper sand of a select sample of sherds drawn from the megascopic analysis. In the second stage, elemental analysis of the clay fabric as well as of a selection of mineral inclusions of a sample of sherds was undertaken using Scanning Electron Microscopy and Energy Dispersive X-ray Analysis (SEM-EDXA). Quantitative oxide data from the SEM-EDXA of the clay fabric of these sherds (n=184) were then analysed using two multivariate techniques—principal components analysis (PCA) and correspondence analysis (CA)—to assess similarity and difference both between and within pottery assemblages, and to establish clay groupings that were comprised of sherds of particular established temper groups. That is, compositional groups were founded on the combined ‘biographies’ of temper sand and clay.

The aim of undertaking further mineral identification based on SEM-EDXA data in the second stage of analysis was to ascertain whether it was possible to chemically differentiate between generically similar volcanic sands, which might aid in distinguishing between non-local or indigenous tempers. In particular, I was interested in analysing minerals within types of temper sands—such as the ferromagnesian opaque-rich and pyroxene-rich placers—which on the basis of petrographic evidence seemed compatible with an indigenous origin (or at least this could not be ruled out), but which I suspected on stylistic and other grounds to be non-local.

The pottery samples that I employed in the analysis of temper sand and clay from Tanga, Lasigi (Dori and Mission sites), Lossu and Fissoa, their preparation, and the methodologies used in each stage of the analysis are described in detail in Appendix 3. In the following two sections, I first discuss the results of the analysis of temper sands, followed by clay fabric.
5.3 Results—Temper Sands

The results of temper group attribution for all sherds within the analysed assemblages are given in Appendix 6. Dickinson’s Petrographic Reports on sherd samples from Tanga and the New Ireland sites can be found in Appendix 7. Full details of the mineral composition of all temper groups are found in the accompanying tables in this chapter.

5.3.1 Tanga Islands

Eleven different temper groups were identified amongst the entire corpus of ceramics that I analysed from Tanga (Table 5.1) (see Dickinson 2004a in Appendix 7).

Angkitkita (ETM)

Temper types

While nine of these temper groups are represented at the Angkitkita site (Figs. 5.1–5.2), one type of temper, a feldspathic-rich stream sand (group C1), almost completely dominates the ceramic assemblage, comprising around 92 per cent of sherds by count, and around 89 per cent by weight (Tables 5.2–5.3).\(^1\) With the exception of groups E, F and G, all of the other temper groups made up less than one per cent of the assemblage. The relative proportions of the majority of the temper groups are roughly analogous between the diagnostic (Fig. 5.3) and plain body sherd sets (Fig. 5.4, Tables 5.4–5.5), with only one per cent or less variance.\(^2\) This probably attests to the relatively undisturbed stratigraphic context of the pottery assemblage. Only the G temper’s representation varies significantly, which is nearly three per cent higher amongst the plain body sherds.

Though plagioclase feldspar is by far the dominant mineral, C1 temper also contains small amounts of clinopyroxene and opaques, and scattered flakes of biotite mica. Both Dickinson and I separately identified two related forms of the C1 temper type, which are identical in all respects apart from the variable amount of minor biotite present (i.e. my macroscopic temper codes 2/1/3 and 2/3/1, see Appendix 3.1) or the lack of it in Dickinson’s case (his group

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\(^1\) The slightly lower percentage of C1 group by weight reflects the generally thicker and heavier nature of G temper sherds.

\(^2\) Neither the diagnostic or plain body sherd total counts were adjusted to take into account the small number of conjoined sherds mentioned in Chapter 3, given the negligible impact on the overall pattern and considering that conjoining was not a major focus of analysis. All of the 29 conjoin sets (n=68 sherds) within the corpus of diagnostic sherds from Angkitkita were of temper group C1, as were six of the nine sets of conjoined plain body sherds.
C2). The variable detection of the sparse biotite flakes is most likely due to sampling error—in particular the extremely small sample of a sherd analysed in petrography—and the different hydraulic properties of biotite compared to more equant grains, which will affect its distribution in the source sand (Dickinson 2004a: 4). Consequently, C2 temper type was retained only for a small number of sherds where no biotite was visible megascopically, although it most likely represents a closely related, if not the same, sand. Dickinson (2004a) interprets the C1-C2 tempers as probably of stream origin, given the sorting and angularity of the grains. However, they also closely resemble coarser beach sand that I collected from Waranlis in southern Maledok (see Appendix A3.1.1; Dickinson 2004a: 6).

Of the remaining Angkitkita sherds, the majority (i.e. 6.1% of diagnostic and 8.0% of plain body sherds) are of temper groups E, F and G. Group E temper consists of hybrid microlitic-lithic, non-placer beach sand, in which microlitic volcanic rock fragments are the dominant inclusions. Group F temper is also a hybrid lithic-calcareous beach sand. However, unlike E temper, the volcanic rock fragments are predominantly vitric (glassy) and it also contains a minor amount of hornblende (generally a green or green-brown form, W.R. Dickinson, pers.comm., 14 July 2004). Group G temper is feldspathic-rich, probable beach sand that lacks calcareous material, although like the F group it also contains a minor amount of similar hornblende. The volcanic lithic fragments in type G tempers are notably heterogenous, suggesting that the sand was derived from a range of generically similar bedrock sources (Dickinson 2004a: 6).

Only a small number (less than 1%) of Angkitkita sherds contain calcareous (A) and black volcanic beach sand temper (D1, D2 and D3). In some sherds, A temper (consisting mostly of reef detritus) has been almost completely leached post-depositionally, leaving grain-sized vacuoles in the sherd fabric (see Fig. 5.1). The D1-D2-D3 tempers form a spectrum of closely related ferromagnesian, beach placer sands. D1 temper consists predominantly of clinopyroxene with subordinate magnetite; D3 temper consists mainly of magnetite with minor amounts of clinopyroxene; and D2 temper sits compositionally between the two, consisting of a relatively even mix of clinopyroxene and magnetite. A sample of the black volcanic sand from the former beach occupied during the ‘transition’ at Angkitkita (i.e. Unit II-III) is a placer concentrate

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3 Given the broader surface area available for megascopical analysis, I had identified biotite (i.e. C1) in all the sherds that Dickinson subsequently classed as C2 (i.e. lacking biotite).

4 Temper groups E and F were somewhat difficult to distinguish megascopically, especially given the difficulty of identifying small amounts of hornblende in F. Further complicating identification, a distinctive pale yellow clay paste was associated with sherds that Dickinson allocated to both temper groups E and F (i.e. ETM3361 and ETM3912 respectively).
composed predominantly of clinopyroxene\(^5\) (91%), which closely resembles temper type D1. Another sample of beach sand collected from Amfuli in southern Maledok is a placer concentrate composed predominantly of opaque grains (84%), which closely resembles D3 temper (Dickinson 2004a: 6).

**Distribution**

While small numbers of sherds belonging to most of the minority temper groups were found in all excavated squares and in nearly all units (see Figs. 5.3–5.4), concentrations of temper groups are apparent across the test squares. I interpret this intra-site patterning as relating to the chronology of occupation at Angkitkita (see further discussion in Chapter 6), rather than to a particular activity area or function of the pottery. Square 2 contained all (n=19) but two of the calcareous (A) tempered sherds (the other two were from Square 1A) recovered from the site. Though the total sample was small, the number of sherds tempered with ferromagnesian beach placers (D1-D2-D3) was higher overall in Trench 1A-1B and Square 2 (i.e. in the southwestern part of the site), and Square 2 also had the highest number of F tempered sherds (n=21). The highest numbers of E tempered sherds were located in Squares 3-3A, and G tempered sherds (n=128) were concentrated in Square 3B (Unit II-III).

**Surface sites, Lifafaesing (EUV) and Matambek (EUX)**

**Temper types**

As well as the nine temper groups found at Angkitkita, two additional tempers are present in the small assemblages of surface-collected ceramics from sites on Tanga, and the small, excavated assemblages from Lifafaesing and Matambek (Table 5.6, Figs. 5.5–5.6). As at Angkitkita, sherds tempered with feldspathic-rich C1 temper dominate most of these assemblages.

At Matambek, a single sherd (EUX1) represents a unique temper (B) that consists of apparently deliberately crushed, coarse, intrusive gabbro (Figs. 5.5, 5.7). Apart from its lack of biotite mica, this temper is similar in both its composition and texture to rock specimens (Lif-R; see Appendix 3.1) excavated from the main ‘transitional’ occupation layer (Unit II-III) at Angkitkita.

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\(^5\) Clinopyroxene crystals are ubiquitous at Angkitkita, both on the ground surface and throughout the excavated deposit, and appear to have derived from the decomposition of the volcanic bedrock. The mineral composition of one piece of this material was analysed using a General Area Detector Diffraction System (GADDS) at James Cook University (Dr Alan Watchman arranged the analysis), which indicated it was diopside. However, as Andy Christy (pers. comm. 26/9/05 & 18/7/06; and see Appendix 3.1) has noted, the naming of clinopyroxenes is complicated and the division in nomenclature is at an arbitrarily chosen divided line. For example, when ‘diopside’ (i.e. cation group B = mainly Ca, C = mainly Mg, D = mainly Si) is formed in an igneous rock (e.g. on Tanga) rather than a metamorphic one, and has a lot of solid solution components, the usual name is ‘augite’. 
Rare in Oceanian sherd assemblages, the only other place where crushed rock temper has been encountered is Samoa, where vesicular basalt appears to have been used (Dickinson & Shutler 2000; Dickinson 2006: 21, 36-7).

At Lifafaesing, most sherds (75%) contain C1 temper, and single sherds represent the A, D1, E and F groups (the latter are all from Units VI or VI-VII) (Fig. 5.7).

In the total surface-collected assemblage from Tanga (n=538, plain and diagnostic), approximately 69 per cent of sherds are C1 temper (Fig. 5.7). Of the remainder, most sherds can be attributed to two of the volcanic placer tempers (D2, 8.4%; and D3, 10.6%) and the feldspathic-rich, pyroxenic-hornblendic beach sand (G, 6.9%). Only a small number of sherds represent the other temper groups.

**Distribution**

Despite the often small number of sherds that were collected at individual surface sites on Tanga, there is some interesting patterning evident in the representation of particular temper groups at particular sites. For example, six surface sites on the volcanic islands in the south of Tanga—Ambutu (ETI), Warambulut (ETK) and Salkangkinit (ETL) on Lif Island, Baba (ETE) on Tefa, and Salkangkis (EUA) and Amfuli (ETZ) in southern Maledok—contain much higher percentages (75–99%) of sherds with C1 temper (Fig. 5.8). The small numbers of remaining sherds at these sites are mainly of G (4.9% of total), D2 (2.3%), and D3 (1.3%) tempers.

In contrast, four other surface sites spread throughout the island group—Matampul (ERP) in western Boeng, Matangkipit (ETS) and Nonu (ETR) in eastern Maledok, and Ansingsing in southern Tefa—have significantly higher proportions of temper groups that are in the minority at Angkitkita (Fig. 5.9). Volcanic beach placer tempers (D3 and D2) are particularly abundant at Matampul (61.1% and 33.3% of sherds respectively) and Matangkipit (49.2% and 27.0%), while at Nonu most sherds contain G (35.7%) and D2 (28.6%) temper. C1-C2 tempers are not present at Matampul, and at the other sites they make up a considerably smaller percentage of the assemblage (ca. 14–29%) than at the other group of surface sites. Furthermore, a single sherd from Matangkipit represents a new lithic-rich beach sand temper (H), which is characterised by abundant volcanic rock fragments. A further ten H tempered sherds were recovered from Spit 1 of a test square excavated (A50) at Matangkipit (see Garling 2002), comprising around 8 per cent of

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6 As Felgate (2003: 490) found in his research of surface-collected, intertidal pottery from Roviana Lagoon, the state of ‘completeness’ of Tanga’s surface ceramic assemblages is likely to be low, and therefore each sherd is also more likely to represent an independent observation.
the total plain body sherds from this square. Temper group H was defined subsequent to the petrographic analysis of the sample of Tanga ceramics. However, Dickinson (2004a: 11) did observe that one sherd from Matangkipit (ETS10) had an excessively high content (20%) of volcanic rock fragments compared to the other sherds of this volcanic placer temper type (i.e. D2). Therefore, the temper in this sherd may be the same as, or related to, what I have identified as H temper.

The very small number of calcareous (A) tempered sherds recovered from the Tanga Islands (<1% of the total surface and Angkitkita assemblages) is notable.

**Derivation of Tanga temper sands**

**Indications from petrography**

With the exception of a single calcareous sherd (EUV10) from Lifafaesing, all the mineral tempered sherds recovered from the limestone island of Boeng (i.e. groups B, C1-C2, D1-D2-D3, E, F and G) must on geological grounds represent either the transfer of mineral sands from other islands to produce pottery locally, and/or the transfer of the pots themselves.

Dickinson (2004a: 6-7) interprets the feldspathic (C1-C2) and ferromagnesian placer (D1-D2-D3) tempers as being almost certainly indigenous to the volcanic islands of Tanga, based on their geologic suitability for derivation from the Tanga bedrock, their resemblance to local Tanga sands, and their apparent dominance in the sherd suite. He also interprets the crushed gabbro (B) temper as indigenous to the volcanic Tanga islands, although its derivation is less certain given that gabbro has not been identified there in previous geological mapping.

On the other hand, Dickinson proposes that both the hybrid lithic temper (E) and the feldspathic-hornblendic tempers (F and G) are most probably exotic to Tanga and reflect ceramic transfer from elsewhere. These tempers are empirically unlike the indigenous temper types, and while hornblende is known on Tanga (see further discussion below) it was conspicuously absent in thin sections of the three local sand samples. In terms of incompatibility with a local Tanga origin, Dickinson remarks that F temper is most clearly exotic and G temper is less clearly so.

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7 Of the 123 plain body and four diagnostic sherds excavated from Square A50 at Matangkipit—none of which I consider to be in situ—around 90 per cent were recovered from the top spit (Unit I, Spit 1). The representation of temper groups in this excavated sample was similar to the surface-collected sample, with the exception of the higher proportion of sherds in the G and H temper groups: D2 (33.1%), D3 (25.2%), G (18.1%), C1 (11%), H (7.9%), and A, D1 and E (each 0.8%).

8 Information regarding the relative proportion of volcanic placer tempered sherds (D1-D2-D3) in the entire Tanga sherd suite was not available to Dickinson at the time of his analysis.
Although it in fact contains a higher mean percentage of hornblende than F. E temper is exotic only on the grounds that the dominant varieties of lithic fragments are substantially dissimilar to those in the apparently indigenous temper types, although an origin on Tanga cannot be precluded on geological grounds.

Dickinson’s observation that the clinopyroxene in E-F-G tempers is aegirine-augite strongly favours a source/s somewhere within the alkalic TLTF chain (see also, Dickinson 2006: 76). While comparative petrographic sherd samples are only available at present in small numbers from the Anir/Feni Islands in the chain, Dickinson found that the range in pyribole index (PYi=40-77)\(^9\) of five sherds from the excavations of Wal Ambrose at the Malekolen (EAQ) site on Ambitle Island is indistinguishable from Tanga’s hornblende tempered sherds (i.e. PYi=38-77). Furthermore, Dickinson considers Anir to be a more likely source of hornblende given that a wider range of bedrock types is exposed there than on any other island group in the TLTF chain (cf. Wallace et al. 1983: 36). The temper composition of two Malekolen sherds (L5 and L8) is most similar to Tanga group F. In particular, the hornblende grains in both sets of sherds exhibited similar pleochroism—characteristic of the hastingsitic variety of hornblende reported from Ambitle bedrock and the other islands in the TLTF chain (Wallace et al. 1983: 52, Tables 6, 8, 12 & 14; Dickinson 2004c)—which could suggest a common origin on Ambitle. Tanga F temper is also broadly comparable to that found in three sherds from the Balbalankin (ERC) site on Ambitle (Dickinson 2004c), although the Malekolen sherds are still the most similar.

The tempers in another two Malekolen sherds (L6 and L7) are broadly comparable to the more heterogeneous Tanga G temper.\(^{10}\) Dickinson therefore believes that the most parsimonious interpretation is that G tempered ceramics were also transferred to Tanga from an origin on Ambitle Island.

The likely origin of the more unusual E tempered sherds is less clear. While the existence of a source (as yet unsampled) on Tanga cannot completely be ruled out, the composition of this temper does not resemble either the presumed indigenous Tanga or indigenous Anir tempers. Dickinson suggests that E temper is more likely to represent the transfer of ceramics from the Lihir or Tabar island groups. The origin of lithic-rich H temper is also unclear, however, if it is indeed related to the volcanic placer tempers, then it may also represent an indigenous Tanga

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\(^9\) The pyribole index refers to the clinopyroxene (cpx)/hornblende (hbl) ratio, which is defined as 100 x cpx/(cpx+hbl).

\(^{10}\) In turn, these sherds are broadly similar to two sherds from Balbalankin (ERC), although the Malekolen and Tanga tempers are somewhat coarser grained and better sorted (Dickinson 2004b: 2).
temper source according to Dickinson’s interpretation. Finally, the origin of the calcareous (A) tempered sherds is unknowable on the basis of petrography.

**Indications from SEM-EDXA**

While indicative rather than conclusive given the low level of sampling that was possible owing to time constraints, the results of SEM-EDXA of mineral grains within the Tanga temper groups proved to provide some useful, additional indicators of indigenous or non-local origin (Tables 5.7–5.10). SEM-EDXA permitted the discrimination of particular types of minerals within the broader mineral groups identified by petrography, in particular within the felsic minerals, clinopyroxenes, the amphibole group, and the generic ‘opaque’ group of iron oxides.

Within the apparently indigenous C1 temper group, the plagioclase grains analysed were identified without exception as being oligoclase. While some grains of oligoclase are also present in a small number of sherds allocated to the calcareous (A) and apparently non-local hornblendic groups (F and G), unlike the C1 group sherds, other types of phenocrystic (sand-sized) plagioclase minerals are also present in these groups, as well as in the E group of sherds. For example, labradorite is present in E and F, bytownite in E and G, and andesine in A, F and G groups. Furthermore, phenocrystic quartz is present in both E and F tempers and alkali feldspar (anorthoclase) is present in F. The presence of these other types of felsic minerals in the E temper group could strengthen the interpretation that it is not local to Tanga, although it is also possible that these temper sands derived from specific locales in the TLTF chain. Possible sources of phenocrystic quartz and anorthoclase in the TLTF chain could include the unusual quartz(q)-trachytes that are exposed in discrete areas on each of the island groups. The composition of these q-trachytes, made up of alkali feldspar (anorthoclase is the main type of phenocryst), quartz, orthopyroxene, small flakes of biotite, amphibole and magnetite, contrasts markedly to the mainly alkaline mafic and intermediate rocks in the island chain (Wallace et al. 1983: 48, 50-1). Quartz also occurs in veins in thermal areas on Tatau Island of the Tabar group (ibid. 12).

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11 Sixteen plagioclase grains were analysed, representing two sherds from surface sites on Tanga, ten sherds excavated from Angkitkita, and one sherd excavated from Lifafaesing.

12 Within the volcanic rock fragment component, albite, orthoclase and quartz were identified in E temper, and labradorite was identified in F and G tempers.

13 Q-trachyte forms the Meliau Islands in Tanga (Wallace et al. 1983: 29, 31), the cumulodomes of Tabar (eroded by a small stream) (ibid. 16) and Ambitile islands (from which thermal springs emerge—it is also possibly eroded by the Nanum River) (ibid. 35, 40), and outcrops on southern Babase Island in Anir (exposed near the beach, ibid. 41). The hydrothermally altered volcanic plug adjacent to Luise Harbour on Lihir Island may also have originally consisted of q-trachyte (ibid. 23).
On the basis of wt% oxide data, there also appear to be identifiable differences in the chemical composition of clinopyroxene grains of tempers inferred to be indigenous and exotic. At both Angkitkita and surface sites on Tanga, my preliminary identifications from oxide data suggested that a particular chemical composition (which I classed as ‘diopside’) was most commonly associated with the indigenous C1 group and that other types (‘augite’ and to a lesser extent ‘chromian diopside’) were strongly associated with the D1-D2-D3 and G groups, as well as being present in the E, F, and H groups. However, the apparent chemical distinctions that I detected are not borne out in terms of strict mineralogical nomenclature. Using precise mineralogical methods (see Appendix 3.1.1), Christy classed most of the clinopyroxene grains from Tanga and the New Ireland sherd samples as augite.14

The identification of hornblende grains as edenite (or possibly ferrihornblende) in three F temper sherds from Angkitkita lends support to the TLTF (or quite possibly Ambitle) origin of this temper sand (Table 5.7).15 The amphibole compositions in the TLTF range mainly from magnesiohastingsite, through magnesiohastingsitic hornblende, to edenitic hornblende (Wallace et al. 1983: 52, Tables 6, 8, 12 & 14). The detection of another grain of edenite in the sherd with crushed gabbro (B) temper (Table 5.10) could argue against Dickinson’s interpretation of this temper as being local to Tanga—given the absence of hornblende in the local sands—although it is quite likely to have derived from somewhere in the TLTF chain. The presence of ferrobarroisite (from the Richterite subgroup of the Amphibole group, related to magnesiohastingsite) in a volcanic rock fragment in an E sherd from Angkitkita (Table 5.7), could also be compatible with an origin in the TLTF chain.

Perhaps most usefully, the SEM-EDXA results indicate that there are chemical differences amongst the generic ‘opaques’ (i.e. iron-rich magnetite grains that petrography can glean scant information from), in particular between those belonging to the more securely inferred indigenous (C1) and non-local (F-G) temper groups.16 As I discuss below, this could have a

14 Augite, aegirine-augite, and chromian diopside are technically all varieties of diopside, which grade into one another in a continuous series, although small local variations in oxide content are likely.
15 The hornblende in G group was not analysed using SEM-EDXA.
16 The composition of magnetite is likely to vary between geological localities because it accommodates variable amounts of ulvospinel (Fe2TiO4) in solid solution. The amount of ulvospinel depends on the temperature of formation and the oxidation/reduction state, which will be specific to the original host rock (Andy Christy, pers. comm. 26/9/05). In the TLTF chain, Wallace et al. (1983: 51-2) found that the most abundant spinel in rocks was a ‘low-TiO2 [titanium oxide] magnetite’, which generally contained ‘much less than 10 weight per cent TiO2’, although there was an ‘extensive overall compositional range’ from chromite through to magnetite. Indeed, Wallace et al. (1983: 51-2) remark that a noteworthy feature of a range of minerals (also including clinopyroxene, biotite, and amphibole) found within TLTF island-arc volcanic rocks is their ‘persistently low TiO2 contents’.
potentially useful bearing on the uncertain origin of the A, E and H temper groups, and also bear on the inferred indigenous origin of the volcanic placer (D1-D2-D3) temper spectrum.

Of the 21 opaque grains analysed within sherds of Tanga’s C1 temper group,\(^{17}\) nearly all (n=19) are titanian magnetite, with a percentage of TiO\(_2\) (titanium oxide) in the range of 3.43–6.89, which is entirely compatible with a local origin (see fn. 16; Table 5.11). At Angkitkita, the average percentage of TiO\(_2\) in opaque grains of C1 tempered sherds is 5.23 (n=15), and is only slightly higher at 5.38 (n=3) at three different surface sites on Maledok and Lif. While one opaque grain from a C1 sherd from the Salkangkis (EUA) surface site on Maledok has a significantly higher percentage of TiO\(_2\) (7.58%), the analysis of the clay fraction indicates that this sherd is atypical compared to the majority of the C1 group.\(^{18}\) Furthermore, while two other sherds classed as C1 also contain grains of particularly Ti-rich titanian magnetite (24.82% in sherd ETM758 from Angkitkita, and 25.13% in EUV19 from Lifafaesing), the analysis of the clay fraction also indicates that these are atypical C1 sherds (see further discussion below).

In comparison, opaque grains analysed from G tempered sherds at Angkitkita have slightly higher (5.94%) than the average TiO\(_2\)% in the indigenous C1 temper group. At surface sites on Maledok and Tefa, the average TiO\(_2\)% of opaques in G sherds is higher still (6.68%)—though still compatible with a TLTF origin—and ilmenite (i.e. iron titanium oxide, 49.2% TiO\(_2\)) was also identified in one sherd (ETU3). Within temper groups E and F at Angkitkita, most of the opaque grains analysed are particularly Ti-rich (av. 14.89% and 26.86% respectively) (Table 5.12). An E group sherd (EUV20) from Lifafaesing also contains ilmenite (44.29% TiO\(_2\)).

What of the opaques within the volcanic beach placer (D1-D2-D3) tempers? Though Dickinson had interpreted these tempers as most probably deriving from a source on Tanga, I was sceptical given their very low frequencies at Angkitkita and their apparent association with exotic tempered sherds (E-F-G) at both Angkitkita and surface sites such as Ansingsing, Nonu, Matangkipit and Matampul. However, while the analysed sample is small, no particularly Ti-rich grains were identified in any of the D1-D2-D3 tempered sherds sampled from Angkitkita. Though the average TiO\(_2\)% of the magnetite was somewhat higher overall (Table 5.11) than in the

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\(^{17}\) Comprising 16 grains from nine sherds from Angkitkita; three grains from three sherds from three different surface sites; and two grains from a single sherd (EUV19) from Lifafaesing. Both Ti-rich grains were found in sherds also containing regular titanian magnetite.

\(^{18}\) Sherd EUA109 was allocated to the C1 group by Dickinson (2004a), however, I had originally coded it as 1/2/3 (as opposed to 2/1/3 which describes the majority of C1 sherds) considering its unusually high content of ferromagnesian minerals. Principal components analysis of the clay oxide data indicated that this sherd was to some extent an outlier.
indigenous C1 group, it is still compatible with a local or other TLTF origin. The D1 group had the highest relative values (7.23%), and average values for the D2 (5.67%) and D3 (5.81%) groups were most similar to the values for opaques in the G temper group (i.e. 5.94%).

Opaques within Tanga surface sherds of the D1-D2-D3 groups contained somewhat more variable amounts of TiO\(_2\) than Angkitkita sherds. Opaques from two sherds of the D1 group (ETF6 and ETS15) contained relatively low levels of TiO\(_2\) (5.22% and 3.26% respectively). In the D2 temper group, three sherds (ETU2, ETR6, and ERP2) contained magnetite with higher (two significantly so) than the average values of TiO\(_2\) for the C1 group (i.e. values of 7.01%, 11.09% and 5.64% respectively, av. 7.91%). Three opaque grains from the D3 group also had a higher average (5.73%) than the C1 group. Four further opaques from surface sherds (ETS10, ETF5, ETZ19, and ETI1) in the D2 and D3 groups contained particularly low percentages of TiO\(_2\) (2.47%, 1.78%, 1.44% (D2); and 0.55% (D3) respectively), which may represent a different (and far less frequent) form of magnetite. This form of magnetite was not identified at Angkitkita, but was present in sherd EUV20 (E group) from Lifafaesing (Table 5.11).

Single opaque grains from an H tempered sherd (ETS63) and the crushed gabbro (B) tempered sherd from Matambek had values (6.59% and 6.30% respectively) that were most similar to the majority of opaques in the D2 and G groups. And finally, while four grains from calcareous tempered (A) sherds from Angkitkita had values that were closely comparable to, though on average (4.93%) slightly lower than, the C1 group—and were therefore compatible with a TLTF (or specifically Tanga) origin—one grain of titanium-rich (87.95%) rutile was also identified in an A sherd (ETM922) from Square 2.

Discussion

Considering the results of both petrographic and microprobe analysis, Table 5.13 summarises the most likely derivations of Tanga’s temper groups, and their respective mineralogical markers. Foremost, the presence of distinctive aegirine-augite in all the temper groups strongly suggests that they all derived from the TLTF chain. The C1-C2 temper group is the most likely to be indigenous to Tanga, although it is also possible—on geological grounds—that some of the A and D1 tempered sherds originate from Tanga also. Indigenous Tanga temper appears to be characterised by oligoclase, a lower percentage of TiO\(_2\) in magnetite, a small percentage of altered, glassy volcanic rock fragments, and a lack of hornblende.

The F and G temper groups are likely to be indigenous to Anir and quite possibly reflect transfer from the Malekolen (EAQ) site on Ambitle Island. However, based on the presence of opaques with somewhat higher percentages of TiO\(_2\) (i.e. in the D1-D2-D3, B and H groups, and in
some atypical ‘C1?’ sherds), and the presence of rutile (A) and hornblende (B, D2) in some sherds, I propose that most sherds in these groups are also likely to derive from Anir. These indigenous Anir tempers are characterised by a range of felsic grains, minor amounts of hornblende (of the magnesiohastingsitic-edenitic variety), and a high percentage of vitric-rich volcanic rock fragments.

In spite of its distinctiveness, the presence of aegirine-augite indicates that the E temper group could possibly derive from either the Lihir or Tabar Islands, or perhaps from a specific locale on Anir or Tanga with distinctive geology. This possibly indigenous Lihir-Tabar temper is characterised by a range of felsic grains, an apparent absence of hornblende (ferrobarroisite was detected), opaques with a higher percentage of TiO$_2$ (including ilmenite), and a high percentage of microlitic volcanic rock fragments.

The presence of particularly Ti-rich grains in some sherds of the A, C1?, E, F, and G groups appears to conflict with Wallace et al.’s (1983: 51-2) overall finding of a low TiO$_2$ content in TLTF minerals, although other indicators in these sherds—such as aegirine-augite and edenitic hornblende—would appear to affirm a TLTF origin. The resolution of this conundrum is not within my expertise, nor within the parameters of this thesis. It may be, however, that localised mineral sources containing a higher percentage of titanium oxide were being actively eroded and were available for collection some two thousand years ago.

### 5.3.2 New Ireland

**Lasigi (ELS – Dori and ELT – Mission)**

**Temper types and distribution**

Ten different temper groups were identified in the ceramic assemblages of the Dori (ELS) and Mission (ELT) sites at Lasigi (Figs. 5.10–5.12, Table 5.14). At Dori there is a distinct difference in the frequencies of these temper groups between Phase 4 (the main occupation horizon with the highest density of pottery, dated to the ‘transition’) and Phase 2 (the earlier ‘midden horizon’ dated to the ‘Middle Lapita’).

In Phase 2 at Dori, the clear majority of the diagnostic sherd sample (nearly 78%) is tempered with calcareous sand (Fig. 5.11, Table 5.15). Based on the overall size and uniformity of the calcareous grains (consisting of reef detritus) in these sherds, this type of temper appears to have been collected from at least three different localities with different hydraulic conditions. Relatively equal numbers of sherds contain very coarse-grained (cs-calc, 29%), medium-grained (med-calc, 25%), and fine-grained/placered calcareous sand (fine-calc, 25%) (Fig. 5.10). The few
remaining diagnostic sherds from Phase 2 are distributed between four different mineral temper types. These include: feldspathic-rich, probable stream sand temper (plg-cpx/vrf-hbl, 8%); hybrid quartz-calcite beach sand (qtz-calc); and two types of volcanic beach placer temper, one dominated by opaques (op-rich placer) and the other made up of a roughly equal mix of clinopyroxene and opaques (cpx-op placer).

In contrast, mineral and hybrid mineral-tempered sherds dominate Phase 4 at Dori. Comprising around 63 per cent of the assemblage, this represents an increase of over 40 per cent from Phase 2. The majority of these sherds are tempered with feldspathic stream sand (plg-cpx/vrf-hbl, 21%) and there are similar, smaller numbers of sherds tempered with the op-rich beach placer (14%), the qtz-calc hybrid beach sand (11%), a clinopyroxene-rich beach placer (cpx-rich, 9%), and the mixed cpx-op beach placer sand (9%). In Phase 4, the number of fine calcareous-tempered (fine-calc) sherds has dropped only slightly, whereas the number of both medium and in particular coarse calcareous-tempered sherds has dropped significantly (the latter from 29 to 3%).

At the Mission site, there is no similarly clear spatial distribution of temper types with depth in the deposit (Fig. 5.12, Table 5.16). This is clearly compatible with Golson’s observation of a lack of stratigraphy in the deposit, and suggests either that the Mission assemblage represents occupation over a more restricted time period and/or that there has been significant post-depositional disturbance at the site. In Phase 3, the layer with the highest density of finds (n=187 diagnostic sherds), the feldspathic-rich stream sand (plg-cpx/vrf-hbl) is the dominant temper (31%), followed by the clinopyroxene-rich beach placer (22%). Fine, medium and coarse calcareous tempered sherds together make up around 28 per cent of the Mission’s diagnostic sherds, and a small number of sherds (7%) contain hybrid quartz-calcite beach sand. Another form of hybrid calcareous, beach placer temper (9%, calc-plg-cpx) is also present in the Mission assemblage. Only a very small number of sherds contain op-rich or cpx-op placer tempers.

With the exception of the two hybrid calcareous tempers (qtz-calc was absent, and calc-plg-cpx decreased), the underlying Phase 2 at the Mission contained roughly analogous proportions of all these tempers. In particular, unlike the Dori site, the percentage of sherds with feldspathic-rich stream sand temper (plg-cpx/vrf-hbl) increased somewhat in the lower level. Sherds from the lowest level of the site (Phase 1) also contained a similar range of mineral and calcareous tempers.
Derivation

Indications from petrography

Dickinson (1997, 2005c) suggests that the mineralogical composition of the feldspathic stream sand ( plag-cpx/vrf-hbl) is compatible with, though not exclusive to, an origin on the northeast coast of New Ireland. Broadly similar Paleogene volcanic bedrock sources occurring on Manus, Lavongai, and New Britain cannot be completely ruled out as the source of the temper. The sparse microphaneritic volcanic rock fragments in this temper derive from igneous intrusions that are widespread on both New Ireland and the other large islands of the Bismarck Archipelago. The pale form of clinopyroxene present in this temper is most probably regular augite (i.e. distinct from the aegirine-augite found in TLTF tempers), which is expected for volcanic sources on New Ireland. A green type of hornblende is the most abundant form of this mineral present, although there are also brown to reddish-brown varieties present and some red oxyhornblende (lamprobolite) (the ratio of green to brown to oxyhornblende is 6:3:1), which are absent in the Tanga tempers thought to be indigenous to the TLTF (W.R. Dickinson, pers. comm. 14 July 2004).

On the other hand, the anomalous mineral composition of the hybrid quartz-calcite temper is highly distinctive, and Dickinson (2005c) feels it is not likely to have derived from any of the large islands in the Bismarcks (including New Ireland, New Britain, Lavongai and Manus) or any of the islands within the TLTF chain. Instead, the relatively quartz-rich character of this temper and the particularly limpid quartz grains, strongly suggest a volcanic origin in St Andrew Strait on Lou Island or another nearby islet in the southern part of the Admiralty Island group.

In an earlier report, Dickinson suggested that both the apparent lack of hornblende—distinct from the possibly indigenous New Ireland plag-cpx/vrf-hbl temper—and the slight pleochroism of the clinopyroxene (suggestive of aegirine-augite) in Lasigi's clinopyroxene-rich (cpx-rich) beach placer temper were compatible with an origin within the TLTF chain (Dickinson 1997: 3). However, more recently Dickinson (2005c) interpreted the cpx-rich temper as possibly being 'a local beach sand collected near Lasigi'. Dickinson could not comment on the origin of the other two volcanic beach placer tempers (op-rich and cpx-op) as these were not represented in Golson's original thin-sectioned sample.

Dickinson observed no features that were diagnostic of origin in the calcareous tempered sherds (containing mostly reef detritus) he examined; they could presumably have been collected from beaches at or near Lasigi.
Indications from SEM-EDXA

The SEM-EDXA results from a small sample of minerals from five temper groups (Tables 5.17–5.18) provide some further chemical indicators with which to both characterise the temper groups and help in distinguishing their indigenous New Ireland or non-local derivation. Unfortunately, due to time constraints no minerals were analysed from three minority volcanic beach placer tempers (cpx-op, op-rich and the hybrid calc-plg-cpx), so their derivation must remain unclear for the time being.

First, the analysis of clinopyroxene grains indicates that the augite within the cpx-rich temper is chemically very similar to that in the inferred indigenous New Ireland feldspathic temper group (plg-cpx/vrf-hbl) (Table 5.19). The similarity of the augite composition, as well as the similar percentage of TiO₂ within the titanian magnetite (Table 5.20), could suggest that both the cpx-rich and plg-cpx/vrf-hbl tempers—the most abundant tempers at the Mission and prominent in the Dori Phase 4 assemblage—were collected from localities in the vicinity of Lasigi. Furthermore, a comparison of the averaged oxide data of the augite from these groups with that of the aegirine-augite from tempers thought to derive from the TLTF chain—i.e. the Tanga (C1) and Anir tempers (D1 i.e. the clinopyroxene-rich group) and F-G)—shows that while they are chemically very similar, the New Ireland augite has slightly lower levels of Na₂O and MnO (Table 5.19).

A single plain body sherd (ELT36) in Hunt’s sample from Phase 1 at the Mission (see Appendix 3.1), which I originally attributed to the cpx-rich temper group, was found as a result of SEM-EDXA to contain relatively abundant enstatite (orthopyroxene) and was subsequently re-classed as ‘opx-rich placer’. Dickinson (2006: 52, 55-6) notes that orthopyroxene is generally lacking in appreciable amounts in the Paleogene volcanic bedrock of New Ireland and the other major islands of the Bismarck Archipelago, but is abundant in the magmatic arc geology along the northern coast of New Britain, and also present in lower amounts in the Rabaul volcanic suite of East New Britain and Watom Island. Therefore, this sherd could be indicative of ceramic transfer from some part of northern New Britain. This opx-rich sherd also contains augite and titanian magnetite that is chemically distinct from that of the two indigenous New Ireland tempers mentioned above (Tables 5.19–5.20).

As first indicated by petrographic analysis, the hornblende identified by SEM-EDXA in Lasigi’s feldspathic stream temper (plg-cpx/vrf-hbl) is a different type—i.e. pargasite (or magnesio-hastingsite)—to that found in the Anir tempers from Tanga (F-G), reflecting the different geology of New Ireland and the TLTF chain. SEM-EDXA also permitted the feldspathic stream tempers of Lasigi and Tanga (C1) to be further differentiated through the identification of phenocrystic alkali feldspar (orthoclase and anorthoclase) in the former.
Though only three opaque grains were analysed from quartz-calcite tempered sherds at Lasigi, all of them are particularly rich in TiO$_2$ (Table 5.21), ranging between 29.34–36.50 per cent. These values are around 2.5–9.6 per cent higher than the highest value for Ti-rich magnetite found in any of the temper groups from Tanga. It is tempting, therefore, to suggest that temper containing particularly Ti-rich magnetite is characteristic of the southern Admiralties, although this would require much further investigation. A similarly Ti-rich opaque grain (34.14%) is present in a fine-calcareous sherd from Phase 4 at Dori. The percentage of TiO$_2$ in titanian magnetite from two coarse-calcareous tempered sherds from Phase 2 is also relatively high (av. 26.42%), but somewhat less so than that in the quartz-calcite and fine-calcareous sherds.

While Ti-rich grains are also present in sherds of the plg-cpx/vrf-hbl group—including rutile (60.15% TiO$_2$) and ilmenite (31.21%)—these sherds also contain a much less Ti-rich form of magnetite (Tables 5.20–5.21). The amount of TiO$_2$ in this ‘regular’ titanian magnetite in sherds of both the plg-cpx/vrf-hbl and cpx-rich groups from Dori and the Mission, is still somewhat higher (up to 2.6%) than the average values for the indigenous Tanga (C1) temper group, but similar to the values for those temper groups possibly derived from Anir (i.e. C1?, D1, D2, G, and H).

**Discussion**

The results of petrography and microprobe analysis suggest that both the predominant mineral tempers at Lasigi (plg-cpx/vrf-hbl and cpx-rich) represent wares that were likely to have been produced locally. The less numerous hybrid quartzose (qtz-calc) tempered ware and possibly some of the calcareous tempered ware may have derived from the southern Admiralty Islands, and a single orthopyroxene-rich (opx-rich) sherd from the Mission most probably indicates derivation from northern New Britain (Table 5.22).

Despite the small number of mineral analyses undertaken on the microprobe, there appear to be some indications that differences in the percentage of TiO$_2$ in titanian magnetite could be an effective way of distinguishing between tempers that are indigenous to Tanga (but not apparently indigenous to Anir), New Ireland (i.e. cpx-rich and plg-cpx/vrf-hbl temper), and the southern Admiralties (i.e. qtz-calc).

**Lossu (EAA)**

**Temper types**

A total of six temper types were identified in the small sample of diagnostic sherds from Lossu (Figs. 5.13–5.14, Tables 5.23–5.24). By far the majority of these sherds (ca. 68%) are tempered with feldspathic-rich, probable stream sand, which also contains subordinate amounts of volcanic rock fragments, clinopyroxene and hornblende, and minor biotite (plg-vrf/cpx-hbl). The bulk of the
remainder of the sherds (16%) are tempered with almost pure, medium-grained calcareous beach sand (calc); three sherds contain opaque-rich beach placer (op-rich); and single sherds are tempered with hybrid calcareous and volcanic mineral beach sand (calc-op-plg), a clinopyroxene-rich beach placer (cpx-rich), and a mixed clinopyroxene-opaque beach placer temper (cpx-op-plg). Another temper type, rich in both clinopyroxene and pyroxene, that was previously identified in three Lossu sherds studied by Dickinson (1997), was not found in the present analysis (but see fn. 28 below).

