# Chapter 7

# Neolithic Societies *c.* 4000–2000 Years Ago: Austronesian Farmers?

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**Introduction** [LLS, GB]

Despite the evidence of the Gan Kira pollen core for sustained human activity in the forest around the Niah Caves from *c*. 6000 BP (Fig. 6.7), the caves themselves do not appear to have been used at that time. The earliest evidence for the resumption of activity is a radicarbon date obtained from loose charcoal collected during the excavation of an extended burial (B50) in the West Mouth of the Great Cave, of 3285±168 bp or 3078–3963 cal. BP (AA-2795 **AA-27957 IN APPENDIX 1**) (Krigbaum 2001). Targeted radiocarbon dating of charcoal in the Harrisson Excavation Archive from excavated contexts in the West Mouth, interpreted as possible candidates for the beginning, middle and end of the long gap between the Early Holocene occupation and the start of the Neolithic cemetery, failed to produce dates in this period, or even dates between 6000 BP and 4000 BP contemporary with the palynological evidence. After *c.* 3500 BP there is a consistent number of radiocarbon dates with narrow calibrated date ranges produced on charcoal samples from a number of caves in the Niah complex. The West Mouth again became a focus for human activity, in particular for the burial of the dead. Use of this space for human burial continued over the course of the next 1500 years, resulting in one of the largest prehistoric cemeteries in Island Southeast Asia. At the same time several other caves in the Gunung Subis massif investigated by the Harrissons, caves differing widely in size and character but used predominately for burial, provide a further rich source of data (Fig. 7.1). The quality of this archaeology offers an opportunity unique in the region to investigate the nature of the funerary rituals practised through this period and, through that lens, to make inferences about the nature and structure of the 'Neolithic' societies who buried their dead in the caves.

As in many other regions of the world, the term 'Neolithic' in Island Southeast Asia has traditionally been used to define the first agricultural communities, people who used a new material culture that included polished stone tools and pottery, and who based their subsistence primarily on the use of domestic crops and livestock. There are valid concerns about whether it is appropriate to apply to other parts of the world a term originally coined in the second half of the nineteenth century within the classification systems being established then for European prehistory. However, despite alternative local terminologies being proposed (e.g. Bacus 2004; Soejono 1997), the term 'Neolithic' remains a convenient label for the first pottery-using societies in Island Southeast Asia. As in Europe, though, one of the difficulties with the term is that archaeologists often use it with alternative meanings (sometimes within the same sentence, and often implicitly rather than explicitly): to denote a period of time; and/or a set of material culture (notably pottery and polished stone tools); and/or a way of life (agriculture). Although the term as originally proposed implied all three meanings — that everybody in the Neolithic period used Neolithic material culture and practised a 'Neolithic way of life' (i.e. agriculture) — subsequent research in many parts of the world has found examples of farmers living side by side with foragers in the 'Neolithic period'; of farmers not using the full suite of 'Neolithic material culture'; and of foragers using part of it (Barker 2006). In this chapter we are using

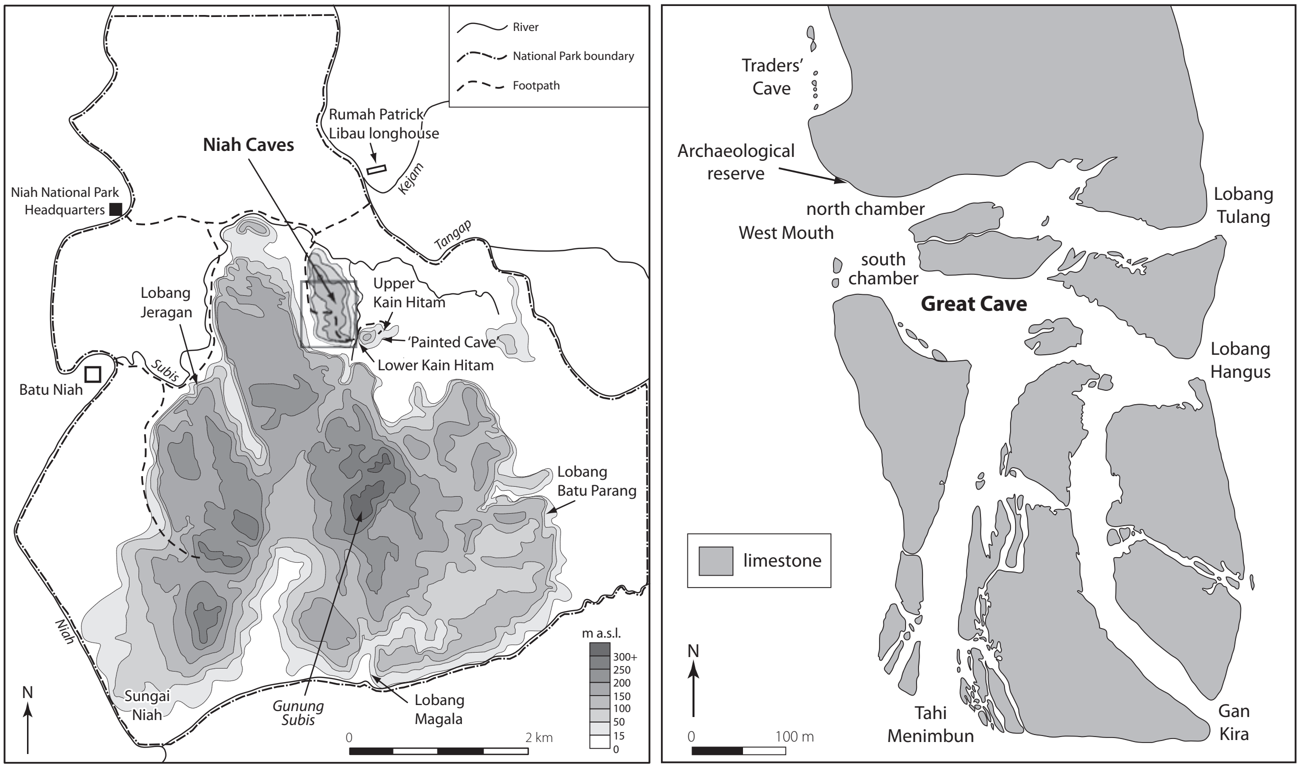


**Figure 7.1.** *The Niah Caves complex, showing sites mentioned in this chapter. The sites with predominately Neolithic remains are the West Mouth, Gan Kira, Lobang Jeragan, Lobang Magala and Lobang Batu Parang.* **and KAIN HITAM - DORA?**

'Neolithic' primarily as a convenience term for the period *c.* 4000–2000 BP, without *a priori* connotations of a particular material culture or way of life; but it is also appropriate because the theory that farming began in Island Southeast Asia during this period has long been one of the tenets of the regional research agenda.

As described in Chapter 1, the debate about the transition from foraging to farming in Island Southeast Asia has long been polarized into opposing theories or 'meta-narratives' of colonization (new people introducing farming from elsewhere) versus acculturation (local foragers adopting farming) and independent invention (local foragers inventing forms of farming themselves). The former has been particularly dominant since the 1970s, when linguistic and archaeological arguments were first combined to propose the Austronesian Dispersal Model. Lexical studies suggested that early speakers of the *c.* 600 Austronesian languages within the Austronesian language family (which extends today north–south from Vietnam to Java, and west–east from Madagascar to Remote Oceania) were acquainted with a suite of domestic plants and animals (Blust 1976). Taiwan was proposed as the likeliest homeland of these 'proto-Austronesians' because it has the greatest linguistic diversity in primary branches. The argument was therefore proposed by Bellwood (1985, and subsequently developed in e.g. 1988**a or b??**; 1990; 1996b; 1997; 2005) that farming was introduced to the region by Neolithic/Austronesian colonists who crossed from mainland China to Taiwan and then fanned out across the South China Sea between *c.* 6000 BP and 3000 BP, and thence across the wider Pacific region, the rapidity of the assumed spread being characterized by Diamond (1988) as a veritable 'Express Train' (Fig. 1.28). These people, the argument ran, spoke a proto-Austronesian language, manufactured Neolithic material culture (pottery and polished stone tools), cultivated domesticated rice, and reared pigs. Their agricultural and sedentary way of life fuelled population growth and led to demographic expansion through the dispersal of founder populations who replaced or absorbed the indigenous forager populations that they encountered. In the case of Borneo, the presence of charred rice remains and rice inclusions in pottery in Gua Sireh cave *c.* 4500 BP was taken to indicate the clearest evidence for the arrival of the Austronesians, a 'Neolithic package' of new people, new material culture, and a new means of subsistence (Beavitt *et al.* 1996; Bellwood *et al.* 2002 **NOT IN REFS**).

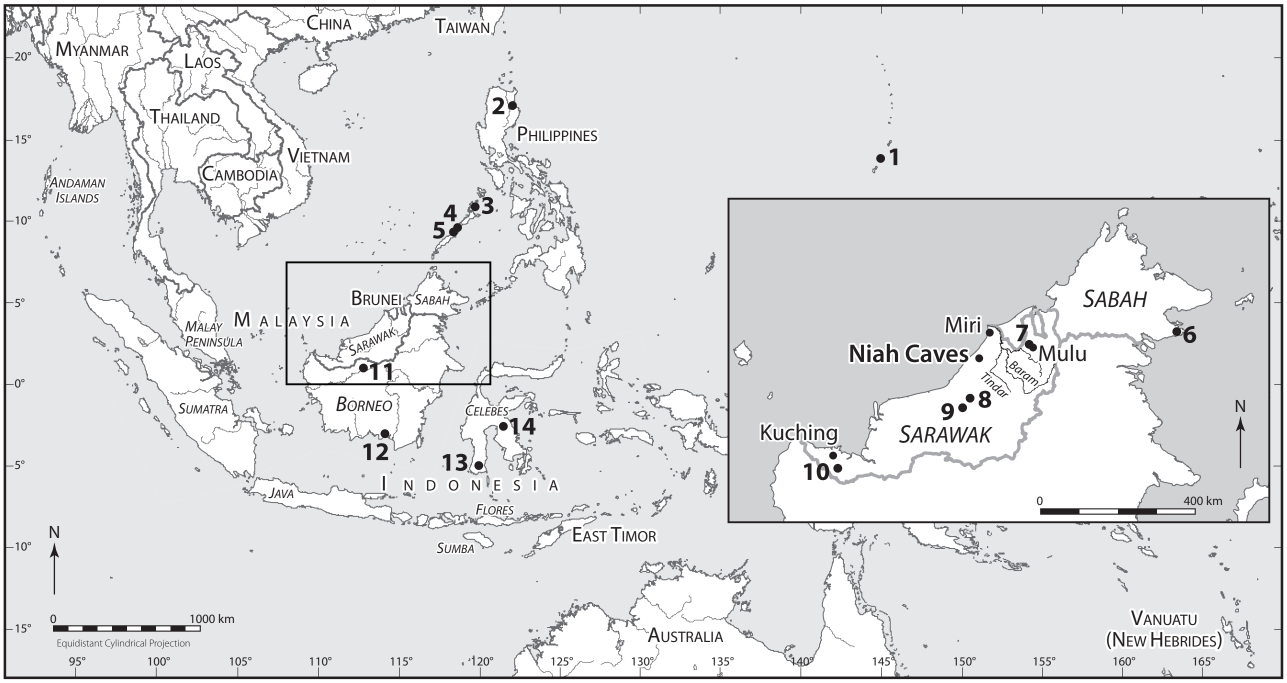


**Figure 7.2.** *East and Southeast Asia, with the principal sites and locations mentioned in this chapter: 1. Marianas; 2. Nagsabaran; 3. Ille Cave; 4. Sa'gung rock shelter; 5. Duyong Cave; 6. Bukit Tengkorak; 7. Lobang Angin; 8. Usun Apau plateau; 9. Upper Rajang river; 10. Gua Sireh; 11. Lake Sentarum; 12. Setia Alam; 13. Ulu Leang; 14. Lake Mantano.*

An alternative model, the 'Nusantao hypothesis', was proposed by Solheim in 1984. He argued that the maritime-oriented culture that linked the inhabitants of the region in the Early Holocene following the flooding of Sundaland facilitated the development of linguistic and cultural similarities and the exchange of trade goods, including domestic plants and animals. He did not explore the mechanisms of acculturation by which foragers might have adopted the new material culture and agricultural resources.

A third theory proposes that rice- and pig-based agriculture only developed after, and perhaps out of, a long process of experimentation and adaptation by the indigenous forager populations of Southeast Asia and western Oceania, involving first tree crops and then root crops such as taro, long before any Austronesian colonization event (Bayliss-Smith 1996; Bayliss-Smith & Golson 1992; Gosden 1992; 1995; Latinis 2000; Terrell & Welsh **Welsch IN REFS** 1977 **1997 IN REFS**; Yen 1995). As we have argued earlier (Chapters 4–6), the evidence from the new excavations at Niah, and from the new studies of the material from the earlier excavations, certainly provides strong support for this third scenario in northern Borneo during the Late Pleistocene and Early Holocene. Most of the Late Pleistocene and Early Holocene foragers who used the Niah Caves appear to have combined systems of hunting, fishing, and gathering with a variety of plant and forest-management strategies. Furthermore, as described in Chapter 6, the pollen and phytolith evidence from the Loagan Bunut deep core and from the two shorter cores taken in the vicinity of Niah suggests that these people may first have become acquainted with domestic rice, *Oryza sativa*, 2000 or even 4000 years before its occurrence at Gua Sireh. This was probably within the context of their participation in the 'maritime interaction zone' of extensive exchange networks that had linked the peoples of Island Southeast Asia since the flooding of Sundaland at the end of the Pleistocene (Bulbeck 2008), though they appear to have made little use of rice in comparison with foraging and vegeculture.

These findings regarding the complexity of Late Pleistocene and Early Holocene lifeways at Niah, persuasive as they are, do not necessarily preclude the possibility of an Austronesian/Neolithic colonization event: of new people arriving at Niah *c.* 4000 years ago bringing with them with new material culture and new modes of living. Indeed, the case for or against such an event provides the central line of debate in this chapter.

**Climate and environment** [CH, PP, GR, KS]

There is little detailed information on climate and environment at the regional scale during the period reviewed in this chapter, and that which exists is often rather conflicting. Nonetheless, a common inference is that the climate of the region in the Mid Holocene, like that of the Early Holocene, was characterized by less seasonality and inter-annual variability than that of the Late Pleistocene (Hope 2001), though one of the difficulties facing palynological reconstructions of vegetation is that most dipterocarps, almost certainly the dominant vegetation on the lowlands, are virtually invisible in the pollen record because of their low and erratic pollen productivity. However, a stable climate can be inferred from the steady growth of peat throughout the Holocene at Lake Sentarum in western Borneo, as it had in the Late Pleistocene (Anshari *et al*. 2004; Fig. 7.2), and from the pollen record of Lake Mantano (South Sulawesi), where the continued diversity in the pollen record from 5500 years ago to the present indicated the continued dominance of closed canopy montane forest similar to the modern forest (Hope 2001). At Setia Alam in central Kalimantan, on the other hand, a cessation in peat growth *c*. 6000 BP suggests a change in rainfall regimes at that time (Page *et al.* 1999). The Lake Sentarum pollen record has high levels of herb pollen in the Mid Holocene suggestive of a more open environment than previously, a phenomenon which could be taken as evidence for swidden farming; the fact that charcoal levels are far lower than in the Pleistocene sediments is interpreted as evidence for an increased occurrence of drought causing the frequent exposure of lake beds and a consequent growth of herb vegetation perhaps exacerbated by ENSO activity (Anshari *et al*. 2004). At Niah, the Gan Kira core suggests the continued small-scale clearance of back-mangrove swamp from *c*. 6000 BP until *c*. 2300 BP, when there was an abrupt change in sedimentation interpreted as evidence for a significant expansion in the scale of clearance activity (Hunt & Rushworth 2005b; Fig. 6.7).

**Neolithic burial in the Nian Caves complex** [LLS, FC]

The Neolithic cemetery in the West Mouth has been intensively studied by several authors: Barbara Harrisson produced the original analysis, Shelaigh and Richard Brooks added substantially to her work, and subsequent PhD research has been undertaken by JK (2001), JM (2005), Luz-Andrea Pfister (Zuraina Majid & Pfister 2005) and LLS (2008). This large collection of burials remains the key point of reference for our understanding of Neolithic funerary practice and other aspects of Neolithic society at Niah. Several other cave entrances excavated by the Harrissons yielded Neolithic burial evidence about which we have greater or lesser amounts of information, and it is quite likely that many of the dozens of other caves around the Gunung Subis, surveyed by staff of Sarawak Museum in the late 1950s and early 1960s, were also used for burial at this time. The most informative sites in addition to the West Mouth are Lobang Jeragan, Lobang Magala and Lobang Batu Parang (Fig. 7.1).

Lobang Jeragan ('Captain's Cave', named after its owner in the 1950s, Awang Jeragan) is a cliff-cave *c.* 50 m above the forest floor, accessed through a dark and restricted cave passage which winds up from a cave entrance at the base of the cliff. It was completely excavated by Barbara Harrisson over a three-week period in 1961, using the recording system developed for the West Mouth. The site was divided into 5 × 5 feet grid squares and these were excavated in 6-inch spits (in this case to a maximum depth of 30 inches), with burials left on pedestals for subsequent recording and lifting. The cave appears to have been used strictly for burial, the excavations revealing a tightly packed cemetery of Neolithic extended and secondary burials (Fig. 7.3). Because of the quality of the excavation and recording, the cemetery was selected by LLS for detailed study, to compare with burial practices in the West Mouth (Lloyd-Smith 2008). New radiocarbon dates place its use between *c.* 2900 BP and *c.* 2500 BP (Appendix 1), indicating that the site was used intensively for a short period within the lifetime of the West Mouth cemetery.

Lobang Magala is a large cave system with seven major mouths, located above the Sekaloh river on the southern side of the Gunung Subis massif. It derives its name from the Punan word for the fruit tree *Nephelium mutabile*, a large specimen of which used to grow across the entrance to the cave's lowermost chamber (B. Harrisson & T. Harrisson 1968, 149). Although much of the cave deposit had been disturbed by guano extraction, a single mouth, Magala 'E', remained untouched. Excavations by Chong and Nyandoh in 1964 found two extended primary burials and numerous burnt and non-burnt secondary burials, together with earthenware including sherds of a complete double-spouted vessel similar to those found in Lobang Jeragan and the West Mouth (see below, Ceramic Types in the West Mouth Cemetery). The single radiocarbon date obtained, on human bone, of 3130±240 bp or 2759–3898 cal. BP (GX-0337), together with the lack of Chinese tradewares (B. Harrisson & T. Harrisson 1968, 154), suggest that the burials in Magala 'E' were broadly contemporary with main series of Neolithic burials in the West Mouth.

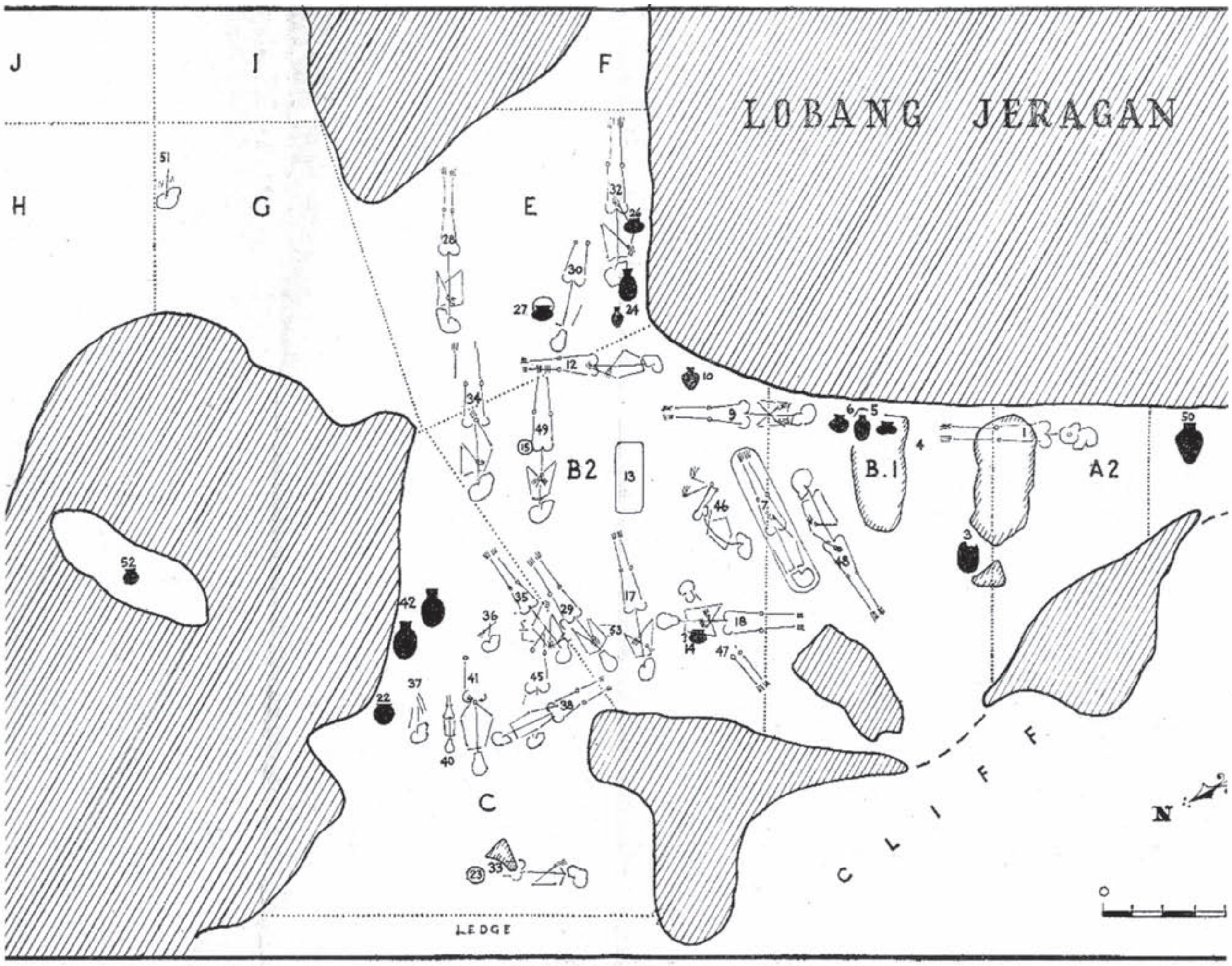


**Figure 7.3.** *Original plan of the Lobang Jeragan Neolithic cemetery. (Reproduced with the permission of Sarawak Museum)*

Lobang Batu Parang ('Stone Knife Cave') is a small cave on the eastern side of the Gunung Subis massif. Excavations by Jack Reavis in 1965 opened a 15 × 10 feet trench, to a depth of 12–18 inches. Photographs in the Harrisson Excavation Archive, together with a letter from Jack Reavis to Tom Harrisson dated 18 November 1965, reveal there to have been at least six extended burials and several burnt and non-burnt secondary burials, including apparently isolated skulls, some of which were stained with red pigment. The burials were accompanied by a large assemblage of earthenware pottery including double-spouted and funnel-necked vessels similar to those found in the West Mouth (T. Harrisson 1971, 57) which, together with the absence of Chinese wares, indicate a Neolithic date.

