

WASH AND WEAR, DISPOSABLE AND CHEAP: CERAMIC BANGLES AS EVERYDAY PERSONAL ORNAMENTS *NOT* FOR SYMBOLIC USE

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ABSTRACT

Fragments of what appear to be clay bangles are regularly found in Bronze and Iron Age sites in Central and Northeast Thailand. Fragments of what appear to be clay bangles are regularly found in Bronze and Iron Age sites in central and northeast Thailand; these are generally multi-component sites that include mortuary dimensions. Graves are often dug from, into or between occupation deposits and it is from these contexts that the clay bangle fragments are usually recovered. No clay bangles have been found complete and any found within graves were almost certainly accidental inclusions. In contrast, bangles of shell, marble, nephrite, copper-alloy and iron are all common grave goods. In this paper probable clay bangles from Noen U-Loke in Northeast Thailand and Non Pa Wai in Central Thailand are discussed. The basic questions considered are (1) what is the relationship between fired clay bangles to those made of other materials and (2) what does this relationship tell us about the living communities in prehistoric Thailand?

Investigations of Thai prehistory have concentrated on mortuary contexts. By examining and comparing characteristics of graves, archaeologists hope to gain insights into the living community thus represented. In this paper we wish to concentrate on a slightly different aspect – the relationship between grave goods and their everyday counterparts as used by the living community.

Our focus is narrow in that we will concentrate on just one type of artefact – bangles – following an initial observation that fired clay (ceramic) bangles are frequently found in Thai prehistory, but are never found complete, nor in obvious mortuary association. The few that have been found in mortuary contexts are almost certainly accidental

inclusions. In contrast, bangles of shell, stone and in later periods copper alloy and iron, are common grave goods.

Material from several archaeological sites is considered (Figure 1). Non Pa Wai and Non Mak La are located inland in central Thailand and include Neolithic and Bronze Age components. One of us (Voelker) participated in these excavations while the other (Chang) was asked to analyze the personal ornaments recovered. Both authors participated in excavations at the northeast Thailand sites of Ban Lum Khao (Bronze Age) and Noen U-Loke (Iron Age), with Voelker (2002) incorporating the pottery analysis into a PhD dissertation while Chang (2001) similarly considered the personal ornaments. All four sites included some ceramic bangles, despite their geographical and temporal spans.

Two further sites will play a part in this discussion, Khok Phanom Di (Neolithic) and Nong Nor (Bronze Age component) are central-east Thailand sites, formerly coastal in location, at which no clay bangle fragments were found. Data from Khok Phanom Di have been recorded by Pilditch (1993), while Nong Nor has also been part of Chang's (2001) research. Both authors participated in the excavation of the latter site.

Four questions will be addressed. First, because no ceramic bangles have been found on skeletons, can we really be sure that they were used as bangles? Second, what are the implications of parallel sets of personal ornaments, one for everyday use and one used in mortuary ritual? Third, was the use of ceramic bangles restricted to a specific time period or region? And fourth, were other materials or artefacts treated in the same manner?

CLAY BANGLES AND OTHER PERSONAL ORNAMENTS

The assumption has already been made that the clay objects at the centre of this preliminary study were indeed bangles. We will look more closely at the evidence for this conclusion

