



Mortuary rituals and social change from the Neolithic to the Iron Age in Thailand

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Abstract

Disposal of the dead reflects decisions on many levels made by the living. Extensive area excavations in key sites located in Central and Northeast Thailand now present sufficient evidence for an assessment of social change over a period of ca. 3000 years, that began with late hunter-gatherers and continuing through the arrival of the first farming communities, their adoption of bronze metallurgy, to be succeeded by the Iron Age and its transition into early states. Throughout this ca 150 generational sequence, the men, women, infants and children were interred within settlements, usually in individual graves and associated with a range of mortuary offerings. These could be utilitarian, symbolic or exotica perceived as having intrinsic value. Dispersed, nucleated, and agglomerated burial patterns have all been identified, as well as graves within domestic houses. These patterns changed over time, but never indicated unidirectional progress towards increasing social complexity. By relating the pulses of change to the advent of new materials such as bronze and new climatic conditions, the evidence now suggests that the more nucleated the burials, the more likely they were to involve social aggrandizers. The most recent of these developed into the highly-ranked early states of Dvaravati and Chenla, where the aggrandizers were named and their actions recorded.

Keywords Human burials · Social change · Southeast Asia · Burial rituals

1 Introduction

Extensive excavations in Northeast and Central Thailand have generated a record of how the dead were interred over a period of about three millennia, presenting thereby a window onto the wider process of social change. This period began with late hunter gatherers, whose ancestors had migrated into Southeast Asia at least 60,000 years ago (Freidline et al. 2023). From about 2500 BC, the cultural sequence underwent a seminal change when the first farming communities penetrated from the north along the coast and by the main rivers, bringing with them domestic rice, millet, cattle, pigs and dogs. I discuss below two sites occupied by early rice farmers. Khok Phanom Di (KPD) was strategically located on the estuary of the Bang Pakong River in Central Thailand, and Ban Non Wat (BNW) was situated in the Upper Mun Valley (Fig. 1).

Ban Non Wat is one of the key sites in later Thai prehistory, located in the upper reaches of the Mun River. About 1100–1000 BC, knowledge of casting copper and its alloys infiltrated into Southeast Asia along long-established exchange routes. Three mining and casting sites have been examined, one in the Khao Wong Prachan Valley in Lopburi, the second on the right bank of the Mekong at Phu Lon and a third at Vilabouly in the uplands of Laos. The expertise to mine, smelt and cast copper-base tools and ornaments has been traced progressively southward from northern China by several routes. One of these came through Sichuan and Yunnan, others probably by following the Mekong and Red rivers. New radiocarbon determinations chart a steady progress of the vital skills, with southern Chinese sites being a century or two earlier than those in Thailand itself. I will later describe Bronze Age mortuary practices for two sites: BNW and nearby Ban Lum Khao (BLK).

Southeast Asia underwent a third significant transition when a maritime exchange routes linking the region with South Asia and China developed from the fifth century BC. This was probably the source of knowledge of iron smelting as well as the importation of exotic stone and glass

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Fig. 1 Map showing the location of the sites mentioned in the text. 1. Khok Phanom Di, 2. Ban Non Wat, 3. Noen U-Loke, 4. Non Ban Jak, 5. Ban Lum Khao. Figure by C.F.W. Higham courtesy GeoMapApp (www.geomapapp.org), CC by Ryan et al. (2009)

ornaments, and subsequently the establishment of Buddhism and Hinduism. This in turn led to the establishment of port trading centres, such as Khao Sam Kaeo (Bellina 2017). Unfortunately, no cemetery has yet been identified in any

port centre. The full impact of the Maritime Silk Road was dulled but still penetrated the interior, where we will examine three Iron Age settlements: Noen U-Loke (NUL), BNW and Non Ban Jak (NBJ).

This paper offers a further evaluation of mortuary practices during later prehistory in Southeast Asia (Higham 2016) and turns specifically to the relationship between the structure of cemeteries and the underlying social order (Higham 2021). Among its premises, is that the deployment of exotic valuables in mortuary rituals reflects both the status of the deceased and projection of social prestige by living relatives. As D’Errico and Vanhaeren (2016:49) note, “The ostentatious wearing of ornaments made up of numerous exotic objects obtained by exchange often characterises individuals as belonging to a dominant social group”. In the case of the sites discussed below, these involved a succession of ornaments crafted from exotic substances. They began with items made from marine shell, bronze and marble, succeeded by those made of carnelian, agate, glass, gold and silver. It is also necessary to consider the quantity of mortuary offerings that included artefacts locally made, such as ceramic vessels and iron tools or weapons. Many of the artefacts in question could also had a spiritual or symbolic significance, for example cowries, bivalve shells, red ochre, eggs and painted scenes. It is also relevant to consider the size of a grave and how the corpse was interred as for example, being contained in a wooden or clay coffin, or within the confines of a domestic residence as indicators of wealth and status.

2 The late hunter-gatherers

There are no known large hunter-gatherer sites incorporating a cemetery in the study area, unlike settlements like Con Co Ngua in northern Vietnam and others to the north in Guangxi, (Oxenham et al. 2018). One recurrent feature of these burials is interment in a flexed posture, with few if any mortuary offerings, and no evidence for social distinctions between either individuals or groups. At BNW, however, 14 flexed burials were uncovered at the start of a long cultural sequence, dating to the early second millennium BC (Higham and Kijngam 2010). They were individually scattered across the excavated area, although one couple were interred together and one woman held an infant in her arms. Mortuary offerings included shell beads of a form not found in any known farmer context, bivalve shells widely seen as fertility symbols, a pottery vessel quite distinct from the Neolithic repertoire and a polished stone adze. One woman held a pig’s skull (Fig. 2). Placing a bivalve shell with the dead was widespread across Southeast Asia from the first farmers onward, and since these graves are contemporary with the first Neolithic settlement of this and other sites, it seems likely that these putative late hunter gatherers co-existed with and integrated with the first farmers.



Fig. 2 A flexed burial of a probable hunter-gatherer woman, holding a pig’s skull, from Ban Non Wat

3 The Neolithic

3.1 Khok Phanom Di

KPD was occupied by a community of rice farmers for about six centuries from ca. 2300 BC (Higham and Higham 2022). Being located on an estuary, the brackish marine environment was not conducive to rice cultivation apart from a brief interlude when the sea level fell (Higham and Thosarat 2004). However, the estuary afforded access to coastal and inland exchange routes and abundant food as seen in the shellfish, crabs and fish remains in the site middens. The cultural sequence included seven mortuary phases (MP). The first of these involved just six settlers whose graves were dispersed with very few offerings across the excavated area. The next three mortuary phases present a sequence of tightly-nucleated clusters of graves on a chequer-board pattern, with spaces between (Fig. 3).

Since the diet incorporated liberal quantities of shellfish, detritus accumulated rapidly, such that the dead during MP 2–4 were buried directly over the ancestors for a period of about 10–12 generations. Despite several attempts, only

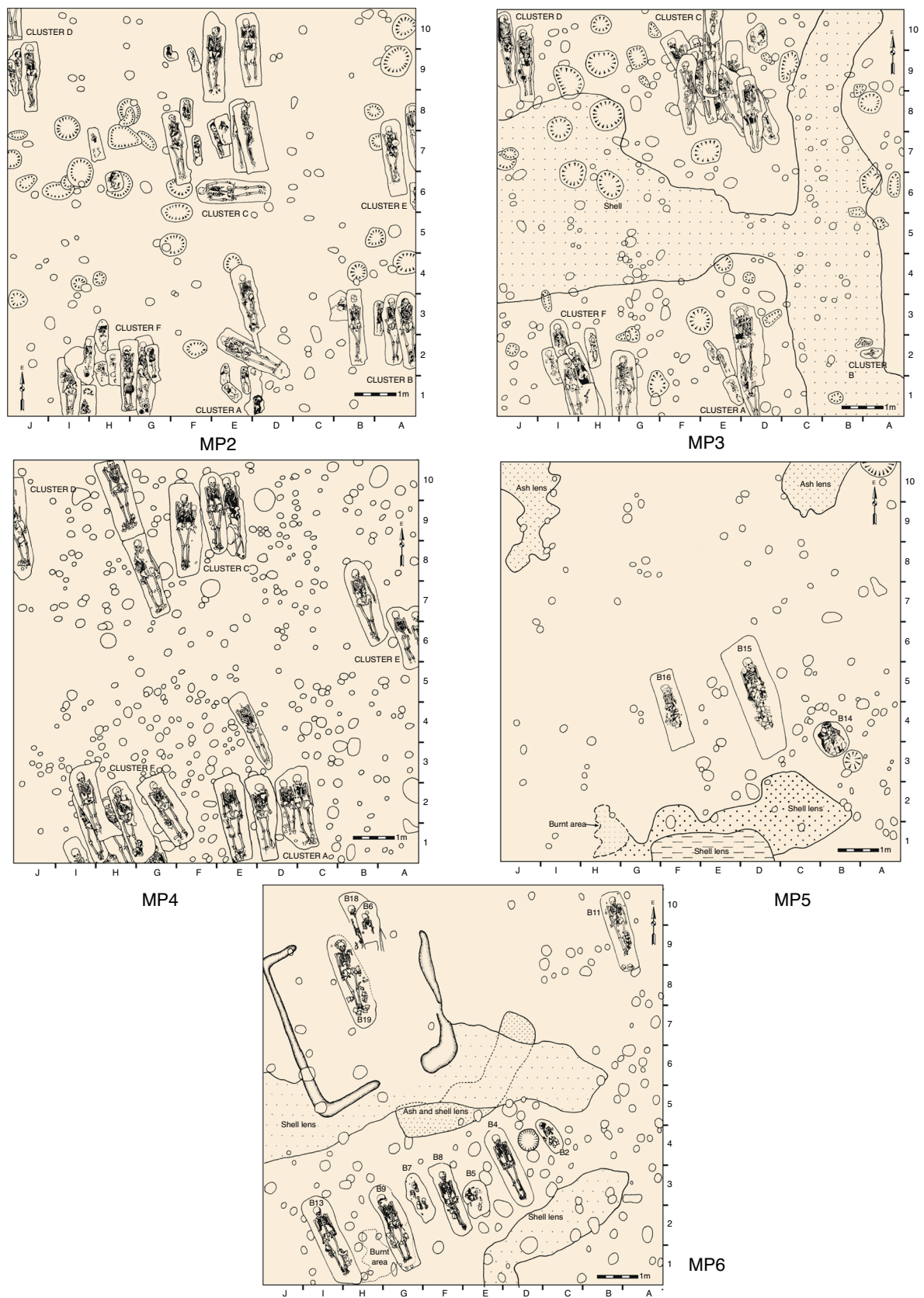


Fig. 3 The cemetery plans for mortuary phases 2–6 at Neolithic Khok Phanom Di, ca. 2200–1700 BC

