Archaeological Research at Caution Bay, Papua New Guinea

Cultural, Linguistic and Environmental Setting

Edited by

Thomas Richards, Bruno David, Ken Aplin and Ian J. McNiven
Cover: Tanamu 2 excavations in progress, 27 November 2009. The site is located 110 metres inland of the mangrove-fringed coastline, on the western margin of Caution Bay's alluvial plain as it extends into the littoral zone. Occupation at the site peaked around 2500 cal BP (photograph by Ian J. McNiven).
## Contents

<table>
<thead>
<tr>
<th>Chapter 1.</th>
<th>Introduction to the Caution Bay Archaeology Project</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomas Richards, Bruno David, Ken Aplin, Ian J. McNiven and Matthew Leavesley</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Research Goals and Themes</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Lapita Colonization</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Ceramic Transformations</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Long Distance Ceramic Trade</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Historicizing the Ethnographic Koita and Motu</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Spatial and Temporal Faunal Resource Utilization Patterns</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Caution Bay Landscape Use</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Raw Material Sources</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Technological Transformations</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Scope and Organization of the Caution Bay Monographs</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Organization of the Present Volume</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 2.</th>
<th>Archaeology in Port Moresby and the Southern Lowlands of Papua New Guinea: Intellectual and Historical Contexts for Caution Bay</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruno David, Thomas Richards, Robert Skelly, Ian J. McNiven and Matthew Leavesley</td>
<td>Introduction</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Port Moresby Region</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Graeme Pretty</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Susan Bulmer</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Jim Allen</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Pamela Swadling</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Yule Island-Hall Sound</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Ron Vanderwal</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Gulf of Papua Region</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Jim Rhodes, David Frankel and Bruno David</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Bruno David and Robert Skelly</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Amazon Bay-Mailu</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Geoff Irwin</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Summary and Conclusions</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 3.</th>
<th>The Motu-Koita: A Cultural and Social History</th>
<th>27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Goddard</td>
<td>Introduction</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>A Provisional Prehistory</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Social Organization</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Lifeworld</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Effects of European Contact and the Colonial Period</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Independence and Afterwards</td>
<td>34</td>
</tr>
</tbody>
</table>
Chapter 4.
Motu-Koita Contact in the Caution Bay Area of Central and Southeast Mainland Papua New Guinea:
Some Linguistic Observations ................................................................. 39
Tom Dutton
Introduction .......................................................................................... 39
The Linguistic Scene at First Contact .................................................... 39
Motu .......................................................... 39
Koita ........................................................................................................ 42
Motu-Koita Contact: The Linguistic Evidence ...................................... 43
The British New Guinea Annual Report for 1889–90 Vocabulary .......... 43
The 1994 Study ..................................................................................... 45
Historical Implications of the Linguistic Evidence .............................. 46
Three Comparative Cases ..................................................................... 47
Maisin ..................................................................................................... 47
Ouma and Related Remnant Languages ............................................ 48
Lau’una .................................................................................................. 50
Motu-Koita Contact in the Caution Bay Area ....................................... 50
Conclusion ............................................................................................ 50

Chapter 5.
Koita and Motu Landscapes and Seascapes of Caution Bay .................. 53
Linus S. digim’Rina, Thomas Richards, Bruno David, Matthew Leavesley, Michael Goddard, Tom Dutton, Robert Skelly, Brad Duncan, Laura Naidi and Julia Hagoria
Introduction .......................................................................................... 53
Preliminary Place-Name Study ............................................................... 53
Detailed Mapping of Caution Bay Place-Names: The Focused Study ....... 56
Methods ................................................................................................ 58
Recorded Places ................................................................................ 58
Named Places in the Study Area ......................................................... 58
Named Places Near the Study Area ....................................................... 61
Conclusions .......................................................................................... 63

Chapter 6.
Historicizing Motu Ceramics and the Hiri Trade ................................. 65
Bruno David, Thomas Richards, Michael Goddard, Tom Dutton, Matthew Leavesley, Ian J. McNiven and Herman Mandui
Introduction .......................................................................................... 65
The Hiri Trade ...................................................................................... 66
Origin of the Hiri .................................................................................. 67
The Ceramic Industry .......................................................................... 70
Conclusion ............................................................................................ 73

Chapter 7.
The Natural Setting of Caution Bay: Climate, Landforms, Biota, and Environmental Zones ........................................... 75
Ken Aplin, Cassandra Rowe, Helene Peck, Brit Asmussen, Sean Ulm, Patrick Faulkner and Thomas Richards
Introduction .......................................................................................... 75
Location and General Topography ...................................................... 75
Sources of Information ......................................................................... 77
Terminology of Environmental Zones and Habitats ............................ 83
Climate ................................................................................................. 83
Environmental Zones and their Resources .......................................... 85
The Littoral Plains Zone ..................................................................... 85
Littoral Plains Zone Landforms ......................................................... 85
Littoral Plains Zone Soils .................................................................. 86
Littoral Plains Zone Plant Communities ............................................ 87
Littoral Plains Zone Animal Resources ............................................. 89
The Hinterland Zone ......................................................................... 90
Chapter 8.

Archaeological Surveys at Caution Bay ................................................................. 113
Bruno David, Thomas Richards, Robert Skelly, Siobhán Walker, Matthew Leavesley, Jeremy Ash and Herman Mandui

Introduction .................................................................................................................. 113

Archaeological Surveys ............................................................................................. 113

Core Study Area Survey ............................................................................................ 116

Core Study Area Survey Strategy, Methods and Intensity ........................................ 117

Core Study Area Survey Results .............................................................................. 117

Peripheral Survey ........................................................................................................ 132

Peripheral Survey Strategy, Methods and Intensity .................................................... 132

Peripheral Survey Results .......................................................................................... 132

Vaihua River Survey ................................................................................................... 136

Papa Lea Lea Road Survey .......................................................................................... 138

Papa Lea Lea Road Survey Strategy, Methods and Intensity ....................................... 138

Papa Lea Lea Road Survey Results ............................................................................ 139

Other Sites ................................................................................................................... 140

Conclusions .................................................................................................................. 143

Chapter 9.

The Caution Bay Project Field and Laboratory Methods ........................................ 145
Bruno David, Thomas Richards, Ian J. McNiven, Jerome Mialanes, Ken Aplin, Fiona Petchey, Helene Peck, Brit Asmussen, Sean Ulm, Katherine Szabó, Holly Jones-Amin, Patrick Faulkner, Claire Perrette, Cassandra Rowe, Matthew Leavesley and Bryce Barker

Introduction .................................................................................................................. 145

Project Personnel and Research Structure ................................................................ 145

Field Methods ............................................................................................................... 146

Analytical Methods ..................................................................................................... 146

Pottery Analysis .......................................................................................................... 156

Pottery Conservation .................................................................................................. 157

Treatment ..................................................................................................................... 157

Final Comments on Pottery Conservation ................................................................... 160

Stone Artefact Analysis ............................................................................................... 160

Raw Materials ............................................................................................................. 161

Technological Variables .............................................................................................. 161

Colours and Heat Alteration ....................................................................................... 163

Non-Molluscan Faunal Remains ............................................................................... 163
Bone from Vertebrate Animals ........................................................................................................ 164
Eggshell ........................................................................................................................................ 166
Invertebrate Exoskeleton .................................................................................................................. 166
Reporting ........................................................................................................................................ 166
Molluscan Remains ......................................................................................................................... 167
Taxonomic Identification of Molluscan Remains ........................................................................... 167
Modes of Quantification .................................................................................................................. 167
Worked Shell Analysis ..................................................................................................................... 169
Determination of the Worked Shell Sample .................................................................................... 169
Protocols for the Identification of Worked Shell .............................................................................. 169
Analytical Procedures ..................................................................................................................... 170
Context of Interpretation .................................................................................................................. 170
AMS Radiocarbon Dating and Chronological Model-Building ..................................................... 171
Caution Bay Marine Reservoir Corrections ...................................................................................... 171
Chronological Model-Building ......................................................................................................... 173
Other Analyses ............................................................................................................................... 174
Concluding Comments .................................................................................................................... 175