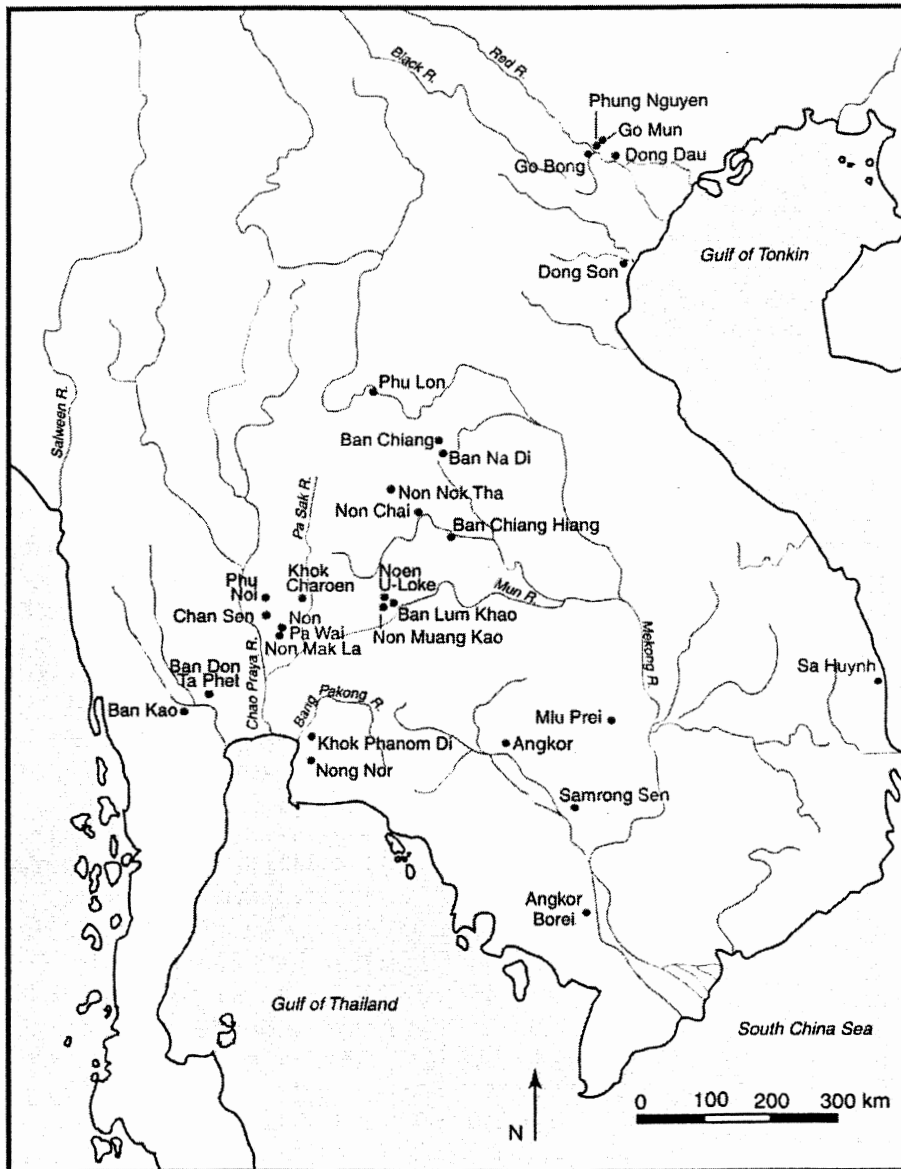


Figure 1: Map of selected Southeast Asian archaeological sites.

a bewildering array of individual artefacts. However, Chang (2001) has argued that personal ornaments as a group can be defined as portable and personal (wearable) objects incorporating either deliberate or subconscious symbolic values. It should be noted that, while in this paper we focus on just ceramic bangles, much of the value of any conclusions is drawn from understanding these artefacts in relation to the wider category.

At a practical level, Chang (2001: 30), following Pilditch (1986) and Kenoyer (1991), has defined a number of personal ornament types. Bangles are defined as any circlet (closed or open) made of a continuous homogenous material that can be worn on the arm. They are distinguished from bracelets, which are circlets made from components such as beads, chain or cord. While not essential to the present discussion, this is a useful distinction when talking more broadly about personal ornament assemblages.

THE CENTRAL THAILAND CERAMIC BANGLES: NON PA WAI AND NON MAK LA

Non Pa Wai and Non Mak La were first surveyed in 1984 by Surapol Natapintu; however, the material examined by Chang was excavated between 1992 and 1994 as part of the Thai Archaeometallurgical Project (TAP), co-directed by Vincent Pigott and Surapol Natapintu. Excavation in the Khao Wong Pracharn Valley by TAP is guided by a research design to document the widespread metallurgical activity by prehistoric peoples in the region (Pigott *et al.* 1997). Non Pa Wai is a large copper smelting occupation site approximately 5 ha in size. The site of Non Mak La lies at a distance of c. 500 m to the southeast of Non Pa Wai, near the small Huai Pong Creek. Non Mak La is also approximately 5 ha in size and may have served as a habitation site for the prehistoric workers at Non Pa Wai. Two main periods of use have been identified at Non Pa Wai. The first dates to shortly after 2300 BC, the second spans from c. 1500-700 BC (Natapintu 1988, 1991; Pigott *et al.* 1997). We believe that the ceramic

in later sections; first, however, let us consider more fully, what are bangles and what are personal ornaments?

As a general category, personal ornaments include a diversity of artefacts. This diversity is expressed both in artefact class, with such objects as beads, rings, bangles, earrings, pendants, torcs/necklets, hair/head ornaments, belts and decorative clothing (such as beaded cloth) all represented; as well as in materials used to manufacture these objects. In Thailand prehistory, bone, ivory, tooth, turtle carapace, shell, soft stone (e.g., marble), hard stone (e.g., agate, carnelian), ceramic, glass and a variety of metals were all used to make personal ornaments. These cross-cutting categories of material and artefact class provide for

bangles most probably date to the later, Bronze Age period. Radiocarbon dates are not yet available for Non Mak La.