one individual from this site has yielded DNA, so that the relationships between those interred in any given cluster, or across the site as a whole, have not been open to evaluation. However, genetically-determined abnormalities of the teeth have been identified. For example, the presence of a precondylar tubercle is found in the female founder of cluster C, and recurs in women of the 4th, 5th and 10th and two men of the 5th and 6th generation of her putative descendants (Tayles 1999). Yet no such condition was found in any member of cluster F. Two other such abnormalities, the posterior ethmoid foramen and the highest nuchal line also predominate in cluster C. The conclusion from several similar investigations is that these clusters comprise predominantly female individuals related by descent rather than marriage.

During MP2-4, the dead were accompanied by mortuary offerings that include finely-made pottery vessels decorated with incised and impressed designs. There were also shell beads in various designs, the most found in any burial being worn with a man, who wore about 39,000. Fish vertebrae were converted into bangles, red ochre was regularly applied to the corpse, and several individuals were accompanied by the pebbles used to polish and burnish pots before firing. By ascribing a point score to the number of artefacts with each individual, one can judge social wealth over time and between clusters. We find that some individuals were singled out as being particularly well endowed with offerings, but that the degree of opulence fluctuated over time between the clusters. This hints that individual attainment, perhaps in exchange ventures or the manufacture of pottery vessels, characterised the three or so centuries in question.

During later MP3 and MP4, the associated biological remains provide evidence for a retreating sea level, resulting in the formation of freshwater conditions conducive to the cultivation of rice. The dead continued to be interred in groups. Shell harvesting knives and granite hoes accompanied this change. During MP5, the sea level advanced, so that local rice farming became marginal and there was a reversal to a diet heavily based on marine resources. This was also accompanied by a dramatic change in the cluster/chequer board pattern of burials. Centrally placed in the excavated area lay a phenomenally wealthy woman, aged about 35 when she died. She lay in a far bigger grave than her ancestors, placed under a pile of cylindrical preforms for fashioning pottery vessels supporting two pots. Her skeleton was blood red from the ochre placed on her body. She wore a shell bangle, shell ear discs, two large shell discs on her chest and 120,787 shell disc beads along with 950 large I-shaped shell beads. This number exceeds by far those encountered with any other prehistoric individual in Southeast Asia. Six more superb pottery vessels lay over the body, possibly made by herself because by her right ankle lay her clay anvil for shaping pots and a shell containing two well-abraded burnishing stones. Adjacent lay a grave

large enough for an adult but containing the skeleton of a child aged about 15 months, also covered in red ochre, with 12,247 disc and 200 I beads, a shell bangle and by the right ankle, a miniature clay anvil (Fig. 4).

Surely her daughter, this infant was learning to make pots even before reaching two years of age. Another infant within two outstanding pots lay on the other side of her grave. Right next to the woman's grave lay a narrow grave containing a headless male with just two pots. This unique conjunction is indeed, highly intriguing. A few metres to the northwest, a man was interred with 56,200 disc and 435 I beads and shell discs. Given the time it takes to manufacture shell beads, and the ethnographic evidence for their association with high status in Melanesia (Goto 1996), it is almost a given that this was an ascendant family group of exceptional status within their community.

During MP6, two groups of graves were identified. The first comprised two women and a child, buried within an unusual raised chamber measuring ca. 4 by 4 m, with wall



Fig. 4 The grave of burial 16 at Khok Phanom Di, an infant who died aged about 15 months, covered in red ochre. The infant wore about 12,000 shell beads and a shell bangle. A miniature clay anvil for shaping clay was found beside the right ankle

foundations and a floor. Both women were accompanied by a clay anvil, and one had two burnishing stones. One woman wore 9969 shell disc beads and 700 of a new form of H bead, the other wore 1600 disc beads. The 9-year-old child had a burnishing stone, 17,786 disc and 656 H shell beads. In front of this structure, an array of post holes are interpreted as the foundations of a mortuary structure that contained a row of eight graves: two men, two women and four infants, two of which died at birth and were probably twins, buried next to each other in the same grave. Both women were potters, but this 2-generation family group, if that be the case, were poor, mustering only 14 shell beads between them (Fig. 5).

There is no Neolithic settlement in Southeast Asia, or indeed southern China, that has provided such a mortuary assemblage. Indeed, in some respects it is unique. A span of 17–20 generations has been suggested, a number which harmonises with the radiocarbon chronology of about six centuries of occupation. The sequence began with a handful of individuals with hardly any grave goods, scattered with no obvious patterning across the excavated area. It then proceeded through three phases of tightly nucleated groups with the occasional rich individual but no convincing evidence of continuous elevated status within or between the nuclei. Then a presumed family of great wealth lived at this site, succeeded by two groups, the one of moderate wealth, the other marked by relative poverty.

3.2 Ban Non Wat

BNW is a moated settlement located in the upper reaches of the Mun River plains of Northeast Thailand. There are two periods of Neolithic burials. In the first, dated between 1650–1250 BC, there are six men, six women, five adults of unknown gender (Higham and Kijngam 2010). Most of the 14 infants were contained within highly decorated lidded

pots. Graves were distributed in the western part of the excavated area, with no nucleation into groups as seen at KPD (Fig. 6).

Nor does any individual attain anything like the wealth of the elites there. There is just one shell bead among the 17 adults, and about 3 to 4 pots per person save for one young female with nine. A young man in burial 86 had an arc of five infant jar burials placed round his head, and wore two cowrie shell ear ornaments. Another man and a woman were interred in huge lidded jars, a very rare finding in the South-east Asian Neolithic (Fig. 7).

The second Neolithic period dates to 1250–1050 BC. There are 12 males, 13 females and 10 infants or children. The pottery vessels are quite different from their predecessors, which might be due to a period of abandonment followed by the arrival of a different population. The graves are scattered across the excavated area, with variable orientations (Fig. 6). In four cases, a man and woman were buried alongside each other. *Prima facie*, it would seem likely that they were affinally related. Just ten shell beads were found with all adults. Apart from a few fish and pig bones, up to four pottery vessels complete the list of offerings (Fig. 8).

A contemporary group of graves has been identified at the nearby site of Ban Lum Khao, with almost identical pottery vessels. Again, the ten graves were distributed with no nucleation save for one instance when a man and a woman were interred alongside each other. One male wore 786 shell beads, and a woman was accompanied by ten pottery vessels. Otherwise there were rare offerings of pig bones, a single bivalve shell, a stone adze and deer's antler.

4 The Bronze Age

4.1 Ban Non Wat

Burial rites over the six centuries of the Bronze Age are documented at BNW (Higham and Kijngam 2012a). The sequence is divided into five Bronze Age periods, BA1–BA5. The first of these involved seven graves dated between ca. 1050–1000 BC and comprising one young male, two young adult females and four infants two of which were either neonate or pre-term (Fig. 9). Despite the small sample size, it is clear that only a small part of the graveyard at this juncture fell within the excavated area, several highly significant changes from the preceding late Neolithic had taken place. However, there was also continuity as seen in the form of the pottery vessels that accompanied the deceased. These were four to 17 in number. For the first time in the sequence, at least four people were buried in wooden coffins within deeply cut graves. Five were also accompanied by copper-base axes, including children aged just two and ten years at death. The two women wore 2382 and 909 shell beads



Fig. 5 A row of mortuary phase 6 graves at Khok Phanom Di, that had been contained within a wooden structure

