The Palace Centre of Sago City: Utti Batue Site, Luwu, Sulawesi, Indonesia

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INTRODUCTION

Archaeological remains rarely preserve well in humid equatorial regions, apart from those in a few favoured locations such as anaerobic swamps. One of the best known of these sites is Kuala Selinsing, in Peninsular Malaysia, an important offshore trading and industrial centre occupied from *c*. 2000–1000 yr BP (Nik Hassan Shuhaimi 1991). In this paper we briefly describe a second site of comparable significance – Utti Batue, which evidently served as the palace centre of Luwu, a prominent Bugis kingdom, during its pre-Islamic heyday in the fifteenth and sixteenth centuries. The site has major implications for historians of Sulawesi in view of Luwu's widely held reputation as the oldest and most prestigious Bugis kingdom (*e.g.* Pelras 1996). It also has great archaeological significance as it is, to our knowledge, the best preserved Southeast Asian palace centre which dates to the 'early modern period'. Following its abandonment *c*. AD 1600 and the shift of Luwu's capital to Palopo between 1610 and 1630 (Bulbeck and Caldwell 2000, 70), Utti Batue became sealed beneath approximately 1 m of sediment, and its material remains were virtually free of degradation from subsequent habitation or agricultural disturbance.

Utti Batue is located at 2º 47' 50" S, 120º 24' 00" E in Kecamatan Malangke Barat, Kabupaten Luwu Utara, in the province of South Sulawesi (Fig. 12.1). The site lies at 1–2 m above sea-level, in an environment of oppressively high temperatures and humidity, and an average annual rainfall of 2500–3000 mm. It was first recorded in 1997 during a preliminary survey by the 'Origin of Complex Society in South Sulawesi' (OXIS) project (Bulbeck and Prasetyo 1998), and in 1999 a borehole survey estimated its extent as 4 ha. During this survey, test pits were excavated to the north of the site, adjacent to the drainage ditch which had previously exposed its existence; this paper describes the artefacts and ecofacts recovered through excavation.

One of the hypotheses formulated by the OXIS project is that the dominant plant food of the Utti Batue inhabitants was sago (Bulbeck and Caldwell 2000, 14–5); the coastal swamps surrounding the site are one of the main sources of sago in South Sulawesi, exporting over 1000 tons of wet sago in 1984 (Osazawa 1986). It is also estimated that the population stood at about 10,000 inhabitants in the fifteenth century, and 10–15,000 in the sixteenth century, on the basis of looted pre-Islamic cemeteries in the Malangke site complex, and the size of the two main settlements of Utti Batue and Pattimang Tua (Fig. 12.2) (Bulbeck and

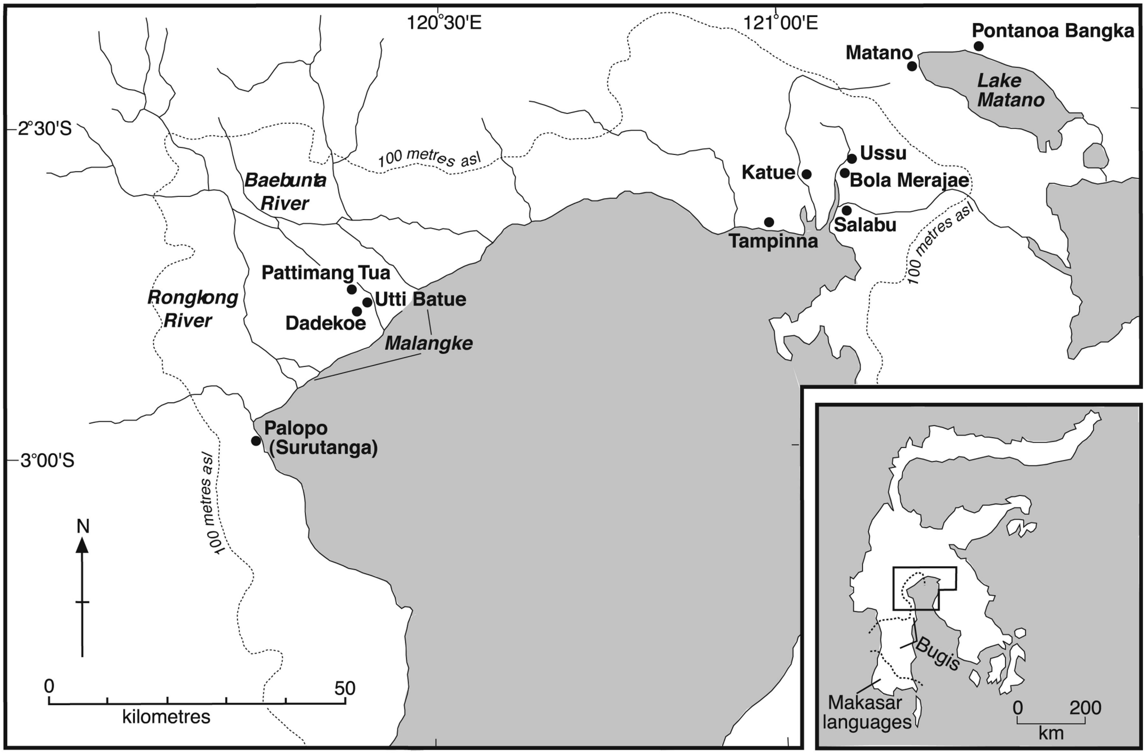

Fig. 12.1 Luwu, South Sulawesi, and main locations mentioned in the text.

Caldwell 2000, 73–6). These urban population levels, in conjunction with a monumental structure with brick foundations at Tampung Jawa, a centralised economy and the well-established literary tradition in pre-Islamic Luwu, would satisfy all four of Fagan's (1995, 343) criteria for a 'civilisation'. Utti Batue would accordingly rank with the famous fifteenth century entrepôt of Melaka, in Peninsular Malaysia, whose inhabitants also established the capital of a civilisation in an environment too brackish for wet-rice cultivation, and instead turned to sago for their staple diet (Wheatley 1961, 311–2).

SURVEY AND EXCAVATION

Immediately north of Utti Batue lies the site referred to as the Dato Sulaiman Islamic Cemetery. It features the tombs of the first sultan of South Sulawesi, Matinroe ri Ware Sultan Muhammad Wali Muzahir, and his teacher Dato Sulaiman who converted his royal pupil to Islam in 1605. This major Islamic site, noted by Caldwell (1993), was subsequently shown to abut a rich, looted, late pre-Islamic cemetery (Bulbeck 1996–7). The tombs face a large fishpond, excavated by the local inhabitants in 1997 and containing a lock-controlled drainage ditch in which buried posts of massive dimensions were unearthed. Pottery and other debris were also reported.

The OXIS team was able to survey the bottom of the ditch, and in addition to observing an abundance of earthenware pottery, an iron knife with a curved blade and other iron fragments were collected. A water-