Ninety-four individual fragments of ceramic bangles have been examined from Non Pa Wai. Of these, 20 can be considered decorated. Thirteen fragments have a scalloped or pinched outer edge, two are decorated with what appear to be fingernail impressions around the outer edge, three have a reddish-brown slip, one has been formed into a star-shape, and one has been scored around the outer edge. A further 27 fragments have a black outer surface that may have been intentionally produced. Re-examination will clarify whether this black surface was the result of burnishing. The remaining 47 fragments appear to be roughly formed with a generally ovoid cross-section. These bangle fragments vary in overall dimension and in colour and texture of paste.

Internal diameter was assessed by comparing the inner curve of the fragment with a nested series of circles drawn on a sheet of paper. The largest likely diameter of the Non Pa Wai bangles is about 80 mm with the smallest being about 40 mm. The diameter of each individual artefact was expressed as a range, for example, 50-60 mm. If the centre-points of these ranges are taken as the real values, then the average diameter is 55.5 mm.

Turning to Non Mak La, 12 clay bangle fragments have been examined (Figure 2). Although a smaller sample, these fragments are generally better finished and of a more sophisticated form than those recovered at Non Pa Wai. Eight showed evidence of burnishing and one other appeared to have a reddish-brown slip applied. Cross-section was also more varied, with L-shaped, three variations of T-shaped, circular, flat triangular and band-like forms all represented. Two fragments are from well-formed star-shapes and may have come from just one original bangle. Estimated internal diameters range from 35 mm to a maximum of about 70 mm, with an average of 52.1 mm.

THE NORTHEAST THAILAND CERAMIC BANGLES: BAN LUM KHAO AND NOEN U-LOKE

The Origins of Angkor Project, co-directed by Racharnie Thosarat and Charles Higham, has excavated a group of culturally related habitation sites in the Mun Valley of northeast Thailand. These sites; Ban Lum Khao, Non Muang Kao, and Noen U-Loke are located within 7 km of one another, and approximately 20 km from the historic township of Phimai. A fourth site, Ban Non Wat, is currently under investigation. These are multi-component sites with well-provenienced ceramic assemblages from mortuary and domestic contexts, as well as some ceramics associated with industrial activities. As a group, they date from the mid-second millennium BC to the late first millennium AD.

Ban Lum Khao is a modern village located on a low mound. Excavations were carried out during the 1995/1996

dry season uncovering a Bronze Age cemetery at the western edge of the village. The remains of 110 individuals were recovered (Domett 2001) and these have been grouped into three succeeding mortuary phases (Higham and Thosarat 1998).

Twenty-six fragments of clay bangle were recovered at Ban Lum Khao. Three were found in mortuary contexts but these were most likely accidental inclusions. While the forms are generally simple, they are well made and regular. Circular, D-shaped, square and rectangular cross-sections are most common, although two triangular and one T-sectioned fragment are also present (Figure 3). Decoration is minimal with just two black burnished fragments, two burnished red or brown fragments (including the T-sectioned fragment) and one with a reddish-brown slip. Estimated internal diameters range from a minimum of 42 mm to a maximum of 65 mm. The average diameter is 56.7 mm.

Noen U-Loke is located near the Mun River on the alluvial plain and was occupied from around 300 BC to at least AD



Figure 2: Clay bangle fragments from Non Mak La.

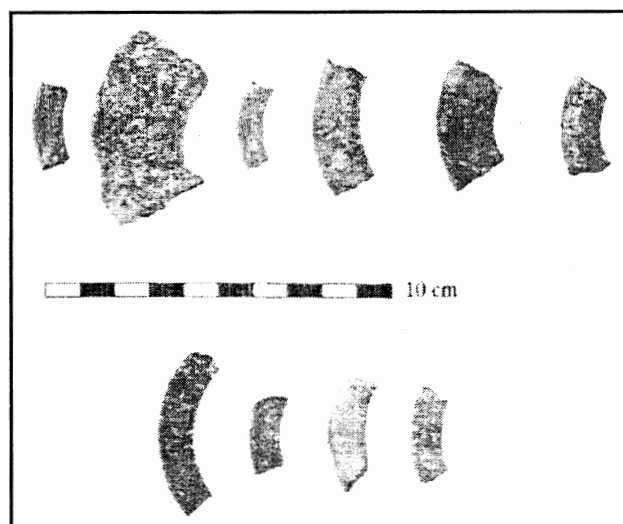


Figure 3: Clay bangle fragments from Ban Lum Khao.

300 (Higham and Thosarat 1998). It is a mounded site surrounded by a series of moats. Excavations in 1997 and 1998 identified 127 grave cuts, of which 120 were associated with human remains.