**Derivation**

**Indications from petrography**

Dickinson’s (1997, 2005b) observations indicate that Lossu’s feldspathic-rich stream sand temper (plg-vrf/cpx-hbl) is virtually identical to the one identified in the Lasigi ceramic assemblage (i.e. plg-cpx/vrf-hbl).\(^\text{19}\) Though the presence of biotite in some of the feldspathic-rich Lossu sherds initially made them appear superficially similar to the indigenous feldspathic-rich stream sand temper from Tanga (C1-C2) and/or to the feldspathic-rich beach sand (G) possibly derived from Anir, a number of characteristics distinguish between them and discount a TLTF origin for the Lasigi-Lossu feldspathic temper types. First, there is a difference in the ‘habit’ and colour of the biotite present. In Lossu feldspathic-rich sherds (i.e. plg-vrf/cpx-hbl), biotite often appears as thick ‘books’ of compound, sometimes green, flakes, but in Tanga tempers the predominantly brown-yellow biotite occurs as thin, scattered flakes (Dickinson 2005b). Like at Lasigi, the augite present in the Lossu tempers is the pale form, which is distinct from the green aegirine-augite found in TLTF tempers, and the varieties of hornblende in Lasigi and Lossu sherds are very similar to each other, and distinct from the TLTF varieties. The Lasigi-Lossu feldspathic tempers also contain a small proportion (1–3%) of microgranular hypabyssal igneous rock (microphanerite), which is to be expected for tempers derived from New Ireland and was not present in any of Tanga’s tempers, exotic or local (W.R. Dickinson, pers. comm. 14 July 2004).

Do the Lossu and Lasigi feldspathic-rich, stream sand tempers in fact derive from the same local source? And, does this represent ceramic transfer of some sort between the two sites? As detailed in Appendix 4, Dickinson (1997) originally suggested three possible interpretations of this feldspathic temper type: 1) both the Lasigi and Lossu tempers had separate local origins, 2) feldspathic tempered pottery stemmed entirely from one of the sites, and was

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\(^\text{19}\) The Lasigi temper has a slightly higher proportion of clinopyroxene.
transferred to the other, or 3) feldspathic tempered wares were imported to both sites from an origin elsewhere on New Ireland. However, he noted that considering the New Ireland bedrock, ‘which should yield similar derivative sands over a wide area, there is no particular reason to entertain these more complex hypotheses’ (i.e. interpretations 2 and 3) (ibid.).

Dickinson (2005b) speculates that the cpx-rich beach placer temper from Lossu may have derived from the same local beach system that yielded the Lossu calcareous tempers. Unlike Lasigi’s cpx-rich placer temper, the Lossu temper contains hornblende, as well as a significantly higher proportion of plagioclase and significantly less opaques.

**Indications from SEM-EDXA**

A small sample of mineral grains was analysed in sherds from four Lossu temper groups (Table 5.25). As no sherds bearing opaque-rich placer temper were within Hunt’s original sherd sample (which was used in the present analysis, see Appendix 3.1) the origin of this temper remains unclear, although it could feasibly be local.

This analysis indicates that the augite contained in the cpx-rich and cpx-op-plg tempered sherds is chemically very similar, which could suggest that both types derive from similar locally available sources (Table 5.26). Furthermore, a comparison of the chemical composition of this Lossu augite with that found in the presumed local tempers from the Dori and Mission sites (i.e. the cpx-rich and plg-cpx/vrf-hbl sherds) indicates chemical differences with regard to the amounts of MgO, Al₂O₃, SiO₂ and TiO₂ (Table 5.26). This strengthens the petrographically observed differences between the Lossu and Lasigi cpx-rich tempers, and probably indicates separate local origins of this temper type.

The SEM-EDXA results also contribute to the question of whether the Lossu and Lasigi feldspathic-rich stream sand tempers (plg-vrf/cpx-hbl and plg-cpx/vrf-hbl respectively) derive from the same source. Like the Lasigi temper, hornblende grains in Lossu’s feldspathic temper are most probably pargasite (or possibly magnesio-hastingsite), although edenite (or ferrihornblende) was identified in one sherd (EAA17). The Lossu temper also contains a similar suite of plagioclase and alkali feldspar minerals to the Lasigi temper. However, while only a few grains were analysed, the TiO₂ values of the magnetite within the feldspathic temper sand from Lossu are significantly lower than in those from Lasigi, but are similar to those from two other Lossu temper groups (i.e. cpx-rich and cpx-op-plg) that are possibly local (Tables 5.20–5.21 & 5.27).

**Discussion**

Given this evidence, I consider that the very similar, feldspathic-rich stream tempers dominant at both Lossu and Lasigi are unlikely to represent evidence of ceramic transfer between the two
sites. Though more sampling is required to strengthen this claim, it seems more likely, as Dickinson suggested, that these two temper types were collected at two different localities on New Ireland, possibly in the vicinity of each site, within a broadly similar geological setting. The generically similar clinopyroxene-rich tempers at these sites also most likely represent the use of separate local sources.

**Fissoa (ENX)**

**Temper types**

In contrast to White and Murray-Wallace’s (1996: 34) rather limited observations in relation to the tempering of Fissoa ceramics, the megascopic and petrographic analysis conducted in this thesis revealed a compositionally diverse assemblage. Fourteen different temper types were identified, including eight different (probable) beach sands and five different stream sands (Figs. 5.15–5.16, Tables 5.28–5.29). Indeed, no two of the ten sherds Dickinson (2004b) analysed bear a close resemblance to one another, and though they consist of broadly similar volcanic sands the temper sands are ‘highly variable both mineralogically and texturally’. With few exceptions, the Fissoa mineral tempers are characterised overall by a significant proportion and variety of volcanic lithic fragments—in particular vitric types—and the presence of hornblende. The much greater variety of temper groups present in the plain body sherds compared to the diagnostic sherds highlights the importance of analysing a sample of the plain component of an assemblage, particularly in cases such as at the Fissoa site where there has been significant post-depositional disturbance and few diagnostic sherds remain.

Just under half (48%) of all the Fissoa sherds—but well over half of the diagnostic sherds (67%)—are tempered with almost pure calcareous (calc) beach sand. A small number of other sherds (ca. 8% of the total) contain two types of hybrid calcareous beach sand temper, one of which has a distinctively high content of clinopyroxene (calc-cpx-vrf-plg) and the other has a significant feldspathic component (calc-plg-op). Five temper types are characteristically feldspathic-rich, comprising around 24 per cent of the assemblage. They include a lithic-hornblendic beach sand (plg-rich w/ vrf-hbl)—the dominant type (ca. 15%)—and five probable stream sands with a variety of lithic fragments and other minerals (plg-rich w/ vrf, plg-rich w/ biot, plg-rich w/ qtz & opx, plg-rich w/ vitric-rich vrf, and plg-rich w/ felsitic-rich vrf), which are found in smaller numbers of sherds. Two tempers contain feldspathic minerals in almost equal proportions

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20 These sherds were chosen as a representative sample part way through the analysis.
to another volcanic component. One of these, a feldspathic-lithic stream sand (plg-vrf rich) with a high proportion of various lithic fragments, is the third most prominent temper type at Fissoa, comprising around 13 per cent of the total assemblage (but absent in the diagnostic sherds). The other temper of this type is a feldspathic-pyroxenic beach placer (plg-cpx rich), which is found in a single sherd. A small number of sherds contain beach placer sand that is either particularly clinopyroxene-rich (cpx-rich w/ plg-vrf) or opaque-rich (op-rich). The final temper group, a mixed vitric-lithic rich beach placer (vrf-cpx-plg), was only observed in three sherds.

Derivation

Indications from petrography

Dickinson (2004b: 1) considers that the Fissoa tempers he examined are all compatible with derivation from the Paleogene volcanic bedrock assemblage exposed on New Ireland—there was no reason to suspect their derivation from any other island. However, given the clear heterogeneity of the tempers, they were probably collected at multiple locales, although these need not have been far apart.21 The three most prominent temper types may represent sands that were collected in the immediate vicinity of Fissoa: the calcareous beach sand (calc), the feldspathic/lithic-hornblende beach sand (plg-rich w/ vrf-hbl), and the feldspathic-lithic stream sand (plg-vrf rich). The remaining ten temper types may have been collected from other nearby localities on New Ireland.

While the Fissoa tempers are generically similar to some from Lossu and Lasigi to the south (in particular those containing clinopyroxene and hornblende), Dickinson observed no close temper matches. Lossu tempers are typically more fine-grained and better sorted than the Fissoa ones, and the feldspathic-rich, non-placer tempers from Lasigi and Lossu have significantly higher pyribole contents and lower contents of volcanic rock fragments. Nor are there any close parallels with temper sands from Tanga or Anir. All the clinopyroxene grains observed in Fissoa sherds are regular augite, typical of New Ireland, and not the aegirine-augite common to the TLTF chain.

Indications from SEM-EDXA

Minerals were analysed in eleven Fissoa plain body sherds from nine different temper groups (Table 5.30). As a result of SEM-EDXA, it became clear that the temper of one sherd (ENX123)

21 Information regarding the representation of temper groups in the entire assemblage was not available to Dickinson at the time of his analysis.
had been misidentified with binocular microscopy. Previously assigned to the dominant feldspathic-rich temper (plg-rich w/ vrf-hbl)—though it was noted as having a different paste to the other sherds of this group—mineral analysis showed that unlike the other sherd (ENX124) of this type it contained quartz and orthopyroxene (i.e. plg-rich w/ qtz & opx). Like the Lasigi sherd, the presence of orthopyroxene could possibly point to an origin in northern New Britain (see Dickinson 2006: 55-6). However, the mineral suite is also similar to that of quartz trachytes exposed on nearby Tabar (see above), which could be a more likely origin.22

While the sherd sample is small, it can be seen nevertheless that the opaques (titanian magnetite) within two of the dominant, presumably local temper types—i.e. calcareous and plg-rich w/ vrf-hbl—contain almost identical amounts of TiO₂ (av. 6.73%) (Table 5.31). This could be further evidence that these two temper types do indeed derive from beaches in a similar geological context in the vicinity of Fissoa. The somewhat higher TiO₂ values of opaques within the less frequent temper types (i.e. calc-cpx-vrf-plg, op-rich and vrf-cpx-plg) are similar to those in some sherds from Lossu and Lasigi, which could indicate that they derive from further afield. Ti-rich magnetite is also present in sherds tempered with two types of beach sand: the opaque-rich placer and the possibly local feldspathic beach sand (plg-rich w/ vrf-hbl). These grains have similarly high TiO₂ levels (27.13% and 29.55% respectively) to some from Lasigi’s quartz-calcite (possibly deriving from the southern Admiralties), calcareous, and feldspathic-rich stream sand (plg-cpx/vrf-hbl) tempers.

A compositionally very similar augite is present in four of the minority tempers, including a stream sand (plg-rich w/ biot) and three beach placer sands (calc-cpx-vrf-plg, vrf-cpx-plg, and cpx-rich w/ plg-vrf) (Table 5.32). The composition of this augite is most similar to that identified in sherds from Fissoa’s nearest neighbour Lossu (ca. 20 km to the southeast) and is different from Lasigi augite on a number of counts. This could indicate that these minority-tempered, Fissoa ceramics were produced at a locality somewhere between the two sites within a similar geological setting to Lossu.

Fissoa tempers contain a similar range of felsic minerals (including andesine, oligoclase, labradorite and quartz) to those from the other two New Ireland sites.

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22 To test this proposed origin, the clinopyroxene (if present) in ENX123 would need to be examined using petrographic methods to determine whether it is the aegirine-augite typical of the TLTF chain.
5.3.3 Temparal indications of exchange, interaction and discontinuity?

As predicted at the beginning of this chapter, the analysis of temper sands at sites on the Tanga Islands and at Lasigi, Lossu and Fissoa on the New Ireland mainland has shown that the majority of all ceramics were most likely produced using a relatively small number of locally available sands. A much smaller proportion of the assemblages—but consisting of a larger variety of temper sands—most likely represents ‘exotic’ or imported wares indicative of some form of exchange or interaction with communities further afield.

But who were these communities? The most resounding finding from the analysis of temper is that there is no conclusive, compositional evidence of exchange or transfer of pottery either between the New Ireland and Tanga sites (or any other island group in the TLTF chain) or between any of the three New Ireland sites. Contrary to earlier suggestions, the further research conducted in this thesis does not conclusively support the existence of some form of interaction—predicated on temper at least—between the Lasigi and Lossu sites, or between Lasigi and unknown sites/communities within the TLTF chain. Both the very similar feldspathic-rich stream sand tempers common to Lasigi and Lossu, and Lasigi’s clinopyroxene-rich temper are more likely to have been procured in the vicinity of each site.

The available evidence does, however, suggest that communities on Tanga, and at the Fissoa and Lasigi sites on New Ireland, were involved in exchange or interaction with other communities, the latter potentially at some distance. In Tanga, two temper types (F and G) likely to derive from Ambitle Island in Anir, and another temper type (E) possibly deriving from the Lihir or Tabar groups, are found in ceramics that are broadly distributed across all the islands in the group. Given the chronological context afforded by the Angkitkita and Lifafaesing sites, this indicates that at the ‘transition’ (dated to ca. 2250–2000 cal BP) as well as during the ‘Early-Middle Lapita’ (most clearly represented in the basal levels of Sq. 2 at Angkitkita, dated to ca. 3160–2930 cal BP) there was systematic transfer of these wares to Tanga from Anir and possibly also other locales in the TLTF chain (see further discussion below and in the next chapter). At Fissoa, the large number of, and variation within, temper types (n=13) in the assemblage—only three of which are likely to have been procured in the immediate vicinity of the site—suggests either that this part of New Ireland is home to a very texturally and mineralogically diverse range of sand sources, or more likely, that the Fissoa community was involved in relatively extensive exchange with a number of other pottery-producing communities in northern New Ireland. The lack of any clear temper matches with either Lossu or Lasigi could indicate that the communities Fissoa was interacting with were either within around 15–20 km south of Fissoa, or located...
further to the north. One Fissoa temper could possibly indicate ceramic transfer from Tabar (but see below). At the Mission and Dori sites at Lasigi, the distinctive hybrid quartz-calcite tempered ware—particularly abundant in the ‘transitional’ Phase 4 at Dori—and possibly some of the calcareous tempered ware, may have been the product of limited interaction (either indirect or direct) with communities over 200 km distant in the southern Admiralty Islands. Another temper identified at the Mission possibly suggests interaction with communities somewhere on the north coast of New Britain (but see below).

The analysis of mineral temper in conjunction with SEM-EDXA in this thesis has also shown that there are potentially useful chemical indicators—deriving from the specific localised, formational characteristics of the host bedrock—that can be used to distinguish between apparently similar temper sands. In particular, there appear to be subtle differences in the amounts of titanium oxide within ‘regular’ (i.e. not particularly Ti-rich) opaques, and differences in the chemical composition of clinopyroxenes. Very Ti-rich opaques may also be a feature of some temper sands derived from the southern Admiralties and New Ireland.

In terms of tempering practice, the Dori site exhibits clear, but not complete, intra-site discontinuity in pottery technology. This discontinuity is seen in the differently tempered wares that characterise the ‘transitional’ and Lapita periods of occupation in Phases 4 and 2 respectively—a not particularly surprising finding given the lengthy hiatus indicated between these phases. In a familiar pattern—present at a number of ‘transitional’ sites (see Chapter 4 and Appendix 4)—distinctly calcareous-tempered wares dominate the earlier ‘Middle Lapita’ Phase 2 assemblage (dated to ca. 3000–2600 cal BP), while mineral-tempered wares dominate the ‘transitional’ Phase 4 assemblage (dated to ca. 2250–2050 cal BP) (see Chapter 2, Appendix 1).

As detailed above, however, there is no complete separation of mineral and calcareous tempering across these phases at Dori, nor should one necessarily be expected. But the effects of Phase 3 should be borne in mind when considering the compositional make-up of the Phase 2 and 4 pottery assemblages, as well as when assessing the degree of continuity/discontinuity exhibited at the site. That is, the digging of very large postholes in Phase 3 must have created significant opportunities for mixing of the Phase 2 and 4 ceramics. Stratigraphically, the postholes were clearly dug from the surface of Phase 2 to nearly a metre depth. However, as Golson (1991) noted, it is not completely clear whether they were chronologically or functionally associated with,

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23 This temper, which has an apparently volcanic origin, is not the same as the unusual hybrid quartz-calcite temper identified in sherds from sites in the Solomons (Dickinson 2005c; and see Appendix 4).
or distinct from, the Phase 2 occupation, although they could arguably be contemporary with its later stages. Golson (1991: 249-50) estimated that the digging of the post-holes would have created a large quantity of both Phase 1 and 2 spoil, which was presumably disposed of on the surface in the vicinity. Furthermore, he also believes that the postholes were empty, or at least substantially unfilled, when deposition associated with the ('transitional') Phase 4 began. Consequently, the holes were partially infilled by early Phase 4 deposit—the deposit within at least the upper portions of the postholes is continuous with the Phase 4 deposit—but their deposit also represents a mixture of materials from Phases 1, 2 and 3 itself. Consequently, it is quite likely that the assemblages of both Phases 2 and 4 contain a certain non-in situ component that has been introduced as a result of post-hole excavation (e.g. in digging spoil) and infilling and possibly bioturbation. In particular, the significant reduction of coarse calcareous-tempered sherds in Phase 4 may indicate that they were introduced from Phase 2 digging spoil and were subsequently mixed with later occupation debris.

Is discontinuity in tempering practice also evident at Angkitkita? Unfortunately, the only excavated square (Sq. 2) that clearly contains material associated with the 'Early-Middle' Lapita date (ca. 3160–2930 cal BP) also has the most disturbed stratigraphy (see Chapter 3). However, the presence in this square of all but two of the total number of calcareous-tempered sherds (A) recovered from the site, as well as the higher incidence of exotic mineral tempered sherds from Anir (i.e. D1-D2-D3, F) seems more than fortuitous. The local feldspathic temper type (C1-C2) is clearly dominant in the 'transitional' phase of occupation at the site (i.e. in Unit II-III dated to ca. 2250–2180 cal BP, 1σ). However, some distinctive hybrid lithic (E and F) tempered sherds (i.e. with a yellow clay paste) and feldspathic beach (G) tempered sherds—representing transfer from Anir—that are present in Unit II-III and absent from the lower levels of Sq. 2, may also be contemporary (see discussion in see Chapter 6). Therefore, the Angkitkita ceramic assemblage is like Dori’s on both counts: there is clear discontinuity in tempering practice between the largely mineral-tempered ‘transitional’ assemblage and the earlier ‘Middle-Early’ Lapita assemblage, in which calcareous-tempered wares appear to be confined; and there is a similarly lengthy hiatus in occupation between these two phases.

The surface sites in southern Tanga that have a similar distribution of tempers to that found in Unit II-III (i.e. Ambutu, Salkangkis, Amfuli, Warambulut, Salkangkinit, and Baba; see Fig. 5.8) may also be largely ‘transitional’ in age. Whereas, the surface sites with a similar distribution of ‘exotic’ tempers to Square 2 (i.e. Matampul, Nonu, Matangkipit and Ansingsing; Fig. 5.9) are likely to represent occupation of a similar, ‘Early-Middle’ Lapita age.
5.4 RESULTS—CLAYS

The normalised clay oxide data from SEM-EDXA of all the pottery sherd samples are presented in Table 5.33. These results are investigated through four different sets of multivariate analyses, which I discuss below. In most cases, CA proved to provide better groupings of the data than PCA (see Chapter 8 for a similar finding with red ochre). The results are, however, informed by a comparison of both techniques.

5.4.1 Tanga and New Ireland

Angkitkita (ETM)

In the first set of multivariate analyses, only the clay data from Angkitkita sherds is utilised. Overall, the most striking result of these analyses is that there is a broad association of clay compositional groupings with particular temper types. In other words, pottery tempered with a particular type or types of temper appears to have been produced from chemically distinct sources of clay.

Multivariate analysis suggests the presence/use of five main, chemically distinct clay sources within the Angkitkita assemblage (Table 5.34). The approximate boundaries of these clay groupings are shown in the three-dimensional CA plots (Figs. 5.17–5.18). Factors 1, 2 and 3 account for approximately 86 per cent of the total chemical variation present, which can be considered a successful approximation of the data (cf. Baxter 2003).24

With the exception of a few outlying sherds, clay samples from the majority of sherds tempered with the assumed indigenous feldspathic-rich stream sand temper (C1) form a relatively discrete cluster, which suggests they were produced from a single clay (Clay 1).25 More detailed investigation of the chemical variation of the clay fabric within C1 tempered wares reveals an interesting distribution related to intra-site patterning. Namely, the majority of outlying C1 sherds, or those close to the periphery of the cluster, were recovered from Square 2, while a few also came from Square 3A. This is most clearly shown in a detail from the PCA plots (Fig. 5.19; components 1, 2 and 3 successfully account for around 85% of the total variation).

24 NB: Sherd ETM758 (C1 temper group) was removed from all CA plots carried out with NCSS as it was considered to be an extreme outlier. Outliers such as this can deleteriously affect patterning present in the data (see, Bolvik et al. 1982; Baxter 1999). However, the clusters in MV-ARCH plots were not unduly affected by this sherd’s inclusion.

25 The degree of variation present within the Clay 1 paste is to be expected. Henrikson and Blackman (1992: 139) show a similar spread of variation in a bivariate plot of chemical data of samples from the same pot.
Many of these outlying C1 sherds cluster with sherds containing a variety of tempers that are inferred to be exotic to Tanga (most probably deriving from Anir), forming what could be another potential clay source (i.e. Clay 2). In total, Clay 2 groups together eight different temper types—including calcareous (A; sherds ETM933-5 and ETM970, Sq. 2), feldspathic-rich (outlying C1), volcanic beach placer (D1-D2-D3; e.g. ETM999), hybrid microlitic-lithic (E) (a single sherd only), and hornblende-bearing beach (F-G) sands—although it is most strongly associated with the feldspathic-rich, pyroxenic-hornblendic beach sand temper (G).

Another potential clay source (Clay 3), which is clearly, chemically distinct from Clay 1, is most strongly associated with the hybrid microlitic-lithic (E) temper, and possibly with about half of the F tempered sherds, and a single clinopyroxene-rich sherd (D1; ETM615, Sq. 1B). This evidence could indicate that like the F temper, both the E and D1 temper types do in fact derive from locales on Anir.26

The remaining two clay sources are represented more tentatively by pairs of outlying sherds, including: two sherds (ETM1001 and 1003, Sq. 2) tempered with opaque-rich (D3) beach sand (i.e. Clay 4); and two outlying calcareous (A) sherds (ETM922 and ETM923, Sq. 2) (i.e. Clay 5).

The distribution of the samples in the CA and PCA plots therefore appears to most securely indicate that A, C1, D1, D3, E, F and G tempered wares were produced from at least two different clay sources. A small number of single, outlying sherds (e.g. two C1 sherds (ETM758 and ETM902, Sq. 2); a D1 sherd (ETM167, Sq. 1A); and a couple of the F sherds (e.g. ETM985 and ETM783, Sq. 2)) may also represent additional, chemically distinct clay sources.

**Tanga Islands**

In the second set of multivariate analyses, the sample consisted of all sherds from the Tanga Islands as a whole (n=130), including Angkitkita (ETM), Lifafaesing (EUV), Matambek (EUX) and numerous surface sites across the island group. The CA scatterplots show some interesting results indicative of inter-island interaction (Figs. 5.20–5.23).

As expected, feldspathic-rich (C1) sherds from two surface sites on Lif—Salkangkinit (ETL7) and Ambutu (ETI2)—cluster securely in the main Clay 1 group with Angkitkita’s feldspathic tempered wares, suggesting that this type of ware was in wide use on Lif and was

26 However, because of the difficulties of discriminating between tempers E and F megascopically, there is some potential for the grouping of these tempers to be the result of misidentification.
made from a single clay source. Seven other C1 tempered sherds from Maledok sites—including Matangkipit (ETS16), Waradan (ETU4), Sautam (ETV3), Amfuli (ETZ17–18), and Salkangkis (EUA108–9)—are outliers to varying degrees of the core Clay 1 group, and could possibly belong to either Clay 2 or 3, or in fact represent a Maledok clay source.

All but one of the G tempered sherds analysed from surface sites cluster with the Clay 2 group, confirming the strong association of G temper with this clay source. These sherds are from sites located throughout the Tanga Islands, including: Baba (ETE3) and Ansingsing (ETF7) on Tefa; Salkangkinit (ETL6) on Lif; and Nonu (ETR8–9), Sautam (ETV1), Salkangkis (EUA110) and Waradan (ETU3) on Maledok. A clinopyroxene-rich (D1) sherd from Lifafaesing (EUV6) on Boeng, and the unusual gabbro-tempered (B) sherd (EUX1) and a G sherd (EUX3) from Matambek also group with Clay 2 wares. This strengthens other indications that the gabbroic and clinopyroxene-rich tempered wares originated from Anir. An unusual E sherd (ETF1) from Ansingsing on Tefa is more strongly associated with the Clay 2 group, rather than the Clay 3 group of other E tempered Angkitkita sherds.

Few other surface sherds appear to cluster with the Angkitkita sherds of the Clay 3 group. An F sherd from Baba (ETE5) on Tefa may possibly belong in this group (or to Clay 6, see below).

The Clay 4 source is now a robust cluster made up of sherds tempered with the full spectrum of black, volcanic beach sands (D1-D2-D3), which further confirms the association of these temper variants and could indicate that they and Clay 4 all derive from a relatively discrete locale. This cluster includes a small number of sherds from sites widely distributed through the Tanga Islands, including Angkitkita (ETM1003) and Ambutu (ETI) on Lif, Matampul (ERP) on Boeng, Ansingsing (ETF) on Tefa, and Matangkpit (ETS), Waradan (ETU) and Amfuli (ETZ) on Maledok (Fig. 5.22). The sherd tempered with unusual lithic-rich beach sand (ETS63, H) from Matangkpit also clearly falls in the Clay 4 group, which strengthens the previously mooted association of this temper type with the volcanic beach placers (see above). The Clay 4 group possibly also includes some feldspathic-tempered (C1) sherds from Maledok sites.

The two calcareous Angkitkita sherds representing Clay 5 remain a discrete cluster.

The remaining four Lifafaesing sherds (EUV9, E temper; EUV12, C1; EUV19, C1; EUV20, E) are all clear outliers in the top left portion of the plots. These sherds, together with one

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27 Sherd EUX2 was accidentally omitted from the MV-ARCH plots.
Angkitkita (ETM902, C1, Sq. 2), one Matangkipit (ETS12, G), and one Matambek (EUX12, C1) sherd, possibly represent another chemically distinct clay source (i.e. Clay 6). A number of factors, such as the presence of exotic G and E tempers amongst this group (and possibly also F and D2 tempers, see below), the presence of Ti-rich opaques amongst Lifafaesi ng sherds, as well as the association of one of the Lifafaesi ng sherds (EUV6) with the Clay 2 group, could indicate that Clay 6 also derives from Anir. Alternatively, but perhaps less likely, tempers may have been transported from Anir and made with a distinctive, local Boeng (or other Tanga) clay.

**Tanga versus New Ireland**

The third set of multivariate analyses compared the clay composition of all analysed sherds from Tanga and the three New Ireland sites. A clear compositional difference was apparent between the clays used to manufacture the majority of Tanga and New Ireland sherds. This is best illustrated in the PCA plots—the first three components successfully accounted for a total of 81 per cent of the chemical variation—which show an almost complete separation between the Tanga and New Ireland assemblages (Fig. 5.24).

The Tanga sherds previously allocated to Clay 6 remain a distinct outlying cluster in the right hand portion of the plots. However, a number of other Tanga sherds are now also located in the close vicinity of this cluster, including sherds from Angkitkita (ETM985, F), Baba (ETE3, G; ETE5, F), Waradan (ETU3, G), and Matampul (ERP2, D2). One outlying Fissoa sherd (ENX123, plg-rich w/ vrf-hbl) is also close to the Clay 6 group.

A few sherds from three different Maledok sites (including Amfuli (ETZ17–8, C1; ETZ19, D2), Sautam (ETV1, G; ETV3, C1), and Nonu (ETR 8, G)) also lie outside the main cluster of Tanga sherds, which can be seen in the plot of principal components 1 and 3.

Two New Ireland sherds of different temper groups from the Mission site (ELT30, cpx-op; ELT31, cs-calc) are clear outliers, located in the left hand portion of the plots.

However, a number of Tanga sherds appear to overlap with the main New Ireland cluster—and/or lie outside of the main Tanga cluster—in both CA and PCA plots. The fourth and final set of multivariate analyses was therefore undertaken to further investigate the possible association of these clays. These plots included all the New Ireland sherds together with select sherds from the following Tanga sites:

- **Angkitkita**—ETM1977, -2873, 872 (C1, Sq. 2 and 3A); ETM970, -933 (A, Sq. 2)
- **Matambek**—EUX1–3, EUX12 (tempers B, C1, G)
- **Ansingsing**—ETF1, -5–7 (D2, E, G)
- **Matangkipit**—ETS10, -12–16, -63 (C1, D1-D2-D3, G, H)
- Sautam—ETV1, -3 (C1, G)
- Matampul—ERP2, -3 (D2-D3)
- Waradan—ETU1–4 (C1, D2-D3, G)
- Baba—ETE3–5 (C1, F, G)

Overall, the CA scatter plot shows that with the exception of a few distinct outliers—including sherds ETS12 and EUX12 from Clay 6, EUX1 and 2 from Matambek, and the two Mission sherds (ELT30–31)—the rest of these sherds form a somewhat nebulous cluster (Fig. 5.25). However, the apparent singularity of this grouping is likely to have been at least partially imposed by the effects of the outliers (see e.g., Bolviken et al. 1982; Baxter 1999).

Within the cluster there is still some limited patterning evident amongst the New Ireland sites' clays, and there are indications that a number of Tanga sherds do not sit within it comfortably. For example, looking at the whole cluster, most of the Lossu sherds lie towards the upper left area; most Mission sherds lie in the upper portion; and most Dori sherds in the lower half. At Lasigi, this could possibly indicate that different clay sources were made use of at each site, or perhaps that different taphonomic weathering processes acted upon the sherds—which fits with the difference in stratigraphic disturbance at each site—producing slight chemical differences in the sherd fabric.

Looking at a detail of only the Lasigi sherds in this CA plot, it can be seen that the majority of sherds form a large cluster (Fig. 5.26a). However, within this cluster there is some reasonably convincing patterning present amongst particular temper types, which could possibly indicate the presence of four different clay sources. Feldspathic-rich (plg-cpx/vrf-hbl) sherds tend to cluster closer to the fine and medium calcareous (fine-calc and med-calc) sherds (forming Clay 1); clinopyroxene-rich (cpx-rich) sherds and the single orthopyroxene-rich (opx-rich) sherd cluster at the far right end of the group (Clay 2); quartz-calcite (qtz-calc) sherds tend to cluster with coarse calcareous (cs-calc) sherds (Clay 3), an association that was first suggested by the common presence of Ti-rich magnetite in these tempers (see above); and the single, mixed clinopyroxene and opaque-rich (cpx-op) sherd from the Mission (ELT30) is a clear outlier and probably represents another distinct clay source (Clay 4). The indication that the single opx-rich sherd was made using the same clay source as the probably locally derived cpx-rich sherds could argue against the derivation of opx-rich temper from northern New Britain. An unusual local source of this temper may be a more likely explanation than the transport of temper alone from New Britain. All of the Lasigi clay clusters contain sherds that were recovered from both Phases 2 and 4 at Dori. However, the potential for some mixing to be present should be kept in mind (see discussion above). Within the Clay 1 cluster, the single fine-calc sherd and all the plg-cpx/vrf-hbl
sherds from Dori are from Phase 4, while the single cs-calc and med-calc sherds are from Phase 2. Within Clay 2, one of the cs-calc sherds and all of the qtz-calc sherds from Dori are from Phase 4 and two cs-calc sherds are from Phase 2. In the Clay 3 cluster, one somewhat more outlying cpx-rich sherd is from Dori Phase 2, and the remainder are from Dori Phase 4 and the Mission.

Conclusive associations between clays and particular temper groups amongst the Lossu sherds are hindered by the small sample size. However, I tentatively suggest the presence of four different clays. The clay of the single analysed calcareous-tempered Lossu sherd (EAA19) (forming Clay 1) is an outlier that is clearly separated from that of the mineral-tempered Lossu sherds. The clay of the sherd with presumably local, mixed clinopyroxene-opaque beach placer (cpx-op-plg) also appears to lie on its own (Clay 2), although to a lesser extent than the calcareous-tempered sherd. There appear to be two clay groups amongst the remaining mineral tempered sherds: one made up of sherds containing feldspathic-rich and clinopyroxene-rich sands (Clay 3—i.e. the apparently local stream and beach sands); and the other represented by two feldspathic-rich sherds (EAA12 and EAA17) that are well separated from the other feldspathic sherds (Clay 4) (Fig. 5.26b). The distinctiveness of sherds EAA12 and EAA17 is also backed up by differences observed in the mineral component.28

Fissoa sherds are much more widely distributed throughout the CA plot. The large number of temper types amongst the small sherd sample has hampered the development of clear patterning. However, it is tentatively possible to define a minimum of three clays within the assemblage (Fig. 5.26c). Sherds containing the three most common, presumably local beach and stream tempers—i.e. calcareous (calc), feldspathic/lithic-hornblendic (plg-rich w/ vrf-hbl) and feldspathic-lithic (plg-vrf rich)—form a reasonably cohesive cluster together with three other less frequent temper types (i.e. calc-cpx-vrf-plg, op-rich and plg-rich w/ biot). This cluster could represent a single clay source (Clay 1). However, within the Clay 1 cluster there are two conspicuous pairings of calcareous sherds—one pair is more closely associated with the other mineral tempered sherds and the other pair is at the edge of the cluster—which could suggest that two somewhat compositionally distinct clay sources were used to produce calcareous

28 Unlike the other feldspathic-rich sherds, SEM-EDXA revealed that magnetite within EAA12 had a significantly higher percentage of TiO₂, phenocrystic andesine was present in both sherds, and phenocrystic edenite was present in EAA17. My preliminary microscopic examination of the sherds also noted that both sherds contained distinctive ferric oxides and that the grains were more rounded and placered. The temper in this pair of sherds could possibly be the same (or similar to) fine-grained, plagioclase and pyroxene-rich, possible beach sand temper that Dickinson (1997c) previously identified in three Lossu sherds.
tempered pottery.\textsuperscript{29} The clustering of a clinopyroxene-rich (cpx-rich w/ plg-vrf) sherd and two unusual types of feldspathic-rich sherds (i.e. plg-rich w/ vitric-rich vrf and plg-rich w/ qtz & opx), which is also evident in the PCA plot, could indicate another New Ireland clay source (Clay 2), at an indeterminate distance from Fissoa. This group includes the temper (plg-rich w/ qtz & opx) that I proposed earlier could have derived from Tabar (or possibly even New Britain). Its presence in the same clay group as other presumably local New Ireland temper types probably indicates that it is in fact a local temper variant. The single, somewhat outlying, lithic-rich sherd (vrf-cpx-plg) could also represent another source (Clay 3).

A limited number of sherds from only three Tanga sites appear to group relatively strongly with New Ireland sherds in the CA (Fig. 5.25). These sherds include EUX3 (G) from Matambek, all of the set of Angkitkita sherds used in the analysis (A, C1), and all the Ansingsing sherds (in particular ETF1, E; ETF5, D2; ETF7, G). The clays of sherds from three Maledok sites (ETS, ETV, ETU) cluster less strongly with New Ireland sherds, and sherds from Matampul (ERP) and Baba (ETE) clearly do not.

A PCA of the same clay data set—unfortunately excluding the five Angkitkita sherds—shows a much clearer separation between the Tanga sherds and the bulk of the New Ireland sherds. It also shows a somewhat greater degree of separation between each of the New Ireland sites, in particular between Lossu and Fissoa (Fig. 5.27). Of all the Tanga sherds that appeared to cluster strongly with New Ireland sherds in the CA, now only three sherds from Ansingsing (ETF5, D2; ETF6, D1; ETF7, G) continue to cluster strongly, in particular with Lasigi sherds. There is no conclusive association of clays with particular temper types at the New Ireland sites in this plot.

\section*{5.4.2 Discussion}

In summary, there are four main findings from the clay compositional data from the Tanga and New Ireland pottery: 1) with the possible exception of pottery from Ansingsing on Tefa, there appears to be no firm evidence for the exchange or transfer of clay for pottery manufacture between Tanga and New Ireland; 2) there is often a strong association between distinctive temper types and compositionally distinctive clay sources; 3) an apparent discontinuity in tempering practice is matched by a discontinuity in clay resource use at some sites; and 4) clay

\textsuperscript{29} Calcareous sherds ENX126 and ENX128 were both noted as having black (reduced) cores and may even be from the same vessel.
data have been particularly informative regarding inter-island interaction within the Tanga island group, and in some cases have strengthened the case for or against interaction between sites on Tanga and New Ireland in relation to particular tempers.

How can the first finding be interpreted? On the one hand, the data suggest that the clay used to manufacture some of Ansingsing’s pottery came from New Ireland—possibly Lasigi—while on the other hand the sand tempers used to manufacture the pottery probably derived from Anir (possibly in the vicinity of Malekolen). Given the potentially high cultural value attached to clays, it seems feasible that clay as a raw material was transferred or exchanged from communities on New Ireland to Anir where it was mixed with local sands to produce pottery, which was later transferred or exchanged to Tanga. Importantly, based on the representation of temper types in the Ansingsing assemblage, which is similar to the apparently earlier Square 2 assemblage at Angkitkita (see above), this exchange most likely occurred during the Lapita period, not during the ‘transition’.

The second finding suggests that to some extent the biographies of clay and temper are associated, that is, they are telling a similar story. On Tanga, there is a strong association of Clay 1 with C1 temper, Clay 2 with G temper, Clay 3 with E temper, and Clay 4 with the volcanic placer tempers D1-D2-D3. In other words, those wares that I have argued to be both exotic (mostly from Anir) and probably related to earlier Lapita period occupation were made from clays that are chemically distinct to the one that was used to produce the bulk of the later, probably local, ‘transitional’ ware (i.e. Clay 1). Evidence from the Watom pottery assemblages indicated a similar degree of correlation between anomalous or exotic temper sand (e.g. the quartzose and hornblende-bearing sherds) and anomalous clays (Dickinson 2000: 168, 170). At the New Ireland sites there are also indications that different clay sources were used to produce differently tempered wares. In particular, the quartz-calcite and coarse-calcareous tempered wares at Lasigi may have been produced from the same clay source, most probably originating in the Admiralties. The investigation of the association of particular clays with temper groups at the New Ireland sites would have benefited from larger sample sizes, as well as the separate multivariate statistical analysis of the sherds from each site in the absence of outliers.

The third finding is most apparent at Angkitkita. Here, the previous evidence of a discontinuity in tempering practice (and derivation of much of the pottery itself)—between the ‘Early-Middle’ Lapita occupation from Square 2 and the more securely dated ‘transitional’ occupation (ca. 2250–2180 cal BP) in Unit II-III of the other squares—is matched by a discontinuity in clay resource use. A similar discontinuity in tempering practice at the Dori site, between the likely Lapita-aged (Phase 2) and the ‘transitional’ occupation (Phase 4) may also
have coincided with the use of different clay resources, although there appear to be overlaps in resource use between the phases. At Lossu, calcareous and mineral-tempered wares appear to have been produced with chemically distinct clay sources, although it is impossible to ascertain the temporal relationship of these wares at this point (see Chapter 6).

In regard to interaction, it would appear that Clay 1, used in the bulk of locally produced 'transitional' wares at Angkitkita, was mostly confined to communities in southern Tanga, in particular on Lif Island. In contrast, the pottery in use during the earlier Lapita period of occupation, which was made using clay sources (Clays 2, 4 and 5) that probably derived from Anir (as indicated by temper), was widely distributed throughout the island group, signalling either broader interaction or greater movement of goods/people. Furthermore, just as Stark et al. (2000: 296) found that chemically and mineralogically distinct pottery and clay sources were representative of discrete pottery-making communities, the variety of temper types that are associated with these Lapita clay sources (Clay 2 in particular) suggests that a minimum of 11 discrete, dispersed pottery-making communities on Anir—who made use of readily available, distinctive local sands as temper—were exploiting a small number of clay sources. Following Ambrose (1992: 170) (see discussion in Chapter 4), this could indicate that particular Anir clay sources had high cultural value, possibly because of their scarcity, specific physical (e.g. plasticity) or intangible qualities, or other social factors. Potters may have expended a great deal of effort to procure certain clays—through various forms of exchange or interaction—but perhaps returned to their own village to produce the pot, where locally available temper was used.

The clay data have also strengthened the case for an external origin of Tanga’s gabbroic (B) and clinopyroxene-rich (D1) tempered pottery, which appear to have been made from the same clay source as other pottery containing more clearly ‘exotic’ tempers thought to derive from Anir. The clay results also add strength to the apparent lack of exchange of pottery between Lasigi and Lossu. The indication that quartz-calcite and some calcareous wares from Lasigi were made using a distinct clay source (Clay 3) could strengthen the interpretation that they derived from a distant locale in the Admiralties. The wider distribution of Fissoa clays, broadly reflecting the variety of temper types, lends support to the interpretation that Fissoa pottery derived from multiple locales in northern New Ireland, and was brought to the site as a result of a relatively broad interaction network.
5.5 Conclusion: Is New Ireland’s ‘Incised and Applied Relief’ Tradition Fabricated?

There is no conclusive compositional evidence, from the analysis of temper or clays, of the systematic exchange of pottery between these apparently contemporaneous, ‘transitional’ communities on Tanga and the New Ireland mainland, or between the three New Ireland sites that White and Murray-Wallace (1996) claimed to have constituted an ‘IAR Tradition’ on the northeast coast of New Ireland. Does this mean there was no interactive cultural ‘tradition’ drawing these communities together? The virtual lack of exchange of either pottery or raw materials between these ‘transitional’ communities is not a wholly surprising or unpredictable result. At this point, prior to the discussion of stylistic associations in the next chapter, it could merely imply that if any such interaction between these sites did indeed occur, then the exchange of the pottery itself did not play a substantive role—as, indeed, is mooted for Lapita assemblages.

White and Murray-Wallace’s (1996) other main claim regarding the ‘IAR Tradition’ was that it represented a clear discontinuity from the Lapita tradition. In this regard, there is indeed compelling compositional evidence from Angkitkita and to a lesser extent at Lasigi, of a disjunction in both the method of pottery production and its areal distribution, between the apparently earlier, Lapita phase assemblages and those dated more securely to the ‘transition’. However, such discontinuity is not overly surprising considering the indications at both sites of a lengthy occupation hiatus between the assemblages of these two periods.