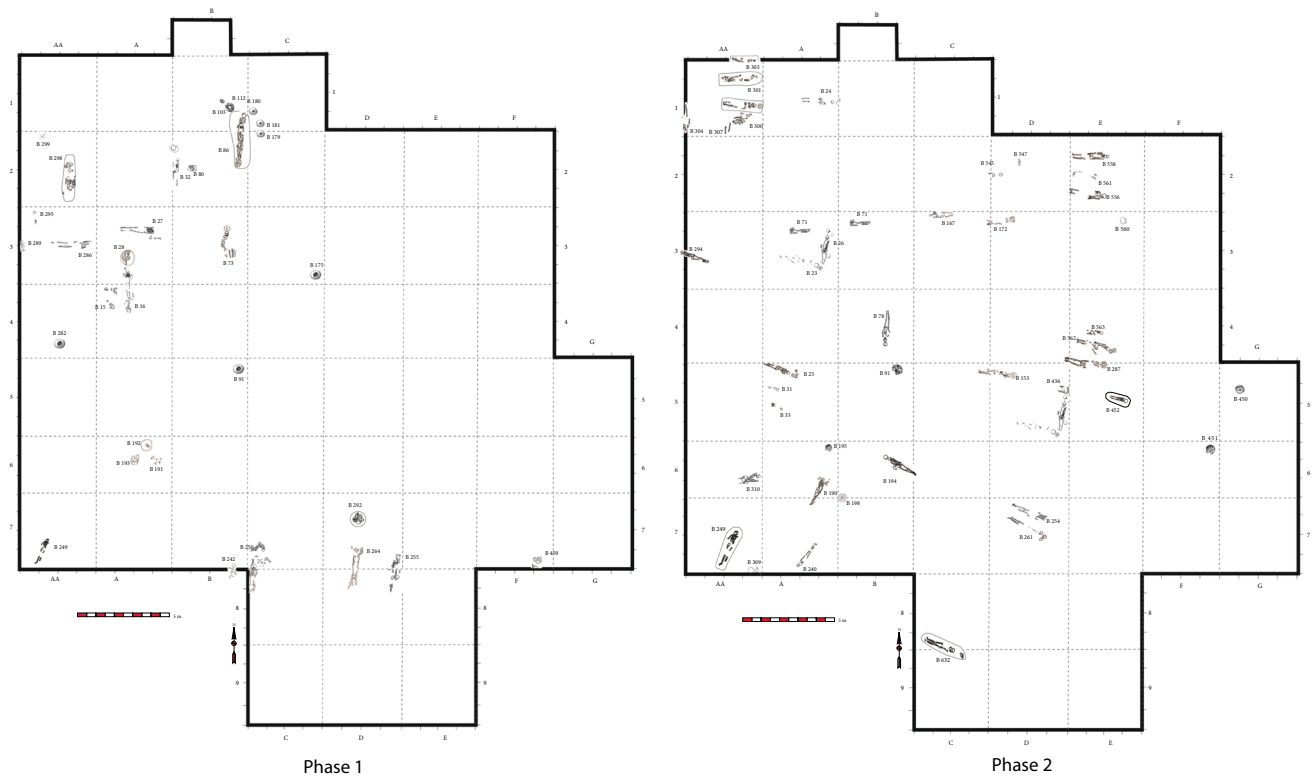


Fig. 6 The cemeteries of Neolithic phases 1 and 2 at Ban Non Wat



Fig. 7 This woman of Neolithic phase 1 at Ban Non Wat was interred in a seated, flexed position within a large, lidded pottery vessel

respectively. A two-year-old wore six exotic marine trochus shell bangles and a copper-base socketed axe lay between the ankles (Fig. 9). Perhaps the most significant change is the fact that the dead were grouped, rather than dispersed.

This brief phase was a prelude to a complete transformation of the burial record. With BA2, which lasted for about century until ca. 900 BC, three groups of burials were laid

out in discrete and isolated rows and one in a nucleated group (Fig. 10).

Each contained men, women and infants who were accompanied in death by a quantity and quality of mortuary offerings unparalleled in any corresponding early Bronze Age context in Southeast Asia. The range of pottery vessels expanded dramatically and the red-painted decoration on many of them was of the highest craft quality. Yet not one person was buried with the tools for their manufacture. There are several key facts about this assemblage. Men, women and infants wore clothing embellished with up to tens of thousands of shell beads. There were also numerous exotic marine shell bangles and earrings, and some of exotic marble. They were often associated with copper-base socketed axes, and occasionally anklets, bells, chisels and awls. Some had been disinterred from the grave, and the bones later replaced. Graves were now very large and the dead lay in wooden coffins. Infants were placed into graves far larger than the body, to accommodate the numerous pottery vessels that were placed therein.

A handful of those interred during BA2 were partially disinterred after burial, and the bones then replaced in the grave with evident care: in one instance, the skull was balanced on top of a stack of limb bones facing the rising sun (Fig. 11). This might well reflect the involvement of ancestors in remembrance rituals. The range of many pottery



Fig. 8 Typically, Neolithic phase 2 burials at Ban Non Wat included just a few pottery vessels

forms and incorporation of food remains in the graves also suggests the practice of mortuary feasting.

While it might be argued that these wealthy adults accrued prestige through personal endeavour during their lifespan, the treatment accorded infants at this juncture suggests that status could be inherited. Nearly all infants, rather than being interred in mortuary jars, were laid out supine in graves far larger than was necessary to contain the corpse, in close proximity to adults. The size of the grave was necessary to contain the number of pottery vessels. Thus, burial 293 of BA2 contained a 2–4 year old in a grave measuring 4.2 m (Fig. 12).

This infant was accompanied by 13 pots, nearly 2,000 shell beads and two large tridacna shell bangles. Burial 302, an infant who died aged about 12 months, was associated with 23 pots, seven trochus shell bangles, and wore 1500 shell beads. Two other infants were also interred with a copper-base axe. Where the infant was interred in a lidded pot, the vessels were splendidly decorated with painted designs.

BA3 graves fell into two sub-phases dated between ca. 900–800 BC. BA 3A, the earlier, comprised seven females, five males and one infant. They were laid out in a tight group and were no less wealthy than their predecessors (Fig. 10). Despite the change in the orientation of the graves, continuity is securely demonstrated by the virtually identical ceramic repertoire involving 19 distinct forms, many of which were decorated with red painted designs. One female wore 42,255 shell beads. A man wore 65 trochus shell bangles. One copper-base axe and five anklets were found in these graves (Fig. 13). BA 3B morphed directly to the south with the graves on the same orientation. There were six males, five females, two young adults and seven infants. With one or two exceptions, the mortuary wealth fell sharply. While the pottery forms reveal continuity, there were far fewer of them. One female wore 3941 shell beads, and a man wore 56 trochus shell bangles. There were no bronzes.

BA 4 dates from ca. 800–700 BC. Based on the form of the ceramic vessels, the transition from BA3B into BA4 was seamless. However, the cemetery structure changed. Graves were now orientated with the head to the north-west, and there was no evidence for tight nucleation into distinct groups, although four or five looser groups have been identified (Smith et al. 2015). Instead, the burials were laid out in rows and in many cases, with up to six placed head to toe. Four or five possible groups can be discerned, and when combined, there is a total of 43 males, 46 females and 46 infants or children. Almost all were found intact (Fig. 14).

There was no intercutting of an older grave by a new one, clearly the population knew where their forebears were interred. There was also a remarkable conformity in the range and quantity of mortuary offerings. Thus, in group A the maximum number of pottery vessels with women

Fig. 9 With Bronze Age 1 at Ban Non Wat, the dead were interred with much more ritual attention than during the preceding second Neolithic phase. This infant wore exotic shell bangles. A copper-base axe lay between the ankles, and there were many more pots than hitherto and a layer of shells over the body

was 14. One wore 30 exotic shell bangles, and another, 18. However, in general exotic shell ornaments were rare. The most shell beads with any female in this group was 227. We do find that two women were buried with a spindle whorl, showing that spinning and weaving were undertaken on site. A fragment of copper-base bangle was found in the grave fill and might not have been actually worn by the dead woman. One man in this group was accompanied by 21 pots, and another by 20. The maximum number of shell beads worn by any of the dead was just 79, and one male wore four shell bangles.

This uniformity was found across the entire burial ground, with one remarkable exception. The young male in burial 549 was interred with 29 clay moulds for casting socketed bronze axes and bangles. He was by no means wealthy in terms of other goods, which comprised four shell beads, some red ochre and two pots. A woman in another part of the cemetery was buried with a crucible, another with clay anvil for shaping pottery vessels. Grey clay was found, a substance commonly used as a mordant for dyeing cloth. Bronzes were very rare indeed, two arrowheads being found with one male.

BA5 burials formed a group with the orientation of the bodies as for BA4, to the northwest (Fig. 10). They overlaid the BA4 burials and the ceramic forms had evolved from their predecessors while retaining the cord-marked base and red slipped upper body. There are 15 females, nine males, five other adults and six infants or children. One man was accompanied by 14 pots but the average number for the others was just 4.5. Apart from one bangle, there was no shell jewellery for men. Grey clay was relatively common, there was one clay mould and two copper-base arrowheads. Pots were rare with females, with an average of 2.6. Five of the 14 were accompanied by a spindle whorl, and a mid-adult female wore 295 shell beads.

4.2 Ban Lum Khao

BLK is also located in the upper Mun River valley, and the cultural sequence incorporates a Bronze Age cemetery in which the dead were, again, laid out in rows and head to toe replicating BA4 at BNW (ca. 800–700 BC; Fig. 15). There are the graves of 19 men, 21 women, 3 adults and 44 infants or children (Higham and Thosarat 2004). The range and general quantity of mortuary offerings is also similar. One female was accompanied by 15 pots and another wore 2595 shell beads, no other person had more than 160 beads,