Just five fragments of clay bangle were recovered at Noen U-Loke (Figure 4). All have rounded rectangular cross-sections with one forming a narrow band, while the remainder would have projected from the wrist when worn. None have any decoration. Inner diameter was estimated for just three fragments: 35 mm, 45 mm and 50 mm. The average is 43.3 mm.

SO, ARE CERAMIC BANGLES *ACTUALLY* BANGLES?

As already noted, even the title of this paper assumes we know how these artefacts were used. Yet, it is always useful to re-examine our assumptions. Not all archaeologists are convinced of our interpretation and alternative explanations have been discussed in the field. The two main alternatives are that these artefacts were *pot handles* or some form of *pot stand*. The first is fairly easily dispensed with, because no pottery vessels with handles have been recovered at any of the sites considered here. It seems unlikely that the only evidence we would have of putative handled pots would be the disassociated fragments of their handles.

An explanation of this artefact type functioning as pot stands is more difficult to discount without *in situ* evidence. Many prehistoric pots have round bottoms with no legs or applied bases to help them stand upright, so an annular "stand" could be of some use. However, similar round-bottomed earthenware vessels are still made in Thailand and stands are not used to provide stability. Instead, these vessels are often rested on hollowed wooden stumps, although sometimes a coil of clay is applied to the stumps for added support (Figure 5). Villagers also commonly store round-bottomed vessels directly on the ground.

Looking more closely at the artefacts in question we see that average internal diameters range between 43 mm and 56 mm. This range agrees well with the internal diameters of bangles of other materials found at the same sites (Table 1). Indeed, if we discount samples representing less than five measured artefacts, we see that average internal diameters of clay, stone and shell bangles at all six sites fall within the narrow range of 45.4 to 59.1 mm. The clay bangle diameters (excluding Noen U-Loke, for which just three measurements are recorded) occupy the comfortable centre ground between 51.8 and 55.5 mm.

Figures 6 to 9 present histograms for ranges and distributions of measured diameters, grouped into 2 mm categories. Figure 6 represents the total sample, including clay, stone and shell bangles; note the clear concentration between about 52 and 65 mm. There also appears to be a second cluster between about 36 and 45 mm.

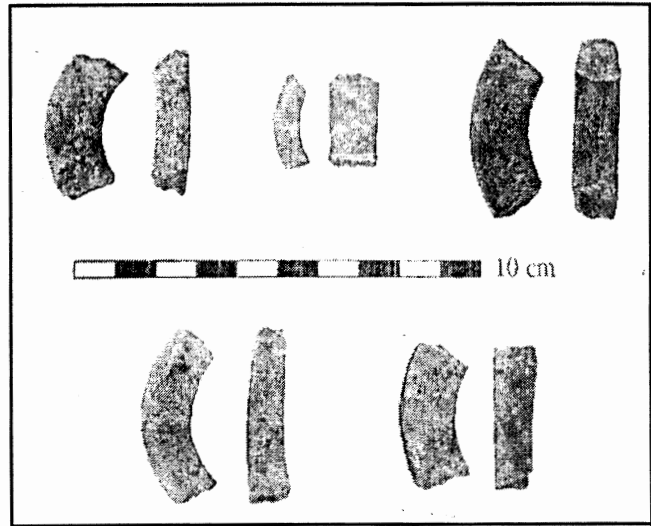


Figure 4: Clay bangle fragments from Noen U-Loke showing both side and inner circumference views.

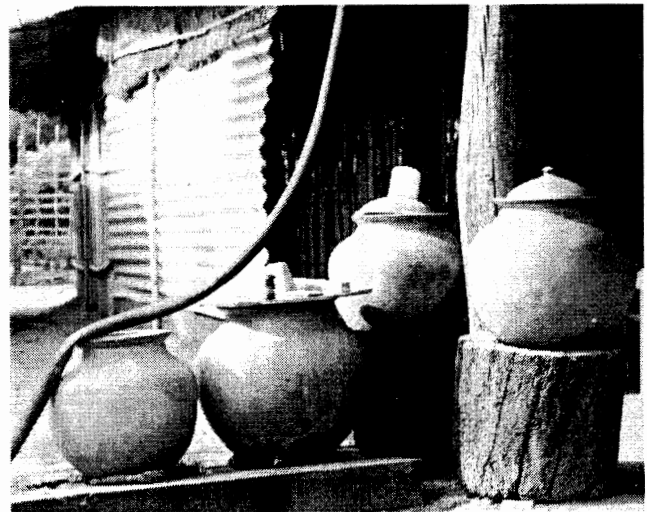


Figure 5: Earthenware vessels with rounded bottoms, in contemporary use.

