

RECENT INSIGHTS ON THE CHRONOLOGY AND CERAMICS OF THE KALUMPANG SITE COMPLEX, SOUTH SULAWESI, INDONESIA

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ABSTRACT

Radiocarbon dates from Minanga Sipakko place its Neolithic occupation between 2500 and 3000 years BP, and increase the likelihood that Kamassi had direct links with Neolithic Taiwan in excess of 3000 years ago. These two Kalumpang sites usefully represent the interlude between Indonesia's colonisation by maritime-oriented Neolithic farmers, and subsequent population expansion during the Palaeometallic. Around 20% of Kalumpang potsherds are slipped, about 5% are decorated, while jars, covers, boxes and cylindrical vessels are represented at both sites. All of the main decorative elements observed at Minanga Sipakko have been illustrated in publications of Kamassi pottery. Both sites present a rich array of polished stone tools which probably reflects the local abundance of stone suitable for polishing, but with poor flaking qualities. The potential and problems of using lexical items reconstructed from Austronesian historical linguistics in understanding human adaptation at Kalumpang are discussed.

Kamassi and Minanga Sipakko, collectively referred to as Kalumpang after the township near them in Sulawesi (Figure 1), have consistently been the subject of divergent opinion. Earlier archaeologists (see Heekeren 1950) agreed they were Neolithic sites with pottery similar to Indochinese Bronze Age pottery, but age estimates varied between 600 years ago (Heekeren) to over 3000 years ago (Heine Geldern). Solheim (1984) viewed the Kalumpang pottery as an example of the expansion of the ornate Sa Huynh-Kalanay tradition, after 4000 BP, from its homeland in the southern Philippines. Truman Simanjuntak (1994-5) views Kalumpang as transitional between the Neolithic and Palaeometallic phases in Indonesian prehistory, and relates the pottery decorations

to the Dong Son culture of North Vietnam. Bellwood (1997:227) links Kamassi and Minanga Sipakko to the early expansion (before 3000 BP) of Austronesian speakers from Taiwan into Island Southeast Asia, based on a suite of artefactual similarities between Kalumpang and Taiwan.

The area's archaeological study was originally spurred by the adventitious discovery of one of the oldest and finest bronze Buddha statues in Indonesia, stylistically dated to between the second and seventh centuries AD (Bosch 1933). A.A. Cense excavated Sikendeng (near the mouth of the Karama River), the find-spot of the Buddha statue, in 1933. He could not find any traces of a Buddhist settlement, but he recovered polished stone axes and scantily decorated earthen pottery. After learning of similar artefacts disturbed during the construction of a road through the Kamassi site, Cense collected a range of polished axes and decorated sherds. In late 1933, Stein Callenfels confirmed Cense's records of the material culture at Sikendeng, and excavated an area of 100 m² at Kamassi. In 1949 Heekeren excavated 180 m² in the southern zone of the Kamassi hilltop, and carried out a surface collection at Minanga Sipakko where the Karama was cutting into the site (Heekeren 1950, 1972:184-85; Stein Callenfels 1951).¹

The Karama sites are highly susceptible to erosion. A disastrous flood had already washed away Sikendeng by 1949 (Heekeren 1972:185). Few artefacts apart from plain earthenware sherds were observed at Kamassi by archaeologists and students from Hasanuddin University, Ujung Pandang (now Makassar), during their 1990 and 1993 surveys (Fatimah 1995:24-26; Ikhsan 1995:32). When Indonesia's National Research Centre for Archaeology re-activated excavations in 1994, Kamassi was found to be heavily deteriorated through erosion and human activity. Few artefacts remained on the surface, and a test pit near the top of the mound found that the remaining cultural deposits petered out at less than 50 cm depth.

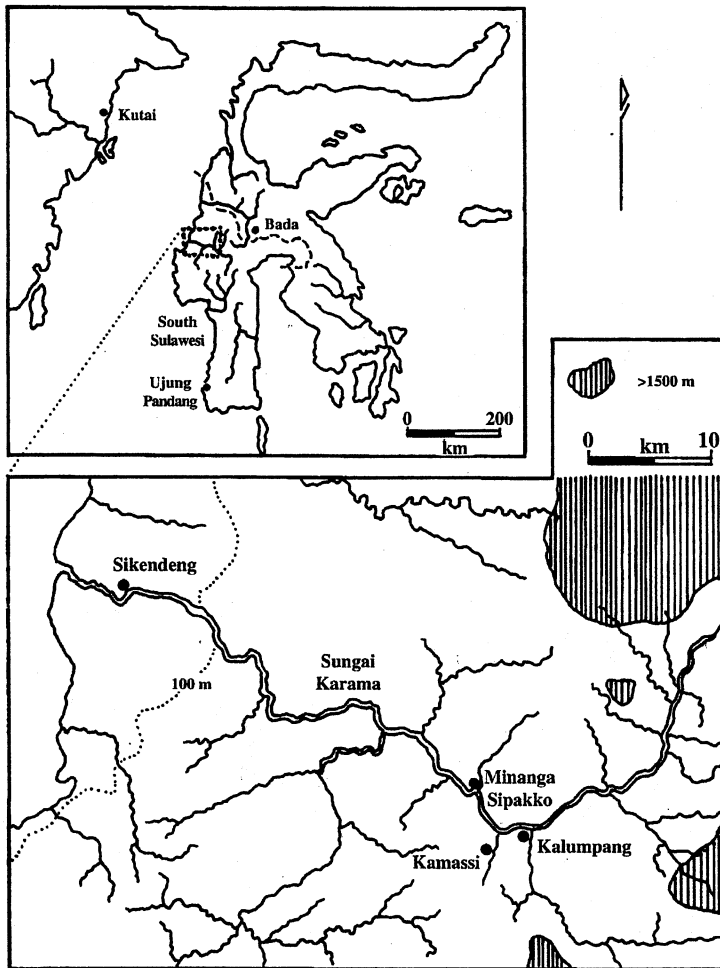


Figure 1: Location of Kalumpang and the Karama River sites in South Sulawesi, Indonesia.

The southern zone of Minanga Sipakko is also being eroded by the Karama when it floods (Figure 2). Water erosion has exposed artefacts along a section approximately 50 m long, with cultural materials to a depth of 1.5 m beneath the surface (Simanjuntak 1994-5). A test pit 1 m deep, excavated as far as sterile deposit, indicated some mixing of materials, and showed no signs of stratigraphic change with depth. The National Research Centre for Archaeology deemed Minanga Sipakko a promising site for further work and, indeed, in a state of urgency given the encroachment of the Karama. Two further test pits were excavated in 1995, one in the eroded zone to a depth of 82 cm, and No. 2 to a depth of 197 cm on the uneroded mound (Figure 2). Test Pit No. 1 exhibited an evidently *in situ* cultural layer only at about 60 - 70 cm depth, directly above sterile, while Test Pit No. 2 evinced vertical layering throughout, including a sterile layer between 58 and 142 cm depth (Nasruddin and Ramli 1995). Surface collections have also been made at this site in 1993 (by the Hasanuddin University expedition), 1994 and 1995.

The Karama sites are impressive testaments to late prehistoric habitation along the river. Stein Callenfels (1951:89) described his recovery of "sacks full of ... pottery" at both Kamassi and Sikendeng. Heekeren's (1972:187) excavated assemblage of pottery at Kamassi was slighter, 750 sherds and one baked clay object, amply compensated by a rich array of 89 Neolithic stone artefacts. The three 1 x 1 m test pits excavated at Minanga Sipakko also suggest a reasonable density of cultural materials. Minanga Sipakko (Figure 2) and Kamassi (Ikhsan 1995) are both quite large sites which extend across approximately one tenth of a hectare.

Rather than being simple farming settlements, the Karama sites could conceivably reflect early trade of produce from the Sulawesi hinterland in exchange for prestige goods from overseas. The Karama, the largest river along the west coast of south-central Sulawesi, drains a considerable area of Sulawesi's central highlands (Figure 1). The Kalumpang sites mark the point farthest up the river readily navigable by *perahu* (Simanjuntak 1994-5). Gold is currently panned along the tributaries of the Karama, and there are rumours of Japanese plans to establish a goldmine near Kalumpang (Caldwell 1993:7). Thus Kamassi and Minanga Sipakko resemble the 'collecting centres' of Bronson's (1977) model of a 'dendritic' economy, while Sikendeng (with its bronze Buddha statue) looks like a coastal centre at the river mouth. The location of the Karama across the Makassar Strait from Kutai, where numerous Indic icons and Indonesia's oldest inscriptions have been found (Coèdes 1975:52-3), supports the dendritic trade interpretation, at least during the early first millennium AD. There may even have been some connection between the Karama sites and the Central Sulawesi highland valley settlements, such as Bada, with their renowned tradition of ancestor statues, giant vats (*kalamba*) and other prehistoric megaliths.