Appendix A.
Comparison of Motu and Koita Vocabulary in the British New Guinea Annual Report for 1889-1890 (MacGregor 1890) with that in Dutton (1966) and Dutton (1975) ................................................................. 177

Appendix B.
Other Apparent Borrowings in Motu and Koita in Dutton (1975) not Included in Appendix A .......... 179

Appendix C.
Established Borrowings in Koita with Comparative Evidence from Motu, Sinagoro and Keapara ................................................. 181

Appendix D.
Caution Bay Project Field Staff, 2009-2010 .................................................................................... 183

References ........................................................................................................................................ 185
Introduction

Until the Caution Bay project, limited archaeological research in the Port Moresby region and, more broadly, along the entire southern lowlands of Papua New Guinea (PNG) had been almost exclusively restricted to sites of the past 2000 years, representing that period after the arrival of ceramicists (Figure 2.1; Chapter 1: Figure 1.1). This limited window of time covered by the archaeological evidence had critical impacts for how we have since come to understand the long-term history of the entire region, and thus for how the Caution Bay finds themselves came to be slotted-in to a predetermined cultural pattern incorporating hypothesized ceramic transactions along vast distances of coastline. Here we revisit this archaeological setting, as it sets the scene for how our understanding of the long-term history of the southern lowlands needs to be rethought in light of the Caution Bay results, and, on the other hand, for how some of these new results confirm other pre-existing patterns.

Given a paucity of known pre-ceramic sites across much of the southern PNG lowlands, debate on Port Moresby’s archaeology has focused on the wide variety of ceramic decorative styles revealed by surface surveys and excavations. Ceramics have been favoured by archaeologists not only because of their plasticity of manufacture – i.e., for their ability to reveal information on cultural practice including both historical traditions (conservativeness of practice) and artistic creativity (change) – but more particularly because the Port Moresby region was, ethnographically, a great centre of mass manufacture of pottery towards long-distance hiri maritime exchanges (see Chapter 6). Since the late 1960s and early 1970s, when professional archaeological investigations were initiated in Port Moresby and elsewhere in southern PNG (e.g., Allen 1972; Bulmer 1971, 1978; Irwin 1985; Vanderwal 1973, 1976, 1978), research has targeted ceramic sequences both within the pottery-producing (see Allen 1977a, 1977b, 1978, 1984; Allen and Rye 1982; Bulmer 1982) and pottery-receiving (see Frankel et al. 1994; Rhoads 1980, 1994) ends of the hiri system. Despite this considerable archaeological effort – particularly concentrated in the 1970s – and significant findings, few excavations and ceramic sequences had been reliably radiocarbon-dated or systematically published, making it difficult to...
characterize, adequately model, or trace the evolution of ceramic sequences within and between the Port Moresby and Gulf of Papua regions. There are, of course, perfectly apt historical reasons for this situation (e.g., absence of AMS radiocarbon dating and advanced preparation chemistry of charcoal or shell samples; poorly understood species-specific ΔR values for individual locations), but the fact remains that until recently ceramic chronologies have been compromised by limited chronological data that were often problematic.

Initially, researchers who tried to investigate the origins and history of the hiri generally concluded that the hiri system itself (as known from ethnography) began only a few hundred years ago (but see Rhoads 1982), with viewpoints ranging from around 800 to 300 years ago depending on the region of concern, the specific archaeological site, and the kind of evidence used (e.g., oral traditions, archaeological ceramics, archaeological evidence for settlement intensification and population increase, linguistic modelling). For example, Bulmer (1982: 117) concluded, largely from archaeological evidence in the Port Moresby region, that ‘it is not necessary to search beyond the immediate Port Moresby area or further back in time than the past three to four hundred years to find the origins of the hiri’. For Allen (1977b: 408), the hiri probably developed ‘since the ancestors of the Motu arrived on that [Western Motu] coast some 800 years ago’. Working in recipient villages near Kerema to the west of Port Moresby, Frankel et al. (1994: 47) concluded that the ceramics ‘reflect … 500 years of continuous trade between the Motu and villages in the Papuan Gulf’ leading to the ethnographically observed hiri’.

There has, however, also been widespread recognition that the hiri is only one of a number of post-Lapita long-distance Melanesian maritime trade systems operating during the late 1800s around mainland PNG’s coastline and offshore islands (e.g., see Irwin 1985 for discussion of Mailu trade to the east of Port Moresby; Harding 1967 for Vitiaz Straits; Uberoi 1962 for the Kula system of the Massim), and whose ceramic ancestry somehow emerges from more ancient, Lapita cultural practices beginning in the Bismarck Archipelago off the northeast PNG mainland around 3300-3400 years ago. Along the southern PNG lowlands, however, the earliest ceramics prior to Caution Bay came from Nebira 4, Loloata, Oposisi, Eriava and Emo, all dated somewhat short of 2000 years ago (Allen 1972; Bulmer 1978; David et al. 2010; Rhoads 1980; Sullivan and Sassoon 1987; Vanderwal 1973; see also Macintyre and Allen 1990).

The past 2000 years of southern PNG’s history was recently modelled in an influential paper by Summerhayes and Allen (2007) that divided the broader region’s entire then-known ceramic history into three broad phases:

1. An early phase of widespread ceramic decorative styles and shapes beginning with the arrival of ceramicists c. 2000 years ago, termed Early Papuan Pottery (EPP).
2. A period of ceramic transformation uncertainly dated from c.1200 to 800 years ago and previously coined the ceramic ‘hiccup’ by Irwin (1991; see also the ‘Papuan hiccup’ of Rhoads 1982: 146). This phase was a period of ceramic transformation that in some regions may have involved a lull in long-distance maritime trade and an abandonment of settlements, such as suggested by a hiatus in the cultural sequence of Yule Island/Hall Sound between c. 1200 and 700 cal BP, and, as more recently determined, of the mid-Kikori River further to the west between 950-500 cal BP (David 2008; Vanderwal 1973; see also Irwin 1991; Rhoads 1982).
3. A recent phase of highly specialized, regionalized ceramics beginning c. 800 years ago that represents the identifiable roots of ethnographic cultural practices including the hiri.

Antecedents of the ethnographic hiri trade were set in new focus a few years ago by the findings of red-slipped ceramics in northern Australian waters (Torres Strait). At Ormi and Mask Cave, Carter et al. (2004) and McNiven et al. (2006) have found stratified ceramic sherds on islands that have no ethnographically known pottery making (or using) traditions. The significance of these findings is highlighted by McNiven et al.’s (2006) claims for the presence of ceramic sherds dated to 2400-2600 cal BP from Mask Cave on the islet of Pulu, which they suggest may relate to the onset of southern PNG influences from the east into Torres Strait around 2600 cal BP (see also Barham 2000).

A major reason for preferring an eastern rather than western source for these Torres Strait ceramics is the known presence of ethnographic hiri trade ceramics in the Gulf of Papua region to the east. Ceramics have not yet been found archaeologically in neighbouring western regions, although there research has been very limited. Nevertheless, a western origin for Torres Strait’s ceramic tradition(s) cannot be entirely dismissed, especially given that red-slipped ceramics have also been a feature of trade networks and archaeological sites further to the west (e.g., Aru Islands, Bomberai Peninsula of western New Guinea). Sourcing of the Pulu sand tempers by Dickinson (in McNiven et al. 2006) failed to specifically locate the manufacturing centre(s), but were tentatively identified to western Torres Strait sandy-clay sources. The Mask Cave results pre-dated any confirmed ceramics along the PNG southern coast prior to the Caution Bay research, thereby throwing into question what we thought we knew of southern PNG’s ceramic history. This incongruity between the apparently earlier Torres Strait and later southern PNG ceramics led some
archaeologists to think that ceramicists had arrived in southern PNG somewhat earlier than the hitherto argued 2000 years ago, perhaps going back to Lapita itself (McNiven et al. 2006; see also David et al. 2004).

The temporal pattern in settlement and ceramics from the Gulf of Papua region in the west is of considerable significance for understanding the broader region’s social history via exchanges with ceramic production centres in the Port Moresby area in the east (for ceramic sourcing studies see Bickler 1997; Worthing 1980). The occupational trends in the Gulf region indicate that settlement systems were never stable for very long, and we follow David’s (2008) suggestion that the history of the southern lowlands is best understood as a sequence of pulses in occupation and long-distance maritime (ceramic) trade rather than as singular long-term trends. Because of the workings of the hiri system, cultural sequences in one part of southern coastal PNG are closely linked to those of other parts, even if many hundreds of kilometres apart (as recognized by previous researchers).