Table 1: Average inner diameter of clay, stone and shell bangles at sites mentioned in the text

Site	Clay bangles		Stone bangles		Shell bangles	
	Dia.	no.	Dia.	no.	Dia.	no.
Khok Phanom Di	-	-	58.8	109	48.8	20
Nong Nor	-	-		29	57.9	9
Non Pa Wai	55.5	35	55.6	5	60	2
Non Mak La	52.1	8	49.8	14	47.4	18
Ban Lum Khao	51.8	23	56.7	14	59.1	9
Noen U-Loke	43.3	3	56.5	2	45.4	20

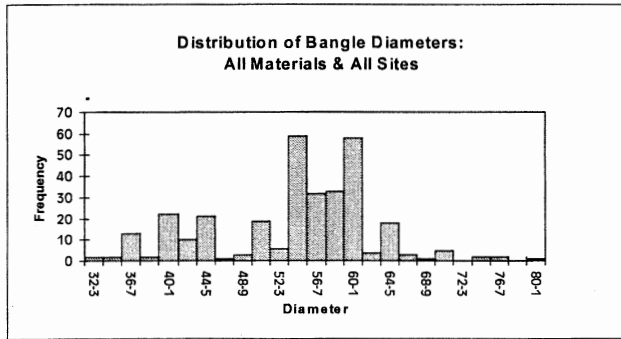


Figure 6: Histogram indicating the distribution of all assessed bangle diameters at the sites of Non Pa Wai, Non Mak La, Ban Lum Khao, Noen U-Loke, Khok Phanom Di and Nong Nor.

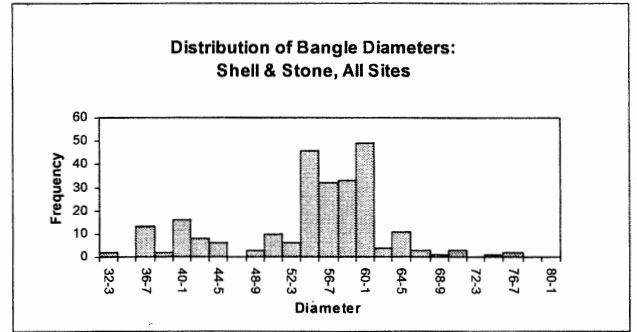


Figure 8: Histogram indicating the distribution of non-ceramic bangle diameters from the sites of Non Pa Wai, Non Mak La, Ban Lum Khao, Noen U-Loke, Khok Phanom Di and Nong Nor.

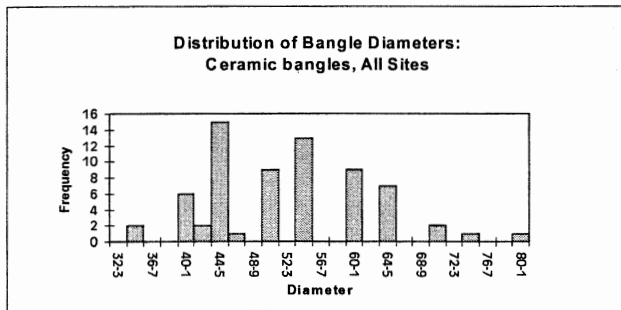


Figure 7: Histogram indicating the distribution of assessed ceramic bangle diameters from Non Pa Wai, Non Mak La, Ban Lum Khao and Noen U-Loke.

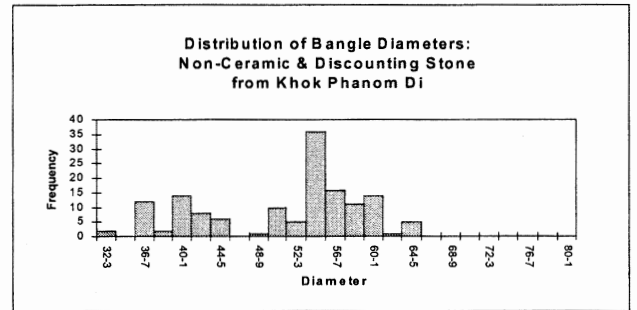


Figure 9: Histogram indicating the distribution of non-ceramic bangle diameters, discounting stone bangles from Khok Phanom Di, from the sites of Non Pa Wai, Non Mak La, Ban Lum Khao, Noen U-Loke, Khok Phanom Di and Nong Nor.

In Figure 7, the ceramic bangles have been disassociated from the larger sample. The complete range of diameters is still covered, but there are gaps and the overall pattern appears distinctly mono-modal, with the greatest concentration being between about 44 and 57 mm. The gaps may be partly due to the measurement strategy used at Non Pa Wai, which tends to produce 5 mm, rather than 2 mm, grouping intervals.