The Angkitkita temporal compositional pattern can be extrapolated to the surface evidence on Tanga. The apparently earlier wares at Angkitkita and a select group of surface sites distributed throughout Tanga (i.e. Matampul, Matangkipit, Nonu, and Ansingsing) were predominantly imported from Anir and contained a larger variety of sand and clay types. The later ‘transitional’ wares at Angkitkita and a group of surface sites that are largely confined to southern Tanga (i.e. Ambutu, Warambulut, Salkangkinit, Baba, Amfuli, Salkangkis) were predominantly made using a local feldspathic-rich temper sand and—more significantly in a cultural sense—a probably local clay source (Clay 1). However, the presence of some exotic wares (in particular E tempered/Clay 3 and G tempered/Clay 2 pottery) in the main occupation horizon at Angkitkita could either suggest that there was some continued interaction with Anir at

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30 Similarly, compositional evidence indicates that earlier ‘Far Western’ Lapita style ceramics recovered on Nissan, which contained a heterogeneous array of tempers, possibly derived from Anir, New Ireland and New Britain (Spriggs 1991a: 237; Dickinson 1999; Dickinson 2006: 52).
the ‘transition’, or possibly that certain ‘heirlooms’ were retained, or that these types of pottery represent disturbed materials from the earlier occupation horizon. These possibilities are further investigated in the next chapter, where style is added to the mix.
CHAPTER 6—
Transitional Pottery Style in Tanga and New Ireland

6.1 INTRODUCTION

In this chapter, I present the results of the stylistic analysis and comparison of ceramics from Tanga and the New Ireland case study. This chapter provides another thread in the fabric of potential avenues to investigate the nature of interaction between these communities at the ‘transition’.

From amongst the potentially very broad aspects and ‘reservoirs’ of style (see Sackett 1989 for a discussion of where style resides), I characterise pottery style in this chapter based on the combination of vessel form (in turn based on various constituent vessel parts), decorative techniques, and design elements or decorative motifs (see Appendix 3.2 for full details of my methodology). These aspects of style will be used to assess the nature of both ‘micro’ and, most importantly in terms of interaction, ‘macro’ style (cf. Braun 1991) on Tanga and New Ireland, as per my discussion in Chapter 4. Amongst these aspects, the comparison of decorative elements and motifs has perhaps the greatest potential to provide meaningful insights into group identity, exchange, and interaction amongst and between the potting communities of Tanga and New Ireland. While clearly it is the way design elements and motifs are combined into a broader or more complex design structure or composition that provides the most insight into group identity and relations (cf. Craig 2005: 502-3; Longacre 1981: 63), this scale of analysis was not possible due to the generally very fragmentary nature of the assemblages I analysed.

Indeed, the mostly unavoidable (and unsatisfactory) reliance in the Bismarck Archipelago on fragmentary ceramic assemblages—often also somewhat mixed and poorly dated—to compare style on an inter-regional basis and assess widespread stylistic change, has been a chief criticism of Bedford and Clark (Bedford 2006: 187-9; Bedford & Clark 2001: 71). Felgate (2003: 503) has also argued that the cultural sequences of the Bismarck Archipelago and western Solomons are insufficiently complete (both chronologically and structurally) to permit the kind of resolution required to make assessments of stylistic similarity between regions. In my own case, a reliance on design elements and motifs—that is, the ‘vocabulary’ of design if not its ‘grammar’ (see Chapter 4)—is unavoidable, but at least comparable with other research (e.g. Specht 1969; Wickler 2001; Felgate 2003; Bedford 2006). But two other factors in my analysis somewhat salve...
their other concerns: the plausible chronologies and relatively undisturbed contexts at Angkitkita, Lifafaesing and the Dori site at Lasigi; and the specific approach that I take to assessing style and stylistic change within the assemblages. Importantly, to present and discuss the stylistic results from Tanga, Lasigi, Lossu and Fissoa, I have paired them with the detailed compositional results from Chapter 5 (cf. Specht 1969; Galipaud 1988). That is, the evident compositional groupings or divisions within the ceramic assemblages from each site form the fundamental basis for the examination of style. In this way, stylistic continuity and discontinuity within and across sites can be more securely assessed at a finer scale.

As shown in Chapter 5, the compositional data also provide some indications of the locus and ambit (as well as relative chronology in some cases) of the ‘identities’ being communicated through the form and decoration of the pottery, which can be used to infer the nature of interaction and the exchange of information at this period. In particular, petrography has in many cases within the Tanga and New Ireland sample provided indications of whether temper (and probably the pot itself) is local or non-local to the area, and in some cases has pointed to a likely origin.

As Stark et al. (2000: 325) demonstrated ethnographically, detailed compositional analysis—including both petrographic and chemical data—can allow ‘social boundaries to become more visible’, as compositional groups may correlate closely with social groups. These social boundaries in material culture patterning are ‘most pronounced’ when a ‘multi-pronged approach’ is used, which incorporates both stylistic and detailed compositional data (ibid. 324). However, I would emphasise that the compositional data can only be used as a rough guide and should not be seen as providing the strict confines or boundaries within which any interaction/communication occurred, or necessarily its directionality. Indeed, in Chapter 5 I found that there was no conclusive compositional evidence for the systematic exchange of pottery either between the Tanga and New Ireland sites or amongst the New Ireland sites. If there was some form of interaction between these sites occurring in the period 2350–1900 cal BP, then the exchange of the pottery itself clearly did not play a substantive role. The spheres of communication and interaction represented by compositional and stylistic data are likely to overlap to some degree, though it is also likely that the stylistic data—unrestricted by physical

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1 In fact, as Sackett (1989: 34) argues, these compositional data can be seen as containing inherent elements of style, reflecting particular temper and clay choices by the potters from amongst a range of ‘isochrestic’ options. Sackett argues that style is ‘essentially ubiquitous’ in formal variation, residing in both ‘instrumental’ (e.g. functional) and ‘adjunct’ (e.g. ‘style-rich’ decoration) components.
form if their transmission is through information/ideas—cover a somewhat larger sphere. It is also possible that the actual sphere of communication and interaction that was in existence between communities was larger than either of these data sets is able to indicate. As I stressed in Chapter 1, the key to unravelling the complexity of interaction is not to rely on pottery alone, but to sort between the many alternative interpretations using a variety of independent sources of evidence. The evidence presented in this chapter is just one aspect.

### 6.2 TANGA ISLANDS

On the basis of the clay source groupings evident from SEM-EDXA, and the association of these with particular local or exotic temper(s) (see Chapter 5), I have divided the assemblages of Tanga into five ceramic groups or ‘wares’. These include one clearly predominant ‘Local Ware’—most likely produced in southern Tanga—and four different groups of non-local, ‘Exotic Ware’ (Table 6.1). I consider these groups to be relatively robust in terms of their compositional basis.² In the following sections, I will discuss the stylistic attributes of each of these different wares at the Angkitkita (ETM) and Lifafaesing (EUV) sites, and then amongst the combined Tanga surface assemblage.

#### 6.2.1 Angkitkita (ETM)

**Tanga Local Ware**

The feldspathic-tempered ‘Local Ware’ (LW) at Angkitkita, which was probably produced on Lif Island itself, comprises nearly 93 per cent of the total diagnostic sherd assemblage and is clearly associated with the main ‘transitional’ occupation horizon (Unit II-III) (Tables 6.2–6.3). The 623 diagnostic sherds attributed to LW include a large number of rims (ca. 52%) and necks, with smaller numbers of a range of other classes of sherd (Table 6.4).

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² The pragmatics of the compositional analysis necessitate a degree of caution. Given that logistically only a small sample of the total sherds could be analysed using the more precise and labour intensive SEM-EDXA and petrographic methods, the attribution of diagnostic sherds to ceramic groups/wares has in large part relied on megascopic methods. This may have resulted in some degree of misattribution of sherds, in particular, in the case of some feldspathic tempered sherds (C1) from Square 2 and to a lesser extent Square 3A at Angkitkita, but possibly also in other squares. Unlike the majority of C1 sherds, which are associated with Clay 1, SEM-EDXA indicated that most of the analysed feldspathic (C1) tempered (plain body) sherds from Square 2 (and some from Sq. 3A) were probably produced using the Clay 2 source (see Fig. 5.19 in Chapter 5). However, because of the difficulty of visually discriminating between clays, unless the fabric or other features (e.g. higher densities of particular minerals, highly polished surface, or colour of fabric) were noted as being unusual, the majority of C1 sherds were attributed to the Clay 1 source (i.e. ‘Local Ware’).
Vessel forms

Angkitikita’s LW is characterised by two main vessel forms—RO/ROG and VIIa—with small numbers of two other types.

The RO/ROG Vessel Form, a pot with a restricted neck (R), outcurving rim (O) and globular body (G), is by far the dominant form. This vessel accounted for nearly 60 per cent of the total orientable LW rims (n=102) and is also indicated by significant numbers of neck and neck/shoulder sherds (Figs. 6.1–6.3, Tables 6.5–6.6). The majority of RO/ROG vessels are plain; only six (ca. 10%) of the recovered RO rims are decorated.¹ Nearly all of the outcurving rims of this vessel type gradually converge to a flat lip. The rims of indeterminate orientation (n=139) corroborate the dominance of this particular rim profile/lip form in the assemblage. A small proportion of flat-lipped outcurving and indeterminate rims have a parallel-sided profile.⁴ More rounded lips are found on a small number of rims of both profiles. Over half (58%) of all RO/ROG vessels have orifice diameters of between 16–24 cm (Table 6.7). Overall, these LW vessels are relatively thin-walled. Convergent rims average between 3.3(a)–5.9(b) mm thick, and neck and body sherds average between 4.6(b)–6.4(a) and 4.8(b)–5.9(a) mm thick respectively.⁵

Vessel Form VIIa, a pot with a restricted neck/upper body, vertical or near vertical rim and (probable) globular body, is entirely plain (Fig. 6.4). A minor variant of this form (VIIb) has a more inward oriented rim (Fig. 6.5). Many of the recovered curved, globular shoulder sherds (as well as some restricted ‘R’ neck sherds) could also be from this vessel form (Fig. 6.3). Form VIIa vessels make up nearly 22 per cent of the total orientable LW rims. Like the RO/ROG vessels, most of the Form VIIa rims are flat-lipped and convergent (av. 3.3(a)–6.3(b) mm), and a small number are flat-lipped and parallel in profile. Form VIIa vessels have similar orifice diameters to RO/ROG vessels, with the majority (62%) ranging from 16–20 cm.

Vessel Forms I and II are inferred from small numbers of generally small rims (around 10% and 6% of LW rims respectively) (Fig. 6.6). Form I could be an open bowl or cup with an

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¹ NB: Three sets of conjoined rims (#18, 29, 21) from plain RO vessels (see Fig. 6.1)—including the unusual, thicker-walled, near horizontal-rimmed vessel (#21)—that were recovered near the base of Square 3A may in fact be associated with the earlier occupation phase at Angkitikita (see further discussion below). Though none of these feldspathic-tempered (C1) diagnostic sherds were analysed using SEM-EDXA, the clay of a C1-tempered plain body sherd from this level (ETM3207) (and two others from further up the profile) was found to be associated with other outlying C1 sherds from Square 2, which most probably belong in EWI.

⁴ Some short parallel rims, with only up to 1 cm remaining of the sherd body, may in fact be remnant convergent rims.

⁵ On rims the ‘a’ measurement is at the lip and the ‘b’ measurement below the lip. For all other sherds, ‘b’ measures the thinnest point and ‘a’ the thickest point on the sherd (see Appendix 3.1.2).
outward oriented rim, however, it is also possible that some of these rims are remnant fragments of outcurving RO/ROG vessels. Only one of these rims is decorated. Like the two main vessel forms, most Form I rims are flat-lipped and convergent (av. 3.1(a)–5.3(b) mm) and a few are parallel-sided. Just over half of these open bowls have orifice diameters of between 12–16 cm, with the remainder ranging between 16–28 cm.

Vessel Form II is a relatively thin-walled, plain open bowl or cup with a vertical or slightly incurving rim. All the lips of this vessel form are flat and the rim profile is either convergent (av. 2.6(a)–4.9(b) mm) or slightly divergent in profile (av. 4.4(a)–3.3(b) mm). The vertical-rimmed examples of this vessel form (n=4) have the smallest orifice diameters, in the range 8–16 cm. The two slightly incurving vessels have somewhat larger diameters.

Over 30 per cent of all LW diagnostic sherds from Angkitkita have signs that a red-brown slip was applied—often on both the exterior and interior surfaces—which is often associated with fine striations or wipe marks. A similar proportion of sherds have a polished exterior surface. This was probably produced using the smooth, rounded pebbles (mostly highly polished themselves) recovered from the site (see Chapter 3). Around 15 per cent of all sherds show the combined use of slipping and polishing. Many LW sherds (at least 13% of diagnostic sherds) also have generally small, rounded impressions on their interior surface, suggesting the use of either a pebble or possibly the fingertips as anvils during finishing with a paddle. The paddle and anvil technique is also attested to by the occasional presence of roughly parallel, transverse paddle impressions (see Fig. 6.1; NB: none are carved paddle impressions), laminar sherd-edge fracture, or star-shaped cracks around mineral grains in the outer sherd surface (see Rye 1981: 84-5, 132; Shepard 1985: 185).

Decoration Techniques

A total of 119 LW sherds (or ca. 19%) from Angkitkita are decorated, the vast majority (ca. 82%) of which were recovered from Unit II-III dating to the ‘transition’ (Figs. 6.7–6.11, Tables 6.8–6.9).

Plain incision (i.e. not in combination with other decorative techniques) is the most frequently recorded technique (39%), consisting mostly of rectilinear incision (34%) but also a few examples of curvilinear incision (Figs. 6.9, 6.11). However, it is also likely that the relatively high level of fragmentation of the sherds has bolstered the apparent abundance of plain incised sherds (and see below). A small number of incised rims have notched (n=7) or incised (n=1) lips.

The next most frequent category of decoration, accounting for approximately 29 per cent (n=34) of all decorated LW sherds, is incision in combination with forms of applied relief (IAR).
Bands are the most common form of applied relief and are sometimes found with high and low relief, roughly conical-shaped nubbins. Of the 31 sherds with applied bands, 22 have bands that are oriented vertically, one sherd has oblique bands, another has both curvilinear and vertical bands, and seven are of indeterminate orientation. There are no definitive horizontal bands. Over half of these sherds (n=19) have ‘notched’ bands, which have been modified by either spaced single tool impressions or perpendicular incisions/excisions. Plain incision and IAR are clearly associated with RO/ROG vessels. Lip notching is also an associated technique and occurs on all three of the outcurving rims that are decorated with IAR (Fig. 6.7, Table 6.10).

Incised and IAR decoration appears to have been concentrated on the upper bodies of RO/ROG vessels, between the shoulder and lip (Table 6.11). A total of 22 rims have lips modified by notching or incision (or ca. 7% of all LW rims). A small number of body sherds are incised on their interior (Fig. 6.9), though some of these marks may have been incidental.

A possible white-ish, micaceous ‘paint’ is found on the exterior of a few sherds, though only one rim has what could be the remains of a painted design (Fig. 6.7) (see also, Garling 2003: Fig. 5).

Only two excavated LW sherds from Angkitkita have fingernail decoration, which is rather minimal in both cases (Fig. 6.11). Indeed, it is possible that the mark on one sherd (ETM1094) is accidental and not part of an intentional design.

One unusual sherd recovered from Square 2 has been ground flat along four edges to form a rough rectangular shape—i.e. it has been shaped from a broken piece of a fired vessel—and has a central groove ground into both sides (Fig. 6.11). One other sherd (ETM3930) has also been incised following the firing of the vessel (Fig. 6.11).

**Motifs**

Seven body motifs/motif elements—including five IAR and two incised—and four lip motifs were identified amongst 68 LW sherds (Figs. 6.12–6.13, Table 6.12). However, one IAR (#T5) and one incised body motif (#T2) clearly dominate the assemblage. Sherds bearing this IAR motif (#T5)

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6 Many of the large number of ‘body’ sherds with these forms of decoration were sherds of insufficient size to retain features diagnostic of their actual position on the vessel.

7 The results of the analysis of this substance by General Area Detector Diffraction System (GADDS) at James Cook University were never forthcoming. Under the binocular microscope, flakes of biotite mica appeared to be embedded in its surface. The substance does not react to dilute HCl and so is apparently not carbonate-based. It is also possible that this coating is the product of salts leached from, or accumulated in, the fabric of the sherds as a result of weathering and taphonomic processes.
possibly derive from the breakage of only a small number of individual vessels, although I would estimate there to have been at least four distinctive vessels present. This motif consists of vertical ridged (i.e. with a triangular cross-section) and notched applied bands, in combination with oblique, linear crosshatch incision (Fig. 6.10).

The most frequent incised motif (#T2)—oblique linear (though sometimes more curvilinear lines are incorporated) crosshatch incision—is perhaps more properly a motif element (Fig. 6.9). Some #T2 sherds may in fact be small fragments of #T5 decorated vessels. This motif is associated with three different lip motifs, including spaced across-lip notching (#Tlm3; n=3 rims), spaced parallel linear incision (#Tlm2; n=1), and spaced interior lip notching (#Tlm5; n=1).

The remaining four IAR motifs each probably represent either a single, individually decorated vessel or at least a small number of similarly decorated vessels. Two motifs, #T1 and #T6, probably represent the latter (Figs. 6.7–6.8). Motif #T1 consists of a low relief conical-shaped nubbin joined to a vertical applied band (which is either plain or has spaced, perpendicular incisions), with radial linear incision around the nubbin and oblique parallel linear incision either side of the band. Motif #T6 is similar to #T1 except that the nubbin is larger and in higher relief and the incision includes crosshatch. Though these large nubbins may have functioned as lugs, the adjoining applied band ‘neck’ on one of the sherds suggests that they were also an integral part of the decorative structure. Motif #T3, represented by two conjoined sherds from an unusually narrow-mouthed RO/ROG vessel, is the only one with curvilinear ‘notched’ (with perpendicular incision) applied bands, which appear to have formed a repeated half loop under the rim. These are combined with vertical notched applied bands, small conical nubbins and oblique linear crosshatch incision (Fig. 6.7). Motif #T7 is represented by a single restricted neck sherd. It has adjoining oblique, single tool-impressed, applied bands and linear and crosshatch incision (Fig. 6.8).

Spaced across-lip notching (#Tlm2) is the only lip motif associated with IAR body motifs. It is found with all of those IAR motifs (n=3) where rims are represented (i.e. only body sherds were recovered bearing motifs #T5 and #T7, although the unrecovered rims may well have been notched). Three other lip motifs are present on a small number of LW rims, including oblique parallel incision (#Tlm1), perpendicular parallel incision (#Tlm2), and exterior notching (#Tlm6).

8 The other sherds with this motif have broken immediately below the nubbin, possibly removing the ‘neck’.
9 Four of the five small rims with this lip motif are probably from the same vessel.
There is only one example of a zigzag motif (#T13), on a notably thin body sherd (Fig. 6.9). The two examples of fingernail impression could not be attributed to a particular motif.

**Tanga Exotic Ware – Group I**

Angkitkita’s ‘Exotic Ware – Group 1’ (EWI), which was probably produced by at least nine discrete pottery-making communities dispersed across the Anir Islands, is represented by the highest number (n=30) of diagnostic sherds from amongst the minority non-local/exotic component (Tables 6.1–6.2).\(^\text{11}\) Though small numbers of EWI sherds were found in all excavated squares, there is a clear concentration in Square 2, where the basal level was dated to the ‘Early-Middle’ Lapita period (Table 6.3).

**Vessel form and decoration**

Only three of the eleven EWI rims could be oriented, representing three different decorated vessel forms (Fig. 6.14, Tables 6.4–6.5).

One rim sherd (ETM996) is probably from an open bowl (Vessel Form III). This vessel has an everted, horizontal rim with a gradually convergent profile (4.5(a)–6.5(b) mm), flat lip, and an orifice diameter of 20–24 cm (Table 6.7).\(^\text{12}\) This sherd is decorated with a dentate-stamped, ‘crosshatch’ zone marker on the exterior; spaced, circular, single tool-stamping on the top of the lip; and two rows of adjoining curved dentate-stamping with crescentic single tool-stamps in between two horizontal, parallel lines of dentate-stamping on the interior (possibly Anson’s Motifs #2, #237 and #417). It also has clear traces of red slip and a high polish on both its interior and exterior surfaces.

The only other dentate-stamped sherd recovered from Angkitkita is also attributed to EWI.\(^\text{13}\) This thick (9.8–10.4 mm) body sherd is from an indeterminate vessel and has an indeterminate motif (Fig. 6.15). Both dentate-stamped sherds were recovered from the basal levels of Square 2 (Table 6.9).

The other two EWI rims represent variants of Vessel Form VII and are decorated on the lips only. One rim (ETM999) with a slightly convergent profile (7.5(a)–9.4(b) mm) is from a

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\(^{10}\) The single notch on this sherd extends almost across the lip from the exterior and may in fact be a poorly executed across-lip notch (i.e. #Tlm3).

\(^{11}\) Some ‘E’ tempered sherds could possibly derive from Lihir-Tabar or an unsampled location on Tanga or Anir (see Chapter 5).

\(^{12}\) This vessel is very similar to Wickler’s (2001: 78) Vessel Form 2B.

\(^{13}\) NB: Both dentate-stamped sherds were attributed to EWI on the basis of petrography and SEM-EDXA results.
relatively thick-walled, narrow-mouthed (diameter of 12–16 cm) globular pot with an inward oriented rim (Form VIIb). The flat lip of this vessel is decorated with parallel, oblique linear incision (#Tlm1)—as is one other similarly tempered indeterminate rim sherd—and there are coarse wipe marks on the sherd’s exterior. The other rim (ETM778) is from a very narrow-mouthed (4–6 cm diameter), vertical-rimmed pot (Form VIIa). This highly polished rim is parallel in profile and has small, spaced notches on the interior (#Tlm5) of its sharp-edged, flat lip. Two other indeterminate EWI rims also have interior lip notching (Table 6.12).

Another highly polished rim sherd of indeterminate vessel form (Fig. 6.15) has unusual diamond-shaped, stamped lip modification (#Tlm4), with four grooves visible in the stamp.

A single carinated sherd—the only one recovered from the site—suggests the presence of an indeterminate type of carinated vessel (Form V?) amongst EWI (Fig. 6.14). Plain neck sherds also indicate that vessels with restricted necks and probable outcurving rims (RO Vessel Form) are present (Table 6.6).

Three sherds belonging to EWI are decorated with linear incision with a clear, sometimes thick, red slip on their interior and exterior. One sherd from a thick-walled vessel (ETM4763; 9.8–10.3 mm) has what appears to be a Lapita-like incised motif (Fig. 6.15) (see e.g., Lapita sherds in Sand 1999b: 45; Hedrick n.d.: Ch. III).

Two very small sherds (ETM1971-2), possibly from the same vessel with pale paste, are decorated with what appears to be applied relief (Table 6.8). However, both sherds are very weathered and worn and the orientation of the possible, remnant plain applied bands cannot be determined.

Considering EWI diagnostic sherds as a whole, around 47 per cent have evidence of red slip, 27 per cent have evidence of polish, and 17 per cent have both slip and polish. Possible anvil impressions are present on the interior of only one sherd. EWI sherds are somewhat thicker than LW sherds overall, with neck sherds averaging between 4.6–7.2 mm thick and body sherds averaging between 5.9–7.1 mm.

**Tanga Exotic Ware – Group II**

Twelve diagnostic sherds are attributed to ‘Exotic Ware – Group 2’ (EWII), which most likely also derives from the Anir Islands (Tables 6.1–6.2). Most of these sherds have a characteristically yellow paste/fabric. As I mentioned in Chapter 5, the temper of one sherd (ETM3912, F) in this
group was found to be very similar to sherds from the Malekolen (EAQ) site on Anir. These sherds were recovered from three different squares (1A, 3, and 3B), the majority from Unit II-III (Table 6.3).

Vessel form and decoration

Only one of the five EWII rims could be oriented (Fig. 6.16, Tables 6.4–6.5). This parallel-sided, somewhat thick rim (6.7–6.8 mm) is from an outcurving RO vessel with a flat lip and estimated orifice diameter of between 24–28 cm (Table 6.7). This vessel has clear red slip on its exterior and interior. Like LW, the indeterminate rims of this group have convergent profiles and flat lips (av. 3.5(a)–4.7(b) mm). A single restricted neck sherd is the only other sherd indicative of vessel form amongst this small group (Table 6.6).

Rectilinear incision and applied relief are the only techniques recorded amongst EWII (Table 6.8). A group of five small, weathered sherds from Square 3B, probably all from the same indeterminate, relatively thin-walled (ca. 5.6–6.6 mm) vessel, bear elements of an incised triangular-type motif (#T4) made up of groups of parallel, alternating oblique lines (Fig. 6.16, Tables 6.11–6.12). A single, yellow-paste sherd from the same square has part of a plain, ridged applied band (indeterminate orientation), with red slip on its exterior and interior (Fig. 6.16). Three other yellow-paste sherds also have red slip and two sherds have a slight lustre or polish.

Tanga Exotic Ware – Group III

Only one sherd (ETM1003) from Angkitkita definitively belongs to ‘Exotic Ware – Group III’ (EWIII), which is more strongly associated with surface sites on Maledok (see below) and may originally have been produced on Anir. This thick (10.7–11.0 mm), undecorated, restricted neck sherd with volcanic temper (D3) was recovered from the base of Square 2, in association with sherds of EWI (Fig. 6.17, Tables 6.2–6.4).15

14 EWII includes a small number of E tempered sherds (identified by megascopic means only) with yellow paste. On the basis of his petrographic analysis, Dickinson suggested that Tanga’s hybrid-lithic E temper probably derived from an island in the TLTF chain other than Tanga or Anir (i.e. Lihir or Tabar). The single E sherd he analysed from Angkitkita (ETM3361) also had a yellow paste. However, all the E tempered plain body sherds with yellow paste that I analysed with SEM-EDXA clearly grouped with other yellow F tempered sherds (e.g. ETM3913) in Clay 3. Since E and F tempers are somewhat difficult to discriminate between using megascopic methods on their own, it seems likely that I have incorrectly classed the temper of some of these sherds, and that the bulk of the group does in fact derive from Anir.

15 All the other volcanic-tempered (D3) Angkitkita sherds analysed by SEM-EDXA grouped with Clay 2 (i.e. EW1).
**Tanga Exotic Ware – Group IV**

Six diagnostic sherds comprise the calcareous-tempered ‘Exotic Ware – Group IV’ (EWIV), all of which were recovered from Square 2 (Tables 6.2–6.3). While the temper offers few clues to its origin, the association of this ware with EWI sherds could indicate that it also derives from Anir.

**Vessel form and decoration**

Only one EWIV rim could be oriented. Possibly from a slightly incurving, globular pot (Form II), this rim is divergent in profile (7.2(a)–3.0(b) mm) with a grooved lip and orifice diameter of 20–24 cm (Tables 6.5, 6.7). This was the only vessel in the Angkitkita assemblage with fine, spaced notches on both the interior and exterior of the lip edge (#Tlm7) (Fig. 6.18).

Four sherds are indicative of the RO/ROG vessel form, three of which bear fingernail pinch decoration (Fig. 6.18, Table 6.6). Two of these sherds, probably from the same relatively thin-walled vessel (3.7–4.7 mm), have remnant spaced vertical fingernail pinch (#T9a) along the restricted, inflection point of the neck. The orientation of the single fingernail pinch on the globular body sherd is indeterminate (Fig. 6.18). This relatively thick sherd (7.3–8.6 mm), with much stronger fabric and a very smooth surface, probably represents another individual vessel. It has anvil impressions on its interior and a slight polish on its exterior.

One plain, restricted neck sherd has clear red slip on its exterior and interior.

**Malasang**

A single distinctive, possibly Malasang-style rim sherd (Jim Specht, pers. observ.) was recovered from the most recent Unit I (Spit 2) of Square 3A (Tables 6.2–6.3) and was most probably produced on Buka. This short, everted rim with a pointed lip is from a wide-mouthed pot (Fig. 6.19). Its decoration is difficult to discern due to the small area of the remaining sherd body, but possibly involved somewhat curvilinear incision or impression. Specht (1969) originally dated this style to between 1300–800 BP, though Wickler (2001: 6) places it somewhat later between 800–500 BP.

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16 No petrography or SEM-EDXA was carried out on this sherd.
6.2.2 Lifafaesing (EUV)

Tanga Exotic Ware – Group V

Compositional analysis indicated that together with a few sherds from other sites across the Tanga Islands, the sherds excavated from Lifafaesing were made from a clearly distinct clay source (Clay 6). This clay may have derived from Anir or some other non-local source within the TLTF chain (see Chapter 5) (Table 6.1).

The three plain diagnostic sherds from Lifafaesing that comprise part of this ‘Exotic Ware – Group V’ (EWV)—but which were all tempered with possibly local feldspathic sand (C1)—were all recovered from the very base of the excavation (Units VI and VI-VII, Spits 13–15). Two sherds conjoin (EUV11, 19) to form a curved shoulder of a probable restricted neck, globular vessel (RG). The single thin-walled (3.3 mm) rim sherd has a parallel profile with a flat lip.

6.2.3 Surface sites

Tanga Local Ware

On the basis of their feldspathic temper (C1), most of the diagnostic sherds collected from Tanga’s surface sites were attributed to Local Ware (LW, n=39) (Table 6.13).17 These sherds came from four sites in particular, all in southern Tanga: Warambulut (ETK) and Salkangkinit (ETL) on Lif Island; and Salkangkis (EUA) and Amfuli (ETZ) on the southern side of Maledok Island.

Vessel form

Like the Angkitkita assemblage, the two vessel forms identified amongst the small number of surface LW rims are restricted outcurving and vertical-rimmed globular pots (RO/ROG and VIIa), nearly all of which have either a convergent or parallel rim profile with a flat lip (Table 6.15). A number of restricted neck sherds (n=21) and a curved, globular neck/shoulder sherd provide further indications of the prevalence of these vessel forms amongst LW. The orifice diameters of these vessels are similar to those recorded amongst Angkitkita’s LW (Table 6.17). One large fragment of a plain ROG Vessel (ETM3, made up of seven conjoined sherds), found eroding from a cutting near Angkitkita’s Trench 1A-1B at approximately the equivalent depth as Unit II-III, has a more restricted orifice diameter of 14 cm (Fig. 6.2).

17 A small number of decorated sherds from unstratified contexts from the small-scale test excavations at Salkangkis (EUA) were included amongst the surface-collected assemblage.
Overall, the surface-collected LW vessels are slightly thicker-walled than those excavated at Angkitkita. For example, convergent rims average 4.7(a)–6.8(b) mm thick; parallel rims average between 5.6(a)–5.9(b) mm; neck sherds (n=21) between 5.6–7.6 mm; and body sherds (n=4) between 5.7–6.4 mm. The single Vessel Form VIIa rim sherd is considerably thicker, converging from 11.3 mm to 5.6 mm at the lip.

A single feldspathic-tempered, carinated sherd with fingernail pinch decoration from Amfuli (ETZ) (see below) could suggest that some form of carinated vessel (Form V?) was part of the LW assemblage (Table 6.16).18

Decoration

Techniques and motifs

Only 13 of the diagnostic LW sherds collected from surface sites are decorated (Fig. 6.21, Tables 6.18–6.20). Like Angkitkita, decorative techniques include rectilinear incision, applied relief, and IAR. Sites on southern Maledok and Lif share possibly two IAR motifs (#T1 and #T7) and the oblique crosshatch incision motif (#T2) with Angkitkita (Table 6.21). A high relief conical nubbin, similar to examples from Angkitkita, was also recovered from Salkangkis (EUA) on Maledok. Unlike the excavated Angkitkita assemblage, however, a small number (n=5) of surface-collected LW sherds are decorated with fingernail pinch, including one from Angkitkita. Three of these sherds probably derive from individual RO/ROG vessels and bear two types of fingernail motif: continuous vertical (#T9b) and spaced oblique fingernail pinch (#T9c) (Fig. 6.21, Table 6.21). A fingernail-pinched rim (#T9b) from Amfuli (ETZ) has the same kind of across-lip notching (#Tlm3) that is characteristic of the Angkitkita LW excavated assemblage. The single carinated sherd from Amfuli has spaced vertical fingernail pinch (#T9a) above the carination angle. One sherd from Salkangkinit (ETL2) has a clear red-brown slip and polished surface.

One small rim sherd of an indeterminate vessel form has a single, deep, diamond-shaped, across-lip notch (#Tlm8, Fig. 6.21).19

Tanga Exotic Ware – Group I

Only six surface-collected sherds were attributed to ‘Exotic Ware – Group I’ (EWI) (Tables 6.13–6.14, Fig. 6.22).

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18 Unfortunately, the clay of this sherd was not analysed and it may have been misattributed to LW.
19 Given the presence of this lip motif amongst Lapita assemblages of the Arawes (see Summerhayes 2000a: 109, Fig. 7.1) this feldspathic sherd may in fact belong in EWI.
Vessel form and decoration

Little could be gleaned about vessel form from this small group. However, one unusual, hard-fired, plain sherd from Ansingsing (ETF1), which is tentatively attributed to this ware, is from an indeterminate carinated vessel (Form V?) with a restricted neck, and two neck sherds are from restricted vessels (Table 6.16).

Rectilinear incision is present on two neck sherds. One has parallel, vertical linear incision partially infilled with oblique parallel incision (#T10) and the other has remnant red slip. One relatively thick body sherd (9.7–10.7 mm) has a very eroded, indeterminate, dentate-stamped motif (Table 6.18, 6.20).

Tanga Exotic Ware – Group II

Vessel form and decoration

Two E-tempered sherds, one from Salkanginit (ETL) on Lif and the other from Nonu (ETR) on Maledok, were tentatively attributed to ‘Exotic Ware – Group II’ (Fig. 6.23, Tables 6.13–6.15). Both are decorated with oblique, parallel, linear incision, one possibly with a variation of the crosshatch motif. This latter sherd is a thick (9.0–10.5 mm), parallel-sided rim with a flat lip from an indeterminate vessel form, though is possibly from a bowl of some sort.

Tanga Exotic Ware – Group III

Vessel form and decoration

Seven, volcanic-tempered diagnostic sherds from Maledok sites—Matangkipit (ETS), Nonu (ETR) and Amfuli (ETZ)—were attributed to ‘Exotic Ware – Group III’ (Tables 6.13–6.14). None of the flat-lipped rims is orientable and there are a variety of profiles (Table 6.15). Two rims have spaced notching on the interior lip (#T1m5) (Table 6.21). Two neck sherds indicate some form of restricted neck vessel (Table 6.16), one of which has a rectilinear incised motif (#T11) consisting of horizontal, parallel linear incision infilled with oblique, parallel incised lines (Fig. 6.24). The only other decorated body sherd also has what appears to be a bounded, incised motif (#T12), made up of vertical, horizontal and oblique, parallel-incised lines (Fig. 6.24, Tables 6.18–6.20). Three of the decorated sherds have remnant signs of red slip and polish.

6.2.4 Discussion

Styles and chronology

Overall, the pottery evidence from Angkitkita and the other Tangan sites demonstrates that there is a generally consistent and clear relationship between compositional and stylistic groupings of
pottery. Unlike many of the ‘transitional’ sites in the Bismarck Archipelago, the Angkitkita (in particular) and Lifafaesing sites provide a stronger chronological framework with which to interpret these compositionally and stylistically distinct groups (see Table 3.21 in Chapter 3). Importantly, Angkitkita indicates a clear chronological disjunction between stylistic groups, potentially of some 600 years.

Concentrated in the main occupation layer (Unit II-III) at Angkitkita, Tanga’s ‘Local Ware’ (LW) is clearly associated with the ‘transition’, most likely dating to around 2250–2150 cal BP. At the Lifafaesing rockshelter, a different type of occupation, but also including some use of pottery, was dated to a similar period of around 2150–2050 cal BP. Tanga LW is clearly dominated by outcurving, predominantly flat-lipped, globular jars (Form RO/ROG), which bear a suite of incised and applied relief motifs. While the decorated component of Angkitkita’s excavated LW assemblage mostly bore IAR and incised motifs in combination with spaced across-lip notching, the surface-collected LW sherds—including one from Angkitkita—indicate that fingernail-pinch motifs were also used (but less commonly) to decorate this ware. The presence of fingernail pinch on the single carinated, ostensibly local-tempered sherd from Amfuli is at this stage something of an anomaly, but could probably be resolved through chemical analysis of the sherd’s fabric (and see further discussion below). A number of motifs (e.g. #T1, 3, 6 and 7) appear to represent distinctive ‘micro’ stylistic elements of Tanga LW, and may have been symbolic of local identities and relationships. The sharing of two IAR motifs (#T1 and possibly #T7), one incised motif (#T2), and fingernail pinch decoration, could indicate that the pottery-making/using communities of Angkitkita and other sites on Lif Island were in particular contact with the communities of southern Maledok at this time.

The only non-local ware that was possibly contemporary with Tanga’s LW, given that it was mainly recovered from Unit II-III (it is also notably absent from Square 2, see below), is the distinctively yellow-bodied ‘Exotic Ware – Group II’ (EWII) excavated from Angkitkita. Like the LW, EWII vessels include a flat-lipped, RO vessel form and incised and applied relief decorative techniques. While firm associations are not possible given the small sample size, EWII could potentially indicate continued interaction of some form with communities on the Anir Islands at this time, possibly even with the Malekolen (EAQ) community on Ambitle.

20 See, Henrickson and Blackman (1992: 136) and Stark et al. (2000) for similar findings between paste and stylistic groupings.
With this one possible exception, I propose that all of Tanga’s ‘minority’, Exotic Wares are associated with the earlier occupation of the island group during the ‘Early-Middle’ Lapita period. Indeed, both Kirch et al. (1991: 158, Table 4) and Summerhayes (2000a: 228-9, 234) have noted a similar pattern in Lapita ceramic assemblages of Mussau and West New Britain respectively, with the earliest ceramics showing the greatest compositional diversity—indicative of a larger number of production locales—which reduced over time. At Angkitkita, the vast majority of non-local sherds (i.e. EWI, EWIII and EWIV) were concentrated in Square 2. At the base of this square, in situ distinctively Lapita-style sherds and decorative techniques—including the rim from a dentate-stamped open bowl (EWI, Fig. 6.14)—were dated to around 3150–2950 cal BP (see Chapter 3). While sherds from these non-local wares were present in small numbers throughout the profile of Square 2 (as well as in other squares), their context is most likely the result of the evident disturbance to the deposit in this part of the site. This is supported by the compositional data, which indicate that these exotic sherds form relatively cohesive and distinctive groups, in particular EWI. The G-tempered sherds (EWI) concentrated in the ‘transitional’ Unit II-III of Square 3B (see Chapter 5), which are from characteristically thicker-walled vessels and include a Lapita-like incised motif (Fig. 6.15), are also most probably not in situ. The retention of an heirloom vessel over some 600 years seems unlikely. At Lifafaesing, though there are no stylistically diagnostic sherds directly associated with initial occupation, the few EWV sherds, mostly recovered from the base of the excavation, are probably related to a similarly early date of between around 2850–2300 cal BP.21

With at least four different clay sources and ten different sand tempers in use, these early Exotic Wares probably originated from multiple communities on Anir and/or possibly some other locales within the TLTF chain of island groups, and were transferred either with or to communities across all the islands in the Tanga group. Though the sample is small, apart from dentate-stamping (EWI), key stylistic features of these Exotic Wares included carinated vessel forms (EWI at Angkitkita and Ansingsing), more regular or bounded forms of incised motifs (e.g. #T10 in EWI and #T11–12 in EWIII), a Lapita-style incised motif (#T8, EWI), unusual forms of lip-notching (e.g. EWI, EWIII, EWIV), and generally thicker-walled vessels. Interestingly, amongst the excavated Angkitkita assemblage, decoration involving the fingernail pinch technique is most clearly associated with the earlier Lapita assemblage—with the calcareous-tempered EWIV—rather than the ‘transitional’ LW. The early fingernail motifs at Angkitkita are difficult to discern, but appear to

21 NB: At 2σ the large standard deviation of this AMS date overlaps with the early Angkitkita date (see Chapter 3).
have included spaced, vertical fingernail pinch (#T9a) around the necks of restricted, possibly globular vessels.

Apart from the Kreslo sherd, which combines dentate-stamping with fingernail impression (Specht 1991: Fig. 7c), fingernail pinch decoration has also been found on small numbers of sherds amongst the Lapita pottery assemblages of Apalo (FOJ, Unit A), Adwe (FOH, Squares D, E and F) and Paligmete (FNY) in the Arawes, and Garua Island (FSZ) and Alanglongromo (FLF) of West New Britain (Summerhayes 2000a: 27, 71, 122, Figs. 5.21, 7.8, 7.12, 9.1–9.2, 2000c: 297-8). However, its occurrence is not precisely dated in any of these sites. In the Arawes’ sites, fingernail pinch is sometimes combined with lip incision or notching and mostly associated with outcurving or everted rims—i.e. possibly later types of vessel form—though it also appears above a single carination. Fingernail pinch decoration is also found on calcareous-tempered sherds at Ifo in Vanuatu (in Layers 2 and 3, together with a few similarly tempered dentate-stamped sherds) (Bedford 2006: 99, Table 5.8). These sherds probably derive from the earlier Lapita pottery assemblage in the lower layer.

**Continuities and discontinuities**

Despite most likely being separated by hundreds of years, there are some perceptible elements of stylistic continuity between Tanga’s transitional Local Ware and the earlier Lapita period wares (EWI, EWIII-V), which feasibly point to aspects of cultural and ‘heritable’ continuity.

Within the Angkitkita assemblage, continuity is most clearly seen amongst the (predominantly) plain ware or likely utilitarian component, which was probably both less culturally significant and less subject to change over time. Vessel Forms VIIa/b—one of Summerhayes’ (2000a) Lapita types—and quite possibly also the RO Vessel Form are found amongst both the Lapita and ‘transitional’ wares, though are only represented by small numbers of sherds in the former. Vessels akin to Summerhayes’ Lapita Vessel Forms I and II—generally plain bowl forms—were also present in the Angkitkita LW assemblage, though comprising only a minor part.