In light of these findings, it is likely that ethnographically documented oral traditions about population movements, village and clan origins for this broader region relate to the latest (i.e., past c. 500 years), rather than earlier, phases of occupation or use. This ethnography also highlights that to understand land use across the southern lowlands, more than environmental conditions and environmental histories need to be understood, requiring a focus on the specifics of social interactions that, in this case, have come to guide settlement processes. Understanding the cultural history of places requires consideration of past social relationships. What the above results highlight is the significance of ceramic producing centres for understanding the history not just of those locations for themselves, but for understanding the history of the entire southern coastal region of PNG, as an interconnected social network.

Many of the sites discussed below possess their own language names (obtained from oral traditions or named after the general areas from which they are found) (e.g., Nebira), a name or number given by the discovering archaeologist as part of their own survey referencing system (e.g., Nebira 2), and/or a unique three or four letter reference code (e.g., ACJ), being the official designation on the PNG National Museum and Art Gallery site register (by convention, site lettering is organized by PNG Province; all registered cultural heritage sites from the Central Province and the National Capital District begin with the letter A). For example, the cultural heritage site known from oral traditions as Nebira (AJA), a rock shelter. Her investigations focused on the region from Bootless Inlet in the east to Galley Reach in the west, from the coast northward to the Laloki River. Within this area the Koita and Motu have long lived in a ‘complementary relationship in an overlapping territory’ (Bulmer 1978: 2) involving trade and cohabitation in close social relations.

At Nebira 2 (ACJ), more than 55,000 pottery sherds were excavated, along with the skeletal remains of at least 45 individuals (Bulmer 1978: 135). Taurama (AJA) is a beachside ‘foundation village of the western Motu’ and is said to have been settled from Motupore around 14 generations before 1978 (corresponding well with the timing of abandonment at Motupore as evidenced by archaeological investigations) (Bulmer 1978: 258, after Oram 1969: 429; see also Golson 1968: 69). Taurama contains a rich assortment of shells, stone and shell artefacts (including imported obsidian flakes), beads, vertebrate faunal remains, almost 25,000 pottery sherds, and evidence of past structures (e.g., postholes).
Eriama 1 (ACV), 48-50 burials were excavated, along with 1530 pottery sherds, shell and animal bone remains, and stone artefacts including a small amount of exotic obsidian, probably imported from Fergusson Island (Bulmer 1978: 202, 246). Many of these interments contain burial goods such as shell arm rings, beads, pottery, stone artefacts, or bone or tooth ornaments (e.g., Bulmer 1978: 182, 226-34, table 6.9).

Bulmer’s (1978) doctoral research represents the culmination of research she began in 1967, and supersedes many of the conclusions she had previously presented (e.g., Bulmer 1969, 1971) about the region’s archaeological past. Bulmer was interested in understanding the distribution and ecological and social inter-relationships of sites across the landscape, and how spatial variation and temporal change in ceramic conventions could be used to explore the region’s cultural and social history. She argued that settlement-subsistence systems shifted through the course of Port Moresby’s pre-European contact history, and these changes were accompanied by shifts in the location of pottery-producing centres and changes to ceramic styles.

She suggested that during the Early Period of occupation, from around A.D. 0 to 1000, a relatively homogeneous pottery style was widespread along the Central Province coast, from Malu in the east to Yule Island in the west. Towards the end of the Early Period, a large settlement could be found at Ranvetutu. During the Middle Period, from around A.D. 1000 to 1500, the earlier pottery style rapidly changed, making way for ceramic conventions akin to those of Milne Bay some 370km to the southeast. Towards the commencement of this period large pottery-producing communities were set up at Motupore and Boera, while previously established communities at Taurama, Nebira and Eriama continued to exist. During this time, pottery-using settlements became established on elevated hills in the coastal hinterland, probably for reasons of defence. The Middle Period was followed by the Proto-historic Period around A.D. 1500-1875, immediately preceding, and continuing into, the early European contact period, when ‘Middle period pottery is replaced by a single style, which in the 18th and 19th centuries appears to sub-divide into the eastern and western variants’ (Bulmer 1978: xxi). The late Proto-historic Period saw a predominance of settlement on the coastal hills and along the coast, and ‘heavy dependence upon imported food based on the specialist manufacture of shell ornaments and pottery, was of relatively recent origin’ (Bulmer 1978: xx). Bulmer (1978, 1982) argues that the people of the ancestral Nebira, Eriama and Taurama villages – spanning nearly 2000 years of occupation – were not specialized craft manufacturers (for an opposite view, see Allen 1977a; Allen and Rye 1982), and that while there is evidence in oral traditions and in the archaeological record for close contacts between coastal and inland communities, these sites show little evidence of specialized trade (a point disputed by Jim Allen in particular – e.g., Allen and Rye 1982).

Bulmer suggests that early in the region’s history large settlements containing ceramics were established on the inland river plains. For the past 300 years (based on oral traditions), she argues that settlements shifted towards the coast. She asks if the earlier, hinterland villages were occupied by the Koita (the ‘people of the land’, who possess the oral traditions about those older sites), while the later coastal settlements were occupied by the Motu ‘people of the sea and trade’ (sometimes together with the Koita). Using oral traditions and historical records, she interprets the archaeological evidence around the notion that the Koita ‘had moved down from the mountains and across the plains to the coast, while the Motu arrived by sea to dwell with them’, both movements taking place only during the past 400 to 500 years, with the Koita ‘reaching their position in or near Motu villages in the 19th century’ (Bulmer 1978: 39). Yet the Koita did not traditionally practice pottery-making, having learnt the craft from the Motu after the latter’s arrival along the coast (perhaps 2000 cal BP, but perhaps more recently, with earlier ceramic manufacturers having arrived in the Port Moresby region before the Motu). If the hinterland villages indeed relate to early Koita occupation, what of the pottery found within those sites?

The archaeological ceramics of the Port Moresby region contain a range of vessel shapes and decorative designs, many of which are not represented by ceramic conventions of ethnohistoric times. Here we summarize the major pottery decorative styles identified by Bulmer (1978) for the Port Moresby region (incorporating Lea Lea-Boera). We note that while the chronological value and spatial integrity of these styles remain in contention by archaeologists (e.g., Allen 1977b; Swadling and Kaiku 1980), Bulmer’s schema is one of only two detailed published accounts by which archaeologists previously ordered Port Moresby ceramics. And here-in lies a major problem: Bulmer’s ceramic styles are ordered into an apparently chronological system but are not, in themselves, based on systematic temporal data.

Bulmer’s study is largely based on 2977 ceramic sherds from 67 undated surface archaeological sites (Bulmer 1978: 76-77). She reports six decorative styles followed by the ‘Historic Period’ for which she does not attribute a specific style (Figure 2.2). Her six decorative styles are summarized in Figure 2.3. She argues that four cultural phases can be identified for the broader Port Moresby region based on changes in ceramic conventions (including decorative styles), as indicated by her surface ceramics, combined with radiocarbon dates from her three archaeological excavations (Nebira 2, Eriama 1 and Taurama) together with results of other excavations (principally Motupore, Nebira 4, Ava Garau) (Bulmer 1978: 340-41):
1. Early Period with Style I pottery: around A.D. 0-1000.
2. Middle Period with Styles II, III and IV pottery: around A.D. 1000-1500.