The comparison between Figures 7 and 8 is intriguing. In the latter, only stone and shell bangles are represented and a bi-modal distribution begins to emerge. As with Figure 6, the lower cluster resides between 36 and 45 mm, but the upper group is more tightly clustered between 54 and 61 mm. If we go one step further and remove the Khok Phanom Di stone bangles, as in Figure 9, the bi-modal distribution is further emphasized, with a distinct spike at 54-55 mm.

Clearly then, there are some differences in the distribution of diameters between ceramic bangles and those made of shell and stone. However, the total ranges of diameters are similar and it may be that the more regular distribution of ceramic bangles is a function of the plastic nature of the medium, rather than anything to do with different uses.

We can further support our claim that these artefacts are bangles by considering form as well as dimension. While many have nondescript cross-sections, several reproduce the classic T-shaped cross-section found among bangles in a wide variety of materials in prehistoric Thailand (Figure 10). The distinctive star-shape is also reproduced at Non Pa Wai and Non Mak La. Finally, decoration such as fingernail impressions, patterns made by pinching the soft clay around the outer edge prior to firing, and application of slips or evidence of burnishing, all reveal attention to detail consistent with use as personal ornaments.

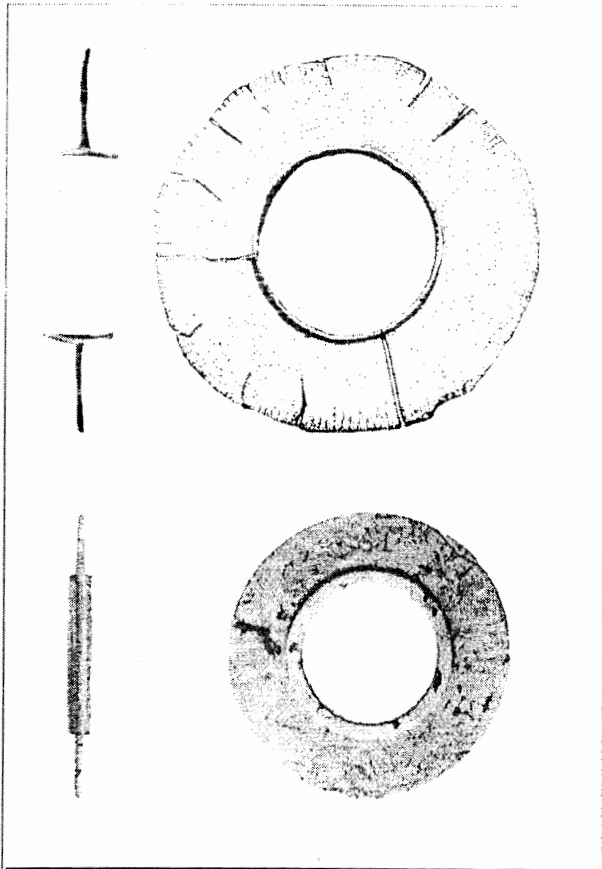


Figure 10: T-sectioned bangles. Top: Nong Nor bronze bangle (radial width c. 36mm); bottom: Ban Lum Khao stone bangle (diameter 112.2mm).

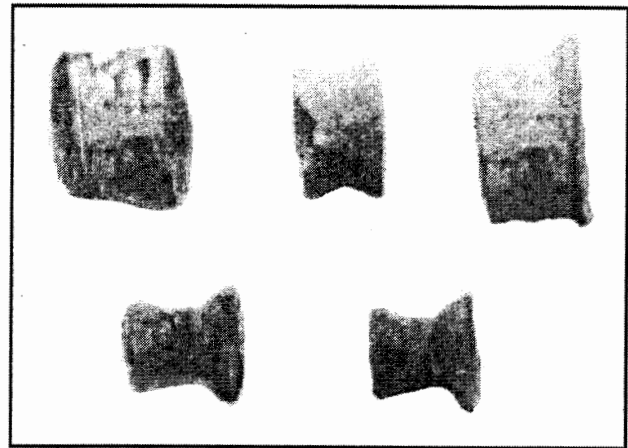


Figure 11: Clay earplugs from Non Mak La. The T-shaped example, bottom left, is 14.3mm long.

Finally, one may question whether clay is a suitable material for personal ornaments at all? This question is easily addressed by considering artefacts such as beads and ear ornaments. Clay beads are rare, but several examples from Non Pa Wai closely resemble simple barrel beads. More dramatic is the variety of ceramic earplugs recovered from Nok Mak La (Figure 11). These would have been worn by insertion through a large perforation in a stretched earlobe, rather than as pendants suspended from the ear. The forms include T-shaped earplugs, waisted earplugs, tabular (possible) earplugs and earspools (Chang 2001:280). Of these, the T-shaped earplugs are perhaps the most refined, being often burnished and well fired. One example is described from Non Pa Wai and several have turned up at the nearby site of Ban Tha Kae excavated by Roberto Ciarla and Surapol Natapintu (Ciarla 1992).