The major phase of burial at Lobang Tulang ('Cave of Bones'), one of the cave mouths on the eastern side of the Niah complex, was certainly during the Metal Age on the evidence of numerous imported Chinese stoneware and porcelain (B. Harrisson 1959**a, b, c or d??**; and see Chapter 8), but red-pigmented earthenware pottery and cremated human bones found below the main layer (0–6 inches) with Metal Age material suggest that burial at the site may have started late in the Neolithic phase. Gan Kira ('Kira's Sleeping Place'), the southern entrance into the Niah complex, was another Metal Age cemetery where burial may have started late in the Neolithic. Two phases of burials (nine primary extended, and at least eighteen non-burnt secondary burials) were found in the uppermost 12 inches of a deposit that varied between 48 inches and 6 inches in thickness, along with a significant quantity of earthenware pottery, iron tools, glass beads, worked shell artefacts, vertebrate fauna and shells. The majority of the earthenware assemblage was initially described as comprising utility pottery rather than ornate funerary wares (B. Harrisson 1959**a, b, c or d??**, 170), but this interpretation is currently undergoing revision (Chapter 8). Two charcoal samples from levels 6–12 inches and 24–30 inches in Trench YA/17 produced inverted radiocarbon dates of 3067±33 bp or 3370–3210 cal. BP **3210–3367 IN APPENDIX 1** (Wk-19568) and 2266±33 bp or 2350–2160 cal. BP **2158–2346 IN APPENDIX 1** (Wk-19569) respectively. Metal Age material included numerous beads and metal artefacts, two complete Chinese stoneware vessels, and 76 sherds of imported trade wares (see Chapter 8). The range of the two radiocarbon dates does not correlate easily with the burial data, most probably relating to the use of the cave mouth for occupation, the latter not necessarily contemporary with the burials.

Funerary practice at Lobang Jeragan was an important comparator for LLS in his study of the West Mouth Neolithic burials. The ceramic assemblages from Lobang Jeragan, Lobang Magala and Lobang Batu Parang were the subject of the PhD by FC comparing earthenware technology, typology, and use at these sites with those of three Metal Age assemblages with Chinese trade wares (Lobang Tulang, Lobang Magala and Kain Hitam) in an investigation of the role of ceramics as an indicator of changing identities (Cole 2011).

*The West Mouth cemetery: layout and chronology* [LLS]

Human remains and burials form a substantial part of the West Mouth's archaeology. In combination, the three excavation projects in the West Mouth (the Harrissons 1954–67; Zuraina Majid 1977; NCP 2000–2003) have investigated a total of 258 prehistoric 'burials' (including the Deep Skull), spanning over 40,000 years. The detailed re-analysis of this burial archaeology by LLS combined a review of the excellent excavation records created especially by Barbara Harrisson with new studies of the age and sex of the individuals, where these could be established, and a new programme of radiocarbon dating (Lloyd-Smith 2008). This study established that a total of 206 burials could be recognized in the West Mouth, which could be divided visually into twelve distinct Burial Groups (Table 7.1; Fig. 7.4). Burial Groups 1–4 predominantly consist of the 'flexed', seated and cremated burials with Early Holocene dates which were discussed in Chapter 6, though there are also later secondary burials amongst them. The other Burial Groups can be ascribed to the main phase of use of the Neolithic cemetery. These Neolithic burials were re-classified into a 'first-order' division of four basic types according to the physical arrangement and treatment of the body in

**Table 7.1.** *Burial Groups in the West Mouth of Niah Great Cave. Depths refer to the level at which the burial deposit was first exposed below the cave surface. (Source: Lloyd-Smith 2008.)*

| Burial Group | Description |
|---|---|
| 1 | Thirteen flexed burials, two secondary burial cremations, and one unburnt secondary burial clustered under and around overhang at northwest corner of cave mouth. All burials found at depths of between 0.64 m and 1.27 m. Two possible Sub-Groups identified: Group 1A, comprising a cluster of six flexed burials under the northern end of the overhang; and Group 1B, formed by cluster of three flexed burials at the southern end of overhang. |
| 2 | Open-air cluster of three flexed burials, and possibly one unburnt secondary burial, located at the end of the slight ridge-line falling out from cave interior. Found at depths of between 0.51 m and 1.12 m. Spatially overlapping with Burial Group 3. |
| 3 | Seated burials: B54, B141, and B147. Located along a ridge from B147 in the vicinity of Burial Group 2, to B54 located *c.* 35 m into the cave. Seated burials were found at depths between 0.45 m and 0.90 m. |
| 4 | Adjacent pair of decapitated flexed burials, B155 and B156, laid back-to-back. Located 10 m east into the cave from Burial Group 2, on the western edge of the Neolithic cemetery. |
| 5 | Semi-articulated secondary burials B144, B153, B157 and B165. Located between Burial Group 2 and Burial Group 4. |
| 6 | Sub-surface burials in Grid ED2, overlying Burial Group 2. Four unburnt secondary burials and three disturbed primary flexed burials found at depths of between 0.10 m and 0.40 m. |
| 7 | Central Neolithic cemetery group. Largest cemetery group comprising 47 extended burials and 35 secondary burials in an approximately oval area measuring 21 m × 6 m. |
| 8 | Northeast satellite group 2 m from Burial Group 7 and adjacent to the cave wall. Cluster of burials further into the cave, comprising one multiple burial, seven extended burials, and twelve secondary burials. |
| 9 | Northern satellite group abutting Burial Group 7 and adjacent to cave wall. Dispersed cluster of burials, consisting of one multiple burial, twelve extended burials, and nine secondary burials. Southern boundary of Burial Group 9 merges into northern edge of central cemetery group, Burial Group 7. |
| 10 | Northwest satellite group, 5 m from Burial Group 7 and adjacent to cave wall. Dispersed cluster of six secondary burials, several placed in 'rock-pockets' along cave wall, and seven extended burials. |
| 11 | Western satellite group 2 m from edge of central cemetery group. Row of six extended burials and ten overlying secondary burials. |
| 12 | Three sub-surface secondary unburnt burials along the cave wall at the southern edge of the overhang towards the front northwest corner of the cave. |
| '13' | Isolated and dispersed burials that do not easily fit into any of the above spatially defined groups. |

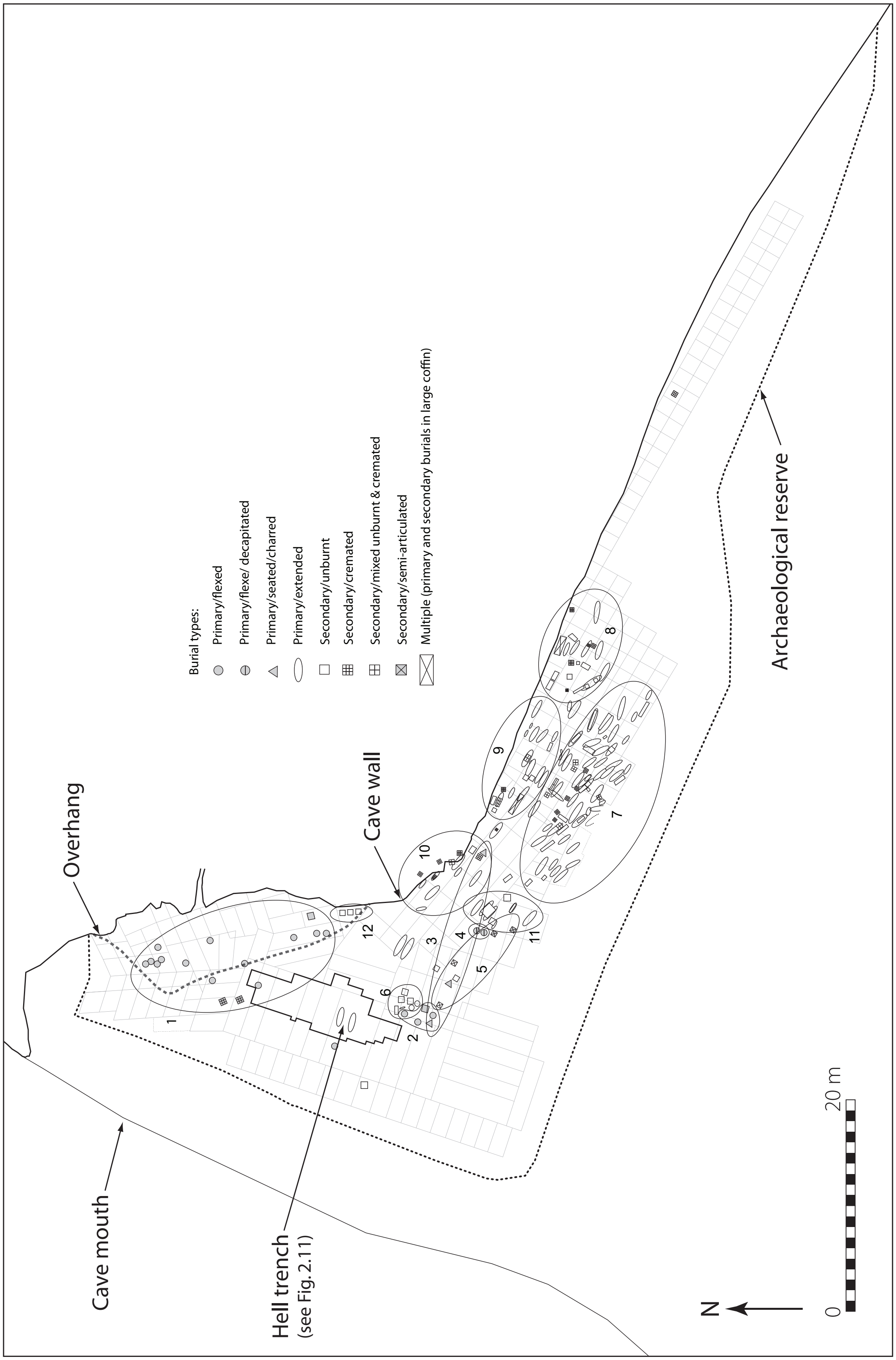


**Figure 7.4.** *The archaeological reserve in the West Mouth of the Great Cave, showing the Burial Groups identified by Lindsay Lloyd-Smith; Burial Groups 1–4 are primarily Early Holocene, the rest are Neolithic or post-Neolithic.*

**Table 7.2.** *Re-classified later prehistoric burial types in the West Mouth, Niah Cave. (Source: Lloyd-Smith 2008.)*

| First-order classification | Second-order classification | Third-order classification | Higher-order variables |
|---|---|---|---|
| Primary | Flexed | Tightly flexed<br>Loosely flexed | Grave-goods<br>Red colouration |
| Primary | Extended | Arm positioning | Container: coffin, bamboo,<br>Grave-goods<br>Red coloration |
| Secondary | Un-burnt<br>Including cremation<br>Solely cremation<br>Semi-articulated remains | Skull only | Container: coffin, bamboo, sherd-cover, burial jar<br>Grave-goods<br>Red colouration |
| Multiple | Including cremation | | Container: coffin |

the case of primary burials, and the nature and degree to which the body was transformed in the case of secondary burials, with 'higher-order variables' then considered, in particular the burial container (coffins, bamboo biers, ceramic jars) and other grave-goods such as individual ceramic vessels or sherds, stone, shell, metal or wooden artefacts (Lloyd-Smith 2008; Table 7.2). It emerged that the original classifications of 'burnt' and 'cremated' by Barbara Harrisson (1967) had been inconsistently applied: while there is evidently variation in the degree to which the cremated remains have been burnt, all but two of the original 'burnt' burials showed no signs of burning. Sixty-six secondary burials could be assigned to the main phase of use of the cemetery: 39 non-burnt, twenty cremated, and seven with mixed remains.

The area occupied by the Neolithic cemetery is the only place from which the entire West Mouth is visible, from the cave mouth to the guano mound of the interior northern chamber. Given that the southern chamber is obstructed by a massive boulder roof-fall, the northern chamber is the natural route-way into the central chambers of the Great Cave and through them to the other five entrances (Lobang Tulang, Lobang Hangus, Lobang Gan Kira, Lobang Bulan and Lobang Tahi Menimbun). Neither burials nor other archaeological evidence of past human activity have been reported from the interior chambers despite the long history of guano-digging and birds-nesting and Tom Harrisson's involvement with their regulation. It is striking, therefore, how the zone chosen for Early Holocene and Neolithic burial was where the natural route through the mountain emerges into daylight, in the transitional or liminal zone of 'half-light' between the bright outside world and the dark (in places pitch-black) interior.

Although there are a few outliers such as pairs of extended inhumations near the front of the cave, most of the extended inhumations and secondary burials are concentrated within a 900 $m^2$ area about 15 m wide that extends from about 15 m east of the cave's lip for some 60 m into the 'twilight zone' of the interior, adjacent to the north wall of the northern chamber. The extensive overlap between the area used for burial in the Early Holocene and the area used in the Neolithic phase is all the more significant given that the trial excavations conducted by the Harrissons outside the present archaeological reserve, areas with no evidence of significant disturbance from guano digging, failed to find evidence for human activity. Species representation and taphonomic traces indicate that most of the vertebrate and molluscan faunal remains recovered by the Harrissons during their excavations of the Neolithic burials had probably been disturbed from Late Pleistocene and Early Holocene strata underneath. It is highly likely, therefore, that the people who buried their dead in the West Mouth after *c*. 4000 BP had some awareness of earlier human activity in the cave, including burials. Although the Neolithic reuse of the West Mouth clearly involved a shift in the focus of burial away from the cave mouth, there are hints of some continuity in concepts of 'living' and 'non-living' space across the *c*. 4000-year hiatus in the use of the site. The Late Pleistocene and Early Holocene occupations were characterized by food preparation and consumption at the front of the cave and the dumping of residues from these activities — the 'ashy guano' (Chapter 3: Lithofacies GW, p. **??**) — further into the interior, in the area of the Neolithic cemetery, with burial apparently remaining part of the domestic sphere. The Neolithic dead were clearly divided from the realm of the living, but it is interesting that they were placed in the 'non-living' space of earlier visitors.

Thirty-one radiocarbon dates obtained from samples of human bone during the original analysis of the skeletons suggested a date range of *c*. 6000 BP to *c*. 1300 BP for the Neolithic cemetery (Brooks *et al.* 1977; Appendix 1), but these dates have since been discredited because they were produced at a time when the effect of unknown rates of bone diagenesis in wet tropical climates was not realized (Spriggs 1989). As part of the Niah Cave Project and subsequent doctoral research, 44 samples of wood, bamboo and

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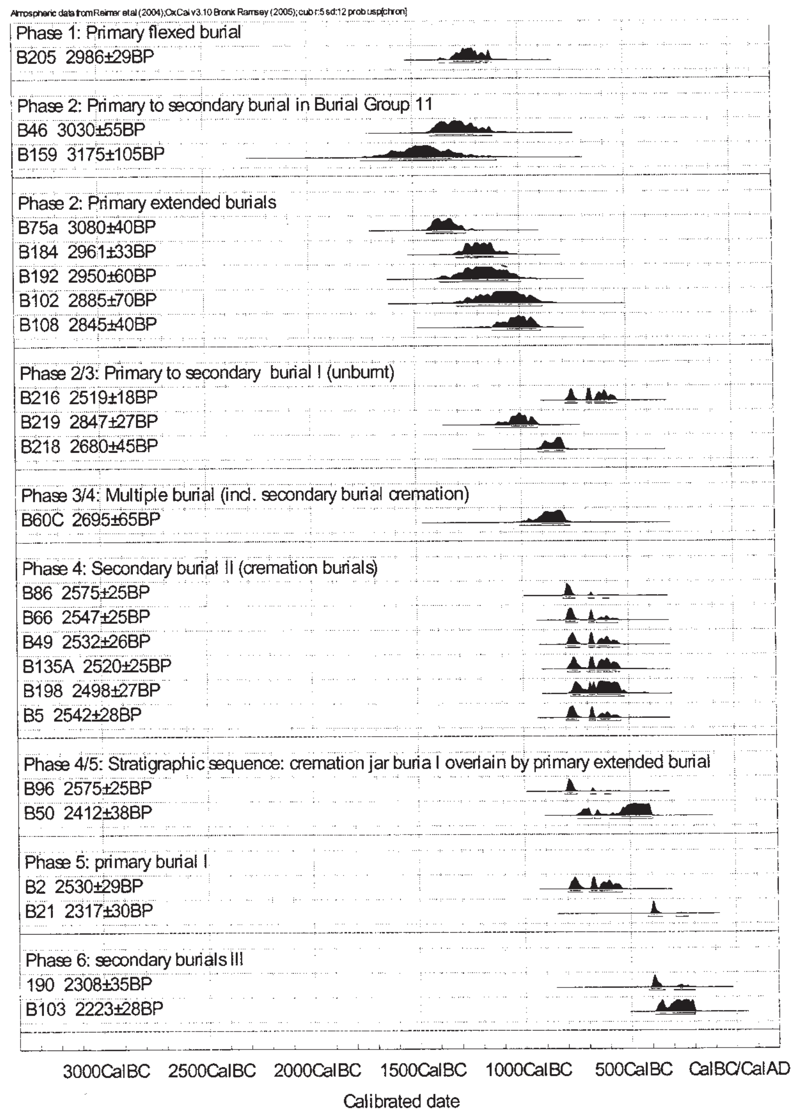


**Figure 7.5.** *Proposed radiocarbon chronology for the Neolithic cemetery in the West Mouth of Niah Great Cave. [***LLS Fig. 7.25 – need to amend figure with additional results from resubmitted samples]**

cremated bone from 40 burials were submitted to the Oxford Radiocarbon Accelerator Unit in an attempt to establish a robust chronology for the cemetery's development. Four samples**,** two of coffin wood and two of cremated bone, were also submitted from four burials at Lobang Jeragan. The re-dating exercise was not straightforward. Some samples of bamboo and wood failed because of insufficient carbon, and in two instances where bamboo and wood samples from the same burial were dated, the bamboo produced a significantly earlier (older) date, the reverse of what might have been expected given the potential for old wood to be retained for making coffins. Five of the seven radiocarbon dates from burial contexts which are earlier than the earliest charcoal date from a burial were produced on bamboo. Of the two large coffins first exposed in the 1960s and left *in situ* since then, one produced a date of 626±28 bp or 552-660 cal. BP (OxA-18397), and the other a 'modern' date. When the first sample was subsequently re-dated, it too produced a 'modern' date. The earliest date on a sample of wood from a Neolithic burial (B185) of 4216±29 bp or 4860–4630 cal. BP **4629–4851 IN APPENDIX 1** (OxA-14206), must also be viewed with some suspicion given that the other dates on wood from the cemetery are 800 years younger. Excluding these doubtful dates, the 25 dates from 24 burials that can be considered secure, and the nine dates from nine burials that are regarded as semi-secure, indicate that the West Mouth was probably used for Neolithic burial from (at the earliest) *c*. 4000 BP to *c*. 2200 BP, or from *c*. 2000–1500 BC to about 200 BC (Lloyd-Smith 2008; Fig.7.5).

*Mortuary practice in the West Mouth* [LLS]
This section describes the evidence for burial rites in the West Mouth, in terms of how bodies were treated. Further insights into funerary practice come from the study of the Neolithic material culture excavated from the cemetery zone, especially the pottery, which is discussed later under Material Culture.

The Neolithic use of the West Mouth for burial probably began as a series of sporadic and dispersed 'flexed' burials sometime between *c*. 4000 BP and *c*. 3300 BP (Table 7.3). The earliest Neolithic burial dated is Burial B205, first excavated in 1967 (described as 36 inches below the ground surface) and re-excavated by the project in 2003 (Barker *et al*. 2003, 69; Fig. 7.6). This was flexed, like most of the Early Holocene burials, but was accompanied by a trapezoidal polished stone adze, a classic item of Neolithic material culture (Fig. 7.7). Compressed plant remains overlying Burial B205, conceivably associated with extended burial B178 (the base of which was directly overlying and at the same level as Burial B205), dating to 2986±29 bp or 3072–3319 cal. BP (OxA-13491) provide a *terminus ante quem* for B205.