Jim Allen

Jim Allen’s work in the Port Moresby region involved both field research and the theoretical modelling of culture change in this ceramic manufacturing and ethnographically renowned long-distance maritime trading centre. Allen (e.g., 1984: 415-16) noted that the Motu, like other southern PNG lowlands Austronesian-speaking groups, did not settle rich agricultural landscapes but rather coastal regions fronted by resource-rich offshore reefs. He further pointed out that these were (and continue to be) specialized maritime peoples who also gardened, hunted and gathered, but it is the sea that formed the focus of subsistence and settlement practices. Nevertheless the seasonally drought-prone Port Moresby region, and the paucity of agricultural products directly available to the maritime specialist Motu, meant that alternative means of obtaining food resources had to be developed to ensure long-term survival. The answer came in the form of craft specialization (ceramics and shell valuables used for bride price and the like) and the intensification of long-distance maritime trade (Allen 1982: 202) in time leading to the hiri. However, Allen (1977c: 399), also noted that ‘...the environmental stress hypothesis remains nothing more than an explanation for the developed system as first recorded by Europeans, and not necessarily an explanation of why it developed in the first place’. Allen (1977c: 406) further noted that ‘despite the economic imperatives it is impossible to separate the hiri as a subsistence expedition from the hiri as a social institution, for in the hiri ... socio-political and economic objectives were closely intertwined’. Nevertheless, regardless as to whether the hiri emerged as a subsistence strategy or not, ceramics and shell...
valuables have high archaeological visibility enabling the history of such trade and social relations to be investigated.

Jim Allen undertook archaeological excavations at two ancient village sites in the Port Moresby region, Nebira 4 (ACL) and Motupore (AAK). Both sites contain rich cultural deposits, including flaked stone artefacts (among which are obsidian pieces imported from Fergusson Island, and drill points), pottery sherds, numerous animal bones (mainly pig, wallaby, fish and shell), shell artefacts (including beads and fragments of arm bands) and varied pieces of ochre and ground-stone artefacts from Nebira 4; and 40 burials, numerous stone drill bits, hundreds of shell disc beads, large volumes of shell and vertebrate faunal remains (particularly marine and wallaby), structural evidence in the form of pits and post holes, and very large quantities of ceramic sherds from more extensive archaeological excavations at Motupore (e.g., Allen 1977a: 443, 444). One of these Motupore burials (a secondary burial with a dog’s teeth necklace) dated to around 400 cal BP is interpreted as Koita, due to its similarity to Koita and Koiari burials of ethnographic times. The implication is that by that time Koita-Motu relations were already close enough for a Koita burial to be included in a predominantly Motu village, as practiced also during ethnographic times (Allen 1977a: 445).

Nebira 4 is believed to date from around 2000 cal BP to sometime before the colonial period. The similarity in age of the earliest cultural levels at each of these sites, along with Oposisi in the western Central Province where 2000 year old ceramics were also found, led Allen (1972: 121) to conclude: ‘... we appear to be dealing with a widespread maritime migration into the central coast about 2,000 years ago. These people established

<table>
<thead>
<tr>
<th>Style</th>
<th>Common techniques</th>
<th>Vessel forms</th>
<th>Characteristic rim or lip form</th>
<th>Probable associated pot decoration</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Red Slip</td>
<td>Slipping</td>
<td>Simple restricted bowl</td>
<td>Thickened, round</td>
</tr>
<tr>
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<td>Burnishing</td>
<td>Simple unrestricted bowl</td>
<td>Thickened, square</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incising</td>
<td>Composite restricted bowl</td>
<td>Round</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Combing, grooving</td>
<td>Composite unrestricted bowl</td>
<td>Round</td>
</tr>
<tr>
<td>II</td>
<td>Eriama Incised/Applique</td>
<td>Heavy line incising, perforation</td>
<td>Ila Composite bowl</td>
<td>Square, round</td>
</tr>
<tr>
<td>(formerly Massim)</td>
<td></td>
<td>Appliqué</td>
<td>Iib Simple unrestricted bowl</td>
<td>Thickenened, square</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grooving</td>
<td>Iic simple restricted bowl</td>
<td>Thickenened, round</td>
</tr>
<tr>
<td>III</td>
<td>Eriama Incised/Punctate</td>
<td>Fine line incising, punctation</td>
<td>Simple restricted bowl</td>
<td>Thin, round</td>
</tr>
<tr>
<td>(formerly Massim)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Taurama Shell/Comb</td>
<td>Shell and comb impressing, combing</td>
<td>Composite bowl</td>
<td>Square</td>
</tr>
<tr>
<td>(formerly Boera/Taurama)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Taurama Incised/Punctate</td>
<td>Heavy line incising</td>
<td>Simple bowl</td>
<td>Thickenened round or square</td>
</tr>
<tr>
<td>(formerly Motu)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>Waigani</td>
<td>Incising, finger impressing, shell impressing</td>
<td>Simple bowl</td>
<td>Thickenened round or square</td>
</tr>
</tbody>
</table>

**Figure 2.3. Summary of some characteristics of decorative styles of Port Moresby bowls (from Bulmer 1978: table 5.5).**
themselves widely and maintained good communications for at least a thousand years.'

The Nebira 4 faunal assemblage indicates a marine-oriented economy during the earliest cultural layers, becoming gradually less so through time (Allen 1972: 116). This change may be due to increasing dependence on inland gardens, as Allen (1972: 122) suggests, or to subsequent sedimentation of the coastal plains. The ceramic sequence indicates an early red slip (and sometimes burnished) tradition followed by a sequence of ceramic conventions including continuity of red slipping (Allen 1972: 99). Allen (1972: 105-109) identified nine decorative styles (Styles A-I), many, but not all, of which represent sequential changes in ceramic conventions (Figure 2.4).

The Nebira 4 ceramic sequence can be arranged into three successive phases (Allen 1972: 108, 109):

Horizon 1. Levels 1-8. Globular pots with heavily rolled horizontal rims; bowl forms shallow and open, often with a thickened lip; decorative style A the most distinctive marker, with a large percentage of painted pottery. [Corresponds with Styles IA and IB of Oposisi].

Horizon 2. Levels 9-15. Globular forms a mixture of horizontal and angled rims with the latter more popular; deeper bowls with straight sides; styles D and E the most common decorative styles with some temporal value, together with styles F and G. [Corresponds with Style IIA of Oposisi].

Horizon 3. Levels 16-19. Globular forms with angled rims; bowl forms most commonly restricted, and found in association with decorative styles F and G. Styles H and I are the best indicators of this early horizon. [Corresponds with Styles IIB and IIC of Oposisi].

The age ranges of these phases remains unclear due to dating uncertainties and insufficient radiocarbon determinations to resolve such questions (Allen 1972: 121). Nevertheless, Nebira 4 clearly demonstrates some 2000 years of ceramic evolution.

Motupore in Bootless Inlet to the southeast of Nebira was established around A.D. 1200, and appears to have been abandoned around A.D. 1700 (Allen 1977a: 443). Motupore is only referred to once in the recorded oral traditions of the greater Port Moresby area, yet as determined archaeologically it was once a major site of ancestral Motu character (Allen 1977a: 442, 446). Allen (1984: 420) wrote that Motu (and to a lesser degree Koita) pottery ‘underwrote the emergent maritime trading systems’. Allen (1977a) has suggested that socio-economic interactions between the Koita and Motu, and with trading partners further to the west in the Gulf Province, have intensified through time. Such intensifications are observable archaeologically in a simplification (decreased decoration) and standardization of Motu ceramics with the mass production of trade goods, along with an increased population evident in a concomitant proliferation of occupation sites. Among the Western Motu, amicable relations with the Koita led to the establishment of seaside villages, but further to the east less amicable relations between the Eastern Motu and the Koiaeri led to the construction of Motu villages over the sea for purposes of defence (Allen 1977a: 451). Allen notes that pottery-producing Motu settlements were located in low-rainfall parts of PNG subject to periodic droughts, encouraging the development of specialized pottery manufacture for which food products (in particular sago) could be traded in surplus quantities (Allen 1984). Nevertheless, the manufacture of (principally hiri) trade ceramics did not simply meet the dietary needs of the Motu villages, but also enabled high risk, status-enhancing long-distance maritime voyages and the acquisition of surplus products (sago) by which internal exchange relations could develop with Koita and other nearby groups. The development of specialized ceramic-for-food trade relations with long-distance trade partners (in the Gulf region) as well as with neighbouring groups (such as the Koita and Koiaeri, the latter bringing shell lime and highlands stone axes to the Motu) created social developmental momentum that gave rise to the complex Motu and Koita societies of ethnographic times.