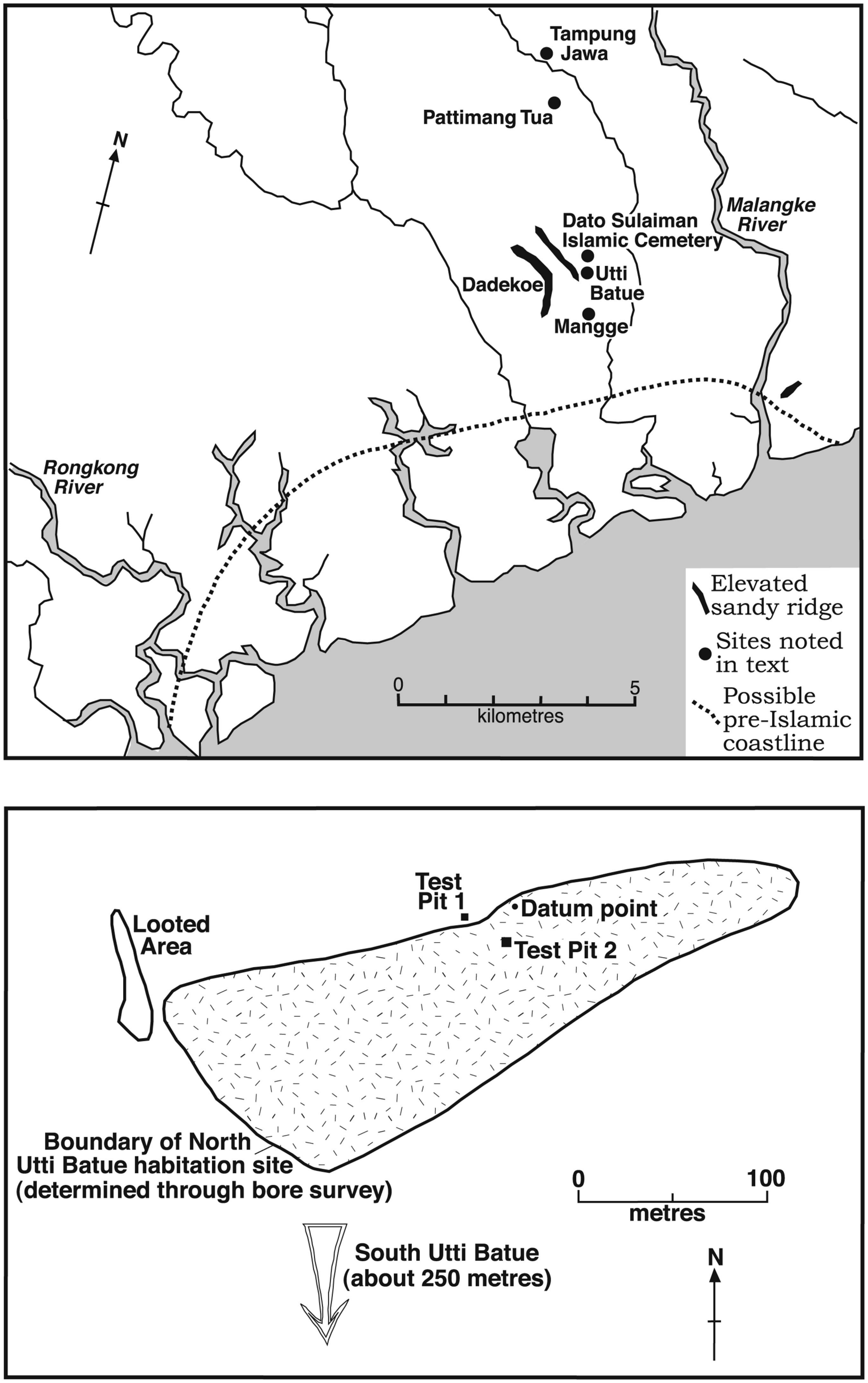

Fig. 12.2 Malangke (above) and Utti Batue (below).

buffalo bone, a pottery fragment with dammar gum adhering to it,[1] and imported ceramic shards dating to the fifteenth and sixteenth centuries were also retrieved (Bulbeck and Prasetyo 1998, 1999, 25). The site's proximity to the tomb of Muhammad Wali Muzahir strongly suggested that it represented Luwu's last pre-Islamic palace, and the range of organic and barely corroded iron remains indicated excellent preservation conditions, brought about by the deposition of flood sediments since the site's abandonment.

To determine the extent of the main habitation area at Utti Batue 35 boreholes were sunk along transects running through the mandarin orchard at the site, and the surrounding *rawa* forest. The boreholes were drilled to a depth of 1.5–2.0 m, or until evidence of habitation, in the form of pot shards or food remains, was encountered (between 0.6 and 1.9 m depth). A boundary drawn around the productive borehole locations produced a shoehorn-shaped site, called North Utti Batue, covering approximately 3 ha (Fig. 12.2). A second area a short distance to the south, reportedly yielded a stone board with engraved squares, evidently designed for playing *macang* (a Bugis game similar to chess), and an extraordinary concentration of imported ceramic shards from a 2 × 2 m illegal excavation, totalling 29 g of glass and 31.4 kg of imported ceramics. It was tentatively inferred that this area, designated South Utti Batue, would have covered around 1 ha and probably served as an elite compound.

An initial test pit (Selatan 4–5/Barat 25–26) (Fig. 12.2) failed to reveal any archaeological traces, but a second, 9 m^2 test pit (Selatan 23–25/Barat 2–4) yielded an abundance of materials (Fig. 12.3). The top 0.7 m of this pit was removed by shovel until the first archaeological trace, an earthenware shard, was exposed (Fig. 12.3). Subsequent deposits were removed in spits of approximately 5 cm depth. The first three such

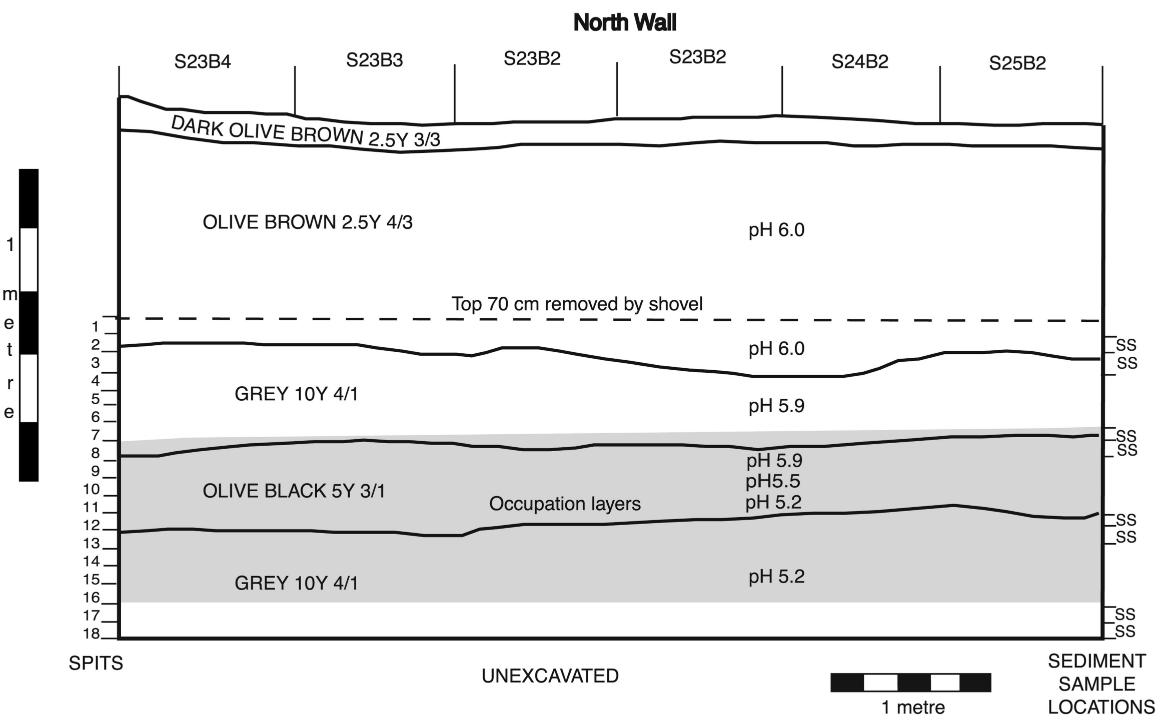

Fig. 12.3 Stratigraphic section of Utti Batue Test Pit 2 (northern wall).

spits, which yielded very sparse remains, covered the entire exposure. Spits 4 to 18, which were excavated through the main cultural deposit to sterile deposits at about 1.6 m depth, were restricted in area to the 4 m^2 in the centre of the test pit. Most of the pit was excavated at levels below the water table, and excavation was only possible by regularly pumping out the groundwater.

In describing the materials retrieved, along with the more interesting finds from the surface survey, we must stress that the work at Utti Batue provides only a very partial view of a site whose total material contents may be in the order of 10,000 times larger than the sample that OXIS was able to extract; based on the second test pit's excavated finds of approximately 45 kg, the total artefactual and ecofactual content of Utti Batue could conceivably lie in the region of 400–500 tonnes.

Site environment and sediments

In the 1980s, Utti Batue lay in a mixed forest of *Rhizophora apiculata*, *Avicennia marina* and *Xylocarpus granatum*, within a 12,000 ha expanse of mangrove forest which was, at the time, the largest in Sulawesi (*cf.* Whitten *et al.* 1987, 125, 190). Intuitively it is assumed that at the time of occupation the Utti Batue site also lay in a mangrove setting, but closer to the shoreline which may then have reached several kilometres to the west of its present position. The colour contrast in the excavated deposits, from predominantly grey in the lowest metre to olive brown in the upper layers (Fig. 12.3), would be consistent with the transition from a hydromorphic alluvium to a gley humus, which Whitten *et al.* (1987, 110) associate respectively with the seaward and terrestrial zones of the Malangke mangrove forest.