CHRONOLOGY

Clues are offered on the antiquity of the Kalumpang sites from their proximity to the Karama River and, consequently, the presumably alluvial status of their deposits. Heekeren (1950) excavated 60 cm of deposit at Kamassi, including an upper layer approximately 10 cm deep, which sealed the Neolithic remains. The deposit at Minanga Sipakko is much deeper, and originally two metres of sediment had covered the Neolithic layers (Heekeren 1972:189). The paradox of present-day erosion of sites built up through alluvial sediment can be explained with reference

to the Holocene sea-levels reconstructed for South Sulawesi (Whitten *et al.* 1987:20). Between 4000 and 3000 BP, the sea-level stood between five and three metres above its present stand, before dropping to about one metre above the present at c.2000 BP, and rising another metre at about 1500 BP. Alluvial sedimentation on Kamassi, which is a low hill abutting the Karama, would most likely have occurred during flood events earlier than 3000 BP. After 3000 BP, when sea-levels dropped and the local rivers cut through the accumulated alluvium, deposition at Kamassi would have given way to loss of sediments through rain-induced erosion, especially in devegetated patches (such as the abandoned rice fields where Stein Callenfels chose to excavate). Initial occupation at Minanga Sipakko may well have occurred during the interval of dropping river levels after 3000 BP. The sterile layer in the site, of nearly a metre's depth, as excavated in Test Pit 2 (Figure 2), may correspond to the rise in sea-level between c.2000 and 1500 BP. Reconstructed sea-levels therefore suggest that the buried Kamassi materials are older than 3000 BP, the Neolithic materials at Minanga Sipakko date to somewhere between 2000 and 3000 BP, and the upper cultural layer at the latter site postdates 1500 BP.

Heekeren (1972:185) collected 'porcelain sherds' (unidentified, but presumably second millennium AD) and 32 flaked obsidian pieces from the surface of Kamassi. An obsidian flake in the 1994 surface collection from Minanga Sipakko (see Simanjuntak 1994-5:21) confirms the case for systematic importation of obsidian to the neighbourhood of Kalumpang. However, no obsidian has yet been reported from the large-scale excavations at Kamassi. Hence the site's obsidian and porcelain would appear to be conflated surface finds related to the time of minimal sediment deposition after 3000 BP. Any importation of obsidian to Kalumpang should post-date Kamassi's Neolithic occupation, possibly by a considerable margin. Glenn Summerhayes (pers. comm. 2000) reports that the Minanga Sipakko obsidian flake has the same chemical composition as another flake he has analysed from Sabbang Loang, a collecting centre on the bight directly east of Kalumpang. The as yet unsourced Sabbang Loang obsidian flake is dated to c.2000 BP (Bulbeck and Prasetyo 2000), and by analogy dates Kamassi's Neolithic occupation to earlier than 2000 BP. By the same token, Minanga Sipakko would also have been inhabited in the vicinity of 2000 years ago.

No excavated finds of metal have been reported at either Kamassi or Minanga Sipakko. As a substantial area of Kamassi has been excavated, its lack of metals cannot be attributed to sampling deficiencies, though it could conceivably reflect hostile preservation conditions (especially as regards iron). Metallic fragments, and a decorated bronze bangle collected by a Kalumpang resident, have been found at Minanga Sipakko, but none are provenanced

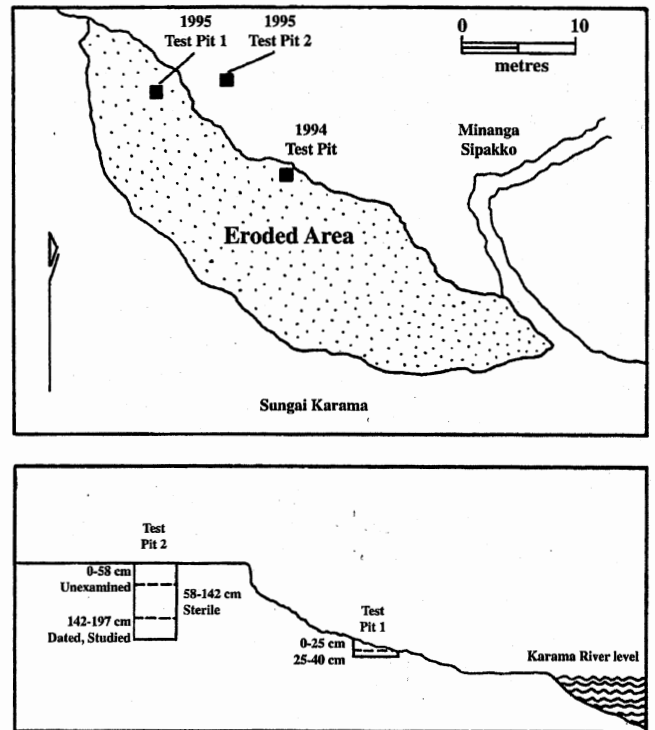


Figure 2: Plan of Minanga Sipakko and the excavations by the National Research Centre for Archaeology (Nasruddin and Ramli 1995).

(Simanjuntak 1994-5). They are more likely to derive from the habitation associated with the upper cultural layer (whose finds had not yet been inspected at the time when the present study was completed) in Test Pit 2, rather than the lower cultural layer. A Palaeometallic dating for the upper occupation phase at Minanga Sipakko would make it broadly contemporary with the Sikendeng bronze Buddha statue, and suggest that a dendritic economy was in operation along the Karama during the first millennium AD. Since the Sikendeng pottery is characterised by its paucity of decorations, similarly scanty decorations on the sherds from the upper habitation level at Minanga Sipakko would confirm the Palaeometallic antiquity hypothesised here.

Two radiocarbon dates are now available for Minanga Sipakko. One, from the depth of 155-160 cm in Test Pit 2, refers to the early habitation phase. The date, 2570±110 BP (Bandung Radiocarbon Dating Laboratory, Truman Simanjuntak pers. comm. 1997), calibrates to 2350-2850 BP at two sigma using the CALIB 3.03 program (see Stuiver and Reimer 1993). The second date (OZE132) is an accelerator mass spectrometry determination on a carbonised bone fragment, identified as a deer terminal phalanx by Colin Groves, from the 1994 test pit. It measures 2810±50 BP, or 2800-3140 BP at two sigma after calibration. Although based on a poorly provenanced specimen, the second deter-

mination confirms an antiquity of approximately 2800 BP for the early habitation at Minanga Sipakko. This dating lies between Bellwood's (1997:229) prediction of an age in excess of 3000 BP, and Simanjuntak's (1994-5) interpretation of Minanga Sipakko as a Neolithic community on the brink of the Palaeometallic.

Bellwood's view would imply that Kamassi antedates the lower occupation at Minanga Sipakko, while Simanjuntak's view suggests that Kamassi could be slightly younger. Both views are compatible with a dating of c.2000 BP for the obsidian found on the surface at Kamassi. As discussed in the next section, and summarised in Table 1, Kamassi performs better than Minanga Sipakko in the degree to which its recorded repertoire of material culture matches items in the Neolithic Ta-p'en-k'eng and Yüan-shan cultures of Taiwan, dated to c.6000-3000 BP (Bellwood 1997:212). Of course, a far greater area has been excavated at Kamassi, and so further excavations are required at Minanga Sipakko to test whether its apparent absences merely reflect sampling error.

On balance, we provisionally date Kamassi's Neolithic phase as slightly earlier than 3000 BP, and the lower occupation phase at Minanga Sipakko to between c.3000 and 2500/2000 BP. The upper occupation phase at Minanga Sipakko would date to about 1500 BP. The sterile layer in Test Pit 2 at Minanga Sipakko would correspond to a gap, as yet unfilled, in an otherwise continuous occupation sequence in the vicinity of Kalumpang over at least the last 3000 years. Palembang, a site that lies a short distance upstream from Kalumpang, could plug this gap; the excavation by Stein Callenfels (1951:90) produced no signs of stone artefacts, only plain earthen pottery which struck him as similar to modern-day pottery made in the region. Our provisional chronology would predict that the pottery assemblages from Kamassi and Minanga Sipakko (at least, from the Neolithic phase) are sufficiently similar to suggest continuity in occupation between the two sites.

Table 1. Distinctive Taiwan Neolithic items at Kalumpang (Bellwood 1997; Judith Cameron pers. comm.)