Following Bulmer (1971), Allen (1977a: 439-442) initially divided Port Moresby’s archaeological sequences into three broad periods, which he referred to as the Early Ceramic Horizon (A.D. 0-1000), followed by a ‘middle period’ onto a ‘final period’. He suggested that during the initial ceramic phase,
Austronesian speakers came from the east and settled in an interconnected network of villages along the southern PNG coast, maintaining between themselves good inter-community communications and thereby a commonality of ceramic conventions. However, ‘The demise of this Early Ceramic Horizon is sudden all along the coast’ (Allen 1977a: 448). The subsequent phase of the ‘middle period’ saw ‘the possible removal of the people from the valley floor site of Nebira 4 to the adjacent hilltop site of Nebira 2 and the occupation of the offshore island site of Daugo near Port Moresby’ (Allen 1977a: 439-440). Allen here suggests that around A.D. 1000 the (presumably Austronesian-speaking) people of the Early Ceramic Horizon came under pressure from inland (ancestral Koita) groups as the latter began to move towards the coast, necessitating the establishment of settlements in more defensive positions (hilltops and offshore islands). Following Bulmer (1971), around A.D. 1000-1400 two new ceramic traditions then appeared in the Port Moresby area: intrusive (i.e., foreign) ‘Massim’ wares from the Milne Bay area, most evident from archaeological sites in the Boera area; and ‘Boera/Taurama’ wares that appeared to represent ancestral Motu ceramics. The pottery of the ‘final period’ corresponds to the ethnographically recorded Motu ceramics. Allen (1977a: 446) suggested that as Motupore was occupied continuously from around A.D. 1200 to 1700, and as Motupore’s most ancient ceramic decorative styles could be shown to evolve uninterrupted into decorative conventions that are akin to Motu ethnographic examples, its inhabitants were likely ancestral to present-day Motuans. ‘For this reason a certain adjustment needs to be made to Sue Bulmer’s proposed culture sequence’ (Allen 1977a: 446), which posited a sequence of interrupted ceramic styles representing external influences or replacements. Hence, as the ceramic conventions of Bulmer’s ‘Boera/Taurama’ Middle Phase were found at Motupore, where they could be shown to be ancestral to, and evolving into, historic Motu incised/impressed wares, Allen (1977a: 446) suggested that the later two stages of Bulmer’s sequence should be coalesced into one, reducing the entire Port Moresby sequence into two phases: an early phase spanning around A.D. 0-1000; and a later phase beginning ‘somewhere before A.D. 1200 and continuing to present’ (Allen 1977a: 446). Allen concludes that the long-debated … hiatus between the two is therefore reduced, and it is into this hiatus the Massim industry described by Bulmer must be fitted. The status of the people represented by this pottery still requires elaboration … On the present evidence it may well be that there was no hiatus at all, and that the Massim component infiltrated during the brief period of disequilibrium following the disappearance of the earlier inhabitants and during the establishment of ancestral Motuan groups (Allen 1977a: 446; see also Swadling 1976).

Motupore has a ceramic industry that can be followed uninterrupted from around A.D. 1200 into ancestral Motu ceramics (Figure 2.5). This phase is interpreted by Allen (1977a: 446) as indicating that the Motu ‘impinged upon the existing central Papuan coastal population from outside the research area some 800 years ago’. That is, around A.D. 1200 a new wave of Austronesian speakers came from the east to the Port Moresby area with new ceramic decorative conventions, establishing a base at Motupore. These were the ancestors of the ethnographic Motu. Through time, as the Motu established and consolidated their villages along the coast, the Motu proliferated on the coast and the Koita both inland and on the coast as the two groups entered into symbiotic social and economic relations (Allen 1977a: 449). Allen (1984: 423) later argued that craft specialization was ‘vital to the Western Motu (and Koita) trade economy, and that they were the only notable producers of pottery along some 400km of the south Pacific coast’. Of note is the highly standardized ceramics that emerged during this recent, monopolizing phase, which Allen (1984: 423) associated with increasing commercialization of production. Following Groves (1960), Allen (1984) noted that the heightened levels of trade generated by establishing trade partnerships led to increased (and surplus) food returns into the Motu villages, which in turn fed increasing trade relations with neighbouring groups who brought hinterland food products (garden produce, wallaby meat) for imported surplus sago and ceramics, positively feeding back to higher populations that enabled the system to grow. By the later stages of the recent phase, this demographic growth had led to further increasing demands on food resources that led the ceramic-manufacturing women to work ‘at breakneck speed’ to produce the very large quantities of pots necessary for exchange expectations, in particular in the form of the long-distance hiri expeditions; ‘insufficient care in making the pots’ led to substandard pots that often broke in the making, and a lack of time for elaboration of designs led to the ‘simplification of shapes and decoration’ evident in recent phase ceramics (Allen 1984: 423).

Pamela Swadling

Swadling (1977a: 38) states that by 1977, about 400 archaeological sites were known from the coastal lowlands of the Central Province by the PNG National Museum and Art Gallery; the oldest of these (e.g., Nebira 4, Eriama 1; subsequently, Loloata Island) dated to around 2000 cal BP, indicating the rarity and great difficulty of finding older cultural materials, despite well-documented archaeological deposits tens of thousands of years old in the highlands. She further noted that at the time of early European contact,
... the largest villages were those of the Motu; but from Pari westwards, all Motu villages also had Koita residents ... The Koita however had other settlements located on the coastal lowlands inland from the coast, or on hills overlooking the sea (Swadling 1977a: 37).

Swadling and Kaiku (1980) excavated two sites in the broader Caution Bay landscape: in the north at Papa they excavated a ‘fireplace in the clay surface of an eroded village site in the Papa salt pans’ (Swadling and Kaiku 1980: 86), dated to 1280±170 BP; and in the south they excavated a large archaeological village site at Ava Garau located on a coastal ridge to the northwest of Boera, dated to 1220±95 BP. The Papa site contained red slipped ceramic sherds typical of the earliest phase of human occupation in the Port Moresby region (e.g., Style I of Bulmer 1978; at Nebira 4, Horizon 3 of Allen 1972).

At Ava Garau, which Swadling identified as an ancestral Boera site,

... pottery was found which shows that both old and new pottery ideas were used by people living there 1,200 years ago. ... The influence of new potting ideas, especially in bowl decoration and rim shapes, from the D’Entrecasteaux, Amphlett and Goonenough Islands cannot be denied. (Swadling 1977a: 39)

Swadling (1977a: 42) concluded that while the ancient ceramic assemblages of the broader Port Moresby region showed close formal and decorative affinities with those of the D’Entrecasteaux, Amphlett and Goonenough Islands as well as Milne Bay, Motuan history could not be reduced to recent or foreign arrivals ‘to the shores of Port Moresby’ (as Allen similarly concluded for the past 800 years, see above). Rather, oral traditions ‘do not tell of a far away homeland, but of old village sites along the Central Province coastline. Some of these old villages are said to be very old, whereas others have been recently settled’ (Swadling 1977a: 42).

Swadling (1980) divided the Port Moresby region ceramics into three phases: Early Period (a.k.a. Bulmer’s ‘Red Slip’, c. 2000-1200 cal BP), Middle Period (a.k.a. Bulmer’s ‘Boera-Taurama-Motupore’, c. 1200-300 cal BP) and Late Period (a.k.a. Bulmer’s ‘traditional Motu’ of the past 300 years) (Figure 2.2). She argued that major stylistic changes in ceramic designs took place between the late Early Period and the Middle Period (broadly but imprecisely corresponding to the ‘Papuan hiccup’ of Rhoads [1982: 146], ‘hiccup’ of Irwin [1991]; ‘ceramic hiccup’ of Summerhayes and Allen [2007]; and ‘hiatus’ of Allen et al. [1997]). Her study of the sources and
antiquity of a small sample of the ceramic vessels found in Central Province and Gulf Province archaeological sites (including sherds from Daugo Island site AAQ, the Papa Salt Pan site [AWL], and Ava Garau [AMH] near Boera) indicates that

… early Middle Period sites do not seem to extend as far west as those of the late Early Period. Does this reflect some settlement changes in the Gulf or the impact of the changing situation in the Central Province, as the early Middle Period marks a rather abrupt, but not total, stylistic change in the Port Moresby region (Swadling 1980: 108-9).