There was then a major change in mortuary practice after *c*. 3300 BP: a formalized and structured cemetery was laid out, with rows of extended burials, frequently in wooden coffins or occasionally wrapped in a shroud (Figs. 7.4 & 7.8). Five groups can be identified: a larger central group, surrounded by four smaller satellite groups, each of the latter located about 2 m from the central group. The central group (Burial Group 7) is notable for its positioning: it is best located for views both inwards and outwards, and also for the spacing of the inhumations, which rarely intercut one another. Grave-goods included pots, stone axes and grinders, beads, basketry and textiles (see below, Material Culture). The regularity of the four burial clusters (Fig. 7.8) suggests that they are likely to represent socially and/or temporally defined groups rather than randomly-selected individuals, such as different family groups within a single community, or associated individuals from a number of different but related communities who used the West Mouth as a collective place of burial. Two clusters of rows of extended burials are located adjacent to the northern cave wall (within Burial Groups 8 and 9), the fourth (Burial Group 11) to the west of the central group towards the cave mouth. The oldest burials appear to have been in the central burial group and the satellite

**Table 7.3.** *Proposed Neolithic and post-Neolithic burial chronology in the West Mouth of Niah Great Cave. (Source: Lloyd-Smith 2008.)*

| Phase | Approximate date range (calibrated years BP) | Description |
|---|---|---|
| 1 | 3500–3300 BP | Dispersed and sporadic flexed burial in the cemetery area. |
| 2 | 2300–2900 BP | Establishment of a formalized cemetery with rows of extended burials including Burial Groups 7, 8, 9 and 11.<br>Possible early secondary burial in Burial Group 11: Jar burial B159.<br>Possible earliest evidence for bronze at the site, placed as a grave-good with a non-local female buried in wooden coffin (B36) and located to the side of the main cemetery area.<br>Open-canopy isotopic signatures probably indicative of mixed agricultural subsistence. |
| 3 | 2900–2700 BP | Widespread transition to non-burnt secondary burial.<br>Proposed date of multiple burials B60B-D and B138.<br>Cessation of Burial Group 11 |
| Hiatus? | *c*. 2800 BP | Possible hiatus, of unknown duration, in burial activity in the cave. |
| 4 | 2800–2500 BP | Widespread appearance of cremation burial.<br>Spatial re-organization of the cemetery, with a shift of focus of cremation burial in Burial Group 7 and the establishment of Burial Group 10.<br>Earliest secure date on bronze artefact in cremation burial B18. |
| 5 | 2500–2200 BP | Cremation burial ceases with a reversion to non-burnt secondary burial.<br>Re-appearance of primary extended burials, particularly in Burial Group 10.<br>End of burial in Neolithic cemetery. |
| Hiatus? | *c*. 2200 BP | Abandonment of Neolithic cemetery.<br>Possible hiatus, of unknown duration, in burial activity at the site. |
| 6 | 2200?–? BP | A shift in burial towards the front of cave mouth with the establishment of Burial Groups 5 and 6.<br>Loosely-flexed primary burials and the continuation of secondary burial including skull burial.<br>Practice of a foreshortened transformational stage of secondary burial possibly being performed in the cave.<br>Possible occupation/camping in front of cave mouth.<br>Closed-canopy isotopic signatures possibly indicative of hunting and gathering subsistence. |

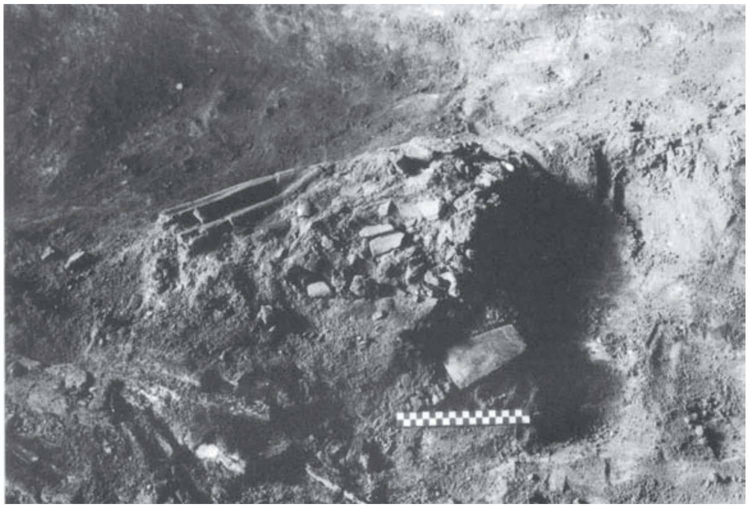

**Figure 7.6.** *Flexed burial B205, the earliest dated Neolithic burial in the West Mouth. Looking north. The polished stone adze shown in Figure 7.7 is visible by the 10 cm scale. (Photograph: Graeme Barker.)*

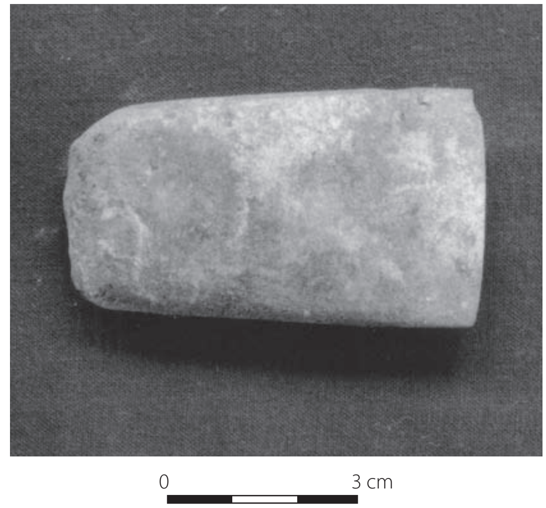


**Figure 7.7.** *Trapezoidal-shaped polished stone adze found on the left side of the torso of burial B205. Scale: 10 cm. (Photograph: Graeme Barker.)*

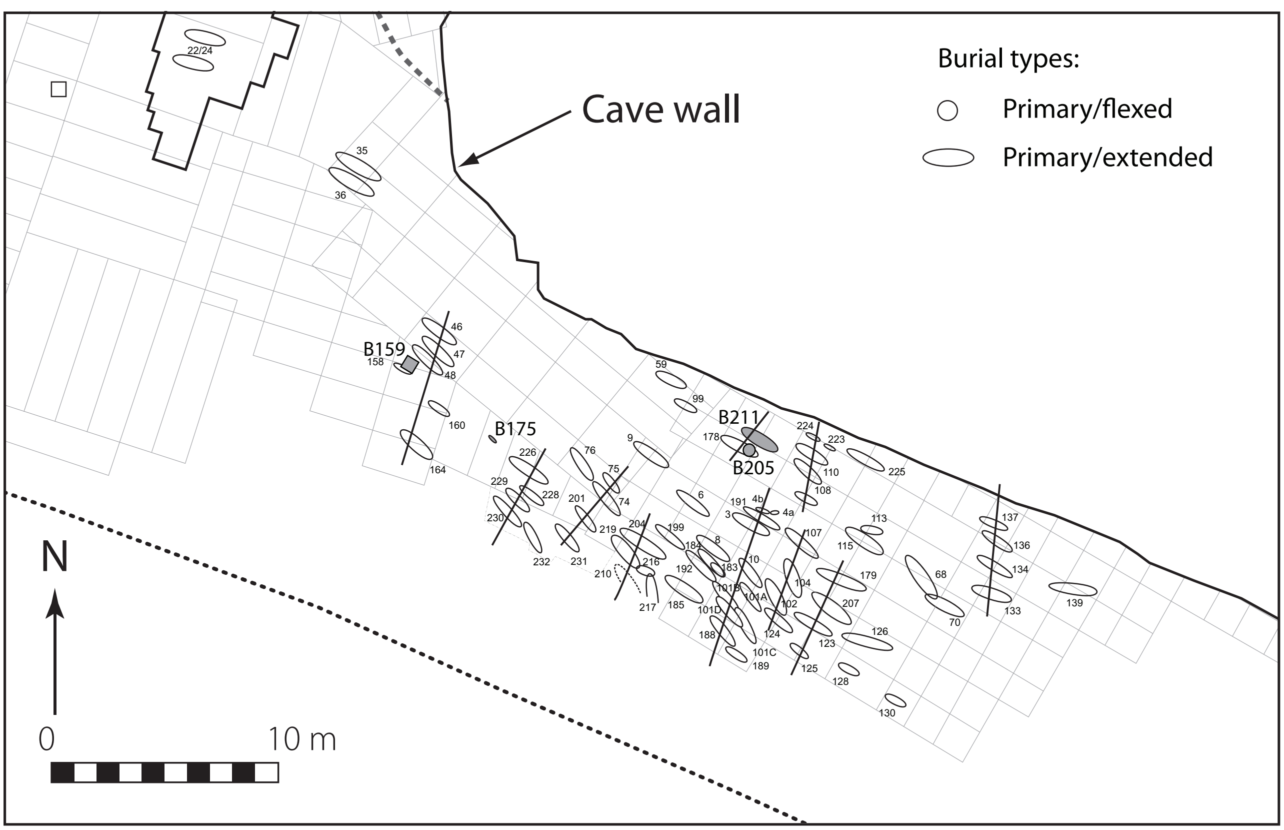


**Figure 7.8.** *The West Mouth Neolithic cemetery* c. *3000–3300* BP*: rows of extended burials, and the beginnings of jar burial (B159). The flexed burial B205, one of the first phase of scattered inhumations dating to between* c. *4000/3500* BP *and* c. *3300* BP*, is shown under two extended inhumations. (Plan: Lindsay Lloyd-Smith.)*


**Figure 7.9.** *Excavation of jar burial B159, which contained the non-burnt secondary remains of five individuals (two adult females, two older children and a younger child). (Harrisson Excavation Archive photograph na 819, reproduced with permission of Sarawak Museum.)*

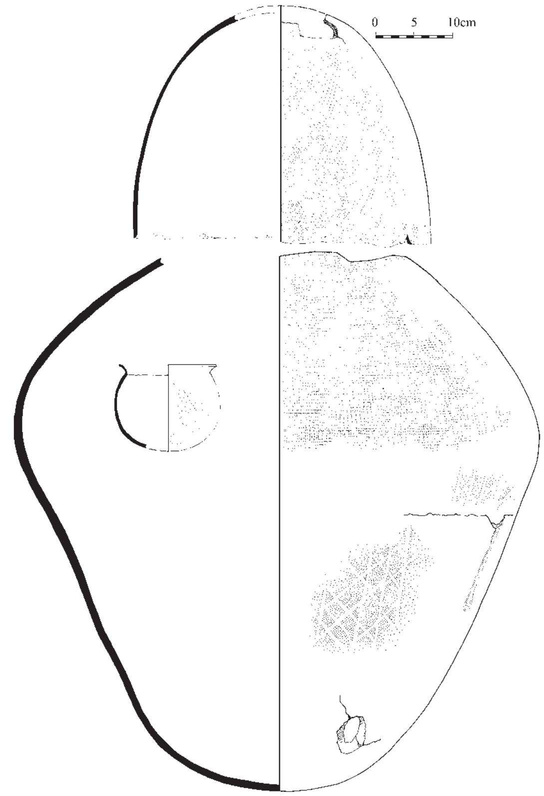


**Figure 7.10.** *Vessel, lid and ancillary bowl comprising jar burial B159. (Drawing: Paul Woodfield.)*

cluster to its west. Most of the burials in the central cluster were recorded *in situ* by the Harrissons and were not excavated. In this light, and given the fact that the southern edge of the excavated area almost bisects the central group, together with the discovery of the early flexed burial B205, it is highly likely that further burials remain undiscovered in this part of the cemetery, where its origins probably lie.

Although extended burial was the dominant rite used in the Neolithic cemetery during its early phase, secondary burial in jars may also have started to be practised on the evidence of Burial B159, a secondary burial from which Barbara Harrisson obtained a radicarbon date on charred wood of 3175±105 bp or 3080–3676 cal. BP (GX-1428; B. Harrisson 1968) and from which we obtained another date, also on charred wood, of 2889±29 bp or 2926–3144 cal. BP **2927–3143 IN APPENDIX 1** (OxA-20995). The burial, the location of which is shown on Figure 7.8, consisted of the remains of five individuals (two adult females, two older children and a younger child) associated with a large ovoid jar, the upper portion of which had collapsed, sherds of a second vessel assumed to have been used as the lid of the jar, and a small bowl thought to have been placed inside (Figs. 7.9 & 7.10). The main jar had a hole punctured into the base, like the drainage holes in the burial jars used by Bornean societies who practised secondary burial up to the 1960s, to allow body fluids to drain away before the skeletal remains were collected for secondary burial (Metcalf 1982; Metcalf & Huntington 1991). As originally placed, the burial jar would have protruded at least 30 cm above the ground surface. Its large size and the presence of the drainage hole suggest that the jar was initially used to hold a primary burial. The skeletal remains were then probably cleaned and re-deposited in the same vessel for secondary burial. In combining elements of primary and secondary burial, Burial B159 is likely to represent one of the first individuals to be given full secondary burial rites.

Secondary burial developed as the dominant rite after *c*. 3000 BP (Fig. 7.11). The transition from

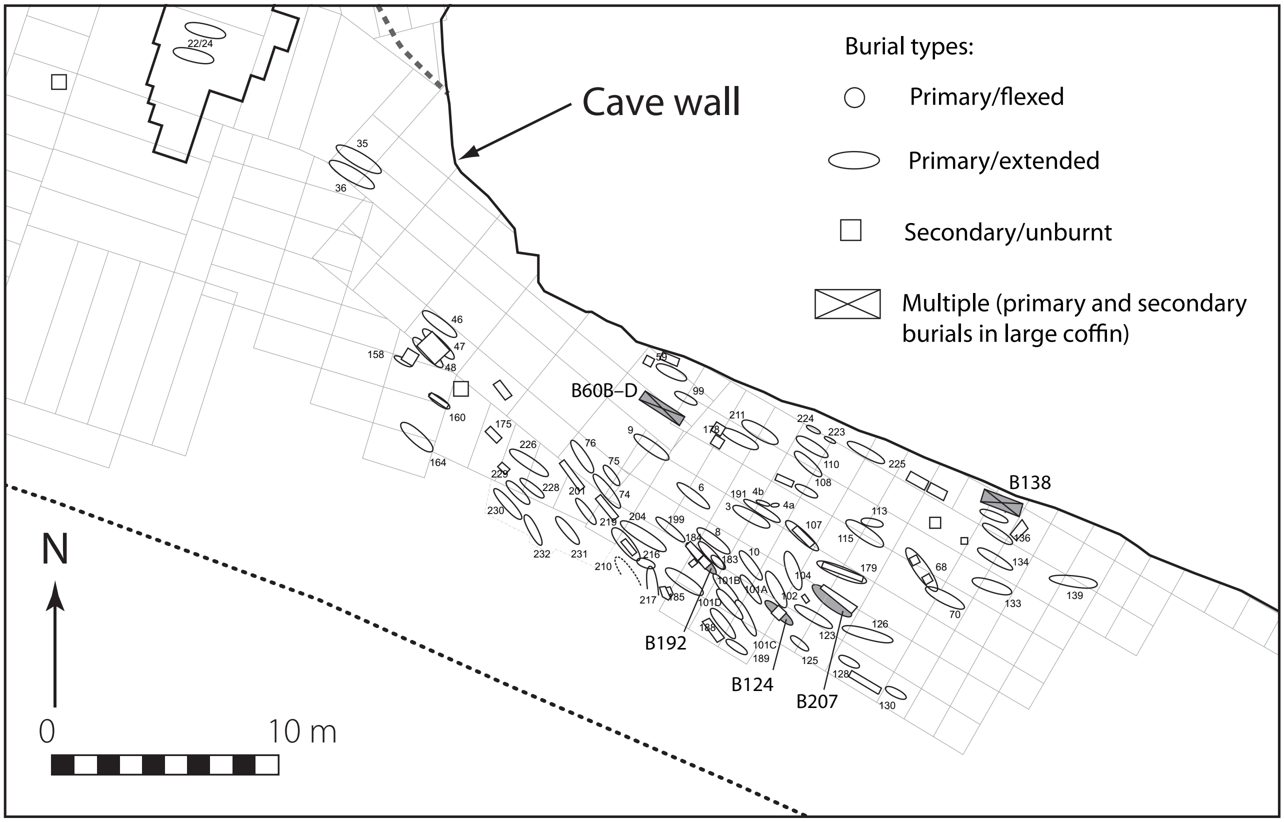


**Figure 7.11.** *The West Mouth Neolithic cemetery* c. *3000–2700* BP*: non-burnt secondary burials and multiple burials. (Plan: Lindsay Lloyd-Smith)* **OUTLINE BURIAL GROUPS??**

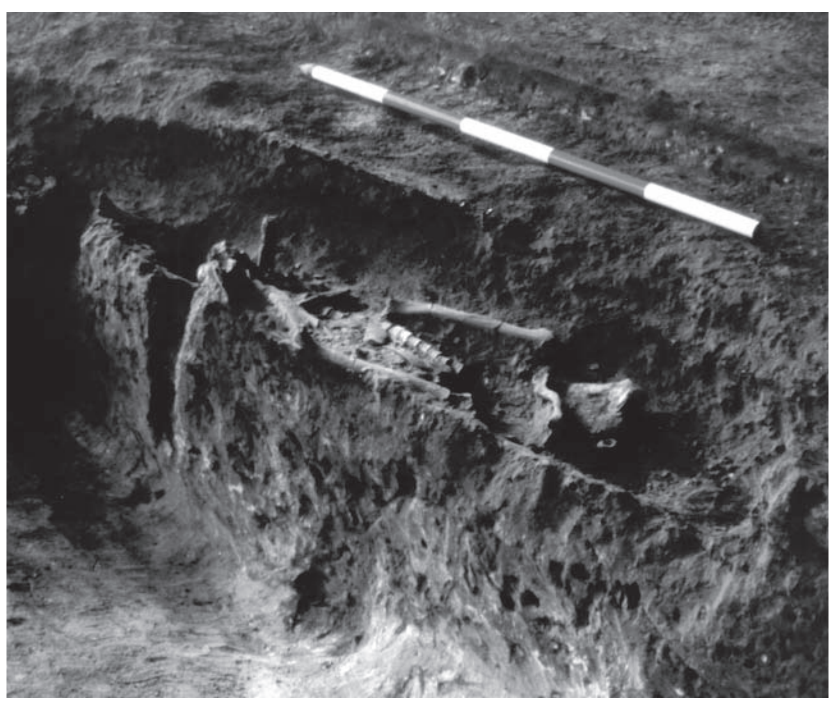

**Figure 7.12.** *Extended burial B211, with a wooden stake in its pelvic area. A circular pit where the skull should be (bottom right) is interpreted as indicating that this burial belonged to the transitional period from primary to secondary burial. Looking northwest. Scale: 1 m. (Photograph: Graeme Barker.)*

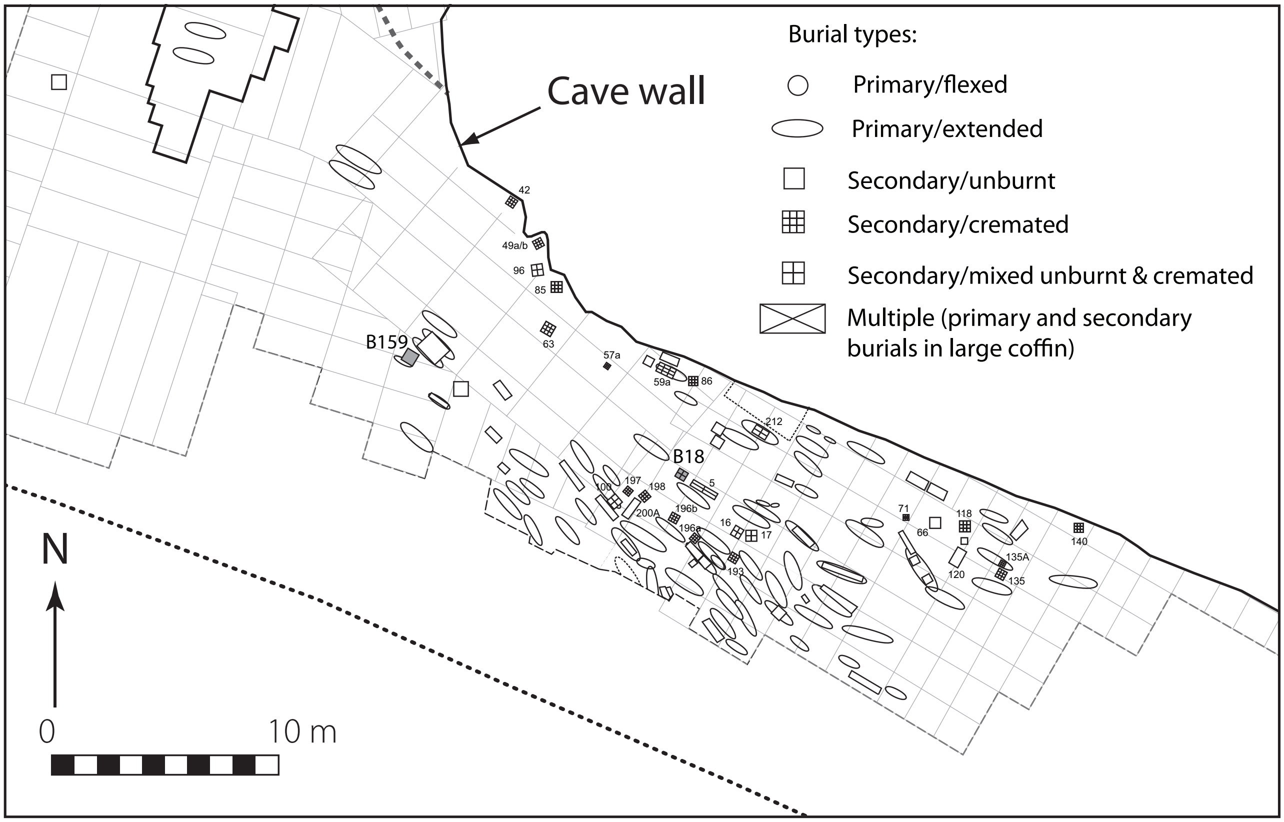


**Figure 7.13.** *The West Mouth Neolithic cemetery* c. *2700–2500* BP*: secondary cremation burials. (Plan: Lindsay Lloyd-Smith)* **OUTLINE BURIAL GROUPS?**

primary to secondary burial involved a transformation in burial rituals, whereby the graves of extended burials were re-opened, the skeletal manipulated, and the skulls removed and possibly curated, before being re-buried sometimes in the same burial or in a subsequent burial placed directly over the earlier extended burial. Some of the human bones have distinctive weathered and exfoliated surfaces suggesting prolonged periods of exposure, so in some instances perhaps flesh was removed at initial burial rites and a selection of bones then re-interred in a secondary burial ritual. The bones were placed in a variety of containers as well as in big jars, for example in bamboo caskets. In some instances it is possible to identify the associated rituals: the skull of extended burial B211, for example, was probably removed through the excavation of a circular pit (Fig. 7.12), subsequently back-filled with wild boar remains. Multiple burials B60 (in Burial Group 9) and B138 (in Burial Group 8) also probably date to this period. B60 consisted of a large hollowed-out coffin on the base of which was a secondary cremation (Burial B60D: two older children wrapped in bamboo), overlain by two primary burials (Burials B60B and B60C: two adult females lying in contorted semi-flexed positions), in turn overlain by an extended burial (Burial B60A).