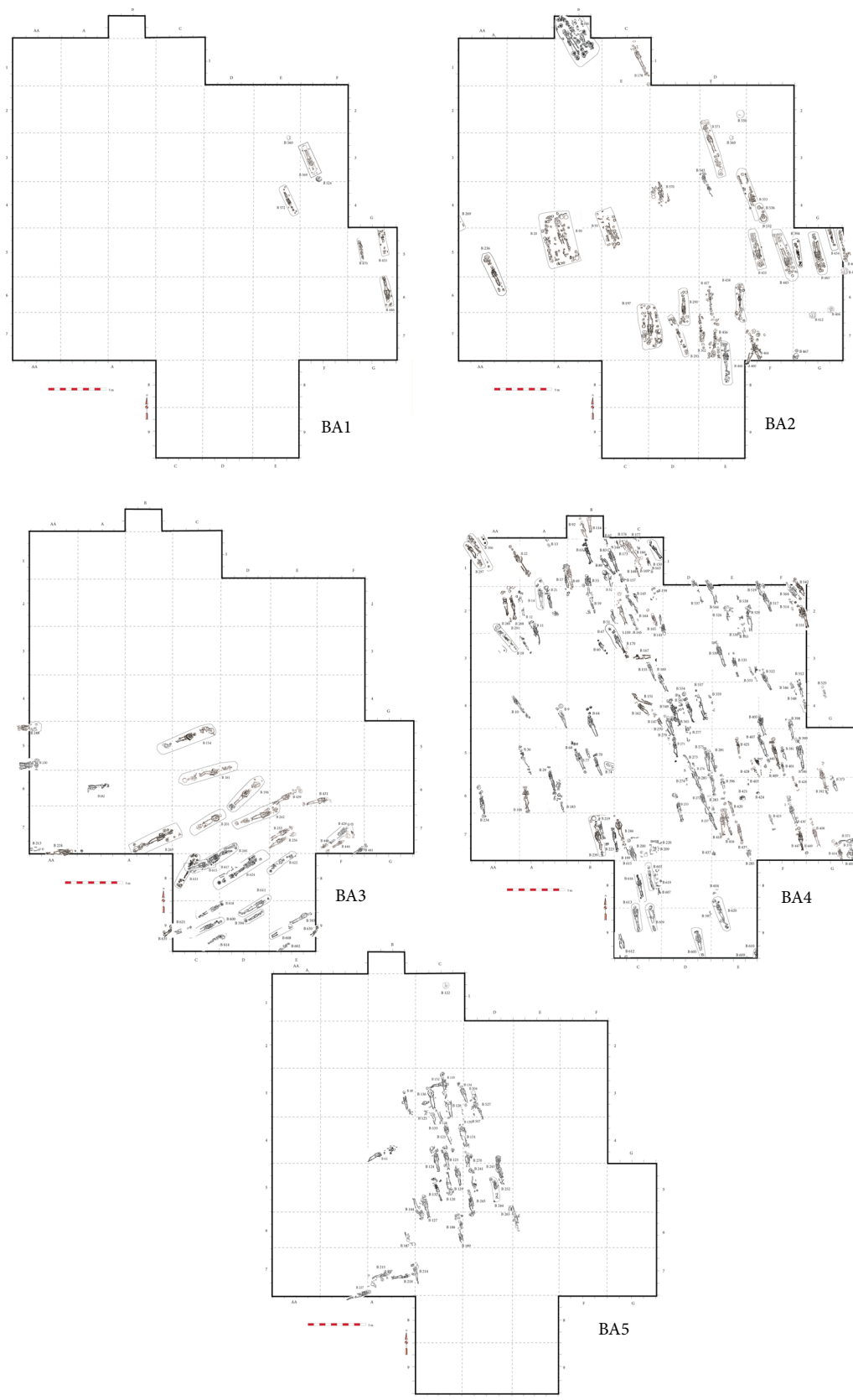


Fig. 10 The layout of the Bronze Age 1–5 cemeteries at Ban Non Wat

Fig. 11 The remains of this young male of Ban Non Wat Bronze Age 2 had been partially disinterred after burial, and the bones were replaced with the skull balanced on top of them looking to the east



and many had none. Sporadically, some were accompanied by clay anvils or burnishing stones, indicating that those interred were potters. No complete copper-base artefacts were found, just a handful of fragments.

5 The Iron Age

5.1 Ban Non Wat

With 133 intact graves, the earliest Iron Age cemetery at BNW is one of the biggest samples for this period in Southeast Asia (Higham and Kijngam 2012b). A vital point about this assemblage, is that the graves are contiguous with those of BA5 (ca. 700–420 BC) at this site as the cemetery expanded to the east. Here, we find the first presence of iron in this region. The graves fall into two distinct groups, one with the head oriented to the north, “the northern group”, the other with the head to the south (Fig. 16).

The former contains 16 male, 18 female, six adult and 24 infants or children. The latter has 17 males, 16 females, nine infants and 17 other adults. Where it is possible to ascertain, bodies were interred in tree trunk coffins. The pottery vessel forms were closely aligned to those of the preceding BA5 repertoire. However, there were developments. With the males of the northern group, we find many fish skeletons in the pots, the occasional water buffalo bone, and chicken bones. Several men were interred with spindle whorls and grey clay. Iron was forged into hoes, knives, spears, bangles and points. Bronzes were markedly more abundant than in

BA 3–5 at this site, and included rings, bangles and one arrowhead. One man wore 27 bronze bangles. It is notable that an agate bead was found, an exotic stone that traditionally signifies contact with South Asia. This is very early. The women of this group had up to 15 pottery vessels, similar whorls and grey clay. One bronze ring was found, along with iron bangles and knife blades. Again, there was an agate bead, and also one of carnelian. Even some infants were interred with grey clay and spindle whorls.

The southern females confirm the rare presence of carnelian and agate beads, and one wore two glass earrings. Up to 12 pots and 11 fish skeletons were also found, along with four iron knives with one female and four bronze bangles with two others. Two men in this group were accompanied by spears with a bronze haft and iron point, another indication that this is a very early Iron Age cemetery. Up to ten pots and 16 fish skeletons were also found with one individual, as well as a bronze bangle and a bronze anklet. One adult wore ten bronze anklets and another, ten iron bangles. One infant wore two hollow bronze anklets filled with clay balls to act as a rattle (Fig. 17).

These graves have been subjected to principal component analyses (Higham and Manly 2007). The conclusion is that the graves formed one compact group, with a handful of outliers irrespective of group affiliation, age or sex. No hint was encountered that there was a distinct nucleus of wealthy individuals that might reflect social distinctions. Indeed, the impression is one of similar status in a community that cultivated rain-fed rice, fished and kept domestic pigs and bovids. There were resident bronze casters, iron smiths, potters and



Fig. 12 This Bronze Age 2 infant was interred in a grave far larger than was necessary to contain the body. It wore marine shell bangles and many shell beads



Fig. 13 Bronze Age 3A adults at Ban Non Wat wore multiple exotic shell and marble bangles. This adult also wore copper-base anklets



Fig. 14 A typical BA4 burial from Ban Non Wat, involved a few pottery vessels, very few exotic ornaments and no bronzes

weavers. Unfortunately, no comparative graves of the later Iron Age were found at BNW; for the sequel, one must turn to NUL, a bigger settlement within five moats and banks just 2 km to the east.

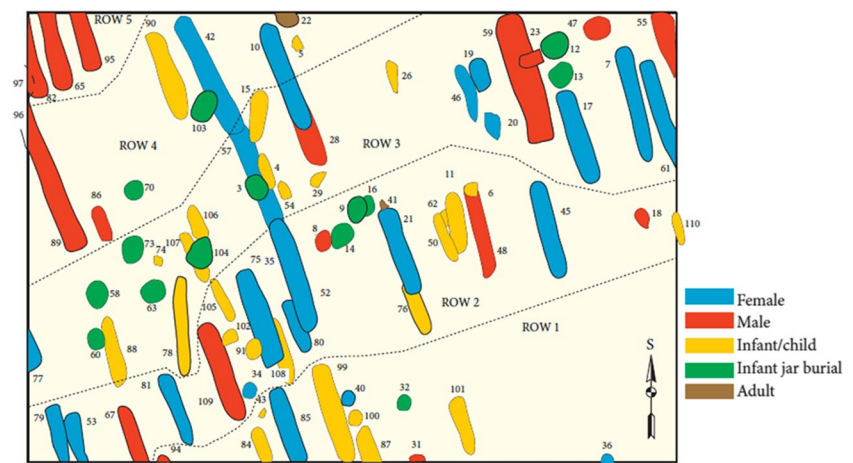
5.2 Noen U-Loke: Iron Age 2–4 (250–600 AD)

There is a fundamental difference between the IA1 cemetery at BNW, and the IA2 burials at NUL as only the latter revealed two tight nuclei (Higham and Thosarat 2007). The first of these comprised two males, two females, a child and an infant interred in a lidded jar, the only ceramic vessel present (Fig. 18).

More graves probably lie in the unexcavated area to the north. These people accounted for nine bronze finger rings, but no iron was found. Two complete young pigs had been placed within graves. The second cluster is complete, with five males, six females, three adults and four infants, a pleasing combination suggestive of people related to each other. They were probably slightly the later group in IA2. There were two layers of graves, suggesting that some of the dead were interred over their immediate ancestors. Again, pigs were placed with the dead but pottery vessels were rare or absent. One significant new feature is that the graves were now filled with rice. Necklaces were made of glass or agate beads and long carnelian beads were also found. Bronze ornaments included bangles, finger and toe rings and a unique spiral placed on the head of a young man. Spindle whorls were commonly interred in graves.

Five tightly nucleated clusters of graves were laid down during IA3, virtually all graves being filled with rice (Fig. 18). Each cluster differs in terms of the quantity of grave goods, but three contain at least one outstandingly wealthy individual. Those graves comprising cluster A were lined and capped with clay, but additions to the burials over time meant that the earlier ones were often disturbed. This cluster includes an outstanding burial 113, of a woman who died in her mid 20s. Only partially located within the excavated area, she wore a necklace of 68 gold and many agate beads. Other grave goods included two agate neck pendants, four finely made thin and burnished pottery vessels, two bronze spirals that would have been set within her ear lobes and at least 38 bronze bangles. There were also 64 bronze and one silver finger ring, and nine bronze and a silver toe ring. Her iron knife bore traces of fabric, perhaps part of clothing or a shroud. While not as rich as this woman, other graves in this cluster were still extremely well endowed with mortuary offerings. This contrasts with cluster B, which is markedly poorer with no clay-lined graves. It is dominated centrally by the burial of a woman who died from mortal head injuries imparted with a weighty and sharp implement. She was buried after being thus killed with four spindle whorls, 11 bronze bangles, and eight key-shaped rings on

Fig. 15 The cemetery layout at Bronze Age Ban Non Wat closely parallels that for BA4 at Ban Lum Khao: Rows and often, graves head to toe



each ear. One agate pendant was found at her neck. Of the 20 burials in this cluster, 14 contained infants or children. Cluster C incorporates rice-filled graves lined and capped with clay. A man in burial 69 stood out for his mortuary wealth that included four bronze belts and at least 125 finger rings. Large bronze discs would have been inserted in his distended ear lobes. He wore at least 36 bronze toe rings and 20 bangles. As with most burials of this phase, fine ceramic vessels had been placed in the grave, along with an iron knife. Burial 86, that of a young man, had been disturbed by later burials, but a complete pot contained a socketed iron ploughshare covered in rice grains. This is a highly significant artefact in determining the origins of more productive and intensive rice cultivation.