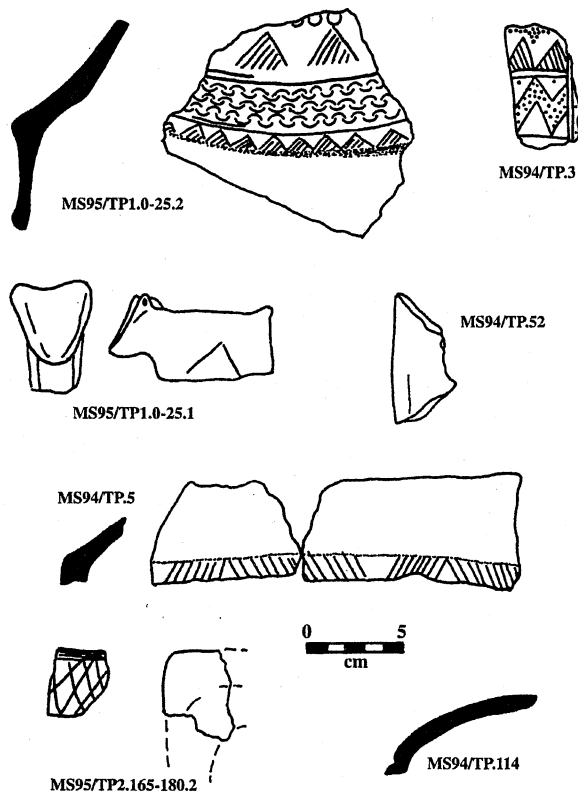
Item	Kamassi	Minanga Sipakko
Clay shield-shaped human heads	x	--
Decorated ceramic discs	x	--
Clay animal figurines	x	x
Clay spindle whorls	--	--
Polished slate projectile points	x	x
Polished slate knives	x	--
Polished bark-cloth beaters	x	x
Waisted polished stone adzes	x	--
Shouldered polished stone adzes	x	--
Highly polished quadrangular adzes	x	--

Settlement Type

If the ornate pottery and polished stone artefacts at Kamassi and Minanga Sipakko had been interred as grave goods, they would not be representative of the Kalumpang residents' domestic material culture. Hence the question of whether human burials had occurred is pertinent to the interpretation of the sites. Unfortunately, organic remains are poorly preserved. Stein Callenfels reported no bone at all from Kamassi, and Heekeren (1972:188) recovered only a smattering of vertebrate remains, sometimes charred. Heekeren's assemblage included human remains, but the incisor and the two metatarsal fragments could have been deposited through trauma or *ante mortem* tooth loss. Only the two fragments from an ulna and a fibula suggest human burial, assuming no cannibalism. Further, the rectangular polished adzes and ornate pottery, the artefact classes most likely to have been interred as grave goods, tend to have been found slightly higher than the other artefact classes at Kamassi (Heekeren 1972:190). This observation is hardly compatible with the notion of intentional burial. Hence Kamassi (and Minanga Sipakko) would appear to have been primarily habitation sites, even if deceased had occasionally been buried on site.

Hooijer assigned the Kamassi faunal remains to (1) the endemic *anoa* buffalo, represented by a horn; (2) the introduced domesticated pig *Sus scrofa vittatus*, represented by two canines; (3) the wild *Sus celebensis* boar, represented by various teeth and bone fragments; and (4) unidentified fish (Heekeren 1972:189). The deer fragment from the 1994 excavation at Minanga Sipakko has already been mentioned. The 1995 excavation produced mandibular, humerus and premolar fragments from pigs, whether *S. scrofa* or *S. celebensis* being unstated (Simanjuntak 1994-5:25). A figurative pottery attachment from Minanga Sipakko resembles a water-buffalo (Figure 3), but it could equally represent the local *anoa*, while another pottery fragment from Kamassi sports apparent frog feet (Flavel 1997:82). Hence the limited faunal evidence emphasises hunting and fishing rather than husbandry. Nor is there any direct evidence on the potential subsistence contributions of agriculture and wild gathered plants in this hot, perhumid neck of the woods. However, the extreme sensitivity of the *anoa* to any disturbance of its rainforest habitat would suggest either a limited role of farming, or that the *anoa* horn had derived from the highlands (for example, through an exchange relationship).

An emphasis on hunting would accord with the frequent recovery of arrowheads and spearheads, made of polished slate or (occasionally) schist, from Kamassi. Stein Callenfels (1951) illustrated 13 examples of arrowheads, including several with hollowed bases and two with tangs, and three



MS95/TP1.0-25.2: Vase shoulder with motifs 9a, 35a, 6a, 28a, 35a.; MS94/TP.3: Vase body sherd with motifs 11a, 43a, 35a, 6, 11a, 12a/8d, 5; MS95/TP1.0-25.1: Appurtenance shaped like a buffalo; MS94/TP.52: Sherd from a high-necked flask spout; MS94/TP.5: Vase carination with motif 21a/21b (five joining sherds); MS95/TP2.165-180.2: Stove corner sherd with 4b motif exteriorly; MS94/TP.114: Dome-shaped cover rim.

Figure 3: Examples of Minanga Sipakko pottery.

spearheads. Heekeren (1950; 1972:187) reported 22 tanged, winged or knobbed arrowheads (some of which could, however, be knives) and five spearheads. The only comparable artefact from Minanga Sipakko appears to be a possible spearhead of polished slate from the 1994 test pit. Stein Callenfels and Heekeren noted that similar projectile points are elsewhere known from Luzon, Hong Kong and farther north, and Bellwood (1997:227) emphasises the examples from Neolithic sites in Taiwan. Similar projectile points made from polished stone have not been reported elsewhere in Indonesia, presumably because their counterparts were made from wood, flaked stone or, later, iron. This observation suggests that Kamassi may be the older site, and Minanga Sipakko marks the point at which polished stone projectile points were lost from the material culture of the Neolithic Austronesians during their expansion southwards. However, other explanations are possible. Beyer (1951:95) implies that polished arrowheads and spearheads continued to be made

in Luzon till the Palaeometallic, in which case the Kamassi examples could have resulted from contact with Luzon at any point until around 2000 BP.

Processing of plants is suggested by a range of stone tools. These include a stone slab (Heekeren 1972:187) and possible reaping knives (Bellwood 1997:227) from Kamassi, and a grinding stone (of fine white stone) and millstones from Minanga Sipakko (Simanjuntak 1994-5:20). Ikhsan (1995) illustrates a further grinding stone and a possible mortar from Kalumpang. Some of the "Hoabinhian axes" excavated by Stein Callenfels (1951:84) at Kamassi, and the four "crude pebble-tools" excavated by Heekeren (1972:187), may also have been used to process plants.

Generally speaking, there is an enormous range of polished stone implements (quadrangular- and lenticular-sectioned 'axes' and 'adzes') at the Kalumpang sites. The Kamassi repertoire includes waisted and shouldered forms otherwise known only from the East Asian mainland and the islands from Botel Tobago and Taiwan northwards (Stein Callenfels 1951:86; Heekeren 1972:187; Bellwood 1997:227). The recorded Minanga Sipakko examples are usually straight-edged, with only minimal shoulder development (see Simanjuntak 1994-5:Figure 2; Nasruddin and Ramli 1995:Figures 5-6). Hence the eccentrically shaped examples may be specifically a feature of Kamassi. The use of easily polished slate and schist, available in the Kalumpang locality, could explain some of this variety. The friable nature of the edges would favour light duties such as fine carpentry and scraping malleable vegetable material. This is the sort of function proposed by Stein Callenfels (1951:87) for the tiny slate 'chisels' he recovered, and which would also apply to the specimen excavated in the 1994 Test Pit at Minanga Sipakko (illustrated in Simanjuntak 1994-5:Figure 2). However, the sheer abundance of polished lithics, the recovery of numerous broken examples, and the frequently spasmodic extent of polishing away from the working edges, would be compatible with their additional use for heavy duties despite the high re-polishing and replacement rates incurred.

A more durable stone, described by Heekeren (1972:187) as hard green chert, appears to have been used for the most highly polished implements. Stein Callenfels (1951:86) referred to the 12 examples he excavated at Kamassi as "late-Neolithic adzes and chisels", and averred that these were the only type of polished stone to be found at Sikendeng. Heekeren (1972:187) labelled them four-cornered rectangular adzes, often with one face vaulted, although his illustrations and measurements include examples that could be called chisels. Comparable specimens are yet to be recorded at Minanga Sipakko. These highly polished implements may have been ceremonial artefacts or even (on occasions) grave goods, as the contribution of labour to their manufacture

would appear to preclude a vernacular use. Their predominance at Sikendeng, apparently associated with the bronze Buddha statue, would support such an interpretation.

The large area excavated at Kamassi (nearly 300 m²) would account for its much larger sample of polished stone tools than at Minanga Sipakko, represented by only three m² of excavation and four surface collections. This sampling discrepancy could also account for the wider morphological range at Kamassi, whose polished arrowheads and spearheads, waisted and shouldered axes/adzes, and rectangular-sectioned implements of hard green chert have few if any counterparts at Minanga Sipakko. Chronological variation (e.g., an early Neolithic age for Kamassi), status differences (e.g., Kamassi's occupation by an elite with a wider range of chattels), or settlement specialisation could also be involved. For instance, Simanjuntak's (1994-5) interpretation of the Kalumpang sites as *ateliers*, where the locally available stone was polished into a variety of tools, could be specifically applicable to Kamassi. The only grooved polishing stones recorded from Kalumpang appear to be the two Kamassi examples excavated by Stein Callenfels (1951:Pl. XIII). It is worth noting that had the polished artefacts been made off-site, then an even wider range had probably been produced, to facilitate activities (such as forest clearance) that would have occurred predominantly in the land surrounding the sites. Gardening tools may be cached and then forgotten in the garden rather than enter the archaeological record associated with habitation debris (White and Modjeska 1978).

