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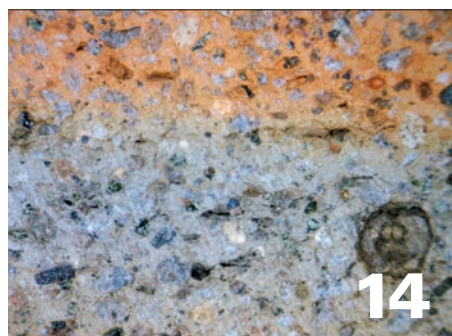
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Earthenware of Malara, Anuru Bay:

A reassessment of potsherds from a Macassan trepang processing site, Arnhem Land, Australia, and implications for Macassan trade and the trepang industry

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Abstract

Previous excavations at Malara (Anuru Bay A), a Macassan trepang processing site in Arnhem Land, produced a substantial quantity of earthenware pottery (Macknight 1969). Earthenware pottery has also been reported and collected from Macassan sites elsewhere along the Northern Territory and Kimberley coastlines. Although several studies have been undertaken on earthenwares from Macassan sites in Australia, it was uncertain whether any included sherds from the significant Anuru Bay site. This paper details the results of the analysis of earthenware sherds recovered during a recent programme of excavation and surface collection at Anuru Bay. The earthenware was analysed in order to investigate its source and to determine whether one or more regions of manufacture were evident. Our results indicate that the sole source for all of the analysed pottery was likely south Sulawesi. It would appear that the trepang fishing fleets who camped at Malara provisioned non-perishables, such as local earthenware, at the port of Makassar prior to beginning their voyage to Marege. This strengthens claims for Makassar as the major operating port for the fleets operating in the Anuru Bay area.

Introduction

Recent archaeological research has sought to investigate and refine the timing of contact between Indonesians, Europeans and Aboriginal communities in Arnhem Land, Australia, with a particular focus on the coastal region to the north of the Wellington Range and the Goulburn Island group (Figure 1) (May et al. 2010; Taçon et al. 2010; Theden-Ringl et al. 2011; Wesley et al. 2012). The Malara complex (previously Anuru Bay A) in Anuru Bay comprises a collection of Macassan stonelines and associated deposits that include marine shell, charcoal, earthenware pottery sherds, bone, sparse ceramics, and glass and metal artefacts (Macknight 1969). These archaeological features attest to either long, non-intensive, or short, intensive periods of occupation, possibly catering for a substantial number of trepang fishermen (Macknight 1969:231–236). Macknight (1976) claimed that Malara was one of three foremost centres of Macassan economic activity along the Arnhem Land coastline, although there are no corroborating historical observations attesting to this practice.

Although several studies have been undertaken on earthenware from Macassan sites in Arnhem Land (Key 1969; McCarthy and Setzler 1960; Rowley 1997), it is still uncertain whether any of these studies included sherds from Anuru Bay. McCarthy and Setzler's (1960) collection was made during the 1948 Anglo-American Scientific Expedition to Arnhem Land (AASEAL) and was derived from a number of different coastal locales in eastern Arnhem Land. Rowley's (1997)



Figure 1 Malara (Anuru Bay A) and other archaeological sites in the Wellington Range, Arnhem Land (map produced by CartoGIS ANU).

sample was derived from a random surface collection made on Goulburn Island by the Rev. Lazarus Lamilami in 1964 and provided to the anthropologists Ronald and Catherine Berndt (Lamilami 1974). The analysis undertaken by Key

(1969) on sherds collected by Macknight did not specify the location of the sites sampled. These earlier studies had suggested that, while most of the earthenware appeared to derive from a single source compatible with south Sulawesi, a small number of 'fine' earthenware sherds were noted to be different to the coarser earthenware that comprised the majority of the assemblages (Key 1969:105). This raised the possibility that some of the pottery may have been sourced outside of south Sulawesi. Mariners from Makassar were termed 'Monsoon Traders' by Knaap and Sutherland (2004) and it seemed plausible that some of the earthenware found on their sites may have been acquired by the crews trading en-route to Australia (Bulbeck and Rowley 2001; Macknight 1976; Rowley 1997).

The one known study of the Malara site, by Macknight (1969:199), collected 17 kg of earthenware pottery from the surface and a further 18 kg of potsherds from excavation, representing a total of 35 kg of earthenware sherds. Macknight (1969:231) also recovered Chinese ceramics, five glass beads, green glass bottle fragments (some embossed), clear glass fragments, iron nails, a lead ball, iron fragments, iron spikes, fish hooks, brass wire, an iron knife blade, a piece of iron cauldron, a copper disc, a needle, a bronze ring and an iron clip. Although the Malara assemblage displayed a relatively high diversity of artefact types, there were relatively few non-earthenware artefacts compared with the assemblage from Goulburn Island. Macknight (1976) suggested that these differences in the proportional representation of exotic goods might be due to temporal differences in the occupation of the two sites, and raised the possibility that Anuru Bay might have been occupied during an earlier period, when fewer Dutch, Chinese and European goods were making their way into the markets of Makassar. Macknight's (1976, 2008, 2013) dating of the stonelines produced radiocarbon ages that he dismissed as too old based on the historic evidence for the timing of Macassan trepang exploitation.

The principal aims of the new investigations were to gain a better understanding of the chronology of Macassan visitation and to collect a sample of earthenware to test earlier interpretations regarding the origin and diversity of pottery. It was important to establish a temper and fabric classification specific to Malara before comparing the sherds from this site with those analysed by Rowley (1997) and Key (1969), as well as sherds from Wellington Range sites. Work undertaken at Malara between 2008 and 2010 excavated a sample of 13 m², the equivalent of 8% of the area excavated by Macknight (1969:199), with all sediments screened through a 3 mm sieve. A further surface collection was conducted over 121 m² of the site. The issue of the chronology of Macassan visitation to the Arnhem Land coast is complex and is dealt with elsewhere (Clark and May 2013; Clarke 2000; May et al. 2010; Taçon et al. 2010; Theden-Ringl et al. 2011; Wesley et al. 2012). Here we focus on resolving the origin of the earthenware pottery from the Malara site, Anuru Bay.