The point of this discussion is that clay was seen as a suitable material for making undisputed personal ornaments, both in the Bronze Age and ensuing Iron Age. Further, at least some ceramic ornaments have been found in unam-

biguous relation to skeletons, within graves or other mortuary contexts. They were clearly worn as personal ornaments and were considered appropriate items for inclusion in the mortuary ritual. If we accept that our ceramic bangles were indeed bangles, as is suggested by the above discussion, then why were they not also considered appropriate grave goods?

WHO WORE CERAMIC BANGLES – WHY AND WHEN?

We will begin this section with questions of who used the clay bangles, and why. While many answers could be advanced, we will consider here the three explanations we consider most likely. Firstly, fired clay bangles could have been made for (and perhaps by) children. Secondly, they were cheap items worn by those without access to more valuable materials. Thirdly, they were cheap everyday versions of more expensive items – the latter being reserved for ritual use – but both “cheap” and “expensive” items were owned and worn by the same people.

If we return to Figure 7, we see that while the distribution of clay bangle diameters is wide, it is perhaps skewed towards the smaller end of the scale. This can be compared with Figures 8 and 9 where the bimodal distribution of non-ceramic bangle diameters may indicate distinct adult- and child-sized artefacts. The largest spike in the ceramic bangle histogram (Figure 7) is within the range of the smaller group of non-ceramic bangles.

It may be, that children wore many of these ceramic bangles. However, we are still left wondering why they were never included as grave goods. Similarly, we encounter the same problem when we turn to our second explanation. Even if a hierarchy was operating and some people were denied access to other materials, surely at least some of those same

people would have been interred with their ceramic bangles, rather than with nothing at all?

Our third explanation, that ceramic bangles were everyday objects that stood in for more expensive items, seems to have some logical support. It may be that these artefacts were more commonly worn by children, or others of lesser status, but the clear implication is that when it came to rituals associated with death, ceramic bangles just did not make the grade, no matter who you were.

Why is this important? We noted at the beginning of this paper that investigations of Thailand prehistory have often concentrated on cemetery sites and their value for reconstructing the structure of the living society. A question that is often raised, at least in informal discussion, is whether or not grave goods were specific ritual objects (e.g., Vincent 1987) with conscious symbolic values and meanings. Or, were they simply objects used more prosaically in life and thought to be comfortable and appropriate accompaniments in death? We believe that our observations on the distribution of clay bangles support the first of these observations.

If grave goods can be shown to have been dedicated ritual objects then we can perhaps be more confident in our interpretations of social organization and structure when they are based on cemetery data. Such conclusions need to be explored further, and we hope to do so in future research.

WHEN?

In looking more closely at the distribution of ceramic bangles it becomes apparent that they are most closely associated with Bronze Age deposits. This is certainly the case at Non Mak La, Non Pa Wai and Ban Lum Khao. Noen U-Loke at first appears anomalous, until one considers that earlier excavations at the site encountered Bronze Age deposits underlying the Iron Age layers (Wichikana 1991), and that the few fragments of ceramic bangles recovered during the Origins of Angkor Project were found in the very lowest levels. Thus, they belong to the Bronze Age phase at the site. Recent excavations at the neighbouring site of Ban Non Wat are also informative. Analysis is barely underway, but Chetwin (pers. comm. 2002), drawing from the current database, notes that clay bangles were almost exclusively found in the Bronze Aged deposits, with just a single fragment from Layer 3 which represents the interface between the Bronze and Iron Ages.

Nong Nor also appears anomalous as no ceramic bangles were discovered from the Bronze Age cemetery. However, if we consider that the graves were dug into earlier Neolithic deposits, with little, if any, of the Bronze Age occupation deposit encountered, then the result is not surprising. Given their distribution at other sites, we would not expect to find ceramic bangles in Bronze Age graves at Nong Nor.

If ceramic bangles are Bronze Age phenomena then we are led to a further question. Are other materials similarly distributed during the Neolithic and Iron Age? First, we will consider Neolithic Khok Phanom Di, as reported by Pilditch (1993). At this site, bangles were made of *Tridacna* and *Conus* shell, various types of stone including slate, slaty shale, andesite, volcanic sandstone and marble, ivory and fish vertebrae. Of these, only shell and fish vertebrae were found in burials, the latter being found only with infants and small children.

On the other hand, of 115 stone bangle fragments, none were found in mortuary contexts. While these artefacts are concentrated in the upper layers, from which burials were not recovered, some were also found amongst occupation deposits surrounding the later mortuary deposits. Ivory bangles have a similar distribution. Clearly, these artefacts were not considered appropriate grave goods.