She continues (Swadling 1980: 115):

… the people living at the late Early Period sites in the Port Moresby region were using a number of different clay sources. Why the people living at Ranvetutu were using pots made from Boera clay, rather than clay from near their own village, is not known. … The intricate decoration and complex shapes of the pots made during the late Early Period indicates that considerable time and effort was spent on pot making. These people were certainly not involved in the quick, mass production of pots which occurred in the Port Moresby region at the time of contact.

Swadling clearly suggests major cultural change across the Port Moresby region between the late stages of the earliest ceramic phase and the classic Motuan ceramic tradition that we are familiar with from ethnography, changes akin to those argued by Allen concerning the period between 1200 and 800 cal BP in particular. Furthermore, farther to the west in the Gulf region sites receiving Port Moresby region ceramics, ‘the bulk of the late Early Period potsherds … come from sources in the LeaLea-Boki area. None come from Boera’ Swadling (1980: 119).

Swadling (1980: 119-21) thus further noted:

The same pattern with most coming from LeaLea-Boki and none from Boera continues in the early Middle Period potsherds from Tei Hill … This finding suggests that the same clay sources continued to be used during the rather abrupt, but not total, ceramic stylistic change which occurred between the late Early Period ceramics in the Port Moresby region. No settlement sites with early Middle Period ware are known from the LeaLea area, but it would not be unrealistic to envisage the continued use of this clay source by descendants of people who may have moved to reside in the Boera village complex from the LeaLea area. … Perhaps the biggest surprise of all, is the lack of late Early Period and Middle Period sherds made from Boera clay in the Gulf sites. … This seems contrary to the widely acknowledged Motuan legend which claims that the *hiri* was started by Edai Siabo from the Boera area. … The results to hand would indicate that it was the people formerly resident in the LeaLea area, who may have been responsible for producing, using their former clay sources, most of the early Middle Period ware which reached the Gulf.

While the people using the Boki clay source in the LeaLea area were the main suppliers to the Gulf of both Early Period and early Middle Period ware, the coming of the Middle Period seems to mark a total decline in the movement of Central Province pots to the Gulf. The author is not aware of any middle Middle Period [ware] … having been collected in the Gulf. In other words, it would seem that soon after the founding of the huge village complex at Boera, that potsherds dating to that period no longer appear in the Gulf.

A likely explanation is that the oral traditions (including the legendary Edai Siabo story) relate largely, if not entirely, to the most recent phase or pulse (dating to the past 500 years), of cultural activity in the Gulf of Papua and Port Moresby regions.

A related question that has dogged the archaeology of the southern PNG lowlands concerns whether or not a hiatus in human occupation and long-distance maritime trade occurred around 1000 cal BP. Swadling (1976: 1) poses this question for the Port Moresby region, pointing out that ‘The excavations and surveys of Bulmer, Allen and Vanderwal along the central south Papuan coast all suggested that there was a chronological break about 1,000 years ago’. A paucity of radiocarbon dates on individual pieces of charcoal (thereby avoiding the potential mixing of charcoal pieces of varied ages) notwithstanding, Swadling (1976: 2-3) suggested that the Ava Garau radiocarbon determination near Boera ‘removes the likelihood of a hiatus in the Port Moresby sequence’, and instead ‘suggests continuity into what has been called the Boera-Taumata-Motupore tradition’, as the Boera-Taumata-Motupore tradition is interpreted as a local development of earlier (imported) ceramic manufacturing conventions of the Port Moresby region (in line with Allen’s [1977a] interpretations). Like Allen (1977a), Swadling (1976: 4) suggested that the Boera-Taumata wares were ancestral to recent Motu ceramics as documented ethnographically. Nevertheless, the question of a hiatus in regional occupation and long-distance ceramic trade between 950-500 cal BP remains for the Kikori River area of the Gulf region. Disruptions in settlement systems, trade relations, and ceramic production in the pottery-producing Port Moresby region villages is key to understanding the lull in ceramics and
paucity of known archaeological villages between the occupational pulses in the Gulf region.

Yule Island-Hall Sound

Ron Vanderwal

From mid-1969 to 1970, Ron Vanderwal undertook his PhD research in the Yule Island-Hall Sound area, located on the brink of the Gulf of Papua (Vanderwal 1973). He identified 13 sites and excavated five, Urorina, Sirirou, Abe and Kukuba Cave, and most notably Oposisi on Yule Island. Vanderwal excavated 30m² at Oposisi, a deeply stratified site with a rich ceramic assemblage, from which six charcoal radiocarbon determinations were obtained (and which greatly influenced other archaeologists working along the entire south coast of PNG). There were a number of dating inversions, but Vanderwal concluded that a date of 1890±305 BP (ANU-425) from the ‘bottom level (14)’ in Zone IIC, approximated the commencement of occupation at the site, with the uppermost undisturbed cultural deposits dating approximately 600-800 years later. He well-recognised, however, that the ‘mid-periods of Oposisi are not well dated’ (Vanderwal 1973: 50).

Vanderwal (1973: 99-108) identified 18 ceramic Types at Oposisi, primarily from vessel form, but surface decoration also contributed to his typological determinations (Figures 2.6, 2.7). However, surface decoration was used only to corroborate and refine determinations based on vessel form. As a consequence, some decorations are attributed to a number of different ceramic Types, whereas others are limited to just one Type. Largely on the basis of Types A-C shell-impressed sherds (e.g., Figure 2.6a-g, 2.6k-m), restricted to the basal Zone IIC at Oposisi, Vanderwal concluded that:

The evidence from both Yule Island and Port Moresby [the Bulmer and Allen excavations] suggests that what I have called the Oposisi ceramics are the earliest in the region. Accompanying the pottery in the research area is an entire range of cultural items, many of which are limited, on the available evidence, to the phase in question. … the Oposisi people might have been supported by a parent community, with certain items like obsidian and even adzes traded in from a source to the east, and they might have been traders themselves, bringing pottery to an area that had previously not known it. … Nevertheless the archaeological evidence shows the case to be not one of trait intrusions … but one of site unit intrusion where cultural identity has been maintained and actual migration involved. (Vanderwal 1973: 233).

Further, he states, ‘there can be little room for doubt that the Oposisi culture is another transformation of the Pacific Lapita’ (Vanderwal 1973: 234). Vanderwal later

![Figure 2.6. Representative sherds from the Yule Island 'Type Collection', PNG National Museum and Art Gallery: a = Type T, b = Type T, c = Type M, d = Type K, e = Type R, f = Type T (Photo: Robert Skelly).](image-url)
modified his interpretation to suggest that ‘the Oposisi assemblage, as represented in Zone IIC, was transported to this part of Papua through exchange media probably mostly after initial settlement’ (Vanderwal 1978: 424), rather than representing colonising traders who settled at Yule Island. But during those initial, influential formative years of south coast archaeology, Vanderwal argued that Oposisi held evidence for the arrival of a new people introducing pottery for the first time to the southern shores of PNG, and given the age of Zone IIC, dating to around 2000 cal BP.
For his study area, using data from all of his excavated sites, Vanderwal (1973: 195-198) defined four cultural phases:

- **Preceramic phase** (c. 4000 BP): represented by stone artefacts from Kukuba Cave.
- **Initial Ceramic phase** (c. 2000 BP): pottery was introduced by intrusive horticulturists who maintained external contacts possibly with founding groups.
- **Developmental phase** (<2000 BP to probably <1000 BP): represents a time of ‘greater control and knowledge’ of mainland resources (Vanderwal 1973: 197).
- **Intrusive Ceramic phase** (>700 BP): represented only by ceramic traits evident at the Urorina site.

The same data and periods were also divided into six chronologically sequential technological complexes spanning the period c. 4000-700 BP (Vanderwal 1973: 167-74). The first of these was a pre-ceramic phase; specific ceramic Types formed the basis of differentiation for the subsequent five ceramic complexes (Figure 2.2):

- **Kukuba complex** (c. 4000-2000 BP). Consists of stone artefacts in pre-ceramic levels at Kukuba Cave (the only pre-ceramic assemblage known from the southern coast of PNG prior to the Caution Bay research).
- **Oposisi complex** (c. 2000 BP). Ceramic Types A, B and C (Figures 2.7a and 2.7b) from basal levels of Oposisi. These earliest ceramics signalled the first arrival of ceramics across the region.
- **Wairo complex** (c. 1100-1200 BP). Ceramic Type S (Figure 2.7p), plus ceramic forms found in the later part of the preceding Ravao complex, and the subsequent Kairuku complex.
- **Kairuku complex** (c. 1000-900 years ago). Ceramic Types T and W (Figures 2.6a, 2.6b, 2.6f, 2.7t and 2.7u).
- **Urorina complex** (c. 700 BP). Includes sherds with a distinctive type of shell-impressed decoration and ‘multi-pronged’ impressed decoration found at Urorina.