The Kalumpang lithics also provide evidence of personal adornment. Two finely hewn bark-cloth beaters were excavated at Kamassi, and a 'horned' bark-cloth beater features in the original surface collection from Minanga Sipakko (Stein Callenfels 1951:Pl. XIII; Heekeren 1972:185. Heekeren (1950:36, 1972:185) mentioned fragments of stone rings excavated by Stein Callenfels at Kamassi, while Simanjuntak (1994-5:21) recovered a cylindrical stone disc with a central perforation at Minanga Sipakko. These items would appear to represent body ornaments (for instance, ear pendants) rather than stone spindle whorls. Various unperforated pottery discs with radial decorations from Kamassi could also have served as body ornaments, although we shall suggest their use as flask stoppers. The renowned pottery face from Kamassi (Stein Callenfels 1951:Pl. XIX) does not display any hint of tattooing, while the two Kamassi sherds with curvilinear incised human figures have lines of punctate decorations respectively within and between the human outlines (Hoop 1941:Figure 105). These points may suggest that clothes and baubles constituted the main forms of personal ornamentation.²

POTTERY ANALYSIS

Based on his excavation at Kamassi, Heekeren (1972:187) recognised a difference between plain, brown, badly baked pottery, and elaborately ornamented, predominantly red ware. Stein Callenfels (1951:89) had noted the equivalent distinction and attributed it to two distinct cultures. However, as both fine and coarse wares also co-occur at Minanga Sipakko (Simanjuntak 1994-5; Fatimah 1995:35), we are more likely looking at variation within a culture than between cultures. As Simanjuntak (1994-5:23) noted, the coarser, typically plain pottery comprises mainly large vessels in contrast to the finer, smaller status of most of the decorated wares. The question of a multiplicity of cultures at the Kalumpang sites can be considered to have been answered in the negative, but issues of variation in vessel form, the prevalence of slips, decorative trends and so on are yet to be addressed. Further, quantitative data have rarely been offered on any of the claimed characteristics of the Kalumpang pottery.

Materials and Methods

Table 2 lists the samples of sherds that could be observed within the time constraints available for the present study. The Minanga Sipakko pottery can be considered well sampled even though the only tightly dated sample involves the 61 sherds from a depth of 155 - 200 cm in the 1995 Test Pit 2. This sample, and the 76 sherds from the 1995 Test Pit 1, had been 'selectively chosen' from the original excavated contents (Nasruddin and Ramli 1995:13), and time restrictions prevented our examination of the other excavated sherds. As regards the 440 sherds from the 1994 test pit, only the 158 larger, more useful sherds were recorded in detail. In all, 691 Minanga Sipakko sherds were handled during this study, although only about 300 were studied in depth. The available sample from Kamassi is much smaller, made up of 31 sherds from the 1994 surface collection, too slight to be considered worth recording in full detail.

Familiarisation with the semi-complete vessels illustrated by Stein Callenfels (1951), or on display at Jakarta's National Museum, served as a background to the vessel forms likely to be present at Minanga Sipakko. Whenever the balance of probabilities allowed it, the sherds under study from Minanga Sipakko were assigned to a vessel form and a part of the vessel. In this regard, smaller sherds tend to foster less confidence so the range of pottery forms, rather than their relative percentages, provides the more secure information. The presence or absence of a slip was noted on both the interior and exterior surfaces and, where present on larger sherds, the colour was recorded with a Munsell soil colour chart. Munsell readings were also taken of the

unslipped interior and exterior surfaces of many sherds. Any reliable evidence of the forming and/or finishing methods used in making the vessels was noted. Observations were made of the fabric, the presence or absence of a sandy temper (and, occasionally, other inclusions), and whether or not the sherd wall showed a reduced core and an oxidised exterior. Maximum sherd thickness was also measured (data not presented here). Decorated sherds were sketched, and the motifs given a number according to the system developed by Flavel (1997) for Sa Huynh-Kalanay pottery.

As discussed above, the 1994 test pit yielded a deer bone whose radiocarbon determination is statistically indistinguishable from the date for the charcoal from the lower habitation level in the 1995 Test Pit 2. This result suggests that most if not all of the finds in the 1994 test pit relate to the early habitation period. That is, the erosion of the site may have removed the upper deposits with minimal intermingling of items from the site's upper habitation level (see Figure 2). In support of this view, the find labelled MS94/TP.5 (Figure 3) is constituted from five cross-mending sherds, suggestive of little post-depositional disturbance. And none of the sherds from the 1994 test pit or the 1995 Test Pit 1 exhibit water-rounded edges, as might be expected if the river had dumped them from a higher level. The material from the 1995 Test Pit 1 will also be provisionally treated as *in situ*, i.e., representative of the first habitation phase at Minanga Sipakko. In sum, all of the excavated Minanga Sipakko pottery will be considered Neolithic, dated to in excess of 2000 BP, and comparisons with the Kamassi material will focus on the likelihood of continuous occupation between the Kamassi and lower Minanga Sipakko habitation episodes.

Fabric

As noted by Simanjuntak (1994-5), the Minanga Sipakko pottery is made of clay tempered with sand, with a tendency for coarser inclusions to occur in bigger vessels such as large jars (and boxes). According to our observations, the inclusions typically include a black mineral or minerals, mica, white sand grains and, sometimes, relatively large, reddish, rounded lateritic inclusions. The local geology is dominated by limestone and a suite of other sedimentary rocks, as well as slate (Simanjuntak 1994-5:14), so the temper could well have been obtained from local river sands. Rarer inclusions extend to seashell fragments (Simanjuntak 1994-5:23; Fatimah 1995:36), a shiny clast which may be pyrites (seven cases), and one as yet unconfirmed record of obsidian specks.

Occasionally the inclusions are so sparse as to be barely noticeable. This is especially the case with one vessel, represented by ten sherds with an unusual yellowish white

to yellow colour, excavated at 165 cm depth in the 1995 Test Pit 2. Chemical tests would be required to determine whether the vessel may have been brought in from elsewhere. Also, the sherds from the Kamassi surface collection, and occasional sherds excavated in Minanga Sipakko, have unusually large, discrete, angular sandy inclusions. These sherds, none of which are elaborately decorated, would presumably correspond to the "plain, badly baked brown potsherds" recognised by Heekeren (1972:187) in his excavation at Kamassi. There is thus some anecdotal evidence for a refined pottery temper in the Minanga Sipakko Neolithic layer compared to Kamassi.

Fourteen sherds from 150 - 180 cm depth in Test Pit No. 2 appear quite distinct as they look like friable, low-baked clay, and the fabric contains lumps of grit rather than a sandy temper. Five sherds (including MS95/TP2.165-180.2, in Figure 3) can be readily assigned to a stove, 12-15 mm thick, and a sixth sherd has faint traces of burning on its surface. One sherd is a fragment of spall from a knob, possibly the stove cover. The other eight sherds, or more accurately formless lumps, could have come from a large, thick-walled stove. Hence the 1995 Test Pit 2 excavation apparently encountered the remains of a large stove, of a very different fabric from the usual Kalumpang earthenwares (see also Simanjuntak 1994-5:24). Seven massive fragments from the 1994 Minanga Sipakko surface collection also represent a rectangular stove, but no other Minanga Sipakko sherds can be confidently assigned to stoves.

Vessel Form

Jars are the most common form overall, and constitute the majority in every sample bar that from the 1995 Test Pit 1 (Table 3). They include large jars, presumably for storage, small jars, and one apparent cooking jar in the same levels as the stove in the 1995 Test Pit 2. Covers as recognised here (e.g. MS94/TP.114 in Figure 3) would include the forms classified elsewhere as bowls (Simanjuntak 1994-5:22) and dishes (Fatimah 1995:45). These vessels of course could have been used as either covers or dishes by the simple expedient of inverting them. Both boxes and covers were observed in every sample, and make up 12 - 15% of the total recorded Kalumpang pottery. Boxes, a frequent component of Palaeometallic pottery in Island Southeast Asia (see Bellwood 1997), have not previously been specified in studies of Kalumpang's pottery (Simanjuntak 1994-5; Fatimah 1995), but are clearly represented by rims and body sherds lacking any discernible curvature.

One very interesting and quite common form is the cylindrical vase. It is represented by short spouts with neatly everted rims, fragments of long spouts (e.g. MS94/TP.52 in Figure 3; see also Fatimah 1995:Gbr. 9), shoulder carinations

Table 2. Samples of Kalumpang sherds observed in the present study

Provenance	Current location	Sampling strategy	No. of sherds	Observations
Kamassi 1994 surface collection	Balai Arkeologi Ujung Pandang	Universal	31	Form, slip, decorations
Minanga Sipakko 1994 test pit	Balai Arkeologi Ujung Pandang	Universal Larger, more useful sherds	440 158	Slipping, decorations Any other observable traits
Minanga Sipakko 1995 Test Pit 1	National Research Centre, Jakarta	Selective	76	All observable traits
Minanga Sipakko 1995 Test Pit 2, 155-200 cm	National Research Centre, Jakarta	Selective	61	All observable traits
Minanga Sipakko surface collections	1994: Balai UP 1995: NRC, Jakarta	1994 plain sherds 1994-5 decorated sherds	101 13	Unsystematic observations Form, slip, decorations

Table 3. Recorded Kalumpang vessel forms (excluding stoves)