The transition from using primary to secondary burial rites occurred around 2750 BP, and by 2700 BP cremation was the dominant form (Fig. 7.13). The appearance of cremation burials marked a pronounced spatial re-organization of the cemetery: Burial Group 11 was no longer used, Burial Group 9 was established, and cremations were placed in the centre of the cemetery on the outer edge of Burial Group 7. These shifts in burial location suggest that there may have been a hiatus in the use of the West Mouth for burial before the change in burial practice. Cremation represented an intensification of secondary burial rituals, because it shortened the time between death/primary burial and the preparation of the skeletal remains for final interment. The cremated remains were collected from the pyre and, it appears, an act of libation was performed in which the calcined bones were immersed in a red liquid. The bones were then curated, most likely within the domestic sphere, until the remains of a number of individuals had

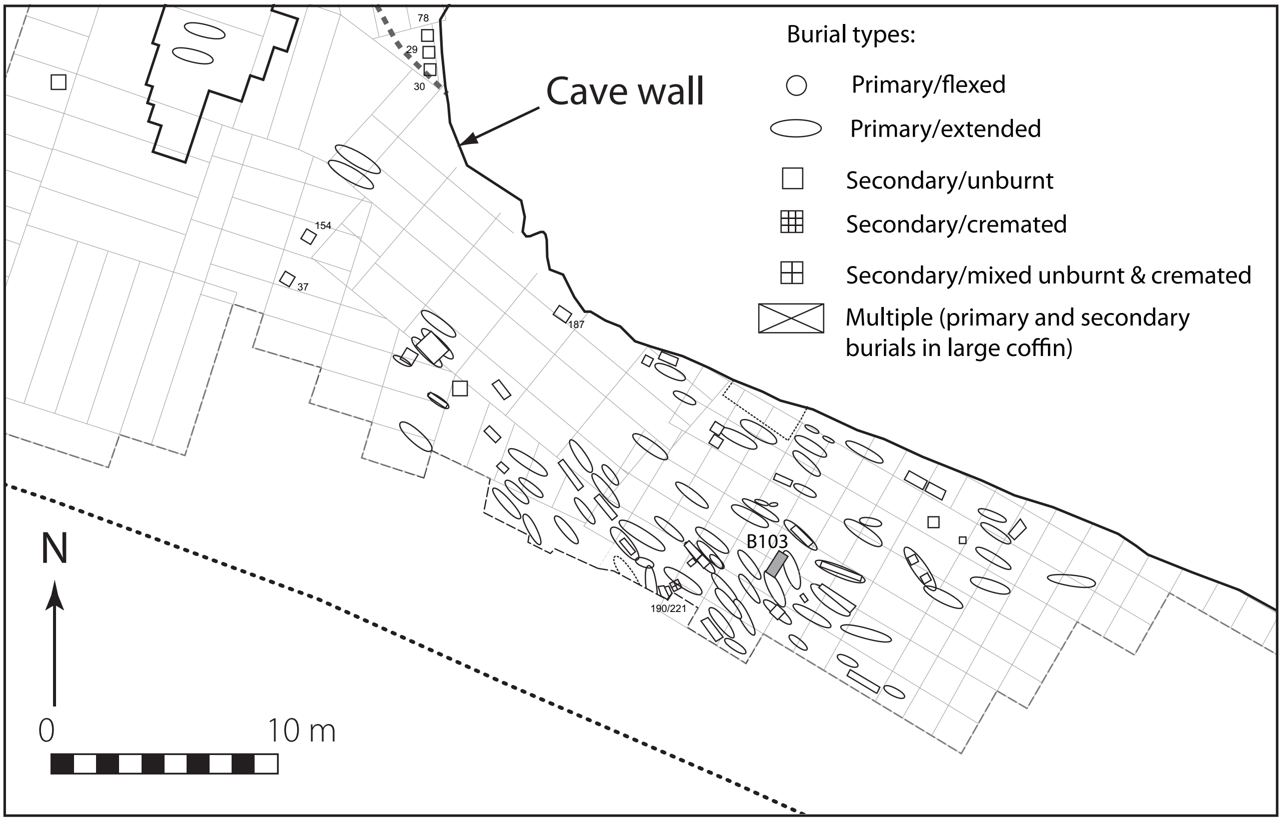


**Figure 7.14.** *The West Mouth Neolithic cemetery* c. *2400–2200* BP*: extended inhumations overlying earlier cremations, and multiple secondary burials; B103 and B190 are secondary burials with reliable radiocarbon dates contemporary with this phase. (Plan: Lindsay Lloyd-Smith)* **OUTLINE BURIAL GROUPS?**

been amassed. The secondary burials with multiple individuals like jar burial B159 indicate not only the maintenance of community/family affiliations but also the increasingly protracted nature of funerary practices. The earliest secure date for a metal object, a small bronze hook or clasp (Fig. 7.35) comes from this phase of the cemetery, from cremation burial B18 in Burial Group 7: a sample of cremated bone from this burial, placed in an earthenware jar, has produced a radiocarbon date of 2577±33 bp or 2508–2761 cal. BP (OxA-22058).

In the final main phase of the cemetery *c.* 2400–2200 BP there was a reversion to non-burnt secondary burial rather than full cremation, and also to primary extended burial, especially in Burial Group 10, with coffins being re-opened for later burials in some cases (Fig. 7.14). The latest reliably dated burial in the cemetery is Burial B103, a secondary burial, with a radiocarbon date on burnt wood of 2223±28 bp or 2152–2331 cal. BP (390–200 cal. BC) (OxA-18451). Following this phase there was a shift in burial away from the main cemetery area towards the front of the cave, with the establishment of Burial Groups 5 and 6. There are examples of loosely-flexed primary burials, and secondary burials including isolated skulls (see Chapter 8).

During our small-scale investigations of the Neolithic burials, we found several instances of evidence of burning, sometimes associated with clusters of gastropod shells. Micromorphological analyses by HL of two places with burning (contexts 2183–2184 and 3052) revealed *in situ* 'micro-hearths' with stratified charcoal and ash and burnt soil, one of which (2183–2184) was directly under a layer of gastropod shells that were probably charred, the other likely to be a single firing episode of some wood. Short-term hearths were also found within areas of jar burials in caves in the Tabon area in Palawan (Fox 1970). Whilst it is possible that some of the funerary practices in the West Mouth may have involved cooking food (see also below, Vertebrate Fauna), the evidence is ambiguous and the burning events and shell deposits may belong primarily to the Metal Age (see Chapter 8, p**. ??**).

Small chips of polished adzes were recovered from six Neolithic burials (**LLS: identify which burials**) in the West Mouth (Barker *et al.* 2003; B. Harrisson 1967). A broken adze from the 1958 excavations in the West Mouth had two holes drilled at one end, suggesting the curation of the artefact even after it became non-functional, perhaps for use as an amulet (Harrisson 1959 **LLS: which Harrisson, and which 1959 reference?**). The frequency of adze fragments in the Neolithic burials suggests that they held special significance. Perhaps the fragments symbolized the whole artefact, or as in the case of some of the ceramics discussed below and as Barbara Harrisson (1958**a, b, c, d or e??**) first observed, the act of breakage or fragmentation may have been part of the funerary rituals, something that has been proposed as a part of funerary practice elsewhere in the region (Andrews & Glover 1976 **NOT IN REFS**; Bellwood 1981 **NOT IN REFS**).

Several wooden posts were discovered during the original excavations, both directly adjacent to, or centrally placed in, the first-phase extended burials. These were interpreted as grave markers, notches in four of the wooden sticks (with Burials B101D, B113, B126 and B179) interpreted by Barbara Harrisson (1967, 157) as perhaps representing some kind of genealogical tallies. Similar posts, and evidence for them in the form of post-holes, were found during our own investigations: extended burial B211, for example, which was directly overlain by non-burnt secondary burial B212, had the worked end of a 5 cm-diameter stake set into the pelvic area (Fig. 7.12). These grave markers suggest that the exact positions of earlier burials, and also possibly the identities of the people buried in them, were important to remember. In this light, the numerous instances of direct and exact superimpositions of burials through the various phases of the cemetery would appear to be deliberate parts of the mortuary rituals that involved remembrance of some kind. The direct spatial congruence between the coffin outlines of primary extended burials and the overlying non-burnt secondary burials implies that the secondary burials followed the primary extended burials within the space of one or two generations. Sometimes the secondary burial rites clearly involved the already-buried, as in the case of secondary burial B212: the bones, possibly contained in an organic container, were placed into a pit dug within the confines of the coffin of earlier extended burial B211, suggesting that the earlier coffin was 're-opened' for the interment of the later burial. Similar direct superimposition was recorded in many burials, particularly around the eastern edge of the central cluster of burials in the cemetery (e.g. Fig. 7.11: Burials B124, B175, B179, B192, B207).

The linkages between the successive burial practices of the West Mouth cemetery suggest that Neolithic funerary rituals acted as 'traditions of memory', the 'second order objectification' (Luckmann **Luckman IN REFS** & Berger 1967) of a cultural system that consisted of a network of communicative signs and symbols through which individuals were able to pass on, or legitimize, cultural knowledge. The memory of past generations was perpetuated through the material symbol of ancestor skulls. In recent and historically-attested societies ritual practices seek to conserve the underlying concepts and structures of a tradition through the manipulation of 'surface details' (Boyer 1990, 13). The practice of exhumation, curation, and re-burial of ancestor skulls in the Niah Caves developed from a pre-existing focus in the primary extended burials — and in the much earlier flexed burials — on skulls as the principal arena for red colouration, a practice possibly designed to perpetuate the memory of the ancestors. One (possibly unforeseen) outcome of this change in ritual practice was the sudden development of full secondary burial rites, whereby first the bodies and then the skeletal remains of the dead were curated for lengthy periods in the land of the living, before re-burial. The rapid adoption of cremation following the switch to secondary burial suggests that the association of the skull with the ancestors was transposed to the cremated bones themselves, as these, like the non-burnt skulls before, were washed in red pigment. The use of multiple burial meant that secondary burial had to wait until the remains of a number of individuals had been collected, the lengthy curation process presumably prolonging ancestral memories still further.

Important insights into the geographical origins of the people buried in the cemetery have been provided by the analysis of the strontium and lead isotopes in their skeletons (Valentine *et al*. 2008). Children acquire a specific signature of strontium and lead isotopes from the water they drink, which in turn reflects local geology, so the strontium:lead isotope ratios in the teeth of a skeleton can be an indicator of whether the individual had been born, lived, and died in the same locality (if the ratios in the teeth and the local groundwater are similar), or whether they must have moved into the area from somewhere else at some stage in their lives. The analysis of the strontium and lead isotopes in the West Mouth population indicates two separate groups, interpreted as representing people from two distinct geographical catchment areas in coastal north Borneo ('A' and 'B'), with a possible third group ('C') from further inland. The dominant group by far, throughout the cemetery's history, was the people from Catchment A, suggesting that this area (wherever it was around the Niah Caves) was a preferred settlement zone, from which people came

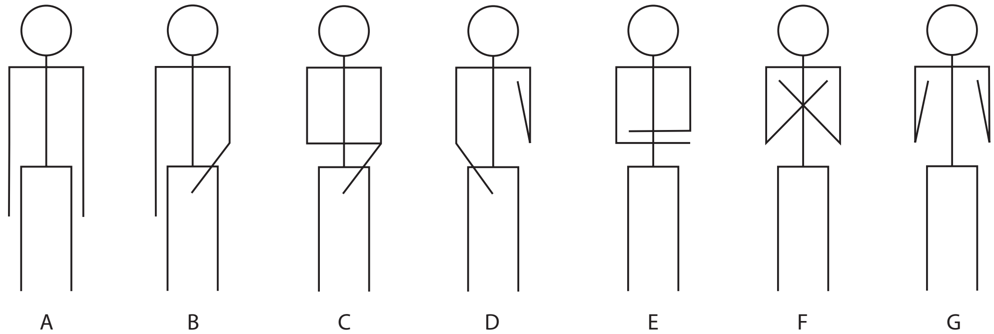


**Figure 7.15.** *Arm positions displayed by extended burials in the West Mouth and Lobang Jeragan Neolithic cemeteries. Positions C, D, and E are found in the West Mouth but not in Lobang Jeragan.*

to bury their dead in the West Mouth. Most of the individuals from Catchment B and C were female.

Both within the large burial group and in the satellite groups, it is possible to identify distinct rows of primary inhumations and, within these, pairs of adult males and females. Moreover, as Brooks and Brooks (1968) noted, people were buried with one of what seem to have been a restricted number of standardized arm positions (Figs. 7.15 & 7.16). Children were buried with both arms laid straight by the sides of the body (Fig. 7.15: position A), as was an adult with a congenital malformed lower arm (B232: Zuraina Majid *et al*. 2005) and an adult female, Burial B36, identified as likely to be non-local from her isotope signature. This grouping implies that the other arm positions may have represented some form of social identifier for (married?) adults belonging to the 'local' population. The Burial B36 woman clearly did not have such an identity, even though she had moved to, and died at, Niah.

The most common position, used for both sexes, was with the arms bent upwards so that the hand rested on or near the same shoulder (Position G). The second most common, also used for both males and females, was with the arms placed symmetrically crossed over the chest (Position F). Women were sometimes buried with their left hand resting on their pelvis area (Position B), though one male burial, B126, was in this position, curiously holding a charred stick in his right hand. Another 'female only' position was the left hand resting on the pelvis and the right hand on the same


**Figure 7.16.** *Burial B107, showing arm position C (see Fig. 7.15), where the right arm is across the chest and the left arm is at 90° across the abdomen. (Harrisson Excavation Archive photograph na 1138, reproduced with permission of Sarawak Museum.)*

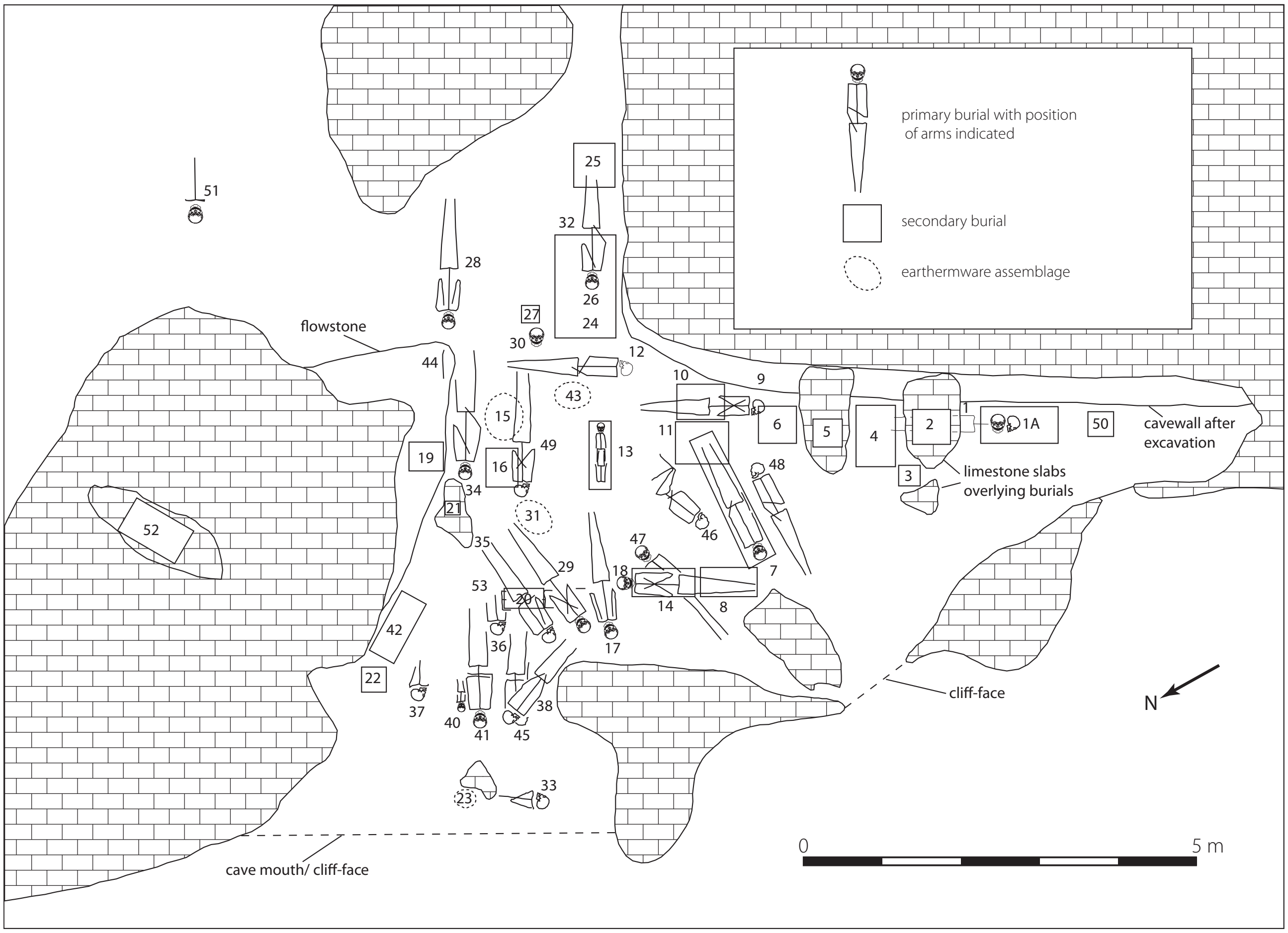


**Figure 7.17.** *Plan of the Neolithic cemetery of Lobang Jeragan, revised following the re-analysis of the excavation archive (compare Fig. 7.3). (Plan: Lindsay Lloyd-Smith; illustration: Christopher Stimpson.)*

shoulder (Position D). A common male-only position was having one arm at 90 degrees across the body and the other across the chest (Position C). The distinctive female hands-on-pelvis burials were largely restricted to the eastern edge of Burial Group 7 and the adjacent Burial Group 8, whereas the male burials with one arm at 90 degrees were widely distributed in the cemetery. It does not seem too far-fetched to suppose that the rows of extended burials represent lineages of family descent. If this was so, the contrasting distributions of the female and male burials within them could imply that the Neolithic societies of Niah were organised according to a partial system of matrilocal post-marital residency, whereby the husband moved to the wife's family group or household, with married couples then being buried together, close to the group representing the female line of descent. The strontium:lead isotope ratios make it clear, though, that on occasion non-local women were also joining the community.

*Mortuary practice at Logang Jeragan* [LLS]

Fifty-five burial numbers were allocated in the original (1961) excavations, but the re-study of the records found that some of these were assemblages of earthenware sherds without human remains and some 'secondary burials' were in fact parts of separately-recorded primary burials. The final calculation was that the cemetery consisted of 25 primary extended and 21 secondary burials, the latter consisting of nine non-burnt, five with mixed non-burnt and cremated remains, and seven with wholly cremated remains. Most of the primary burials were at depths of 12 inches or more, whereas all of the secondary burials were in the top 12 inches and almost all of them in the top 6 inches of deposit, indicating a clear sequence of primary followed by secondary burial. Of the 25 primary burials, 23 were of adults and two were of children, one of them (B13) a double burial (Figs. 7.17 & 7.18). The Minimum Number of Individuals represented in the secondary burials varied between one and five. The total MNI for the cemetery (both primary and secondary burials) was 70. The secondary burials had a greater age range of individuals represented, with fewer young adults than in the primary burials, but this difference probably reflects difficulties of identifying young adults in fragmentary remains rather than a significant demographic change. A best estimate for the duration of secondary burial at the site is between three and four generations.

Red colouration was found on eighteen of the 25 primary burials (especially on the skull, but on the extremity limbs, fingers and toes in two cases) and on fourteen of the twenty secondary burials. Most of the primary and secondary burials were also associated with culturally-modified freshwater bivalve shells, especially the clams *Polymesoda erosa* and *Batissa violacea*. In the case of the primary burials they were usually found under the chin or on the chest, suggesting that they may have been worn suspended from the neck (Fig. 7.19). The ceramic vessel holding cremated remains (B27) also contained a flat ring made from marine conch shell (*Strombus luhuanus*), and others are recorded in the field notebooks with primary burials B12 and B30. Numbers of unmodified brackish and freshwater shells (three species in the family Neritidae and *Paludomus everetti*, all small rounded shells 2–3 cm in diameter) were found in the excavations. The occurrence of one of these inside an intact burial jar suggests that the deposition of freshwater shells was part of the burial ritual, though the possibility that some of the shells derive from an earlier ephemeral phase of occupation of the site missed by the excavators cannot be ruled out.