The majority of sediment samples (labelled SS in Fig. 12.3) comprised clay-rich, silty fine sands, and all are acidic, increasing in acidity with depth (*cf.* Whitten *et al.* 1987, 110). Clay samples from spits 2 and 3 (post-occupation), 7 and 8 (late occupation), 12 and 13 (middle occupation), and 17 and 18 (pre-occupation) were analysed by X-ray diffractometry, and the results from a representative sample (spit 2) are illustrated in Fig. 12.4. Mineralogically the samples are virtually identical, containing orthoclase and plagioclase feldspar, quartz, mica (biotite and muscovite), amphibole, chlorite, kaolinite, smectite, vermiculite and inter-layered clay (in a biotite/chlorite phase). These minerals are consistent with derivation of the sediments from the granodiorite hills which abut the coastal plain where the Rongkong and Baebunta rivers leave the ranges before flowing towards Malangke. The lack of variation in the samples suggests that the same sedimentation regime has prevailed from the time of initial settlement until the present, and chronological indications are consistent with this scenario. The *c.* 0.5 m of sediment deposited during the period of occupation of the site, *i.e.* the 200 years between AD 1400 and 1600, and the overlying 1 m of sediment deposited during the 400 following years, both correspond to an average deposition rate of 0.25 cm yr^{-1}.

Consequently, the abandonment of Utti Batue cannot be attributed to a disastrous flood or other major natural event, and is more likely due to socio-political changes, as the local oral history would suggest (Bulbeck and Caldwell 2000, 70). Moreover, the excellent preservation of organic materials at the site would appear to reflect anaerobic, waterlogged conditions at the time of occupation, rather than the creation of such conditions through the deposition of a sealing cap of sediment at the time of the site's abandonment.

Site contents

The primary means of dating the period of site occupation come from consideration of the 466 shards of imported stoneware and porcelain ceramics identified from the site. While the vast majority of these pieces (434) were recovered from the illegal excavation (noted above) in South Utti Batue, they are entirely consistent with the smaller body of finds recovered from North Utti Batue. Sixteenth century wares dominate the assemblage (Table 12.1). The single fourteenth century shard could have arrived at the site later than its identified age of manufacture, and is thus insufficient evidence of occupation before the fifteenth

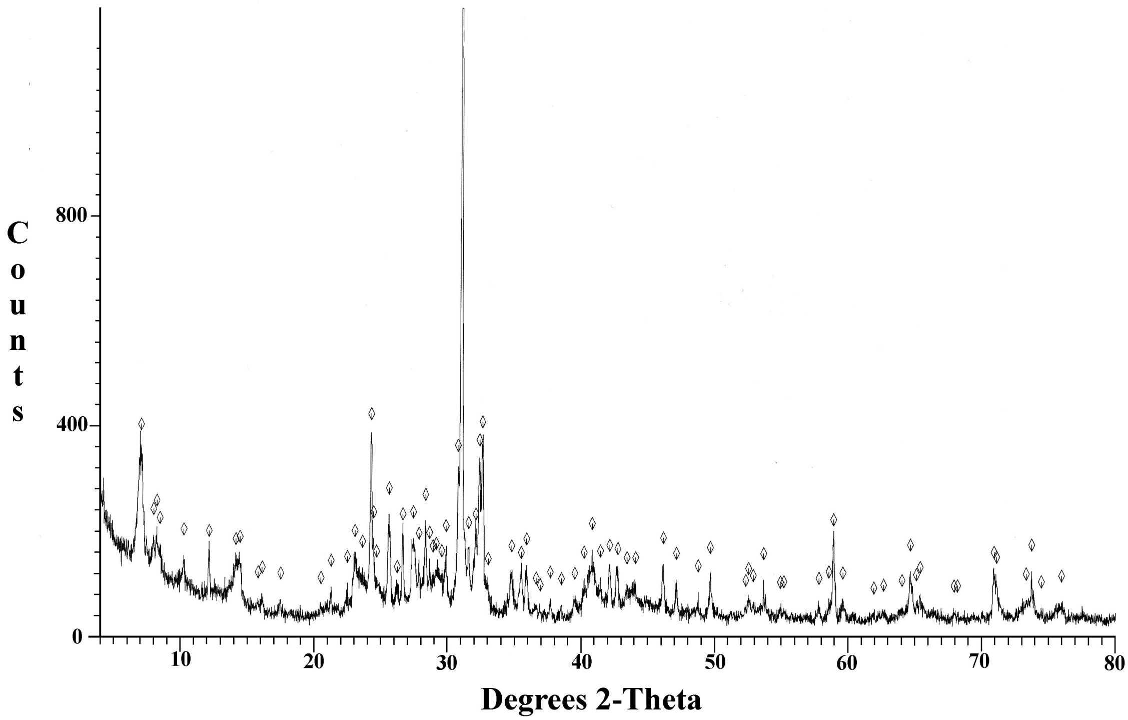

Fig. 12.4 X-ray diffractogram of the clay sample from spit 2.

century. As no wares definitely post-date the sixteenth century, the total period of occupation can be bracketed between *c*. AD 1400 and 1600, suggestive of sudden abandonment at the end of the site's sixteenth century heyday. The variety of imported wares is great (Table 12.1), and includes all manner of large and small jars, jarlets, vases, plates, bowls and covered bowls, with many of the pieces being of excellent quality. The assemblage gives the impression that imported wares served as a regular component of the domestic chattels, although the excavated finds show that earthen vessels greatly outnumbered imported ceramics in daily use (Table 12.2).

A few of the surface finds collected near the test pit in 1998 merit attention. One is a fragment of a brick 16.4 cm wide and 3.85 cm thick, with a length in excess of 19 cm. Its breadth and thickness fall in the range recorded on brick fragments from Tampung Jawa, which are interpreted to have been used in erecting a thirteenth to fifteenth century monumental structure at Malangke (Bulbeck and Prasetyo 1999, 27). Another find is a beautifully polished 'axe' with a square cross-section and dimensions of 149 × 37 × 35 mm, made of a hard, mottled pink and reddish brown stone. Even though it was surely a ceremonial piece (with no traces of use), its appearance at Utti Batue appears anachronistic, and it must have been brought on to the site as a curio or heirloom. The two other surface finds of polished stone are a heat-cracked river pebble (from a hearth or earth oven?), subsequently utilised as a pestle, and a soft river pebble with use-wear striations on one face and transverse fractures along its sharper edge (probably used as a pestle-cum-scraper). Stone tools are rare at this site and the only other identified example is a small polished stone from spit 17 of the test pit. This peg-like chaplet or pin measures 48 mm long × 28 mm maximum diameter, and has been shaped to only a slight degree from a suitably proportioned pebble blank (Fig. 12.5, UTB.2.17.4).

	14th	14th–15th	15th	15th–16th	15th–18th	16th	16th–17th	Undated
Chinese whiteware	1	1	0	13	0	17	16	0
Jizhou black-and-white	0	3	0	0	0	0	0	0
Chinese blue-and-white	0	2	1	5	0	239	8	0
Chinese lead-glazed	0	0	2	0	0	0	0	0
Chinese celadon	0	0	1	7	0	1	0	0
Chinese monochrome	0	0	0	4	0	10	0	0
Sawankhalok	0	0	0	18	0	0	0	0
Sukothai	0	0	0	2	0	0	0	0
Vietnamese	0	0	0	46	0	41	0	0
Pegu (Burma) plainware	0	0	0	0	2	0	0	0
Coarse stoneware jar	0	0	0	1	0	1	0	4
Chinese blueware	0	0	0	0	0	1	0	0
Chin. overglaze enamels	0	0	0	0	0	16	3	0
Total	1	6	4	96	2	326	27	4

Table 12.1 Imported stoneware and porcelain identified from Utti Batue. Summarised from Bulbeck and Prasetyo (1999), and Bulbeck and Caldwell (2000: 119–20), apart from a few coarse stoneware shards subsequently identified among the excavated earthen pottery.