Nature of Macassan Trade and Commerce

It is important to establish some details regarding the nature of Macassan maritime industry and the possible sources of the earthenware pottery that was an integral part of the material culture aboard the trepang fleets. The nature of the Macassan trepang industry in Sulawesi, and the exploitation of this resource in northern Australia, has been discussed

in great detail (Berndt and Berndt 1954; Bowdler 2002; Bulbeck and Rowley 2001; Clark and May 2013; Clarke 1994, 2000; Ganter 2003, 2006; Macknight 1969, 1972, 1973, 1976, 1986, 2008, 2013; Máñez and Ferse 2010; Mitchell 1994, 1996; Mulvaney and Kamminga 1999; Rowley 1997; Russell 2004; Sutherland 2000; Trudgen 2000; Warner 1932, 1937). Important to our study is Watson-Andaya's (2006:675) remark that, surprisingly, the edible *Holothuria* sp. (sea slug or trepang), has required scholars to 'think far beyond area-studies boundaries and serves, if we need it, as another reminder of the great lengths to which human beings will go to satisfy the demands of commerce'. The trepang industry was tethered to the complex South East Asian maritime economy driven largely by China, but also involved an ancient inter-island trading system through eastern Indonesia (Junker 2002; Sutherland 2000). Makassar was notable as being at the intersection of local Sulawesi maritime traffic and inter-island maritime movement through Java, Kalimantan, Maluku, Nusa Tenggara and the Philippines, as well as of long distance trade with Europe, India and China (Máñez and Ferse 2010:1) (Figure 2). Expansion of the trepang industry in the 18th century was based on the need to supply growing demand from late Ming Dynasty China. The industry for the eastern Indonesian archipelago was centralised through the trading port of Makassar (Watson-Andaya 2006:676). During the 18th and 19th centuries there were significant shifts in the fortunes of trade, and imports and exports that involved the port of Makassar very likely influenced the size, timing and composition of the trepang fleets visiting northern Australia (Knaap 2006; Máñez and Ferse 2010; Poelinggomang 1993; Sutherland 2000, 2001, 2010).

South East Asian trepang commerce is generally considered to be the major driver for expansion towards the Australian coast by Indonesian seafarers during the 18th century (Macknight 2008). On the other hand, Grave and McNiven (2013), McIntosh (2008) and Bowdler (2002) proposed that there may have been other economic, political, social and accidental mechanisms that influenced maritime travel to northern Australia, so it is conceivable that visitation may have occurred prior to the expansion of the trepang industry. Certainly the trade and commerce carried out



Figure 2 Island South East Asia illustrating Macassan links to Australia (after Blair and Hall 2013:212; Knaap and Sutherland 2004; Morwood and Hobbs 1997:198; Russell 2004:8; Sutherland 2000) (map produced by CartoGIS ANU).

through Makassar involved a high level of complexity and was undertaken by multiple ethnic groups (Chinese, Malays, Bugis, Sulawesi locals), and considerable volumes of diverse materials passed in and out of this port (Máñez and Ferse 2010; Sutherland 2000, 2001, 2010). Control and rights over the volume of trepang flowing through Makassar was a very lucrative business (Sutherland 2010). According to Sutherland (2000:93), the trepang commerce of Makassar expanded greatly during the 18th and early 19th centuries, both in volume and value. Sutherland (2000:94) noted that:

Porcelain, earthenware, metal goods, textiles and knick-knacks from China, textiles and later opium from India, were exchanged for trepang and other sea and forest products, flowing back to increase both supply and demand in maritime communities. The points of connection and supply were not fixed; Makassar enjoyed a long period of centrality, but later lost business to Singapore and Sulu. Despite such shifts, however, the movement of commodities continued, and the long-term effects of trade lay more in the structural development of new relationships and needs than in localized prosperity or decline.

Mitchell (1994) researched government customs records and found a declining trend in Macassan visitation to Arnhem Land during the 19th century as a result of market fluctuations, domestic crises in China, and the introduction of customs duties by Australian governments between 1882 and 1906. Following the introduction of the customs levy there was a requirement for Macassan prau captains to obtain documentation from Dutch authorities in Makassar (Mitchell 1994; Powell 1988) (Figure 3). After 1882, Australian records show that there was a significant decrease in trepang fleet numbers and that all the fleets that made it to Australia originated from the port of Makassar (Mitchell 1994:36). Before 1882 there were no regular records kept and it is possible that members of crews and/or ships in the trepang fleets originated from other destinations in eastern Indonesia, including Sumbawa, Moluccu and Aru, where other maritime communities were engaged in trepanging and other commerce.

Macassan fleets left for Australia on the trade winds in the early wet season, travelling via islands such as Timor. Clark (2006) noted that the Macassan voyages were usually undertaken seasonally, travelling to Melville Island at the start of the season and moving eastwards, then returning west to the Coburg Peninsula or Melville Island before travelling north again to Sulawesi. As the trepang harvest was undertaken during a season of storms, monsoon rain

and severe tropical cyclones, fleets made for the protected embayments of the Arnhem Land coast, established base processing camps, and split up to exploit various sections of the coastline. While Macassans were noted during the 19th century in many places along the Arnhem Land coastline, there are very few references to their presence in the vicinity of the Goulburn Islands and Anuru Bay during the 1800s. Alfred Searcy recorded only one encounter with Macassans at Goulburn Island in 1885: 'arrived Goulburn Island 21 January 1885 and found three praus which were all found with licences and all regular' (*Northern Territory Times and Gazette* 1885:3). On another occasion he encountered two praus operating a dredging canoe from Sims Island, located between South Goulburn Island and the mainland (Searcy 1909:80). Macknight's (1969:199) extensive research of historical records also failed to find any documentary reference to Macassans at Anuru Bay. For such a large trepang processing site to go unnoticed by Europeans in the 19th century is a significant omission in the historical record. Therefore it is likely that the use of Anuru Bay as a major trepang processing centre may well pre-date the mid-19th century European expansion and settlement of the region.

Earthenware in Northern Australia

The presence of earthenware and ceramic sherds was noted in early anthropological work in Arnhem Land (Berndt 1954; Berndt and Berndt 1947; Thomson 1949), with the first such reports being those of Warner (1937). The Berndts' noted that there were large numbers of earthenware sherds in coastal Arnhem Land and surrounds, noting references to pottery and pottery manufacturing in Indigenous songs, and recorded some sherds and information about them from their Aboriginal informants (Berndt 1954; Berndt and Berndt 1947). The provenance of the pottery was attributed to Makassar, supported by the presence of historically recorded trepang processing camps in northeast Arnhem Land. However, according to the Berndts, their Aboriginal informants told them that pottery was also produced in Arnhem Land with the assistance of local Indigenous people and using material from termite mounds. This claim was refuted by later researchers, with petrological studies showing that potsherds from the Macassan trepang sites exhibited a distinctive non-Australian geological signature (Key 1969; Macknight 1976; Rowley 1997).