Similar arm positions to those of the West Mouth extended inhumations were recorded, in this case distributed across the

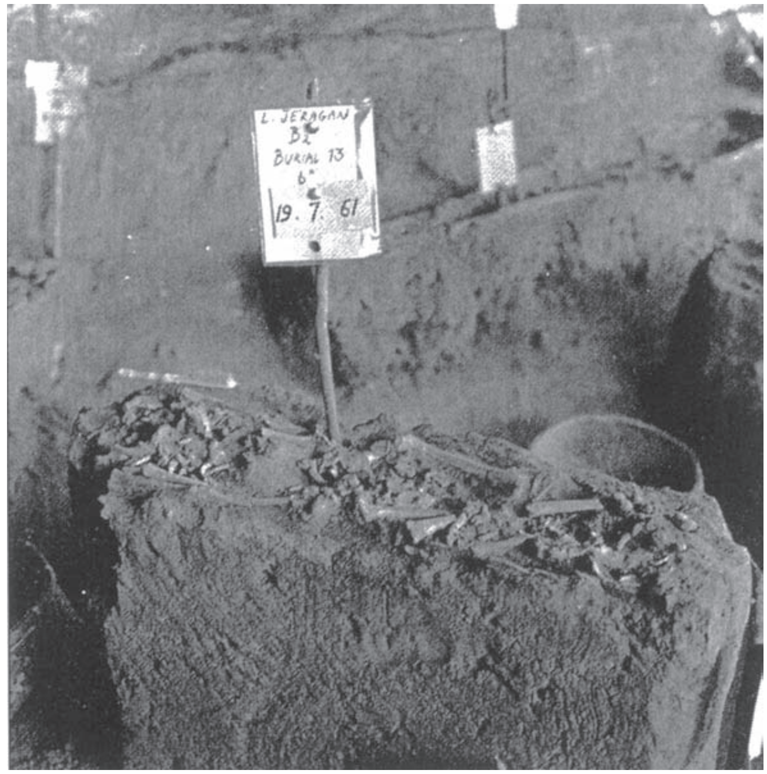


**Figure 7.18.** *Burial B13, Lobang Jeragan: a double primary burial of two children interred in a wooden coffin. (Harrisson Excavation Archive photograph na 94, reproduced with permission of Sarawak Museum.)* **NEED BETTER ORIGINAL**

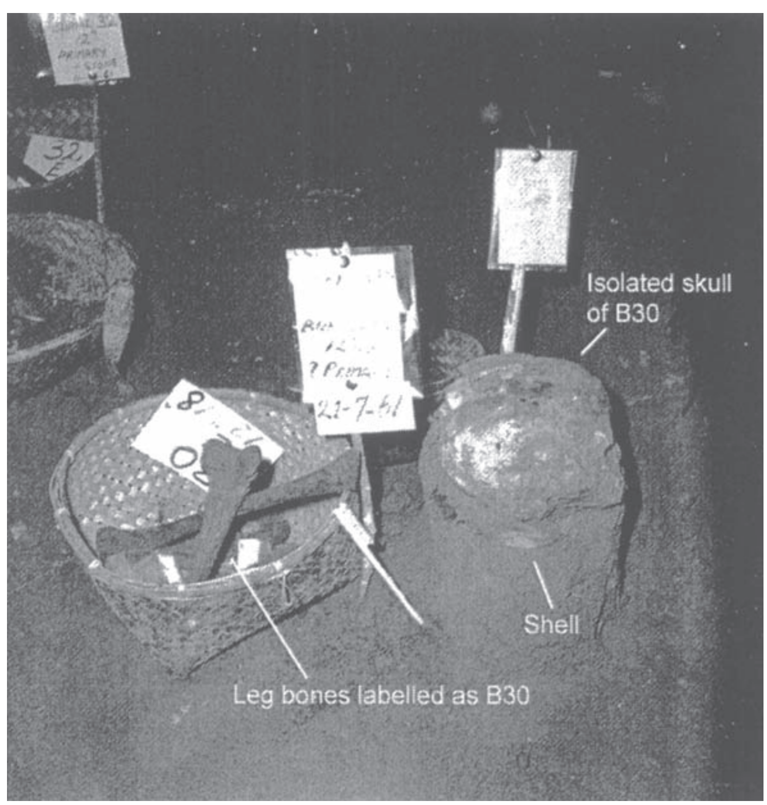


**Figure 7.19.** *Secondary burial B30, Lobang Jeragan, with an intact skull resting on a* Polymesoda erosa *shell (probably worn suspended from the neck). (Harrisson Excavation Archive photograph na 186, reproduced with permission of Sarawak Museum, with notations added by Lindsay Lloyd-Smith.)* **NEED BETTER ORIGINAL**

site rather than in the clusters noted earlier in the West Mouth, perhaps suggesting that the Lobang Jeragan burials were drawn from a more restricted community compared with the people buried in the West Mouth. There also appear to be differences in how gender was marked: one of the positions used for females in Lobang Jeragan, in which both arms rest at 90 degrees across the body, is not found in the West Mouth; the 'hand-on-pelvis' position largely reserved for females in the West Mouth is displayed by both men and women at Lobang Jeragan; and the left hand resting on the pelvis and the right hand on the same shoulder, one of the positions used for women in the West Mouth, is not displayed by either females or males at Lobang Jeragan. If, as proposed in the discussion of the West Mouth data, the positioning of the arms in extended burials signifies an aspect of local identity, the complicated variations evident the West Mouth and Lobang Jeragan burials suggest both connected and separate social histories between the two sites, as well as within the sub-groups represented at each cemetery. If the male-only position with arms at 90 degrees employed in the West Mouth is a reciprocal position to the female-only position used at Lobang Jeragan, one possible explanation could be that the male burials in the West Mouth were of males who had married-in from the Jeragan community.

## Material culture

There were relatively few artefacts found in direct association with Neolithic burials in the Niah Caves, particularly when compared with the rich grave-goods from sites such as Gua Cha, Ban Kao and Khok Phanom Di on the mainland (Higham & Thosarat 1993; Sieveking 1954 **NOT IN REFS**; Sørensen & Hatting 1967 **NOT IN REFS**; Fig. 7.2), or the Tabon cave sites on the island of Palawan in the Philippines (Fox 1970). That said, a fairly large and diverse collection of Neolithic material culture was found in the Niah excavations including earthenware pottery, whole and broken polished stone adzes, worked and/or pigmented shell, very occasional beads and metal work, textiles and burial furniture. Analysis of these is complicated by the fact that, with the exception of Lobang Jeragan, Lobang Batu Parang and Lobang Magala 'E', all the caves used for Neolithic burial have evidence for subsequent burial (West Mouth, Lobang Tulang, Lobang Magala), occupation (possibly in the West Mouth and Gan Kira), or birds-nesting activity (West Mouth, and possibly Lobang Tulang). The most conspicuous distinction between sites with purely Neolithic material and those with mixed period assemblages is the presence at the latter of imported Chinese ceramics, the earliest of which date to the Song and Ming dynasties (twelfth to the seventeenth centuries AD) (see Chapter 8). Whilst there is clearly a danger at the latter sites of Neolithic and Metal Age material culture being mixed, significant insights into Neolithic funerary practice and other aspects of Neolithic life can be drawn from the material that can definitely or with reasonable probability be associated with the Neolithic phase of use of the caves.

*Ceramics* [FC, PD]
During the course of the Harrisson excavations at Niah a significant quantity of earthenware ceramics was recovered from the numerous cave mouths they investigated. The largest assemblage (over 18,000 sherds) was from the West Mouth, but other substantial collections were made from Lobang Hangus, Lobang Tulang, Lobang Jeragan, Kain Hitam, Gan Kira, Lobang Magala and Lobang Batu Parang (Fig. 7.1). Further smaller assemblages were recovered from the Zuraina Majid and NCP excavations in the West Mouth. The combined assemblage of West Mouth and Lobang Hangus pottery was studied by PD and FC, and the pottery from Lobang Tulang, Lobang Jeragan, Upper and Lower Kain Hitam, Magala 'E', Gan Kira and Lobang Batu Parang has been studied by FC for her PhD on ceramics as an indicator of changing identities in the Neolithic and Metal Ages at Niah (see Chapter 8). These studies represent the first comprehensive analysis of prehistoric earthenware ceramics from Borneo, and as such the Niah assemblage now provides a reference for future research. The results of the West Mouth study are presented in detail in Volume 2, Chapter 18.

Most of the West Mouth ceramics were found in the cemetery area, the density of sherds increasing towards the cave mouth, but there was also a significant concentration outside the burial zone near the entrance to the cave and under the rock overhang on the northern wall (Fig. 7.20). In general the ceramics recovered from the burial area were well preserved, with limited traces of abrasion or post-discard trauma (breakage), suggesting that they entered into a secure depositional context either at the point of discard or shortly after. It is likely that most of these sherds were either *in situ* (placed in burials, or on the ground nearby as part of burial rituals) or had been subjected to limited disturbance from secondary burials: there does not appear to have been a lot of constant regular activity in the burial zone other than for funerary purposes. In contrast, numerous sherds towards the front of the cave and under the Area A overhang were highly fragmented and worn, with their break edges rounded, indicating abrasion from trampling, slip-

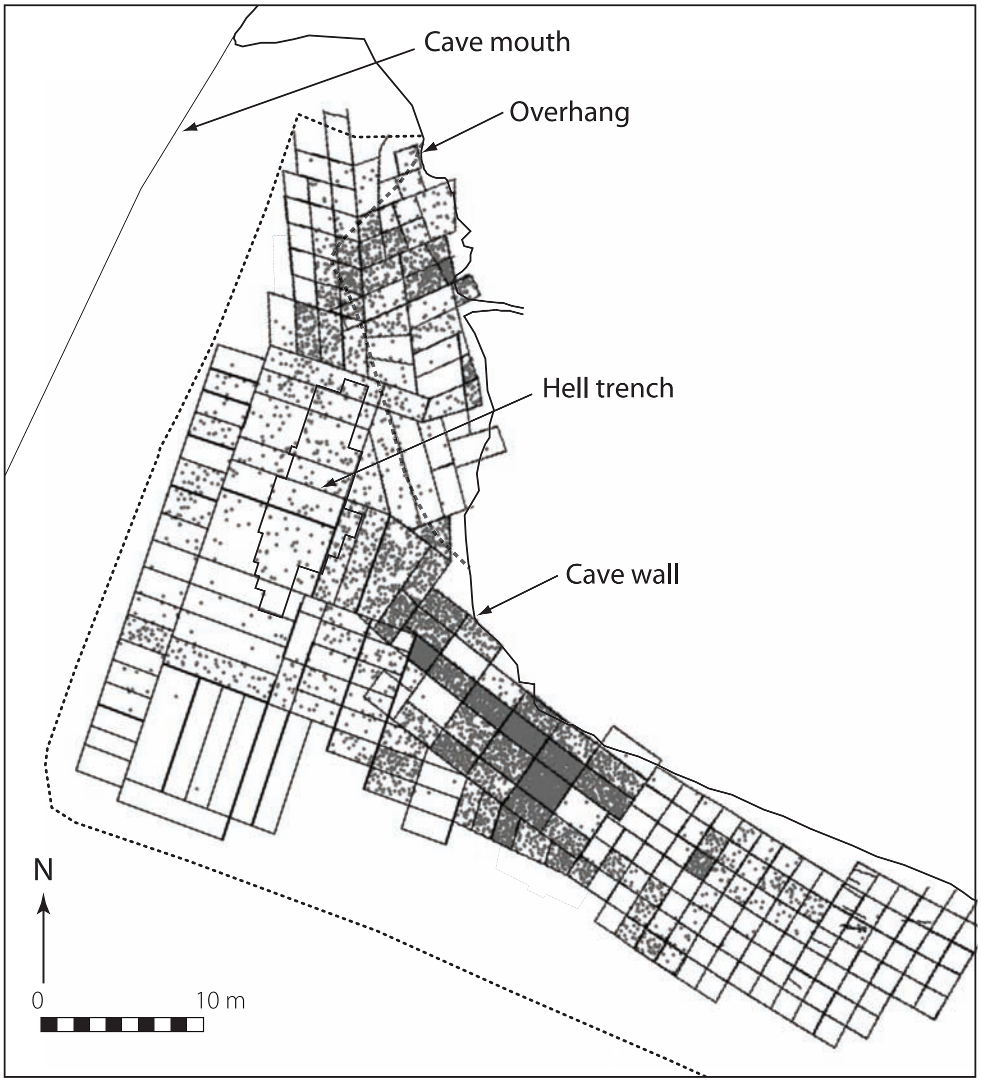


**Figure 7.20.** *The distribution of pottery in the archaeological zone of the West Mouth, Niah Great Cave. (Data compiled by Patrick Daly.)*

page downslope and, especially, water action. (As described in Chapter 3, there is evidence for gullying parallel to the cave wall during the Holocene caused by water flowing along its base towards the rock overhang and the sink-hole buried beneath it.)

The pottery assemblages from the front of the cave and under the overhang have a slightly different range of vessel types to the assemblage from the cemetery area. Smaller vessels dominate, and fragments of well-preserved reconstructible vessels are found alongside heavily abraded sherds. Open bowls are particularly common, emphasizing the differences in use across zones of the cave. The complete pots may be evidence for ritual vessel deposition outside the main cemetery area alongside low-intensity 'domestic' activity involving food preparation and/or consumption. The difference in taphonomy seen in these vessels, alongside their differences in form, may also indicate a more recent date for their deposition than the cemetery assemblage.

With no existing earthenware reference collection from Borneo to refer to, the recognition of vessel types was based upon commonly-defined categories well-grounded within both archaeological and anthropological literature. In the first instance, because most sherds were not diagnostic and could not be clearly assigned to specific vessel type, they were classified according to rough categories of vessel size and wall thickness. Five basic vessel types were thus defined: small and large jars, large urns, bowls, and bottles (Table 7.4). It is evident that there is a fairly even distribution of large and small vessels, with smaller

**Table 7.4.** *Frequencies of principal vessel shapes in the West Mouth of Niah Great Cave. (Source: Franca Cole.)*

| Type | Percentage count | Percentage weight (g) |
|---|---|---|
| Small jar | 37.37 | 31.35 |
| Large jar | 27.71 | 32.33 |
| Large urn | 31.13 | 32.78 |
| Bowl | > 1 | > 1 |
| Bottle | > 1 | > 1 |

**Table 7.5.** *Frequencies of ceramics in the West Mouth of Niah Great Cave by decoration type. (Source: Franca Cole.)*

| Decoration type | Percentage of decorated sherds by count | Percentage of decorated sherds by weight (g) | Mean sherd weight |
|---|---|---|---|
| Basket-marked | 10.06 | 5.62 | 8.82 |
| Complex carved paddle | 2.02 | >1 | 7.18 |
| Cord-marked | 16.33 | 10.83 | 10.47 |
| Diamond-impressed | 30.59 | 24.46 | 12.62 |
| Square-impressed | 25 | 44.06 | 27.81 |
| Incised | >1 | >1 | 34.37 |
| Incised and impressed | 12.04 | 11.65 | 15.27 |
| Ribbed | 3.54 | 1.54 | 6.87 |

numbers of shallow bowls near the cave mouth and bottles, both single and double-spouted, restricted to the cemetery area. As the study developed, more than 260 individual vessels with significant diagnostic characteristics were identified, of which it was possible to reconstruct 140 profiles, representing the majority of vessel types present at the West Mouth (Fig. 7.21). Small vessel forms include a range of open bowls, globular 'cooking pots', bottles and carinated pots. Medium and large vessel forms include 'cooking-' and 'storage'-type vessels, funnel-necked vessels with globular bases, and the unusual double-spouted, and three-colour-ware vessels for which the Niah Caves have become renowned (T. Harrisson 1971; Solheim *et al.* 1959 **NOT IN REFS**). While nearly one third of the catalogued ceramics consists of what may be termed 'domestic' ceramic forms, few of these vessels display the characteristic signs of use such as external sooting and localized abrasion normally expected in a habitation assemblage (Skibo 1992).

Most vessels were made by the paddle and anvil technique, a method used in Borneo for making earthenware pottery for domestic use until recent decades (Baier 2005; Freeman 1957; Janowski 2003; Morrisson 1955 **NOT IN REFS**): a ball of clay is hollowed out using a rounded stone or wooden pestle (the anvil) and the clay is shaped around it by beating with a wooden paddle. Patterns carved into, or fibres bound around, the paddle perform a practical as well as decorative role, providing an uneven surface which breaks up the clay, enabling it to stretch. An additional forming technique was hand-building with strips of clay, commonly used for making rims, carinated upper bodies, and the necks and spouts of bottles and double-spouted vessels. A few vessels such as shallow open bowls were made by draping a flattened clay sheet over a rounded form and paddling the exterior, a technique not previously recorded in Bornean archaeology. The petrology of the fabrics is consistent with the local geology, indicating that a majority of vessels could have been made locally, though conceivably some of these could have been made from the similar near-coastal clays that occur at a distance from Niah.

Many sherds have traces of resin on their exterior surfaces. Applying resin to the outside of a vessel when it is still hot from the firing process was a traditional water-proofing technique in Borneo (Janowski 2003; Morrisson 1955 **NOT IN REFS**). A thick coating of resin daubed on the interior of the vessel was found only in vessels used for jar burial. Analysis of weathered resin from the interior of the jar from burial B190 suggested that it was a triterpenoid resin from a non-coniferous tree (Lampert & Thompson 2002 **NOT IN REFS**).

About 33 per cent by count, and 39 per cent by weight, of the ceramics have some form of surface decoration. For the most part the decoration is clear and easy to categorize, most of it resulting from the use of carved and/or bound paddles applied to the exterior of the vessel prior to firing. Vessels with diamond and squared impressions are the two biggest components of the assemblage (Table 7.5), the decoration being made by beating the outside of the vessel before firing with wooden paddles with carved designs (Fig. 7.22). There is also a significant number of cord-marked ceramics, a form of decoration produced by beating the clay with a paddle wrapped in some kind of cord or thin rope (Fig. 7.23).

Most of the paddle-impressed decoration was found on smaller vessels, especially the globular jars. Remains were found of several large urns covered in very coarse impressed squares, and some of the large funnel-necked jars have basket markings: woven rattan matting was impressed onto the exterior surface of the vessel, a form of decoration uncommon elsewhere in Borneo or peninsular Malaysia (Fig. 7.24; and see below: Textiles). The 'incised and impressed' decoration, most commonly seen on what the Harrissons called three-colour-ware, consists of different rectilinear and curvilinear patterns, incised into the surface of the pots, dividing the surface into zones. The zones demarcated by these lines were then smoothed and left plain, or infilled with an impressed design of circles,

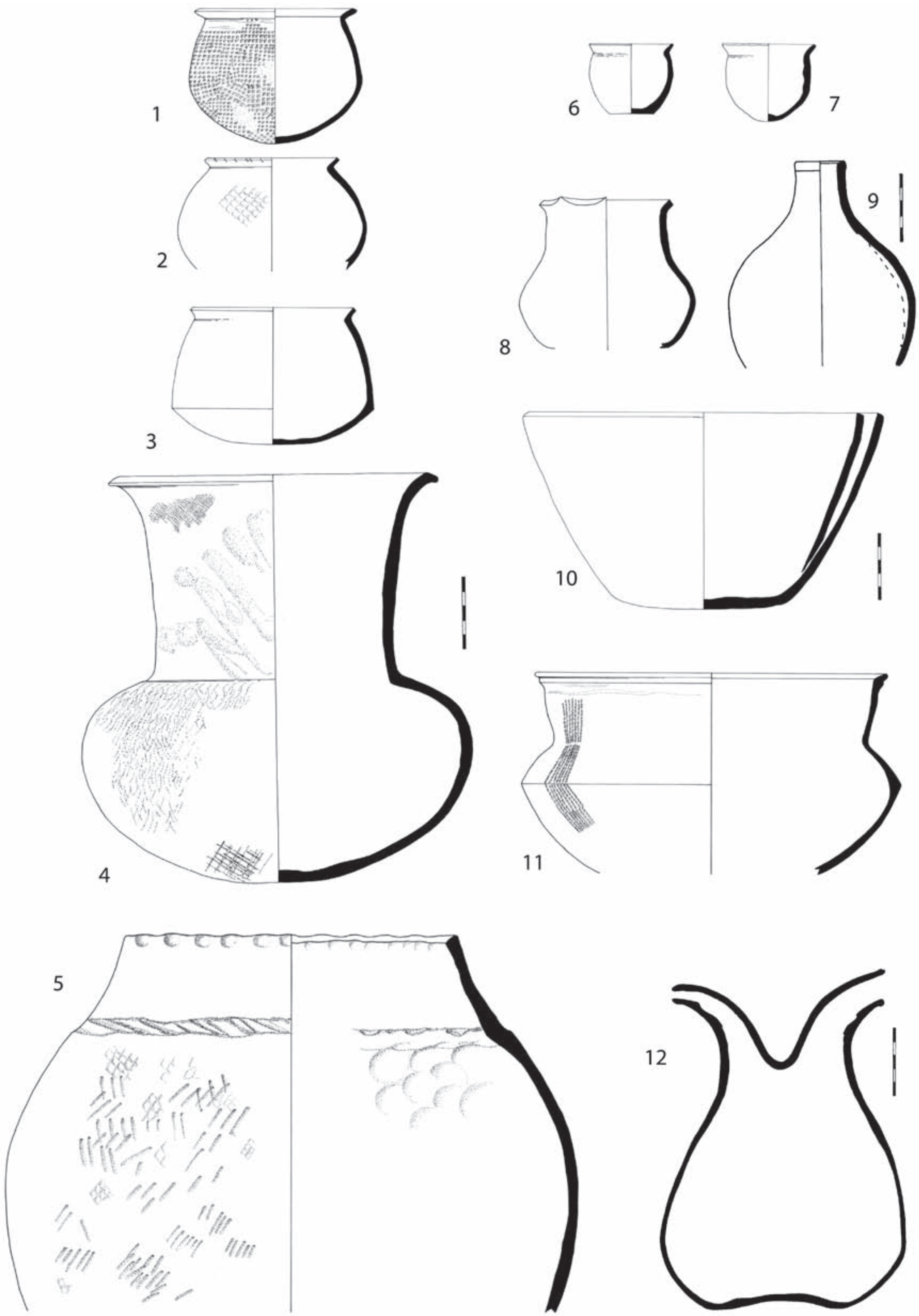


**Figure 7.21.** *Main vessel types recovered from the West Mouth: 1. open mouth deep bowl with rounded bottom (note wide flaring rim); 2. small shallow open bowl; 3. restricted medium-sized rounded jar with carination; 4. large shallow open bowl; 5. pear-shaped jar/flask; 6. small open flat-bottomed bowl; 6. medium-sized globular jar; 7. large burial urn; 8. mini jar; 9. large jar with carination. (Data compiled by Franca Cole; drawings* **BY WHOM??***)*