Cluster D probably extended beyond the excavated area, but includes the richest of all burials during this phase. Burial 14, a man aged about 35–40, lay in a rice-filled grave under at least eight pottery vessels. His bronzes comprised three belts, 150 bangles, 67 finger rings and four toe rings (Fig. 19). His ear lobes would have been embellished with silver coils covered in gold. Glass beads littered the lower part of the skeleton, and his iron knife covered part of his left arm. A feature of this and other clusters is the wealth of the infants. Burial 13 was found next to this wealthy male grave, the three-month old being interred with two agate pendants, two pottery vessels, bronze rings and bangles and many glass beads.

With IA 4, there was a marked change of emphasis in how the dead were interred. Although on the same orientation, the graves were widely spaced in approximate rows, rather than nucleated. The same variety of mortuary offerings were identified, but in smaller quantities. Burial 1, for example a man who died at the same age as burial 14 and was buried in the same part of the site, was accompanied by three pots and wore 22 bronze bangles, bronze ear coils, and about 60 finger rings. A younger man in burial 5 was buried with two iron sickles and a spear. A second young man lay face down, killed when an arrow pierced his spine. He wore two bronze

bangles, an earring and two finger rings of bronze. But other adults were buried with very few grave goods.

5.3 Non Ban Jak: The late Iron Age

The excavation of this moated site, that lies 8 km west of NUL, revealed occupation dating to IA 4 and extending into the early historic period which encompassed about 16 generations (Higham and Kijngam 2020). There are two mounds, the western and eastern. The pioneer settlers lived in small wattle and daub houses. Residences subsequently were much more substantial, with broad foundations and large posts to support the walls and roof. The burials fall into four phases. On the western mound, the IA phase 4A graves were laid out dispersed and on a west to east orientation (Fig. 20). There are two male and five female adults and 15 foetal, neonate or infant burials. These adults were not well endowed, being associated with no more than two pots apiece, and just 16 bronze bangles worn by one man. No adult wore more than a single finger or two rings, and only a single agate pendant was found, along with one spindle whorl.

The IA4B graves followed those of IA4A in a westerly direction. There were four males, three females and one adult, together with 22 infants. The adults were again, not richly endowed with grave goods. Just 10 bronze bangles with one man and 12 toe rings with another. Iron was also rare: one sickle, two knives and two spears. The same applies to the infants, although one individual wore nine gold beads. There is an IA4B cemetery on the eastern mound. The disposition of graves is unusual, in that there appear to be two groups divided by a ditch flanked on each side by a row of posts (Fig. 21).

On the eastern side, there is one man and a woman, and a cluster of infant graves, and on the western side, three males and a person who died when aged about 16–19 and at least five infants. Indeed, infants comprised an unprecedented proportion of all graves. While not as wealthy as at NUL during the preceding IA3, one older man did wear

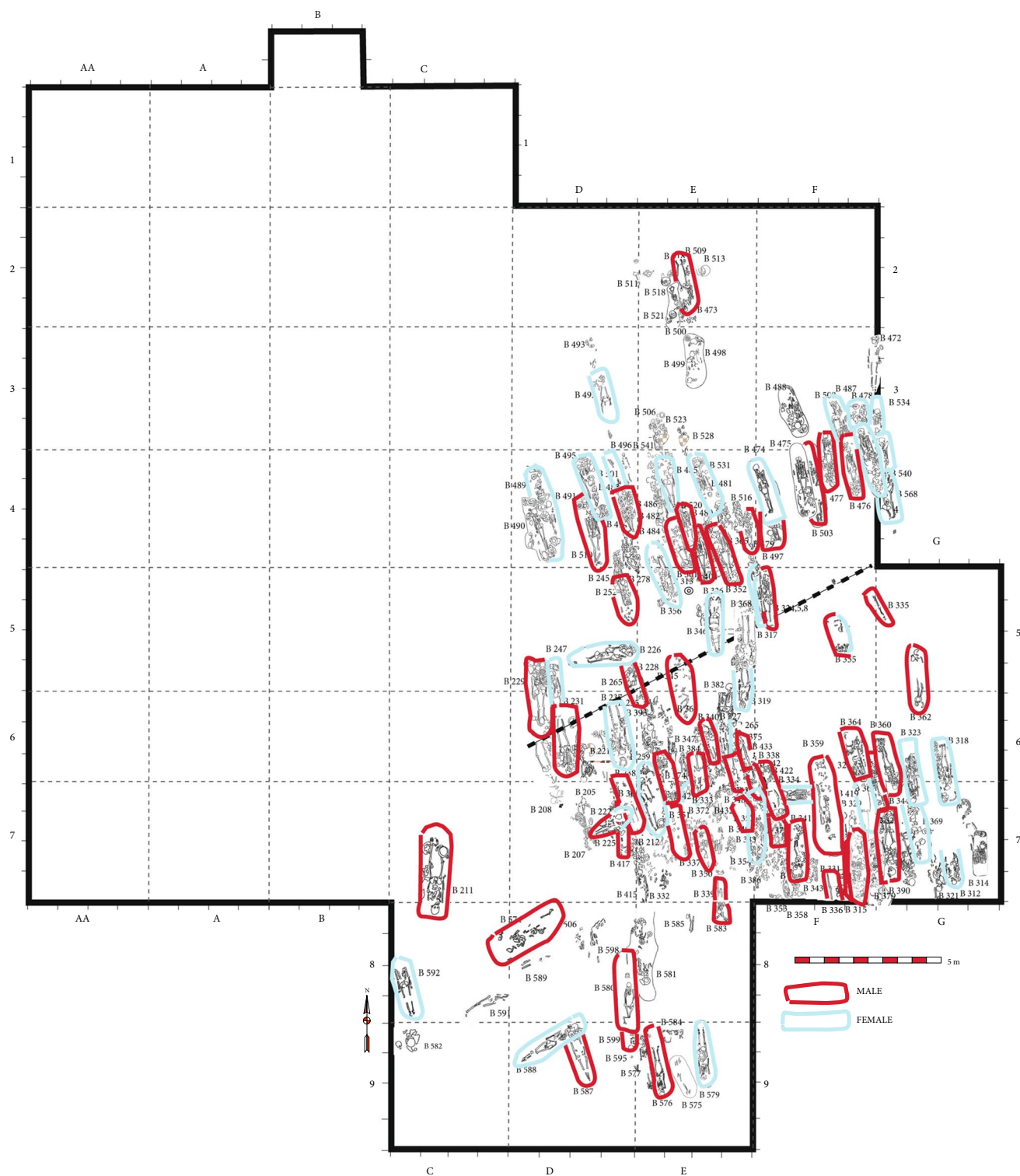


Fig. 16 The plan of the Iron Age 1 cemetery at Ban Non Wat

a bronze belt, along with 14 toe rings, 31 bronze finger rings and one made from silver. A second man was found with a single pot and an iron toe ring.

With IA4C, much more substantial houses were constructed, with broad wall foundations and plastered floors into which the graves were cut (Fig. 22).

Fig. 17 This infant from iron age 1 at Ban Non Wat wore remarkable bronze anklets containing clay balls



This practice of residential burial resulted in a dispersed pattern of graves matching that for the same period at NUL, and it seems likely that a similar residential burial practice took place at both settlements though the house remains at NUL did not survive. This phase in the western square revealed seven male, four female and two other adult graves, together with the graves of 24 infants. The adults were marginally more wealthy than their predecessors: the richest man wore two gold earrings, and his bronzes comprised two earrings, three bangles and 17 rings. Like most other adults in this group he had an iron sickle and knife. A key point about these burials is their interment within the rooms of houses, a situation matched in the smaller contemporary excavated area on the eastern mound (Fig. 23).

The final burial phase on the western mound, IA4D, included four males, three females and an adult, with seven infants. Again, the dead were interred under floors in domestic buildings. Iron sickles and knives were commonly found with adults, along with a spear, chisel, axe and a machete. But the graves were not well endowed with exotic items. One glass bead was found, an agate bead and a pendant and two gold earrings.

6 Discussion

It is most unusual to have access to a prehistoric sequence covering 3,000 years, perhaps 150 human generations, with an unbroken sequence of human burials which can simultaneously be considered in conjunction with changes in the environment, technology, subsistence, production and patterns of trade and exchange (Wohlfarth et al. 2016, Castillo et al. 2018; Pryce and Pigott 2022). Just five sites are under discussion, all of which have been excavated on a sufficient scale to identify the pattern of human burials phase by phase. With the exception of Non Nok Tha, no other sites fulfil this qualification (Bayard and Solheim 2010). One is located on a central exchange node at the estuary of the Bang Pakong River, the others within a chokepoint in the upper reaches of the Mun River. These had access to the exotic bronze, marine shell, marble, hardstone jewellery, glass and iron that travelled a vital exchange route linking the Mun Valley with Central Thailand to the west and the copper mines of Laos to the east, exchange routes now clearly defined and validated by the analyses of the lead isotope signatures in the copper-base artefacts (Pryce and Pigott 2022). This region is rich