Form	Kamassi survey	1994 Test Pit	1995 Test Pit 1	1995 Test Pit 2	Total
Large/storage jars	0	3	5	9	17
Small jars	0	3	9	3	15
Cooking jars	0	0	0	1	1
Miscellaneous jars	17	76	10	28	131
JARS	17 (54.9%)	82 (51.9%)	24 (41.1%)	41 (85.4%)	164 (55.6%)
Cylindrical jars/vases	0	27	0	0	27
Restricted vases	0	0	2	0	2
High-necked flask spouts	0	4	4	0	8
Miscellaneous vases	0	4	6	0	10
CYLINDRICAL VESSELS	0 (0.0%)	35 (22.2%)	12 (20.6%)	0 (0.0%)	47 (15.9%)
COVERS	8 (25.8%)	23 (14.6%)	13 (22.4%)	1 (2.1%)	45 (15.3%)
BOXES	6 (19.4%)	18 (11.4%)	8 (13.8%)	4 (8.3%)	36 (12.2%)
APPURTENANCES	0 (0.0%)	0 (0.0%)	1 (1.7%)	2 (4.2%)	3 (1.0%)
Total	31	158	58	48	295

Table 4. Minanga Sipakko pottery manufacture techniques

Technique	1994 Test Pit	1995 Test Pit 1	1995 Test Pit 2	Total
Hand modelled	6 (6%)	19 (43%)	14 (34%)	39 (20%)
Slab built	16 (15%)	0 (0%)	7 (17%)	23 (12%)
Anvil finishing effects	24 (23%)	9 (20%)	6 (15%)	39 (20%)
Slow wheel finishing effects	56 (53%)	12 (27%)	11 (27%)	79 (41%)
Fast wheel finishing effects	4 (4%)	4 (9%)	3 (7%)	11 (6%)
Total observations	106	44	41	191

(e.g. MS95/TP1.0-25.2 in Figure 3), and cylindrical bodies that taper out towards the shoulder carination. Several fine examples of these bodies, from Kamassi, are on display at Jakarta's National Museum, but whether they were crowned with short or long spouts cannot be determined (both short- and long-spouted versions were present at Kamassi, as shown by Stein Callenfels's illustrations (1951:Pl. XVIII). The long-spouted variant is labelled *kendi* by Simanjuntak (1994-5:22) and Fatimah (1995:30), and the "high-necked flask" by Bellwood (1997:304). Bellwood (1997:304) is not aware of high-necked flasks in any Island Southeast Asian Neolithic assemblages south of Taiwan, so the occurrence

of this vessel form at Kalumpang may be further suggestive of a direct link between Kalumpang and the Taiwan Neolithic.

Ceramic figurines (Figure 3) and decorated ceramic discs (not yet observed at Minanga Sipakko) constitute two of the ceramic parallels between Kalumpang and Neolithic Taiwan (Table 1). A fourth item involves ring feet with cut-out decorations from Kamassi (Stein Callenfels 1951:Plate XVI; Bellwood 1997:227). A comparable example occurs in the 1994 surface collection from Minanga Sipakko, so this parallel would involve both Kalumpang sites. The presence of high-necked flasks in the Kalumpang sites suggests that the Kamassi ceramic discs could have served as stoppers.

The wide ceramic repertoire at Kalumpang suggests that its absence of reported spindle whorls is real, and not an effect of inadequate sampling, or the production of spindle whorls in a perishable substance such as wood. A stronger case exists for the absence of spindle whorls from Kalumpang than from virtually any other prehistoric site in Island Southeast Asia.³

A chi-square test that compares the number of sherds from jars, cylindrical vessels, covers and boxes in the four samples shows a statistically significant difference (chi-square = 39.8, 9 degrees of freedom, $p < 0.005$). The main contributing factor is the dominance of jar sherds in the sample from the 1995 Test Pit 2 (Table 3). These jar sherds, and their association with stove fragments, give the Test Pit 2 sample a more utilitarian aspect than the samples from the 1994 Test Pit or the 1995 Test Pit 1, where approximately 20% of sherds are assigned to cylindrical vessels (not to mention the ceramic figurine from Test Pit 1). There is accordingly some evidence for a division within Minanga Sipakko into utilitarian and ceremonial areas. Further, jar sherds were decorated less often (3 cases, 2%) than sherds from covers (2 cases, 5.4%), cylindrical vessels (6 cases, 12.8%), boxes (6 cases, 20%) or appurtenances (1 case, 33.3%). The difference is statistically significant when jars and covers are compared with the other three classes (chi-square = 16.1, 1 degree of freedom, $p < 0.005$).

Manufacture

The basic forming techniques in evidence are building up slabs (especially box and stove bodies), and modelling with the hands and fingers (all forms). No evidence of coiling was noted (Table 4). Many body sherds, especially from jars, exhibit internal dimpling. This is consistent with the finishing technique of thinning the body by beating or rubbing the external wall (probably with a flat stone rather than a paddle) to exert pressure against an anvil placed inside the formed vessel. Many rim, neck and shoulder sherds show parallel, horizontal lines.⁴ These indicate that the parts of round-bodied vessels near the orifice were often finished by wiping them smooth as the vessel was turned on a slow wheel. In approximately ten percent of cases, the lines are so regular and smooth as to suggest a fast wheel, but this effect more likely reflects skilled use of the slow wheel rather than familiarity with the true potter's wheel. The contrast between anvil traces on body sherds and wheel lines near vessel mouths is not absolute, but it is sufficiently marked to imply that both finishing techniques were employed on many vessels. Typically, then, round-bodied vessels were hand modelled, the body was finished with the aid of an anvil (except high-necked flasks, whose narrow aperture would have prevented entry of the anvil), and the rim and

shoulder finished on a slow wheel. Boxes were slab built and/or hand modelled, and very occasionally finished off by pressure applied against an anvil.

When slow and fast wheel finishing effects are pooled to permit valid application of the chi-square test, a highly significant result emerges (chi-square = 39.7, 6 degrees of freedom, $p < 0.005$). The salient contributors to this result are the very high frequency of wheel effects, and the very scarce evidence of unmodified hand modelling, on the observed sherds from the 1994 Test Pit (Table 4). The stark differences in these regards from the 1995 Test Pit 2 sherds accord with other indications of the utilitarian status of the latter sample. Further, traces of unmodified slab building were not recorded on any sherds from the 1995 Test Pit 1 (Table 4), a result explained by the observation that virtually all of the box sherds in that sample are from rims.

In the 1995 Test Pit 1 sample of 55 sherds, 19 had reduced cores and 20 had oxidised walls. 23 of the 42 sherds (excluding the stove) from the 1995 Test Pit 2 showed reduced cores and 19 had oxidised walls. These rates are higher than those among the 1994 Test Pit sherds, where only 35 of 158 exhibited reduced cores and 24 had oxidised walls. The latter rates may be more representative of firing practices at Minanga Sipakko, given that our observations on the sherds excavated in 1995 depend on a selectively chosen sample.

Slips

The presence or absence of a slip can be difficult to determine owing to two factors. Slips tend to be eroded post-depositionally, leaving only remnants or (presumably) no traces at all, hence the rates of slip application we observed would be minimum estimates. Second, finishing techniques which smooth the surface can generate a slurry of clay that is then evened out across the surface, producing 'self-slipped' wares. The potential exists to confuse self-slipped and *bona fide* slipped sherds, especially in the case of vessels which were treated to intensive surface treatments such as burnishing (which we occasionally observed).

A slip was recorded on 3/31 (10%) of the Kamassi survey sherds, 2/13 (15%) of the decorated sherds from the Minanga Sipakko surface survey, 89/440 (20%) of the sherds excavated from the 1994 Test Pit, 16/76 (21%) of the sherds from the 1995 Test Pit 1, and 12/51 (24%) of the sherds from the 1995 Test Pit 2. Sherds from boxes and large jars rarely showed slips, which were more prevalent on covers and cylindrical vessels (the stove and knob sherds from 150-180 cm depth in Test Pit 2 were all unslipped). Slipping was preferentially applied to clearly visible parts of the vessels, such as the interior and exterior surfaces of the rim and neck, and the shoulder's external face. In the 1994 Test Pit sample, the sub-sample of 158 sherds which included all the rim and

neck sherds as well as many body and basal sherds included 66 slipped sherds (42%), while a second sub-sample of 282 body and basal sherds included only 23 slipped sherds (8%).

Rims constitute a larger proportion of the observed sherds from the 1995 excavations, compared to the 1994 Test Pit sample, and this explains why the 1995 sherds show a slightly higher rate of slipping. Using the 1994 Test Pit sample as our leitmotif, we may conclude that application of a slip was a common technique with all the Kalumpang round-bodied vessels of small to medium size, with the result that approximately 20% of sherds evince a slip. Further, eight of the observed total of 35 decorated sherds (22.9%) show slipping, so decorated and plain vessels would seem to have had a slip applied at approximately equal rates.

The most commonly recorded slip colour was a true Munsell red in all three Minanga Sipakko excavated samples (Table 5). Weak red and reddish brown are the other common colours. Rarer variations extend to dark and dusky red, reddish yellow, and shades of grey. The wider range of slip colours in the 1994 Test Pit sample reflects its greater sample size of recorded slips.

Body Colour

Body colour, especially on the interior surface, is more variable than slip colour (Tables 6 and 7). Usually the interior and exterior surface colours are highly correlated, but with a slight tendency for the interior colour to be darker or browner. This is the expected result of the more limited circulation of atmospheric oxygen within the vessel during firing and, hence, greater potential for a reducing environment. Reddish brown and light reddish brown shades dominate the 1994 Test Pit sample, whereas the 1995 excavated samples include proportionally more cases of pinks (especially in Test Pit 2) and reds (especially in Test Pit 1).