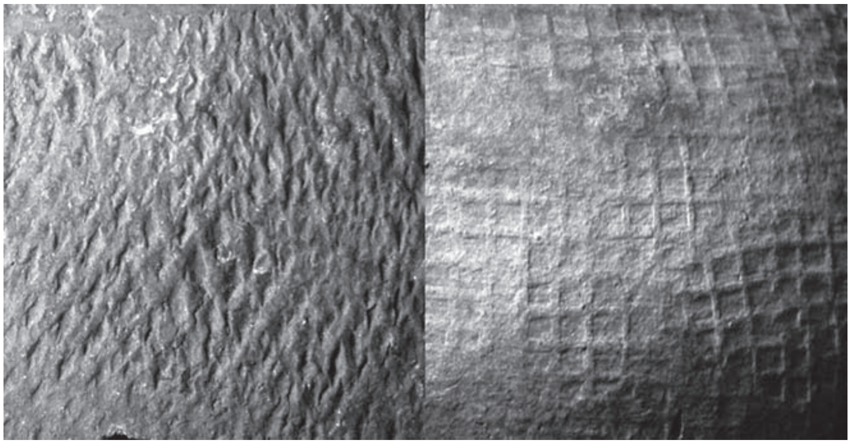

**Figure 7.22.** *Neolithic pottery from the West Mouth: diamond and square impressed decoration. Both images 5 × 5 cm. (Photographs: Franca Cole.)*

**Figure 7.23.** *Neolithic pottery from the West Mouth: cord-marking decoration.* ***Scale??*** *(Photograph: Franca Cole.)*

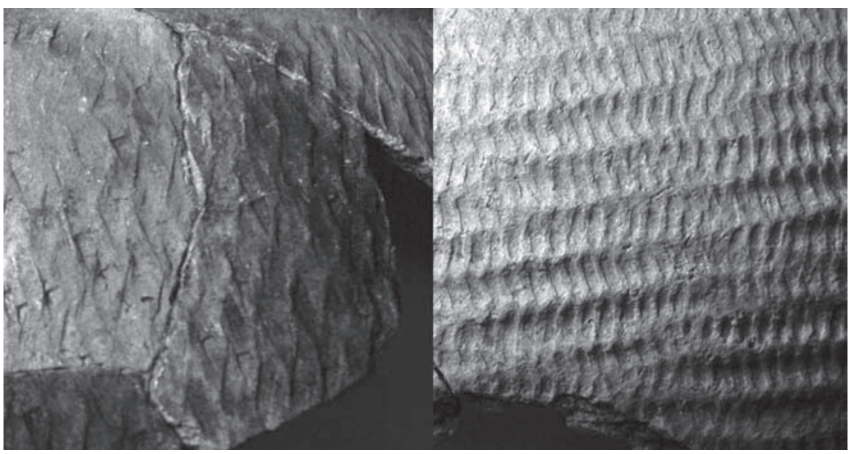

**Figure 7.24**. *Pottery from the West Mouth: sherds with vertical (left) and spiral (right) basket impressions.* ***Scale??*** *(Photographs: Franca Cole.)*


**Figure 7.25.** *Pottery from the West Mouth: sherd of three-colour-ware. Scale in cm. (Photograph: Franca Cole.)*


**Figure 7.26.** *Burial B76, a burial with a group of funnel-neck sherds placed on top of the interment and body sherds from a similar but larger vessel placed inside. The latter were found to join funnel-neck sherds in a burial some 15 m away. (Harrisson Excavation Archive photograph na 416, reproduced with permission of Sarawak Museum.)*

dots or slashes. In the majority of cases these patterns are associated with the application of different pigments, usually reddish and black. Sherds of only three vessels were found that had three colours (reddish, black and white/grey: Fig. 7.25), suggesting that some of the 'three-colour-ware' reported in earlier studies (Solheim *et al.* 1959 **NOT IN REFS**; Wall 1962) may in fact have derived from vessels decorated with incised and impressed patterns filled with red and black pigments, the third colour deriving from the vessel itself**.**

Approximately 80 per cent of the incised-and-impressed assemblage in the West Mouth can be traced back to one of six large vessels, described in an unpublished manuscript in the Harrisson Archive as drum-shaped (Kraszewska 1958). The latter was probably due to their superficial resemblance to the Dongsonian bronze drums, the distribution of which extended into the Malay peninsula and the Indonesian Sunda chain (Bellwood 1997, 277; and see Chapter 8). Sherds of similar vessels are not found in the 'pure' Neolithic ceramic assemblages of Lobang Jeragan, Lobang Magala 'E' and Lobang Batu Parang, their closest comparanda being in the predominantly Metal Age assemblage of Lobang Tulang (B. Harrisson 1958 **WHICH ONE?**; 1959 **WHICH ONE?**). This suggests that the three-colour-ware vessels of the West Mouth were probably deposited in the West Mouth at a later date than the use of the Neolithic cemetery. Fragments of similar vessels alongside fragments of double-spouted vessels were found in Lobang Angin in the Mulu Caves, a site some 80 km southeast of Niah (Datan 1993). Ceramics from Lobang Angin are the closest parallels to the Niah assemblages known to date.

Discussion of mortuary ceramics in terms of grave-goods is complicated by funerary practice in the West Mouth (Cole 2007). Complete vessels were placed on top of or abutting a burial rather than inside the interment. The condition of most of the sherds on recovery shows that many vessels were either smashed as part of initial interment or burial practices, or were broken by subsequent activity in the cemetery, such as secondary or later burials. Sherds and vessel fragments appear to have been important: sherd 'covers' were placed on some burials and sherds from double-spouted or three-colour-ware vessels were placed inside other interments. The funnel-necks of some of the large vessels used to contain burials were broken off and the fragments re-used in different burials. Burial B76, for example (Fig. 7.26), had a group of funnel-neck sherds placed on top of the interment, and body sherds from a similar but larger vessel placed inside which were found to join funnel-neck sherds in burial B178 some 15 m away. In addition, it is apparent that numerous unused, near-complete, vessels were deposited in

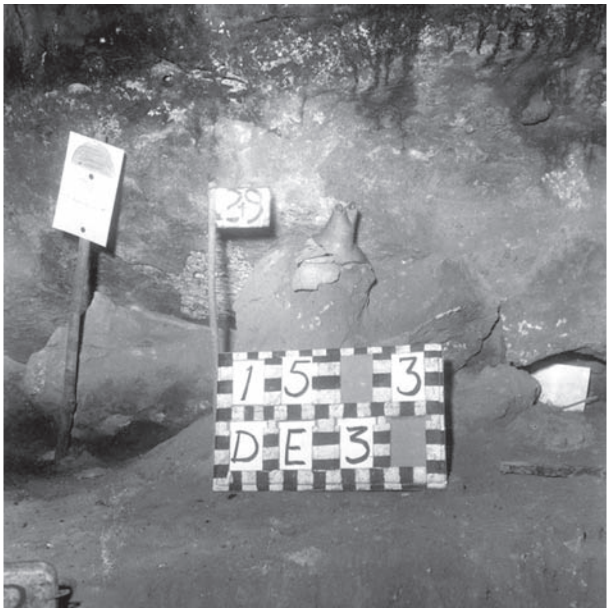


**Figure 7.27.** *Neolithic pottery from the West Mouth: double-spouted vessels: (left)* in situ *found adjacent to a top portion of a cranium of burial B29, and (right) the same double-spout reconstructed. Scale in cm. (Left - Harrisson Excavation Archive photograph na 221, reproduced with permission of Sarawak Museum; right - photograph by Franca Cole.)*

the West Mouth archaeological zone, particularly near the mouth of the cave as noted before, but also in the cemetery, with no association to any known interment, suggesting that a ritual use for pottery extended beyond the purely mortuary arena.

Small globular jars occur in abundance and with many variations, but typically have some form of out-turned rim and impressed decoration on the bodies. They may have served as cooking vessels, with the more open examples being used for food preparation, though only a few have traces of carbonized food residues inside or other signatures suggesting that they were burned or otherwise used for cooking or for boiling water. This implies that most of these vessels were reserved for the funerary rituals practised in the West Mouth, rather than being evidence of authentic domestic activity on site, or of vessels being used first in the domestic sphere and then as part of the burial rituals. The numerous types of bottles, including the remarkable double-spouted vessels (Fig. 7.27), appear to have been wholly reserved for funerary contexts, possibly as marker vessels for interments. A few of these were found outside the cemetery area, but invariably as fragments only.

The development of secondary burial at Niah must have signified an important change in the way people used and thought about pottery. Because many secondary burials were placed in large jars, pottery changed from being a material associated with mortuary practices to a material in which people were buried. Furthermore, whereas the wooden coffins, caskets, bamboo byres and baskets used in earlier burials were completely buried, as mentioned above the burial jars were set partially into the ground, their upper bodies remaining visible as grave markers (Fig. 2.22). Yet this position did not mean that they remained un-disturbed, as there are several instances of burial jars being deliberately collapsed inwards to form a seat for another to be stacked on top, as in the case of burials B190 and B221 (Fig. 7.28).

In addition to the West Mouth, three other cave mouths at Niah produced Neolithic earthenware ceramics from exclusively mortuary and ritual contexts: Lobang Jeragan, Magala 'E' and Lobang Batu Parang. Combined with the lack of evidence for domestic activity in these spaces, this suggests that the people using the Niah Caves in the Neolithic period maintained a clear division between the spheres of the living and the dead, carefully defining the spaces each was allowed to inhabit.

The pattern of predominantly ritual and mortuary use of pottery in the West Mouth and the other entrances with evidence for Neolithic activity fits within the broader context of Neolithic funerary arrangements elsewhere in the region, Palawan in the Philippines in particular (Dizon 2003 **NOT IN REFS;**

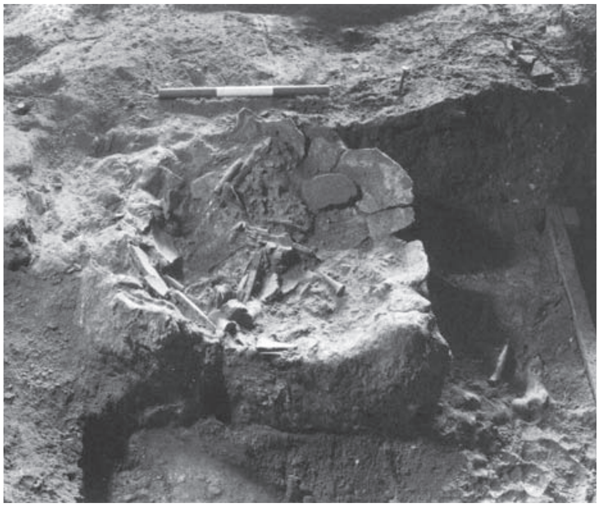
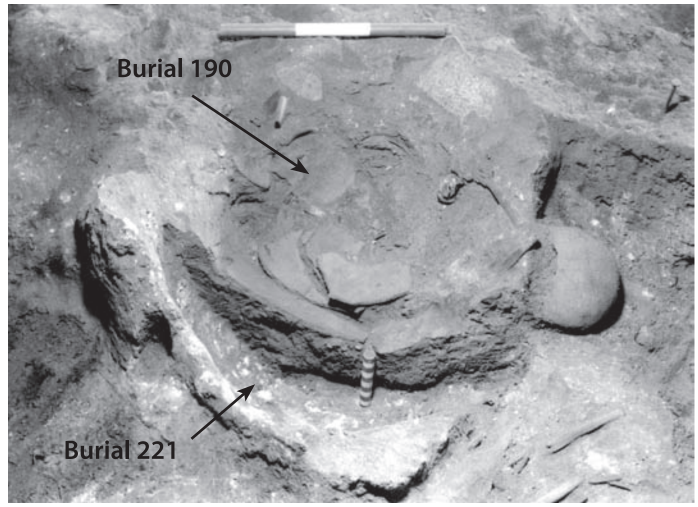


**Figure 7.28.** *(Left) Burial B190, a jar burial stacked directly on top of the deliberately-collapsed jar burial B221, which (right) had been inserted partly overlying the inhumation burial B185, the bones of which are visible to the right. Looking west. Scale: 30 cm. (Photographs: Graeme Barker.)*

Fox 1970; Indrawooth 1997 **NOT IN REFS**). The ceramics themselves, particularly the double-spouted and three-colour-ware vessels, are paralleled at Lobang Angin (Datan 1993; Datan & Bellwood 1992 **NOT IN REFS 1992??**), but have yet to be found elsewhere. There are conspicuous differences in both the Niah ceramics and their use in mortuary practice compared with the regional Neolithic type-sites of Gua Sireh in northwest Sarawak and Gua Cha in peninsular Malaysia. Differences are particularly marked at Gua Cha, where complete cord-marked and tool-impressed vessels were placed inside interments, directly on top of or adjacent to the body (Peacock 1959 **NOT IN REFS**; Sieveking 1954 **NOT IN REFS**). Complete vessels placed inside interments have yet to be found at Niah, and while superficial similarities exist between a handful of vessels, the pots of Gua Cha and Niah differ markedly in techniques of both manufacture and decoration (Cole forthcoming **NOT IN REFS**). The same is true of Gua Sireh, where the only similarity with the Niah Neolithic pottery assemblages appears to be the ubiquitous globular 'cooking-pot'. Little of the Gua Sireh assemblage has been reconstructed, so rim sherds are the most commonly used comparative: notched tool-impressed rims were noted as a common feature, but they represent less than 0.5 per cent of rim sherds at Niah. While much research remains to be done in making valid comparisons at a regional level, at the current level of knowledge it would appear that Neolithic potting at Niah was more related to that of contemporary sites in the Philippines than to those in western Borneo and peninsular Malaysia.

*Stone technologies* [HB]

The paucity of surviving exposures in the West Mouth documenting the development of stratigraphic units within the guano lithofacies during the later Holocene means that it is impossible to determine on secure stratigraphic grounds whether artefacts recovered by the Harrissons in the spits that they dug through the upper 24 inches in the different parts of the site belong to the Neolithic or Metal Age or both. For this reason the stone artefacts are discussed here as a single group in the knowledge that some of them might relate to Chapter 8 rather than to this chapter.

A functional analysis was undertaken on 30 pieces from Area A (in the vicinity of the rock overhang) and Area C (the cemetery zone). Tool types include flakes, grinding stones, mortars and polished stone. The assemblage is marked by technological continuity with artefacts in the preceding phases of occupation: flaked stone continued to be produced from the casual reduction of quartzite pebbles and retouch is extremely rare. Although a full technological analysis of all the ground stone pieces in the Harrisson Excavation Archive needs to be completed, the significant change in the upper spits appears to be the addition of polished stone adzes (though there are a few flakes with polished surfaces at lower levels, up to 36–48 inches), as well as a higher frequency of sandstone grinding stones. (The distinction is made in this discussion between flakes that have been polished, referred to as polished flakes, and flakes that appear to have been removed during the maintenance of polished stone tools.) The assemblage conforms with

**Table 7.6.** *Polished stone adzes from the Harrisson excavations in the West Mouth of Niah Great Cave, from deposits within the upper 24 inches, and their likely functions. (Source: Huw Barton.)*

| NCP tool no. | Type | Raw material | Trench | Depth (inches) | Function |
|---|---|---|---|---|---|
| 129 | adze | igneous | US/18 | 12 | chopping medium to hard wood |
| 130 | adze | ironstone | E/X1 | 24 | chopping |
| 131 | adze | volcanic | H7 | 2 | chopping medium soft plant/pounding plant in depression on surface |
| 132 | adze | volcanic | X5 | 18 | chopping medium to hard wood |

the 'additive' nature of earlier technological changes at Niah: new tool types are added but not subtracted, and there are no major technological shifts in flake production through the Pleistocene and earlier and later Holocene levels. The production of flakes from quartzite pebbles is an idiosyncratic feature of the Niah assemblage, contrasting with the absence at Niah of shifts in stone-tool technologies seen elsewhere such as the production of Hoabinhian 'Sumatraliths' in mainland southeast Asia, bifaces in Sabah (T. Harrisson & B. Harrisson 1971), or microliths from Suluwesi (Bellwood 1997).

Twenty flakes were subjected to microscopic analysis of use wear and residues, selected on the basis of good preservation of working edges and surfaces, though with some attempt to sample across the site and by depth; nine proved to have some evidence of use and three retained organic residues. The sample included four pieces of polished stone (one adze fragment and three polished flakes), two hammerstone fragments, and one retouched flake. The contact materials determined by use-wear analysis included siliceous plant and hard materials as well as mineral pigment. Extracted residues included plant fibres and starches. Only one flake, NCP125, an unretouched quartzite flake from Trench E/F4 at 12–24 inches in depth, had well-preserved organic residues: a green/brown matrix was associated with rounding, a patchy distribution of use polish, and micro-scarring on the lower half of the left-hand margin. Extraction of the residue produced masses of cellulose including ovate parenchyma cells, fragments of vascular tissue, two polygonal starch granules measuring 20 microns in diameter and two ovate granules measuring 29.9 microns and 5 microns in length. Neither the plant tissue nor the starch granules are diagnostic, but the presence of two very different types of starch suggests more than one worked material.

The Harrissons found whole and broken fragments of polished adzes in their excavations in both the West Mouth and the Lobang Tulang cave chambers. All have quadrangular to lenticular cross-sections (Types 2A–D in Duff's categorization: Duff 1970 **NOT IN REFS**, 23–4) and are made of a dark green to black stone. All four of the adzes sampled (NCP129–32) were selected for microscopic study as they had clear signs of macroscopic edge damage on one or both ends (Table 7.6), two of them (NCP131 and NCP132) proving to have traces of organic residue. NCP131 (from Trench H7, at a depth of 9 inches) is an elongate-shaped adze with a lenticular cross-section. Both ends have been ground to produce a cutting edge; one end is slightly tapered with a pronounced area of pitting or battering that appears to indicate use as a mortar or perhaps as a hammerstone, though the latter is less likely due to the morphology of the battered surface. An extraction from this region recovered a plant residue consisting of several pitted vessel members, a thickened fibre and a one large ovate starch granule that is similar in form to types of Dioscoreaceae (yam) starch. NCP132 (from Trench X5, at a depth of 18 inches) is also elongate, lenticular in cross-section with a strongly 'beaked' bevelled end (cf. Tweedie 1953 **NOT IN REFS**). Impact damage is extensive on the working end with step and hinge scarring, heavy rounding, and several larger flake scars with feather terminations that have travelled down the long axis. Damage from impact also appears to have opened up a crack along one side, within which is a yellow 'crumb-like' deposit. The butt end is narrow and tapered and also contains an area of heavy step scarring that may have been caused by housing the adze in a wooden haft. This area also included a deposit of yellow/white matter. Extraction of residue found in the longitudinal crack recovered a single polygonal starch granule with an open vacuole, measuring 11.4 microns in length; this has not yet been identified.

Four polished flakes (NCP088, NCP116, NCP118, NCP124) were identified during analysis of the flaked material. These pieces are rather unusual in having extensive polish formation on their dorsal surface and flake margins. The polish is well developed, sometimes approaching a surface gloss, with strongly-developed striations. Polish may continue across macroscopic flake scarring and flake margins are heavily rounded (Fig. 7.29), often to the point of being bevelled. Striations are readily visible at low magnifications, often clustered, and while consistent in patches, do not indicate any particular directional-

**Figure 7.29.** ***New figure proposed by HB. Details needed. Presumably one of the four flakes he mentions (NCP088, NCP116, NCP118, NCP124) with the microwear and/or residues identified.***

ity or mode of use. These flakes could be maintenance flakes from a large polished stone tool, though they are quite large, and even if they started as maintenance flakes, continued to be used intensively before being discarded or lost. Extraction for residues recovered some cellulose fragments from NCP124, indicating soft plant matter, though the latter is unlikely to explain the heavy extent of polish and edge rounding. NCP118 is also covered in patches of organic matter, which on extraction yielded a residue of thick-walled fibres and two starch granules. The starches are both polygonal grains with a centric, open hilum, 13.3 microns and 15.2 microns in length. They are not yet identified with any known species. The organic residue indicates some contact with soft plant matter, which is also inconsistent with their heavily developed usewear.