Two decorative motifs may also indicate continuity, although their rarity prevents any firm judgements being made. Interior lip notching (#T1m5) is found on both transitional (LW, n=1) and Lapita period rims (EWI, n=3) at Angkitkita, and as mentioned above, spaced vertical fingernail pinch decoration (#T9a) is present on two Lapita period sherds (EWIV) at Angkitkita as well as a surface sherd probably belonging to the transitional LW. Red slip and polishing, and incision and possibly also applied relief decorative techniques, are also in evidence in the assemblages of both periods. However, the transitional slip is darker reddish-brown as opposed to the generally
brighter and thicker red slip of the earlier wares and the decorative techniques are used to form very different types of motifs.

The stylistic discontinuities between the assemblages of both periods at Angkitkita and other sites on Tanga are more apparent. Overall, the earlier assemblage is comprised of generally thicker sherds, the few available rims are more parallel in profile, and carinations are a feature. Dentate-stamping, its associated vessel form(s), and the cultural meaning that these signified had long since disappeared at Angkitkita by the time the ‘transitional’ style pottery was in use. Instead, distinctive new IAR motifs, with clearly different symbolism, were being produced on outcurving pots (Figs. 6.7–6.10). More free or unbounded forms of incision had also replaced regular or bounded forms.

6.3 NEW IRELAND

6.3.1 Dori (ELS) and Mission (ELT) sites at Lasigi

On the basis of the compositional data (see Chapter 5), I have divided the Lasigi diagnostic assemblage into five ceramic groups or ‘wares’, including three ‘Local Wares’ and two ‘Exotic Wares’ (Table 6.22).

Unfortunately, however, my decision to restrict destructive petrographic and microprobe analysis to the small sample of representative plain body sherds originally selected by Jack Golson (and later processed by Hunt, see details in Appendix 3.1) has somewhat weakened the robustness of the compositional/stylistic groupings I was able to infer from the diagnostic sherds, and forced me to rely heavily on the results of megascopic temper analysis. More detailed compositional analysis (in particular SEM-EDXA) of a sample of diagnostic sherds of specific styles (both form and decoration) would have benefited all of the proposed ceramic groups, particularly as nearly all of them clearly contain pottery from both of the two distinct periods of occupation at the site (see also, discussion in Chapter 5). That is, similar suites but different frequencies of local and non-local sands and clays appear to have been used to produce pottery during the ‘transitional’ (the main occupation phase, dated in Dori Phase 4 to around 2250–2050 cal BP) and ‘Middle’ Lapita phases of occupation at Lasigi (dating to between around 3000–2650 cal BP).

22 In particular, the opaque-rich (op-rich) temper that I later identified in the diagnostic sample was not amongst Golson’s sample and therefore has not undergone petrographic or microprobe analysis in this thesis. Also, as I noted in Chapter 5, the secure identification of quartz-calcite temper by megascopic means is difficult and has probably resulted in some non-quartz bearing, hybrid calcareous sherds being inadvertently misattributed to ‘Exotic Ware – Group I’. None of the ‘quartz-calcite’ diagnostic sherds were verified through petrography or SEM-EDXA.
cal BP, in Dori Phase 2). But while the Lasigi pottery assemblages remain somewhat more entangled than I would like, it is still possible to infer some broader stylistic patterns. The stratified and reasonably well-dated Dori site, albeit containing some evidence of mixing (see discussions in Chapters 2 and 5), provides some opportunity to assess the apparent stylistic-compositional differences within the different ceramic wares, which are related to chronology.

**Lasigi Local Ware – Group I**

Lasigi’s ‘Local Ware – Group I’ (LWI) is made up of diagnostic sherds from three different temper groups—one predominantly feldspathic sand (plg-cpx/vrf-hbl) and two predominantly calcareous sands (fine-calc and med-calc)—which appear to have been produced from the same or similar local clay source(s) (Clay 1). LWI is the dominant ware at Lasigi, comprising around 59 per cent of the total diagnostic sherd sample, with a slightly higher frequency at the Mission (ca. 62%) compared to Dori (ca. 58%) (Table 6.23).

While the percentage of LWI sherds within the total assemblage of each of the two main occupation phases at Dori is comparable, LWI sherds are most numerous in the ‘transitional’ Phase 4 (Table 6.23). In contrast, while the total samples are small, there is a significantly higher percentage of calcareous-tempered LWI sherds in Phase 2 (ca. 86%) compared to Phase 4 (ca. 62%). There are further differences in the frequencies of these calcareous temper types in each Phase. A somewhat larger number of Phase 4 calcareous LWI sherds contain fine calcareous sand (ca. 59%), whereas in Phase 2 the number of medium-calcareous LWI sherds is only marginally higher than the number of fine-calcareous sherds. Therefore, the compositional evidence from Dori suggests that there are two temporally distinct assemblages within LWI—an inference that is strengthened by the stylistic data (see below)—that are made up of pottery produced from similar local temper suites and clays.

**Vessel forms**

The 289 diagnostic sherds attributed to Lasigi LWI include 140 rims (ca. 48%), 91 necks, 36 body fragments, and small numbers of other classes of sherds, including carinations and lugs/handles (Table 6.24). Only a small number of the total rims are able to be oriented with confidence (n=19), and consequently, a range of other sherd types is also required to elucidate vessel form (Tables 6.25–6.26).

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23 At the unstratified Mission site, feldspathic sherds make up the majority of the LWI assemblage (62%), with fairly comparable numbers of both medium- (20%) and fine-calcareous (18%) sherds.
As a whole, the Lasigi LWI assemblage appears to be comprised of six different vessel forms. Most orientable rims (n=10) are from RO Vessels (Fig. 6.25). Numerous restricted neck sherds (R) and a small number of curved neck/shoulder (RG) sherds are also probably indicative of this form. Most of these rims are divergent in profile (av. 6.4(a)–4.8(b) mm) with flat lips, though two are parallel-sided and two are convergent. The considerably more numerous indeterminate LWI rims clearly indicate that divergent, flat-lipped rims are the dominant type (n=63, av. 7.0(a)–4.7(b) mm), followed by parallel flat-lipped forms (n=16, av. 5.6(a)–5.3(b) mm) (Table 6.25). Most of these RO vessels have orifice diameters of between 20–32 cm (Table 6.27).

Small numbers of rims represent either vertical-rimmed, probable globular pots (n=4, Form VIIa) or bowls with vertical or inward-oriented rims (n=4, Form II) (Fig. 6.26, Table 6.25). Like the predominant RO vessels, all of the bowl rims are flat-lipped and divergent and are also of a similar thickness, while the slightly thicker, similarly flat-lipped pots have either parallel, convergent or divergent rim profiles. Both these vessel forms have more restricted orifice diameters of between 16–24 cm (Table 6.27).

A single feldspathic LWI rim from the Mission (ELT284), with a divergent profile and flat lip, is possibly from a horizontal-rimmed open bowl (Form III), though it could also be an unusually thick-rimmed (10.3(a)–7.0(b) mm) RO Vessel. An indeterminate type of carinated vessel (Form V?) is indicated by a small number of LWI sherds (Fig. 6.26). There are six handle fragments amongst this ware, including four with oval sections, one with a rectangular section, and one crescent-shaped lug (Table 6.26).

At Dori, only four LWI rims from RO vessels were recovered: two from Phase 4 and one each from Phase 3 and the surface (Table 6.28). However, when indeterminate-orientation rims (n=32) are also considered, it is clear that the flat-lipped, divergent rim form that is associated with RO rims is typical of this ‘transitional’ local assemblage (Table 6.29). Both rims and globular shoulder sherds indicate that these Phase 4 outcurving vessels were mostly produced using feldspathic stream sand and fine calcareous beach sand temper. All of Lasigi’s few rims representing Form VIIa vessels, all of which were feldspathic-tempered, were also recovered from the upper horizons at Dori. Though the single bowl rim (Form II) from Dori Phase 4 is medium-calcareous tempered, the three other specimens from the Mission are all feldspathic. One decorated, oval-sectioned handle fragment from Phase 4 is also feldspathic-tempered. Just over half (53%) of all Phase 4 LWI sherds have evidence of reddish slip on their exterior and interior, and some of these sherds (15%) also have polished surfaces. Unlike the Phase 2 assemblage, a few sherds (3%) have anvil impressions on their interior.
The ‘Middle’ Lapita LWI assemblage at Dori (Phase 2) contained no orientable rims, although the indeterminate rims (n=15) were all flat-lipped and either parallel (n=5), divergent or convergent in profile. Only two feldspathic rims were recovered from Phase 2, but their temper and form both suggest that they were probably displaced from Phase 4. The remaining rims indicate that fine and medium-calcareous beach tempers are most clearly associated with vessels of this phase (Table 6.28). While most of the small number of carinated sherds were in fact recovered from Phase 4 at Dori, with single examples from Phases 2 and 3 (the latter is the intermediate ‘construction’ horizon, which was responsible for mixing components of all the phases), their medium or fine calcareous temper suggests that they probably all derive from Phase 2 (and see the discussion of their decoration below). Similarly, a crescent-shaped lug and rectangular-sectioned handle fragment with medium-calcareous temper recovered from Phases 5 and 4 respectively may also originally derive from Phase 2. Like Phase 4, over half of the sherds in the Phase 2 assemblage have evidence of reddish slip (57%); some also in combination with polish (14%) or wipe marks/striations (11%).

Decoration

Techniques

A total of 133 (or 46%) diagnostic LWI sherds from Lasigi are decorated (Fig. 6.27, Table 6.30).24 Forms of lip modification—predominantly simple notching—are overwhelmingly the most frequent type of decoration (ca. 50% of the decorated assemblage). Apart from a single rim (ELS43, Phase 3) from a plain-lipped, probable outcurving vessel (RO) that has had a small conical hole (ca. 8 mm diameter) drilled through it after firing (Fig. 6.25)—which may, in fact, have been a functional (possibly for suspension) rather than decorative addition—lip notching is the only form of decoration found on the orientable rims representing the three main vessel forms (RO, II and VIIa) (Table 6.31). However, the assemblage’s high level of fragmentation and the apparent emphasis on decorating the necks of vessels—probably RO/ROG vessels in most cases—has no doubt influenced this result. More than likely, many of Lasigi’s RO/ROG vessels had notched lips in combination with decoration around the bend of the neck.

Forms of applied relief decoration, including bands, nubbins and smoothed ridges that are sometimes combined, comprise the next most frequent category (ca. 24%). A small number

24 The high percentage of decoration in the assemblage is skewed, due to the absence in the select Golson collection of plain diagnostic sherd classes such as necks and shoulders (which were included in the Tanga analysis). Only plain rims were present amongst the largely decorated collection I analysed.
of applied bands (n=3) are ‘notched’ with perpendicular incisions or excisions. Seventeen LWI sherds are dentate-stamped and small numbers of sherds are decorated with rectilinear or curvilinear incision, and fingernail impression or pinch. Appliqué and fingernail techniques are most clearly associated with the RO/ROG vessel form, while dentate-stamping occurs on restricted neck sherds and carinations (Table 6.31). In fact, two sherds (ELS88, 132) with the same type of large-tined dentate-stamping could combine to suggest a carinated vessel with a restricted neck and possibly outcurving rim (Fig. 6.27). All of the dentate-stamped sherds (n=16) were recovered from Dori. None of the sherds bearing incision are indicative of vessel form.

**Motifs**

Eight non-dentate body motifs/motif elements—all represented by small numbers of sherds—and six lip motifs were identified amongst Lasigi LWI (Figs. 6.27, 6.33–6.34, Tables 6.32–6.33). All of the LWI body motifs are based on applied relief (n=6) or fingernail pinch (n=2), including: spaced vertical and oblique fingernail pinch (#LAS4b, c); spaced circular to oval nubbins (#LAS9); ‘stomate’-shaped appliqué (#LAS5); a high relief nubbin with adjoining low relief, applied band ‘neck’ (#LAS8); and a smoothed horizontal ridge (#LAS7). With one exception, all of the body motifs occur at the inflection point of restricted neck sherds, which are probably from RO/ROG vessels. Spaced nubbins are occasionally combined with vertical, ridged, plain applied bands (#LAS10; one on the neck/shoulder of a probable ROG vessel at the Mission) and in one case a smoothed ridge. Only two examples of horizontal notched applied bands (#LAS1b) are present in LWI, one of which is possibly at the bend of the neck. No incised body motifs could be identified due to the small size of the sherds. Apart from a single sherd (ELS73) with deep, alternating, oblique, parallel-incised lines, the remaining four incised sherds all bear single incised lines of indeterminate orientation (Fig. 6.27).

Only one dentate-stamped Lapita motif could be identified (possibly Anson’s motif #29) (Fig. 6.27, Table 7.32), with the remainder too small to be determined (IND-Lapita).

The lips of LWI vessels at Dori are most frequently decorated by spaced interior notching (#LASIm1; Vessel Forms II, III, VIIa and RO/ROG), spaced across-lip notching (#LASIm3; RO vessel only), and to a lesser extent scalloping/finger-pressing forming a wavy edge (#LASIm2). The same three lip motifs, with #LASIm1 the dominant type, are present at the Mission site. None of the rims with wavy lips are able to be oriented; however, as they are predominantly divergent in profile with flat lips they could derive from RO/ROG vessels.
**Chronology**

The distribution of LWI decorative techniques and motifs at the Dori site shows a clear association of fingernail, appliqué, and incised decoration, as well as scalloping and notching of the lip, with the ‘transitional’ assemblage of Phase 4 (Tables 6.34–6.35). This decorative suite is also present amongst sherds in the upper, disturbed Phase 5 and surface collection, which were most probably displaced from Phase 4. The decorative suite of LWI at the Mission closely corresponds to that of Dori’s ‘transitional’ Phase 4 (Table 6.33), suggesting that this site’s assemblage is most representative of a single phase of occupation.

The few Dori sherds of this decorative suite that were recovered from the Lapita period (Phase 2) are most likely not *in situ* and have probably been introduced into the underlying horizon as a result of the posthole disturbance in Phase 3. Both of the sherds with remnant appliqué, one sherd with spaced vertical fingernail pinch (#LAS4b), and both scalloped rims from Phase 2 are tempered with sands that are characteristic of Phase 4 (i.e. feldspathic and fine calcareous). Conversely, the dentate-stamped sherds recovered from Phase 4 have most probably been displaced from Phase 2 through the same process of disturbance. All of the Phase 4 dentate-stamped sherds are tempered with calcareous sands typical of the *in situ* ‘Middle’ Lapita Phase 2 sherds (either medium or fine), and probably represent a small number of similarly carinated vessels with restricted necks.

The ‘Middle’ Lapita assemblage (Phase 2) at Dori is also distinguished by a complete lack of interior lip notching (#LASlm1)—the most common motif in the ‘transitional’ LWI of Phase 4—and the presence of exterior lip notching (#LASlm4). Owing to its medium-coarse calcareous temper, the single indeterminate rim with spaced diamond-shaped lip notching (#LASlm6) recovered from Phase 4 may also be displaced from Phase 2. A medium calcareous-tempered sherd from Phase 2 with a single vertical fingernail pinch at the bend of the neck (#LAS4b?) and an unusually hard-fired fabric could possibly indicate that this motif was also present amongst the Lapita-aged assemblage, though this would need to be confirmed by SEM-EDXA. The single sherd from Dori Phase 3 (ELS43) with a drilled hole could possibly also be a component of this assemblage, given the small number of similar sherds found amongst Lapita reef site assemblages on Nissan (DES, n=1), Buka (DJQ, n=1) and Sohano (DAF, n=2)25 (Wickler 2001: Tables A.14–A.16). Spaced, across-lip notching (#LASlm3), associated with feldspathic and fine

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25 It is not clear from the text which area of the DAF site these sherds were found in.
and medium calcareous LWI sherds, appears to have been shared by both the ‘transitional’ and Lapita assemblages.

**Lasigi Local Ware – Group II**

Comprising 65 diagnostic sherds—the second most dominant group—Lasigi’s ‘Local Ware – Group II’ (LWII) has a distinctive, probably local composition, characterised by clinopyroxene-rich beach temper (Tables 6.22–6.23). Most prevalent at the Mission site and within Dori Phase 4, LWII has a number of stylistic features in common with the ‘transitional’ LWI assemblage and the bulk of the sherds probably date from this period. However, also like LWI, LWII has a small number of sherds that most likely derive from the earlier Phase 2 occupation.

**Vessel form and decoration**

Only three of the 20 LWII rims were able to be oriented, indicating two of the vessel forms that are characteristic of the LWI assemblage: Forms RO and II (Fig. 6.28, Tables 6.24–6.28). The two outcurving vessel rims (Form RO) are both from the Mission. One of these has the typical divergent, flat-lipped form—and interior lip-notching (#LASIm1)—of LWI outcurving vessels. This rim form is also dominant amongst the indeterminate LWII rims (av. 5.8(a)–4.3(b) mm thick) and a large number of restricted neck sherds are also indicative of RO/ROG vessels. The rim from the small, plain, slightly incurving, thin-walled bowl or cup (Form II) is divergent and flat-lipped like the other local bowls from Dori Phase 4.

Also like the LWI ‘transitional’ assemblage, LWII is mainly decorated around the neck with incision and applied relief (nubbins, bands, or smoothed ridges), has in some cases been slipped and polished, and the lips of vessels are modified by interior notching or scalloping (#LASIm1, 2) (Tables 6.30–6.35). One very small, indeterminate rim from the Mission (ELT587) has a possible notch on the lip in combination with two oblique fingernail impressions on the exterior. LWII shares two applied motifs (#LAS9 and #LAS7) with Lasigi LWI. These stylistic similarities between LWI and LWII lend support to the compositional evidence that indicated that the distinctively clinopyroxene-rich LWII was made from local materials. A new local applied motif/motif element (#LAS11), comprising adjoining curvilinear applied bands, is present on one LWII sherd from the Mission (Fig. 6.28, Table 6.33).

The remaining two decorated LWII sherds—one with red slip and dentate-stamping (Dori, Ph. 4) and the other a carinated sherd (Form V?) with vertical, parallel incised lines above the angle (Mission, Ph. 2)—have probably been displaced from the earlier ‘Middle’ Lapita deposit given their stylistic similarity to the LWI assemblage of this phase.
Lasigi Local Ware – Group III?

Though the clay source of this group has not been characterised, I have tentatively classed 36 opaque-rich sherds as ‘Local Ware – Group III?’ (LWIII) based on their stylistic similarity to the other local pottery and because the origin of this temper is not incompatible with the volcanic bedrock suite of northeastern New Ireland (see Appendix 7) (Table 6.22).

**Vessel form and decoration**

Like the other two local wares, LWIII is most prevalent within the ‘transitional’ Dori Phase 4. It also contains a few sherds that have most likely been displaced from the earlier ‘Middle’ Lapita horizon, including a carinated sherd (Form V?), a possible stand fragment (Form VIII?), and two dentate-stamped sherds (Fig. 6.29, Tables 6.23–6.24).

The only LWIII rim that could be oriented (ELS706, Dori Ph. 4) probably represents a bowl (Form II). It has a similar orifice diameter and divergent, flat-lipped rim to other local bowls (Tables 6.25, 6.27). However, the decoration of this vessel—exterior punctations combined with sharp notching of the interior and exterior lip edge (#LAS6, #LASlm7a, Table 6.32)—is unique at Lasigi, and it is one of only two sherds with punctation found at the site. Like LWI and LWII, most other rims are divergent and flat-lipped (with a few parallel or convergent forms) and neck sherds are restricted and probably come from RO vessels (Tables 6.25–6.26). One curved, cylindrical, handle fragment was recovered from Dori Phase 4.

LWIII decoration is characterised by fingernail pinch, forms of applied relief (including a conical-shaped nubbin or lug), and interior lip notching (#LASlm1) (Fig. 6.29, Table 6.30). Red slip is found on sherds from both periods. Like the other local wares, fingernail pinch is found around the necks of restricted vessels (Table 6.31). Only one applied relief motif is identifiable: a ridged and ‘notched’ applied band of indeterminate orientation (#LAS1ind) on a sherd from Phase 4 at Dori (Fig. 6.29, Tables 6.32, 6.34). All but two of the sherds decorated with fingernail pinch were also recovered from Phase 4 at Dori, the majority of which have horizontal pinch motifs (#LAS3a or 3b) (Table 6.35). A single sherd from Phase 2 at Dori, with what appears to be the remains of two rows of vertical fingernail pinch (#LAS4a) at the neck, could lend further weight to the suggestion (see LWI above) that vertical pinch is a ‘Middle’ Lapita period motif at Lasigi, though again it would need to be confirmed through more detailed SEM-EDXA of the clay fabric of the assemblage (Fig. 6.29, Table 6.36).

Lasigi Exotic Ware – Group I

This compositionally distinct ware (EWI), the most abundant of the non-local wares (n=57), consists of pottery that appears to have been produced using the same or similar clay source(s)
(Clay 3) and tempered with either quartz-calcite or coarse-calcareous sand (Table 6.22). The distinctive quartz could indicate that EWI was transferred to Lasigi from somewhere in the southern Admiralties (see Chapter 5). Only a small number of EWI sherds were recovered from the Mission, and at Dori, sherds were somewhat more numerous in the ‘transitional’ Phase 4 (Table 6.23). However, like LWI, when the small EWI assemblage is divided into its component temper groups there is a clear association of temper types with a particular temporal phase of occupation. While the division is not absolute, a clear majority of Dori’s quartz-calcite (or hybrid calcareous) tempered sherds derive from the ‘transitional’ period occupation in Phase 4—similarly, all of the Mission’s quartz-calcite sherds are from the upper part of the deposit—and the majority of coarse-calcareous sherds derive from the ‘Middle’ Lapita period in Phase 2 (Table 6.36). This suggests that interaction with the Admiralties most securely (on account of the presence of quartz) took place during the ‘transition’. However, the presence of one quartz-calcite/hybrid calcareous sherd with a Lapita-like motif (see below) and the indications that coarse-calcareous tempered pottery shared the same or similar clay source to the later ware could suggest that contact with the Admiralties began during the Lapita period, though this would need to be confirmed through more extensive analysis of the temper and clays.

**Vessel form and decoration**

Only one quartz-calcite rim—with a parallel profile, flat lip, and interior lip-notching (#LASlm1)—from Phase 4 at Dori could be oriented, indicating an outcurving RO vessel (Fig. 6.30, Table 6.37). The other indeterminate quartz-calcite rims from the Mission and Dori Phase 4 are predominantly divergent in profile (av. 7.4(a)–6.1(b) mm), with a variety of lip forms.

In contrast, the majority of all coarse-calcareous rims are convergent in profile with flat lips (av. 4.7(a)–6.1(b) mm). Two vessel forms, Form I and RO, are present in the coarse-calcareous EWI assemblage. Single carinated sherds (Form V?) are present in both Phase 4 and 2 at Dori. The plain Phase 4 sherd (ELS123) has coarse-calcareous temper, which could indicate that it has been displaced from the Phase 2 horizon. The Phase 2 sherd (ELS167), attributed to the quartz-calcite temper group, has a stamped-impressed, indeterminate Lapita-style motif (Fig. 6.31). A crescent-shaped lug handle (qtz-calc) was also found in the Phase 4 assemblage (Fig. 6.31).

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26 All three quartz-calcite sherds sampled in SEM-EDXA from Dori were from Phase 4.

27 NB: As with all diagnostic quartz-calcite sherds, this attribution is not based on SEM-EDXA of the sherd itself, but rather on the presence of similar-looking hybrid calcareous sand.
‘Transitional’ EWI decoration consists mainly of across-lip and interior lip-notching (#LASlm3 and 1 respectively), represented by small, equal numbers of quartz-calcite and coarse-calcareous sherds. One divergent rim (cs-calc) from Phase 4 combines lip incision (#LASlm5) with spaced punctations on the exterior (Fig. 6.31). The across-lip notching motif is most strongly associated with the Phase 2 horizon, where it is found on 11 coarse-calcareous, flat-lipped rims, all except one of which has a convergent profile (Tables 6.34–6.35). A single calcareous rim with rare exterior lip-notching (#LASlm4) was also recovered from Phase 2. Sherds of both phases bear reddish slip and polish.

Apart from one body sherd with parallel plain applied bands (Ph. 4, qtz-calc), the few other decorated sherds are mainly restricted necks. Phase 4 sherds included spaced vertical fingernail pinch (#LAS4b) and oblique fingernail pinch in combination with a smoothed ridge (#LAS4c, LAS7). The single quartz-calcite sherd (ELS114) from Phase 2 with vertical fingernail pinch (#LAS4b?) was noted as being very similar to the Phase 4 example—possibly even from the same vessel—and has probably been displaced from this phase. Also recovered from Phase 2 was an everted neck sherd with an impressed Lapita zone marker motif (Anson #240?) (Fig. 6.31, Table 6.35).

While Lasigi’s quartz-rich EWI assemblage is small, there are a number of similarities between this ware and the Sasi (GDY/GEF) site ceramics, including the flat-lipped outcurving rim form, restricted neck vessels, lip notching and incision, spaced punctation, and plain applied relief bands (Ambrose 1991a; Wahome 1998: 43-5, 48-9) (see Appendix 5). Lasigi’s EWI lacks applied nubbins on the rims of vessels as well as the incised body motifs (e.g. crosshatch and chevron) that are characteristic of the Sasi ware, although this could be a function of the small sample size. Conversely, Sasi ware lacks Lasigi’s distinctive fingernail pinch motifs (#LAS4b, c).

**Lasigi Exotic Ware — Group II**

I have attributed a small assemblage of pottery (n=26) tempered with distinctive mixed clinopyroxene-opaque (cpx-op) beach sand to ‘Exotic Ware - Group II’ (EWII). While the temper itself is not incompatible with an origin on New Ireland, SEM-EDXA indicated that the clay (Clay 4) of the single cpx-op sherd (ELT30) that underwent analysis was distinctly different from all the
other non-local and local wares (see Fig. 5.26a, Chapter 5). The origin of this ware is unclear, though it may possibly derive from another part of New Ireland (Table 6.22).²⁸

Nearly all of Dori's EWII sherds were recovered from Phase 4, indicating that it most firmly dates to the ‘transitional’ period and that the few sherds recovered from Phases 3 and 2 are probably not in situ (Table 6.23).

**Vessel form and decoration**

Despite there being only one orientable rim (Dori Ph. 2), if all of the available form features are considered, EWII appears to comprise a small number (perhaps a minimum of 5–6) of carinated vessels (Form V?). These unusual ‘transitiona l’ vessels have restricted necks with outcurving rims, which are mainly flat-lipped and parallel or divergent in profile (Fig. 6.32, Tables 6.25–6.28). Furthermore, they are decorated with distinctive, vertical fingernail-impressed decoration (#LAS2) around the perimeter of the carination and the lips are notched (#LASIm1, #LASIm3) or scalloped (#LASIm2) (Tables 6.30–6.35). One vessel also has horizontal fingernail pinch (#LAS3a) around the bend of the neck in combination with a fingernail-impressed carination. A restricted neck sherd from the Mission is decorated with four adjacent, vertical, ridged and notched applied bands (#LAS1a) (Fig. 6.32).

**6.3.2 Lossu (EAA)**

Based on the compositional results, I have tentatively divided the small sample of diagnostic, mainly decorated sherds from Lossu into four ceramic groups, including two local and two non-local wares (Table 6.38). As no provenance information was available for these sherds—and indeed, much of the Lossu assemblage was recovered from apparently disturbed contexts—changes in style through time cannot be stringently assessed. Lossu’s unreliable radiocarbon determinations lend little chronological structure to the assemblage. However, like Lasigi, the bulk of the sample appears to date from a single, possibly ‘transitional’ phase of occupation, with a small component probably dating from an earlier Lapita-aged occupation.

**Lossu Local Ware – Group I**

This ware (LWI) appears to have been made from a single clay source and two types of locally available temper: a feldspathic stream sand (plg-vrf/cpx-hbl) and a clinopyroxene-rich beach sand

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²⁸ No minerals within the temper of sherd ELT30 underwent SEM-EDXA, and therefore their chemistry cannot be compared with those from the local and non-local tempers.
(cpx-rich). It is the most dominant ware in the sample, comprising around 62 per cent (Table 6.39).

**Vessel form**

Only two vessel forms could be identified from the available rims: an outcurving, restricted neck jar (Form RO) with a scalloped lip (#L1m1); and a plain, slightly incurving bowl (Form II) (Fig. 6.35, Tables 6.40–6.41). The orifice diameters of both vessel types are comparable to those within Lasigi’s LWI (Table 6.42). Considering all of the available form characteristics, vessels with flat-lipped rims—mostly parallel in profile (av. 6.4(a)–5.6(b) mm) with lesser numbers of either convergent (av. 3.2(a)–4.2(b) mm) or divergent (av. 9.8(a)–5.3(b) mm) forms—and (to some extent) restricted necks are most characteristic of Lossu LWI (Tables 6.41, 6.43).

**Decoration**

Various forms of applied relief clearly dominate the decoration of this local ware (ca. 62% of the decorated sample) (Figs. 6.35–6.36, 6.40–6.41, Tables 6.44–6.46). Located mainly on the upper part of vessels (in particular on restricted necks but also on the lip), forms include plain and notched or single tool-impressed applied bands (vertical, horizontal and curvilinear), small rounded nubbins, and flattish ovals, which were sometimes combined. Within the LWI sample, applied relief is combined with other decorative techniques on only a single sherd (EAA-Unid. 7.4, Fig. 6.35)—in this case, fingernail-impressed applied ovals combined with oblique fingernail impressions (#L7) and incision—though this could also be biased by the generally small size of most sherds. Including the above motif, there are six different applied relief motifs present on the body of LWI pots (Table 6.46). A motif/motif element consisting of vertical, ridged (i.e. with a triangular cross-section) and notched applied bands is the most common (#L6a), and there are single examples of vertical and horizontal notched applied bands (#L6a, 6b), a curvilinear impressed applied band with nubbins (#L5), and ‘stomate’-shaped plain applied bands (#L9). A

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29 Only one sherd with cpx-rich temper (EAA18) was present in the small Lossu sample.
30 NB: As mentioned in Chapter 4, White and Downie’s own analysis of Lossu pottery found that ‘calcareous’ (or ‘white’) temper in fact dominated the assemblage, comprising 75 per cent of all decorated sherds (n=332) and 56 per cent of all plain rims (n=454) from their sample from Mounds I, V and VI (1980: 210-1, Tables 8-9). I suspect that many of the sherds they classified as calcareous were in fact feldspathic-tempered (i.e. LWI), which often have white-ish volcanic rock inclusions that can be mistaken for calcareous material.

31 Similarly, White and Downie (1980: Table 8) found that appliqué was present on around 58 per cent of decorated body sherds and 8 per cent of modified rims (lips) in their considerably larger sample.

32 White and Downie (1980: Table 8) note ‘several small shoulder sherds’ in their larger sample that combine very eroded ‘lines of applied and incised decoration’. Only four sherds with fingernail impression were present in their sample.
distinctive applied relief lip motif, consisting of large notched or single tool-impressed nubbins, is found on three rims (#Llm7). The lips of a few other rims are scalloped (#Llm1) or wavy (#Llm5), and one rim has deep cut notches or excisions on the exterior and interior of the lip (#Llm3).33

The three incised sherds all have oblique, parallel lines, one with a horizontal ‘half herringbone’ motif (#L10).34

Reddish slip is present on the majority (74%) of Lossu LWI sherds.

**Lossu Local Ware – Group II**

Lossu’s other local ware (LWII), characterised by a mixed clinopyroxene and opaque-rich temper, is represented by a single sherd in my diagnostic sample (Tables 6.38–6.39). Like LWI, this rim sherd (of indeterminate orientation) is flat-lipped with a divergent profile.

**Lossu Exotic Ware – Group I**

This non-local ware (EWI) is characterised by purely calcareous temper and a clay source that is highly distinctive from the other local clays (see Chapter 5). This could suggest that EWI was transferred from another part of New Ireland or possibly even further afield, however, more detailed compositional analysis would be required to substantiate this (Table 6.38). Only six sherds within the diagnostic sample belong to this group (Table 6.39).

**Vessel form and decoration**

Two rims sherds were able to be oriented. One indicates a relatively narrow-necked, outcurving (RO) vessel with divergent rim profile and interior lip notching (#Llm6) on a flat lip—one other rim also has this lip motif—and the other is from a plain, narrow-mouthed, vertical-rimmed vessel (Form VIIa) with a convergent, flat-lipped rim (Fig. 6.37, Tables 6.40–6.46). A similar range of rim/lip forms to that found in LWI is present in this apparently non-local ware. A single parallel-sided, flat-lipped rim has the only example of across-lip notching (#Llm2) in the Lossu sample. Two restricted neck sherds, possibly from different vessels, have plain, adjoining applied bands, one of which appears to form a cross shape.

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33 Within White and Downie’s (ibid.) sample of rims with lip modification (n=155), most were ‘scalloped’ (56%) or ‘notched’ (33%), and a small number had appliqué (8%) or were ‘crenellated’ (2%).

34 Fifty-one (29%) of White and Downie’s (ibid.) total decorated body sherds were incised, including ‘discrete line’, ‘continuous line’ and ‘lattice’ (the latter presumably some form of crosshatch incision that was not present in my own much reduced sample).
**Lossu Exotic Ware – Group II**

This potentially non-local ware (EWII) is made from clay that is distinctive from both the two local wares as well as the calcareous EWI (Table 6.38). Tempered with a more placered, feldspathic-rich temper than LWI, this group is represented by only three sherds in the sample (Table 6.39).  

**Vessel form and decoration**

Two of these sherds are fragments of the same highly decorated, unusual vessel (Figs. 6.38, 6.40; White & Downie 1980: 212, Fig. 1a, e). This shallow open bowl or dish (Form I) has an abruptly convergent rim with a pointed lip, and has been red-slipped and polished. The decoration on the exterior of the bowl is located either side of a transverse applied band or ‘collar’ (ca. 13–15 mm wide) on top of which is a row of ‘star’-impressed, continuous nubbins (#L2). Above this band are sets of alternating oblique, parallel, plain applied bands (#L3), and below there is a double incised zigzag (#L1) over an indeterminate curvilinear-incised motif. On the interior of the vessel, a line of single tool impressions and sets of alternating oblique parallel lines form a zigzag (#L4).

The other sherd is a rim from an outcurving vessel (RO Form) with a convergent (3.5(a)–6.2(b) mm), flat-lipped rim. The ends of a set of oblique, parallel lines are all that remain of the incised decoration on this vessel.

**Indeterminate ceramic group**

Owing to the absence of detailed compositional data, four sherds from two different temper groups—opaque-rich beach (op-rich) placer and hybrid calcareous beach sand (calc-op-plg)—could not be attributed to a ceramic group (Fig. 6.39, Tables 6.39–6.46). Two sherds have clear Lapita links: a red-slipped, dentate-stamped carination (a surface find) and a rim with an impressed, incised and applied relief lip motif (#LIm4). One rim is from a plain, red-slipped open bowl (Form I) and a restricted neck sherd has a remnant vertical applied band.

**6.3.3 Fissoa (ENX)**

The compositional data from Fissoa suggest that there are at least three main ceramic groups amongst the pottery assemblage: one local (LW) and two non-local groups, produced using a large variety of different tempers, each of which may reflect discrete pottery-making communities in northern New Ireland (Table 6.47). Compared to the plain body sherd assemblage,
considerably fewer temper types are present amongst the small diagnostic sherd collection (see Chapter 5). As I described in Chapter 2, the Fissoa site has undergone a high level of disturbance and cultural material is not in situ. Consequently, the chronology of stylistic change at the site is difficult to assess.

**Fissoa Local Ware**

I have attributed all of Fissoa’s 30 diagnostic sherds to the ‘Local Ware’ (LW) group (Table 6.48). LW appears to have been produced using the same (or similar) clay source(s) (i.e. Clay 1) and at least six different types of temper. While hindered by the small size of the sample, SEM-EDXA indicated that within the Clay 1 source there was potentially some differentiation between the clays of differently tempered pottery (see Chapter 5). In particular, there was some suggestion that calcareous-tempered pottery was produced using clay from two somewhat chemically distinct sources. In order to better perceive any stylistic differences related to temper—and possibly chronology—I have divided the small diagnostic, locally-produced pottery assemblage into three broad temper groups: calcareous (LW-c, including hybrid calcareous), feldspathic-rich (LW-f) and opaque-rich (LW-o). Calcareous-tempered sherds make up the bulk of the diagnostic assemblage (ca. 73%); only small numbers are feldspathic and only two sherds are opaque-rich (Table 6.48).

**Vessel form**

While none of the twelve rims in the assemblage could be oriented with any confidence due to their small size, two LW-c rims are most probably from outcurving, restricted neck vessels (RO Form) (Figs. 6.42–6.43, Tables 6.49–6.50). Both with flat lips, one rim (ENX1, -87) is plain with a divergent profile (8.1(a)–4.8(b) mm), while the other (ENX5) has a convergent profile (4.4(a)–6.1(b) mm) and is decorated with an unusual (and somewhat indeterminate) applied relief design. Overall, there are too few rims to indicate what the dominant rim form is in the assemblage. The available rims are divergent, convergent or parallel in profile and with one exception are all flat-lipped. A small number of mostly plain restricted neck and globular shoulder sherds from the calcareous (n=8) and feldspathic-rich temper (n=2) groups may also represent RO vessels. Some of these sherds are from particularly thin-walled vessels (e.g. ENX81 and ENX85 are between 4.0–4.5 mm thick).

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36 NB: Pure calcareous-tempered sherds made up a significantly lesser percentage (ca. 48%) of the Fissoa assemblage as a whole, that is, including both diagnostic and non-diagnostic (plain body) sherds (see Chapter 5, Fig. 5.15).
One plain LW-c sherd (ENX320) represents an indeterminate type of carinated vessel (Form V?) and a single LW-o sherd is possibly from a vessel stand (Form VIII) (Fig. 6.42). Two handles, one a lug or high relief nubbin and the other an elongated band with a cylindrical section, are both calcareous tempered (Fig. 6.43).

**Decoration**

Though the sample of sherds is very small, Fissoa LW vessels appear to have been predominantly decorated on the lips and upper body (Figs. 6.43–6.45, Tables 6.51–6.52).

Four different lip motifs are present, mostly represented by single sherds. LW-f rims have both finger-pressed/wavy (#Flm1) and possibly interior notched lips (#Flm4?), while LW-c rims have wavy, across-lip (#Flm3) and exterior notched lips (#Flm2).

Applied relief decoration is only present on calcareous-tempered pottery. While no motifs were identified, the applied decoration includes plain and single tool-impressed applied bands, and the probable RO vessel rim (ENX5) has an unusually thick, broad, vertical band of relief that adjoins the remains of a curvilinear, plain applied band. Both of the incised sherds—decorated with oblique, parallel lines—are also calcareous, as is the single dentate-stamped sherd with an indeterminate Lapita motif.

The only body motif (#F1) that I could identify is on a feldspathic-rich, restricted neck sherd (ENX8). This surface find has two parallel, horizontal lines of small single tool impressions (or possibly short, deep incisions) with larger rounded impressions between them.

**6.3.4 Discussion**

**Styles and chronology in New Ireland**

The Dori site provides the only secure chronological framework for understanding stylistic similarities and differences amongst the ‘transitional’ New Ireland assemblages. At this site, it is clear that the ceramics from the ‘transitional’ Phase 4 occupation, dating to between around 2250–2050 cal BP, form a distinct and broadly cohesive style. This style is represented in both local and exotic ceramic groups, and may have been produced by at least four discrete, local pottery-making communities and possibly also communities elsewhere on New Ireland (i.e. EWI) and in the southern Admiralties (EWI). With the exception of one non-local ware (EWII), all of the Phase 4 wares are dominated by outcurving, flat-lipped globular jars (RO Form) with predominantly divergent rims. Two other predominantly flat-lipped vessel forms—a vertical-rimmed globular jar (Form VIIa) and a vertical or in-curving-rimmed pot/bowl (Form II)—are also characteristic, though more minor components. The lips of these vessels are typically decorated
with notches on their interior (#LASIm1) or to a lesser extent with wavy/finger-pressed (#LASIm2) or across-lip notching (#LASIm3). RO Vessels are typically decorated around the bend of the neck with a suite of distinctive applied relief and fingernail motifs (in particular horizontal fingernail pinch), and incision is also used to a minor extent. Rare examples of (probable) bowls have modified lips (parallel-incised or notched) and bodies that are decorated with punctation. While the non-local EWII was unique amongst Dori’s ‘transitional’ assemblage in having a carinated jar (Form V?), this ware also shared a number of diagnostic features with the other ceramic groups, including the outcurving, predominantly flat-lipped, divergent or parallel rim form, lip notching and finger-pressing, and decoration characterised by fingernail and applied relief motifs (including notched applied bands).

In contrast, the predominantly calcareous pottery belonging to the Dori Phase 2 occupation, dating to between around 3000–2650 cal BP, is dominated by features that are the hallmarks of Lapita style—carinated vessels and possible vessel stands, and dentate-stamped or impressed decoration (including two of Anson’s (1983) Lapita motifs). In addition, the Phase 2 assemblage appears to be characterised by a broader range of rim/lip forms and lip motifs, although across-lip notching is dominant. At least four discrete local communities and one non-local community (possibly in the southern Admiralties) may have produced these earlier wares.