Putting aside the Australian origin hypothesis, there is still significant information regarding Indonesian pottery to be gleaned from the Berndts' ethnographic work with the Yolngu at Yirrkala. Aboriginal informants identified 62 different components of Macassan material culture and activities associated with sailing, trepang processing and cooking (Berndt Museum records 7152, 7249, 7246, and 7164). Using crayon drawings, Yolngu informants recorded detailed descriptions of items that were brought with the Macassan trepang fishermen. For example, Drawing 7152 is labelled with the following description:

This drawing depicts in plan view a Macassan trepang processing site at Melville Bay, near Yirrkala, north-eastern Arnhem Land. Praus are sailing in the large harbour, and various Macassan settlements are shown on the shores. Islands are a feature, with a central peninsula which was the principal residential area of the traders. Here is a hut built on stilts surrounded by trepang-boiling pots, the ashes from curing fires, a spoon, bottles of liquor, a length of bamboo, an axe and various knives.

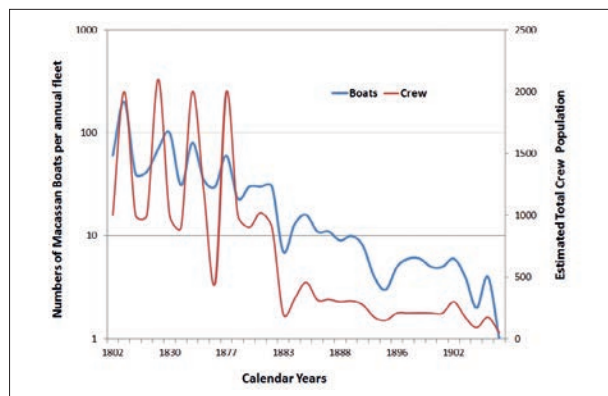


Figure 3 Data illustrating the fluctuations and decline in Macassan visitation to northern Australia in the 19th century (Mitchell 1994:36).

Personal items described by Yolngu informants included a water jug (*boidjung*), bamboo containers, bottles, pots (*malaria*), plates (*bani*), coloured plates (*lambang*) and a flat tray/plate (*dendanga*) (Item 7249). Table 1 lists other language words from the Berndt's Yolngu informants that differentiated various types of earthenware vessels, including porcelain plates (i.e. coloured plates) and other imported materials (Items 7246 and 7163). The depth of the penetration of Indigenous knowledge and use of earthenware is further supported by Evans (1992:69), who published an extensive list of Indigenous loanwords originating from Makassarese, Malay and Bajau. Evans (1992:66–88) found loanwords in numerous Arnhem Land languages that related to trepang and food preparation, including containers.

The first major study of earthenware and ceramics recovered from Macassan sites was undertaken by McCarthy and Setzler (1960). In 1948 they collected 'hundreds' of earthenware potsherds from Winchelsea Island and various beach locations along the east Arnhem Land coastline during the AASEAL (Clarke and Frederick 2011; Mulvaney 1996). Analysis of a sample of these potsherds concluded that they were of a type common across Indonesia and could date anywhere from 208 BC to 906 AD (reported in Clarke and Frederick 2011:135). No further research has been conducted on the AASEAL pottery, Chinese porcelain or stoneware sherds.

Of the pottery that he excavated from Macassan sites, Macknight (1969:290) found that the earthenware derived from common globular, spherical pots, including some with additional lids, handles and decorative elements. He described the exteriors as smooth and well finished, with the body wall away from the rim typically comparatively thin (Macknight 1969:290). Macknight (1969:293) also noted the presence of a reddish-brown slip or paint on some sherds, though at times weathering made it difficult to distinguish.

To test the Berndts' theories about local production, Macknight (1969:133–138) had Key (1969) undertake a petrological examination of the collection. Key thin sectioned and examined the mineralogy of 20 sherds but, unfortunately, he did not specify from which sites they originated. Nineteen of the 20 samples contained the same mineral inclusions, these all being components of andesitic ash: feldspar, pyroxene, brown hornblende, biotite and

occasional sherds of glass, limonite and rock fragments (Key 1969:105). In view of these results, he confirmed that the earthenware was foreign to Australia and suggested that the raw material source was consistent with the recent andesitic volcano of Lompobatang in southwest Sulawesi (Key 1969).¹ The results also revealed that, while there was mineralogical homogeneity, the potsherds differed in the amount of silt within their fabric. Key (1969) proposed that, although the earthenware contained the same volcanic temper, there were two separate clay types used in pot production. The second type had a 'finer' fabric, and is sometimes referred to as 'fine ware' (Rowley 1997). A single potsherd contained hornfels, and Key (1969) proposed that this pot was possibly obtained en-route to Australia, such as in the Kei Islands.²

Key's analysis has been largely supported by the only other petrological analysis conducted to date. Rowley (1997) conducted petrological examination of sherds from two assemblages associated with Macassan stonelines: 500 sherds excavated by Ian Crawford from the Tamarinda site in the north Kimberley, and 481 sherds from Goulburn Island provided to the Berndts by Lazarus Lamilami (1974) and now housed in the Berndt Museum. Rowley (1997:12–15) also acquired historical sherds dating from the 16th, 18th and 19th centuries from southwest Sulawesi from David Bulbeck, in addition to a control sample of contemporary pot sherds from Makassar. Rowley (1997:27–28) examined 28 thin sections using energy dispersive spectrometer (EDS) microanalysis attached to a scanning electron microscope (SEM), including clay matrix analysis and production technique analysis, and 74 thin sections for temper analysis using a polarising microscope, thus aiding in distinguishing between naturally occurring minerals within clay fabric and added mineral temper.³

Rowley's (1997) Goulburn Island results were indicative of the use of volcanic andesitic raw material, and distinguished two distinct earthenware types. The first contained lithoclasts and discrete crystal grains in varying proportions, while the second contained a high frequency of lithoclasts and phenocrysts of feldspar and pyroxene, and minute quantities of hornblende, biotite, altered biotite, iddingsite and brown clay (Rowley 1997:96). Quartz was noted to be present but was not included in the findings, as the mineral source could not be used as a diagnostic factor (Rowley 1997:96). Temper analysis of the Goulburn Island sherds produced identical mineral signatures to both the historical and contemporary Sulawesi control sherds, although the minerals differed in quantity and size. Rowley (1997) noted that there were two exceptions: sherds G165 and G11 contained finer-grained

Material Culture Item	Yolngu Word
Earthenware pots for drinking	budjung
Bottles (wine/spirit)	budalu
Pot (rice cooking)	gawa
Jug	none known
Earthenware jar	bodalu, or garumbal
Iron bucket	yimbari
Earthenware pot	wari
Coloured plates	bani (lambang design)
Boxes	badi
Bamboo	woiyung
Hard wax on the stopper of a bottle	damara

Table 1 Yolngu words for Macassan pottery and food-related material culture recorded by Ronald and Catherine Berndt (Berndt Museum Collection 7246 and 7163).