Spit	Gravels and misc. pebbles	Ironstone pebbles	Baked/indurated earth	Earthen shards	Ceramic shards	Glass bead
5	–	–	–	1.1 g	–	–
6	4.0 g	–	–	34.1 g	–	–
7	1.0 g	–	–	541.5 g	–	–
8	25.0 g	–	–	596.1 g	–	–
9	20.0 g	–	5.0 g	1082.0 g	–	–
10	210.0 g	–	117.0 g	3015.0 g	17.0 g	–
11	160.0 g	86.0 g	–	2937.8 g	210.9 g	–
12	564.0 g	–	174.0 g	3120.9 g	2.7 g	–
13	120.0 g	–	196.7 g	3305.3 g	19.0 g	–
14	247.2 g	–	105.0 g	2512.0 g	86.5 g	–
15	26.0 g	–	–	1263.1 g	–	0.1 g
16	6.0 g	–	6.6.g	681.3 g	37.4 g	–
17	–	–	–	38.0 g	–	–
18	–	–	–	9.6 g	–	–
Total	1.4 kg	86.0 g	604.3 g	19.8 kg	379.8 g	0.1 g

Table 12.2 Weight of inorganic finds from the Utti Batue test pit. Earthenware total includes 0.7 kg of shards collected from the wall, and the total of imported ceramic shards includes one from the wall.

Various pebbles and gravels, weighing 1.4 kg in total, were collected during the excavation. Their occurrence rises and falls with that of the artefacts and ecofacts (Tables 12.2 and 12.3), indicating that they had been transported manually on to the site. Some of the rocks show traces of exposure to heat and others may be spalls from used pebbles, confirming their role in the material culture of the occupants. A single jagged pebble of ironstone (Table 12.2) is of interest for its possible suggestion that iron ore had been imported to Malangke. The 600 g of baked and/or indurated earth point to some lighting of fires in the

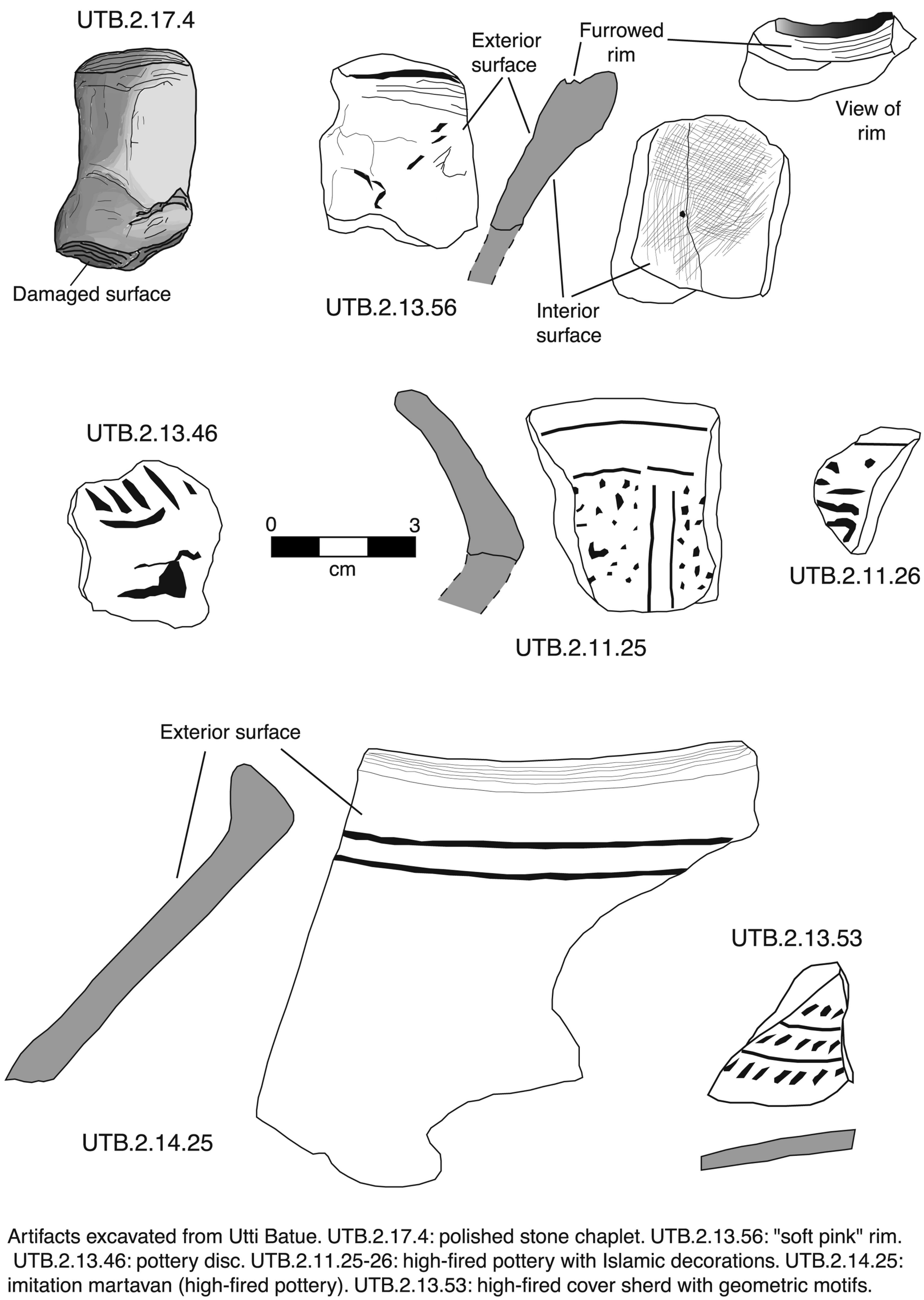

Fig. 12.5 Representative artefacts excavated from Utti Batue Test Pit 2.

vicinity of the settlement, notwithstanding the waterlogged terrain that surrounded the site. The most prominent class of finds is earthenware shardage which, at nearly 20 kg, accounts for almost half of all recorded finds. The excellent preservation conditions probably account for the observation (detailed below) that a dammar coating[1] has been better preserved on the local pottery at Utti Batue than at other excavated sites in Luwu.

The organic finds include over 1 kg of charcoal, about 13 kg of timber, over 330 g of other plant macrofossils, about 6.6 kg of faunal remains, and a lump of dammar gum (Table 12.3). Closer study of the plant macrofossils (which were identified only in the field) would quite likely reveal a greater variety than those shown here, but the direct evidence for the consumption of canarium nuts and coconuts is of interest in dietary reconstruction. Many of these fragments were recorded as burnt, as were all the faunal fragments. The wood had been deposited in large blocks of up to 2.7 kg in weight, and two pieces were observed to show clearly planed surfaces, as would be expected if the timber had been used for constructing houses on the site. According to the workers at a sawmill near the Makassar Archaeology Office in Sudiang, the type of wood represented is locally named *taluttu*, a mangrove timber of fine quality for carpentry and construction.

In view of the incomplete nature of the reference collection and the lack of a specialist analyst to undertake faunal identification, we attempted to be conservative in our identifications (Table 12.4). However, it is clear that bovids account for almost two-thirds of the faunal remains by weight. Large mammals, including pigs and deer, dominate the assemblage, while the contribution from medium-sized mammals, apparently including monkeys and dogs, but possibly also cuscus, was modest.

Few small fauna were recorded, and of these the rats were probably unwelcome guests. Fish and turtle make up a restricted but recognisable marine component of the assemblage, but no shellfish were recorded. This contrasts with the archaeological excavation of shellfish middens in Luwu, which are both

Spit	Charcoal	Canarium nut husks	Carbonised seed	Coconut shell	Wood	Dammar lumps	Faunal fragments	Organic lumps
2	8.5 g	8.0 g	–	–	–	–	–	–
3	1.4 g	–	–	–	–	–	–	–
5	3.5 g	–	0.3 g	–	–	–	–	–
6	0.6 g	15.0 g	–	–	–	–	–	–
7	77.0 g	2.0 g	–	–	–	–	124.7 g	–
8	53.0 g	1.2 g	–	–	2.7 kg	–	104.5 g	–
9	76.0 g	9.0 g	–	–	4.5 kg	–	700.6 g	15.0 g
10	193.0 g	7.0 g	–	30.0 g	–	–	1629.9 g	11.0 g
11	112.0 g	33.0 g	–	33.0 g	3.1 kg	–	641.4 g	26.0 g
12	240.0 g	27.0 g	–	–	–	–	677.6 g	3.0 g
13	293.7 g	33.3 g	–	1.0 g	2.1 kg	1.3 g	387.5 g	9.0 g
14	162.0 g	68.0 g	–	–	118 g	–	853.4 g	18.0 g
15	106.0 g	35.0 g	–	4.0 g	148 g	–	177.9 g	5.0 g
16	69.0 g	19.0 g	–	2.0 g	100 g	–	59.6 g	8.0 g
17	10.0 g	1.0 g	–	–	62 g	–	26.7 g	2.0 g
18	–	–	–	–	131 g	–	–	–
Total	1.4 kg	260.5 g	0.3 g	70.0 g	13.0 kg	1.3 g	6.95 kg	97.0 g

Table 12.3 Weight of organic finds by spit from the Utti Batue test pit (spits 1 and 4 were sterile). Totals include 12.4 g of charcoal, 2 g of canarium fragments, 6.6 g of wood, and 1.55 kg of bone fragments collected from the test pit wall.