As indicated by asterisks in Table 6, there were three recorded cases of exterior body colours (with ten or more observations) where at least 28% of the sherds were slipped. They all involve light colours with a dash of red (reddish yellow, light reddish brown, pink), suggesting that the slips were applied to produce a darker, redder vessel. We noticed a weak tendency for darker colours, and browns, to occur on the surface of boxes, while pink and light reddish brown surfaces are more characteristic of small to medium-sized, round-bodied vessels. No relationship could be detected between exterior colour and tendency to be decorated. However, sherds internally coloured reddish brown (7/120), brown, grey or black (1/55) tended to bear decorations less often than sherds with a red or a light internal colour (11/73), and the difference is statistically significant (chi-square = 8.85, 2 degrees of freedom, $p < 0.025$). A similar difference at Kamassi might have provided the basis for Heekeren's (1972:187) claimed distinction between plain brown sherds

and elaborately decorated, mainly red sherds. But any such distinction at Minanga Sipakko would have been subtle, especially as it could not be observed when the exterior surface colour was considered.

Decoration

Kamassi may well have the richest corpus of decorated earthenware pottery in any site in Island Southeast Asia. 33 major motifs, according to the system developed by Clune (1996; see Clune and Bulbeck 1999) and Flavel (1997), may be recognised from illustrations published in the literature (Table 8). This list excludes the anthropomorphs and zoomorphs mentioned previously. Inspection of the unpublished decorated sherds would possibly reveal yet further motifs at Kamassi. Many Kamassi sherds bear a replete multitude of different elements, similar to the two examples from Minanga Sipakko illustrated at the top of Figure 3.

About five per cent of Kalumpang sherds of substantive dimension are decorated. This is the approximate frequency recorded in the largest available samples from both Kamassi and Minanga Sipakko, and for these two sites as a whole (Table 9). Although less than two per cent of the sherds in other large samples from both of these sites show decoration, in both cases comminuted body sherds constitute a large portion of the sample. Decoration tends to be concentrated on upper surfaces from shoulders upwards, as noted by Simanjuntak (1994-5:25), so even well-decorated vessels will tend to result in a majority of plain sherds upon advanced disintegration.

At least 19 of the 33 major motifs at Kamassi are also recorded at Minanga Sipakko (Table 8). Kamassi's wider recorded repertoire undoubtedly stems, at least in part, from differences in sample size, given the large area excavated at Kamassi. The ten major elements represented only among the sherds excavated by Stein Callenfels or Heekeren (14, 18, 24, 36, 38, 44, 48, 50, 52 and 54) are, typically, highly ornate motifs illustrated on only one or a few sherds. The recorded Minanga Sipakko repertoire does not include any new major elements compared to Kamassi, although there are four new sub-elements (4a, 9d, 23c, 35c). It may be concluded that the two sites represent the same tradition of decorated pottery, and any chronological gap between the Kamassi and Minanga Sipakko Neolithic settlements would have been minimal.

Heine Geldern viewed Samrong Sen in Cambodia, dated to 4-3000 BP (Higham 1989:173), as the closest parallel for Kamassi's decorated pottery (Heekeren 1950). Heekeren (1972:187) concluded that the Kamassi pottery designs were derived from the Sa Huynh culture of central Vietnam (c.3-2000 BP - Higham 1989:232; Pham 2000). Simanjuntak (1994-5:23) argues that Kalumpang decoration is characteristically Palaeometallic in the Indonesian context, related to Dong

Table 5. Minanga Sipakko recorded slip colours (Munsell nomenclature)

Slip colour	1994 Test Pit	1995 Test Pit 1	1995 Test Pit 2	Total
Red	34 (52%)	9 (56%)	8 (67%)	51 (54%)
Dark red/dusky red	0 (0%)	2 (12.5%)	3 (25%)	5 (5%)
Light red	3 (5%)	0 (0%)	0 (0%)	3 (3%)
Weak red	11 (17%)	3 (19%)	1 (8%)	15 (16%)
Reddish brown	12 (18%)	2 (12.5%)	0 (0%)	14 (15%)
Light reddish brown	1 (2%)	0 (0%)	0 (0%)	1 (1%)
Dark reddish brown	2 (3%)	0 (0%)	0 (0%)	2 (2%)
Reddish yellow	1 (2%)	0 (0%)	0 (0%)	1 (1%)
Pinkish grey/light grey	2 (3%)	0 (0%)	0 (0%)	2 (2%)
Total observations	66	16	12	94

Table 6. Recorded Minanga Sipakko exterior body colours (Munsell nomenclature)

Slip colour	1994 Test Pit	1995 Test Pit 1	1995 Test Pit 2	Total
Very dark grey	2 (2%)	0 (0%)	0 (0%)	2 (1%)
Grey	0 (0%)	1 (2%)	0 (0%)	1 (0.5%)
Reddish/dark reddish grey	4 (3%)	0 (0%)	2 (5%)	6 (3%)
Dark brown	1 (1%)	0 (0%)	0 (0%)	1 (0.5%)
Brown	9 (7%)	4 (8%)	0 (0%)	13 (6%)
Dusky red	0 (0%)	1 (2%)	0 (0%)	1 (0.5%)
Red	7 (5%)	11 (22%)	2 (5%)	20 (9%)
Light red	3 (2%)	8 (16%)	4 (10%)	15 (7%)
Weak red	3 (2%)	2 (4%)	0 (0%)	5 (2%)
Yellowish red	3 (2%)	0 (0%)	3 (7.5%)	6 (3%)
Reddish yellow*	3 (2%)	6 (12%)	3 (7.5%)	12 (5%)
Reddish brown	64 (48%)	2 (4%)	6 (15%)	72 (32%)
Light reddish brown*	28 (21%)	4 (8%)	6 (15%)	38 (17%)
Light/very pale brown	4 (3%)	4 (8%)	3 (7.5%)	11 (5%)
Pink*	2 (2%)	5 (10%)	7 (17.5%)	14 (6%)
Pinkish grey/light grey	0 (0%)	2 (4%)	3 (7.5%)	5 (2%)
Pinkish white	0 (0%)	0 (0%)	1 (2.5%)	1 (0.5%)
Total observations	132	50	40	222

Son (c.2500-1800 BP, Higham 1989; Bellwood 1997). The available dates from Minanga Sipakko would place the site in the same age bracket as the sites which, according to Vietnamese archaeologists, were the direct antecedents of Sa Huynh and Dong Son respectively (Bellwood 1997:269-272). Kamassi may indeed be older than Minanga Sipakko, in excess of 3000 BP, as noted previously. The suggestion of a direct relationship between Kalumpang and contemporary societies in present-day Indochina remains an intriguing possibility.

Formal statistical analysis of the Kalumpang repertoire recorded by Flavel (1997) found definite links with decorated earthenware assemblages (especially Leang Paja) in the peninsula of South Sulawesi, to the south of Kalumpang.⁵ But as these latter assemblages would appear to be younger than Kalumpang, they have no direct bearing on the origins of the Kalumpang tradition of decorated pottery. Impres-

sionistically speaking, a large number of the Kamassi elements also find their parallels in the c.3000 year old Lapita pottery of eastern Melanesia (Sand 2000), just as the Leang Paja pottery is decidedly 'Lapitoid' (Flavel 1997:89). The appearance of similar repertoires of decorated pottery at approximately the same time in Indochina, South Sulawesi and eastern Melanesia need not constitute evidence of direct links between these three widely separated locales. It may point to a similar process of transferring elements from a widespread iconography, generally reserved for decorating archaeologically perishable items, to the medium of ceramics.

DISCUSSION

One critical comparison for the material culture at Kalumpang is Taiwan, widely seen as the immediate homeland of proto-Austronesian speakers prior to their dispersal into Southeast Asia and the Pacific. The two other critical comparisons,

Table 7. Recorded Minanga Sipakko interior body colours (Munsell nomenclature)

Slip colour	1994 Test Pit	1995 Test Pit 1	1995 Test Pit 2	Total
Black/reddish black	0 (0%)	2 (4%)	0 (0%)	2 (1%)
Very dark grey	3 (2%)	0 (0%)	0 (0%)	3 (1%)
Grey	0 (0%)	1 (2%)	0 (0%)	1 (0.5%)
Reddish/dark reddish grey	3 (2%)	1 (2%)	3 (7%)	7 (3%)
Dark reddish brown	4 (3%)	0 (0%)	0 (0%)	4 (2%)
Dark brown	3 (2%)	0 (0%)	0 (0%)	3 (1%)
Brown	14 (9%)	3 (6%)	0 (0%)	17 (7%)
Red	7 (5%)	10 (20%)	2 (5%)	19 (8%)
Light/pale red	4 (3%)	8 (16%)	5 (12%)	17 (7%)
Weak red	3 (2%)	1 (2%)	0 (0%)	4 (2%)
Yellowish red	0 (0%)	1 (2%)	2 (5%)	3 (1%)
Reddish yellow	2 (1%)	5 (10%)	3 (7%)	10 (4%)
Reddish brown	81 (52%)	1 (2%)	6 (15%)	88 (35%)
Light reddish brown	17 (11%)	7 (14%)	5 (12%)	29 (12%)
Light/very pale brown	12 (8%)	2 (4%)	5 (12%)	19 (8%)
Light yellowish brown	0 (0%)	1 (2%)	0 (0%)	1 (0.5%)
Light brownish grey	0 (0%)	1 (2%)	0 (0%)	1 (0.5%)
Pink	3 (2%)	3 (6%)	7 (17%)	13 (5%)
Pinkish grey/light grey	0 (0%)	4 (8%)	1 (2%)	5 (2%)
Pinkish/yellowish white	0 (0%)	0 (0%)	2 (5%)	2 (1%)
Total observations	156	51	41	248

based on pottery decorations, are central Vietnam and eastern Melanesia, both destinations for early Austronesian colonists. The Kalumpang sites are surely associated with early Austronesian speakers. Almost as certainly, they reflect Neolithic Austronesians' colonisation of a hitherto hunter-gatherer area.