As Kirch et al. (1991: 152) and Golson (1992: 164) originally noted, there are some striking stylistic parallels—in particular with regard to lip modification and the use of punctation—between the Lasigi ceramics and those from the Epakapaka (EKQ) rockshelter in the Mussau group. These stylistic parallels were seen as being suggestive of common ties to the Admiralties, which was also indicated by the dominance of Admiralty obsidian in both sites (Kirch et al. 1991: 157-8; Golson 1992: 164; Weisler 2001: Fig. 5.14) (see also Chapter 7). Similar to both the Lasigi and Lossu assemblages, the predominantly incised EKQ ceramics consist of a variety of thin-walled, generally flat-lipped vessels with everted rims that are notched, finger-pinched or crenate (Kirch et al. 1991: 152). Three of the lip motifs that I recorded at Lasigi—i.e. spaced interior notching (#LASIm1), shallow interior and exterior notching (#LASIm7a), and spaced across-lip notching (#LASIm3)—and one body motif—spaced punctations (#LAS6) below the rim—are present in the illustrated EKQ assemblage (Kirch et al. 1991: Fig. 4; Kirch 2000: Fig. 5.5). The alternating parallel oblique incision on another EKQ sherd (Kirch et al. 1991: Fig. 4g) is also characteristic of a few sherds from Lossu (see Figs. 6.36, 6.38) and other ‘transitional’ assemblages across Island Melanesia (see Table 4.1, Chapter 4). Three sherds with ‘knobbled'
applied relief—possibly akin to Lasigi’s applied nubbins—were also recovered from the upper part of the EKQ deposit (Layer II) (Kirch et al. 1991: 151; Weisler 2001: Table 5.3). Particularly striking are the two illustrated sherds from EKQ that combine lip modification with spaced punctations below the rim, which are very similar to the two examples from Lasigi that are attributed to LWIII (ELS706, Fig. 6.29) and EWI (ELS162, Fig. 6.31) respectively. Importantly, in terms of the proposed Admiralty connection in pottery style, my compositional data do indeed suggest that EWI is derived from the southern Admiralties.

But what of the chronologies of these two sites and their pottery styles? They would appear not to be comparable in some ways. At Dori, both of the sherds decorated with punctations and lip modification were recovered from the ‘transitional’ Phase 4 horizon. Furthermore, interior lip notching (and to a lesser extent finger-pressing), nubbin appliqué, and flat-lipped outcurving vessels are key features of the ‘transitional’ style. At EKQ, however, four determinations on shell from Layers III to V produced consistently ‘Early-Middle’ Lapita ages, the earliest and latest of these indicating an age range similar to that of Dori Phase 2, between around 3320–2660 cal BP (2σ). These dates were interpreted as indicating that the entire ceramic assemblage dated to this period and accumulated in a continuous, relatively rapid fashion (Kirch et al. 1991: 151, 160; Kirch 2001: 214, 216; Weisler 2001: 157). But despite these dates, the distribution of decorated ceramics and obsidian in the EKQ deposit provides a tantalising indication that there are two temporally (and stylistically) distinct assemblages that have been partially mixed and conflated. That is, a dominant, predominantly incised ceramic assemblage (but also including some appliqué and punctate) in the upper part of the sequence—which has evident stylistic similarities with the ‘transitional’ Lasigi wares (and other ‘transitional’ sites) and may be a similar age—and an earlier, smaller, underlying Lapita assemblage. The majority of dentate-stamped ceramics were found in the basal levels of EKQ, corresponding to a peak in the discard of West New Britain obsidian (as seen in other sites of the Bismarck Archipelago, see Chapter 7). Then in both excavated squares, these early Lapita peaks are followed by roughly coincident peaks in incised decoration and the use and discard of

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37 There are no illustrations of the ‘knobbed’ sherds. The indications that Layer II has been ‘thoroughly reworked’ (Weisler 2001: 156) could suggest that these sherds are not in situ and most probably belong with the underlying predominantly incised ceramics.

38 While Kirch et al.’s (1991: 158) compositional analysis of the clay fabric of a sample of EKQ sherds also indicated that some probably derived from the Admiralties, information correlating the compositional results with the style of the analysed sherds is not presented.

39 Calibrated using CALIB Rev 5.0.1 and a ∆R value of 0 (see Kirch 2001: 216).
predominantly Admiralties obsidian (see Weisler 2001: Figs. 5.12–5.14). Perhaps tellingly, there is a gap in the presence of dentate-stamped sherds in the deposit (roughly corresponding to the incised/Admiralties peaks), which could indicate that the smaller numbers of dentate-stamped sherds in the upper part of the deposit (i.e. Level 9 and above) are not in situ. The evidence of mixing in the site’s deposit (including date inversions), and of a number of activities capable of displacing and mixing it (Weisler 2001: 154, 156), could have been responsible for partially bringing together two temporally distinct assemblages in this seemingly well-stratified site. Further support for a ‘transitional’ age for the punctate Epakapaka (and Lasigi) sherds comes from Roviana Lagoon. Here, a closely similar style of punctuation is a key diagnostic feature—its presence on over 60 sherds representing the regional mother lode—of the possibly ‘transitional’ Gharanga/Kopo style, and is notably absent from the earlier Lapita-derived Honiavasa ceramics (Felgate 2003: 501-2) (see Chapter 4 and further discussion below). Perhaps then Kirch’s (2001: 217-9) ‘missing middle segment’ of the Mussau cultural sequence is in part not so much missing as misidentified.

Turning to the disturbed and poorly dated assemblages of Lossu and Fissoa, it is clear that while the ceramics of each site have some distinctively local stylistic features, they also have a range of attributes in common with the Dori ‘transitional’ assemblage. In particular, Lossu and Fissoa’s dominant ceramic wares are characterised by the flat-lipped, outcurving jar vessel form (RO) and decorative suites with signature applied relief, incision, and wavy/scalloped and notched lip modification. In addition, the Lossu assemblage also contains the predominantly flat-lipped Vessel Forms II and VIIa (Lossu LWI and EWI respectively) that are present at Lasigi. However, both the Lossu and Fissoa pottery assemblages lack Lasigi’s distinctive fingernail pinched decoration, and Lossu LWI is distinctive due to the dominance of a variety of applied relief motifs—in particular notched applied relief bands—on both the body and lips of vessels. Limited evidence from Lossu also indicates that appliqué was sometimes combined with fingernail impression or incision (see also, White & Downie 1980). While decorated sherds are few at Fissoa, the assemblage contains one unusual single tool-impressed motif (#F1) not found at the other sites. The ceramic assemblages of both Lossu and Fissoa contain only very minor

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40 Weisler (2001: 158) suggests that only the dentate-stamped sherds from the uppermost Level 1 (Unit 2) are not in situ, as a result of disturbance.
41 A few similarly punctate decorated sherds have also been recovered from Nissan (DES, n=2) (Wickler 2001: 120) and Ambile (Anson 1983: Fig. X). Wickler (ibid.) compares the sherds of both islands with those from Epakapaka.
42 Full details of the Epakapaka ceramics have not yet been published (forthcoming, in Volume III of Kirch (ed.) Lapita and its Transformations in Near Oceania).
‘classic’ Lapita components—such as dentate-stamping and carinated vessels and stands—which were tempered with calcareous- and opaque-rich beach sand at both sites. The stylistic evidence therefore suggests that the bulk of the Lossu and Fissoa ceramics are roughly contemporary with Dori Phase 4.43

Continuities and discontinuities

Given the nature of the New Ireland pottery assemblages, stylistic continuity or discontinuity between Lapita and transitional period ceramics is best assessed at the Dori site. But even here the Lapita period assemblage (Phase 2) is relatively small, has been mixed with material from the other occupation phases to some degree, and like Angkitkita, is separated from the ‘transitional’ occupation (Phase 4) by a lengthy hiatus, possibly of around 400 years in duration. While overall, there are clear differences between the overarching stylistic suites—in both vessel form and decoration—of the ‘transitional’ and Lapita period ceramics (discussed above), a number of stylistic features also suggest a perceptible degree of continuity between the two, despite the significant age difference. For example, there is some overlap in rim/lip and vessel forms. In particular, the flat-lipped, outcurving jar vessel form (RO), which is the hallmark of ‘transitional’ assemblages, is also found amongst the calcareous-tempered EWI of Phase 2, though unlike the ‘transitional’ assemblage, convergent rim profiles are most prevalent here. Carinations are also present in both phases, though it is impossible to tell what kind of vessels these constituted in the Phase 2 assemblage. Interior (#LASlm1) and across-lip notching (#LASlm3) motifs are also present in the assemblages of both phases, but #LASlm1 is clearly dominant in Phase 4 (it is represented by only a single sherd (EWI) in Phase 2), and conversely #LASlm3 dominates the earlier assemblage. Finally, there is some possible indication, as seen at Angkitkita, that vertical fingernail pinch decoration may have also been part of the Lapita decorative suite. Horizontal pinch motifs are most prevalent in the ‘transitional’ Phase 4 assemblage.

6.4 Conclusion: Interacting with Style in New Ireland and Beyond?

The analysis of style in this chapter has shown that the ‘transitional’ pottery assemblages of Tanga and New Ireland each have distinctively local ‘micro’ stylistic attributes—differentiating them and forging unique local identities. But at the same time, there are in my opinion persuasive

43 At Lossu, there is clearly a higher frequency of sherds decorated with incision and applied relief than any other technique (White & Downie 1980: Table 8).
‘macro’ stylistic similarities that link them to each other and to other Island Melanesian sites in a broad ‘transitional’ ceramic style in the closing centuries of the third millennium BP.

While there are evident differences in the frequencies and types of particular rim/lip forms, motifs and decorative techniques at each site—for example, the abundance of combined incised and applied relief (IAR) motifs and predominantly convergent rim profiles at Angkitkita, the prominence of divergent rims and fingernail pinch motifs at Lasigi, and the distinctive appliqué lip motifs of Lossu—the ‘transitional’ Tanga and New Ireland assemblages share a set of stylistic features (Table 6.53). The Fissoa site has the least marked stylistic similarities with the other sites, which could reflect its position as the northernmost and potentially most culturally different site in the group, and indeed the compositional data indicated that the Fissoa assemblage was considerably more diverse than the other sites. However, Fissoa also clearly has the most severely degraded assemblage and the potential for similarities to have survived is concomitantly low.

Foremost, all of the ‘transitional’ Tanga and New Ireland sites were making use of the same design ‘canvas’. The outcurving-rimmed globular jar (RO Form) was the dominant ‘transitional’ vessel form—as well as the dominant decorated form—at all of these sites. This is clearly consistent with the form that I proposed in Chapter 4 was possibly the earlier ‘transitional’ vessel form of Island Melanesia, in particular in the Bismarck-Solomons region (see Table 4.1). Tanga, Lasigi and Lossu also share the same subordinate vessel forms: a vertical-rimmed globular jar (Form VIIa) and a vertical or slightly incurring-rimmed bowl or pot (Form II).

All the sites share the two most common forms of ‘transitional’ lip modification: across-lip notching and interior lip notching. However, the across-lip form is clearly dominant at Angkitkita and the interior form clearly so on New Ireland. Interestingly, the across-lip form is most dominant in the ‘Middle’ Lapita period at Lasigi (Phase 2), on the calcareous, predominantly convergent-rimmed EWI, which possibly derives from the Admiralties. Conversely, the interior form is most prominent in Angkitkita’s ‘Early-Middle’ Lapita assemblage (EWI, EWIII—including on a divergent and parallel rim), which possibly derives from Anir or elsewhere in the TLTF island chain. This implies that differentiation of lip modification between these sites occurred during the ‘transition’ period, from amongst a common early pool of lip motifs. It could also imply the movement of lip styles and people between the islands and the mainland at this time. While conspicuously absent on Tanga, the three New Ireland sites share the other characteristic ‘transitional’ lip motif: the deep finger-pressed, ‘wavy’ notch. Angkitkita (LW) and Dori (EWI, Ph. 4) also share the perpendicular lip incision motif, which in the case of Dori may have originated in the southern Admiralties.
In regard to body motifs, the vertical notched applied band motif is prominent in the ‘transitional’ local wares of both Angkitkita and Lossu, and is also present on a single sherd of the distinctive, non-local Lasigi EWII. The local wares of Lasigi and Lossu share three other applied relief motifs: horizontal notched applied bands, ‘stomate’-shaped bands, and spaced low relief nubbins. Tanga and Lasigi local wares share one other applied relief motif (large conical ‘necked’ nubbins) and three types of fingernail pinch motif (continuous vertical, spaced vertical, and spaced oblique). Two fingernail pinch motifs are also shared with Lasigi EWI, which possibly originates from the southern Admiralties. Incised decoration is clearly most prolific on Tanga, though crosshatch and alternating parallel oblique incision are shared with Lossu (see also, White & Downie 1980).

The decorative suites of these Tanga and New Ireland sites are clearly comparable with the broad suite that I identified in Chapter 4 as belonging to Island Melanesian ‘transitional’ sites, dating to between around 2300–1900 cal BP. The ‘transitional’ assemblages of three localities in particular bear some striking similarities with the local wares of Tanga, Lasigi and Lossu: the Reber-Rakival site on Watom, the central reef material from Sohano Wharf (DAF), and reef sites from Roviana Lagoon in New Georgia (Miho and Gharanga/Kopo styles) (see full descriptions in Appendix 5 and Chapter 4, Table 4.1). While each of these assemblages also has clear local ‘micro’ stylistic elements—e.g. in motifs and lip forms—like the Tanga and New Ireland sites, they all have outcurving or everted-rimmed globular vessels as the dominant form, and decorative suites that include unbounded incision, appliqué, fingernail pinch, and lip-notching techniques (including simple and ‘wavy’ notching), often in similar combinations. Furthermore, all of these locales share the notched applied band motif element, and with the exception of Lossu, also share single or multiple rows of vertical fingernail pinch, which are generally located on the neck and/or upper body of the vessels. The DAF central reef assemblage and Roviana’s Miho-style also share crosshatch incision with the Tanga and Lossu local wares, zigzag incision with Tanga LW, and sets of alternating oblique linear incision with Lossu LWI and the possibly contemporary yellow-bodied EWII at Angkitkita, which originates from the Anir Islands. Sohano’s incised herringbone motif may also be present amongst Lossu LWI. With support from Lasigi, the Angkitkita site lends the Watom, Sohano and New Georgia transitional-style assemblages—all from surface or questionable stratigraphic contexts—a firmer, more plausible chronological framework for the first time.

In particular, Watom’s ‘coarse ware’ or ‘transitional’ assemblage has similarly flat-lipped, outcurving globular vessels to the RO/ROG Vessel Form on Tanga (LW) and the New Ireland sites, and also has a vertical-rimmed vessel similar to Tanga’s (LW) second most dominant form
(VIIa), which is also present at Lasigi (LWI) and Lossu (EWI). Though lacking linear incision, one Watom applied relief motif associated with a ROG-type vessel form in Meyer’s collection (Garanger 1971: Fig.12, no. 5, 6, 8, 9), which combines vertical, notched applied bands with conical-shaped nubbins, bears an intriguing similarity with Tangan motifs #T1 and #T5 (Fig. 6.46a). Like Tanga LW, the slip of Watom’s ‘transitional’ assemblage is also darker in colour compared to the bright red slip of Lapita-style pottery (Anson 2000: 113).

As seen in Tanga LW, the DAF central reef assemblage also demonstrates an association between more narrow-necked outcurving vessels (i.e. DAF Form 9A) and decoration that employs incision, appliqué and lip notching in combination (Wickler 2001). The notched applied bands at DAF are commonly vertical like on Tanga (LW) and Lossu’s (LWI) local wares (see e.g., on an unusually inverted vessel form, Fig. 6.46b). Wickler (2001: 119-20) also noted their similarity to decorated sherds from Watom. Fingernail pinch motifs at Lasigi and on Tanga (LW surface) are also similar to those at DAF, which include: ‘Multiple horizontal rows of single or paired fingernail impressions’ (Wickler 2001: 120). The vertical fingernail-impressed carinations of Lasigi’s unusual non-local EWII, the composition of which was found to be distinctly different from all the other non-local and local wares at the site, have counterparts among the DAF ware, where they also occur with relief strips and unbounded incision (Wickler 2001: 119-20, 265, Table A.11). A number of thin-walled bowl forms similar to those from Tanga and New Ireland are also represented in the DAF central reef assemblage.

Like the Tanga and New Ireland RO/ROG vessels, the dominant outcurving globular vessels of Roviana Lagoon’s Miho and Gharanga/Kopo styles are predominantly flat-lipped and relatively thin-walled (Felgate 2001, 2003). In particular, the incised, ‘worm-like’ (curvilinear) applied relief bands that Reeve (1989: Fig. 4c) described at Paniavile, are similar to Tanga’s Motif #T3 (Fig. 6.7), although the rim form they are applied to in this case is unusual (Fig. 6.46c). Notched applied bands on Miho-style vessels are also commonly vertical, as is also the case on some sherds belonging to the apparently earlier Lapita-derived Honiavasa assemblage (Fig. 6.25d, e). Like Lasigi, spaced fingernail pinch is found around the bend of the neck of Miho-style vessels (Felgate 2003: 373, Figs. 10-14, 143), while Tanga and Lasigi’s multiple and oblique fingernail pinch motifs recall those on Gharanga-style vessels (ibid. Figs. 15–17, 25). The vertical fingernail-impressed carinations of the unusual, non-local EWII at Lasigi are also similar to those

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44 The Honiavasa assemblage also shares the spaced nubbin motif around the bend of the neck with Lasigi (see e.g., Felgate 2003: Figs. 7, 60, 143).
on vessels from the Zangana site (ibid. 330, Fig. 83). One of the punctate decorated sherds from Dori (#ELS706, EWIII?), with notching on either edge of the lip, which I earlier compared with sherds from Epakapaka, is very similar to some Gharanga/Kopo-style sherds (in particular Z.89.549 & GE.266) (ibid. 177-80). Indeed, Felgate (2003: 502) suggests that a single exotic-tempered example from Roviana bearing Gharanga/Kopo style punctuation could indicate ‘an extended zone of production, design emulation, or exchange of potters as well as pots’.

The ‘transitional’ ‘macro’ stylistic evidence therefore appears to indicate that there was more interaction between these New Ireland-Solomons communities—perhaps significantly so—than the compositional data suggests. This is, of course, also characteristic of Lapita ceramics (e.g. Summerhayes 2000a: 233-4). The inclusion of the southern Admiralties in the ‘transitional’ interaction sphere, as the compositional data suggested, is also supported by stylistic evidence.

The approach I used in the analysis of pottery style in this chapter, which combined both compositional and stylistic features to establish more robust ceramic groupings, has helped to ‘untangle’ somewhat mixed assemblages and enabled a better basis on which to assess continuities and discontinuities within assemblages, as well as comparisons between assemblages. Importantly, the evidence from Angkitkita and Lasigi in particular indicates the existence of temporally distinct stylistic-compositional ceramic groups belonging to an earlier ‘Early-Middle’ Lapita and a later ‘transitional’ phase of occupation. Combined with the evident similarities between the ‘transitional’ styles of these sites and the similarly compositionally distinct ‘Late Decorated’ ware of Watom (Anson et al. 2005), the evidence suggests that ‘transitional’ and Lapita period wares are not contemporary at the seemingly well-stratified Kainapirina (SAC) (within Zones C2 or C1) site or at the Vunavaung (SDI) site (in Zones C3–C1) (see also, discussion in Chapter 2). Furthermore, while Anson et al.’s (2005) estimate of the emergence of ‘Late Decorated’ ware within the Reber-Rakival cultural sequence at around 2100 BP is entirely compatible with the chronology of Angkitkita and Dori, these sites also indicate that the production of neither the Lapita nor ‘transitional’ wares is likely to have continued as late as Anson et al. (2005) have proposed (i.e. 1870–1550 BP in Zone C1 at Kainapirina and even later at SDI; see Table A5.1 in Appendix 5). The evidence from Tanga and New Ireland provides a more plausible framework and suggests that these compositionally and stylistically distinct groups of pottery have been disturbed and mixed to varying degrees in both Watom sites. At Kainapirina, the Zone C1 age range most likely dates the natural events that disturbed the upper Zone C2 deposit and created Zone C1 (see Chapter 2).

In terms of continuity with the earlier Lapita pottery tradition, the Angkitkita and Lasigi sites provide stylistic evidence of somewhat attenuated connections between ‘transitional’ and
Lapita styles—as indeed one would expect given they are separated by lengthy periods of time—such as the sharing of particular vessel forms and lip motifs, possibly a fingernail pinch motif, and the use of red-slipping and polishing. This most probably indicates that the later pottery-making groups were at least partly descended from, or linked in some way, with the Lapita potters. However, like White and Murray-Wallace (1996: 43), I believe that the sheer distinctiveness of the considerably later ‘transitional’ style(s) of Tanga and New Ireland—with a stylistic suite that includes a particular set of vessel forms in combination with a set of varied lip motifs and predominantly new applied relief, incised and fingernail motifs—suggests that it was indeed ‘an expression of a different cultural pattern and set of associations’. To subsume this ‘transitional’ style under the banner of the Lapita tradition is unjustifiable and risks losing much insight into the nature of interaction and cultural transformation at this period.
CHAPTER 7—
Obsidian Exchange and Interaction at the Transition

7.1 INTRODUCTION—THE ‘HARD’ EVIDENCE OF INTERACTION?

This chapter turns to what could be considered the most ‘hard’ of all the available threads of evidence for interaction and exchange at the ‘transition’: the compositional analysis and source attribution of obsidian. Over the last 30 years or so, intensive research has identified and characterised not only the obsidian from different source regions in the western Pacific (i.e. the Admiralty Island group, West New Britain, and Fergusson Island in Papua New Guinea, and the Banks Islands in northern Vanuatu), but also a number of chemically distinct subgroups or subsources within these regions, for example Pam Lin, Umrei, Wekwok and Umleang in the Admiralties, and Gulu, Kutau/Bao (sources formerly described as ‘Talasea’), Baki, Hamilton and Mopir in West New Britain (Fig. 7.1) (see e.g., Ambrose 1976; Ambrose et al. 1981; Ambrose & Duerden 1982; Bird et al. 1997; Duerden et al. 1987; Fredericksen 1994; Fullagar et al. 1991; Summerhayes & Hotchkis 1992; Summerhayes et al. 1993, 1998; Torrence et al. 1992, 1996; Specht et al. 1988; White et al. 2006). As a result, it is now possible to routinely compare the compositional/chemical ‘fingerprint’ of a range of known obsidian sources with that of archaeological specimens to provide ‘hard’ evidence of the movement of material from particular regions or localities, and to model the nature of interaction and exchange over time within the Bismarck Archipelago and beyond (see e.g., Ambrose 1976, 1978; Fredericksen 1994, 1997a, 1997b; Gosden 1991a; Green 1979, 1987; Kirch 1988a, 1991; Specht et al. 1988; Specht 2002; Summerhayes 2003a, 2003b, 2004; Torrence et al. 1996; Torrence & Summerhayes 1997; White 1996).

Unfortunately, however, for the ‘transition’ within Island Melanesia (i.e. between around 2350–1900 cal BP), while this thread of evidence may be ‘hard’ it is also relatively gossamer owing to the small number of excavated obsidian assemblages that are currently known, and the even smaller number of these that are stratigraphically and chronologically secure. Models of interaction and exchange that are based on obsidian source data are especially reliant on the

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1 Christian Reepmeyer (ANU) is currently undertaking research on obsidians from the Banks Islands.
stratigraphic integrity of the deposit, particularly when there are two or more phases of occupation apparent. Unlike pottery, where stylistic data can be paired with compositional data to ‘disentangle’ a mixed or even relatively undisturbed assemblage—as demonstrated in the previous chapter—the largely simple, expedient flaking technology that has been shown to characterise both Lapita and post-Lapita period obsidian assemblages (e.g. Sheppard 1992, 1993; Torrence 1992; Fredericksen 1994; Halsey 1995; Hanslip 2001; Swete Kelly 2001) does not permit effective disentangling and the obsidian source ‘message’ may be mixed. Indeed, hydration dating of obsidian from Mouk (GLT) showed just how temporally mixed an assemblage can become (Ambrose & McEldowney 2000). Furthermore, detailed technological analysis has only been undertaken of a small number of ‘transitional’ assemblages. So, while the true social value/cultural significance of obsidian in exchange transactions in the Lapita period is still somewhat unclear (see discussion in Chapter 1), it is even less clear at the ‘transition’.

The Tanga sites bring some much needed additional data to this period. In particular, the Angkitkita site’s relatively large quantity of in situ flaked obsidian, dated firmly to around 2250–2180 cal BP (see Chapter 3), is ideally situated to address current models of obsidian exchange. In the second part of this chapter, I present the results of the compositional analysis of samples of flaked obsidian artefacts from the excavated ‘transitional’ assemblages of Angkitkita (ETM) and Lifafaesing (EUV), and from a number of surface collections from sites throughout the island group.2 The age of obsidian from these surface sites is estimated on the basis of its association with pottery from the ceramic wares identified in Chapter 6. I use two techniques to determine the source of obsidian at these sites: Proton Induced X-ray Emission–Proton Induced Gamma-Ray Emission (PIXE-PIGME) and relative density.

Regardless of what the inherent, no doubt varying, social or symbolic value of obsidian was as an exchange item amongst communities at the ‘transition’, for the sake of this analysis I assume that the access to, and selection and exchange of, particular materials was driven and governed by established social relationships (cf. Green 1987; Kirch 1988a; Sheppard 1993: 135; Specht 2002: 44; Summerhayes 2003a: 138, 2003b: 139, 2004: 154; Torrence & Summerhayes 1997: 75; Torrence et al. 1996: 220-1). Consequently, the origins and proportions of obsidian amongst the Tanga sites should indicate aspects of the social relationships that these communities maintained, and potentially how these relationships changed over time. I specifically compare the results of the Tanga analyses to Summerhayes’ (2003a & b, 2004) model of

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2 Technological analysis of these assemblages was outside of the scope of this thesis.
changing obsidian distribution and exchange in the Bismarck Archipelago—the most comprehensive and recent synthesis of the available data to date—in particular across the Late Lapita to ‘transition' periods.

Before presenting my results, I first discuss and assess Summerhayes’ model in more detail. As in Chapter 4, I then discuss the findings of a detailed review of the key ‘transitional’ sites across the southwest Pacific in terms of the nature of the obsidian assemblages and the available evidence of distribution from particular sources (see Appendix 8), and consider what can be gleaned about interaction and continuity or discontinuity with Lapita patterns. In some cases, this discussion refines and adds to the assemblages used in Summerhayes’ model.

7.2 Summerhayes’ Model of Obsidian Exchange in the Bismarcks

Summerhayes’ (2003a & b, 2004) model is based on PIXE-PIGME data from primarily excavated obsidian assemblages dating to the last 3500 years. These data indicate the varying proportions of particular obsidian subgroups (or subsources) from either the West New Britain (WNB) or Admiralty (AD) source regions that are present at each site. Divided into five heuristic chronological stages, the model tracks the changing patterns of obsidian exchange within the Bismarck Archipelago from ‘Early Lapita’ through to the ‘Last 1600 years’. The key features of each stage are summarised below (see Summerhayes 2003a: 136-7, 142-3, 2003b: 137-8, 2004: 150-4, Figs. 3-7):

- ‘Early Lapita’ (3500–3000/2900 BP): WNB obsidian (predominantly Kutau/Bao subsource) dominates all the known assemblages of the Bismarck Archipelago. Distribution is probably associated with more mobile populations.

- ‘Middle Lapita’ (2900/2800–2700/2600 BP): Two obsidian distribution networks develop. AD obsidian (predominantly Umrei subsource) becomes the dominant source in sites in the northern and eastern parts of the archipelago, e.g. on Mussau (ECA and EKQ), Anir (ERC and EAQ), and in the Duke of York Islands (SDP Layer III). WNB obsidian continues to dominate assemblages in the vicinity of the Willaumez Peninsula (e.g. FEA) and on the Arawe Islands (e.g. FOJ, FOH, FOL). Source distribution is best explained by proximity to source and probably indicates more sedentary populations.

- ‘Late Lapita’ (2700/2600–ca. 2200 BP): AD obsidian continues to dominate in Mussau but WNB sources become more dominant again in East New Britain—e.g. on Watom (SAC Zone C2, SDI Zone C3) and the Duke of Yorks (i.e. SDP Layer II)—and Anir (ERG). WNB obsidian continues to dominate assemblages in the vicinity of the Willaumez Peninsula (e.g. FSZ,
FAO) and on the Arawe Islands (e.g. FOJ). The amount of Mopir obsidian increases markedly in both the SDP and SAC assemblages. Variations emerge in the representation of Admiralty subsources.

- **‘Post Lapita Transition’ (2200–1600 BP):** AD obsidian continues to dominate in Mussau (EKQ) and northern New Ireland (i.e. Lossu (EAA) and Lasigi (ELS/ELT)). Amongst the AD subsources, Umrei is dominant on New Ireland and in East New Britain; a higher proportion of Pam Lin is present in western sites; and Wekwok increases in importance. WNB obsidian (Kutau/Bao subsourse) is increasingly dominant on Watom (i.e. SAC Zone C1, SDI Zone C2) and the Duke of Yorks (SDP Layer I), where the Mopir subsource remains significant. Sites in the immediate vicinity of sources contain predominantly local obsidian.

- **‘Last 1600 years’:** Two major spheres of obsidian distribution develop: a northern sphere encompasses Mussau, northern New Ireland, and New Ireland’s offshore islands (TLTF chain); and a southern sphere encompasses the southern third of New Ireland and the whole of New Britain. AD obsidian dominates the northern sphere—almost completely replacing WNB obsidian—while in the southern sphere WNB obsidian is exclusively used on New Britain and makes up a significantly larger proportion of the assemblages in southern New Ireland. Simple ‘down-the-line’ exchange may be applicable in many parts of the region. On New Ireland, the boundary between the northern and southern spheres may reflect the ‘cultural divide’ (Summerhayes 2004: 154) between the ancestors of the Tolai and peoples to the north.

A number of points are particularly salient to note in regard to my own compositional analysis of obsidian from Tanga. First: what might the source distribution amongst Tanga’s obsidian assemblages be like? Summerhayes’ model shows that the most significant diachronic changes in obsidian distribution consistently occur in the ‘middle’ zone between source regions, that is, within the elongated zone on the eastern side of the archipelago that includes Mussau, New Ireland and its offshore islands, and East New Britain (including the Watom and Duke of York islands). This suggests that the obsidian assemblages of Tanga are also likely to reflect significant changes in source over time. Potentially earlier obsidian on Tanga (i.e. from some surface sites associated with earlier ceramic groups) may therefore indicate a similar distribution pattern to that observed at ‘Early’ (i.e. mostly WNB obsidian) or ‘Middle’ Lapita sites (i.e. mostly AD obsidian) on the Anir group to the south. The lack of data for the TLTF chain for the ‘Post-Lapita Transition’ period, however, makes it difficult to predict what Tanga’s ‘transitional’ source distribution pattern may be like. Summerhayes’ model indicates that a very similar ‘Late Lapita’ pattern is found amongst sites on nearby Anir (ERG), Watom (SAC Zone C2, SDI Zone C3) and
the Duke of Yorks (SDP Layer II). However, a number of things undermine the certainty of this pattern. To begin with, the dating of these Watom assemblages has been revised since Summerhayes’ model was published. Anson et al. (2005) now place the age of SDI Zone C3 and the upper part of SAC Zone C2 beyond Summerhayes’ upper ‘Late Lapita’ limit of around 2200 BP (see Chapter 2 and Appendix 1), that is, within the early part of his ‘Post Lapita Transition’ period. It is also unclear what percentage of obsidian belongs to the upper ‘transitional’ part of Zone C2 at SAC (see further discussion below). The Feni Mission (ERG) assemblage may not securely characterise ‘Late Lapita’ either. Summerhayes (2004: 147, 150) classified the ERG site as ‘Middle/Late Lapita’ on the basis of pottery decoration, but feels its obsidian pattern is more similar to other ‘Late Lapita’ assemblages. However, Summerhayes (2000b: 171, 2004: 147, & pers. comm.) also notes that the ERG pottery looks eroded and re-deposited, there was no distinct stratigraphy within the deposit (which is dated by a single unreliable radiocarbon determination), and the assemblage is likely to be mixed. The age of the Kabilomo (SDP Layer II) site’s obsidian assemblage is difficult to interpret. While Summerhayes attributes the obsidian assemblage from SDP Layer II to the ‘Late Lapita’, this layer is said to constitute an ash that almost certainly derives from the Rabaul eruption at around 1400 BP (White & Harris 1997: 98, Table 1), and indeed Specht (2002: 43, Table 3) attributes both SDP Layers I and II to the ‘post-Lapita’. White and Harris (1997: 103) also note that there may be some disturbance in the upper ash levels of SDP (i.e. Layers I and II) and the associated pottery was not readily attributable to a particular style group. Furthermore, if the larger sample of obsidian analysed by density from SDP Layer II is added to the small PIXE-PIGME sample employed by Summerhayes, the distribution pattern in this layer is more heavily weighted to AD obsidian (54%) than WNB obsidian (46%) (White & Harris 1997: Table 4). Therefore, the ‘Late Lapita’ obsidian pattern in East New Britain and southern New Ireland must be considered with caution.

In the ‘Last 1600 years’ sites on the TLTF islands and northern New Ireland appear to be dominated by AD obsidian. Summerhayes (2004: 151) emphasises, however, that this last period is the most difficult to model due to the very limited and patchy archaeological investigation across the region. Consequently, for New Ireland and East New Britain it is fleshed out using ethnographic analogy (ibid. 154). Indeed, I would note in particular the less than satisfactory requirement to rely on small, largely undated surface collections to represent both the southern part of New Ireland (White 1997) and its offshore islands—including the Tanga Islands (Ambrose

NB: White (1997: 144) presents seven obsidian hydration dates from four different sites, dating from 1207–402 BP.
1976, 1978; Summerhayes 2004)—during this period. As the analysis of pottery from surface sites on Tanga has shown, surface material is not necessarily the most recent, and there may well be mixed source ‘messages’, potentially reflecting earlier periods, amongst this last stage.

Second: what might Tanga’s distribution pattern(s) mean in terms of interaction? Summerhayes argues that the development of two distinct obsidian distribution networks in the Middle-Late Lapita periods ‘no doubt represents a re-alignment’ (2004: 152) in both the movement and exchange of obsidian and the relationships between groups. However, combining stylistic evidence from pottery over this period, he proposes that the changes do not signify the social break-up of Lapita society and the onset of ‘regionalisation’, but rather more sedentary, socially related communities that were still interacting (Summerhayes 2003a: 139, 142-3, 2004: 153). It is only at the end of the Lapita sequence that regionalisation is evident. As he states, the development of ‘social boundaries’ (cf. Allen 1996) ‘separating socially unrelated groups could be what was happening from the post-Lapita transition period onwards’ (2004: 154). According to Summerhayes then, the comparison of Tanga’s ‘transitional’ obsidian distribution pattern with that of other ‘transitional’ sites could point towards more tightly defined, localised interactions between related communities. The very small mean weights that characterise post-Lapita obsidian assemblages (including those from Tanga, see Chapter 3 and below), irrespective of their distance from the sources (i.e. 0.2–1.5 g; Specht 2002: 44, Table 4), are thought to be indicative of economising behaviour (see also, Summerhayes 2003b: 140). Therefore, these communities may not have used obsidian to ‘replicate’ their ancestral society in social and material terms in the sense that Specht (2002: 44-5) suggests for colonising Lapita groups. However, similarities in obsidian distribution patterns may still have had similarly ‘significant historical meaning’ (ibid.). Obsidian may have been used in part to ‘reproduce’ the social relationships between ‘transitional’ communities—symbolising, facilitating, maintaining, and constraining them (cf. Foster 1995 for Tanga; Sheppard 1993: 135; Torrence et al. 1996: 220; Thomas 1999: 7, 93-4, 125). But economical use following exchange (cf. Sheppard 1993) could feasibly indicate that the supply of obsidian was not as assured and that the social relationships that guaranteed access to it were weakened. Alternatively, there may have been other more favoured or valued ‘tools’/means of social reproduction. Like Summerhayes’ approach, the social ‘value’ or meaning of obsidian is unlikely to be fully apparent when viewed in isolation; when combined with other threads of evidence a fuller picture may emerge.
7.3 OBSIDIAN AND ITS SOURCE DISTRIBUTION AT KEY ‘TRANSITIONAL’ SITES

The detailed review of the nature of obsidian assemblages at the key ‘transitional’ sites is presented in Appendix 8. The findings of this overview are discussed below (see Appendix 8 for full references).

7.3.1 Discussion

The ‘transitional’ obsidian source distribution evidence indicates that the Admiralties’ dominance of supply (in particular Lou Island’s Umrei subsource), which Summerhayes (2003b, 2004) identified in the northern Bismarck Archipelago (e.g. at Lossu and Lasigi), extended southeast through Nissan (Spriggs 1991) to the DAF site on Sohano Island (Wickler 2001). The amount of obsidian moving along this corridor of perhaps broadly, socially related groups, was apparently never large—still less than one kilo at the site (DAF) with the greatest quantity—and it appears to have been used in a largely expedient fashion. While the ‘transitional’ Sasi (GDY) assemblage on Lou Island, in the source region itself, was made up exclusively of locally derived obsidians, the other sites involved in this AD obsidian exchange network also contained varying minor amounts of WNB obsidian, indicative of participation in a western network as well. For example, at Lasigi around four per cent of the total obsidian came from the Talasea area of WNB (mostly Kutau/Bao subsource) (Figs. 7.2–7.3), and at Lossu, the analysis of a small sample indicated that around 15 per cent of pieces were from WNB.

At Lasigi, given the distribution of obsidian in the deposit and the indications from pottery style in the previous chapter, it seems more than likely that the bulk of obsidian artefacts from both Dori and the Mission derive from the ‘transitional’ phase of occupation dated to around 2250–2050 cal BP. Similarly, at Lossu, pottery style also indicates that most of the obsidian assemblage is probably ‘transitional’. The low mean weights of obsidian at Lossu and in all phases at the Dori and Mission sites (i.e. <1 g) fit the ‘post-Lapita’ reduction pattern (Specht 2002), and provides further support for a ‘transitional’ age for all these sites.

The few retouched obsidian point fragments found at Lossu and DAF (White & Downie 1980; Wickler 2001) most probably indirectly link these sites with the remarkable Sasi assemblage (Ambrose 1991a; Fredericksen 1994, 2000), which comprises a ‘workshop dump’ resulting from the relatively large-scale or intensive manufacture of retouched obsidian points. The Lossu and DAF points possibly constituted the most meaningful or valuable elements of exchanges involving AD obsidian, rather than representing hostile interactions (see Ambrose
Evidence of blade technology is also present at the Paniavile site (Reeve 1989), which may date to around the same period. If this ‘post-Lapita innovation’ (cf. Fredericksen 1994: 177) was indeed intended primarily for use as a weapon, then it is intriguing to think whom the Lou Islanders were defending themselves against. Perhaps as Ambrose (1991a: 110) proposed, the point technology was symbolic of developing (potentially hostile?), wider connections, not only within the Bismarck Archipelago, but also perhaps with areas further to the west in New Guinea and Island Southeast Asia, as the piece of Sasi bronze implies (see Chapter 2).

The evidence from Watom indicates that in terms of the supply of obsidian, the communities at Reber-Rakival had considerably closer social ties with communities in the direction of the West New Britain source region (Green & Anson 2000b; Anson 2000). Like the AD obsidians, this material was used in a wholly expedient fashion. As mentioned above, unlike Summerhayes’ model, in which both the Kainapirina (SAC) Zone C2 and Vunavaung (SDI) Zone C3 assemblages are classed as ‘Late Lapita’, the redating of these sites (Anson et al. 2005) indicates that both are largely ‘transitional’ in age. The relatively low mean weight (1.0 g) of the SAC (I-II) Zone C2 assemblage, which is compatible with Specht’s (2002: 40, Table 2) post-Lapita reduction pattern, could also indicate that it is largely ‘transitional’ in age.

South of Buka the evidence is very minimal and unclear. In fact, in Vanuatu and Fiji, while obsidian is found in early Lapita assemblages in varying amounts, there is no flaked obsidian—from any known source—dating to the ‘transition’. On Tikopia, however, there is the possibility that some Admiralties and Banks Island obsidian may in fact date to the ‘transition’ in the late Kiki phase (see discussion of this possibility in Chapter 4), indicating far ranging contact with the northern Bismarcks and northern Vanuatu at this time (Kirch & Yen 1982; Spriggs 1997: 137; Hanslip 2001: 230).

### 7.4 Obsidian and Its Source Distribution on Tanga

PIXE-PIGME was carried out on a 20–25 per cent sample of obsidian from the squares with the highest density at Angkitkitana (Sq. 3B, n=80) and Lifafaesing (Sq. 2, n=15), and a 12 per cent sample drawn from seven surface sites (n=19) across Tanga. Following this, relative density analysis was carried out on the total number of pieces recovered from the sampled squares at Angkitkitana (n=394) and Lifafaesing (n=61), and the entire collected sample from the surface sites (n=153). Full details of sample selection and preparation, and the methodologies used are presented in Appendix 3.3.
A similar sized sample (ca. 20%) of obsidian was drawn from each spit of Sq. 3B at Angkitkita. However, given that the highest densities of all artefacts were recovered from the main occupation horizon (Unit II-III), which is dated to around 2250–2180 cal BP (1σ) in the ‘transition’ period, this horizon is represented by the highest number of obsidian samples. As I have discussed in Chapter 3 and elsewhere, the majority of the cultural material from the upper Units I and II is most probably not in situ and more than likely derives from Unit II-III. The total obsidian recovered from Sq. 3B represents approximately 39 per cent of that recovered from the site as a whole, which amounted to less than 300 g.

At Lifafaesing rockshelter, the total obsidian from Sq. 2 represents 66 per cent of the total number (23.8 g) recovered from the site. Unit VI of this square dates to the ‘transition’ at around 2150–2040 cal BP (1σ). Obsidian from some of the other units (in particular Unit V) may possibly have been displaced from Unit VI by disturbance.

On the basis of association with pottery of particular ceramic groups (see Chapter 6), the surface sample includes obsidian collected from sites that most likely date to the ‘transitional’ period (i.e. Warambulut (ETK) and Amfuli (ETZ)) and earlier Lapita period of occupation (i.e. Matampul (ERP), Matangkipit (ETS), Nonu (ETR) and Ansingsing (ETF)) (see Figs. 5.8–5.9 in Chapter 5). The latter period is dated at Angkitkita to around 3150–2950 cal BP.