Identification	Weight (g)	NISP	Identification	Weight (g)	NISP
Bovid	4234.2	272	*Bovid?*	112.4	15
Pig	39.8	8	Pig?	21.8	5
Deer	299.0	1	Large	912.9	302
Large/Medium	680.5	422	Medium	87.1	49
Macaque?	12.4	2	Dog?	2.0	1
Medium/Small	14.3	8	Small	3.1	7
Rat	1.0	7	Rat?	2.0	5
Bat?	1.8	1	Turtle/tortoise	5.7	4
Fish	110.8	52	Unidentified	413.1	352
			TOTAL	**6953.9**	**1513**

Table 12.4 Recorded weights and numbers of individual specimens (NISP) of fauna from the Utti Batue excavation.

contemporary with Utti Batue (Salabu, Tampinna) and younger than it (Surutanga, in Palopo) (Bulbeck and Caldwell 2000). The identifications at Utti Batue suggest an animal protein diet dominated by domestic animals, especially bovids, along with some exploitation of resources from the adjacent sea. It is assumed that the bovids were mainly water-buffalo, which would have thrived in the wet conditions at Utti Batue, rather than cattle.

The term ‘organic lumps’ is used for the 97 g of rounded cylindrical objects (Table 12.3) which the excavators tentatively identified as coprolites, but this was later demonstrated not to be the case at the Palynology Laboratory of Texas A&M University, although their identification remains uncertain. X-ray mineralogical analysis showed that one specimen consisted entirely of amorphous material, a second was predominantly of amorphous matter but included some quartz, possibly accompanied by some chloritic material and a little kaolin, and a third specimen consisted of an outer skin, which is mineralogically identical to the surrounding sediments, and inner matter which produced the same essentially amorphous X-ray spectrum as observed for the other two samples (Fig. 12.6). The most plausible identification currently comes from Malcolm Lillie at the University of Hull, who observed pockets of oil in the matrix and inferred that the specimens sent to him could be some sort of seed or fruit.

Phytolith analysis

Analysis of phytoliths (plant biogenic silica microfossils) was carried out on nine sediment samples from the test pit, in particular to determine whether sago palm (*Metroxylon sagu*) was part of the vegetative landscape when occupation at the site was flourishing. Illustrated references of phytoliths extracted from tropical material are limited. Nonetheless, leaf material from a small phytolith reference collection of tropical economic plants indicates that sago palm is a high volume producer of small, spherical echinate phytoliths in three sizes, *c.* 5, 8 and 10 mm diameter. However, as small spherical echinate and similar phytoliths are also identified in other palms (*e.g.* coconut), use of a higher magnification scanning electron microscope would be required to distinguish phytoliths of less than 10 mm. In this instance an assumption has been made that the presence of high numbers of phytoliths within the size range noted in sago reference material, and the current presence of sago palms throughout this area, indicate a probable continuous presence through time, as reflected by the high numbers of phytoliths with small palm type morphology. The sago palm also produces starch grains which can and do migrate and cluster on the slide, but not necessarily in the count transect. While phytoliths classified to a morphological group are not necessarily identical, their size, shape and ornamentation place them within the various groups.

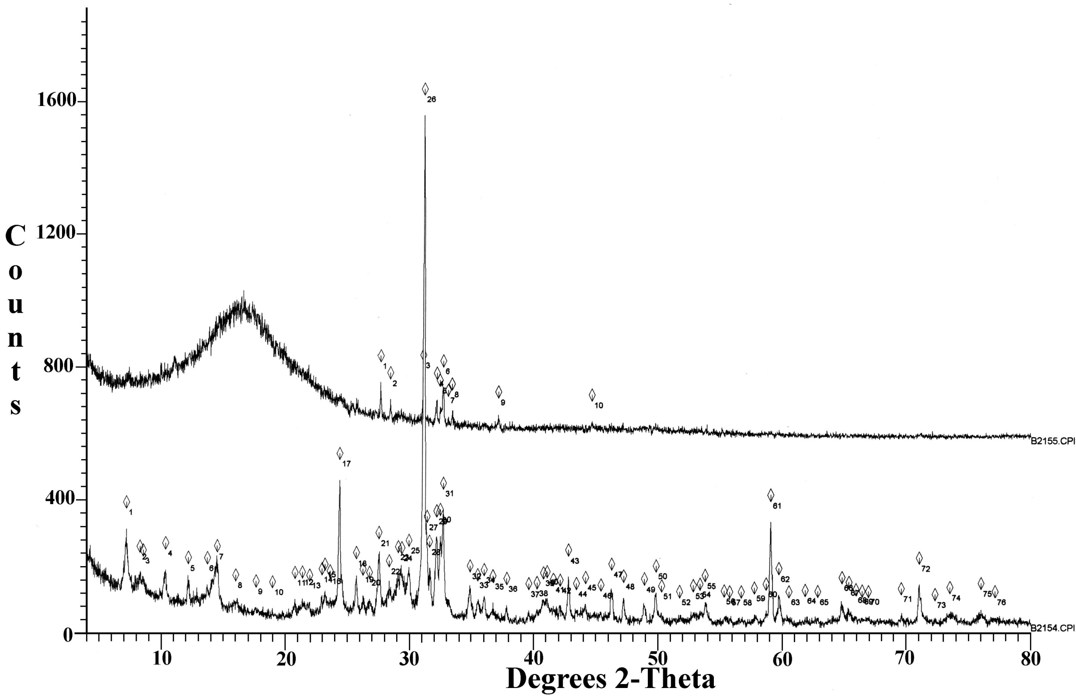

Fig. 12.6 X-ray diffractogram of an 'organic lump' sample contrasting the outer skin (with peaks) and the inner matter (amorphous spectrum).

Given the high rainfall, high water table, low relief and likely regular inundation of the area through time, it is suggested that the excavation area has always experienced various degrees of wetness, similar to the existing swampy conditions. In the Utti Batue phytolith assemblage (Table 12.5) two morphologies are indicative of wet conditions. These are the spherical echinate palm types of less than 10 mm (Group 1) and grass arc/triangle cells (Groups 69–71).

Where possible, plant names are tentatively identified to the groups. Groups 1–8 are palms with Group 1, which dominates the phytolith assemblage, probably sago palm and Group 7 probably coconut palm. Also tentatively identified are Groups 29 (*Barringtonia*), 33 (wild banana) and 34 (ginger). These plants, along with a variety of palms and other flora, are all to be found in disturbed areas of Indonesia (Whitten *et al.* 1987). Group 25, Cuticle 2 is identified (Fahn 1989) as from the Iridiaceae family, whose members are swamp plants in their native habitat (Dykes 1974). Rectangles (Groups 36–48) are ubiquitous and unidentified to plant in this assemblage. 'Grasses' (Groups 50–71) follow a classification scheme devised by Bowdery (1998) to identify short cell morphology. Group 55 and Angular groups 58–67 in this instance are tentatively associated with bamboo. The arc/triangle morphology of Groups 69–71 identifies hydrophylic grasses such as *Imperata*, *Phragmites* and bamboo. It is suggested that, given the short chronology of the deposit, morphologies occurring in all nine samples (final column, Table 12. 5) may be considered as part of the phytolith 'noise' for the site. Omitting Group 72 ('others'), this gives 27 morphologies occurring as noise.