However, Kalumpang has attracted little attention from historical linguists interested in the early Austronesian diaspora, a situation that is likely to persist. Sulawesi in general is viewed as of minimal importance for understanding the early diversification of Austronesian languages, for instance, being effectively ignored by Blust (1984-5). The Karama River, in particular, is populated by Mamuju and Kalumpang speakers who would appear to be later offshoots of the South Sulawesi language group with its origins probably lying somewhere on the South Sulawesi peninsula (Bulbeck 1992:Appendix A; Pelras 1996:39). The early Austronesian vocabulary items reconstructed by Blust (1995) show a mediocre correspondence with the material culture in evidence at Kalumpang, notwithstanding the latter's unsurpassed credentials as an Island Southeast Asian Neolithic habitation site (Table 10). Only 13 of the 76 items (17%) reconstructed for proto-Austronesian or proto-Western Malay-Polynesian (WMP) are matched at Kalumpang, and five of the 17 items (29%) at Kalumpang cannot be related to early Austronesian reconstructions. Kalumpang currently offers little grist for the historical linguists' mill.

The material culture preserved in the archaeological record is at best a patchy and biased sample, so would it be responsible for archaeologists to amplify the physical evidence at Kalumpang with the items reconstructed for proto-WMP? It seems highly unlikely that the Kalumpang villages could have been sustained without some agriculture, but suggestions on which of the crops listed in Table 10 were tended at Kalumpang would currently amount to ungrounded speculation. Similarly, the location of the sites on a major river, with direct access to the sea, suggests facilities for water transport, but would we be entitled to infer possession of the full outrigger canoe complex? Certain proto-WMP items could have been lost during the establishment of a settlement at Kalumpang, as argued previously for spindle whorls. The use of proto-WMP reconstructions becomes even more tendentious when these are controversial, as is the case with metals. Gold (Table 10) could have been extracted from the tributaries of the Karama, and a trade in gold would help to explain the healthy long-term occupation at Kalumpang, but suggestions of a Neolithic industry in Karama gold would strike most archaeologists as way too daring. Accordingly, it is not at all clear that proto-WMP reconstructions advance our understanding of Kalumpang much beyond a consideration of those resources that would have been available to the residents, and would have sustained the size of their settlements, based on the principles of cultural ecology.

Table 8. Kalumpang pottery decorations (labelled by the numbers in Flavel's and/or Clune's system)

Motif Description	Kamassi		Minanga Sipakko					Kalumpang
	Dutch excavations	1994 survey	1949 survey	1994-5 surveys	1994 Test Pit	1995 Test Pit 1	1995 Test Pit 2	Fatimah 1995
Crosses	2	--	2	--	--	--	2 (1)	--
Diagonal cross-hatches	4b	--	4a	--	--	--	4b (1)	--
Vertical incisions	5	--	5	5 (3)	5 (1)	--	--	5
Horizontal incisions	6	--	6	6 (2)	6 (4)	6 (2)	--	6
Triangles	7b, c, e	--	7a	7e (1)	--	7b, c (2)	--	7e
Zigzags	8a, c, d	--	8c, d	--	--	--	--	8d
Impressed circles	9a, b, c	--	9a	9a, c (2)	--	9a, d (5)	--	9a, c
Single lines of punctate dots	11a, b	--	11a	11a (1)	11a (1)	--	--	--
Zigzag lines of punctate dots	12a, b	--	12a	--	12a (2)	--	--	--
Vertically gouged grooves	13b	--	13b	--	--	--	--	13b
Symmetrical lunates	14	--	--	--	--	--	--	--
Scalloped/grooved rims	16a, b, c	16c (1)	--	16b (1)	--	16b (1)	--	--
Hats with internal incisions	18c	--	--	--	--	--	--	--
Slanting incisions	21a, b	--	--	21a, b (4)	21a, b (2)	21a, b (2)	21a, b (2)	21a, b
Diverging grooves	22	--	--	--	--	--	--	22
Parallel dashes	23a, b	--	23a, c	23a, c (2)	--	--	--	--
Bone-shaped stamps	24	--	--	--	--	--	--	--
Interlocking semi-circles	28a, b	--	--	28a (2)	--	28a, b (4)	--	28a, b
Horizontal grooves	30b	--	--	--	30b	--	--	--
Triangles of diagonal lines	35a	--	35a, c	35a, c (3)	35a (2)	35a (1)	35a (2)	35a
Square maze	36	--	--	--	--	--	--	--
Horizontal/vertical incisions filling geometric figures	37a, b	--	--	--	--	--	--	37b
Arca shell impressions	38a	--	--	--	--	--	--	--
Punctate-filled curvilinear designs	41a, b, c, d	--	--	--	--	--	--	41a
Punctate-filled triangles	43a	--	43a	--	--	--	--	43a
Dash-filled rectangular maze	44	--	--	--	--	--	--	--
Meshes of punctate dots	45a	--	45a	45a (1)	--	--	--	45a
Square maze	48b	--	--	--	--	--	--	--
Wave motif	50a	--	--	--	--	--	--	--
Radiating X-motif	51	--	--	--	--	--	--	51
Diamonds	52	--	--	--	--	--	--	--
Ellipses	53	--	53	--	--	--	--	53
Concentric semi-circles	54	--	--	--	--	--	--	--

The following variants are not in Clune's or Flavel's system. 7e refers to cut-out triangles on foot pedestals. 12b refers to zigzag arrangements of points and dashes. 16c refers to irregularly spaced, gouged rim grooves. 35c refers to triangular mazes. 41d refers to punctate-filled lozenges. Diamonds (52), ellipses (53) and concentric semi-circles (54) are adopted from Santoso (1985). Motifs from the Dutch excavations at Kamassi are abstracted from the illustrations in Hoop (1941:Figs 104-106), Stein Callenfels (1951), Heekeren (1972) and Santoso (1995:Fotos 68-69). Motifs from the 1949 Minanga Sipakko survey are abstracted from Heekeren (1972:Pl. 102). The illustrations and descriptions of decorated sherdage in Fatimah (1995) are merely assigned to Kalumpang, but most of her decorated sherds are from Minanga Sipakko (Table 9). Other data are the writers' original observations.

Our views have certainly progressed from Heekeren's (1950; 1972:188) assessment of Kalumpang as a serious case of cultural retardation in an Indonesian backwater. Simanjuntak (1994-5) offers a more appropriate perspective by portraying Kalumpang as transitional between the Neolithic and the Palaeometallic in Indonesia. Even his assessment may understate the case as no other dated Neolithic sites

with a recorded habitation area approaching one tenth of a hectare are known from Island Southeast Asia. If the Kalumpang settlements represent an unusually large Neolithic community by Indonesia's standards, the inhabitants may have exerted considerable influence on developments elsewhere. Even had there been other Neolithic settlements similar to Kalumpang in size, but those

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Table 9. Proportions of Kalumpang sherds that are decorated

Kamassi				Minanga Sipakko				
1949 excavation	1993 survey	1994 survey	Total	1993 survey	1994 Test Pit	1995 Test Pit 1	1995 Test Pit 2	Total
44/770	7/400	1/31	52/1201	35/539	7/440	9/76	5/61	56/1172
5.7%	1.8%	3.2%	4.3%	6.5%	1.6%	11.8%	8.2%	4.8%

1949 excavation: Heekeren (1972:187). 1993 survey: Fatimah (1995). Other data: present study.