- 1 Volcanic activity in Sulawesi has been occurring over the last 45 million years, with more vigorous volcanism occurring at 10 mya which dominates the southern arc of Sulawesi and its current geological and geomorphological structure (Hall 2009:152). Although geologically complex, southern and northern Sulawesi are generally considered to be dominated more by volcanism, whereas west Sulawesi emerged from different geological processes (Hall 2009:159). Islands to the south of the Java-Sulawesi arc are largely formed from Quaternary reefs, providing differentiation in eastern Indonesia between volcanic geologic islands and those dominated by limestone (Hall 2009:156).
- 2 Historically the Kei Islands were known for pottery manufacturing and as suppliers of the western Indonesian region (Key 1969:106).
- 3 Earthenware is fired at a wide range of temperatures, but usually between 900–1200°C, causing minimal chemical changes.

temper with no lithoclasts and only feldspars, pyroxenes and hornblende grains. She suggested that these differences could be a result of vessel production methods rather than different sources, and that these sherds might be the same as the 'fine earthenware' described by Key (1997:150–151).

Rowley (1997) also analysed ceramic form, decoration and the ethnographic evidence of potting in Sulawesi to investigate the amount of variability which could arise from differences in manufacturing techniques. She concluded that the Goulburn Island collection could consist of two distinct wares: the first using a coarser clay fabric with volcanic andesitic mineral temper inclusions, and the second using a 'finer' clay fabric but also containing a volcanic andesitic mineral temper. She concluded that the sherds in the Goulburn Island collection could all derive from Makassar, and that the variability in the fabric and the proportional representation of mineral inclusions might result from differences in local source areas for clay collection, coupled with differences in manufacturing techniques.

Rowley's pottery from the Tamarinda site also fell into two groups. The first, Tamarinda Group 1, was friable and porous and had a calcareous shell temper and was therefore very distinct from all the volcanic tempered earthenware studied. Crawford (1969:345) suggested that this pottery might have come from the Kei Islands; however, Rowley (1997:146) thought the poor quality of this pottery made the Kei Islands an unlikely source. She concluded that the clay and temper in this pottery was compatible with many Indonesian islands but, whatever the source, they demonstrated that the trepang fleets using the Tamarinda site acquired pottery manufactured outside Makassar. Tamarinda Group 2 was volcanic tempered and, while there was some variability in this group, Rowley (1997:147–149) thought it likely that all of these pots were sourced from Makassar during the 18th–19th centuries based on the comparative archaeological assemblage from Sulawesi from that time period.

The Malara Site in Anuru Bay

Anuru Bay is a shallow harbour located approximately 280 km east of Darwin. The area mostly comprises Quaternary regolith consisting of sand, silt, carbonate sediment and ferruginous laterite, the distribution of which reflects the complex environmental evolution of the area since sea level stabilisation ca 6000–8000 BP (Needham 1984; Senior and Smart 1976; Sweet et al. 1999). The coastal and estuarine plains developed mainly on estuarine sediments deposited in drowned river valleys and embayments that are seasonally inundated during the annual wet season. The bay is surrounded by Holocene sand dunes, sandy spits, rocky promontories, claystone cliffs and mangroves.

The Macassan trepang processing site at Anuru Bay, known locally as Malara, is located on a late Holocene sand and shell grit promontory built up over a silt-clay rich sandstone that crops out on the point. The northern side of the peninsula is fringed by an open sandy beach, while its southern side was formerly a sandy beach but is now covered by extensive intertidal mangroves. The changeover point between these two environments, at the peninsula's furthest western point, is distinguished by a rocky shoal outcrop and a tamarind tree. From the water's edge the land transforms to a sand dune ridge on a steep incline. The area beyond the sand dune to the north is sparsely vegetated, with open savannah

woodland consisting of eucalypts, low dense coastal scrub in places, and fine medium to tall grasses (*Sorghum intrans*). It is on the south-facing incline of the dune that Malara is located. A shell midden lens is present on the crest of the dune, with general scatters of *Anadara granosa* and *Telescopium telescopium* in varying densities across the site.

Malara contains a total of 21 trepang processing stonelines, some of which are now buried, running from south-southwest to north-northeast (Figure 4). The stonelines comprise parallel lines of heaped and broken sandstone boulders, with some secondary lines protruding horizontally from the main central line to form 'cooking bays'. The area surrounding the stonelines contains a collection of pottery sherds, shell and other faunal remains. Nearby Macassan features include stone arrangements, burials, wells and artefact concentrations.

In 1982 archaeologists from the Museum and Art Gallery of the Northern Territory flew over the site and reported that the stonelines were visible from the air and in an excellent state of preservation (Baker 1984); since then the site has suffered significant surface erosion in places and disturbance from feral animals, mainly pigs. Malara is in an area where there are high levels of contemporary use by local traditional owners for fishing, resource gathering and camping, with vehicles frequently being driven over the western half. It contains a moderate density of modern glass, metal and organic debris concentrated in the southeast portion of the site. The peninsula can be subject to extreme weather, particularly wind and monsoonal rains in the wet season, and has very little natural protection from extreme weather events (e.g. Cyclone Monica in 2006). This has caused previously sub-surface material to be exposed, revealing scatters of potsherds between several of the stonelines.

Surface Collection Areas A and B and Earthenware Sampling 2008–2010

During the 2008–2010 fieldwork a collection of earthenware was made from two areas of the Anuru Bay site: Areas A and B (Figure 5; Table 2). Areas A and B were selected using different stonelines as area perimeters, as these were the largest and best preserved within the site complex and considerable surface erosion had uncovered a high quantity of potsherds. The method of collection was determined by establishing a gridline and conducting transects at 1 m intervals from south-southwest to north-northeast. When a potsherd was observed its location was flagged, and the square was mapped and visually inspected for additional finds. These areas were subsequently marked with a grid square identification number, and all sherds within the square were then recorded, bagged and labelled. Collection Area A, measuring 38.18 m² in size, was located between Stonelines 4 and 5. Stoneline 4 is 7 m long with a width of 1.3 m. Stoneline 5 is 8.3 m long and has a width of 1.8 m. Both are moderately disrupted lines made of locally outcropping silt and clay rich sandstone. Collection Area B, measuring 83.16 m², was between Stonelines 3 and 4. Stoneline 3 is 8.4 m long with a width of 1.3 m. Stoneline 3 is a relatively discrete line of stone, whereas Stoneline 4 is a more disrupted linear scatter. All sherds recovered from collection Areas A and B were assigned an identification consisting of Area-Square-Sequential Sherd Number.