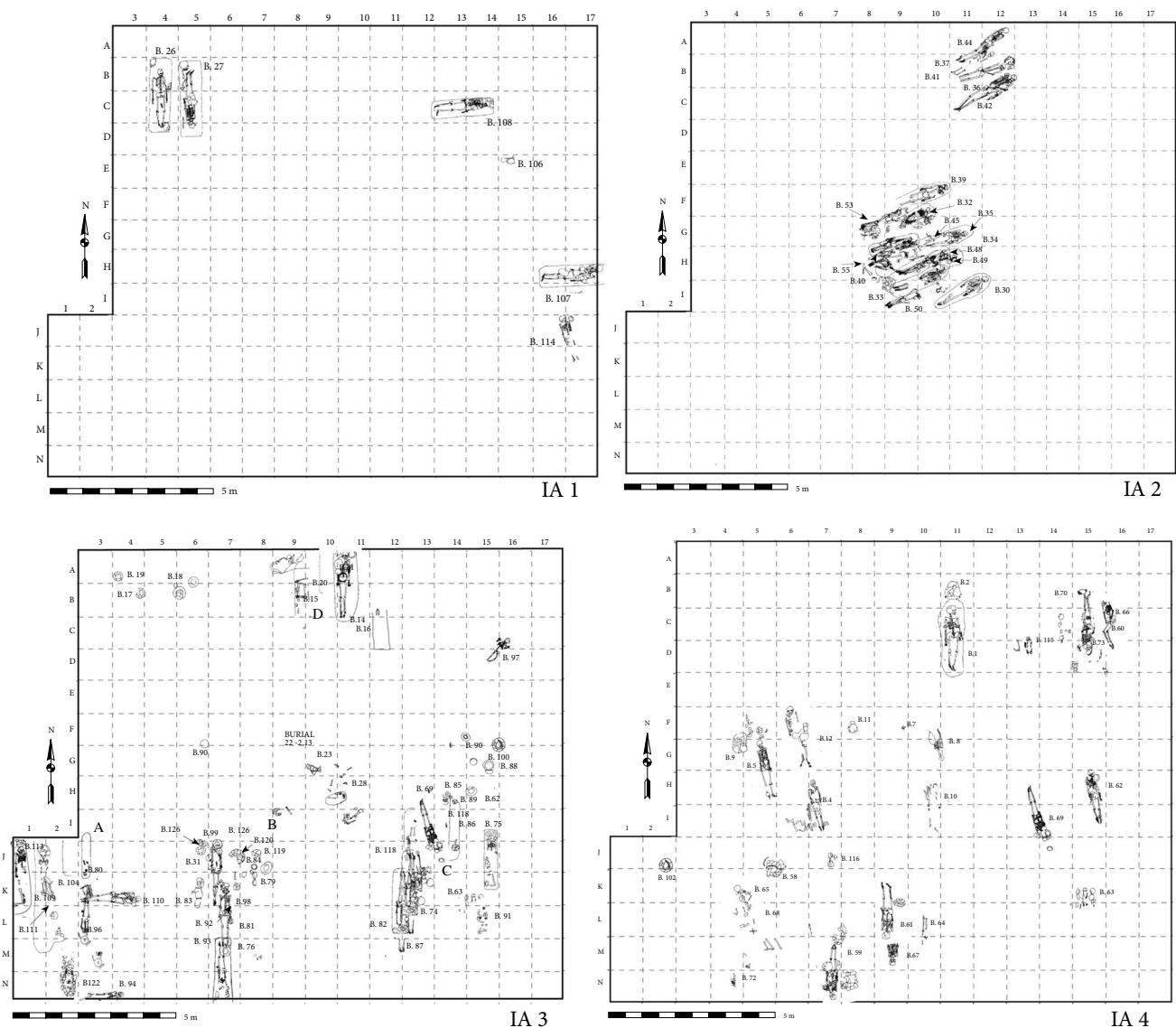


Fig. 18 The plans of the cemetery at Noen U-Loke during Iron Age 1–4

in salt deposits, a strategic concurrence of local resources and exchange routes.

In terms of the analysis of isotopes, the initial finding of ancient DNA and the continuities in the styles of material artefacts, there was long-term cultural continuity in the Northeast Thai sequence (King et al. 2013; McColl et al. 2018). The longevity of the sites in prehistory was very much reliant on the production of rice, and the maintenance of domestic cattle and pigs. There was much hunting and fishing, all of which combined to provide a well-balanced diet. The mortuary record reveals both continuity and change. The dead were consistently interred in supine positions, accompanied by a variety of mortuary offerings. Pottery vessels were placed with the deceased, and their jewellery accompanied them to the grave. Initially this

was made of exotic or locally sourced shell and stone, but over time it came to include bronze, iron, carnelian, agate, glass, bronze, iron, gold and silver. A person's occupation or artisanal skill was indicated by the inclusion of tools: the anvils for shaping pots and stones for burnishing them, the spindle whorls for manufacturing fibres for weaving and the clay to dye cloth. There are bronze founders interred with their moulds and crucibles. Iron hoes, ploughshares and sickles were placed with presumed rice farmers. Some men had their spears, knives and machetes interred with them. Tiger's teeth pendants might indicate a renowned hunter.

There is a consistent indication that the dead remained very much a part of the living community. This is seen in the location of graves within the confines of the settlement. In



Fig. 19 Burial 14 at Noen U-Loke Iron Age 3, wore three bronze belts, 150 bangles and many finger rings

no case does one find cemeteries beyond the inhabited village or town. From the initial Neolithic, bivalve shells were placed with the dead, often in significant areas of the body, such as the mouth, the hands or between the legs. Most see

these as symbols of fertility and birth. Eggs were on occasion placed with the dead. Red ochre was often included in the grave, powdered over the body or placed in pellet form. Infants during the Bronze Age were regularly interred in lidded pottery vessels embellished with a cordon on the exterior surface that reminds one of a snake. In Yunnan, snakes symbolise rebirth through the sloughing of their old skin. A scene painted on the lid of one infant jar burial resembles the act of birth, and a second scene from an infant burial depicts a human, possibly ancestral, face.

There is, however, a consistent and crucial thread of change, of pulses in the structure of a cemetery over time. There are four basic patterns as to how graves related to each other. Pattern 1 is found at basal KPD and during the two Neolithic phases at BNW. Its graves were dispersed, the only discernible structure at the latter site being males and a females being found in close proximity. Pattern 2 involved tight nuclei, each comprising male, female and infant graves, with clear intervening spaces. The third pattern comprised a dense accumulation of burials within which there seems to have been a horizontal spread of graves over time, and with pattern 4, the dead were interred within domestic houses on the same orientation as the walls. Beyond these four, there is the phase 5 outstandingly wealthy woman potter at KPD flanked by two richly endowed infants and an inexplicably headless man, and the phase 6 row of graves confined, according to the layout of the surrounding post holes, within a wooden structure.

Pattern 1 is consistently associated with an initial settlement phase, seen at KPD, BNW and NBJ. There is no evidence of social distinctions or unusual wealth for any individual or group within these contexts. With time, however, the structure of the cemeteries changed. At KPD, burials of both sexes and infants were packed into tightly constrained groups each probably representing generations of shared descent. This was a trading community, manufacturing ceramic vessels that according to Brian Vincent (2004), would have been exported. The stone for adzes and hoes had to be imported, as were at least some of the shells to be converted into ornaments. No evidence has been found at the site for the manufacturing of shell beads despite the tens of thousands that were worn by the dead. At the end of MP4, a period of lower sea level that had expanded the area suited to rice ended, and it was at this juncture that a phenomenally wealthy woman potter lived, as well as a richly-endowed man and three infants. It is suggested that this rise of elite leadership took place at a time of environmental crises, or at least major change. It was followed by a phase where wealthy women were found in a probable mortuary structure, or possibly a house, in front of which lay a wooden building containing markedly poorer individuals. The Neolithic inhabitants of this site were clearly well attuned to social distinctions based on wealth: a social milieu