More recently Allen and colleagues excavated a column sample on the edge of the original excavation pit at Oposisi, the results of which generally confirmed and slightly extended the age of basal deposits at c. 2000 cal BP, and refined the overlying ceramic chronology. Obsidian from the period c. 2000-1500 cal BP was sourced to Ferguson Island in the Massim off the eastern tip of New Guinea, demonstrating strong links with the east for this early phase (Allen et al. 2011).

**Gulf of Papua Region**

*Jim Rhoads, David Frankel and Bruno David*

The Gulf of Papua represents the recipient end of the *hiri* trade. Archaeological excavations began there during the 1970s, first with Rhoads (1980) in the mid-Kikori River and at the site of Popo at Orokolo Bay (Rhoads 1994), then by Frankel and Vanderwal at Kinomere on Urama at the mouth of the Purari River and at a number of sites near Kerema (Frankel and Vanderwal 1982, 1985; Frankel et al. 1994). Between 2006 and 2009, Bruno David, Ian McNiven, Bryce Barker and Lara Lamb excavated a number of sites from the mouth of the Kikori River inland to Baina at the foothills of the Highlands. Frankel et al. (1994: 46) have pointed out for the coast that:

No sites in the Gulf have been securely dated between 700 and 500/400 years ago. This is probably a product of the limited amount of research and the difficulty of locating sites without pottery, but may well reflect [a] decline in long-distance trade, at least in pottery (Frankel et al. 1994: 46).

Most researchers (e.g., Allen 1977a; Swadling 1976) have suggested that the *hiri* as known from ethnography immediately post-dates the ‘ceramic hiccup’ phase of transformation in pottery styles (in Central Province pottery-producing communities) or apparent ceramic absence (in Gulf Province pottery recipient communities), and is probably only 500 to 300 years old (Rhoads and Mackenzie’s [1991] ‘Recent Ceramic’ phase). This most recent ceramic phase in recipient Gulf Province sites is usually taken to indicate some 500-300 years of continuous trade, an increasing standardisation of trade goods (including increasing specialisation and centralisation of ceramic production within the ceramic producing areas), population increases and the establishment of large settlements in the Gulf region (e.g., Allen 1977a, 1977b; Frankel et al. 1994: 45-47). More recently and consistent with these views, David (2008) has demonstrated major shifts in ceramic trade into the western sections of the Gulf region beginning 500 cal BP, attributed to the onset of the *hiri* continuing uninterrupted into ethnographic times. This most recent pulse in occupation, ceramics and radiocarbon dates in the Gulf region, dated to 500-0 cal BP, corresponds well with Rhoads and Mackenzie’s (1991) Recent Ceramic and Proto-historic phases (Figure 2.2). This period of time contains the greatest number of ceramic sherds, traceable to the onset of the ethnographically documented *hiri* system (again in agreement with Rhoads and Mackenzie’s earlier interpretations). Precisely how the newly excavated ceramics from this most recent period formally, decoratively, economically and occupationally relate to the earlier ceramic phases – in particular how
they relate to an earlier pulse of high archaeological representation 1450-950 cal BP also associated with large quantities of imported ceramic sherds (David 2008) – remains a matter of debate.

While the major pulses in occupation in the mid-Kikori River area suggest the existence of active exchange relations 1450-950 and again 500-0 cal BP separated by a hiatus in the arrival of ceramics during the intervening period, they also indicate a loosening of village stability presumably in concert with a breakdown in long-distance trade relations between 950-500 cal BP, a period so far characterized by an absence of (imported) ceramics. It is significant to note that this period in the mid-Kikori River area lies largely within the ‘ceramic hiccup’ phase of the Central Province – a period of transformation of pottery styles in the ceramic production end of the hiri system. The paucity of radiocarbon dates and the apparent absence of ceramics between 950 and 500 cal BP in the Kikori River area may thus reflect contemporaneous and/or shortly earlier disturbances in ceramic producing sites and cultural sequences further to the east. If the precise dating of cultural sequences in the Port Moresby region is correct (which is not certain), the rejuvenation of ceramic-sago exchange in the Gulf region around 500 cal BP appears to post-date the start of intensified pottery production and the most recent ceramic phase (immediately following the ‘ceramic hiccup’) in the Port Moresby region by perhaps 200 years (possibly involving Koita-Motu displacements there; Allen 1977a; Bulmer 1978). During this most recent period, the establishment of a new phase of trade partnerships and stable settlement locations were associated with new forms of regionalized ceramics, indicating a break-down of the earlier and more widespread ceramic conventions. Critical to understanding the onset of this new phase is, therefore, the period known as the ‘ceramic hiccup’, a perceived gap between the earlier and later phases of ceramic production and long-distance maritime trade. In such ways the archaeology of the Gulf of Papua has profound significance for understanding the socio-cultural history of the ceramic-producing villages in the Port Moresby region, and vice versa.

**Bruno David and Robert Skelly**

On 20 August 2007 the *Post-Courier* (PNG’s major daily newspaper) announced that two wrecked *lakatoi* (hiri trading vessel) hulls had been discovered near Epemavo and Kea Kea villages east of the Vailala River in the mid-region of the Gulf of Papua. One week later archaeologists Bruno David and Nick Araho (PNG National Museum and Art Gallery) arrived to investigate the finds (see David et al. 2008 for details). Following community discussions and completion of initial investigations of the hulls site, clan leaders representing Epemavo and Kea Kea villages led the archaeological team to Keveoki (OKE and OKG) and Meiharo swamps (OKF) where large amounts of buried ceramics had recently been exposed through gardening activity (see David et al. 2009; Moffat et al. 2011; Skelly et al. 2010). Comparing ceramic conventions of the Keveoki assemblage with those known from the ethnographic hiri trade, David et al. (2009: 18) described a ‘predominance of everted carinated dishes and everted indirect pots at Keveoki 1 [OKE surface collection] … consistent with the predominance of Motu *uro, nau* and perhaps *hodu*. David et al. (2009: 18) concluded that,

Keveoki 1 [OKE] belongs chronologically to the early part of the late ceramic phase in the Gulf Province (see David 2008 for discussion), the one immediately following the so-called ‘Ceramic Hiccup’ on the southern Papuan coast (see Summerhayes and Allen 2007), and located at the beginning of the ceramic sequence that then continues uninterrupted to the period of the ethnographic hiri.

Based on promising results from investigations at Keveoki and Meiharo, for his doctoral research Robert Skelly investigated other cultural sites from the same region of what is locally known as the Kouri lowlands. Skelly excavated 10 archaeological sites in 2010, shortly after the Caution Bay fieldwork and the discovery of Lapita sites there, but his research is relevant to the interpretation of the Caution Bay finds and therefore to discussions presented in forthcoming Caution Bay volumes. Noteworthy is a detailed ceramic sequence that starts with a small Late Lapita ceramic assemblage with dentate-stamped body and lip decorations from the Hopo site (OJS) dated to c. 2600 cal BP (Skelly et al. 2014) (Figure 2.2). This is followed by several post-Lapita ceramic phases with shell-impressed body decorations dating to an uncertain time within the period 2300-1550 cal BP, followed by a phase of red-slipped/painted and linear incised decorations dating to c. 1550-1175 cal BP. This is then followed by a period of some 500 years (c. 1175-675 cal BP) when no cultural evidence is apparent, a period that corresponds well with the ceramic ‘hiccup’ previously identified by Rhoads (1982), Irwin (1991) and Summerhayes and Allen (2007) for various parts of the southern lowlands (see above). Ceramics then reappeared c. 675 cal BP in the Kouri lowlands, continuing unabated into the ethnographic period (Skelly 2014). Ceramics in that most recent, post-‘hiccup’ phase were initially decorated with linear arrangements of individually-impressed shell valve lip impressions on the bodies of pots, with deeply-incised lip decorations leaving distinctive crenulated vessel profiles also being characteristic of the period. After c. 540 cal BP these decorations declined in complexity, and after c. 300 cal BP body decoration consisted of gash-incisions or punctuations along vessel contours and shallowly incised lips. Body and lip decoration ceased entirely by c. 150

**Archaeological Research at Caution Bay, Papua New Guinea**

22

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cal BP (Skelly 2014), a period largely corresponding with the ethnographic hiri of the colonial period.