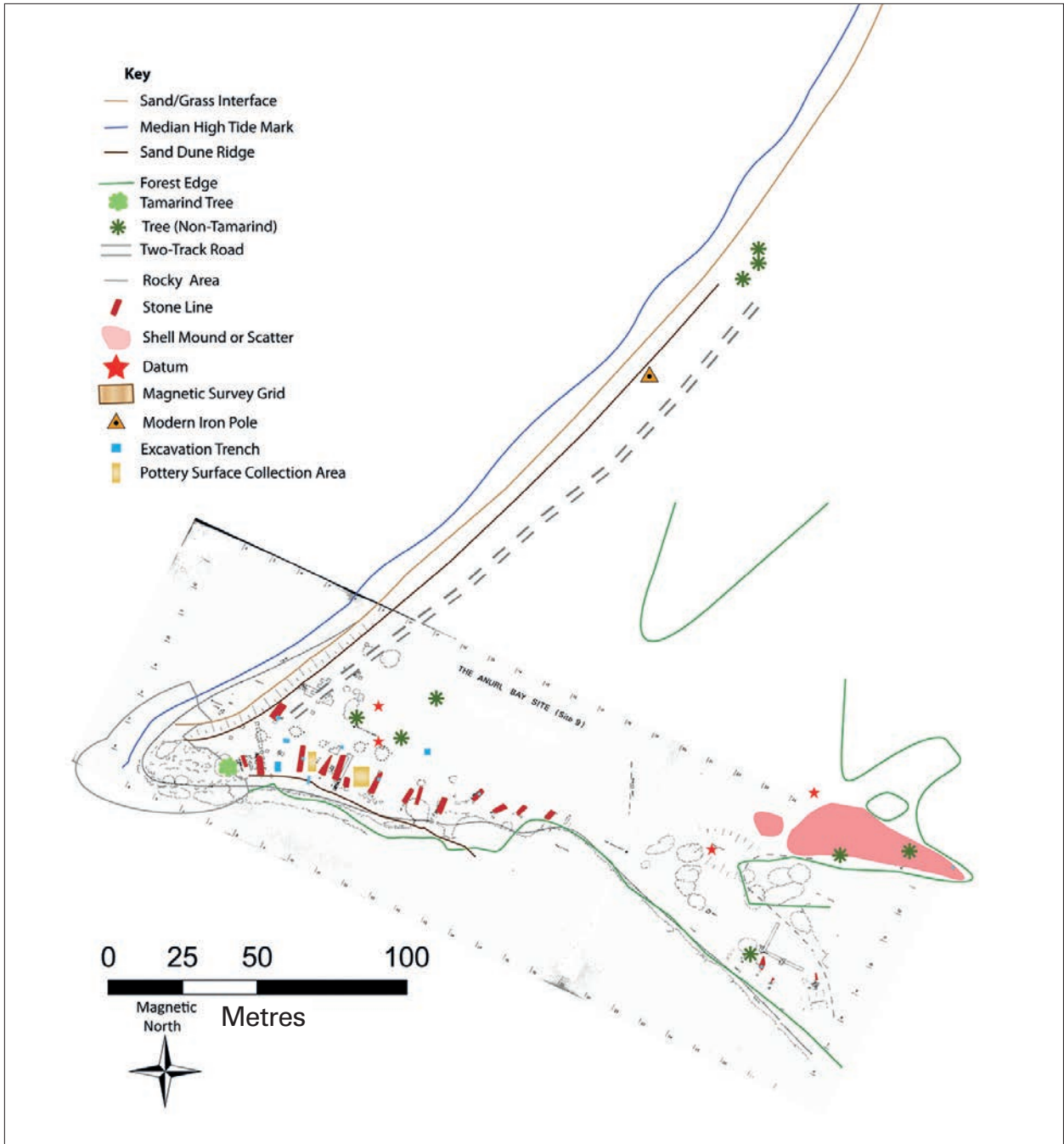


Figure 4 Malara (Anuru Bay A) showing archaeological features and areas of investigation in 2009–2010, with Macknight's (1969) map overlaid (map by Jack Fenner) (see also Figure 5).

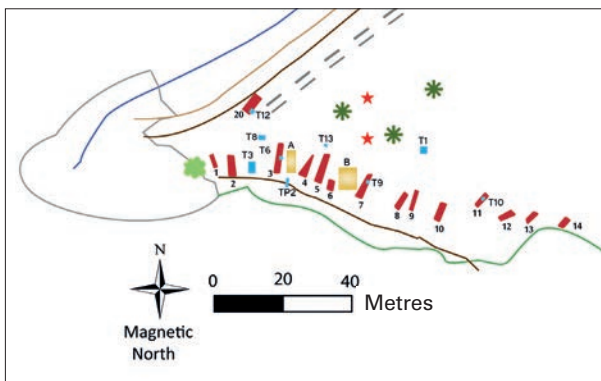


Figure 5 Malara illustrating stonelines, excavation trenches, and pottery collection Areas A and B (map by Jack Fenner). The key for this figure is the same as that given in Figure 4.

Pottery Identification Methodology

Descriptions of form and decoration, categorising finds according to temporal chronology, and assessing production and distribution patterns, all form the basis for a comprehensive archaeological ceramic analysis, and have been completed in several earlier studies (Macknight 1969; Rowley 1997). The primary objective for this project was to undertake a preliminary assessment of the temper and fabric of the Malara earthenware in order to acquire data that could aid in provenancing the sherds and provide geographical information on the ethnic origin of the trepang fleet and trade routes (following Veth et al. 2005). The methods used to describe sherd form, identify vessel form and vessel function, determine production technique and ascribe dates followed those outlined by Gibson and

Woods (1997). Commonly this also includes reconstructions of vessels using rim sherds and conjoining techniques (Orton et al. 2013); however, the Malara rim fragments were too small to attempt this. Another important feature of analysis was to determine whether the core margins were sharp or diffuse. This provides information about whether oxidised organics were present in the clay and whether the earthenware was cooled rapidly in the air after firing (Orton et al. 2013:154). These are important factors in the analysis of local earthenware production in island Indonesia.

The individual sherds from Malara prepared for analysis were inspected using a polarising microscope at magnifications of 25x and 40x and initially classified using the following identification principles (after Sinopoli 1991):

- Description of fabric, observing colour and clay particle size;
- Description of temper, noting inclusions, frequency, size, sorting and roundness;
- Allotment to a 'preliminary category' according to fabric and temper;
- Recording the sharpness and diffuseness of core margins; and,
- Recording surface features, including decoration, slip and glaze, and production marks, such as moulding, coiling, wheel thrown marks, or paddle and anvil markings.

The sherd samples were prepared for microscopy by the truncation of the samples using a manual diamond saw. Samples too small for cutting with the saw or for subsequent petrographic analysis were rejected, resulting in only 33.5% of the total of 88 sherds from Areas A and B being suitable for analysis.