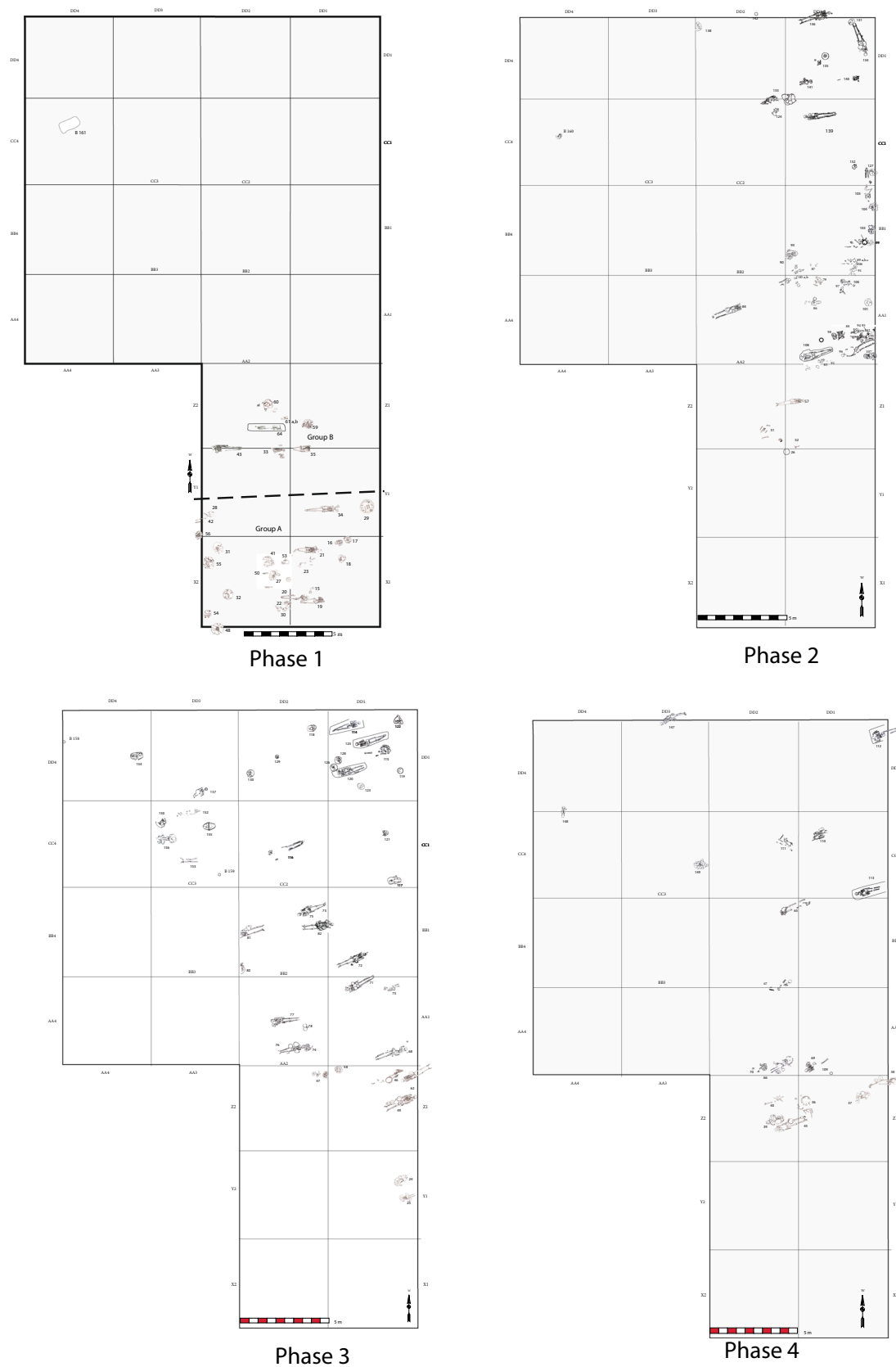


Fig. 20 The plans of the western cemetery at Non Ban Jak during iron age 4A-D

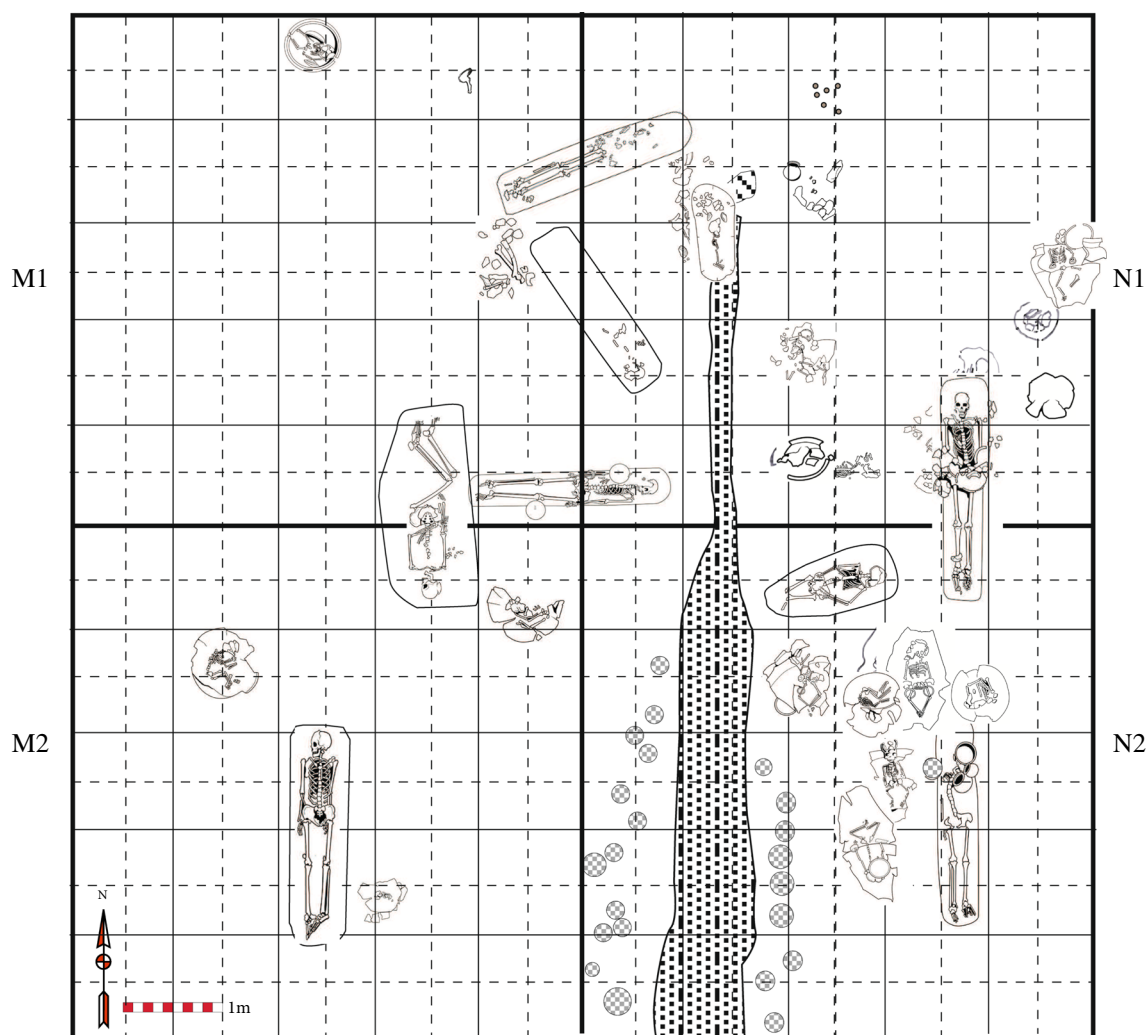


Fig. 21 The plans of the eastern cemetery at Non Ban Jak during iron age 4B



Fig. 22 A room within a house at Non Ban Jak contained three graves cut through the floor. A wall has collapsed over one of them

that witnessed an aggrandizing woman of such exceptional status as to be interred only with two infants and a headless man.

At BNW there was a rapid change from a dispersed late Neolithic burial ground into a group of BA 1 graves in the same location and on the same orientation. It is essential here to stress the continuity in the form of the pots, with many more found in the later phase, suggesting continuity of related individuals. The graves were cut much deeper into the ground, were bigger, and at least four of the dead were interred in wooden coffins with a surge in the number of shell ornaments. The copper-base socketed axes found with five of the seven probably came to the site through exchange, for at this period there is no convincing evidence for local casting. These were found with one infant of two and a child of ten, suggesting that at least in the case of the former, they were of no practical use. With such a small sample, we do not know if this group of individuals were exceptional

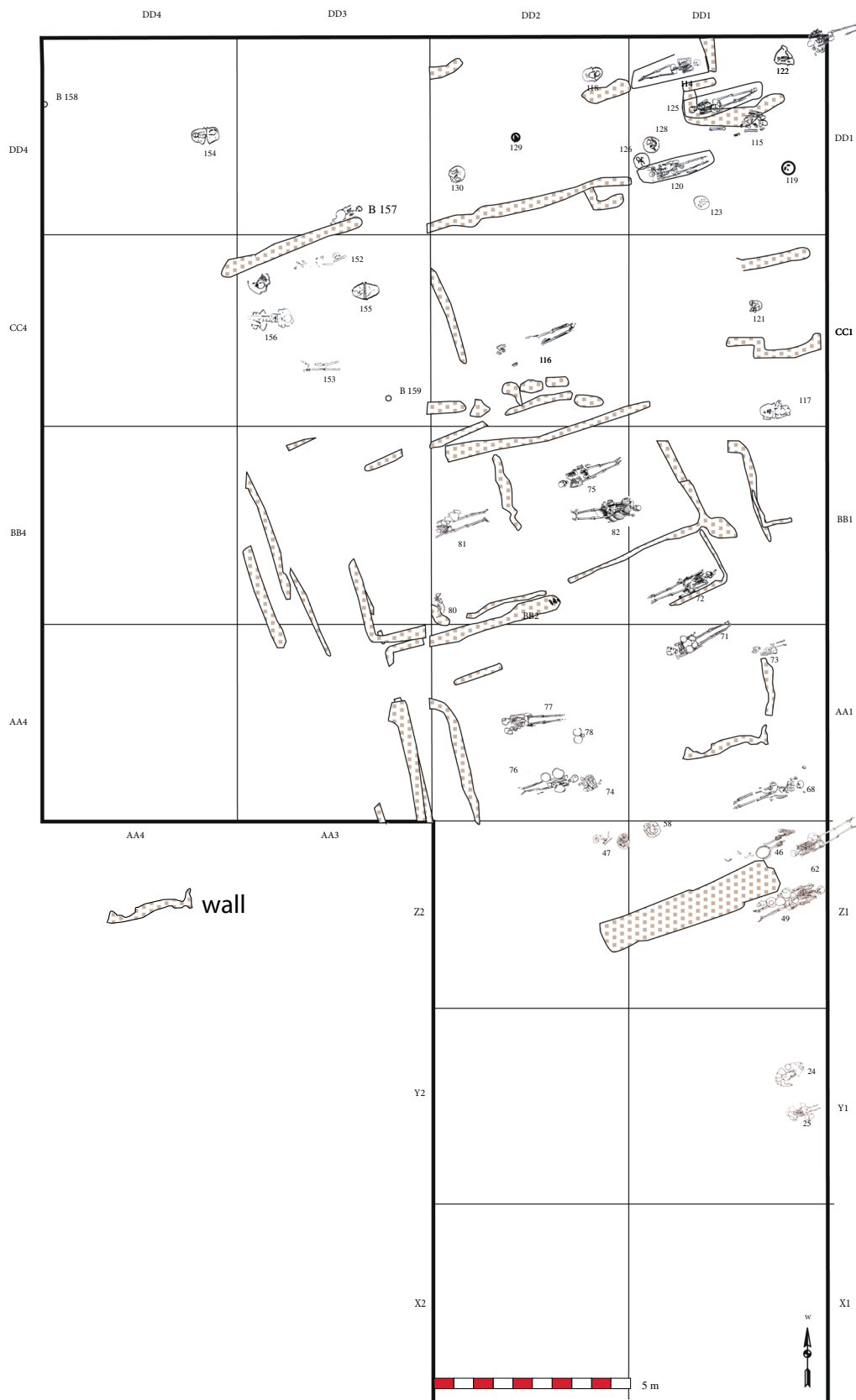


Fig. 23 The iron age 4C graves at Non Ban Jak were all contained within residences

for their new mortuary wealth, or whether it was the norm. However, that the acquisition and display of exotic marine shell and copper-base axes burnished the social status of some BA1 inhabitants is a persuasive model.