Turning to the site of Noen U-Loke we find bangles made of shell (almost exclusively *Tridacna*), ivory, slate, clay, bronze and iron. Only the metal bangles were regularly found in burials. Of the other materials, we have already noted that ceramic bangles occur in the very lowest layers and probably date to the Bronze Age. The same can be inferred for the slate bangles. Ivory and shell are slightly more widely distributed between lower Layers 4 and 6 (the base of the site), and so are potentially more interesting. However, it is hard to argue that the shell bangles are anything more than detritus from an earlier Bronze Age occupation.

SUMMARY AND CONCLUSIONS

In our introduction, four main questions were posed. While we have not comprehensively answered each of these we hope to have indicated directions for future research. Taking each question in turn:

We hope to have demonstrated that these earthenware artefacts were most likely worn as bangles and that the appellation "ceramic bangle" is both justified and descriptive.

We believe that their distribution indicates that some personal ornaments were reserved for mortuary and probably other ritual purposes, while some items, such as ceramic bangles, were everyday items. This distinction implies that grave goods had very specific and deliberate symbolic values, the better appreciation of which will help us in interpreting past social structures from cemetery data.

On a more practical level, ceramic bangles seem to be predominantly a Bronze Age phenomenon in Thai prehistory.

CHANG AND VOELKER: CERAMIC BANGLES AS EVERYDAY PERSONAL ORNAMENTS

Stone bangles at Khok Phanom Di may have served a similar everyday function in Neolithic society. The situation during the Iron Age is far less clear.

This last point may have further implication for our understanding of the differences between Bronze and Iron Age social organisation in prehistoric Thailand. This is a subject beyond the present discussion, but is something we hope to return to in future research.

ACKNOWLEDGEMENTS

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REFERENCES

- Chang, N.J. 2001. Personal Ornaments in Thai Prehistory: Nong Nor, Ban Lum Khao and Noen-U-Loke. PhD dissertation, University of Otago, Dunedin.
- Ciarla, R. 1992. The Thai-Italian Lopburi regional archaeological project: preliminary results. In Ian Glover (ed.), *Southeast Asian Archaeology 1990, Proceedings of the Third Conference of the European Association of Southeast Asian Archaeologists*, pp. 111-28. Hull: Centre for Southeast Asian Studies, University of Hull.
- Domett, K.M. 2001. Health in Late Prehistoric Thailand. Oxford: *BAR International Series* 946.
- Higham, C.F.W. and R. Thosarat. 1998. *Prehistoric Thailand: from Early Settlement to Sukhothai*. London: Thames and Hudson Ltd.
- Kenoyer, J.M. 1991. Ornament styles of the Indus Valley, Harappa, Pakistan. *Paléorient* 17/2:79:98.
- Natapintu, S. 1988 Current research on ancient copper-base metallurgy in Thailand. In P. Charoenwongsa and B. Bronson (eds), *Prehistoric Studies: The Stone Age and Metal Ages in Thailand*, pp. 107-24. Bangkok: Thai Antiquity Working Group.
- Natapintu, S. 1991. Archaeometallurgical studies in the Khao Wong Prachan Valley, central Thailand. *BIPPA* 11:153-8.
- Pigott, V.C., A.D. Weiss and S. Natapintu. 1997. The archaeology of copper production: excavations in the Khao Wong Prachan valley, central Thailand. In R. Ciarla and F. Rispoli (eds), *South-East Asian Archaeology 1992: Proceedings of the Fourth International Conference of the European Association of South-East Asian Archaeologists*, pp. 119-58. Roma: Istituto Italiano Per L'Africa E L'Oriente.
- Pilditch, J.S. 1986. The Ban Na Di Jewellery: a typological and comparative study. MA dissertation, University of Otago, Dunedin.
- Pilditch, J. 1993. The personal ornaments. In C.F.W. Higham and R. Thosarat (eds), *The Excavation of Khok Phanom Di: A Prehistoric Site in Central Thailand. Volume 3 The Material Culture (Part I)*, pp. 119-76. London: The Society of Antiquaries of London, *Research Report* No. 50.
- Voelker, J. 2002. Ceramic Production in Northeast Thailand: 1500 BC-AD 500. PhD dissertation, State University of New York at Buffalo.
- Vincent, B. 1987. The ceramics. In C.F.W. Higham, B. Maloney, R. Bannanurag and B.A. Vincent (eds), *Khok Phanom Di: Results of the 1984-5 Season*. *BIPPA* 7:148-78.
- Wichakana, M. 1991. Prehistoric sacrifices at Noen-U-Loke. *Muang Boran* 16:69-79 (in Thai).