Table 12.6 gives relative frequencies of phytoliths obtained from a count of one 10 mm transect for each

Spit #			5		8	9	10	11	12	13	14		18		
dbs cm			105		120	125	130	135	140	145	150		170		
Slide ID			713		723	714	715	716	717	718	719		720		
PHYTOLITH MORPHOLOGY	Gp #														Occurrence
															in seds
Spherical															(max. 9)
echinate (palm)	-														
- <10µ (sago)	1		x		x	x	x	x	x	x	x		x		9
- <20µ	2		x		x	x	x	x	x	x	x		x		9
- <30µ	3		x		x	x	x	x	x	x	x		x		9
- <40µ	4		x		x	x		x	x	x	x				7
- <50µ	5					x									1
- <75µ	6					x	x								2
- Se1 (coconut)	7		x		x	x	x	x	x	x	x		x		9
- Se 2	8		x		x	x	x	x	x	x	x		x		9
psilate (arboreal)															
- < 10µ	9		x		x	x	x	x	x	x	x		x		9
- < 20µ	10		x			x	x			x	x				5
- < 30µ	11		x		x	x	x				x				5
- < 40µ	12				x	x		x	x		x				5
- < 50µ	13				x	x		x	x		x		x		6
- < 60µ	14		x							x			x		3
- < 75µ	15					x	x			x					3
- < 100µ	16					x									1
- < 100µ	17							x							1
3D chunks	18		x		x	x	x	x	x	x	x		x		9
Sheet	19		x		x		x	x	x	x			x		7
Facetted	20		x				x								2
Crescent	21						x	x							2
Perforated - clear	22				x	x	x	x	x	x	x		x		8
- brown opaque	23		x		x	x	x	x	x	x	x				8
Cuticle - C1	24				x	x	x	x	x	x	x				7
Cuticle - C2 Iridaceae	25				x	x	x	x	x	x					6

Table 12.5 Utti Batue phytolith presence.

Cuticle - 3	26				x										4
Cuticle - C4	27				x										4
Cuticle C5 - other	28		x		x	x	x		x	x			x		7
Barringtonia?	29		x		x	x	x	x	x	x	x				8
Ornamented. rect. - arboreal	30		x		x	x	x	x	x	x	x		x		9
Ornamented rect. - grasses	31		x		x	x	x	x	x	x	x		x		9
Adiantaceae type	32				x			x	x	x	x				5
Wild banana?	33		x		x	x	x	x	x	x	x		x		9
Ginger	34		x		x	x	x	x	x	x	x		x		9
Trichome/hair	35		x		x	x	x	x	x	x	x		x		9
Rectangles															
- short - narrow	36		x		x	x	x	x	x	x	x		x		9
- medium	37		x		x	x	x	x	x	x	x		x		9
- wide	38		x		x	x	x	x	x	x	x		x		9
- medium - n	39		x		x	x	x	x	x	x	x		x		9
- medium	40		x		x	x	x	x	x	x	x		x		9
- wide	41		x		x	x	x	x	x	x	x		x		9
- long - narrow	42		x		x	x	x	x	x		x		x		8
- medium	43		x		x	x	x	x	x	x	x		x		9
- wide	44					x	x								2
- tapered	45		x		x	x	x	x	x	x	x		x		9
- sinuous	46		x		x		x	x	x	x	x		x		8
- rounded	47				x	x	x	x	x	x	x		x		8
- square	48		x		x	x	x	x	x	x	x		x		9
- oval	49				x	x	x	x			x		x		6
GRASSES															
Bilobe group - 1	50				x	x	x	x	x	x	x		x		8
- B2	51		x		x	x	x	x	x	x			x		8
- B3	52				x	x		x	x				x		5
- B4	53				x	x	x	x	x	x	x		x		8
- B5	54				x	x	x	x	x						5
- B6	55		x		x	x	x	x	x	x	x		x		9
- B7	56				x	x	x	x	x	x	x		x		8
- B8	57				x	x	x		x						4

Table 12.5 continued.

Angular group -1	58		x		x	x	x	x	x	x	x		x		9
- A2	59		x		x		x	x	x	x					6
- A3	60		x		x		x	x	x	x	x		x		8
- A4	61		x		x	x	x	x	x	x	x		x		9
- A5	62		x		x	x	x	x	x	x	x		x		9
- A6	63		x		x	x		x	x						5
- A7	64		x		x	x	x	x	x	x			x		8
- A8	65				x								x		2
- A9	66				x	x	x	x	x	x	x		x		8
- A10	67				x	x	x	x	x	x	x		x		8
- A other	68		x		x	x	x	x	x	x	x		x		9
Arc/triangle - AT1	69		x		x	x	x	x	x	x	x		x		9
- AT2 (bamboo)	70				x	x	x	x	x	x	x		x		8
- AT3 (*Phragmites/Typha*)	71		x		x	x	x		x	x	x		x		7
-															
OTHERS - not classified	72		x		x	x	x	x	x	x	x		x		9
TOTAL GROUPS (71)**:** Presence			44		61	59	58	56	56	52	49		48		
TOTAL GROUPS (71): Table 6			29		44	42	44	47	46	39	35		36		
OTHER BIOGENIC SILICA MICROFOSSILS															
Diatoms - D1			x		x	x	x	x	x	x	x				
- D2			x		x	x	x	x		x					
- D3			x		x	x				x					
- D4			x		x					x					
Sponge spicules			x		x		x	x	x	x	x				
OTHER MICROFOSSILS															
Nematoda			x		x	x	x	x	x	x	x		x		
Starch grains			x		x	x	x	x	x	x	x		x		

x = presence

Table 12.5 continued.

Spit #	5		8		9		10		11		12		13		14		18	
dbs cm	105		120		125		130		135		140		145		150		170	
Slide ID	713		723		714		715		716		717		718		719		720	
PHYTOLITH MORPHOLOGY																		
		%		%		%		%		%		%		%		%		%
Spherical																		
- echinate (palm)																		
sago	392	76.3	215	43.3	245	39.9	181	40.8	351	37.6	185	33.2	250	63.3	40	19.7	97	38.3
coconut	1	0.2	4	0.8	18	2.9	6	1.4	15	1.6	10	1.8	1	0.3	2	1.0	1	0.4
palm type other	20	3.9	10	2.0	10	1.6	16	3.6	25	2.7	12	2.2	14	3.5	9	4.4	5	2.0
- psilate (arboreal)	9	1.8	10	2.0	15	2.4	6	1.4	12	1.3	10	1.8	7	1.8	3	1.5		
Cuticles			3	0.6	11	1.8	2	0.5	12	1.3	4	0.7	1	0.3	5	2.5		
Rectangles	14	2.7	63	12.7	80	13.0	67	15.1	123	13.2	80	14.4	24	6.1	23	11.3	27	10.7
Grasses																		
Bilobe	2	0.4	29	5.8	26	4.2	24	5.4	49	5.2	34	6.1	5	1.3	4	2.0	6	2.4
Angular	23	4.5	48	9.6	78	12.7	56	12.6	112	12.0	73	13.1	18	4.6	17	8.4	18	7.1
Arc/triangle			6	1.2	16	2.6	1	0.2	24	2.6	7	1.3	8	2.0	23	11.3	10	4.0
Grass others	2	0.4	6	1.2	13	2.1	8	1.8	14	1.5	9	1.6	4	1.0	23	11.3	7	2.8
Others - identified	13	2.5	42	8.5	43	7.0	20	4.5	74	7.9	56	10.1	7	1.8	16	7.9	12	4.7
Others - not identified	38	7.4	61	12.3	59	9.6	57	12.8	123	13.2	77	13.8	56	14.2	38	18.7	70	27.7
TOTAL PHYTOLITHS	514	100.0	497	99.9	614	100.0	444	100.0	934	100.0	557	100.0	395	100.0	203	100.0	253	100.0
OTHER BIOGENIC SILICA MICROFOSSILS																		
Diatoms - D1	x																	
- D2	x																	
- D3	x																	
- D4	x																	
Sponge spicules	x		x												x			
OTHER MICROFOSSILS																		
Nematoda			x				x				x		x					
Starch grains	c91		c188		c52		c143		c378		c93		c268		c302		c56	

x = presence

Table 12.6 Utti Batue phytolith relative frequency.

sampled spit. Counts were made using the morphologies listed in Table 12.5; these were then consolidated into broader groups. The number of groups observed during the count for each spit is shown in Table 12.5 in the row headed 'TOTAL GROUPS observed in count'. These numbers are lower than those observed for each spit, recorded in the adjacent row headed 'TOTAL GROUPS Presence'. Of importance is the number of groups not shown by the transect count. In a possible presence of 639 groups (over all sampled spits), inspection of the entire slide returned 483 groups (75.6%) compared to the 362 groups (56.7%) observed in the transects – a difference of 18.9 percent of the morphologies not reflected by the counts. For this reason it is suggested that phytolith presence as reported in Table 12.5 is a more reliable indication of phytolith diversity than the 10 mm transect counts. The difference may be attributed to how phytolith morphology affects migration across the cover slip when mounted. The small palm type has an even distribution amongst all other shapes and sizes and this may cause bias in a count. It will be seen from Table 12.6 that palms (groups 1–8) dominate the assemblage with sago palm (group 1) in turn dominating the palms.