In their survey of Sabah's prehistory, the Harrissons noted that 'other stones from island and cave sites include large extraneous pebbles probably used as hammers, pestles, pounders, and rubbers for domestic purposes. It is not possible at this stage of our knowledge to classify them, though we can surmise that they were important in the past, as people took the trouble to transport them' (T. Harrisson & B. Harrisson 1971, 186). Seven such artefacts, two mortars and five grinding stones, were sampled from their excavations in the West Mouth above 24 inches in depth.

The mortars were from Trench M in the cemetery zone, NCP001 from the surface and NCP002 at 3–6 inches depth. Both pieces are multifunctional implements used for plant processing with evidence of grinding, pounding, smoothing, and with traces of mineral pigment (Table 7.7). There are no excavation notes associated with these pieces, but the J/H and M series trenches produced extended burials with associated grave goods, including wood and shell armlets, fragments of a quadrangular adze and earthenware (Harrisson 1967, 160–64 **WHICH Harrisson and WHICH REF?**). NCP001 is a large irregular-shaped mortar manufactured from a small sandstone cobble. One surface is distinctly smoothed and one end is concave and heavily battered with a large crack running across the bowl. Several corners also show evidence of battering. Two surfaces are soot-blackened, which suggests that this tool was kept inside a dwelling above a fire hearth at some point. Plant fibres are visible in the pecked area of the bowl and elsewhere on this piece, and incident-light examination revealed long plant fibres impacted onto the surface of the tool, suggesting that it was used for some kind of plant 'pounding'. The surface is also covered in white fungal filaments and a white 'crumb-like' deposit that is not related to use. NCP002 is a regularly-shaped ovate disc mortar with two pronounced depressions or 'cupules' on opposing surfaces. One surface has a break that shears through one of the pecked depressions, probably from breakage during use. The surfaces surrounding the pecked areas are artificially smoothed. The perimeter of the piece, flat to slightly convex and heavily pecked or battered, may represent a use surface. Two smaller areas of pecking occur on opposite ends of the battered side. One surface near the pecked depression has traces of a red mineral pigment and the other appears slightly soot-blackened. Given its shallow depth in the cemetery, it is highly likely that NCP002 represents a domestic tool of some sort previously associated with a burial. Pitted and cupped disc mortars are known to

**Table 7.7.** *Mortars and grindstones from the Harrisson excavations in the West Mouth of Niah Great Cave, from deposits within the upper 24 inches, and their likely functions. (Source: Huw Barton.)*

| NCP tool no. | Type | Raw material | Trench | Depth (inches) | Used edge | Function |
|---|---|---|---|---|---|---|
| 001 | mortar | volcanic | M | none | 2 | pounding |
| 002 | mortar | volcanic | J/H7 | 3–6 | 3 | pounding |
| 009 | grindstone | sandstone | J/K32 | 0–6 | 1 | pounding |
| 012 | grindstone | siltstone | X/4 | 0–24 | 1 | grinding |
| 015 | grindstone | sandstone | X/4 | 0–24 | 2 | manufacture, grinding fibrous plant/artefact |
| 014 | grindstone | sandstone | W/W66 | 0–24 | 2 | manufacture |
| 016 | grindstone | sandstone | W/E1 | 12–24 | 1 | grinding fibrous plant |

have a wide range of ethnographic functions including for polishing stones, cracking nuts, grinding mineral pigments, and processing plant and insect remains. Examination under incident light revealed polish and wear around the margin of the cupules, suggesting a rubbing mode of use, as well as polish within the cupule suggesting its use as a mortar for crushing or grinding. The soot blackening of NCP002 is consistent with NCP001 and suggests that both pieces were brought to the site from domestic contexts elsewhere. Given the quantity and variety of other grave-goods present, it seems likely that these pieces were part of that tradition, deposited during funerary activity.

The five grinding stones, all from Area A, were made on irregularly-shaped pieces of tabular sandstone of varying thickness that were either rudely shaped before use or may have been unmodified pieces. Their worked surfaces of these items can be classified into three types: (A) flat surface morphology (A), irregular surface morphology (B), and concave in profile (C). On the basis of use wear, Types A and C are generally related to the production of stone implements or at least to heavy grinding of non-organic matter, Type B to plant processing.

NCP009 (from Trench J/K32 at 2 inches depth) is a medium-sized fragment of dark red-brown sandstone, smoothed on its two main surfaces, both of which are undulating (Type B). Under low power magnification the upper surface contains a very visible yellow deposit across the entire surface caught in small irregularities and pits. The lower surface is even more undulating and is also worn smooth. On it and on the sides of the piece is a thick but patchy deposit of red mineral pigment, probably haematite. This surface also contains traces of an organic deposit similar to the one on the upper surface. The organic residue is thick, cracked, and yellow to white in colour. Fungal filaments occur in high numbers and permeate the deposit, a clear indicator that the residue is organic and not mineral. The stone surface is polished with a greasy lustre. Striations are frequent and rather haphazard in direction. They also occur in the residue itself, an indicator that this material was deposited during use. Extraction revealed a large quantity of starch granules and macerated plant fibres. Two main types of starch were present: a form distinctive of palm (4 granules); and a starchy mass (>50 granules) with a bimodal size distribution that is characteristic of some cereals. Small fragments of yellow resinous material are also common within the residue deposit on both worked surfaces. The multiple functionality of this piece is typical of much of the assemblage, and certainly of the mortars and the other ground stone. NCP009 appears to be a grinding stone with a long history of variable use to process palm (possibly pith though palm shoot is also a possibility), some type of grass seed, resin and mineral pigment.

NCP012 (from Trench X/4 at or near the surface) is an irregularly-shaped fragment of tabular siltstone covered on all surfaces with a patchy but thick coating of fibrous, almost paper-like, material associated with a white hydroscopic material that is featureless and similar to latex rubber. It is possible that this adhering matter is post-depositional, indicating that the entire stone was at some point wrapped in thick paper impregnated with some form of glue, but there are several important species of latex-producing trees in Borneo and it is possible that the NCP002 artefact was used to process latex for an unknown function. Extraction of the fibrous material revealed large thickened fibres with circular bordered pitting, typical of vessel elements in secondary xylem and wood.

NCP014 (from Trench W/W66 on or near the surface in the 0–24 inch spit) is made from fine-grained sandstone with two used surfaces; one of Type A and the other of Type C. Under incident light both surfaces have extensive areas of bright polish and flat sheared crystals. The indications are that NCP014 was manufactured primarily for making and maintaining polished stone artefacts and was later recycled to process plant material.

NCP015 (from Trench X4 at or near the surface in the 0–24 inch spit) is a blocky fragment of a larger grindstone, made from fine-grained sandstone. It has two worked surfaces, both strongly concave (Type C), with shallow linear grooves of the type noted by

Zuraina Majid (1982, 63–4), probably related to the production of polished stone tools or, given the shallow depth of this piece, for sharpening metal ones. One of the smaller sides is not ground and contains two straight parallel groves, shallowly incised. Extraction recovered fragments of insect wing scales, plant trichomes (hairs) and some thickened plant fibres from these grooves. The use of this piece to process some plant matter is a possibility, but the predominant function appears to have been related to the manufacture of polished stone artefacts.

NCP016 (from Trench W/E1, in the 12–24 inches spit) is a thick tabular piece of fine-grained sandstone. Like the other sandstone implements it appears to be incomplete, though the pattern of weathering suggests that three sides are intact with one major break bisecting the working surface across its width; if so, the original form of this piece was probably a rectangular slab perhaps twice its current size. The working surface is undulating (Type B). There is patchy contiguous use-polish across this surface, with some crystals sheared flat, suggesting some working of stone. Incident illumination revealed a yellow/orange and white crumb-like residue heavily impregnated with fungal filaments which extraction revealed to have thick-walled cellulose fibres. The tool appears to have been used for both processing both plant matter and polishing stone.

Two extended burials were found with long ovoid river-worn pebbles placed above the heads (Fig. 7.30) that were described as 'long stones' or 'phallics' from their general shape and comparisons with known ethnographic examples from Australia and elsewhere (Harrisson 1959) [**HB: which Harrisson 1959 reference?]** Several pieces had evidence of light battering at one or both ends, but no obvious function could be determined from visual inspection, and microscopic analysis was not undertaken.


**Figure 7.30.** *Extended burial B133, buried with a stone pounder placed above the head and two 'polished bone' rings next to the left jaw. (Harrisson Excavation Archive photograph na 1115* **CORRECT OR 1165??***, reproduced with permission of Sarawak Museum.)*

*Bone and shell artefacts* [RR, KS]

Eighteen bone artefacts (tool and ornamental forms) were recovered during the Harrisson excavations from the upper 24 inches in Area A (Harrisson & Medway 1962; Table 7.8). Five of these pieces were available for re-analysis. The single bone point from Trench E/W2 carried surface modifications that suggested it was probably a piercing implement rather than a projectile (Volume 2, Chapter 16). Originally identified as 'rods and drifts' by Harrisson and Medway (1962), three ornamental pieces were re-confirmed by RR as having been worked. The fifth artefact was a piece of worked pig tusk. A further artefact (from Trench E/W77) originally interpreted as a possible 'pot hook' (Harrisson & Medway 1962, pl. IV) was identified as a fragment from the cranial end of a pig mandible and exhibited no evidence of post-fracture modification. None of the artefacts listed appears to have been associated with the burials beneath the rock overhang.

A total of 23 pieces of worked or modified bone and tooth was reported from the cemetery area (Table 7.9). Sixteen of these were originally identified as various forms of tool and a further piece (from Trench J/K3) was identified as a 'bone carving' (Harrisson & Medway 1962). One of these (M/2) was available for re-analysis and was re-classified as 'worked bone'. A further six pieces were identified during the NCP study of the West Mouth faunal remains, and during our own excavations in this area of the West Mouth: two of these were classified as tools, the remainder as worked or modified fragments. Circumstances prevented a detailed study of the tusk fragment from Trench L7. In addition to the implements, a single fragment of pierced and carved bone was originally

**Table 7.8.** *Worked bone and tusk artefacts (tools and ornamental pieces) from Area A in the, West Mouth. Descriptions in quotes (e.g. 'simple point') refer to the terms given to artefacts in B. Harrisson (1967) and Harrisson and Medway (1962); neither these items, nor those listed as 'unknown', were available for re-analysis. Min. = minimum; max. = maximum; int. dia = internal diameter. (Source: Ryan Rabett.)*

| Trench/ Context | Min. depth (inches) | Max. depth (inches) | Dimensions (mm) | | Description |
|---|---|---|---|---|---|
| | | | Max. length | Max. width | |
| E/W2 | 21 | 24 | 38.1 | 9.32 | Short curved point |
| E/W5 | 0 | 3 | 75.09 | 8.77 | Worked bone |
| E/W66 | 0 | 24 | - | - | Unknown |
| E/X1 | 12 | 15 | 39 | 5 | 'Simple point' |
| W5 | 12 | 24 | 30(RB) | - | 'Cylindrical bead' |
| W/W1 | 12 | 24 | 51 | 7.5 | 'Simple point' |
| W/W1 | 12 | 24 | 42 | 7.5 | 'Simple point' |
| W/W2 | 12 | 24 | - | - | Unknown |
| W/W2 | At 18(?) | - | - | - | Unknown |
| W/E1 | 0 | 12 | 74 | - | 'Rods and drifts' |
| W/E1 | 12 | 24 | 27 (RB ) | 7 | Worked bone |
| W/E2 | 6 | 12 | 104.01 | 12.28 | Worked bone |
| W/X1 | 12 | 24 | 57 | - | 'Cylindrical bead' |
| X1 | At 1 | - | 18 (int. dia.) | - | 'Ring' |
| X3(B) | 0 | 24 | 56 | 7 | 'Simple point' |
| X3(B) | At 14 | - | - | - | Unknown |
| X5 | 0 | 24 | 42.54 | 18.61 | Worked tusk |
| X5 | 0 | 24 | 92 | 23 | 'Spatula' |

**Table 7.9.** *Worked bone and tusk artefacts (tools and ornamental pieces) recovered from Area C (the Neolithic cemetery) in the West Mouth. Descriptions in quotes (e.g. 'simple point') refer to the terms given to artefacts in B. Harrisson (1967) and Harrisson and Medway (1962); neither these items, nor that from L7, were available for re-analysis. Min. = minimum; max. = maximum. (Source: Ryan Rabett.)*

| Trench/ Context | Min. depth (inches) | Max. depth (inches) | Dimensions (mm) | | Description |
|---|---|---|---|---|---|
| | | | Max. length | Max. width | |
| D/E2 | 0 | 12 | 49 | 11 | Modified bone |
| D/E2 | 0 | 12 | 65.25 | 10 | Modified bone |
| D/E2 | 0 | 12 | 87 | 10 | 'Gouge' |
| D/E2 | 0 | 12 | 106 | 11.5 | 'Gouge' |
| D/E2 | 24 | 48 | 77 | 11.5 | 'Gouge' |
| D/E3 | 10+ | - | - | - | 'Bone needle' |
| D/E3 | 42 | 48 | 22.85 | 19.41 | Edge-form fragment |
| D/N2 | 22+ | - | - | - | 'Bone tool' |
| D/N4 | 0 | 12 | 42.25 | 7.75 | 'Gouge' |
| D/N5 | 12 | 24 | 50 | 11.25 | 'Gouge' |
| D/N5 | 0 | 12 | 62 | 57 | 'Turtle tool' |
| H4 | 0 | 12 | 38 | 12 | 'Tusk tool' |
| JI/B | 15+ | - | - | - | 'Bone point' |
| K3 | 0 | 12 | 50 | 24 | 'Turtle tool' |
| L3 | 0 | 12 | 62 | 57 | 'Turtle tool' |
| L4 | 0 | 12 | 32 | 27 | 'Turtle tool' |
| L4 | 0 | 12 | 57 | 8.5 | 'Gouge' |
| L4 | 0 | 12 | 80 | 10 | 'Gouge' |
| L7 | 0 | ? | - | - | Tusk fragment |
| M2 | 0 | 12 | 26 | 10 | 'Gouge' |
| 3259 | - | - | 21.1 | 6.45 | Short sub-tri point |
| 3176 | - | - | 19.49 | 4.62 | Worked bone |

excavated from Trench J/K3 (0–6 inches) in the uphill portion of the cemetery. The face carved into this piece was incised into a surface that had been previously scraped (chatter marks are still visible on surface from this process), possibly in preparation for the carving. The image has somewhat feline-like features, with a pointed chin, broad nose and almond-shaped eyes, but is of a style that does not appear elsewhere in the Niah assemblage (Harrisson & Medway 1962, 338 and pl. I).

In terms of the spatial distribution of these artefacts, most (*n* = 20/23) were recovered from trenches towards the western edge of the cemetery. The 'bone tool' recovered in Trench D/N2 is listed as being from Burial B35 at a depth of 22 inches or more, but the evidence of the association is less clear. Although no other direct association can be made between these artefacts and particular burials, the finds occur in the part of the cemetery defined as Burial Group 10, a group rich in grave-goods dating to the full Neolithic. The only other piece directly associated with a burial is from further back in the cemetery area in Trench JI/B, a 'bone point' reported to be from Burial B17, excavated as a juvenile flexed burial but now thought to be a secondary burial.

Two artefacts of possible Neolithic or later age were recovered by Harrisson in areas of the West Mouth outside those re-studied for the Niah Caves Project. These included a piece identified as a pierced and incised 'bone pendant' from Trench E/B2 (0–12 inches) and a 'pig tooth pendant' from Trench E/G5 (0–12 inches) (Harrisson & Medway 1962).

A number of formal shell artefacts and pieces of worked shell were recovered from excavations in the West Mouth, although as with the stone and bone artefacts it is very difficult to assign any categorically to the Neolithic as opposed to the Metal Age. The firm Neolithic chronology of Lobang Jeragan, however, provides insight into the use of shells for artefact production at this time. Shell artefacts recovered from Lobang Jeragan were of two types: modified brackish/freshwater clam valves and a small, carefully-executed shell ring. The modified clams mostly consist of *Polymesoda erosa* valves coloured with either a powdery or viscous red pigment. They parallel pigmented *P. erosa* shells found elsewhere in the Holocene levels of the Niah Caves, often in direct association with burials. A single valve of the closely-related species *Batissa violacea* was also recovered from Lobang Jeragan, but in addition to being covered in powdery red pigment had been deliberately ground at the umbo to produce a perforation. When taken together with the use of *Batissa* rather than *Polymesoda*, the presence of this perforation makes this artefact unique within the Niah samples. The only formal shell artefact recovered was a small (22.5 mm diameter) fully-abraded ring produced from the shoulder of a gastropod shell, almost certainly *Strombus luhuanus* (Fig. 7.31). A virtually identical artefact, although unprovenanced, is within the collections of the Niah Caves branch of the Sarawak Museum, and what is perhaps an unfinished example was recovered from Gan Kira with a likely Metal Age association.

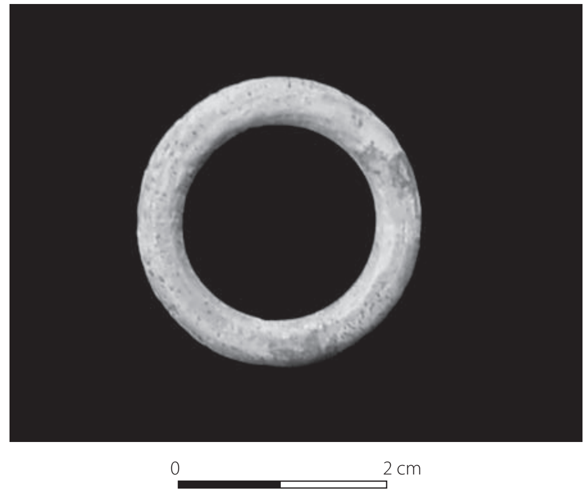


**Figure 7.31.** *Shell ring found in Lobang Jeragan cremated secondary burial B50. (Photograph: Katherine Szabó.)*

*Textiles* [JC]

The high ammonia content of the bat and bird guano, particularly in the West Mouth, preserved a wide range of archaeological textiles or woven artefacts — basketry, cordage, matting and textiles. Most were recovered by the Harrissons, but a number also came to light in the NCP excavations. These include the earliest securely-provenanced archaeological textiles from Island Southeast Asia, those from the West Mouth and Lobang Tulang dating to the latter phase of the Neolithic and to the Metal Age. They are discussed in detail in Volume 2, Chapter 17. Most of these perishable artefacts were worked from indigenous fibre-producing plants, especially rattan or rotan (*Calamus*). Contemporary basket-makers in Borneo use over twenty species of rattan, mostly collected from dipterocarp forest.

The simplest basketry technique evidenced is plaiting, used for example to make a well-preserved basket that encased Burial B198, found in 1967, a cremation jar burial in the central Burial Group 7 (Fig. 7.32). A human bone in this burial yielded a radiocarbon date of 2498±27 bp or 2470–2723 cal. BP **2470–2733 IN APPENDIX 1** (OxA-18360). The contemporary

**Figure 7.32.** *Basket enclosing jar burial B198* **CORRECT??***: (left) photograph taken at the time of excavation, (middle)* **CAPTION??** *and (right) drawing made soon after excavation.* **SCALE??** *(Left - Harrisson Excavation Archive photograph na* **NUMBER??***, reproduced with permission of Sarawak Museum; middle -* **PHOTOGRAPHER??***; drawing: Peter Woodfield)*

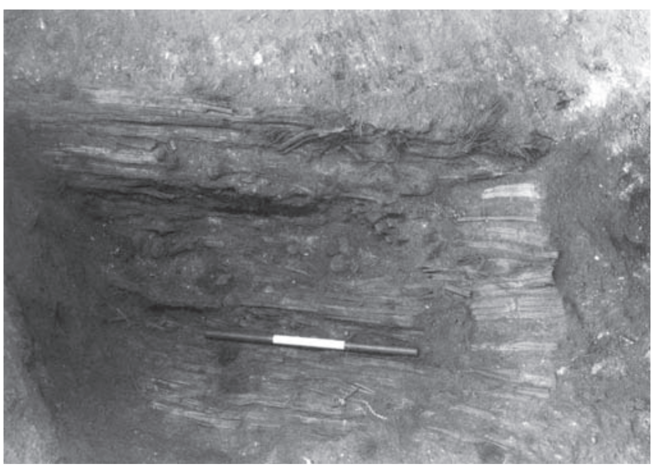

**Figure 7.33.** *Open-twined bamboo basketry used for wrapping burial B219. Scale: 30 cm. (Photograph: Graeme Barker.)*

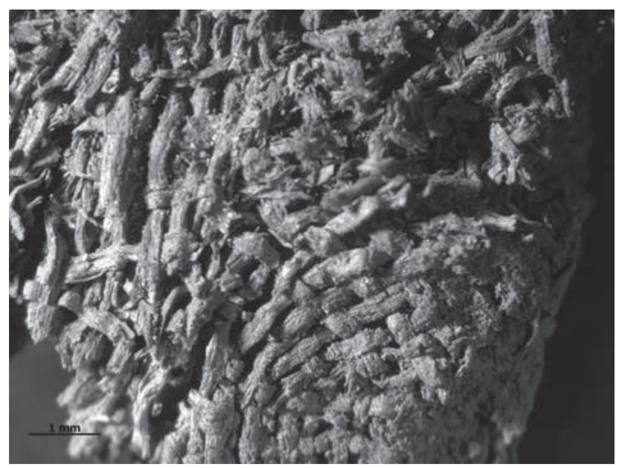


**Figure 7.34.** *An example of 'tabby-weave' matting from cremation burial B200A. (Photograph: Judith Cameron.)*

photograph and drawing show that the basket was probably made by constructing a foundation by laying a series of strands horizontally across each other, which was then plaited with a third horizontal set of elements, the mouth being finished off by weaving several strands around the projecting warps. The concavity of the basket was produced by inserting two small sticks crosswise through the interstices and then attaching an additional warp at each angle. Another basket of identical fibres and using the same techniques enclosed a nearby jar burial, Burial B197. The two handles on the B198 basket suggest that it was probably attached to the jar when it was transported to the cemetery. On the outside of the basket were found fragments of twisted cordage (strips of fibre twisted together), which SEM analysis indicates were of ramie, *Boehmeria nivea*. Today lengths of this plant are cut, stripped, and split longitudinally, the outer layer is removed and the fibres then washed and dried. The outer bark is then removed from the rest of the stalk ('ribboning'), soaked to remove non-fibrous materials ('retting'), and re-dried to prepare for hand spinning.