Table 10. Early Austronesian (after Blust 1995) and Kalumpang material culture and faunal resources compared

Item (only those animals present in Sulawesi and its waters are included here)	Kalumpang	Proto-Austronesian	Proto-Western Malayo-Polynesian
Monkey. Squirrel.	--	x	x
Buffalo (water-buffalo, or anoa). Pig.	x	x	x
Dog. Chicken.	--	x	x
Deer.	x	--	--
Frog.	x	--	--
Estuarine crocodile (present in the lower Karama).	--	x	x
Shark. Octopus. Jellyfish. Hermit crab.	--	x	x
Dugong.	--	?	x
Cowrie. Cateye shell. Conch. Oyster. Giant clam. Snail. Lobster. Starfish. Squid. Mangrove crab. Coconut crab.	--	--	x
Bow +arrow.	x	x	x
Spear (large projectile points).	x	--	--
Terrestrial traps. Fish traps. Fish hooks.	--	x	x
Miscellaneous fishing gear (floats, poles, lines, nets), or fish.	x	--	x
Mortar.	x	x	x
Harvest, or reaping knives.	?	x	x
Rice (+derivative terms). Millet.	--	x	x
Wild taro. Sugarcane.	--	x	x
Taro. Ginger. Yam. Breadfruit. Coconut. Banana. Sago.	--	--	x
Digging stick.	--	--	x
Hearth. Cooking.	x	x	x
Cooking pot.	x	--	x
Earth oven.	--	--	x
Axe/adze.	x	--	x
Carpentry (dowels, or fine woodworking tools).	x	--	x
Iron. Lead or tin.	--	x	x
Gold.	--	--	x
Village +connected territory.	x	--	x
Housing.	x	x	x
House-post. Roof thatch.	--	x	x
Crossbeam. Ridgepole. Access ladder. Rafter. Storage rack.	--	--	x
Boats. Paddles. Sails.	--	x	x
Outrigger canoe complex.	--	--	x
Headhunting.	--	x	x
Shield.	--	--	x
Loom +its parts. Weaving spindle. Belt. Sewing. Needle.	--	x	x
Cloth (including bark cloth).	x	x	x
Plaiting (e.g. basketry).	--	--	x
Beads. Tattoos.	?	x	x
Rings.	x	--	--
Fine pottery.	x	--	--
Flute	--	x	x

sites were destroyed in later times or lie buried under sediment, Kalumpang would still serve as our witness on wider trends. In either case, Kalumpang presages numerous developments, especially in terms of pottery, that emerged as widespread phenomena in Island Southeast Asia during the Palaeometallic. Even those aspects of (presumably) Taiwan-derived material culture that were evidently lost (e.g., spindle whorls), or apparently in the process of being abandoned (e.g., production of slate projectile points), are important evidence for the adaptations of early Austronesian colonists to the island world south of the Philippines. Unfortunately, as our information on the pre-Neolithic archaeology in the region of Kalumpang is blank, the site complex is of scanty use in researching the interactions between immigrant Neolithic farmers and indigenous hunter-gatherers.

One major adaptation must have been the capacity for social reproduction despite considerable isolation from other Neolithic communities. Contrast the sparse scatter of *c.* 3000 year-old *kampongs* in Island Southeast Asia (unless future evidence radically alters the picture) with the indications of networks of ebullient populations in Taiwan and Vietnam at that time (e.g., Bellwood 1997). Self-reliance for goods and services would have been at a premium, as the interpretation of Kamassi (and possibly Minanga Sipakko) as *ateliers* suggests. Acquisition of manufactured luxury items, and marriage partners from other Neolithic communities, presumably would have involved lengthy expeditions. The evident abandonment of spinning and weaving could be expected given the difficulties in obtaining or locally producing suitable fibres, or attracting weavers to this isolated community, not to mention the reduced need for spun and woven cloth in a lowland equatorial climate. Ceramics however could be produced in quantity. The explosion in decorations (compared to any Taiwan Neolithic assemblage) suggests compensation for a restricted repertoire of material culture by transferring previously familiar icons (e.g., on cloth) to pottery (the vessel surface covered with interlocking stylised human figures, as reconstructed by Heekeren (1972:Figure 46), appears as a paradigmatic example of a textile design transferred to ceramics).

As discussed with regard to Minanga Sipakko, there is some evidence for the site's division into predominantly utilitarian and mainly ceremonial areas, and some indication that fancier vessels, such as boxes and cylindrical vases, were preferentially decorated. However, there is little sign of a cult focused on distinctive pottery, as has been suggested by Pat Kirch for Lapita dentate-stamped ware, or of the special lines of mortuary vessels that dominate Palaeometallic decorated pottery in Island Southeast Asia (e.g., Bellwood 1997; Flavel 1997). Rather, the Kalumpang pottery may have enhanced domestic intercourse through

the availability of finer wares for serving and display, as compensation for the loss of access to certain other household goods. Some material representation of ceremony and status differences would appear to have been an integral part of successful social reproduction at Kalumpang.

If the material culture at Kalumpang is correctly interpreted as an adaptation to isolation, then it would have lost its relevance when larger numbers of communities were established in the region, and trade links were established with Kutai and beyond. The location of Sikendeng near the mouth of the Karama is consistent with the orientation of its residents towards the sea and maritime trade. Coèdes (1975:7) treated Sikendeng as Neolithic, whereas modern outlines of the archipelago's prehistory would rather interpret it as a Palaeometallic settlement whose metallic wares (apart from the Buddha statue) could not be recovered archaeologically. The reduction of the repertoire of polished stone at Sikendeng to highly polished, presumably ceremonial axes, and the virtual loss of decorated pottery, are consistent with an expanded role of metal tools and enhanced access to trade goods. Unprovenanced and surface finds of obsidian and metals at the Kalumpang sites suggest the locality then served as a collecting centre for highland produce, including gold, traded downstream to the coastal centre at Sikendeng.

The differences between Kalumpang and Sikendeng in their material culture can therefore be fitted into a model of increasing population and trade. The concentration of four major settlements in the vicinity of Kalumpang (including Palembang, just east of Kalumpang) stamps this area as an optimal location, even if the available evidence does not permit us to infer continuous, un-punctuated occupation. The relationship of the area's archaeology to the derivation of the ethnographic languages along the Karama would be a matter for future research.

CONCLUSION

Kamassi and Minanga Sipakko supported closely related Neolithic villages. Kamassi has sufficient parallels with Neolithic Taiwan to suggest a dating earlier than 3000 BP, while Minanga Sipakko is dated to somewhere between 2000/2500 and 3000 BP. These chronological indicators remove the Kalumpang sites from direct consideration of trade and community interactions during the Palaeometallic. Nonetheless the Kalumpang communities probably contributed to subsequent developments along the Karama, which would appear to have been an important zone for maritime-hinterland trade during the first millennium AD. Even a minimalist interpretation of the Kalumpang sites would view them as emblematic of wider transformations in the Neolithic to Palaeometallic transition in Island Southeast Asia.

NOTES

1. Many of the Kalumpang materials are held at Indonesia's National Museum in Jakarta. Sikendeng items are accessioned under Nos 1508 and 1716-1718, and Stein Callenfels's Kamassi items under Nos 1506-1507 and 1713-1714 (Hoop 1941). Bulbeck's museum notes record Kamassi items excavated by Heekeren under Accession Nos 5988-5999 and 6027-6029, and the Minanga Sipakko survey finds as 6030-6043 and 6194.
2. Heekeren (1972:187) claims a phallic symbol of baked clay from Kamassi. The apparently later site of Palembang yielded a small pottery head (Stein Callenfels 1951:Pl. XIX). A similar pottery head has been found in the peninsula to the south, at the mortuary site of Ulu Leang 2, where it probably dates to the first millennium AD (Glover 1976:146-47).
3. Reports of ceramic spindle whorls at the Palaeometallic site of Melolo in Sumba (Heekeren 1972:198; see Bellwood 1997:304) imply that Dutch archaeologists were capable of recognising these items and that they may have reached Indonesia at later times. Both implications strengthen the case that spindle whorls were absent from Kalumpang's Neolithic repertoire.
4. 27 of the 39 sherds with evidence of anvil finishing are body sherds. 28 of these same 39 sherds were classified as jars. In contrast, 69 of the 90 sherds with the effects of finishing on a wheel are rim, neck or shoulder sherds. Simanjuntak (1994-5:22) and Fatimah (1995:37) provide observations similar to ours, but with less detail, on the manufacture of the Kalumpang pottery.
5. Flavel employed a repertoire similar to that listed in Table 8, but without access to Hoop (1941) or Stein Callenfels (1951). The most recent formal statistical analysis of Flavel's repertoire finds an intriguing similarity between the South Sulawesi repertoires, as a well-defined group, and the Sa-Huynh repertoire (Bulbeck 2000). A more definitive study is currently in process.

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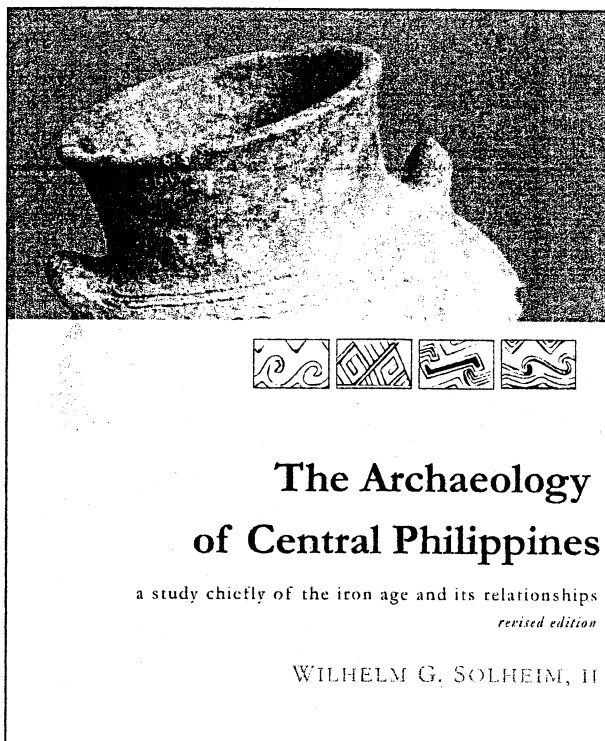
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