Of the other microfossils, diatoms, sponge spicules and *Nematoda* are associated with water. At least four species of diatoms were noted. Their presence in spits 13, 8 and 5 suggests that these were relatively wetter periods. There were few sponge spicules or *Nematoda*. Starch grain size fell within the range noted in reference material, *i.e.* up to 32 mm in diameter.

The cultural sediments in spits 8–17 are positively correlated with phytolith diversity. Group numbers rise from spit 14 to spit 8, with the highest diversity of phytoliths, most indicative of a human presence, occurring in spit 8. The phytolith presence data in spits 12–10 suggest that these sediments were the driest in the column. This inference is confirmed by the excavated materials, at least in spits 10 and 12, where the finds include over 100 g of baked or indurated earth (Table 12.2), but no wood (Table 12.3). The data from Tables 12.5 and 12.6 are combined below to provide a summary of phytolith presence through the assemblage.

170 cm, Spit 18: Non-cultural spit. Lowest phytolith diversity, low palm and coconut. High bamboo presence. Few other grasses represented. Possibly no standing water but high precipitation.

150 cm, Spit 14: Similar to 170 cm but with increased phytolith diversity related to cultural presence. First appearance of eight phytolith groups including various palms. The appearance of diatoms, sponge spicules and *Nematoda* indicates an increase in water availability. Wetter than spit 18.

145 cm, Spit 13: Increase in phytolith diversity but with less bamboo (bilobes and angular types). First appearance of Iridaceae cuticle. Complete specimens of diatoms (all four species), and sponge spicules with two terminations intact, indicate little movement likely to cause damage, *i.e.* probably standing water.

140 cm, Spit 12: Further increase in phytolith variety. The increase in tree/shrub morphologies and grasses other than bamboo possibly indicates some clearance and drier conditions. Fewer small palm and starch grain numbers.

135 cm, Spit 11: Highest number of small palm phytoliths in the cultural levels. All grass groups present, and many cuticle fragments. *Canarium* trichome tentatively identified.

130 cm, Spit 10: Grass presence maintained, increase in *Barringtonia* (tree) morphology, fewer cuticles.

125 cm, Spit 9: Highest coconut count. Grass presence maintained, increase in cuticle types. Increase in water indicated by an increase in hydrophylic AT cells and three species of diatoms noted.

120 cm, Spit 8: Highest phytolith diversity. Many arboreal ornamented rectangles. Fewer grass groups represented with many hydrophylic AT, all groups.

105 cm, Spit 5: Non-cultural. Drop in phytolith diversity to less than that of spit 18 at the base of the excavation. Highest number of sago phytoliths present in the column. Possible extension of sago palm cultivation with increasingly swampy conditions.

From the summary above it can be seen that phytolith presence changed continuously throughout the column. At the same time the available water changed from still, to drier to wetter (for example, spits 13, 12–10, and 9 respectively). However, the phytolith assemblage indicates that this variation is modest, and the site has always been wet to varying degrees. The sago palm dominates at all levels and increases to its highest numbers in spit 5 above the habitation layers. It may be the case that some clearing of bamboo occurred during a drier interval corresponding to spit 12, and this clearance enabled expansion of sago palm, by natural or anthropogenic means, as water availability subsequently increased (represented by the higher spits). This argument would support the hypothesised importance of sago to the inhabitants of Utti Batue. The continuing high numbers of sago phytoliths may have possibly been maintained by natural regeneration of *Metroxylon* sp. in the increasingly swampy conditions after the abandonment of the site.

Pottery analysis

Owing to time constraints, the local pottery was only recorded in detail in spit 14 and especially spit 13. These two assemblages appear to be dominated by shards from storage vessels, some of which may have been used in storing water and victuals at the site, but many of which were perhaps related to cartage of goods. In support of this claim, only 33 shards (22.9 g) of the >5.8 kg of earthen pottery bore traces of charring attributable to cooking fires, and an apparent ceramic disc from spit 13 may have functioned as a marker of merchandise (Fig. 12.5, UTB.2.13.46). When this incised disc is excluded, along with shards bearing simple ridges and horizontal incisions, and rims with marginally decorated notches, the number of clearly decorated shards is reduced to two – a tiny number possibly more compatible with outdoor utilitarian wares than with domestic utensils.

A wide variety of fabrics was encountered, and these were grouped into five ‘wares’: soft white, soft pink, fine, coarse, and high-fired. Soft white grades into soft pink, soft pink into fine, fine into coarse and high-fired, and coarse into high-fired. The soft pottery (whose shards typically have water-rounded edges) was recorded at about the same frequency as the high-fired pottery, and either the fine or the coarse pottery was the most commonly observed class (Table 12.7). Dammar is the suspected resinous agent on dark-surfaced ware (see note 1), based on reports of its continued use in coating locally made vessels at Lake Matano (field observation), and its historically attested role as a major forest product from Luwu (Caldwell 1993, 1995, but see Bulbeck 1993).

Fabric class (spit 13)	No.	Weight (g)	**Fabric class (spit 14)**	No.	Weight (g)
Soft white	27	37.3	Soft white	37	54.1
Soft pink	262	542.8	Soft pink	143	167.0
Utti Batue fine	433	1597.8	Utti Batue fine	204	544.6
Utti Batue coarse	67	511.7	Utti Batue coarse	169	1035.0
High-fired*	16	615.7	High-fired*	3	113.5
Surface effects (13)			**Surface effects (14)**		
None	429	1084.1	None	386	887.0
Textile-impressed	66	218.1	Textile-impressed	16	20.7
Red-slipped	27	161.6	Red-slipped	20	83.9
Dark-surfaced	265	1194.8	Dark-surfaced	126	758.4
Dark-surfaced and decorated*	11	598.0	Dark-surfaced and decorated*	1	110.8
Other decorated	7	48.7	Other decorated	6	52.9
Total	**805**	**3305.3**	**Total#**	**608**	**2512.0**

*Table 12.7 Pottery counts and weights from spits 13 and 14. *Includes many shards which may belong to a single large jar represented in both spits, and so are not enumerated separately. #Total includes 54 rim and base shards (~598 g) not classified into sub-classes.*

Textile impressions were first observed on the spit 13 pottery curated in Makassar, and studied in more detail on the spit 14 pottery brought to Canberra. Some of the cloth impressions were of a plain weave with a single warp and weft, *i.e.* 1/1 tabby. Some shards were impressed with coarse fibres and others with fine fibres. A number of shards were impressed with fine netting, made from a single set of interlinked elements. The more angled and curvilinear patterns (Fig. 12.5, UTB.2.13.56) could reflect irregularities in the weaving, or creasing and distension of the textiles. The more regular patterns resemble the textile impressions on the interior of shards from a late prehistoric context at Gunung Kidul, Java, related by van der Hoop (1941, fig. 96) to palm cloth. Although cotton has evidently replaced the traditional bast fibres used by local groups in South Sulawesi, matting and textiles woven from *Metroxylon sagu* (sago palm), *Corypha* palm and *Borassus flabellifer* are still being produced on nearby islands. Analysis is continuing, with impressions from woven palm textiles being used for comparative purposes.

Brian Vincent of the University of Otago, New Zealand, has suggested that the cloth may have been employed to cover the surface of a vessel to keep it separate from clay that was packed on to the cloth. The inner vessel would thus have acted as the mould for the new vessel formed around it. After shaping, the new vessel could have been bisected to dislodge it, and fired after the two halves were luted back together. Vincent's suggestion would explain the occurrence of the impressions only on the interior face of the vessel, which rules out cord-marking or any other decoration as the cause, as well as the curved and angled orientation of the thread impressions. The manufacture technique he proposed would also tally with the irregular appearance of the shards' exterior face, the dominance of geometrically simple forms (lids, inverted jars and, possibly, boxes) and the use of easily moulded clay with remarkably little of the temper generally required for structural support. The vessels in question could have been rapidly produced containers designed to traffic their contents, with little consideration given to use-life beyond the intended destination. In support of this interpretation, 'soft' pottery has been observed in *c.* fifteenth century contexts at Bola Merajae and Matano, two sites which are suspected to have been linked to Malangke in the exportation of Luwu's iron (Bulbeck and Caldwell 2000).