Results

The breakdown of the potsherd collection per square is given in Table 2 for surface collections and Table 3 for both surface collections and excavation squares. These are very small in comparison to the amount of earthenware collected by Macknight (1969). The sample from surface collection totalled 88 sherds: 41 from Area A and 47 from Area B. The majority were non-diagnostic, with only eight diagnostic sherds, comprising five rim sherds, two rim and neck sherds, and one sherd that featured portions of rim, neck and shoulder. Sherd size ranged from 67.8 g (B-10-37) to 0.5 g (B-6-29 and B-3-10) and wall thickness from 3–11.6 mm. Forty-nine of the 88 sherds were considered suitable for subsequent thin section analysis. A further 65 (623.3 g) sherds were collected from the broader site and were located individually using total station coordinates. These helped to give a better understanding of the range of pottery but were not used for subsequent analyses as they were not recovered from a controlled sample area.

Area	Area Size (m ²)	Number of Sherds	Density
Total A	38.18	41	1.07/m ²
Total B	83.16	47	0.56/m ²
Total	121.34	88	0.72/m ²

Table 2 Summary information about the surface collection of earthenware potsherds from Malara.

The material culture excavated from Malara was significantly less abundant and diverse than that recovered by Macknight (1969, 1976) and consisted mostly of earthenware potsherds (n=301; 1.3 kg) (Table 3). There were two sherds of blue on white Chinese porcelain (1.9 g) and three sherds of stoneware (8.9 g). No glass, beads, metal objects or metal (i.e. lead or iron) fragments were recovered from the excavations or surface collection. A silicified sandstone flake, silcrete unifacial point and dolerite flake were the only Indigenous artefacts recovered from the excavations. Trench 13 contained the highest proportion of the excavated earthenware assemblage, but the total amount of earthenware recovered from the excavations weighed only 389.4 g (n=148). The excavated earthenware assemblage was highly fragmented, with an average potsherd weight of 4.2 g (median 1.8 g; sd 10.45) and a range of 121.1–0.1 g.

The majority (82.4%) of the 148 potsherds from the Malara excavation were small, non-diagnostic fragments. Potsherds that could be identified consisted mostly of body (n=25) and rim (n=23) sherds. Only eight sherds displayed distinguishable patterns, these being paddle impressions (n=2), line impressions (n=1), applied patterns (n=2) and incised lines (n=3). Earthenware breakage is likely to have been exacerbated by contemporary use of the site since the late 1960s. Figure 6 shows the section profile from Trench 8, which is located in a high traffic area, and illustrates areas of soil disturbance compared to the stratigraphy recorded by Macknight (1969).

Square	Number of Sherds	Weight (g)
1	3	4.1
3	39	91.8
4	5	47.5
8	16	60.3
9	2	44.4
12	7	29.8
13	75	106.0
SL17	1	5.5
Surface finds	65	623.3
Area A	41	91.2
Area B	47	196.6
Total	301	1300.5

Table 3 Total earthenware potsherds recovered from excavations and surface collection.

Potsherd Analysis

Sherd fabric colour was variable and the collection included a combination of sharp and diffuse core margins following Orton et al. (2013:154). These results demonstrate that pots from Malara were fired in both oxidising and reducing firing environments, meaning that the amount of oxygen contact in the firing was uncontrolled. Sherds B-5-19 and A-8-41 are examples from a reducing firing environment, were cooled rapidly in air and feature a sharp core margin. Sherd A-5-19 is an example of earthenware produced in an oxidising firing environment without organics present, resulting in the lack of a core margin. Sherd B-11-43 was also produced in an oxidising firing environment and organics were originally

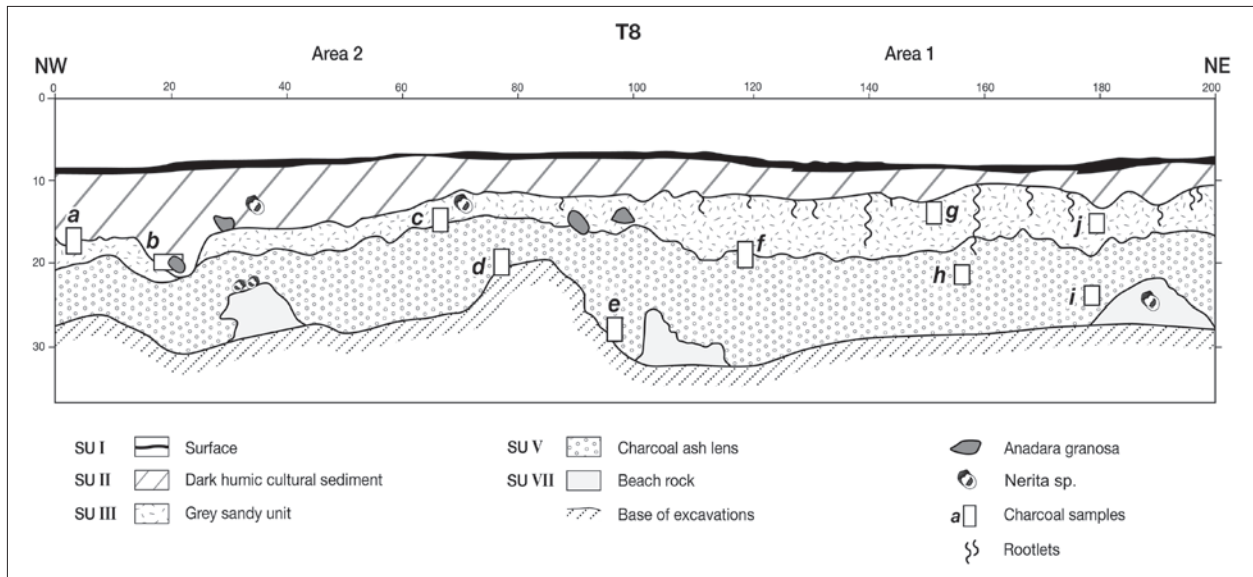


Figure 6 Stratigraphic profile of Trench 8, Malara, illustrating the complexity of the sediment profile in areas that were attributed to the processing of trepang (map produced by CartoGIS ANU).