A key point about the transition from BA1 to BA2 is that the graves, all on the same orientation, integrate with no disturbances or intercutting. This, again linked to the same basic structure of the ceramic vessels, in addition to the radiocarbon chronology, strongly suggests that there was a seamless transition between the two phases. However, there was a quantum leap in the quantity and range of mortuary offerings. The graves were disposed in four rows, but whether these were contemporary or sequential is not easy to resolve. There is one instance only of a grave lying over another. This was the phase when copper-base implements and ornaments, marble, freshwater and marine shell jewellery reached heights unprecedented in the Bronze Age of Southeast Asia. The range of ceramic forms and the quality of their decoration are particularly notable. Moreover, we find that most graves were far bigger than was necessary to contain the human body, and that some individuals were partially exhumed and reburied. This rigorously structured and extremely wealthy located cemetery in the centre of the site contrasts with markedly poorer but contemporary burials at this site, and sustains the conclusion that this early phase of the Bronze Age saw the rise of one or perhaps more lineages of aggrandizers who dominated the community for about four generations.

The tight nucleation of extremely wealthy burials continued into BA3A, but then there was a crash in mortuary wealth as the graves progressed with BA3B in a southerly direction. There were no more copper-base axes or ornaments, fewer pottery vessels and a sharp decline in exotic shell and marble jewellery.

With BA4, the graves covered the excavated area, were disposed in rows and columns with hardly any burial disturbing an earlier one, in pattern 3. This is matched at Ban Lum Khao.

Intensive research has been applied to this cemetery to identify valid groupings, they might be four, and to ascertain if any group stood out for its mortuary wealth or other aspect of the rituals of interment (Smith et al. 2015)). None has been found. This was also the period when bronze axes and bangles were being cast, as seen in the grave of a bronze caster and many fragments of crucibles and moulds, together with furnaces for liquefying metal, but no bronzes were found with any of the dead. It might be that the abundance of available metal diminished their intrinsic value. Certainly, there is no evidence for a subset of graves, whether it be based on location, age or gender, that stands out on the basis of mortuary treatment.

Although *prima facie* the BA5 graves at BNW when plotted alone look like a pattern 2 tight nucleus, in fact they

must be considered in conjunction with the IA1 burials that form part of the same cemetery, as it extended horizontally in an easterly direction. When this is done, what we find is pattern 3. Again, despite intensive statistical analyses, no subset of wealthy individuals has been identified. Over time, the number of bronzes did increase, and a range of iron weapons, tools and ornaments appeared and the first glass, carnelian and agate ornaments were identified. But unlike the first exposure to bronzes, the introduction of iron did not witness a rise of social aggrandizers.

Pattern 2, with sharply defined nuclei, returned with IA 2 and 3 at NUL. Particularly with the latter, there was also another marked rise in the range and number of exotic mortuary offerings, involving the replacement of shell and marble as the preferred medium with glass, gold, silver, carnelian, bronze and agate ornaments. Bronzes proliferated and iron was forged into sickles, spears and ploughshares. Graves were filled with burnt rice and the proliferation of iron points suggests that competition and conflict were now factors. The remarkable weight of exotic ornaments worn by some of the dead is strongly suggestive of the need to symbolise wealth and social attainment. The question is, what stimulated this rise of aggrandisers? We now know that this same period witnessed a sharp decline in the strength of the monsoon, heralding a period of aridity. A nexus of interacting changes ensued that it has been argued, are traceable to this environmental setback (Wohlfarth et al. 2016). Banks around settlements were constructed to retain river water that was then distributed into permanent, banked rice fields (Hawken 2011). Iron ploughshares and sickles replaced hoes. Weeds and shellfish that flourish in permanent water proliferated. The changed environment round the site, involving as it did wet fields and moats, had a decisively deleterious impact on health that is reflected in the very high rate of infant mortality. However socially, these changes were decisive: For those organising the labour to construct the water control measures, and who owned greatly improved wet rice fields, these changes created wealth that could be measured in the ownership of exotic ornaments and ultimate interment in tightly defined groups.

This phase of elevated wealth and nucleated burials was of brief duration. With IA4, the dead were interred in the rooms of domestic residences, necessarily spaced across the settlements. The range of exotic ornaments remained the same but in reduced numbers. This occurred as the agricultural revolution involving wet rice plough-based agriculture took hold. Many underlying motivations for such residential burial have been proposed. For Susan Gillespie, this practice was “a key organizing principle of Maya society: ancestors are the ultimate origins of property rights, and their active presence should be ritually maintained within the houses or land belonging to their living descendants” (Gillespie 2010:70). Nicola Laneri, suggested that the development

of residential burial in Mesopotamia was stimulated by the “consolidation of the economic and social power gained by wealthy private households” (Laneri 2010:128). In Postclassic Oaxaca, King has written that “Burial within residential structures conceptually harnessed the social, economic, and political power of deceased house members in service of the collective group” (King 2010:44). It is suggested that in the case of late Iron Age Northeast Thailand, residential burial expressed the family’s ownership of land sequestered and improved by the ancestors. The possibility that this occurred is supported by its sequel, the rise of early states. In Northeast Thailand and adjacent Cambodia, this occurred rapidly from the fifth century, and was manifested in the expansion of a handful of late Iron Age settlements into substantial urban complexes, such as Wat Phu, Muang Sema and Isanapura. These incorporated temples dedicated to rulers linked with exotic South Asian deities and a corpus of texts that distinguish sharply between the elite grandee lineages and those who worked their rice fields.

7 Conclusions

The ingress of farmers into Southeast Asia from the north during the third millennium BC was followed by the establishment of enduring sedentary communities that adapted to the seasonal monsoon rains to cultivate rice and to a limited extent, millet. There is growing evidence that they met and integrated with the long-established hunter-gatherers who, in rich riverine or coastal habitats, were themselves sedentary to the extent that they maintained cemeteries in which the dead were interred in a flexed position with few if any mortuary offerings. By contrast, the rice farmers buried their dead in extended and in a supine position, with a variable suite of ceramic vessels, tools, ornaments and items of probable symbolic significance such as red ochre, cowries and bivalve shellfish. Extensive excavations in the region of the upper Mun River and the estuary of the Bang Pakong River have exposed occupation remains and cemeteries that illuminate change over a period of about 150 human generations. At times, these involved advances in technology, such as bronze casting or iron forging. At another, there was a significant change in the climate.

This review has examined the possibility that the way people were interred reflects a community’s social structure. In all cases, the dead were interred within the confines of a settlement. Within this constraint, there are four patterns: an agglomeration of graves, interment in rigidly defined groups, burial in the rooms of houses and loosely-dispersed graves with no obvious linkages between them.

The earliest phase in at least three sites, one early Neolithic and the other two early Iron Age, graves were dispersed

and relatively poorly endowed with offerings. Agglomerated burials that often formed rows with a horizontal expansion over time have not evidenced any major distinctions in terms of mortuary wealth. However, tightly-defined nuclei almost invariably contained markedly wealthy individuals that reached their clearest expression in the KPD woman, with 121,000 shell beads, and the NUL Iron Age man with 150 bronze bangles, gold and silver ear coils and three bronze belts. The necessarily widely spaced burials of the latest Iron Age at NBJ reflected their placement within the rooms of domestic houses.

Three stimuli for nucleated burials have been identified. In the first, that took place in the second mortuary phase of KPD, the community was highly strategically located on the environmentally rich estuary of the Bang Pakong River. This location commanded exchange routes into the interior and along the coast, as well as enviable sources of potting clay. The settlement became a central place for trade, importing stone and marine shell and exporting pottery vessels and, probably, salt. This was a competitive environment reflected by the lineages interred in the mortuary clusters over at least 10–12 generations. The transition into the fifth mortuary phase occurred when rice farming became marginal due to the rising sea level. It was to a background of this environmental change, perhaps crisis, that one particular family of aggrandizers rose to social prominence.

The second equally swift development of nucleated burials coincided with the first appearance of copper-base axes and ornaments in the exchange networks of Southeast Asia, as we now know from proximal northern sources that surely included the migration of those commanding the necessary technical know-how. As it happens, this same juncture saw a massive importation of exotic marine shell and marble jewellery. This was employed in death to display the status of the surviving kin, along with lavish mortuary feasts and to judge from the decoration on a ceramic vessel, dancing. The aggrandizing descent group or groups interred centrally within the settlement of BNW did not maintain their elevated wealth and status for more than 4–6 generations, thereafter the burial pattern was agglomerated in rows with no, or at least very little, ostentatious display of wealth and status. If one takes the number of pottery vessels placed with the dead as a physical reflection of social status, then the dramatic rise seen in the nucleated Bronze Age 2 and 3A, followed by a sharp decline, is illuminating (Fig. 10).

The third and last preference for nucleated graves came with the agricultural revolution that occurred with a period of increased aridity. Here, it is suggested, it was the organisation of water control facilities and the ownership of improved, irrigated land that underwrote the generation of social aggrandizers. This transition, further manifested in residential burials, was more permanent as it morphed into the rise of early state societies. The average number of

bronze ornaments worn over the duration of the Iron Age saw a massive rise during IA3 at Noen U-Loke, followed by a steep decline (Fig. 11). Taking bronzes as a proxy for status, it is noted that it was during IA3 that the agricultural revolution involving plough-base wet rice farming occurred, a move that coincided with the first evidence for rice fields demarcated by banks (Hawken 2011). This, it is suggested, was the springboard for the swift and seminal changes involved in the foundation of early states.

Far from presenting as an unchanging sequence of hetero-archic communities, as has been suggested by some (White 1995), the picture presented is one of dynamic pulses of social change. This paper has attempted to identify and explain possible causes. It has been enabled by a long-term commitment to the opening of large areas by excavation. This will be greatly clarified and tested if new techniques for extracting DNA from human remains complement what we now have available from the 38 genomes recovered at NBJ. These disclose deep ancestry, demographic change and the affinal or consanguineal relationships of those interred in their homes.

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Data availability The human remains described above are archived at the office of the Fine Arts Department, Phimai, Nakhon Ratchasima, Thailand. The artefacts described are archived at the office of the Fine Arts Department, Phimai, Nakhon Ratchasima, Thailand, the Phimai National Museum and the Prachinburi National Museum, Thailand.

Declarations

Competing interests The author has no competing interests to declare that are relevant to the content of this article.

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