### 7.4.1 Results

**Angkitkita**

PIXE-PIGME analysis of the total sample from Sq. 3B revealed that more than half of the obsidian (ca. 59%; n=47) derives from the WNB source region (Table 7.1, Fig. 7.4). Nearly all of these pieces are from the Kutau/Bao subsource (55%), though two pieces are attributed to Gulu (one provisionally; 2.6%), and one piece possibly comes from the Baki subsource. Approximately 41 per cent (n=33) of the Sq. 3B sample comes from sources in the Admiralties. With the exception of one piece attributed to Pam Lin Island, all of the AD obsidian derives from the Lou Island subsources of Umrei (35%) and Wekwok (5%). The source distribution pattern amongst the sample from Spits 4–8 (Fig. 7.4b), which comprises the relatively in situ material from the

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4 The compositional results (i.e. both temper and clay fabric) from the analysis of pottery throughout the deposit indicate a cohesive assemblage and strengthen this interpretation (see Chapter 5).

5 Given the density distribution of obsidian in the Sq. 3B deposit, Spit 4 (classed as Unit II) is believed to relate to the Unit II-III occupation layer, and Spit 9 (classed as II-III) to Unit III.
‘transitional’ horizon, is virtually identical to that from the entire square, indicating that the bulk of the obsidian, in particular from the upper units, is probably ‘transitional’ in age (but see below).

Density analysis revealed a very similar overall pattern (Table 7.2, Figs. 7.5–7.6). Around 58–63\% per cent of the total obsidian from Sq. 3B derives from WNB, with a slightly higher percentage (59–64\%) amongst the ‘transitional’ material from Spits 4–8. An interesting result, however, is the indication of a minor, earlier peak in the use/discard of AD obsidian within Spits 9–12 (Unit III), which could relate to the Lapita period occupation of the site (Fig. 7.7). AD obsidian comprises at least 75 per cent (n=21) of the obsidian from these spits, with about 18 per cent (n=5) from WNB (Table 7.2).

Within the ‘transitional’ period at Angkitkita, the peak discard of AD obsidian (in terms of both count and the weight of material) also appears to have occurred somewhat earlier in the depositional sequence in Spits 6–7, whereas the discard of WNB obsidian peaks in Spit 5 (Fig. 7.7). However, given the small amount of material present, the Unit II-III obsidian could simply represent a small number of knapping events of different material acquired from the two source regions, which were not necessarily separated by any great lengths of time.

Though the difference is very small and is perhaps insignificant, the mean weight of WNB obsidian at Angkitkita is lower than AD obsidian, apparently regardless of its relative abundance in the deposit (Table 7.3). In the ‘transitional’ horizon (Spits 4–8) where it is most abundant, WNB obsidian has a mean weight of 0.24 g and AD obsidian has a mean weight of 0.32 g.

**Lifafaesing**

PIXE-PIGME analysis indicated that the source distribution of the small sample of obsidian in the ‘transitional’ horizon (Sq. 2, Unit VI) at Lifafaesing is nearly identical to that at Angkitkita, with around 57 per cent of material from WNB (all from Kutau/Bao) and 43 per cent from the AD region, including pieces from the Umrei and Pam Lin subsources (Table 7.1). A similar distribution pattern is evident in the sample from the whole square—some of which may be displaced from Unit VI—with a slightly higher percentage of material from the Umrei source.

Density analysis of the entire sample from Unit VI, however, reveals a much stronger representation of WNB (ca. 86\%) compared to AD obsidian in the assemblage (Table 7.2, Figs. 7.8–7.9), though it is possible that this is skewed by the small size of the sample. The percentage of WNB obsidian is somewhat lower (ca. 73\%) in the square as a whole.

\* The upper limit includes samples thought possibly to derive from this source region (i.e. allocated to 'WNB?').
Like Angkitkita, the mean weight of WNB obsidian is lower than AD obsidian, in both the ‘transitional’ Unit VI (0.17 g opposed to 0.24 g of AD obsidian) and in the square as a whole (Table 7.3).

**Surface sites**

PIXE-PIGME analysis of the sample from the seven surface sites on Tanga indicated a significantly higher representation of AD obsidian (ca. 74%) than at either Angkitkita or Lifafaesing. The sample is predominantly made up of material from the Umrei subsourse (63%), with single pieces from Pam Lin and an unallocated AD source (Table 7.1, Figs. 7.10–7.11). Of the few pieces sourced to WNB, most are from Kutau/Bao (21%) and one from the Ansingsing (ETF) site is from Gulu.

Density analysis of the entire assemblages from these sites furthers the indications from PIXE-PIGME that AD obsidian is most dominant at sites that I have argued to contain earlier Lapita period pottery—i.e. mostly ‘Exotic Wares’ exhibiting stylistic features that include carinations, and dentate-stamped and bounded incised decoration—such as Matampul (ERP), Matangkipit (ETS), Nonu (ETR) and Ansingsing (ETF) (Fig. 7.12). The two surface sites with apparently ‘transitional’ period assemblages in which ‘Local Ware’ is dominant, Warambulut (ETK) and Amfuli (ETZ), both have a larger percentage of obsidian sourced to WNB. However, the higher percentage of AD obsidian compared to WNB obsidian at Amfuli could possibly indicate that the assemblage from this site is somewhat earlier in age, which was also suggested by a single finger-pinched carinated sherd collected here. The lack of pottery at Poktanli (EUY) on Boeng hinders an assessment of this site’s relative age. The obsidian at Poktanli was found in association with a variety of artefacts that probably represent a former workshop for the manufacture of amfat (tgg), which could indicate a relatively recent age for the site (i.e. sometime in the last 1000 years).

Considering these surface sites together, the mean weight of obsidian from the WNB sources was significantly lower (0.43 g) than that from the AD sources (1.24 g) (Table 7.3). The mean weight of AD obsidian was particularly high at two of the earlier sites with Lapita period pottery (i.e. 3.74 g at ERP and 5.47 g at ETS)—fitting Specht’s (2002) early Lapita pattern—but was still slightly higher at the ‘transitional’ ETK site (i.e. AD = 0.56 g; WNB = 0.34 g). WNB obsidian had a slightly higher mean weight at ETZ, EUY and ETF.
7.4.2 Discussion

The patterns of obsidian source distribution within the ‘transitional’ assemblages of Angkitkita (ETM) and Lifafaesing (EUV), both dating to between around 2250–2000 cal BP, conform much more closely to Summerhayes’ (2003b, 2004) so-called ‘Late Lapita’ pattern from Anir, Watom and the Duke of Yorks than his ‘Post Lapita Transition’ pattern. As discussed above, however, the ‘Late Lapita’-ness of this pattern is somewhat tenuous, and this apparent disparity can be partly explained by the revised dating of the relevant Watom assemblages, which now indeed date to what both Summerhayes and I would class as the ‘Post Lapita Transition’.

The source region distribution amongst Angkitkita’s PIXE-PIGME sample of around 59 per cent WNB and 41 per cent AD obsidian is most like that of the ‘Late Lapita’ Feni Mission site (ERG) on the Anir Islands (i.e. 56% and 44% respectively) (Summerhayes 2003b: 137, Table 1). Although, in terms of AD subsources, ERG has a much higher proportion of material from the Pam Lin subsource (45%; ibid.) compared to Angkitkita (3%). However, as I discussed previously, the assemblage of this site appears re-deposited, is not well dated, and is difficult to interpret (Summerhayes 2004: 147). Indeed, with pottery decoration including ‘open and loose’ dentate-stamping as well as ‘linear incision, applied bands and flat knobs’ (Summerhayes 2004: 147), like Angkitkita, it may eventually emerge that the ERG site contains materials belonging to two distinct phases of occupation: an earlier Lapita phase and a ‘transitional’ phase. The similarity of the ERG obsidian assemblage’s source region pattern to Angkitkita’s could possibly even indicate that the bulk of it is ‘transitional’ in age.

Angkitkita’s PIXE-PIGME distribution pattern is also very similar to that of Zone C2 at Kainapirina (SAC) (i.e. 53% WNB and 47% AD) (Summerhayes 2003b: 137). Considering the revised dating of the upper Zone C2 (Anson et al. 2005) and the low mean weight of the obsidian (see above), like ERG, the similarity with Angkitkita could possibly provide further indication that the obsidian assemblage from SAC Zone C2 is largely ‘transitional’ in age. The source region distribution pattern at both sites is also similar when the broader results of density analysis are considered: 59 per cent WNB and 41 per cent AD obsidian in SAC Zone C2 (Green & Anson 2000b: 67, Tables 8, 10), and 58–63 per cent WNB and 34–37 per cent AD obsidian at Angkitkita. Unlike SAC, however, PIXE-PIGME analysis did not identify any obsidian from the Mopir source

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7 Only 0.2 per cent of the total sherds at ERG were dentate-stamped (Summerhayes 2001c: Table 1).
8 The future publication of full details of the Anir sites (Summerhayes in prep.) is eagerly awaited.
in the Angkitkita 'transitional' assemblage. On the other hand, the proportions of subsources within the AD obsidian at both Angkitkita and SAC Zone C2 are similar, with the largest percentage deriving from Umrei (85% at ETM; 65% at SAC), followed by a smaller proportion from Wekwok (12% at ETM; 27% at SAC), and a small amount from Pam Lin (3% at both ETM and SAC) (Green & Anson 2000b: 67; Summerhayes 2003b: 137). This could suggest that both sites had access to similar subordinate supplies from the AD source region.

While the small PIXE-PIGME sample from Lifafaesing conforms to the 'Late Lapita' pattern, the much higher percentage of WNB obsidian in Unit VI indicated by density analysis—the highest numbers of obsidian are clearly associated with 'transitional' dates—is more comparable with 

\textit{either} the 'Post Lapita' pattern at Vunavaung on Watom (SDI Zone C2) and in the Duke of Yorks (SDP Layer 1) (i.e. around 80–84% WNB) or the 'Early Lapita' pattern on Anir (ERA, 80% WNB) (Summerhayes ibid.). Most likely, the small sample of obsidian from this special purpose rockshelter—which appears to have been used primarily for activities related to fishing, shellfish gathering, fish-hook manufacture, and rock-art production—is skewed towards WNB and is not particularly representative of broader usage.

Most striking is the difference in source region distribution between Angkitkita and Lifafaesing and New Ireland's 'transitional' sites (i.e. Dori, Mission and Lossu). Admiralties obsidian clearly dominates the New Ireland assemblages, comprising between 85–100 per cent of the samples analysed by PIXE-PIGME. However, like SAC Zone C2, the proportion of each subsource amongst the much smaller amount of AD obsidian at Angkitkita (Sq. 3B) is similar to that found at the Dori site (i.e. 84% Umrei, 5% Wekwok, and 5% Pam Lin at Dori (Bird 1996); and 85% Umrei, 12% Wekwok, and 3% Pam Lin at Angkitkita), possibly suggesting access to a similar supply/distribution network from the source region.

The \textit{acquisition} (i.e. relative proportions) of obsidian on Tanga during the 'transition' from the WNB and AD source regions—around 400 km and over 600 km distant respectively—could simply reflect the greater proximity of the WNB sources. Similarly, the higher proportion of AD obsidian in the New Ireland sites could also be explained by closer proximity to the AD source region. What proximity does \textit{not} explain, however, is why likely 'transitional' assemblages further to the south of Tanga and Anir (i.e. on Nissan and Sohano islands) contain significantly higher proportions of distant AD obsidian. It therefore seems likely that Tangans acquired greater quantities of WNB obsidian because it was more socially accessible and meaningful than AD obsidian. That is, WNB obsidian may have been used in exchanges or interactions that 'reproduced' the more important established social relationships (cf. Sheppard 1993; Torrence & Summerhayes 1997; & see other references above) to Tangans at the 'transition'.

\textbf{Chapter 7—Obsidian Exchange & Interaction at the Transition}
Tangans’ use of obsidian from the two source regions appears contrary to the findings of White and Harris in southern New Ireland and the Duke of Yorks, which point to ‘down-the-line’ exchange (White 1997: 145; White & Harris 1997: 104). They suggested that the more distant, subordinate, AD obsidian was distinguished by users and consequently used more intensively and economically, as opposed to obsidian from the dominant, nearby WNB sources, which was used more lavishly. On Tanga, however, while the low mean weights of obsidian from both source regions suggest that obsidian was greatly reduced and probably economised, the mean weight of the dominant and presumably more accessible (socially and geographically) WNB obsidian is consistently lower (i.e. more reduced) than that of the more distantly acquired AD obsidian. Though the difference in mean weights is only minimal, this could possibly suggest that obsidian from WNB had inherent properties or qualities that made it more valuable to Tangans at the ‘transition’, thus prompting greater economy. This lustrous, often highly translucent material may have been considered a higher quality material (cf. Anderson 2000: 121) and/or it may have been easier to flake, therefore allowing it to be somewhat more greatly reduced; it may have been more visually appealing; or its shininess or brilliance may even have been imbued with a certain spiritual power or ritual value (cf. Morphy 1989: 30-1), making it preferable over more dull or opaque types of obsidian. Alternatively, or perhaps additionally, Tangans may have been somewhat more lavish or wasteful with the obsidian/relationships (i.e. with the AD region) they cared less about.

The results from Tanga also indicate a change in the dominant obsidian source region over time. The indications of an earlier peak of AD obsidian discard in Unit III at Angkitkita (Sq. 3B) and the apparent predominance of AD obsidian at surface sites associated with earlier, exotic, Lapita period ceramic groups, are comparable to Summerhayes’ pattern for the ‘Middle Lapita’ period, where AD obsidian (from the Umrei source in particular) dominates assemblages. This pattern is consistent with the single radiocarbon determination (ANU-12144) from Angkitkita that is associated with exotic ceramic groups at the base of Square 2, which most probably predates the AD peak in Unit III. This determination indicated a most likely age of around 3160–2930 cal BP (0.932, 1σ) (see Chapter 3), overlapping what Summerhayes’ (2001a, 2004) defines as the end of the ‘Early Lapita’ period and the beginning of the ‘Middle Lapita’ period. The relative dearth of clearly early forms of decorated Lapita pottery found to date on Tanga would also seem to argue for a ‘Middle Lapita’ age for this AD obsidian peak.
7.5 Conclusion

The evidence discussed above indicates the existence of two main ‘transitional’ obsidian supply/distribution networks in the Bismarck-Solomons region: a west-east (W-E) network stemming from the WNB sources and incorporating Watom (and possibly the Duke of Yorks?), Tanga and possibly Anir; and a north-south (N-S) network stemming from the AD sources and extending through northeastern New Ireland (i.e. Lossu and Lasigi), the offshore islands (Tanga, possibly Anir, and Nissan) to Sohano Island (DAF) in the southeast and on to the New Georgia region. These networks were overlapping and interconnected and most of the sites/communities under discussion participated in both to varying degrees; however, they exhibited stronger ties in a particular direction. The evidence therefore lends support to Summerhayes’ (2004: 154) suggestion that two major obsidian spheres of interaction that possibly reflected social/cultural boundaries—i.e. a southern New Ireland-Gazelle Peninsula-Duke of Yorks sphere and a central-northern New Ireland sphere, which were perhaps entrenched by 1600 BP—were indeed developing ‘from the post-Lapita transition period onwards’.

Tanga’s ‘transitional’ obsidian distribution pattern, in which WNB obsidian is dominant, is most similar overall to that found in East New Britain (especially Kainapirina (SAC) Zone C2) and on Anir, and is equally distinct from the pattern seen at the New Ireland ‘transitional’ sites, where AD obsidian dominates. This could suggest that in terms of the exchange of obsidian, Tanga had closer interaction and stronger social relationships in the direction of the West New Britain source region, perhaps via the communities of East New Britain and southern New Ireland (i.e. in the W-E network). Like communities in East New Britain, however, Tangans clearly had exchange partners operating in both the N-S and W-E networks at the ‘transition’. The similar proportions of AD subsources in the assemblages of Angkitkita and Kainapirina (Zone C2)—which reflect those of the Dori site on New Ireland—suggest that both sites had access to similar subordinate supplies of obsidian from the AD source region, through the N-S network. These supplies presumably symbolised and maintained relationships of some social utility or value, but were probably less significant than those maintained in the W-E network.

The obsidian evidence from Tanga also provides some indication of discontinuity between the ‘transitional’ distribution pattern and an earlier, possibly ‘Middle Lapita’ pattern in which AD obsidian dominated, and thus by inference a change in the direction in which Tangans maintained their strongest relationships. Tanga’s earlier, AD obsidian was found at sites with pottery that appears mainly to have come from the Anir Islands to the south, though some (in particular at the Ansingsing (ETF) sites on Tefa, see Chapter 5) may also have been transferred.
from the New Ireland mainland. The ancestral, obsidian and pottery-using communities of Tanga therefore appear to have had closer social ties with communities to the north, stemming from the Admiralty region. This evidence also indicates that Tanga's more tentative ‘transitional’ links to the N-S Admiralty network were probably historically based. By the ‘transition’, however, albeit in the midstream of the N-S network, Tanga had developed stronger links to the west.

In the complementary but by no means identical stories of interaction produced so far from pottery and obsidian—that is, in the match and mismatch of the evidence—we are thus beginning to tap the complexity of interaction at the ‘transition’. This will be further explored in the next chapter by means of a new avenue of investigation of interaction in the western Pacific, using a material that may have been of high cultural significance.
8.1 A NEW WINDOW ON PACIFIC INTERACTION?

The compositional analyses presented in Chapters 5 and 7 have attempted to investigate interaction at the ‘transition’ via two very familiar and well-trodden paths: pottery and obsidian. In this chapter, I argue for the existence of a new ‘compositional’ window into the study of interaction and exchange in the western Pacific—the characterisation of red ochre—which may not only augment the information gained from the two main material culture players, but could possibly provide a means of accessing more culturally significant or meaningful exchange. The important potential of red ochre as a material in compositional studies is that unlike pottery and obsidian—the former ostensibly socially significant but not greatly transported and the latter widely distributed but of ambiguous social value—it may be able to deliver on both the key requirements discussed in Chapter 1: evidence of both movement and significance.

First, we know from numerous historic and ethnographic accounts from the western Pacific that red ochre was a valuable item used for a variety of ritual and decorative purposes. It was also often an item that was traded or exchanged between communities, sometimes over significant distances (see Appendix 9 and further discussion below). Like obsidian, there are historically recorded cases of particular non-local red ochres—which were considered higher quality or as having greater social significance—being preferred over more accessible and readily available local ochres (e.g. Blackwood 1935: 416, see further details in Appendix 9). In Australia, Smith et al. (1998: 283) have also demonstrated this to be the case with sourced red ochres in Pleistocene-aged deposits at the Piritjarra rockshelter.

In the archaeological record of the western Pacific, the generally small but persistent presence of red ochre suggests that its cultural significance may also have had a long history in the region. Though usually relegated to the ‘miscellaneous’ artefact category when reported—if reported at all—rather than in the ‘valuable’ category with such artefacts as shell ornaments or particular stone artefacts (see e.g., Smith 2002: 161), red ochre has nevertheless been interpreted as serving as a colouring agent for red slip on pottery, body decoration, in burial practices, or as possibly inferring bark cloth production (e.g. Kirch & Green 2001: 185-7). Small
quantities of red ochre nodules—often with abraded facets and striations suggesting that they have been ground to produce a powder used in pigment—or red clay or mudstone-like material have been recovered from a number of sites, ranging from the Bismarcks to Western Polynesia, in contexts dating to the:

- **pre-Lapita**: Pamwak rockshelter (GOD) on Manus Island (unpublished data); and Palandraku (DBE) and Kilu (DJA) caves on Buka Island (Wickler 2001: 193)

- **early to late Lapita (and ‘transitional’)**: the Dori (ELS) and Mission (ELT) sites at Lasigi on New Ireland (Jack Golson, unpublished data);¹ Malekolen (EAQ) on the Anir Islands (Glenn Summerhayes, unpublished data); Kainapirina (SAC) on Watom Island (Green & Anson 2000b: 62); Sohano Wharf (DAF) on Sohano Island (Wickler 2001: 193; see further discussion below); the Ponamla, Ifo and Mangaasi sites (Bedford 2000: 200-2, 2006: 210) in Vanuatu; Lolokoka (NT-90) on Niuatoputapu (Kirch 1988b: 218); and sites on Tongatapu in Tonga (especially To.1 and To.2) (Poulsen 1987: 214, Vol. I, & 70-1, Tables 91 & 92, Vol. II), and

- **post-Lapita periods**: Kura (DJW) on Pororan Island, Buka (Wickler 2001: 193); Emo (VK-10) on Teanu Island, Vanikoro (Kirch 1983: 91, 107); the Sinapupu Phase of Site TK-35 on Tikopia (Kirch & Yen 1982: 271); and Sasoa’a (SU-Sa-3) (Green 1974a: 152) and Folasala-lalo (SU-FO1) (Ishizuki 1974: 55) in Western Samoa.

In the absence of nodules of ochre, the widespread prehistoric use of red ochre in the western Pacific is also of course well attested to in numerous rock-art sites containing red painted or stencilled art (Wilson 2002, 2003). Crushed red ochre has also been reported on pounders and anvils from the Mararing period on Buka (Specht 1969: 269, 310-1), dating from around 500 BP (Wickler 2001: 6).

Second, the value of ochre resides in the substance *itself* and as such its cultural significance is ‘non-transferable’ in the absence of its physical manifestation, which makes it an ideal material for studies of interaction. That is, unlike ceramics, where culturally significant information encoded in decorative motifs may be transferred through more intangible interactions—e.g. the exchange of ideas or the movement of potters—in the absence of the physical pots themselves, with ochre it is the material itself that must move.

¹ Unfortunately, the three red ochre nodules from Lasigi appear to have been destroyed when bush fires engulfed the Weston Storage Facility in Canberra in 2003 (see, Swete Kelly & Phear 2004; Swete Kelly & Hunt 2006), and so could not be utilised in the present study.
Furthermore, and crucially for provenancing studies, another emerging, advantageous feature of red ochre is that like obsidian, ochre sources are often highly localised, discrete deposits that are geochemically and mineralogically distinct (see e.g., Smith et al. 1998: 276; Erlandson et al. 1999: 524; Hradil et al. 2003), or even magnetically distinct (Mooney et al. 2003). A number of studies in Australia (David et al. 1993; Goodall et al. 1996; Smith & Fankhauser 1996; Jercher et al. 1998; Smith et al. 1998), North America (Popelka et al. 2005), and Israel (Weinstein-Evron & Ilani 1994) have successfully characterised archaeological red ochre and/or ochre sources using a variety of geochemical and mineralogical techniques, with the aim of investigating prehistoric inter-regional interaction and behaviour. These studies have indicated that the degree of chemical difference between sources/groups of ochres is greatest when those sources are located in different geological settings, and are therefore the product of different diagenetic or other formation processes, such as sediment infill, hydrothermal deposition, or weathering (David et al. 1993: 55-6; Smith & Fankhauser 1996: 1, 93). Finer-scale source attribution or ‘fingerprinting’ of archaeological ochres to individual ochre veins or outcrops within similar broad geological settings is possible using trace element analysis (Smith & Fankhauser 1996: 69; Jercher et al. 1998: 397; Erlandson et al. 1999: 521-2), but is often still a difficult feat (e.g. David et al. 1993: 54; Weinstein-Evron & Ilani 1994: 465).

So, in spite of the widespread historic and prehistoric distribution of red ochre in the Pacific, its variety of potential uses, cultural significance, and the number of successful ochre characterisation studies carried out in other parts of the globe, the research presented in this chapter constitutes the first attempt to undertake a similar characterisation study of red ochres in the western Pacific. Spurred on by the large number of red ochre nodules recovered from my archaeological investigations on Tanga, I began the ochre study with the aim of assessing whether ochre might offer a valuable, alternative window into prehistoric interaction and exchange at the ‘transition’ in the Bismarck-Solomons region. But I also aimed to assess whether red ochre might have broader temporal and spatial applications across the Pacific in future studies of interaction. In a similar vein to the feasibility study undertaken by Erlandson et al. (1999)—who assessed whether eight North American ochre sources could be differentiated geochemically—the immediate goal of this preliminary characterisation study was to assess the suitability of (Pacific) red ochre as a material for future sourcing studies. Primarily, I hoped to assess whether or not ochres from different geographic areas within the Bismarck-Solomons region, and to a more limited degree other parts of the western Pacific, were geochemically and mineralogically distinct enough to permit the characterisation of source areas or at least source groups of spatially distinct ochres. Two techniques were used to determine the chemistry and mineralogy of
red ochres respectively: Instrumental Neutron Activation Analysis (INAA) and X-Ray Diffraction (XRD). If this assessment was positive, then ochre could be a useful material for reconstructing both intra- and inter-regional patterns of prehistoric interaction. Secondly, I also aimed to assess intra-source variability. For sourcing studies to be successful the so-called ‘provenance postulate’ must hold, namely, the intra-source variation needs to be less than the inter-source variation (cf. Weigand et al. 1977).

In this chapter, I first discuss the broad findings of a detailed overview of historic and ethnographic accounts of the role, significance, exchange, processing and sources of ochre in the western Pacific (see Appendix 9). Focussing on the Bismarck Archipelago, but also including the northern Solomon Islands and the Papua New Guinea (PNG) mainland and environs, this overview is not intended to be exhaustive. Rather, I hope to emphasise the broad social significance of red ochre in the region, which appears likely to have extended into prehistory. I then describe the archaeological (including pre-Lapita, Lapita, post-Lapita, and ‘transitional’) and modern red ochre samples that were analysed in the present study, and present the results of INAA and XRD.

8.2 STORIES OF RED OCHRE: USES, SIGNIFICANCE, EXCHANGE, SOURCES AND PROCESSING

The findings of a broad overview of the role of ochre in the western Pacific are discussed below (see Appendix 9 for full references).

8.2.1 Discussion

Historic and ethnographic accounts from PNG, the Bismarck Archipelago and the northern Solomon Islands demonstrate that red ochre was almost uniformly regarded as having important ritual, ceremonial and spiritual significance—high above that of other coloured pigments. In some areas, like many other parts of the world (see e.g., Wreschner 1980), red ochre is associated with blood and fertility (e.g. in some initiation rites; Bell 1936a: 94-5, 1957: 139; Kingston 1998) as well as death and mourning (e.g. in funerary rites; Bell 1936b: 321, 332; Foster 1990: 60), thus reflecting its connection with transformation and the cycle of life and death. In two cases, it was literally the stuff of legends (see Bell 1947: 363-4; Chowning 1978: 297).

Red ochre had, and continues to have, a wide variety of uses, ranging from body decoration (e.g. colouring the hair or face), love-magic, garden and fishing-magic (to ensure bountiful crops or catches), medicines, magical protection, rock-art, placement in burials, artefact
decoration (including to increase the ‘power’ of ceremonial items), and the storage of ceremonial currency, to more mundane uses such as to stimulate hair growth and prevent lice.

The overview also demonstrates that red ochre was frequently exchanged, often extending over considerable distances, e.g. Anir–Tanga (ca. 70 km), Tanga–Rabaul (ca. 150 km), Rabaul–Willaumez Peninsula (ca. 270 km), Kombe–Bali–Vitu (ca. 110 km), Siassi–Arawes (ca. 70 km), Pororan–Nth. Bougainville (ca. 40 km), Kurtachi–Numanuma (Bougainville, ca. 72 km), and Kiwai Island (PNG)–Mabuiag (Torres Strait) (ca. 220 km). Importantly, it was sometimes exchanged for significant cultural (including ceremonial) items that reflected alliances or relationships between groups. In one case (Anir), the wearing of red ochre was considered integral to the actual process and performance of ceremonial exchange (Rubel & Rosman 1991: 339). In conjunction with this, there are clearly recognised ‘grades’ or qualities of red ochre (e.g. Blackwood 1935: 416; Nevermann in Ohnemus 1998: 378). Those renowned for either their redness or potency are particularly sought after and are used in preference to locally available, lesser sources (e.g. Blackwood 1935: 416; Bell 1950: 96). This bodes well for sourcing studies, because it suggests that some types of ochre will be moved widely, and their distribution may track high cultural value and long-standing relationships.

In terms of source areas, there is documented evidence of at least ten—Anir (in two geographically separate areas), Simberi (in the Tabar group), Buka, Bougainville, the Willaumetz Peninsula of West New Britain, the Gazelle Peninsula of East New Britain, Papua New Guinea (at least three areas, i.e. Kiwai Island, Wahgi Valley, and Karkar Island)—and there are probably an additional three source areas in Lavongai, the Admiralties, and the Siassi Islands or Kilengi in West New Britain. A range of geological settings and therefore ochre formation processes—which would manifest in useful chemical and mineralogical distinctions—are also indicated in these widely distributed source areas.

Lastly, evidence of the deliberate heat treatment of ochre to improve its redness shows that people in the western Pacific had and have a clear understanding of the manipulation of its properties, which is probably of some antiquity (see Hughes 1977: 108; McNiven & David 2004: 218-20; Antje Denner, pers. comm. & pers. observ.; Dalmurak and Dalilit, pers. comm., Anir 2003). In effect, this knowledge is of the conversion of ferric oxides (or yellow goethite) to red hematite by a process of rapid oxidation (i.e. with the right fuel), as well as of the potential to convert hematite to black magnetite by a process of reduction, through slower burning at higher temperatures (i.e. with the wrong fuel or timing) (cf. Deer et al. 1992: 542, 562; Pomies et al. 1999; Cornell & Schwertmann 1996 in Van Klinken 2001: 50-1).
8.3 OCHRE SAMPLES USED IN THE STUDY

A total of 50 samples of red ochre were analysed by Instrumental Neutron Activation Analysis (INAA) in this pilot study and the results assessed using multivariate analysis. Subsequently, a representative sub-set of this sample (n=23) was analysed by X-Ray Diffraction (XRD). Full details of sample preparation, methods and multivariate analysis techniques are given in Appendix 3.4. Two non-ochre samples—a veneer of red slip and a small fragment of pottery fabric—were also analysed by INAA for comparative purposes. Forty-six of the samples derived from nodules found in archaeological contexts from a number of different localities within the Bismarck Archipelago of Papua New Guinea, the Autonomous Region of Bougainville, and Vanuatu (Fig. 8.1). Most dated to the Lapita or ‘transition’ periods, although two samples are from a pre-Lapita context. All except two of the archaeological ochre nodules showed signs of usewear—in the form of often multiple abraded facets on their surface—suggesting that they had been ground to extract pigment. Four samples of modern red ochres from Buka were included for comparative purposes. Summary details of the number, contexts and estimated calibrated ages of these ochre samples are given below and in Table 8.1.

8.3.1 Tanga Islands

The bulk of the total red ochre samples (n=33) used in the study were taken from 26 ochre nodules collected from seven different sites on Tanga (Fig. 8.2). Preliminary macroscopic recording of these nodules (Table 8.3) suggested that they consisted of a fairly homogeneous material that probably derived from a single source. Consequently, I hoped that the Tanga sample might provide a good test of the possible range of variation present within a single ‘source’, bearing in mind that a large amount of variation would indicate that it was not an appropriate material for sourcing studies.

Angkitkita (ETM)

The majority of Tanga samples came from the excavated assemblage of Angkitkita (n=25 from 19 nodules; i.e. 38% of the total nodules recovered) (Table 8.2, Figs. 8.3–8.5). More than half (68%) of the 19 nodules used in the analysis derived from the relatively in situ main occupation horizon (Unit II-III) (Table 8.2), which is roughly comparable to the distribution of the total nodules

2 This rock-like material was not immediately recognised as ochre (boiam) by Tangans—which today is in powdered form (see Appendix 9)—and no one could suggest where a possible source of it might be.
recovered at the site. However, it seems more than likely that the small numbers of nodules from the under- and overlying units were originally deposited in Unit II-III and have been displaced by post-depositional processes (see discussion in Chapter 3). Consequently, the total ochre from Angkitkita can be viewed as a single assemblage that was in use during the main period of occupation at the site (i.e. represented by Unit II-III) during the ‘transition’, most likely between around 2250–2180 cal BP (0.632, 1σ).

To also test for the possible range of variation present within a single nodule of the Angkitkita ochre (representing Tanga ochre overall), I ran duplicate INAA samples from two of the larger nodules, taking four samples from different parts of nodules ETM12 and ETM13 (see Figs. 8.3–8.4), which were labelled A to D.

**Lifafaesing (EUV)**

One sample (EUV1) was taken from the single recovered nodule from the Lifafaesing rockshelter, on Boeng (Fig. 8.6). This small, facetted ochre nodule, which was embedded in limestone, was recovered approximately at the middle level of Unit V (Spit 7). The nodule is bracketed by two statistically identical radiocarbon determinations on charcoal (ANU-12076 and ANU-12077), which when pooled indicate a post-Lapita age range of 1060–910 cal BP (0.893, 1σ) (see Chapter 3, Table 3.14). However, as this was the only nodule recovered from the excavations and as some disturbance was noted in Unit V (see Chapter 3), it is not clear whether the nodule is in situ. Indeed, given the encrustation of limestone, it may have been dislodged from part of the sloping limestone floor of the rockshelter, which was first exposed in Square 2 during the ‘transitional’ Unit VI, where occupation is dates to around 2150–2040 cal BP (1.000, 1σ).

**Surface sites**

Samples were taken from seven nodules collected from surface sites across the island group, including Matambek cave (samples EUX1-2) and Matampul (ERP1) on Boeng, Matangkipit (ETS1) and Matantuba (ETX1) on Maledok, and Warambulut (ETK1-2) on Lif (Figs. 8.7–8.8).

One sample (EUX2) from Matambek was taken from a piece of what is most likely naturally occurring, ferric oxide-rich limestone within the cave. This piece, which is possibly flaked but shows no evidence of grinding, acted more as a comparative ‘control’ sample in the analysis.

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3 A total of 50 red ochre nodules (293.2 g) were recovered from Angkitkita, 64 per cent from Unit II-III.
On the basis of obsidian source distribution (see Chapter 7) and/or the dominance of pottery fragments from particular local or exotic stylistic-compositional ceramic groups (see Chapter 6), this group of surface sites includes ones that most probably date to some time in the ‘Middle’ Lapita period—i.e. Matampul (ERP), Matangkipit (ETS), and Matantuba (ETX)—or are roughly contemporaneous with Angkitkita, probably dating to the ‘transition’—i.e. Matambek (EUX) and Warambulut (ETK).

Other

The two non-ochre samples—a veneer of red slip and a small fragment of pottery fabric—came from two sherds recovered from the ‘transitional’ Unit II-III at Angkitkita (Table 8.3). These sherds are most likely from the same thick-walled vessel, which is attributed to an exotic ware (EWI) dating to the ‘Early-Middle’ Lapita period (see Fig. 6.15) and possibly derives from Anir.

This slip sample was taken in an attempt to test whether Angkitkita’s ochre nodules had been used in the production of the slip. The fabric sample from one of these sherds (ETM4015) was intended as a comparison for the slip sample, to investigate whether they could be chemically differentiated.

8.3.2 Malekolen (EAQ), Anir Islands

From the Anir Island group southeast of Tanga, I analysed all three ochre nodules (samples EAQ1–3) excavated by Summerhayes from the Malekolen (EAQ) site (Test Pit 4, Summerhayes unpublished data) (Fig. 8.9).

While Summerhayes (2000b: 172, 2001a: 33-4, 2004: 147-50) considers both radiocarbon dates from Malekolen to be suspect given their very large standard deviations at 2σ, the vessel forms and decoration of the pottery that he recovered from the site suggested that the assemblage dated to the Middle Lapita period, from around 2900 to 2700–2600 BP. However, pottery recovered from Wal Ambrose’s earlier excavations at the site and from a stratigraphically unprovenanced collection contained a significantly higher proportion of sherds in what Summerhayes might consider a ‘Late Lapita’ style, or I would argue is possibly ‘transitional’ style—including sherds with crosshatch incision, applied bands and nubbins, punctation, and shell impression (pers. observ.; Ambrose unpublished data; Anson 1983: Fig. X). Furthermore, compositional evidence indicates that the distinctive, probably ‘transitional’, yellow-bodied, incised

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4 Red slip of approximately 1 mm thickness was flaking off the body of both sherds (ETM4014 & ETM4015) as a result of weathering and was easily removed with tweezers.
ware (EWII) at Angkitkita may indeed derive from Malekolen (see Fig. 6.16, Chapter 6). Therefore, there appears to be evidence that more than one phase of occupation exists at the site. One of Summerhayes' radiocarbon determinations (ANU-11190, 2110±240 bp), on charcoal in Spit 10 of Test Pit 4, is below the context of all three of the ochre nodules, and directly below nodule EAQ3. Tantalisingly, while this determination calibrates to a whopping 2620–1560 cal BP at 2σ, a more likely 'transitional' age range is indicated at 1σ (i.e. 2360–1810 (0.966) cal BP). Summerhayes (2001a: 34), however, believes the date comes from re-deposited charcoal and probably dates the eruption on Ambitle at around 2300 years ago (Licence et al. 1987), rather than the cultural assemblage.

8.3.3 Kainapirina (SAC), Watom Island

Both of the abraded, red ochre nodules recovered from the excavations at the Kainapirina (SAC) location at the Reber-Rakival site on Watom Island were included in the sample (Fig. 8.10). One nodule (sample SAC1) was recovered near the base of Zone C2 (Spit 2) and the other nodule (SAC2) comes from Zone C1 (Spit 3) (Green & Anson 2000b: 62; Anson et al. 2005: 24).

As discussed in Appendix 1 and Chapter 2, Anson et al. (2005: 28-30) now believe that the lower portions of Zone C2 at Kainapirina, where nodule SAC1 was found, represent the beginning of permanent, domestic occupation ('Event Phase III') in the Reber-Rakival area from around 2700 cal BP (i.e. within the 'Middle' Lapita period). Three statistically identical radiocarbon determinations on shell from pit features within this zone (ANU-5336, Beta-16835 and Wk-7846) pool to give a significantly later calibrated age range of 2250–1620 cal BP (2σ). These determinations are thought to date the late stage of Event Phase III in Zone C2 at the site, beginning sometime between around 2350–2150 cal BP, within what I define as the 'transition' period. Indeed, as I have argued, the bulk of the Zone C2 obsidian assemblage may be 'transitional' in age (see Chapter 7 and Appendix 8). However, due to the generally shallow depth of the Zone C2 deposit and the large number of features within it that would have displaced and

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5 Calibrated by Garling using CALIB Rev 5.0.1.
6 Licence et al. (1997: 274) interpret the most recent crater on Ambille as a maar of approximately 800 m wide, resulting from a phreato-magmatic eruption that blanketed much of the existing central caldera (ca. 9 km²) with a 5–30 m thick trachyte tuff-breccia deposit. They use three radiocarbon determinations (details not given) to date the deposit at 2300±100 years. This date calibrates to 2550–2100 (0.874, 2σ) or 2370–2150 (0.815, 1σ) cal BP (CALIB Rev 5.0.1).
7 Meyer reported recovering further red ochre pieces in the Kainapirina locality (in Green & Anson 2000a: 185).
mixed the deposit (see Appendix 1) it is not possible to give the SAC1 nodule a more circumscribed age.

The SAC2 nodule lies above the radiocarbon determination (ANU-5330) on *Tridacna maxima* shell from the interface of Zones C1 and C2, which calibrates to 1860–1560 cal BP (1σ) (Table 2.2) (Green & Anson 2000b: 38; Anson et al. 2005: 38). Anson et al. (2005: 31-2) place Kainapirina Zone C1 within their ‘Event Phase VII’ at Reber-Rakival, which they propose represents a short interval of occupation from around 1750–1550 cal BP. However, as I also argue in Appendix 1, it is most likely that the majority of artefacts from Zone C1—in particular those from the lower part of the zone like nodule SAC2—are not *in situ* and may in fact derive from the upper portion of Zone C2. The radiocarbon determination from the zone interface probably dates the timing of disturbance to the zone rather than the artefacts’ manufacture and use. Consequently, it is possible that SAC2 may in reality belong to the same cultural assemblage—and time period—as SAC1.

### 8.3.4 Pamwak Rockshelter (GOD), Manus Island

The two ochre samples (GOD1 and GOD2) used in this study from Pamwak Rockshelter in the Admiralties were both recovered from the dense shell midden layer (Layer 2) within the site. The GOD1 nodule has striations visible on one flattish surface (Fig. 8.11), while GOD2 is an amorphous, unmodified nodule. Given the very large quantities of the unmodified material throughout the site’s sequence (pers. observ.), I suspect it may be a naturally occurring ferric oxide in the deposit, perhaps part of a massive layer deposited in the Miocene limestone as a result of past hydrothermal activity.

Revised dates from the site indicate that both samples date to the Early Holocene. Both were recovered from a transition zone between analytical Units C (dated to ca. 9750–7900 bp, uncalibrated) and D (ca. 13000–9750 bp) (Matthew Spriggs, pers. comm.).

### 8.3.5 Sohano Wharf (DAF), Sohano Island

Three of the four red ochre nodules with ‘multiple grinding facets’ that were surface collected from the Sohano Wharf site (DAF) were included in the analysis (Wickler 2001: 193) (Fig. 8.12). These nodules were collected from Areas 1, 2 and 4 of the site (and labelled accordingly),

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8 See, White (1988: 233-5) for a discussion of hematite in carbonate rocks.
corresponding to the central reef (samples DAF1 and DAF2) and beach (DAF4) areas of the site (Wickler 2001: 23, 77).9

Estimating the age of these ochre nodules is difficult given their rarity, their surface context, and their association with pottery fragments of a range of styles (that Wickler describes as including 'Lapita', Sohano, Mararing and Recent). As discussed previously (see Chapter 4, Appendices 4–5), Wickler (2001: 6, 122, 241) estimated the central reef assemblage to date to around 2500–2300 BP and the beach/inner reef assemblage to around 2300–2100 BP. However, as I argued in Chapter 6, the similarity of the DAF central reef area pottery to Angkitkita’s ‘transitional’ Local Ware suggests that it probably dates to around the same period (i.e. 2250–2180 cal BP). Consequently, the beach/inner reef area is probably better thought of as also dating to the ‘transition’, possibly to around 2100 BP or later.

Wickler suggests that ochre may have been imported to the site considering the uplifted, coralline limestone geology of Sohano Island, but both the Wahgi (see Appendix 9) and Pamwak examples, however, indicate that ferric oxide deposits can co-occur with limestone geology.