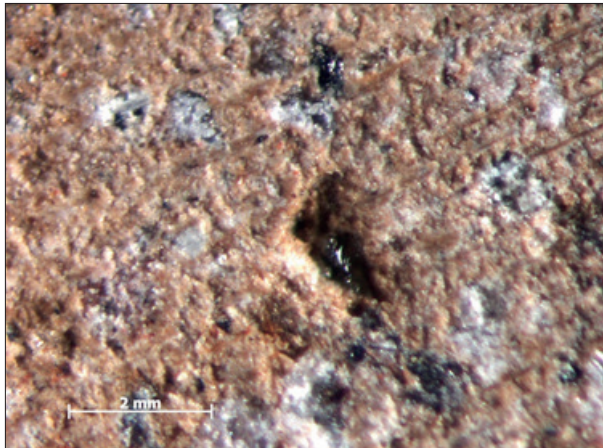


Figure 7 Sherd ABB-11-43: an example of an oxidised firing environment with organics originally present to produce a diffuse core margin.

present but were lost in the firing process; thus this sherd features a diffuse core margin (Figure 7).

Examination under a polarising microscope suggested that two temper categories and two distinct clay fabric types might be represented, initially designated as A, B, C₁ and C₂ (Table 4 and Figures 8, 9 and 10). Thin sections of 18 sherds (ten from Area A and eight from Area B) were examined petrographically to establish the nature of the temper (Table 4). These sherds were selected after macroscopic examination using a polarising microscope identified them as being representative samples of the range of earthenware. Table 4 indicates the sherd characteristics and the temper types as provisionally classified by megascopic examination using a hand lens.

Temper Types and Variation

Petrographic analysis demonstrates that tempers on all sherds are moderately sorted, sub-rounded to sub-angular aggregates of andesitic volcanic sand, probably of fluvial origin. The only grain types in the temper are volcanic lithic fragments (polymineralic grains internally variable texturally) and mineral grains of volcanic derivation, including plagioclase feldspar, pyriboles (pyroxene and

amphibole) and an opaque iron oxide (probably magnetite). If either quartz (reflective of felsic volcanic origin) or olivine (reflective of basaltic volcanic origin) is present in the tempers, it must be quite rare, for neither were noted during thin section analysis.

The only notable mineralogical variance occurs amongst the Type A sherds, in which biotite mica is present in trace amounts (noted macroscopically in both Type A sherds, and microscopically in Sherd ABA-8-4). The biotite mica forms only a minor component (presumably rare in Sherd ABA-1-1) of the ferromagnesian grain assemblage, which is dominantly clinopyroxene with subordinate hornblende and oxyhornblende. The two biotite-bearing tempers seem best regarded as outlier variants of a common temper spectrum in the Malara sherds. This interpretation is apparently confirmed by the presence of isolated flakes of biotite in the temper sands of at least four other Malara sherds from both collection areas (i.e. ABA-3-6, ABB-11-43, ABB-11-44 and ABB-10-37).

The tempers of Type B, C₁ and C₂ sherds vary unsystematically in grain size, sorting and percentage of temper in relation to clay paste, but form a gradational spectrum that is probably related to exact source area and the habits of individual potters, rather than to different locales of origin. Four Area B sherds (ABB-5-21, ABB-5-23, ABB-11-43 and ABB-11-44) have tempers that are somewhat better sorted and coarser grained than the others, but whether or not a slightly different assemblage of vessels was used at Area B as opposed to Area A is debatable. There are no systematic differences in the tempers of sherds from Areas A and B at Malara.

The compositions of the temper sands confirm that all of the Malara sherds are exotic to Australia, but neither confirm nor deny a potential origin from Sulawesi. Comparisons to other tempers studied in thin section by Dickinson confirm, however, that the tempers in the Malara collection do not derive from Aru, Kei, Banda or Maluku Tengah (Buru, Gorom, the Lease Islands or Seram). The differences in ceramic typology and temper grain size demonstrated in Table 4 do not reflect any systematic generic variations in temper mineralogy that might signal different places of sherd origin. The most parsimonious interpretation of the

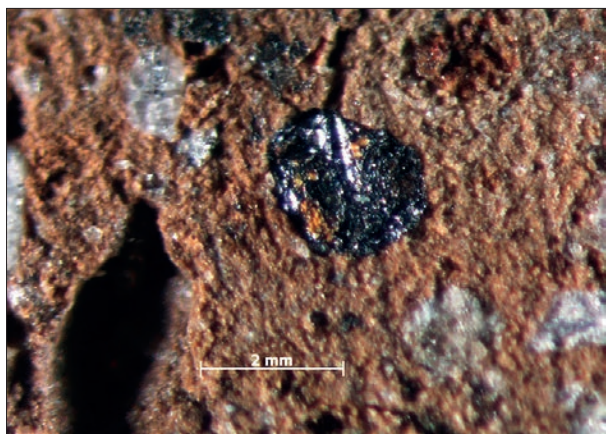


Figure 8 Sherd ABB-4-11: Category B thin ware with fine pale temper, an example of the fine clay fabric identified by Rowley (1998) as 'fine ware'.

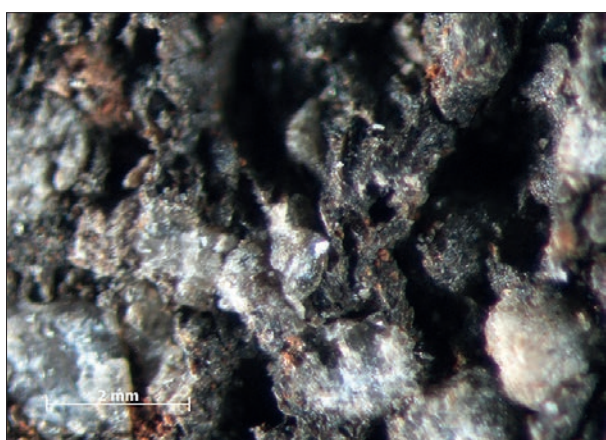


Figure 9 Sherd ABA-2-3: Category C₁ coarse ware with pale temper and ferro-magnesium inclusion.

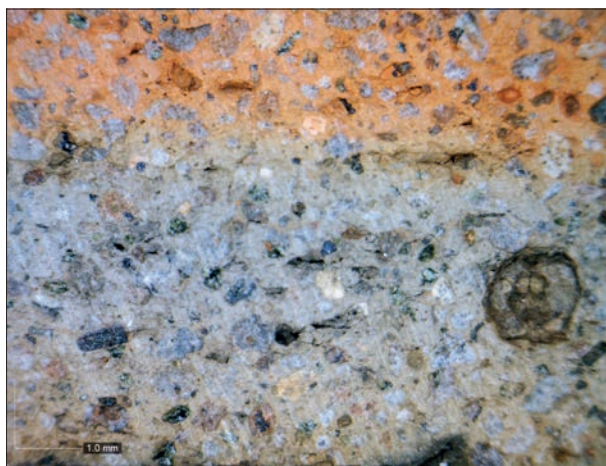


Figure 10 Sherd ABA-4-16: Category C₂ coarse ware rim sherd with pale temper.

temper compositions is that all examined sherds derive from the same general locale where generically related fluvial sands of variable texture could be collected to serve as temper in the same general ceramic assemblage.