In an attempt to quantify the impressions, Bulbeck calculated the average warp and weft on 65 shards by measuring the extent of the affected area in both directions, and dividing the linear distances by the number of thread impressions. The resulting 130 observations showed that the average distance between threads was 0.74 mm, with a standard deviation of 0.20 mm, and a range from 0.4 to 1.3 mm (apart from an outlier at 2.1 mm). The average distance between threads of the example of particularly fine palm cloth illustrated by van der Hoop (1941, fig. 96) is about 0.3 mm. The comparable measurement for a fragment of fine, historical cotton (Bulbeck and Caldwell 2000, 25) from the Pontanoa Bangka cemetery in Luwu, studied by Cameron (2000), is 0.4 mm. Thus the Utti Batue impressions have a distance between threads which is equal to or greater than the between-thread distance of fine palm cloth and cotton. This result is readily understood because old, less valuable cloth that had lost its structural resilience, but which was easier to stretch and distend, would probably have been used in the vessel manufacturing technique suggested by Vincent. Further, coarser cloth of lesser value might have been used for this utilitarian task, and Bulbeck's counts of the number of threads may be too low when the impressions are faint. Cameron's opinion (pers. comm.) that cotton is probably responsible for similar textile impressions on the 'soft orange' pot shards from Bola Merajae, suggests that cotton was surely one of the textiles which left its impressions at Utti Batue. However, local palm cloth was probably involved too.

Some of the shards from the higher spits of the excavation, identified as 'special', deserve comment. Spits 6 and 10 both produced single examples of shards from 'cogwheel pots'. This is the name given by Clune and Bulbeck (1999) for serving dishes with nipples spaced evenly around the circumference, at an interval that is ideal for clasping the vessel with the fingers. A complete example has been recorded by Bulbeck from the looted Mangge pre-Islamic cemetery in Malangke. Previously, cogwheel pots had been documented solely in fifteenth to sixteenth century contexts from the Makasar-speaking area along the south coast of South Sulawesi, and not from any Bugis haunts (Clune and Bulbeck 1999, 46). The Malangke specimens are distinct in being high-fired, dark-surfaced wares, in having the cogwheel band luted on rather than moulded, and in the position of the band along the shoulder. Along with a shard from a vertically gouged pot excavated in spit 10 at Utti Batue, which is a decoration characteristic of the southeast lowlands of the peninsula (Clune and Bulbeck 1999, Table 12.3), the cogwheel pots hint at a link between pre-Islamic Luwu and its Makasar counterparts.

Spits 8 and 11 yielded three shards from what is probably the same vessel, an everted jar with arabesque decorations in vertical and horizontal panels along the inside of its mouth (Fig. 12.5, UTB.2.11.25/26). This apparently local vessel suggests influences from one of the Islamic trading polities already established widely across the archipelago by the sixteenth century. One possible source of inspiration would be Banten (see Ambary *et al*. 1993, 136–42) or another of Java's north-coast ports. Spit 11 produced another high-fired, dark-surfaced shard, the only decorated cover knob yet recorded from Utti Batue. More prosaically, spit 10 yielded a shard from what was probably the cover of a heavy pottery stove, made of Utti Batue 'coarse' fabric. Stoves such as these have been commonly carried around on sailing vessels in the archipelago (Bellwood 1997, 227), so the shard is consonant with the inferred maritime focus of Utti Batue.

In summary, the local Utti Batue pottery is highly variable, and rich in its potential to yield socio-economic information on the site. It provides evidence on textiles unknown through other avenues, and may hint at the importance of dammar resins in the local economy. Links are suggested with the Makasar belt along the south coast of South Sulawesi, as insinuated in the historical texts (Caldwell and Druce 1998), and possibly with early Islamic polities in the region. The assemblage as a whole testifies to systematic maritime trade, and the soft ware reiterates the case for a connection via Ussu to the iron-producing centre of Lake Matano.

DISCUSSION AND CONCLUSIONS

Sago is identified as a major plant species at Utti Batue before, during and, particularly, after the site's period of occupation. While there is little indication that arboricultural practices had ever promoted the growth of sago at Utti Batue, its natural abundance would have provided an immediately available, major source of food. Coconuts and canarium nuts were also evidently available, but presumably of much lesser significance than sago. Rice and other imported plant foods may also have been consumed, but they were not identified among the macro-botanical remains, and the phytolith record would be unlikely to register their presence as processed imports. Water-buffalo seems to have been the major source of animal protein, based on the high rate of bovid identifications and the wet conditions that prevailed at the site. Marine resources such as fish and turtle are also reflected in the faunal assemblage. Overall, the ecofactual evidence is consistent with the claim that the subsistence regime at Utti Batue, and presumably more widely in Malangke, had relied heavily on sago. The subsistence economy at Malangke would appear broadly similar to that at Melaka in Peninsular Malaysia where, according to eye-witness accounts, the dietary staple of sago was supplemented with vegetables, sugar cane and various tree crops such as bananas and jackfruit, as well as marine foods provided by the fishermen attached to the entrepôt (Wheatley 1961, 311–2). Malangke and Melaka pair together as trading settlements with the social complexity of a 'civilisation', and a diverse subsistence economy centred on sago, as witnessed by the archaeological record in one case and the textual record in the other.

Large quantities of timber were recorded only between spits 13 and 8, though not in spits 12 and 10 which may correspond to intervals when conditions at the site were relatively dry (and hence less ideal for preserving wood). Other organic remains, and the pottery shards, were most concentrated slightly lower in the deposits, between spits 14 (or 15) and 9. These distributional data are consistent with a situation in which the residents lived in timber structures and discarded their waste on to the surrounding terrain. Replenishment of their housing, and abandonment at the end of the occupation period, would accordingly have led to the extensive overlap between wood and other remains, with the wood tending to lie slightly higher in the profile. The phytolith identifications are also consistent with a model in which the sediments accumulated steadily and applied their 'seal of preservation' to the incorporated material.

The accumulation of nearly 2 m of sediment between the base of the excavation and the present-day surface would not appear to correspond in any straightforward way with an increasing elevation above the prevailing water table, despite the very low altitude of the site above sea-level. Spit 18 at the base was identified as drier than spit 5 above the habitation levels, on the basis of phytoliths. Small variations in the local sea-level, secular fluctuations in Luwu's precipitation, and changing proximity of the passing streams and rivers to the site, could all explain this counter-intuitive finding. Almost certainly, the inhabitants of Utti Batue lived in houses erected on wooden piles. This inference is based on the massive posts recorded during survey along the ditch that cuts through the site, the large quantities of excavated timber (making up the second-heaviest category of finds), and all of the relevant historical and ethnographic observations known on the Bugis. Pile housing would have allowed the residents to adjust readily to changes in the degree of waterlogging at the site.

The material record reflects the inhabitants' pottery, both locally produced and imported from overseas, access to textiles, use of stone (with usually minimal preparatory shaping) for a range of purposes, and abundant access to dammar. Glass beads and glass vessels would appear to have served only as minor constituents of the material culture. Iron was not recovered from the excavation, and this suggests that it may not have been particularly common, at least in particular contexts. Certainly, no evidence has been recovered of iron-working at Utti Batue, in contrast to the evident focus on working iron at Pattimang Tua slightly further inland (Bulbeck and Caldwell 2000). The Utti Batue pottery is interpreted to have included abundant storage vessels, and ad hoc 'soft ware' vessels moulded around bundles of goods intended for transport. This soft ware in particular links Utti Batue to the suspected trade route for iron from Lake Matano through Ussu to Malangke. The details of the array of artefacts from Utti Batue, as well as their diversity, accordingly confirm the site's hypothesised role as the maritime node in Luwu's pre-Islamic, export-based economy, where iron and other hinterland produce were centralised for onward distribution to Luwu's trading partners. Full excavation of this unique site would provide unparalleled information on the spatial organisation and material culture of an Indo-Malaysian palace centre during the period when European colonists first moved into the archipelago.

NOTE

1 Reference to the possibility of a dammar coating on some of the pottery sherds recovered from Utti Batue, inferred from the presence of a dark resinous layer, was not confirmed during recent analysis by Cynthia Lampert. To date, no indication of an organic coating has been forthcoming from her analysis of the pottery, from which confirmation of the initial field observations could be substantiated.

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