8.3.6 Ponamla (ER-0-8), Erromango Island

From the Ponamla site (ER-0-8) on Erromango Island in Vanuatu I analysed three of the seven red ochre nodules (samples ER-0-8/1, -/2, and -/3) recovered from the excavation of Area A (Fig. 8.13). These nodules were recovered from Layer 1 (thought to date to around ca. 1600 BP; ER-0-8/2), Layer 2 (in situ cultural remains, ca. 2950–2330 cal BP; ER-0-8/3), and Layer 3a (2780–2360 cal BP; ER-0-8/1) (Bedford 2000: 43–4, 201). However, despite the apparently broad period indicated by the radiocarbon determinations, Bedford believes there are, in fact, two much shorter, discrete periods of occupation represented at Ponamla: an occupation by people with a ceramic tradition from around 2800–2600 BP (i.e. a maximum of about 200 years in Layers 2–3a) in the immediate post-Lapita period in southern Vanuatu,10 and a much later non-ceramic occupation when people returned to the area around 1600 BP (Stuart Bedford, pers. comm.; Bedford 2006: 35, 85).

9 Though collected from the inner reef, the material from Area 4 is said to have eroded from the beach deposit.

10 Indeed, if all five, statistically identical (at 95% confidence) radiocarbon determinations on charcoal from Layer 2 (ANU-9507, -9509), Layer 3a (ANU-10079), Layer 3b (ANU-10294), and Layer 4 (ANU-10078) are pooled, they calibrate to 2750–2630 cal BP (1σ) (CALIB Rev 5.0.1).
8.3.7 Modern samples, Buka Island

The final four samples came from two modern red ochres in granular- or powder-form, which were collected on my behalf by Dr. Matthew Leavelsley from residents of two villages on Buka in September 2003. Duplicate samples were submitted for INAA from both these ochres—one fine grained/powdery and the other coarser grained—to test for intra-source variability and the possible effects of different sample preparation.

One of these ochres (samples BUK1A and 1B) was collected from Tohatsi village in northern Buka. The other ochre (BUK3A and 3B), collected from Kubu village in southern Buka, was said to have come from the inland Solos-speaking district. There was some ambiguity about the actual source locations of these two ochres, however, and Leavelsley had in fact assumed they were both from the Solos source.11 Leavelsley (pers. comm.) was unaware whether either of the ochres had been heat treated during their production.

8.4 INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS (INAA)

8.4.1 Results

The results of INAA indicated that there were indeed distinct geochemical differences between ochres across the region. The raw INAA data is presented in Table 8.4. Of the 32 elements assayed, six (Au, Ir, Se, Ag, Ta, and Te) were not detected in any of the samples and a further 10 elements (Sb, Ba, Cs, Mo, K, Rb, Na, W, U, and Zr) were only detected in a small number of samples.

With the aim of exploring group structure and the geochemical relatedness between the ochres, multivariate statistical analysis was then applied to the elemental data from 49 ochre samples using a small set of generally shared elements (see details in Appendix 3). The results of two types of multivariate analysis—principal components analysis (PCA) and correspondence analysis (CA)—are presented here. Where appropriate, the INAA results from elements not used in the statistical analyses, but which characterise particular ochres, will be discussed alongside the statistical results.

Three samples were not included in the final statistical analyses, given the potential for highly unusual outliers to deleteriously affect any patterning present in the data (Bolviken et al. 11)

11 This is probably the same source described by Specht in 1967 (see Appendix 9).
1982: 56; Baxter 1999: 323). As expected, sample EUX2, taken from the piece of possibly naturally occurring ferric oxide-rich stone found at Matambek, was significantly different from the other samples. It had a large percentage of Ca (34%) and a much lower percentage of Fe (6% compared to 44–64% of the other samples). Thus, it should not be considered ochre. The non-ochre sherd and slip samples were also excluded from the multivariate comparison because of this outlier effect. The sample of red slip was most similar in its elemental composition to that of the sherd sample—rather than to the Tanga or Anir ochre nodules, or any of the other ochres—presumably due to contamination of the oxide by the clay fabric. The only significant difference in elemental composition between the slip and sherd sample was the somewhat higher value for chromium (Cr) of the slip, which was most similar to the Cr value of the modern Buka 1 ochre.

**Principal Components Analysis (PCA)**

As shown in the scattergrams plotting the first and second principal components (Fig. 8.14), and the first and third components respectively (Fig. 8.15), PCA separated the analysed ochres into six chemically distinct groups. The first three components of the PCA account for a high cumulative proportion (i.e. 88%) of the total variation in elemental composition of the ochres, which can be considered a very successful approximation of the data (cf. Baxter 2003: 80).

In the plot of PCA 1 and 2 (Fig. 8.14), the elements contributing most to the structure or patterning of the co-ordinates in the first component (i.e. on the x axis) are Th (2.24), Eu (1.62) and Lu (1.39), and the element which contributes most to the second component (i.e. y axis) is U. In the plot of PCA 1 and 3 (Fig. 8.15), Co contributes most to the third component (y axis).

The largest group of ochre samples, source Group 1, forms a tight cluster in both of these plots. Group 1 contains the majority of the Angkitkita (ETM) samples (23 out of 25), four of the seven samples collected from surface sites on Tanga, and all three samples (EAQ1-3) from the Malekolen site on Anir. This group is defined in both plots by: small amounts of As, Eu, La, Lu, and Sc; moderate amounts of Ce (Rare Earth Element, REE) compared to the other ochres; quite variable amounts of Co; and the absence of Th and U. In PCA 1 and 3, the Group 1 cluster is slightly more spaced out, reflecting the high degree of variability in the amount of Co present in these samples, with a maximum value of 233.0 ppm (sample ETM7) and a minimum value of 8.05 ppm (EAQ2).

The three Sohano Island ochre samples (DAF1, 2, and 4) form another tight cluster—Group 2—at some distance from all the other ochres in both PCA plots, indicating that all three samples come from the same chemically distinct source. Group 2 ochre is defined by the
presence of small but significant amounts of U (7.40–9.52 ppm), moderate amounts of As (30.80–
39.40 ppm), and somewhat lower Ce (REE) values compared to the Group 1 average.

The two modern ochres from Buka proved to be from chemically very distinct sources, separating out in both plots as Groups 3 and 4. The two sub-samples (BUK1A and 1B) taken from the northern Buka ochre—representing an unknown source locale—form Group 3 and the two sub-samples from the Solos ochre (BUK3A and 3B) form Group 4. The separation of these two Buka ochres in the plots is based primarily on the significantly higher levels of As in Group 4 (averages of around 164 ppm and 27 ppm respectively) and the lack of Co in Group 3.

The INAA results also reveal a number of other significant elemental differences between these two Buka ochres, which are not depicted in the PCA plots. For example, the Solos ochre (Group 4) contained small amounts of Ca, K, Rb, Yb, and Zn, all of which were undetected in the Group 3 ochre. The Solos ochre also contained a higher percentage of Na and more than twice as much Ba as the Group 3 ochre. Perhaps most significantly though, the amount of Cr in the Group 3 ochre was an order of magnitude higher than the Solos ochre.

Interestingly, the different consistency of sub-samples 1A and 1B in Group 3 has affected elemental detection. The coarser-grained sample BUK1B lacked detectable Eu, whereas the finer-grained BUK1A contained an amount just over the detection limit. This is manifested in the greater distance between these two samples in the plots. In all other respects, these two sub-samples are virtually chemically identical. I suspect the Buka 1 source (Group 3) is characterised by very low levels of Eu, which may or may not be detectable in various sub-samples. Despite different consistencies, there are no chemical differences between the sub-samples of the Solos ochre (Group 4), however, which cluster closely together in the plots.

The Pamwak ochre nodules (samples GOD1–2) form a distinctly separate group—Group 5—in both PCA plots. Source Group 5 ochre is characterised by moderate levels of Th (the average of around 6.5 ppm is the highest of all the analysed samples), the absence of Eu and Lu, and was the only other ochre to contain detectable uranium, though in lower levels than the Sohano ochre (Group 2). The degree of distance shown in the plots between the two Pamwak samples is a result of differing proportions of As, La and Co. The As content of GOD2 (the amorphous, possibly locally-derived nodule) was an order of magnitude higher than that of GOD1 (bearing striations), and GOD1 contained higher amounts of La and Co than GOD2. However, looking at all the elements assayed in INAA, the overall chemical composition of GOD1 and GOD2 is very similar. Where differences do occur they are in quantities rather than kinds of elements, or in some cases, elements that are not detected in one sample are present in only small quantities in the other, and so may be present near the limits of detection. Apart from As,
Th and U mentioned above, the Pamwak ochres are characterised by the presence of Zr (not detected in any of the other ochres) and the highest levels of Ba (av. 512 ppm), Cr (av. 288 ppm), and Hf (av. 13.9 ppm) of all the analysed ochres.

I have ascribed two of the Ponamla ochre samples (ER-0-8/2 and ER-0-8/3) to source Group 6, which lies immediately adjacent to the Group 4 Solos ochre in both PCA plots, due to the fact that both groups lack Eu, Lu, and U, and have similar values for Th. However, differences amongst the other assayed elements clearly distinguish between the two groups. The Solos ochre has a considerably higher As content than the Ponamla ochres (av. ca. 164 ppm and 20 ppm respectively), and somewhat higher values for Ce and Co. Amongst those elements not employed in the plots, the Solos ochre also has much higher Ba than the Ponamla ochres (av. ca. 361 ppm compared to 106 ppm in ER-0-8/2) and detectable amounts of Rb and Zn, while the Ponamla ochres have much higher levels of Cr than the Solos ochre (av. 69 ppm and 11 ppm respectively).

There are a number of chemical differences between the two Group 6 Ponamla ochre samples and the remaining Ponamla (ER-0-8/1) sample, which could indicate that ER-0-8/1 derived from a different source area. Unlike the other samples, ER-0-8/1 contains Sb, Mo, Yb, and Zn (the amounts of the latter two elements are well above the detection limits), and a considerably higher amount of Sm. ER-0-8/1 also contains higher Ce, Co, and Sm and unlike the Group 6 samples contained detectable amounts of Eu, Lu, Mo, Yb and Zn.

A number of samples do not fall into any of these outlined groups in either of the PCA plots. Five samples collected from the Tanga Islands lie outside of Group 1 in the mid-region of both plots, including ETM14 and ETM15 from Angkitkita, and ETK2, EUX1, and ERP1 from surface sites. The outlying Ponamla sample (ER-0-8/1) lies close to these Tanga samples, some distance away from the other two Ponamla samples in Group 6. The two Watom ochres (SAC1 and SAC2) do not form a group together, nor are they closely associated with any of the other groups, though SAC2 is closest to Group 1 in PCA 1 and 2.

**Correspondence Analysis (CA)**

CA separated the ochre samples into fundamentally the same chemically distinct source groups as identified by PCA, with the exception that Group 5 (Pamwak) was less clear (Figs. 8.16–8.17).

Factors 1, 2 and 3 accounted for approximately 91 per cent of the total elemental variation present. This is a very successful approximation of the data, which is clearly shown in the separation of ochre groups in the three-dimensional scatterplot (Fig. 8.18).
Importantly, as the plot of factors 1 and 2 shows (Fig. 8.16), the Group 1 cluster is much tighter than indicated in the PCAs and now includes all of the Tanga samples (i.e. including the previous PCA ‘outliers’), the Malekolen samples from Anir, and one of the Watom ochre samples (SAC2). This expanded Group 1 is clearly defined by the presence of all four of the rare earth elements (Eu, La, Sm and Yb) and by the elements Ce, Co, Lu, and Sc (Fig. 8.17).

The Group 2 Sohano ochre cluster is also well defined in the CA, separating again from the Group 1 ochres as a result of their U content. The two modern Buka ochre groups are also distinct, appearing at opposite ends of the y axis: the Group 3 ochre (northern Buka) drawn above by its moderate amounts of Cr and the Group 4 ochre (Solos) drawn below by its high As content. The two Pamwak ochre samples, defined as Group 5 following PCA, occur in the same general region of the plot (Figs. 8.16, 8.18), however, there is increased distance between them due to the significantly higher As within GOD2.

Unlike in the PCAs, all three Ponamla ochres (Group 6) are now clustering in the same general area of the plot. They are being pulled towards the Group 3 Buka samples because of similar As, Th, and Sc values, although the Buka samples differ in having somewhat higher Cr and La, and no Co.

Only the second Watom sample (SAC1, from the base of Zone C2) still remains dispersed in the CA plots. It lies closest to the Sohano ochres, possibly because of its higher As value, but it does not contain the characteristic U of the Sohano ochres.

Looking at the Group 1 cluster in enlarged detail in the plot of Factors 1 and 2 (Fig. 8.19) allows the higher degree of chemical variability found in the sub-samples of the ETM13 nodule, as compared to the sub-samples from the ETM12 nodule, to be clearly seen.

8.4.2 Discussion

Taking into consideration the more inclusive results of CA, the outlying position of the five Tanga ochre samples (ETM14, ETM15, ETK2, EUX1, and ERP1) on the PCA plots can be interpreted more conclusively as being an artefact of the PCA technique itself, stemming from the problem of ‘missing values’. That is, these samples should not be considered as true ‘outliers’ but as members of Group 1. As Baxter describes (1991: 40), the PCA method is typically ‘dominated by a small number of those oxides/elements having a low absolute presence’ and can therefore have the drawback of being ‘oversensitive to observations with a very low (relative) presence or zeroes and traces’. In this way, ‘PCA plots can suggest outliers not evident from other approaches’ (Baxter 1999: 326). The five Tanga samples all become ‘outliers’ in the PCA plots.
due to the variable detection of small amounts of three particular elements, rather than any significant chemical difference from the Group 1 cluster. With the exception of ETM15, all of these samples contained amounts of Th that were only just above the detection limit, unlike all of the other Group 1 samples. However, there may well have been small, undetectable amounts of Th (i.e. below the detection limit of 0.50 ppm) in other Group 1 samples. Similarly, samples ETK2, ETM14 (lying furthest from the Group 1 cluster) and ETM15 also lacked detectable Lu, and ETK2 also lacked Eu, whereas all Group 1 samples had generally low values for these elements.

The combined results of INAA and the multivariate analyses therefore indicate that all the ochre samples from Tanga and Anir form a chemically distinct group probably representing a single, unique source of the material. This Group 1 source has a fairly consistent chemical signature with a certain degree of variation in the amounts of some elements. This is best summed up as comprising: low levels of As, Cr, Eu (REE), La (REE), Lu, Sm (REE), Sc, and Yb (REE); moderate amounts of Ce (REE) compared to the other ochres; and quite variable amounts of Co (Table 8.5). The standard deviations in the amounts of these elements between samples are mostly low, though there is a small amount of variation present in the amounts of Ce and Sc, and a very large variation in the amount of Co present. Other variations in these Group 1 ochres occur amongst less significant elements and are a result of low levels of detection. For example, less than half of the Group 1 ochres had trace amounts of Cs (2.42±0.8 ppm) and around half had trace amounts of Hf (0.82±0.2 ppm), levels of both elements being just above the detection limit. Only around 17 per cent had detectable levels of Ba (160.67±75.4 ppm) and 23 per cent had detectable amounts of Zn (176.63±68.3 ppm), most of which were also not far above the detection limit (100 ppm for both Ba and Zn).

But what of the Kainapirina ochre ‘outliers’? Do these Watom samples really belong in Group 1 as well? PCA placed both SAC1 and SAC2 outside of the Group 1 cluster, though SAC2 was closest to Group 1 in the plot depicting the greatest percentage of variation (PCA 1 and 2), in a position comparable to that of the other Tanga Island ‘outliers’. On the other hand, CA placed sample SAC2 firmly within the Group 1 cluster, though SAC1 was still some distance from the group. To answer the question of their belonging we need to closely compare their INAA results with those for Group 1. Table 8.6 compares the elemental composition of the Watom samples with the average Group 1 chemical signature and Figure 8.20 compares the Watom elemental values with the highest and lowest recorded values in Group 1.

It can be seen from this comparison that both Watom ochres have a similar chemical composition to Group 1, with values generally lying closer to the lower end of the Group 1 range. In particular, SAC2 has similar Ce, Cr, Co, La, Lu, Sm, Sc and Yb values to Group 1.
The apparent lack of As in this sample, unlike Group 1, may actually be a product of its elevated detection limit (resulting from a low sample weight). The lowest recorded value for As in a Group 1 sample is only 0.16 ppm above the detection limit of SAC2. Looking at the other assayed elements, SAC2 also contains similar values of Br and Hf to Group 1, and like the majority of Group 1 ochres also lacks Ba and Sb. Also like the majority of Group 1 samples, both Watom samples lack Th and U. The more obstinate sample, SAC1, has values for Cr and Sc lying within the Group 1 range of variation and its values for Ce, Co, As, and La are only slightly outside the Group 1 maximum or minimum values. For example, the As value of SAC1 is only 2 ppm higher than the Group 1 maximum, and the values for Ce, Co, La, and Sm are only 4 ppm, 0.24 ppm, 1.7 ppm, and 0.52 ppm lower than the Group 1 minima respectively. While the analysis of SAC1 did not detect Lu (like some of the other 'outlying' Tanga samples) or Yb, all Group 1 samples have generally low values for these elements (minima of 0.2 and 0.6 ppm respectively), which suggests that this may also be an artefact of detection limits. The lack of detectable Eu in both SAC1 and SAC2 is the main reason for them lying outside of the Group 1 cluster in the PCA plots. However, the average Group 1 values for Eu are only just above the detection limit and so it may be that this element was not present in detectable amounts in the Watom samples, in particular in SAC2, which due to its lower sample weight had an elevated detection limit. In conclusion, I propose that the chemical composition of both Watom ochre samples is within the range of potential variation of the Group 1 source.

The two sub-sampled ochre nodules from Angkitkita (ETM12 and ETM13) provide interesting results regarding the potential intra-source variability of Group 1. Though all the samples from both these nodules are clearly clustered in Group 1 in both the PCA and CA plots, overall, the four sub-samples from ETM12 showed much less chemical variability than the sub-samples from ETM13. This is mainly a product of the greater variability in the amounts of Co (standard deviations of 6.3 compared to 2.0), Cr (6.1 and 2.4), As (4.7 and 0.3), and Ce (4.6 and 1.1) in the ETM13 sub-samples compared to ETM12. Furthermore, four elements (Sb, Cs, Cr, and Hf) were detected in some sub-samples of ETM12 and ETM13 and not in others.

The multivariate analyses also produced somewhat different groupings of the Ponamla ochres (Group 6), with PCA grouping together samples ER-0-8/2 and ER-0-8/3, and CA roughly grouping all three samples. While I argued previously that ER-0-8/2 and ER-0-8/3 represented a different source area to that represented by ER-0-8/1, taken together the multivariate results could indicate the existence of two chemically distinct source areas perhaps within a similar geological setting.
PCA of the INAA results also suggests that both nodules analysed from Pamwak are from the same source, possibly within the Pamwak rockshelter itself.

### 8.5 X-ray Diffraction (XRD)

#### 8.5.1 Samples

Following INAA, a representative sub-set (n=23) of ochre samples from each chemically identified source group was analysed using X-Ray Diffraction (XRD), with the aim of determining their mineralogy to further characterise the groups. The following sites (and samples) were included:

- **Group 1**: Angkitkita (n=8, including the two previously sub-sampled nodules ETM12 and ETM13), Lifafaesing (EUV1), Tanga surface sites (ETK1, EUX1), Malekolen (EAQ3), and Kainapirina (SAC1, SAC2)
- **Group 2**: Sohano Wharf (DAF2, DAF4)
- **Group 3**: Buka 1 (BUK1B, northern Buka)
- **Group 4**: Buka 3 (BUK3B, Solos)
- **Group 5**: Pamwak (GOD1 and GOD2), and
- **Group 6**: Ponamla (ER-0-8/1 and ER-0-8/3).

The non-ochre nodule collected from Matambek (EUX2) was also analysed for comparison.

Details of sample preparation and the methodology are given in Appendix 3.

#### 8.5.2 Results

The results of XRD analysis and the quantification of each sample’s mineralogical composition (see method in Appendix 3.4) are presented in Table 8.7 and Figure 8.21.

**Group 1 (Tanga, Anir, Watom)**

Group 1 ochre samples manifest a fairly consistent mineralogical ‘signature’, although a certain amount of variation is clearly present. While most of the thirteen samples are maghemite-rich (Fe$_2$O$_3$, mostly over 70%) with a lesser proportion of hematite (Fe$_2$O$_3$, 0–28%)$^{12}$ and a small

$^{12}$ As the preliminary recording demonstrates (Table 8.3, ‘Reaction to Magnet’) my fridge magnet was extremely good at discriminating between magnetite or maghemite-rich nodules (i.e. a strong to moderate reaction) and hematite or
amount of quartz (SiO₂, less than 3%)—the potential mineralogical signature of the source—two samples (ETM7 and ETM33) are composed almost exclusively of magnetite (Fe₃O₄) with a very small percentage of quartz, and another three are predominantly hematite (ETM14, EUX1, SAC2). One of the maghemite-rich ochres (ETM13) also contains a significant proportion (ca. 23%) of goethite (FeO(OH)) and a small amount (2.5%) of lepidocrocite (FeO(OH)).

**Group 2 (Sohano)**

The two Sohano nodules (DAF2 and DAF4) are quite similar mineralogically, in that hematite is the predominant mineral present. DAF4 is composed entirely of hematite (100%), whereas DAF2 contains a small amount of magnetite (5%).

**Group 3 (Buka 1, northern Buka)**

The Buka 1 ochre (BUK1B) is composed of nearly equal amounts of goethite (53.5%) and hematite (46.5%).

**Group 4 (Buka 3, Solos)**

The Solos ochre (BUK3B) contains roughly equal amounts of hematite (33%) and goethite (ca. 31%), as well as significant amounts of alkali feldspar (22%) and plagioclase (11%), and a small amount of quartz (3%).

**Group 5 (Pamwak)**

The two ochre pieces from Pamwak are significantly different from each other in their mineralogical composition. GOD1, which has evidence of use in the form of striations on one surface, contains mostly hematite (48%), quartz (ca. 26%) and alkali feldspar (ca. 20%), with a small amount (6%) of maghemite. GOD2, on the other hand, the amorphous nodule with no evidence of use-wear, is predominantly composed of maghemite (73%) with a small proportion of hematite (27%).

**Group 6 (Ponamla)**

Both of the Ponamla ochre nodules (ER-0-8/1 and ER-0-8/3) are composed entirely of hematite.

As expected, the mineralogical composition of the non-ochre, EUX2, is completely different to all the other samples of ochre analysed by XRD. It is comprised predominantly of hematite-rich nodules (generally no reaction). The only hematite-rich samples that had a ‘moderate’ reaction to the magnet included sample ETM14, which XRD showed to contain hematite and maghemite in a ratio of 3:2, and sample DAF2, which contained a small percentage of magnetite.
calcite (87.6%), with a small amount of magnesium-rich calcite (7.8%) and hematite (4.6%), and may well have derived from the Matambek cave itself.

8.5.3 Discussion

When assessed in light of the results of INAA and the statistical analyses, the XRD results from Group 1 ochres are particularly informative regarding intra-source variation in mineralogical composition. Though there appears to be a fairly consistent mineralogical signature for Group 1, the degree of chemical variability present in the group is reflected in a similar degree of mineralogical variability. In particular, the more varied mineral composition of sample ETM13 is clearly reflected in the higher degree of chemical variability between its sub-samples seen in the INAA results. Importantly, the XRD results show that mineralogy on its own could not adequately be used to ascribe ochres to the Group 1 source group. However, the fact that maghemite and hematite have the same chemical composition clusters them in the same group.

The unusually large percentage of both maghemite and magnetite in Group 1 could suggest that ochre nodules from this unknown source locality were deliberately heat-treated in wood-fires to form hematite, in a similar way to that carried out today and described historically (see Appendix 9). These maghemite-rich and magnetite nodules may represent by-products or variations of the heating process to improve the ochre’s colour. Being thermodynamically metastable, maghemite will invert to hematite if heated above around 250°C, and is itself formed by low-temperature (200–250°C) oxidation of magnetite (de Boer & Dekkers 1996; Przepiera & Przepiera 2001; Van Klinken 2001: 50). Goethite, as seen in nodule ETM13 as well as the two Buka ochres, will also transform to hematite and maghemite when heated to between around 250–300°C (Gualtieri & Venturelli 1999: 901; Pomies et al. 1999: 275; Frost et al. 2003: 792, 796), and partially dehydrated goethite has been shown to form a small amount of magnetite in an intermediate phase between 238–402°C (Özdemir & Dunlop 2000). Pomies et al. (1999: 280) propose that the presence of maghemite in prehistoric ochre samples can be used as an indicator of the probable goethitic origin of hematite. They state that the main formation pathway of maghemite in surface soils is via the heating of goethite together with organic matter, the result being a mixture of hematite and maghemite, with the amount of maghemite depending on the initial amount of organic matter. The identification of natural hematite as opposed to that produced from heat-treated goethite in these ochre samples could possibly be ascertained from close inspection of the XRD patterns in a later stage of research (cf. Pomies et al. 1999: 279). Similarly, Hanesch et al. (2006) found that goethite and hematite transform to a strongly magnetic phase (e.g. in samples ETM7 and ETM33) only if organic carbon is present. Lepidocrocite, a
small amount of which is found in one ochre sample (ETM13, 2.5%), can also convert into maghemite and hematite when heated above 255°C (Dinesen et al. 2001). These relatively low temperatures are easily achieved in a small, open campfire (Rye 1981; Frost et al. 2003). Indeed, they are significantly lower than the temperatures required to open fire earthenware pottery. Rye (1981: Table 3) reports that firing temperatures of between 680–920°C were achieved by present-day potters in Papua New Guinea, using sago and coconut fronds and husks as fuel, within a period of around ten minutes.

The XRD results indicate that the two modern Buka ochres have significantly different mineralogy, demonstrating that these two samples represent both chemically and mineralogically distinct sources.

The stark difference between the mineralogy of the two Pamwak nodules is somewhat in contrast to their chemical similarities, which identified them as source Group 5. In the PCA, the two nodules grouped together, while in the CA they had separated somewhat but were still in the same region of the plot. Containing calcite and alkali feldspar, the used ochre sample (i.e. GOD1) has quite a different mineralogy to the assumed naturally occurring oxide (GOD2), which could suggest that it was obtained from another sub-source—possibly still in the local area—and was brought into the cave.

8.6 Conclusion

In conclusion, there are a number of significant results from this preliminary characterisation study. First, there are distinct chemical and mineralogical differences between the ochres of the various regions of the western Pacific that I tested. This suggests that ochre is a suitable material to be incorporated in studies of western Pacific inter-regional interaction. Taken together, the results of INAA, statistical analyses (PCA and CA), and XRD clearly indicate the existence of six distinct groups of ochres, which are representative of different source regions/localities. The characteristics of each of these ‘sources’ are summarised in Table 8.8. Second, while there is a clear amount of intra-source variation, and even intra-sample variation, it is importantly less than the variation between sources. The importance of carrying out mineralogical analysis in tandem with chemical analysis for the characterisation of sources has been highlighted. Third, the major apparent ochre source, Group 1, probably representing a single source of raw material, is interpreted as including all of the analysed ochres from Tanga, Anir and Watom islands. And finally, the mineralogy of the Group 1 ochres is highly suggestive of the deliberate heating of ochre nodules to improve their redness.
There are two possible explanations for the apparent coherence of Group 1 that need to be canvassed. The first is that the ochre from all three islands/island groups comes from such a similar geological setting that they are chemically and mineralogically indistinguishable from each other. We can rule this first possibility out however. While both Tanga and Anir belong to the same andesitic, dominantly alkaline volcanic arc (see Chapter 1), the geology of Watom Island is markedly different, with its bedrock made up entirely of basalts and basaltic andesites of the Rabaul Volcanic series (Dickinson 2000: 161, 2006). The other explanation is that all three islands were involved in some form of interaction, perhaps where they were independently involved the exchange of ochre with the same unknown third party, or perhaps a form of interaction that linked all three islands in some way (Fig. 8.22). At present, I cannot describe with any certainty in which directions these interactions occurred, or where the actual source of Group 1 ochre was located. However, the amount of ochre on Tanga far outweighs that recovered from Anir or Watom (from considerably more extensive excavations), which could possibly suggest that Tanga was the source of it. The chemical signature of Group 1 ochres is unlike that of the heterogeneous, hydrothermally deposited Fe oxyhydroxides analysed from Tutum Bay on Ambitle Island in Anir (Pichler & Veizer 1999: 19; Pichler et al. 1999: 1376), particularly given that these oxides contained extremely high As concentrations, moderately high Sb, and very low levels of Co.

So, while the actual source location of Group 1 ochre must still remain with a question mark over it, what is clear is that this was a shared resource between Tanga, Anir and Watom, and that this ochreous interaction occurred over a fairly wide, but discrete area—Anir and Watom lying approximately 70 and 140 km distant from Tanga respectively. Furthermore, given the weight of ethnographic and historic evidence of the important ritual and spiritual significance of red ochre in the region, the exchange of Group 1 ochre may have been part of a culturally meaningful, significant relationship between these three communities, which articulated and reproduced their social relationships and cultural identity (cf. Foster 1995; Thomas 1999: 93).

But when and over what length of time was this potentially significant interaction occurring? Superficially, if we look at the recovered (or proposed) contexts of the ochre, the evidence could be taken to suggest that this ochre resource (Group 1) was being made use of over a relatively long time span, possibly even extending over a period of around 1900 years (i.e. from around 2900–1000 BP). That is, Group 1 ochre is present:

- in a context dated to around 1000 cal BP at the Lifafaesing (EUV) rockshelter on Tanga
- between around 2250–2180 cal BP at the Angkitkita (ETM) site and probably at the same period at some surface sites (EUX, ETK) on Tanga
- in surface sites (ERP, ETS, ETX) probably dating to the Middle Lapita on Tanga
- possibly between around 2900–2600 cal BP at Malekolen (EAQ) on the Anir Islands (on Summerhayes’ estimation), and
- in contexts dated to around 2700–2150 (Zone C2) and 1750–1550 cal BP (Zone C1) at Kainapirina (SAC) on Watom Island (see Anson et al. 2005).

But amongst this group, only the dated association within the Angkitkita site can be considered reasonably secure and there are ample reasons why the others may be insecure. As discussed above, the single piece of Group 1 ochre recovered from Lifafaesing may not be in situ and could possibly even date to the same ‘transitional’ period as the ochre from Angkitkita. Surface sites on Tanga undoubtedly contain some admixture of materials from later time periods, which is difficult to discern. At Malekolen, the radiocarbon chronology is considered suspect and there are indications of re-deposition and more than one phase of occupation. Consequently, the validity of attributing the artefact assemblage in toto to the ‘Middle Lapita’ is not well founded. Finally, due to the evident disturbance within Zone C1 and upper Zone C2 at Kainapirina, it is impossible to be certain of the ages of the single ochre nodules recovered from each zone.

Tantalisingly, however, there is at least the potential for the ochre nodules of both Kainapirina and Malekolen to be approximately the same age as those from Angkitkita. The pooled calibrated age range from the end stages of Zone C2 occupation at Kainapirina (i.e. 2250–1620 cal BP (2σ)) clearly overlaps with the chronology of the main occupation phase at Angkitkita, which could indicate that the SAC1 nodule dates from this period. The overall compositional similarity of the Zone C2 and Zone C1 ochre nodules from Kainapirina also lends further weight to inferences that the majority of artefacts within Zone C1 are not in situ and that the radiocarbon determinations do not date the cultural assemblage. Like the occasional piece of human bone ‘worked up’ from the lower burial phase (Anson et al. 2005: 32), the single ochre nodule (SAC2) from Zone C1—the nodule with the most similar chemical composition to the Tanga and Anir nodules of the two—most plausibly derived from upper Zone C2. The alternative explanation, considering Anson et al.’s (2005) revised dating of the Kainapirina sequence, would require that the same ochre source that was being used from around 2700 cal BP in Zone C2 was still being used some 950 years later in Zone C1 and following a probable hiatus of occupation at the site of around 100–200 years.
At Malekolen, the radiocarbon determination (ANU-11190) from beneath the three ochre nodules, which Summerhayes interpreted to be on re-deposited charcoal that probably dated the last eruption on Ambitle, could in fact be in situ. Most likely dating to somewhere between 2360–1810 cal BP, this determination is also comparable to the dates from Angkitkita and upper Zone C2 at Kainapirina.

Indeed, when calibrated, Licence et al.’s (1997: 274) date for the Ambitle eruption (see fn. 6) is statistically identical (at 95% confidence) to both the Malekolen date and the dates from Angkitkita’s main, ‘transitional’ occupation horizon (i.e. Unit II-III). So, did the ochreous interaction occur prior to or following the eruption on Ambitle? This is difficult to determine with any surety without further detailed analysis. However, at Angkitkita, while pumice nodules were noted as being scattered (i.e. low density) throughout Unit II-III of Trench 3A-3-3B and Square 1A, high densities of pumice were noted beneath the main artefact horizon within the upper part of Unit III (or interface with Unit II-III) in Squares 3 (Spit 10) and 3B (Spits 9-10). This could indicate that the ‘transitional’ occupation at Angkitkita occurred following an eruptive event in the region, possibly on Anir. On Anir itself, the indications given by Licence et al. (1997: 274) of the limited areal extent (ca. 9 km²) and volume of output from the Ambitle eruption (ca. 1.5 km³ if the average thickness of the deposit is considered) could suggest that its impact on communities was fairly negligible (cf. Torrence et al. 2000).13 Given the proposed connections with Tanga established in previous chapters—i.e. the transfer of pottery to Tanga some time during the Early–Middle Lapita period and possibly also at the ‘transition’, and similarities in obsidian source distribution—communities on Anir may have used Tanga as a temporary refuge following the eruption, or alternatively they may not have left Anir at all.

In summary, it is most plausible that Group 1 ochre at all these sites was part of a culturally significant exchange or interaction between the communities of Tanga, Anir and Watom within a limited period during the ‘transition’, between around 2250–2150 cal BP.

The other arguably contemporaneous ochre that I included in the analysis, from the Sohano Wharf (DAF) site, proved to be from a single source (Group 2) that was clearly chemically and mineralogically distinct from the Group 1 source. This indicates that likely ‘transitional’ communities on Sohano were not involved in the perhaps culturally specific

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13 Torrence et al. (2000: 240-2) note that the least severe prehistoric eruptions of West New Britain (WK-3 and WK-4), which each produced an output greater than the Ambitle eruption (i.e. 6 km³), had very little impact on occupation. Their evidence suggested that even after the considerably greater magnitude Dakataua eruption (Dk, 10 km³) there was rapid reoccupation.
interaction involving ochre that linked Tanga, Anir and Watom. Furthermore, it is clear that the Sohano ochre nodules collected from the central reef and beach portions of the site are from the same source. Rather than the long-term use of this resource (according to Wickler’s 2001 estimated dates for the two areas), this may indicate that at least some elements of the assemblages in these areas are contemporaneous.

So, even though it may be difficult to pinpoint the original locations of the source groups identified in this chapter in the same way that we can for obsidian in this region, ochre can still provide useful insights into links or interactions between communities in the past. In particular, it might be possible to tease out more socially ‘meaningful’ interactions and relationships through ochre—being associated with ritual and ceremonial uses—than is possible from sourcing either pottery or obsidian. The successful results of this study indicate that archaeologists in the western Pacific can gain insights into the distribution of this important item in prehistory, the exchange of which has previously been invisible in the archaeological record. When added to our knowledge of the distributions of obsidian and pottery, the characterisation of prehistoric red ochre has the potential to make an important contribution to models of past exchange and interaction in the Pacific.
9.1 The Journey So Far

In this thesis I set out to construct a more nuanced and complex picture of interaction and exchange during the period of apparent cultural ‘transition’ or transformation in the archaeology of Island Melanesia in the closing centuries of the third millennium BP. This was a period of ‘transition’ that had long been tied to the ill-defined and much debated ‘Incised and Applied Relief (IAR) Tradition’, and in the Bismarck Archipelago and northern Solomons was seen as marking the end stages or ‘demise’ of Lapita, in the transition from the ‘Late Lapita’ to ‘Post-Lapita’ periods.

As I discussed in Chapters 1, 2 and 4, I was motivated to develop a more complex understanding of interaction in this period by the current framing of the debate, which has become largely polarised around interconnected notions of the validity of the ‘IAR Tradition’ (broad similarities/differences and so-called homologous/analogous similarity in pottery style), the nature of inter-regional interaction (continuing/relative isolation), the relationship of post-Lapita assemblages with Lapita traditions (continuity/discontinuity, evolution/revolution), and the driving social processes (internal/external). But as I also showed, ethnographic cases exemplify the hollowness of such rigid and inflexible oppositions, the inadequacy of overly stringent measures of similarity, and highlight some very real and complex conundrums for archaeologists. Namely, there is no simple, clear-cut correlation between either similarity or difference in artefact styles with interaction. Rather, elements of both similarity and difference—as the products of both internal/local and external processes of interaction, operating at both micro and macro scales—may be incorporated into designs/motifs used by interacting cultural groups to maintain and forge social identities and boundaries. The balancing, integrating and enmeshing of all these things appears to be the norm. However, importantly, some cases demonstrated that there is a broader areal, overarching style or ‘common pool’ of material culture, within which local and individual agency (i.e. difference) is amply accommodated according to sets of style ‘rules’ (cf. Schwartz 1975: 108-10; Terrell et al. 1997: 167-8; Welsch & Terrell 1998: 68-9; see also, Braun 1991).
Furthermore, I also argued in Chapter 1 that in the Bismarck Archipelago in particular, post-Lapita interaction and social change is forced to contend with a great weight of negative connotations. This is brought about by the robust narrative that has developed of Lapita’s cultural ‘decline’ and ‘demise’, which is couched overwhelmingly in terms of ‘decay’, ‘restriction’, ‘reduction’, ‘devolution’, less effort and simplification. This narrative has the effect of casting a pall over the potentially dynamic and complex nature of post-Lapita society and interaction, especially for those who view post-Lapita assemblages in the context of a continuous evolutionary sequence of development from Lapita.

My strategy to address these issues—in particular the key problem of how to assess and interpret similarity and difference in pottery style, which is fundamental to assessing the validity of the ‘IAR Tradition’—was to adopt a multi-pronged approach. I attempted to track interaction using two broad types of data—compositional and stylistic—gleaned from the analysis of three different archaeological data sets: two ‘old school’ (pottery and obsidian, Chapters 5, 6, and 7) and, importantly, one novel (red ochre, Chapter 8). The latter constitutes a new window into interaction in the western Pacific; one that I have argued could potentially provide more meaningful insights into relationships between communities due to its strong association with ritual, ceremonial, and religious beliefs and practices. My approach was inspired in part by Thomas’ (1999) ‘genealogical’ approach, which builds a ‘contrastive history’ by assembling unique histories or ‘parallel accounts’ for different aspects of the archaeological record and examining their points of intersection and contrast. Notably, this type of approach accepts that each of the different ‘stories’ of interaction may have a degree of autonomy from the others and may also be at differing but potentially cross-cutting scales—thus allowing for both congruity and dissonance (cf. Lightfoot & Martinez 1995; Thomas 1999; Stein 2002).

I brought to the post-Lapita debate much needed new data from my research on the Tanga Islands (Chapter 3) and a reanalysis of ceramics from a group of New Ireland sites that had been attributed to the so-called ‘IAR Tradition’. But crucially, I first established a chronological framework for my research (Chapter 2), armed with revised cultural sequences from key sites and newly available ΔR values. This was an imperative basis from which to make comparisons—and highlight similarities and differences—between sites on both an intra- and inter-regional scale, and addressed recent criticisms of a lack of chronological rigour in previous research (cf. Bedford & Clark 2001; Bedford 2006: 175-80, 188-90). It was also vital for assessing one of the key claims associated with the notion of a pan-Melanesian, post-Lapita interaction sphere (or so-called ‘IAR Tradition’), that is, the apparent synchronicity of apparently similar changes. This was a necessary step towards helping to revise and ‘unpack’ the ‘IAR Tradition’
(cf. Bedford & Clark 2001). Through a detailed review of the chronology of major post-Lapita ceramic ‘transitions’, I established that within the limitations of the radiocarbon calibration curve it was indeed possible to define the parameters of an emerging ‘transitional’ pulse across Island Melanesia, with a group of key ceramic ‘transitions’ from the Bismarck Archipelago to Fiji dating to the period of between 2350–1900 cal BP. Thus, counter to the arguments of Bedford and Clark (Bedford & Clark 2001; Bedford 2000, 2006: 190-1; Clark 1999), there appeared to be some basis for arguing for a degree of synchronicity in the timing of related changes in ceramic sequences across much of Island Melanesia in the late third millennium BP, and therefore also a basis from which to make informed comparisons between sites. With this chronological framework as my foundation, I adopted the term ‘transition’ (and ‘transitional’ sites) as a tool to more objectively assess the evidence from this period—extricating it from either Lapita or ‘IAR Tradition’ connotations.

As a further foundation for intra- and inter-regional comparisons and to begin to assess the relationships of ‘transitional’ ceramic assemblages with each other and with ceramics of the Lapita tradition, I also undertook detailed reviews of the composition and style of ceramics at key ‘transitional’ sites (Chapter 4). Overall, these reviews found that there was widespread evidence of compositional and technological change in the emergent ‘transitional’ ceramics, as well as some limited indications of continuing long-distance ceramic transfer. There was also a generally consistent association between distinctive composition/technology and distinctive styles of pottery, that is, distinct stylistic-compositional groupings or divisions within assemblages that were related to temporal phases. With the notable exception of Fiji, all of these ceramic ‘transitions’, from the Bismarck Archipelago to New Caledonia, were found to involve the efflorescence of decorative motifs employing a repertoire of techniques such as incision, applied relief, fingernail impression and pinch, and punctation (see further discussion below).