With so few diagnostic pieces found amongst the Malara sherds it was not possible to compare pot shapes or decorative motifs with those of other Arnhem Land collections. The few decorative techniques observed are typical of south Sulawesi assemblages as described by Bulbeck and Clune (2003) and unfortunately have been in long use and are therefore not reliable indicators for dating purposes. Further, the number of decorated sherds was far too small to offer a reasonable sample of the patterns to analyse. Dickinson did not have a comparative pottery collection from south Sulawesi to compare against the Malara sherds, so was unable to identify the sherds as definitely from this area. However, his analysis supports the conclusion that all sherds were from a single source area and, in view of their compositional similarity to the Macassan sherds analysed by Rowley (1997), this is the likely point of origin for all the pots examined from Anuru Bay. Variability in the clay fabric could potentially be a result of manufacturing techniques, the technique of the individual potter or slight variation in collection locale for the clay, or a combination of these factors. The difference in clay fabric is largely textural, with Types A and B containing more silt, and Type C containing less silt and larger, gravel-sized inclusions, impacting on compaction and hardness. Fabric colour in the Malara surface collection is highly variable, suggesting unstable heating environments in a non-homogeneous manufacturing environment, typical of Indonesian earthenware pottery production (Bulbeck and Rowley 2001) and typical of Macassan earthenware. This conclusion is substantiated by both historical and ethnographic accounts of pottery production in the Indonesian Archipelago.

Discussion

Origins of the Anuru Bay Earthenware

Macknight (1976) and Rowley (1997) proposed that the fine earthenware may not have been of Macassan origin. Key (1969) suggested that the fine earthenware may have originated from the Kei Islands, which were renowned historically in the 17th and 18th centuries as a major earthenware manufacturing locale in the eastern Indonesian archipelago. We can now be certain that, while calcareous tempers indicating an origin point outside south Sulawesi are found in some of the sherds at Tamarinda and from four other Kimberley assemblages, they are entirely absent from the Malara and Goulburn Island assemblages (Bulbeck and Rowley 2001:65). This indicates that the source of the earthenware pots on the Arnhem Land coast is likely to be exclusively south Sulawesi.

Type	Sherd and Temper Type Description	Area A Sample ID	Area B Sample ID	Figure Number
A	Thin ware with fine dark temper	ABA-1-1, ABA-8-4	N/A	N/A
B	Thin ware with fine pale temper	ABA-5-19, ABA-6-24, ABA-7-38	ABB-1-5, ABB-4-11, ABB-4-12	7
C ₁	Coarse ware with pale temper	ABA-2-3, ABA-3-6, ABA-7-33	ABB-11-43, ABB-11-44	8
C ₂	Coarse ware rim sherd with pale temper	ABA-4-14, ABA-4-16	ABB-1-4, ABB-5-21, ABB-5-23, ABB-10-37	9

Table 4 Summary of results from microscopic examination of a sample of Anuru Bay earthenware sherds.

Bulbeck and Rowley (2001:67) discussed in detail the likely origins of earthenware procured by the crews of the trepang fleets, suggesting they sought superior earthenware from particular vendors through the port of Makassar. As Makassar was an established *entrepôt* linking eastern and western Indonesia from the early 17th century, quality earthenware from various origins should have been available in port at the time of the departure of the Macassan fleets (Bulbeck and Rowley 2001; Poelinggomang 1993; Sutherland 2000). During the 1700s, Chinese traders were importing earthenware obtained in Batavia to Makassar, and also exporting earthenware to other areas around the Flores Sea (Knaap 2006:491). Bulbeck and Clune (2003) noted that distinctive earthenware designs appeared during the Islamic-Colonial period in southern Sulawesi. Very few earthenware pots with these distinctive designs, however, seem to have made their way to Australia via the Macassan trepang fleets, illustrating a choice by the crews to choose plain or less decorative wares for their voyages. It is likely that the crews of the trepang fleets could not afford luxury ceramics and porcelains.

Another consideration in terms of the origin of the earthenware at Malara is to draw on historic analogies for the organisation of major maritime enterprises, such as whaling (Hunt 1842; Littlefield 1906; Schultz 1967). Whaling ships generally amassed the materials, tools and equipment necessary for their work at the time of departing their home port (Hunt 1842; Littlefield 1906; Schultz 1967), only stopping at other ports to seek provisions to supplement low stocks of perishables, such as occurred at Com in Timor (McWilliam 2007:1128). Therefore it could be expected that trepang fishing fleets would be provisioned with all non-perishables and equipment on leaving the port of Makassar, rather than acquiring earthenware en-route. Again, more utilitarian earthenware would be chosen because of the high likelihood of breakage and low use-life expectancy during these maritime ventures.

Implications for Malara Site Use

Potsherd types indicated uniformity in the overall earthenware assemblage from Areas A and B, which is consistent with previous analyses of southwest Sulawesi earthenware from the 18th and 19th centuries by Bulbeck and Rowley (2001). Based on the amount of earthenware recovered by Macknight (1969), the fact that potsherds are still eroding from the site, and considering Mitchell's (1994) analysis of Macassan fleet numbers, it can be assumed that Malara must have been occupied intensively in the 18th century and began to fall out of use by the mid-19th century. It is also important from a social perspective that the fleets occupying, harvesting and processing trepang at Anuru Bay originated from the port of Makassar. Although the earthenware does not identify any specific ethnic origin for crews, it is demonstrative as a proxy for a strong connection with Makassar and southern Sulawesi, and therefore it might be expected that the cultural beliefs of this region were pronounced in crew interactions with local Indigenous populations.

Conclusion

While macroscopic analysis indicated the presence of two distinct tempers, this was not confirmed by the petrological analysis, which suggested Sulawesi as the likely, and sole, source

of the pottery from Malara. The analysis ruled out the possibility of local manufacturing of pottery on the Arnhem Land coast. It also demonstrated that there was no fine ware pottery from the Kei Islands or other islands to the east of the volcanic belt. We would concur with Rowley that the differences noted between individual sherds are likely due to local variability within the source material used by the potters in south Sulawesi and not to different source islands. Given the reports by Bulbeck and Rowley (2001), differences between individual pottery techniques and manufacturing styles in Sulawesi have likely contributed to the small amount of variability observed in the Malara assemblage. The sample analysed from Anuru Bay supports the hypothesis that the earthenware used by the trepang fleet was all sourced at Makassar prior to the fleet's departure, underlying the specific economic nature of the Macassan enterprise. It also strengthens the claim for Makassar and southern Sulawesi as the main origin point for trepang fleets operating in the Anuru Bay region.

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