**Amazon Bay-Mailu**

**Geoff Irwin**

Geoff Irwin’s archaeological fieldwork in the Amazon Bay-Mailu region from 1972 to 1974, along the coast 260km to the east of Port Moresby, revealed historical trends of relevance to the latter region for several reasons, not least also being its importance as an ethnographic period ceramic manufacturing and trading centre. Irwin excavated three sites on Mailu Island, Oraido 1 and 2 and Mailu 3, and the beach-fronting Selai site on the Amazon Bay mainland. Like other archaeologists working along the southern coast of PNG, his basic premise was that ‘One can identify settlement patterns simply by plotting the distribution of archaeological sites shown to be highly similar in their ceramic inventories’ (Irwin 1978: 301).

Irwin (1978) initially argued that the history of the Mailu area, as indicated by archaeological research, could be divided into three major periods, which he called Early, Mayri and Mailu (Figures 2.2, 2.8). The Early period (2000 to around 1500 cal BP) was characterized by a series of pottery-producing villages along the mainland coast and on offshore islands. There is some ambiguity as to the timing of the Mayri and Mailu periods, for Irwin (1978: 302) also writes that the Mayri period ‘dates some 6-800 b.p.’; that is, that it continues to around 600 to 800 years ago. As Irwin here discusses settlement patterns specifically, it is likely that he is referring here only to the distinctive (regionalized) Mayri settlements lasting until 600 to 800 years ago, rather than to the Mayri period of ceramic conventions (which lasts until about 400 years ago). ‘Through time’ – i.e., during the Mayri period (from around 1500 to 400 cal BP) into the early Mailu period (after approximately 400 cal BP, at the time of writing [1978] identified as ‘350 b.p.’ by Irwin) – writes Irwin (1978: 299),

… the density of mainland settlement increased and there was an associated shift in village site location. In addition, one settlement began to differentiate from others at a rate which accelerated through time. By the period of European contact, the small island of Mailu was the location of a settlement that can be described as a central place. It was larger, socially more stratified, more influential and functionally specialized than any other place.

During the Mayri period, ‘pottery making was a widespread skill and occurred in several villages’ (Irwin 1978: 300). By the time of the early European contact period, the entire region was dominated by a single pottery-making village (on the island of Mailu) holding a monopoly over production and ceramic trade as well
as use of large ocean-going canoes, despite the fact that by that time there were many more villages than previously along the coast, and that these villages were more closely but less regularly spaced than during earlier periods (being on average 7km, 6km and 3km apart during the Early, Mayri and Mailu periods respectively) (Irwin 1978: 304, 305). Along with this increasing centralization and specialization of ceramic production and trade, and increasing populations and village density, also came a move from coastal village locations to hilltops for purposes of defence, a further indication that social relations were significantly different between the latest (ethnographic) phase and earlier times (Irwin 1985: 11). Because of insufficient radiocarbon dating, Irwin (1978: 315) concludes that ‘The major change in pattern occurred between early in the Mayri Period and 1890’ – a period covering from around 1500 to 150 cal BP.

Irwin later compared his earlier material to sites of similar age to the west, noting that the lower levels of Oraido 1 revealed sherds with shell-impressed decoration apparently comparable to Type A from Zone IIC at Oposisi on Yule Island and Style H from Horizon 3 from Nebiru 4 near Port Moresby, with a radiocarbon date of 1900±70 BP (ANU-1229) from Oraido 1 suggesting near-contemporaneity of the three pottery assemblages (Irwin 1985: 67). Shell-impressed sherds similar to those from Oraido 1 were also found at Selai on the mainland, where radiocarbon dates of 1790±70 BP (ANU-1316) and 1770±70 BP (ANU-1317) were obtained.

Irwin (1991: 503) coined the term ‘Early Papuan Ware’ (EPW) for the earliest pottery phase from Amazon Bay-Mailu, which although locally made, he suggested was part of a sequence of styles also found along much of the south coast of PNG. EPW remained current as a progression of styles in Amazon Bay-Mailu c. 2000-1200 years ago (Irwin 1991: 504-505). Between c. 1600-1000 years ago, however, there was divergence in local ceramic traditions from similar, contemporaneous ceramic traditions elsewhere along the south coast of PNG, with the EPW pottery tradition ending abruptly in all locations c. 1200 BP (Irwin 1991: 507). Irwin (1991: 504) characterized this later period (c. 1600-1000 years ago) of stylistic divergence as signalling a lessening of communication along the approximately 400km of coastline between Amazon Bay and Yule Island.

Based primarily on results from Amazon Bay-Mailu, but also referencing investigations further to the west, Irwin (1991) presented a four-phase cultural sequence for the south coast of PNG (Figure 2.2):

- **Colonisation** (2000-1600 years ago). Settlements using EPW pottery appear along the south coast of PNG.
- **Deepening Regional Isolation** (1600-1000 years ago). Coastal groups fragment, creating a series of local ceramic traditions, with ceramics in Amazon Bay-Mailu diverging from those of the Port Moresby region and Yule Island-Hall Sound.
- **Pottery Style Transformation** (1200-800 years ago). Earlier ceramic traditions are ‘abruptly replaced’ by new traditions broadly similar in style to each other, but not as uniform as during the Colonisation period.
- **Interaction, Specialisation and Exchange** (800-200 years ago). Areas along the south coast of PNG become locally integrated while coastal communication and exchange relationships fluctuate in their spatial extents.

**Summary and Conclusions**

Prior to the Caution Bay research, only eight sites had been professionally archaeologically excavated and reported from Port Moresby northwestward to Papa; none of these dated prior to 2000 cal BP and no preceramic sites had been investigated. There was a focus on ceramic sequences, investigating archaeological evidence for the hiri, and speculating on the introduction and spread of, and nature of connections between, the earliest known ceramic horizons along the southern lowlands of PNG.

The Caution Bay excavation results, with their >1000 AMS radiocarbon dates and numerous rich cultural sequences, are now forcing us to rethink the known history of the Port Moresby region built from a handful of sites and few more radiocarbon dates. These new results contain virtually continuous dated occupation evidence from c. 4500 cal BP to the ethnographic period. The discovery of a Lapita colony beginning c. 2900 cal BP at Caution Bay, and the record of ceramic transformations from numerous well-dated excavated components, have instantly rendered obsolete the old models regarding the introduction and spread of what was thought to be the earliest ceramic horizon attributed to post-Lapita Austronesian-speakers, the EPP dated to c. 2000 cal BP. And yet the question remains as to how to make sense of various cultural patterns, such as those established during the pioneering years of research, in light of this significantly extended cultural chronology.

The more recent discovery of another locality containing Late Lapita ceramics on the southern lowlands of PNG, some 250km (by sea) to the west of Caution Bay in the Gulf of Papua region, strongly indicates long-distance Late Lapita westward expansions by c. 2600 cal BP, representing a further challenge to the previous orthodoxy involving the post-Lapita EPP (Skelly 2014; Skelly et al. 2014). Such questions of pre-EPP exploration and colonization by Lapita ceramicists, and how they come to connect with the EPP, remain to be elucidated.
While the new Caution Bay database represents a manifold increase in both the number of excavated sites and in the number of available radiocarbon dates for the broader Port Moresby region, pioneering research since the 1960s has also revealed critical patterns leading to enduring models of south coast cultural dynamics. The Caution Bay research represents a quantum increase in excavation data, more finely excavated and significantly more well dated, and spanning greater than twice the time-depth of much of the earlier work. We will therefore be primarily constructing ceramic and cultural sequences specific to Caution Bay based on this new dataset, rather than patching up and expanding the existing chronological models, although much reference will be made to the results of the earlier work.
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