A key part of my approach to tackling the conundrum of similarity/difference and continuity/discontinuity in my own analysis of ceramics was the correlation of detailed compositional data (based on the analysis of temper and clay) with stylistic data (Chapters 5 and 6). This has enabled me to ‘untangle’ the often partially mixed and fragmentary assemblages under investigation—which are indeed the norm in the Bismarck Archipelago—and go some way to salving the concerns of researchers who view such assemblages as being inadequate to assess stylistic change and similarity on an inter-regional basis (cf. Bedford & Clark 2001: 71; Felgat 2003: 503; Bedford 2006: 187-9). Furthermore, the Angkitikita (ETM) site on Tanga is a welcome addition to a small group of sites in the Bismarck Archipelago that enable the ‘transition’ to be perceived in greater relief or resolution—Felgate’s (2003: 501) ‘temporal amplification’—
through its content (in which ‘transitional’ materials are clearly predominant), chronology (with six radiocarbon dates defining the ‘transitional’ occupation), and the relatively undisturbed context of materials in the main ‘transitional’ phase (Chapter 3).

In the remainder of this final chapter, I draw together the different strands of evidence of interaction provided by each data set: pottery composition and style (Chapters 5 and 6), obsidian (Chapter 7), and red ochre (Chapter 8). By overlaying these spheres of interaction and noting the points of intersection and opposition, match and mismatch, I attempt to tease out the complexities of interaction at the ‘transition’. I then discuss the implications of perceived continuities and discontinuities with Lapita traditions and reconsider the validity of definitions of the ‘IAR Tradition’ and ‘Late Lapita’. I end with some suggestions for future research of the ‘transition’.

9.2 OVERLAPPING NETWORKS OF ‘TRANSITIONAL’ INTERACTION

On the modern-day Sepik coast, Welsch and Terrell (1998: 68-9) noted that different objects travelled different social pathways in many directions, each with a somewhat different distribution (see Chapter 1). Similarly, my research has shown that each type of data has been able to trace its own network(s) of interaction, forming overlapping but often contrasting ‘transitional’ interaction spheres of varying spatial scales (and in the case of pottery possibly temporal scales) and likely cultural significance (see Fig. 9.1). First, I will briefly recapitulate the nature of these ‘transitional’ interaction spheres, which date to the period of between 2350–1900 cal BP.

9.2.1 Pottery

Style

Patterns within the style of ‘transitional’ ceramics—which are not homogeneous and do not apply to all sites—are visible at a number of different scales, probably reflecting different ambits, intensities and possibly also temporal phases of interaction.

Macro-style

At the broadest scale, I propose that a ‘transitional’ interaction sphere or ceramic ‘macro-style’ zone (cf. Braun 1991) stretched from the Bismarck Archipelago—including Sasi (GDY), possibly Fissoa (ENX),1 Lasigi (ELS/ELT), Lossu (EAA), Tanga (ETM, other southern surface sites), and Watom (SAC Zone C2, SDI Zone C3, other Late Decorated ‘coarse’ wares)—through the

1 The Fissoa assemblage is less conclusive due to its small and generally degraded nature.
Northern and Western Solomon Islands—Sohano Wharf (DAF) central reef, Sohano Tradition; Miho and Gharanga/Kopo styles of Roviana Lagoon—Tikopia (Sinapupu phase), Vanuatu (Early Mangaasi, Early and Late Ifo), and as far to the south as New Caledonia (Late Puen, Pindai, Early Balabio, possibly Early Plum) (Fig. 9.1). Aspects of this ‘macro-style’ are manifest in the predominant vessel forms and in the predominant suite of decorative techniques (including incision, applied relief, fingernail impression and pinch, and punctuation) and largely unbounded incised motifs/motif elements (e.g. chevrons, herringbone, zigzag, crosshatch, and various forms of asymmetric or simple rectilinear incision) that are present in the ceramic assemblages of the key ‘transitional’ sites (see Table 4.1, and discussion in Chapters 4 and 6).

Western and eastern temporal spheres

Within this overarching ‘transitional’ macro-style, I propose that two main trends in vessel form are apparent, which could represent two closely sequential, temporal spheres of interaction (Fig. 4.1). The relative flatness of the radiocarbon calibration curve over this period (see Fig. 2.5, Chapter 2), however, does not permit the chronology of these possible spheres to be defined with any exactitude. Decorative techniques and some motif elements (e.g. double or multiple rows of fingernail pinch) link these two spheres.

A possibly earlier ‘transitional’ sphere, associated most strongly with northwestern Island Melanesia, is indicated by the distribution of (dominant) globular, round-based jars/pots with restricted necks and outcurving or more sharply everted rims. This often-decorated vessel form is dominant in ‘transitional’ assemblages stretching from the Bismarck Archipelago (Sasi, Watom, Lasigi, Lossu, Fissoa, Angkitkita, Tanga surface sites) to the Northern and Western Solomons (DAF central reef, and Roviana Lagoon’s Miho and Gharanga/Kopo styles), and Tikopia (Sinapupu phase).

The possibly later emerging ‘transitional’ sphere, representing a significant stylistic divergence in central and eastern parts of Island Melanesia, is associated with the distribution of generally incurving spherical to ovoid pots (either with direct incurving or short everted rims) and an incised and infilled triangle motif (Fig. 4.1). This later interaction sphere links the Buka-Sohano islands (Sohano Tradition) with Vanuatu (Early Mangaasi and Late Ifo) and New Caledonia (Late Puen, Early Balabio and possibly Early Plum) (see Chapter 4).

New Ireland/northwestern Solomons sub-sphere

At a higher level of resolution again, a more spatially confined ‘New Ireland/northwestern Solomons’ (NI/NWS) sub-sphere of interaction is indicated within the possibly earlier, western ‘transitional’ sphere. This sub-sphere is indicated by strong stylistic similarities between the
predominantly local ‘transitional’ wares of Lasigi and Lossu on New Ireland, Tanga (ETM and surface sites), the Reber-Rakival site on Watom, the DAF central reef material from Sohano Island, and reef sites from Roviana Lagoon in New Georgia (Miho and Gharanga/Kopo styles). These assemblages are broadly linked by: dominant, generally thin-walled and flat-lipped, outcurving or everted-rimmed globular vessels; decorative suites that include (in different frequencies) unbounded incision (e.g. crosshatch, zigzag, alternating oblique), appliqué (e.g. notched applied bands and nubbins), fingernail pinch (in single or multiple rows), and lip-notching techniques (including across-lip, interior and ‘wavy’); and decoration that is generally located on the neck and/or upper body of the vessels (see details in Chapter 6 and Table 6.53, Fig. 6.46). Local and exotic wares from Lasigi and of the Gharanga/Kopo style also share similar punctate decoration, which could possibly link them with Mussau (Epakapaka) and the Admiralties (see Chapter 6).

**Micro-styles**

At the finest scale of resolution, examples of local ‘transitional’ ‘micro-style’ (cf. Braun 1991) are evident at all sites. These are manifested in the presence/absence and/or differences in the frequency or combination of particular decorative techniques, motifs, rim/lip forms and subordinate vessel forms. That is, local stylistic differences are undeniably present, and indeed, should be expected. To name just a few: Sasi ware’s horizontal rims with applied nubbins and distinctive asymmetric incision; the predominance of combined incised and applied relief (IAR) motifs at Angkitkita and divergent rims and fingernail pinch motifs at Lasigi; unusual appliqué lip and body motifs at Lossu and Paniavile respectively; the generally pointed lip forms of Sinapupu jars; the elaborate incised motifs and lack of lip decoration at Mangaasi; the dense fingernail motifs of Erromango (Early and Late Ifo); multiple punctations on the incurving vessels of the Sohano, Early Mangaasi and Late Ifo styles; the use of shell-impression on Pindaï and Puen wares, and the common ‘loop’ style handles of later Plum ware (see full details in Appendix 5).

**Composition**

Pottery composition has also provided some evidence, albeit limited, of the transfer of ceramics and/or the materials used in their production at the ‘transition’, which in some cases corroborates the paths of interaction indicated by style (Fig. 9.1).

Within the western stylistic sphere, there is evidence for ceramic transfer at the ‘transition’ between:

- Maledok, Lif and Tefa islands in southern Tanga (Tanga Local Ware (LW))
- Angkitkita and possibly the Malekolen (EAQ) site on Ambitle (Exotic Ware (EW) - Group II)
Lasigi and the southern Admiralties (probably St Andrew Strait on Lou Island, EWI) and possibly some other part of New Ireland (EWII)

Lossu and possibly other parts of New Ireland (EWI and EWII) (see Chapters 5 and 6)

Fissoa and other areas of northern New Ireland (EWI and EWII) (see Chapters 5 and 6)

Watom and the New Britain mainland and possibly Manus (or New Ireland-New Hanover) or Bougainville (Dickinson 2000: 168-71, 177), and

Roviana Lagoon and other parts of the New Georgia group and possibly even the New Guinea mainland (or some other locale in the Solomons or Bismarck Archipelago) (Felgate 2001: 54, 2003: 487; Felgate & Dickinson 2001).

Not only did some pottery (EWII) come to Tanga from Anir at the ‘transition’, but also some of the pottery making tools (i.e. three polishing/anvil pebbles, see Chapter 3). This could indicate that it was not just the pots that were moving between the islands, but the potters themselves.

In the eastern ‘transitional’ stylistic sphere, there is possible evidence for ceramic transfer between:

- Tikopia and Vanikoro in the Santa Cruz Islands to the northwest or the Banks Islands to the southwest; and possibly with Santo in northern Vanuatu, and
- Ifo on Erromango in southern Vanuatu and New Caledonia.

### 9.2.2 Obsidian

#### West-East and North-South networks

Two obsidian interaction spheres or distribution networks were operating concurrently in the Bismarck Archipelago-northern Solomons region at the ‘transition’ (Fig. 9.1) (see Chapter 7). These networks were overlapping and interconnected. However, while most communities participated in them both, they did so to markedly different degrees, suggesting that stronger social ties were maintained in a particular direction.

A west-east (W-E) network stemming from the West New Britain (WNB) source region strongly linked ‘transitional’ communities on Tanga (ETM), Watom (SAC Zone C2), and possibly...
Anir (ERG)\(^2\) to the West New Britain (WNB) source region, while a north-south (N-S) network strongly linked communities on the east coast of New Ireland (Lasigi (ELS/ELT) and Lossu (EAA)) and Sohano Island (DAF) (through Tanga and probably Anir and Nissan) to the Admiralty (AD) sources.

Despite its position in the midstream of the N-S network, communities on Tanga (and possibly also on Anir) participated in the exchange of AD obsidian to a much lesser degree. It therefore seems likely that at the ‘transition’ Tangans acquired greater quantities of WNB obsidian—and also appear to have used it somewhat more sparingly—not just because it was more geographically accessible but because it was more socially accessible and in part ‘reproduced’ what they considered were their more important established social relationships (cf. Sheppard 1993; Torrence & Summerhayes 1997). That is, ‘transitional’ communities on Tanga had closer interaction and stronger social relationships in the direction of the WNB source region, perhaps via the communities of East New Britain and southern New Ireland.

The social ties of the main communities participating in the N-S network were even more strongly focussed on the AD source region, with only relatively minor, clearly subordinate amounts of WNB obsidian being exchanged (i.e. at ELS/ELT, EAA, and DAF). Though rare, and clearly not regularly exchanged items, Sasi-style retouched points (fragments of which were found at EAA and DAF) possibly constituted the most meaningful or valuable elements of these exchanges.

### 9.2.3 Ochre

An interaction sphere involving the exchange of a distinctive red ochre from a single unknown source location (Group 1, possibly on Tanga) plausibly linked ‘transitional’ communities on Tanga (ETM, EUV and surface sites), Anir (EAQ) and Watom (SAC) between around 2250–2150 cal BP (Fig. 9.1) (see Chapter 8). Given its likely ritual and spiritual significance, the exchange of this ochre may have been part of a culturally ‘meaningful’ or significant relationship between these three island communities, which articulated and reproduced their social relationships and cultural identity (cf. Foster 1995; Thomas 1999: 93).

\(^2\) The dating and context of materials at this site is insecure (see discussion in Chapter 7).
The other arguably ‘transitional’ community, at the Sohano Wharf (DAF) site to the south, was not involved in this locally (and perhaps culturally) specific interaction. Rather, this community made use of another distinctive red ochre source (Group 2).

9.2.4 Discussion: Intersections, match and mismatch

The intersections, matches and mismatches of these overlapping spheres of interaction are indicative of the finer scale and possible significance of connections that were maintained within a wider set of relationships (i.e. within the ‘macro-style’ zone, see further discussion in 9.4).

Lying at the intersection of the possibly earlier (western) and later (eastern) ‘transitional’ pottery spheres (Fig. 4.1), the Buka-Sohano islands may have constituted a key point of articulation between the Bismarck-Solomons region and Vanuatu and New Caledonia. Indeed, a number of factors indicate that the later eastern ‘transitional’ interaction sphere could possibly have emerged in, and spread from, the Northern Solomons. On present evidence, these islands are the only ones with ‘transitional’ ceramic assemblages representing both the possibly earlier ‘transitional’ style characterised by dominant outcurving vessels (i.e. at DAF central reef—‘western sphere’), and the possibly later ‘transitional’ style characterised by incurving vessels (i.e. Sohano Tradition—‘eastern sphere’). Furthermore, there are overlaps in decorative elements on these vessel forms (e.g. chevron, herringbone and crosshatch incision) showing elements of continuity between the possibly earlier and later ‘transitional’ spheres. Buka-Sohano also marks the westernmost extent of dominant incurving vessels and the infilled pendant triangle motif.

In what would appear to be a case of mismatch, the possible emergence of an eastern ‘transitional’ interaction sphere in the Northern Solomons appears not to have involved the concurrent extension of the exchange of Admiralty obsidian through the N-S network, or of the very minor amounts of obsidian obtained through the West New Britain W-E network. However, given the considerably larger quantity of obsidian found in association with possibly earlier ‘transitional’ wares (i.e. at DAF) compared to that found with ceramics of the Sohano Tradition (see Appendix 8), obsidian exchange—and by inference, strong social connections to the Admiralties—may have been largely restricted to the earlier phase of interaction at the ‘transition’.

The NI/NWS sub-sphere that I proposed on the basis of pottery style could attest to an area of somewhat stronger cultural and historical connections and/or intensity of interaction

3 Specht (1969: 318-9) also noted that Buka was located at something of a geographical junction to other regions.
during the earlier ‘transitional’ phase. With the exception of the Lossu and Lasigi sites in northern New Ireland (in the Madak Chain of languages), this sub-sphere corresponds in large part with what Ross (1988: 258-60, Map 12) has defined as the extent of the ‘South New Ireland/North-West Solomonic Network’ in the Meso-Melanesian cluster of Oceanic languages (see Chapter 1). This could suggest that the stylistic sub-sphere involved groups that spoke historically closely related (probably long established) languages at the ‘transition’.

The most striking intersection within the NI/NWS sub-sphere—comprising the ‘thickest’ area of overlay of the various networks—involves Tanga, Anir and Watom. The inclusion of Anir in this group is at present the least secure due to the poor chronological and stratigraphic resolution of the Malekolen (EAQ) and Mission (ERG) sites and the current absence of detailed published stylistic-compositional data of the ceramics. However, as I have argued in previous chapters, there are compelling indications that these three island groups were linked by similarities in ‘transitional’ ceramic style (in particular Watom and Tanga, see Figs. 6.7–6.8, 6.10, 6.46), similarly strong ties to the West New Britain obsidian source region, and a culturally significant exchange or interaction (or possibly even ritual) that involved the same red ochre source, most probably between around 2250–2150 cal BP. Angkitkita and Malekolen also appear to have been linked through the limited exchange of ceramics and possibly even of the potters themselves. These areas may therefore have comprised a ‘social landscape’ (cf. Gosden 1991a: 265), sharing elements of cultural identity and ideology, and whose access to and use of resources was socially based. The evidence could also suggest that Tanga’s strong present-day (and historical) cultural and linguistic connections with Anir and East New Britain—as well as the broader connections to Buka and New Ireland in the NI/NWS sub-sphere that are historically documented—have an antiquity of over 2000 years, extending back to the ‘transition’ at least.

A striking case of mismatch within the NI/NWS sub-sphere is between Tanga (ETM) and the east coast New Ireland sites, in particular Lasigi and Lossu. These sites exhibit a number of similarities in terms of pottery style (e.g. dominant and subordinate vessel forms, and some common motifs and forms of lip modification, see Table 6.53), but markedly different participation in obsidian exchange networks. There is also a lack of inter-island ceramic transfer, though this is perhaps unsurprising given that the bulk of all ‘transitional’ ceramics are produced locally. One stylistic feature also clearly distinguishes the ‘transitional’ New Ireland sites from those of Tanga: the dominance of interior and to a lesser extent wavy lip notching. The presence of exotic pottery at Lasigi (EWI) that probably derives from the southern Admiralties—the most abundant of the non-local wares—confirms the stronger links of these sites with the Admiralties as indicated by obsidian. Thus, distinct localised differences in interaction, probably reflecting specific cultural
and historical connections, appear to have developed in the ‘transition’ at the *same time* as broader relationships were maintained.4

‘Transitional’ Fiji is the most conspicuous case of mismatch. While the only unambiguous ‘transitional’ assemblage (Period III, Lakeba) has a dominant vessel form that is comparable to the early ‘transitional’ form—and to similar forms in the Lapita tradition—the distinctive paddle-impressed decoration is clearly not closely related to the dominant ‘transitional’ macro-style of decoration. Despite the possible derivation of paddle-impression from New Caledonia (cf. Best 1984, 2002; see Chapter 2), and rare examples of paddle-impressed sherds on Tikopia (Sinapupu phase) and New Caledonia (Podtanéan site) (see Chapter 4), Fiji does not appear to have participated to any great degree in the ‘macro’, ‘transitional’ interaction sphere. There was a lag of at least a few centuries before a ceramic style similar to that which characterised the ‘transition’ to the west proliferated in Fiji.

### 9.3 Continuities and Discontinuities with Lapita

Despite what I argue to be lengthy hiatuses in the occupation sequences of the Tanga (ETM, EUV) and New Ireland sites (in particular ELS)—as well as in other regional assemblages (see below)—like many researchers before me (see Chapters 2 and 4), I have been able to document a number of cases of apparent continuity of elements of Lapita traditions (cf. Spriggs 1984; Green 2003) in post-Lapita ‘transitional’ assemblages throughout this thesis. For example, continuity is indicated in the continued use/presence of: red slip (although it is generally less thick and darker red-brown) and polish/burnish; certain vessel forms (in particular the outcurving-rimmed form, but also some subordinate vessel forms, including Dori’s carinated EWII and possibly the carinated vessel present in Tanga’s surface LW); possibly a ceramic body motif (i.e. one employing the fingernail pinch technique at ETM and ELS); particular lip motifs (e.g. ETM, ELS); possibly some clay bodies and temper sources (e.g. ETM, ELS/ELT, EAA); Lapita stone adze forms (e.g. ETM, EAA); and biconical sling-stones (e.g. ETM, EAA, ENX). Obsidian exchange on Tanga and the limited transfer of exotic ceramics at Lasigi (i.e. Dori EWI) also attest to the maintenance of connections with the southern Admiralties straddling the ‘transition’. On Tanga, ceramics continued to be transferred, albeit in lesser quantities (i.e. Angkitkitka’s EWII), from Anir. Continuity from Lapita is also broadly indicated in the choice of coastal locations for ‘transitional’ settlements

4 The red ochre recovered from Lasigi (Golson, unpublished data), which appears to have been lost in the fires that swept through the Weston archaeological storage facility, could have made an important contribution to these distinctions.
and in subsistence that was based on both coastal and land-based resources, possibly including domestic animals and horticulture (Chapter 3).

In the assessment of such continuity, however, something that my research has highlighted is the critical need for ceramic continuity to be rigorously established on the basis of the correlation of detailed compositional and stylistic data. This is particularly important in the Bismarck Archipelago, where often poorly preserved and somewhat mixed assemblages from gap-toothed sequences can conflate temporal phases of occupation and produce misleading interpretations. Ceramic assemblages must be ‘disentangled’ first, in tandem with other lines of evidence—assumed innocent of continuities (or ‘guilt by association’, see Chapter 2) until they are proven to be the case.

But it is not the presence or absence of continuity or discontinuity that is critical to the post-Lapita interaction debate, rather, it is how they are interpreted, in particular regarding the tendency to perceive continuity/discontinuity as an inflexible case of either-or. I have admittedly tended to emphasise the weakness of continuity because of the way that it has come to be used to imply a simple lack of interaction between communities and the relatively gradual, isolated, independent ‘evolution’ of ceramics that bear only ‘residual’ unrelated similarities (cf. Bedford & Clark 2001, see Chapter 4). However, a more nuanced picture of interaction at the ‘transition’ requires both. Describing the continuing process of social transformation experienced by the Tolai over the preceding century, Epstein (1969: 294) noted ‘the inadequacies of an account … couched simply in terms of change, that is, of departure from some prior set of conditions and relationships’. In the midst of abundant evidence of change, he emphasised ‘the no less striking evidence of persistence and continuity’ (ibid.). Thus he states:

It becomes clear that change and continuity represent two perspectives of the same reality; they are the two faces of a single coin, so that in any given context the one cannot be understood without at the same time specifying the nature of the other (Epstein 1969: 294).

Similarly, my own data from Tanga and New Ireland indicate the persistence or resilience of certain elements that are probably ultimately derived from the Lapita cultural complex in the midst of considerably greater evidence of dramatic but not wholesale change (e.g. ceramic style and composition, obsidian supply). This contributes to a richer understanding. That is, the ‘transitional’ interaction networks described above incorporated elements of both cultural continuity and discontinuity with former Lapita groups. Continuity was perhaps based on shared history and inheritance, as Tanga’s ‘transitional’ links with Anir and more tentative links to northeastern New Ireland and the N-S Admiralty obsidian network probably were. Discontinuity
was in the form of dramatic realignments of interaction, cultural transformations, and new influences.

As Kennedy (1977: 13) noted, however, the simple presence of elements of continuity or tradition in the ‘cultural inventory’ does not necessarily mean that we are dealing with the same social unit, that is, the ‘continuity of a group constituted by [the same] social networks and a distinct identity’ (see Chapter 1). Rather, as Epstein (1969: 320) also emphasised, more tangible signs of continuity need to be sought in the ‘structure of [the] signals’ of identity. At the ‘transition’, I propose that the dramatic transformations in the signals being ‘emitted’ by decorated ceramics indicate that we are indeed dealing with groups that were constituted by different social networks and identities that were no longer recognisable as Lapita per se (cf. Felgate 2003: 502). Not only had the ‘vocabulary’ (i.e. new decorative motifs employing a novel *repertoire* of techniques) and ‘grammar’ (i.e. composition) of the style changed but the canvas itself (see Chapter 4). This ‘transitional’ style was, as White and Murray-Wallace (1996: 43) suggested, ‘an expression of a different cultural pattern and set of associations’. Our understanding of these changes and of the potentially complex nature and history of ‘transitional’ networks, as I have begun to draw out, are far from adequately served by notions of ceramic styles being in a ‘continuous evolutionary sequence’, or being the ‘utilitarian’, less labour intensive end-products of ‘simplification’, ‘reduction’, or ‘devolution’ (see Chapter 1).

**9.4 OF CONSTRUCTS AND DEFINITIONS**

As Green (2003: 96) described the *beginnings* of Lapita, I believe that at the ‘transition’ something ‘with far more content and consequence’ was occurring than warrants being placed under the umbrella of either the Lapita tradition (in particular the ‘Late Lapita’ construct in the Bismarck-Solomons region) or the ‘IAR Tradition’ as it stands. In doing so, we are undermining and obfuscating the likely complexity of interactions and social transformation at this period.

**9.4.1 A revised notion of the ‘IAR Tradition’?**

Bedford and Clark’s critique of the ‘IAR Tradition’ construct was long overdue and well-warranted (Bedford & Clark 2001; Bedford 2006: 190-1; Clark 1999: 219-222, 238, 2003). Now we need to move the debate on by heeding the inadequacies that they have pointed out at the same time as being mindful not to throw the proverbial baby out with the bathwater. I have attempted in this thesis to contribute to their call for further examination and serious revision of the ‘IAR Tradition’.

My research indicates that there is indeed some utility to a *redefined* notion of an ‘IAR Tradition’: one that is both more and less strictly defined. As I noted in Chapter 4, many of the
definitions being employed in the debate are overly strict and inflexible and do not adequately allow for the social complexity of the period to be captured. One option may be to view this cultural phenomenon as a ‘transition’ that:

- emerged within relatively defined chronological parameters (i.e. 2350–1900 cal BP)
- was less strictly tied to a particular geographic zone or ethnic population (i.e. excluding Fiji in ‘Island Melanesia’ but possibly articulating with broader phenomena occurring in Island Southeast Asia)
- was more internally complex, constituted by overlapping and interconnecting layers of networks or interaction spheres (which varied according to the type and significance of the interaction/exchange and the associated objects)
- reflected sets of interconnected relationships (including historical ones) on both more localised and broader intra-/inter-regional levels, which were the product of both local and external processes and influences, and
- was reflected in the efflorescence of a not so strictly defined ceramic decorative style, in which both ‘macro’ stylistic similarities (reproducing over-arching, intra- and inter-regional ties) and ‘micro’ stylistic differences (forging unique local or intra-regional identities) articulated and coexisted.

The overarching ‘transitional’ interaction sphere or ceramic ‘macro-style’ zone that at this stage I argue can be perceived stretching from the Bismarck Archipelago to New Caledonia, echoes the old notions of the ‘IAR Tradition’, but is fundamentally different in the ways I have outlined above. This macro-style zone may have represented a broader cultural identity and/or network of relationships forged through recurrent interaction, which linked ‘transitional’ communities in an overarching post-Lapita ‘community of culture’ (cf. Spriggs 2001: 143). This may have been similar to that perceived in the Lapita cultural complex (cf. Golson 1961: 176) and in some ethnographic New Guinea contexts (see Schwartz 1975: 108-110; Terrell et al. 1997: 167-8; Welsch & Terrell 1998: 68-9); but like the latter, it exhibited somewhat more diverse localised expressions. The layers of ‘transitional’ networks were probably held together by a range of socio-economic factors, including aspects of shared cultural identity and history, kin and marriage relationships, political alliances, interests in particular resources (e.g. obsidian and ochre) that forged trading partnerships, and probably also recurrent small-scale population movements. Also like the Lapita period, the physical exchange of pottery clearly did not play a major role in interaction at the ‘transition’—the bulk of ‘transitional’ pottery across the breadth of the study area was made using local materials. Like Summerhayes (2000a: 233-4) and Best
regarding Lapita ceramic style, I interpret this as indicating that ‘transitional’ macro-style travelled largely as information and ideas, and was therefore not governed by overly strict rules.

Hunt and Smith’s (2007: 15) notion of ‘relational autonomy’ in the context of Australian Indigenous governance networks, could be an appropriate way of thinking about the interconnection of ‘transitional’ interaction spheres. They argue that interconnected Indigenous groups are able to retain and balance important aspects of their local autonomy (and identity) at the same time as maintaining their connections in a wider set or system of relationships. As they also emphasise, not all networks and connection ‘are created equal’; some have higher cultural value and significance than others (usually those based on common identity and interests) and are given greater priority (Hunt & Smith 2007: 20). This could help explain areas of ‘thicker’ overlay—such as between Tanga-Watom-Anir—which operated within broader spheres of interaction.

9.4.2 Is ‘Late Lapita’ a chimera?

In the Bismarck Archipelago, Felgate (2003: 97-102, 501) has criticised Summerhayes’ (2000a, 2001b) ‘Early/Middle/Late Lapita’ construct for its assumption of long-term continuity and its basis on assemblages that potentially and inextricably contain a mix of temporal and functional information. Indeed, Summerhayes (2000a: 27, 2001b: 131, 2007) himself has pointed to the need for ‘Middle to Late Lapita’ changes to be better defined in the pottery assemblages of West New Britain and the Arawes, especially in terms of chronology. My specific concern in the Bismarcks-Northern Solomons is with the use of the ‘Late Lapita’ construct, in particular, Green’s (2003: Fig. 3) ‘Late Dentate Lapita Phase’ in the New Britain-New Ireland-Anir region (see also, Summerhayes 2007: 140).

Based on my research on Tanga and New Ireland and the close examination of other sites in the region, it is my increasingly firm impression that claims of serious disturbance in late Lapita sites are not very much ‘mistaken’ (Green 2003: 104). In a pattern at Angkitkita and Dori that also appears to be applicable to (and/or demonstrated at) other key ‘transitional’ sites such as Lossu, Sohano Wharf, Kainapirina and Vunavaung, I have combined chronological, stratigraphic and detailed ceramic stylistic-compositional evidence to establish that there is a significant hiatus—of between 400 to 650 years duration—that separates a distinctive ‘transitional’ phase assemblage (i.e. in Unit II-III and Phase 4 respectively, dated to ca. 2250–2050 cal BP) from an earlier distinctive most likely ‘Middle Lapita’ assemblage (i.e. lower Unit III/Unit IV and Phase 2 respectively, dated to between ca. 3100/3000–2600 cal BP). Dentate-
stamped decoration is not part of the ‘transitional’ repertoire—it had long since disappeared. This chronological pattern is also present at Lifafaesing (EUV) on Tanga. Furthermore, the association of predominantly Admiralty obsidian with earlier Lapita ceramics at Angkitkita and across Tanga’s surface sites also sends a strong ‘Middle Lapita’ signal (cf. Summerhayes 2003a & b, 2004).

The Tanga and New Ireland evidence puts forward a more plausible framework for interpreting Watom’s compositionally distinct Lapita dentate-stamped wares and fingernail-impressed/applied relief ‘coarse’ wares: they are temporally distinct, not functionally distinct. I suspect that if similar detailed stylistic-compositional analysis to that employed in this thesis was applied to some other regional ceramic assemblages (e.g. EAQ and ERG on Anir, EKQ on Mussau, and sites in West New Britain and the Arawes), then distinctive temporal assemblages could also be untangled at these sites. Like Angkitkita and Dori, these assemblages may contain occupation evidence from two distinct temporal phases—i.e. one Lapita sensu stricto (including a component of dentate-stamped and other decorated wares) and one ‘transitional’ (i.e. dated to 2350–1900 cal BP, including wares decorated predominantly with incision and applied relief etc.)—that have been mixed or conflated to varying degrees. While incision, appliqué and fingernail techniques clearly formed part of the Lapita decorative repertoire, I am not convinced that they were quite so ‘part and parcel’ (cf. Summerhayes 2000a: 232) of Lapita assemblages as has been claimed. Rather, in many cases it could be the mixing of ‘transitional’ and Lapita style ceramics that is promoting notions of continuity or even contemporaneity (e.g. on Watom, Anson et al. 2005) and the long duration of the ‘Lapita’ tradition. This may also be responsible in part for perceptions of the variability and distinctiveness of so-called ‘Late Lapita’ assemblages in terms of decorative techniques and motifs (e.g. Wickler 2001: 122, at the Sohano Wharf site; Anson et al. 2005, on Watom; Summerhayes 2007: 138-41). In other cases, ‘Late Lapita’ style remains (perhaps meaningfully) elusive and difficult to define (e.g. ‘Buka Style’; cf. Specht 1969: 195; Summerhayes 1987: 338). Consequently, I suspect that with further research the temporal ‘mountain’ that Green (2003: 96, Fig. 1) depicts in the dentate-stamping horizon across Near Oceania, formed by apparently late dates for dentate in the Arawes, Anir, Watom and Buka/Sohano—which in the case of the latter three at least are arguably insecure—will prove to be considerably more knoll-like. Perhaps the Near Oceanic pattern is, in fact, not too dissimilar to the Remote one (Anderson & Clark 1999; Burley et al. 1999; Sand 1997; Specht & Gosden 1997), with dentate-stamping lasting at most 400–500 years in Near Oceania (cf. Spriggs 2002: 52).
9.5 Future Directions

As others have emphasised (Specht 1969; Kirch & Yen 1982: 202; Wickler 2001; Bedford & Clark 2001: 71; Felgate 2003: 503; Spriggs 2004: 142; Bedford 2006: 187-9, 192), my research also points to the crucial need for more research on post-Lapita sequences, particularly in the Bismarck Archipelago where there are relatively few secure, well-dated ‘transitional’ sites.

While new sites are clearly needed, further research that correlates detailed compositional analyses with stylistic data (including decorative techniques and motifs) could also be fruitfully undertaken at a number of existing so-called ‘Late Lapita’ (or ‘Middle-Late’) ceramic assemblages in the Bismarck-Solomons region. In particular:

- Epakapaka (EKQ) in the Mussau group—where largely incised wares (but also some with applied relief and punctate decoration, the latter similar to Lasigi’s) overlap with dentate-stamped wares but appear to have different distributions in the sequence (see Chapter 6)
- Malekolen (EAQ) and Mission (ERG) sites on Ambitle—where both Lapita style (including dentate-stamped) and more ‘transitional’ style decorated ceramics have been recovered, and the presence of Group 1 ochre (at EAQ), a similar obsidian distribution pattern to Angkitkita (ERG), and ceramic transfer to Angkitkita (EAQ) suggest further ‘transitional’ ties
- sites/assemblages in West New Britain (e.g. FSZ, FAO, FOY, FAAN, FAAJ, FAAK and FAAQ on Garua; FLF, FRI, FOH) and the Arawes (e.g. FOJ, FNZ)—where ceramic assemblages (including some dating to the ‘transition’) contain pottery decorated with dentate-stamping as well as fingernail pinch and impression, crosshatch incision, lip-notching, shell and stick impression, and appliqué (Torrence & Stevenson 2000; Summerhayes 2000a; see also, Summerhayes 2007: 138)
- Sohano Wharf site (DAF)—where comparisons could be made between a larger sample of the central reef (‘transitional’) and outer reef (Lapita) assemblages, and between the central reef assemblage and pottery of the Sohano Tradition, and
- Kiki phase ceramics from Tikopia—where possibly similarly calcareous-tempered phases of ceramics could be conflated? (see Chapter 4)

At Epakapaka it would also be interesting to assess whether the distribution of lip modification through the sequence follows a similar pattern to that seen at Dori, that is, mostly across-lip notching in the earlier Lapita phase assemblage and mostly interior lip notching in the later ‘transitional’ phase (see Chapter 6). On New Ireland, ceramic analysis should be expanded to include other so-called ‘IAR Tradition’ assemblages (e.g. Pinikindu) and a larger sample at
Lossu. Also, the archaeology of the Lihir and Tabar islands is still incompletely known in comparison to Tanga and Anir.

In Remote Oceania, more detailed compositional analysis—in particular of sherd clay, but also including more detailed analysis of temper, taking into account proportional differences in the representation of minerals—could potentially throw further light on the Late Erueti–Early Mangaasi and Lapita–Early/Late Ifo ceramic ‘transitions’ in Vanuatu. It would also be particularly useful for further investigating the relationship between Early and Late Ifo on Erromango, and Early and Late Mangaasi on Efate. Further detailed research on the post-Lapita, ‘transitional’ assemblages of New Caledonia is also required, in particular the Puen tradition.

Importantly, the geographic focus of future research on the ‘transition’ should be expanded to include well-dated (and scrutinised) assemblages lying further to the west, including the New Guinea mainland and Island Southeast Asia. As shown by the research of Pétrequin and Pétrequin (1999), the illusory divide between ‘Melanesia’ and ‘Southeast Asia’ should be transcended (see Chapter 4). In particular, the potential of pottery style to provide further evidence of on-going links with the west—together with the bronze artefact excavated at Sasi (GDY) on Lou Island (Ambrose 1988)—remains as largely untapped as it was when broached by Golson (1972: 579-82) and later Kennedy (1982: 26) many years ago. Future research of pottery style should also include detailed comparison of ‘transitional’ pottery motifs across this geographic area, similar to the research that Wilson (2002, 2003) undertook on rock-art motifs in the western Pacific.

A comparison with East Timor in particular could be fruitful (Glover 1987). Here, a number of ceramic assemblages (i.e. from the Uai Bobo 1, Uai Bobo 2 and Bui Ceri Uato sites) are estimated to date to the ‘transition’ as I have defined it and, indeed, appear to contain a number of ‘transitional’ characteristics, such as generally thin-walled outcurving to everted rimmed vessels (some with surface burnish and red slip) and motifs incorporating incision and applied relief (including notched applied bands, incised herringbones and ‘hatched’ triangles) (see Glover 1987: 97, 131-2, 148, 151, 169, Tables 65, 96, Figs. 39, 51, Plates 33, 37, 45). As I discussed in Chapter 1, the Uai Bobo 1 site also contains an in situ copper-bronze artefact that has a ‘transitional’ age almost identical to that of the bronze piece recovered from Sasi. Furthermore, Dong Son influences in the rock-art of East Timor provide plausible indications not only of (Metal Age) links further to the west (O’Connor 2003: 97, 122-3; Lape et al. 2007: 249-51), but possibly also with areas to the east in West Papua, the Highlands of Papua New Guinea and parts of Island Melanesia (Wilson 2002, 2003) (see Chapter 2).
Indeed, rock-art would form a compelling overlay in the construction of intra- and inter-regional interaction at the ‘transition’. Tanga’s newly recorded rock-art (see Chapter 3), which contributes significantly to the New Ireland corpus, could usefully be compared with other regional assemblages in the context of Wilson’s (2002, 2003, 2004) model of western Pacific rock-art (and cultural) transformation.

The majority of the rock-art on Tanga appears to correspond with Wilson’s (2002: 220, 2003: 278-9) ‘Rectilinear Red’ subset of the ‘Austronesian Painting Tradition’ (cf. Ballard 1992), which could potentially link it to sites on the New Guinea mainland and to others within western Island Melanesia (importantly, in the Admiralties and on Watom), but also to sites further to the west in West Papua, the Moluccas and East Timor, and to the southeast in Vanuatu. But it is the small corpus of stencilled, charcoal rock-art from Tanga that perhaps presents the most interesting avenues for future research into the ‘transition’. Though black stencils were excluded from her model (presumably because of their relative rarity), Wilson (2002: 192) proposed that in Vanuatu a ‘Black1’ or ‘Mangaasi period’ tradition, typified by ‘inaccessible’ black hand stencils, may have begun around 2200 BP (e.g. on Malakula and Lelepa islands). She noted that the clarification of the dating of this ‘Black1’ tradition was very important not only to notions of cultural continuities and/or discontinuities between the Lapita and post-Lapita periods in Vanuatu—‘Black1’ was seen as being a ‘continuous transition’ from the inaccessible art of the earlier Lapita-related ‘Red1/Red2’ tradition—but also to the broader ‘IAR Tradition’ debate and intrinsic questions of inter-regional interaction (Wilson 2002: 192). Crucially, Wilson proposed that ‘the lack of evidence for black stencils in other parts of the western Pacific’ from around 2300 BP could in part indicate that rock-art production in Vanuatu was largely following its own regional trajectory, rather than participating in a broader western Pacific-wide network since Lapita times, as the bulk of her evidence suggested (2002: 223, 2003: 280; emphasis added). Furthermore, as I noted in Chapter 2, the subsequent extensive AMS dating of charcoal pictures from Vanuatu indicated that there was a major but short-lived peak in rock-art production between 2200 and 2000 BP (Zoppi et al. 2004), thus coinciding with the ‘transition’ as I have defined it.

Is there a similar ‘transitional’ peak in charcoal rock-art further to the west? Was Vanuatu really on its own rock-art trajectory at the ‘transition’? Could rock-art help to corroborate the similarities that I have proposed in ‘transitional’ ceramic style and therefore inter-regional interaction? A program of AMS rock-art dating, similar to the ones undertaken in Vanuatu and New Caledonia (Zoppi et al. 2004; Sand et al. 2006), targeting Tanga’s ‘inaccessible’ black stencils, as well as those from sites on the east coast of New Ireland (i.e. Buang Merabak, Balof 2, and Panakiwuk caves; see Wilson 2002: 72 for an overview) that are in the vicinity of
‘transitional’ sites, could clearly provide a major contribution to these questions. Other black painted rock-art that would be worthy of inclusion in such a program—given ‘transitional’ associations—is present on Watom (Specht 1979, 1994) and in northern Bougainville (see overview in Wilson 2002: 67-9, 74). Additionally, like Vanuatu, the rock-art of Tanga contains elements of a similarly inaccessible red-stencilled tradition, which could also contribute to the understanding of continuity with Lapita traditions.

The red ochre characterisation project could be usefully expanded to include specimens from some other ‘transitional’ contexts, such as at Uai Bobo 1 (Horizon IIIc) in East Timor (Glover 1987: 153), the Sinapupu Phase of Site TK-35 on Tikopia (Kirch & Yen 1982: 271), and Ifo (n=5, associated with distinctive fingernail decorated Late Ifo style ceramics) in Vanuatu (Bedford 2006: 210, Tables 9.11-9.12). Rather than relegating it to the ‘miscellaneous’ finds category, the research in this thesis has shown that archaeologists working in the western Pacific can use red ochre as a means of potentially tracking culturally significant exchanges or interaction between communities.

Additional research on ‘transitional’ obsidian networks should include the remainder of the Lossu obsidian assemblage, the small Fissoa assemblage, and the obsidian blade found at Paniavile in New Georgia (see Appendix 8). Extensive obsidian-hydration dating (cf. Ambrose & McEldowney 2000 at the Mouk site) would be useful for ‘untangling’ sourcing results at ‘transitional’ and possibly partly ‘transitional’ sites (e.g. SAC, SDI, EAQ, ERG) where obsidian assemblages could result from the conflation of distinct temporal occupation phases.

Future research on the ‘transition’ should also be directed towards faunal and palaeoenvironmental evidence. As I noted in Chapter 2, there are currently indications from both types of data of a pulse that roughly coincides with the ‘transition’. Combined with other ‘transitional’ lines of evidence, this could be crucial in helping to elucidate local processes such as population increase, and/or increased interaction and population movements, including from Island Southeast Asia (e.g. inferred from the spread of the dog, cf. Matisoo-Smith 2007). Indeed, the strong ‘Late Lapita’ association with pigs that Matisoo-Smith (2007) perceives—citing Kainapirina (SAC) in particular—could well prove to be a ‘transitional’ one. Pig is strongly represented at Lasigi and Lossu and is the second most common faunal material (subordinate only to fish) at Angkitkita.

We have only just begun to picture the ‘complex intercommunicating world’ (cf. Kennedy 1982: 30) of ‘transitional’ Island Melanesia.


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