A second basketry technique was 'open-twining', used to make bamboo caskets, which appear to have been alternatives to wooden coffins for extended inhumations (Fig. 7.33). Open twining refers to the open space left between the elements. The warps were made of rigid bamboo strips, the wefts of soft pliable cord. The weaver would have passed a horizontal cord around a rigid stationary vertical bamboo elements, which Barbara Harrisson (1967, 153) described as 'stems of bamboo with large circumferences, cut open lengthwise ... flattened out and sewn together to form a cigar-shaped casket or tube surrounding the corpse tightly'.

Fragments of matting were found in fifteen wooden coffins and ten bamboo caskets in the West Mouth cemetery and a few isolated fragments were also found near jar burials (T. Harrisson 1975). Several of these come from burials dated in the new radiocarbon dating programme (from Burials B5, B21, B46, B50, B60A, B75, B102, B185, B192), including direct dates on matting from Burials B46, B50, B60A, B102 and B192, indicating the use of this technology throughout the life of the cemetery. The main technique employed was the simplest: tabby weave or plain weave, in which a single weft passes under and over successive warps. An example was found with the cremation burial B200A (Fig. 7.34), together with an example of half basket weave, where the number of wefts had been doubled (in full basket weave both warps and wefts are doubled). The matting was found especially under or over bones, indicating that it functioned as a shroud. There was also an example of matting being used to wrap round a wooden coffin. Most of the matting was made from 3–5 mm strips of *Pandanus*, a species still used for matting in Borneo. Other shrouds were plaited from broader strips of rattan fibres.

*Metal* [LLS]

The 'Metal Age' in Island Southeast Asia is generally used to refer to the period from about 2000 years ago to the time of European colonialism, the period discussed in the following chapter, but 'Neolithic' people using the Niah Caves were probably also acquainted with metal several centuries before 2000 BP. As Barbara Harrission pointed out in her original publication (1967), a number of the 'Neolithic' burials in the West Mouth cemetery were in fact associated with metal artefacts, including bronze knives in Burial B36, an extended burial, and in Burial B63, a non-burnt secondary burial. In 2006 a fragment of a small metal (probably bronze) hook or clasp (Fig. 7.35) was found by LLS amongst the skeletal remains of Burial B18, a secondary cremation burial in a large earthenware jar and an amorphous (molten?) piece of cuprous metal with the remains of Burial B106, a non-burnt secondary burial. A coffin-wood sample from Burial B36 yielded a radiocarbon date of 3182±26 bp or 3363–3449 cal. BP (OxA-18562), comparable with several other dates from Neolithic extended burials in the cemetery but perhaps resulting from the use of old wood for a later burial. This burial, of an adult female of non-local origin and a maritime-base diet according to isotopic analysis (Valentine *et al*. 2008, 1469), was located against the cave wall in the extreme northwest area of the cemetery near Burial Group 10, a group belonging to fourth main phase of Neolithic burial *c*. 2800–2500 years ago. It is possible that pre-2500 BP dates for metal

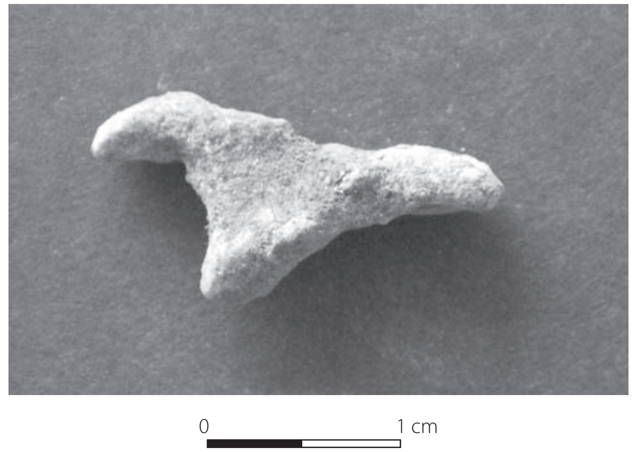


**Figure 7.35.** *Metal (bronze?) clasp or hook found amongst cremated remains of secondary burial B18. (20 mm long, 10 mm wide, 5 mm thick) (Photograph: Lindsay Lloyd-Smith.)*

**Table 7.10.** *Grave-good types and material found in the Neolithic cemetery of the West Mouth of Niah Great Cave.*

| Artefact or material type | Burials | Total |
|---|---|---|
| Bronze artefact | 18, 36, 63 | 3 |
| Bronze lump | 106 | 1 |
| Shell | 47, 96 (found close to burial jar), 154, 190 | 4 |
| Bone | 28, 35, 133 | 3 |
| Jade lingling-o | 226 (found 6" directly above burial) | 1 |
| Jade fragment | 151 | 1 |
| Adze – complete | 5, 118, 196A, 118 | 3 |
| Adze – fragment | 46, 151 | 2 |
| Glass bead | 50?, 60A | 1 |
| Quartz fragment | 44A | 1 |
| Worked wood | 47, 113, 126, 136, 192 | 5 |
| Charred wood | 103, 159, 180 | 3 |
| Red-pigmented *Polymesoda* shell | 44A, 57A | 2 |
| Clay beads | 7, 121, 126 | 3 |
| Fruit beads | 186 | 1 |
| Pigs tusk | 153 | 1 |
| Phallic pebble | 50, 133 | 2 |
| Limestone 'tool' | 43 | 1 |
| Shale stone | 56, 61, 121, 169 | 4 |

objects in the West Mouth are simply the product of the known plateau in the calibration curve *c.* 2500 BP, but the clear stratigraphic and radiocarbon evidence for the continuation of primary and secondary burial activity until *c.* 2200 BP suggests that 2500 BP may well be a realistic date for the first appearance of metal objects at Niah. Their inclusion as grave-goods associated with an intensification in secondary burial mortuary practices and the widespread appearance of rich (for Niah) jar burials (Table 7.10) may be one of the few instances of status differentiation in the West Mouth cemetery.

**The Neolithic population** [JM]

The expansion of Neolithic farmers across Island Southeast Asia envisaged by the Austronesian hypothesis has traditionally been equated with the assumed replacement of an indigenous 'Austromelanesian' population by an incoming 'Southern Mongoloid' population (Ballinger *et al.* 1992; Bellwood 1997; Blust 1999; Brace 1976; Brace & Mahler 1971; Howells 1976; Jacob 1967; von Koenigswald 1952). In the case of Niah, the original classification of burials in the West Mouth into 'Pre-Neolithic' and 'Neolithic' phases (B. Harrisson 1967), coupled with the apparent hiatus in the use of the cave between the Early Holocene and Neolithic phases (which we now know to have been in the order of 4000 years), was assumed to separate two populations that were therefore biologically as well as culturally distinct (Krigbaum 2001). However, it will be apparent from the earlier discussions (above, and in Chapter 6) that the cultural distinction between the 'Pre-Neolithic' (i.e. Early Holocene) and Neolithic burial practices at Niah is far less clear than has been assumed: there is good evidence for secondary non-burnt and cremation burial, thought to be a wholly Neolithic funerary rites, also being practised in the Early Holocene, and the earliest Neolithic burials at the site are tightly flexed inhumations, a rite thought to be wholly 'Pre-Neolithic'.

In addition, the assumption of a marked biological difference between Pre-Neolithic and Neolithic populations has now been shown to be unwarranted by a recent analysis of the shapes and sizes of the skulls and teeth of the West Mouth burials (Manser 2005). The analysis employed the original classification of the burials into Pre-Neolithic (Early Holocene) and Neolithic phases; our reclassification of the burials does not significantly alter this chronological division, apart from re-assigning one burial, B144, to after the Neolithic phase, as discussed in Chapter 8. The fragmentary nature of the skeletal material limited the number of burials that could be included in the study, and cremations were excluded because of the likelihood of distortion of morphological traits and dimensions. The selected material that was studied was drawn from 44 burials in the West Mouth, fifteen Pre-Neolithic (eleven flexed, two seated, one flexed-decapitated, and one possible non-burnt secondary burial), 28 Neolithic (eighteen extended, eight non-burnt secondary burials, and two primary flexed inhumations in a single coffin), and one Post-Neolithic (a semi-articulated secondary burial). Four types of morphological data were considered: cranial non-metric and 3-D landmark (Fig. 7.36), and dental metric and non-metric. A detailed account of the analytical methods and statistical analyses applied to test significant congruence or variation between the Pre-Neolithic and Neolithic data sets is presented in Volume 2, Chapter 22.

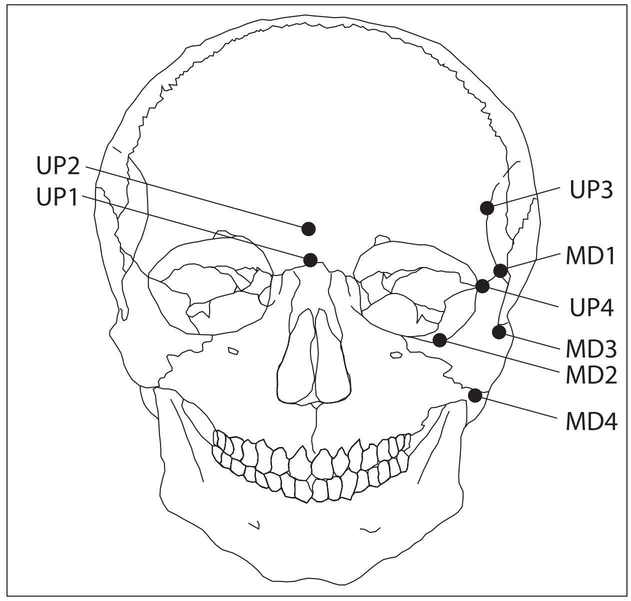


**Figure 7.36.** *Cranial-facial landmarks used for 3-D upper and mid-face analysis. An Austromelanesian morphology is generally defined as being marked by a narrow and long cranial vault, prominent glabellar region, short face with marked prognathism and broad upper face. The Southern Mongoloid morphology is characterized by moderately broad or very broad cranial vaults, facial flatness in the sagittal plane, moderately long faces (superior-inferiorly), anterior projection of the zygomatics, and wide bizygomatic breadths. (After Manser 2005, with the skull adapted from Buikstra & Ubelaker (1994* **NOT IN REFS***); illustration: Christopher Stimpson.)*

The migration/replacement model predicts that in a human skeletal sample spanning the Terminal Pleistocene/Early Holocene and Mid-Holocene peri-

**Table 7.11.** *Cranial non-metric trait frequencies (p) for West Mouth Pre-Neolithic (Early Holocene) and Neolithic burial samples. (Adapted from Manser 2005, fig. 5.1.)*

| Trait (Breakpoint: present/absent) | Supraorbital foramen (1–2/0) | | Accessory mental foramina (2–3/0–1) | | Tympanic dehiscence (TDP) | | Auditory exostosis (1–3/0) | | Palatine torus (PTP) | | Zygomatico-facial foramen (1 & 5/0, 2–4 & 6) | | Accessory infraorbital foramina (AIFP) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample** | **n** | **p** | **n** | **p** | **n** | **p** | **n** | **p** | **n** | **p** | **n** | **p** | **n** | **p** |
| Pre-Neolithic | 13 | 0.231 | 7 | 0.143 | 10 | 0.000 | 9 | 0.000 | 10 | 0.200 | 12 | 0.833 | 4 | 0.250 |
| Neolithic | 14 | 0.357 | 32 | 0.031 | 24 | 0.333 | 26 | 0.038 | 11 | 0.000 | 20 | 0.600 | 4 | 0.000 |

**Table 7.12**. *Dental non-metric trait frequencies (p) for West Mouth Pre-Neolithic and Neolithic burial samples. (Adapted from Manser 2005, fig. 5.5.)*

| Trait: (Breakpoint: present/absent) | $I^1$ shovel (3–6/0–2) | | $I^2$ interruption groove (M, D, Med, MD/0) | | $M^1$ cusp #5 (1–5/0) | | $M^1$ carabelli's trait (2–7/0–1) | | $M^1$ enamel extension (2–3/00–1) | | $M^2$ hypocone (2–5 & 3.5/0–1) | | $M_1$ 6-cusp (6/4–5) | | $M_2$ 4-cusp (4/5–6) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample** | **n** | **p** | **n** | **p** | **n** | **p** | **n** | **p** | **n** | **p** | **n** | **p** | **n** | **P** | **n** | **P** |
| Pre-Neolithic | 6 | 0.333 | 5 | 0.200 | 5 | 0.400 | 6 | 0.167 | 3 | 0.000 | 6 | 1.000 | 4 | 0.250 | 2 | 0.000 |
| Neolithic | 9 | 0.444 | 12 | 0.167 | 15 | 0.400 | 15 | 0.267 | 14 | 0.071 | 10 | 1.000 | 14 | 0.071 | 19 | 0.211 |

ods, specifically the 'Pre-Neolithic' and the 'Neolithic' cultural phases, significant morphological change will be observable in a short period of time, too abruptly to have happened through *in situ* evolutionary change in a single biologically-continuous population. Regarding face shape in the diachronic human skeletal series at Niah Cave, if there had been a rapid population migration/replacement event here then one would predict statistically-significant differences between the Pre-Neolithic and Neolithic samples. For example, Austromelanesian and Southern Mongoloid facial morphologies in recent human samples are clearly distinct from each other when analyzed using traditional and 3-D morphometric techniques (Manser 2005). An Austromelanesian morphology is generally defined as being marked by a narrow and long cranial vault, prominent glabellar region, short face with marked prognathism and broad upper face. The Southern Mongoloid morphology is characterized by moderately broad or very broad cranial vaults, facial flatness in the sagittal plane, moderately long faces (superiorly-inferiorly), anterior projection of the zygomatics and wide bizygomatic breadths. In the case of the Niah populations, however, the three-dimensional analysis of upper and mid-face data sets from the 'Pre-Neolithic' and 'Neolithic' burials failed to reveal significant statistical differences in face shape over time. Analysis of the two data sets detected considerable face shape variation within each temporal sample, such that individuals from one sample overlapped the range of the other sample. In terms of upper-face shape, both temporal samples have relatively tall frontal bones with prominent glabellar regions. The Pre-Neolithic sample has a relatively lengthened superciliary region compared with the Neolithic sample, but they are similar in their mid-face morphology, which can be described as relatively tall, narrow, and with non-flaring zygomatics directed superior-medially.

Statistical comparison of Pre-Neolithic and Neolithic cranial non-metric trait frequencies also detected little or no significant difference. Six of the seven cranial non-metric traits (supraorbital foramen, accessory mental foramina, auditory exostosis, palatine torus, zygomatico-facial foramen and accessory infraorbital foramina) did not differ significantly between the two samples (Table 7.11). Only the presence of a tympanic dehiscence was found to be significantly different at the 0.05 level: the Pre-Neolithic sample had the lowest (0 per cent) and the Neolithic sample had the highest (33.3 per cent) recorded incidence. Nor did the two populations differ significantly in any of the eight dental non-metric traits, appearing to have similar dental patterns (Table 7.12).

It therefore appears from the cranial non-metric, 3-D landmark, and dental non-metric results that — at least in the case of the people buried in the West Mouth at Niah — the two populations are not statistically different from each other. This finding is consistent with the hypothesis that there was continuity of populations between the Early Holocene and the period of the Neolithic cemetery. Of course other scenarios involving varying degrees of migration, interbreeding, and local evolution are possible. Proponents of the Austronesian hypothesis could argue, for example, that small numbers of physically-distinct Austronesians settled in northwest Borneo but that the resulting interaction and interbreeding between them and the much larger indigenous population were so small that gene flow was not enough to change the appearance of the indigenous population. Or they could argue that migration and replacement did take place with the arrival of Neolithic colonists, but that the latter were phenotypically indistinguishable from the indigenous population. A third scenario could be that a migration/replacement event occurred earlier, in the Late Pleistocene, perhaps related to the major population movement predicted by the genetic studies of present-day Southeast Asian populations to have occurred *c*. 14,000 BP in response to rising sea levels (Hill *et al.* 2007 **NOT IN REFS**; Soares *et al*. 2008; Fig. 5.3).

To gain a better understanding of which human populations inhabited Island Southeast Asia or may have migrated into the region during the Late Pleistocene and/or Early Holocene, the West Mouth material was statistically compared with modern Asia-Pacific physical anthropological data from geographical locations across the region. (The methods, results and the implications of this phase of analysis are discussed fully in Volume 2, Chapter 22.) The Early Holocene and Neolithic people at Niah were most similar in face shape, cranial and dental non-metric traits to populations in the region today characterized as southern Mongoloid in morphology (non-Negrito Southeast Asians, Micronesians, and Polynesians), but they also demonstrate similarities to Australian and Melanesian populations.

Unlike results from the previous three analyses, the dental metric analyses did show significant change between the Early Holocene and Neolithic populations in terms of a reduction in the size of the teeth, confirming an earlier study (Brace & Vitzthum 1984). The Pre-Neolithic sample exhibited more instances of greater mesiodistal and buccolingual dimensions in both the maxillary and mandibular dentitions relative to the Neolithic burials. The Pre-Neolithic people had longer posterior maxillary (upper back) teeth and shorter maxillary incisors (upper front teeth) than the people buried several thousand years later in the Neolithic cemetery, and they tended to have longer posterior (back) and anterior (front) teeth in the lower jaw, and narrower lower teeth. These results were repeated in the analyses of posterior crown areas, for which the Pre-Neolithic teeth consistently showed larger maxillary and mandibular occlusal areas.

However, these data are not viewed as supporting a migration/replacement scenario (i.e. a larger-toothed population being replaced by a smaller-toothed population). The difference in tooth size is most likely to be the result of a gradual (and ongoing) process of dental reduction in Bornean populations. This phenomenon has been observed very widely in other human populations (and indeed in many other mammal populations) through the course of the Holocene, such as Mesolithic and post-Mesolithic Nubians, Mesolithic and Neolithic populations in Europe, pre-Neolithic and Neolithic Chinese, and pre-agricultural and agricultural Native Americans (Brace & Vitzhum **Vitzthum IN REFS** 1984; Brace *et al*. 1987; Bulbeck 1982; Calcagno 1986; Christensen 1998; Frayer 1977, 1978), and variously ascribed to adaptations to climate change, population densities, and/or dietary changes (Brace & Montagu 1965, Calcagno 1986; 1989; Christensen 1998; Macchiarelli & Bondioli 1986; Y'Edynak 1978). A reduction in total body size at Niah does not appear to be responsible for the negative dental size trend, because the measure of body size used in this study (centroid size from the 3-D facial landmark data sets) increases rather than decreases from the Pre-Neolithic to the Neolithic: the overall size of the skull (but not necessarily the jaw) increased as the size of the teeth diminished. The likeliest candidate is probably dietary change, possibly associated with changes in food preparation such as the use of pottery for cooking. A dietary shift is in fact indicated by the skeletal chemistry of the Niah population (see below, Stable Isotopes and Dietary Change). While it appears that the peoples' diet may have changed between the Early Holocene and Neolithic phases of activity at Niah, the people themselves did not.

### Diet and subsistence

*Stable isotopes and dietary change* [JK]

Isotopic analyses on the human remains, like the morphometric studies, preceded the re-analysis by LLS of the human burial series at West Mouth, and were based on the original classification system of the burials by Barbara Harrisson (1967) into 'Pre-Neolithic' and 'Neolithic' groups (Krigbaum 2001; 2005).

The principles of stable isotope analyses of diet are encapsulated in the old adage 'you are what you eat', in that the plants and animals consumed by humans vary in their isotopic composition (their stable isotope ratio), such that human diet reflects the isotopic composition of the foods consumed, locked in all biological tissues including teeth, bone, hair, and fingernails. These isotopic ratios are dietary signals that can be measured and quantified using mass spectrometry. Most studies of dietary change in ancient populations using stable isotopes have focused on ratios of $C_3$ versus $C_4$ plants: $C_3$ plants are those that fix atmospheric $CO_2$ using a three-carbon molecule following the $C_3$ photosynthetic pathway, such as trees, shrubs, herbs, shady grasses, tubers, fruits, nuts and most vegetables, and have a wide range of $\delta^{13}C$ values, between –20‰ and –35‰, averaging –27‰. $C_4$ plants, the group that includes most of the cereals, grow in drier more open conditions enriched in $^{13}C$, are characterized by less fractionation with atmospheric $CO_2$ and exhibit a narrower range of $\delta^{13}C$ values, between –16‰ and –7‰, averaging –12.5‰.

Perhaps because rainforest flora is predominantly $C_3$ in composition, and rice is a $C_3$ plant, comparatively little isotopic work on diet has been undertaken in the tropics. However, plants grown in more open conditions in the tropics, exposed to more sunlight, are enriched in $^{13}C$ and have less negative $\delta^{13}C$ values than plants grown in more closed conditions, the so-called 'canopy effect' phenomenon: average $\delta^{13}C$ values at the tree canopy in rainforest are –27‰, compared with –30/35‰ at ground level (van der Merwe & Medina 1991). On this principle, the Pre-Neolithic and Neolithic human remains from the West Mouth were investigated to test the hypothesis that the Neolithic people were farmers who were growing crops on cleared land, and would therefore have less negative $\delta^{13}C$ values than Pre-Neolithic people living as foragers in closed forest (Krigbaum 2001). Following B. Harrisson (1967), all flexed, seated and mutilated burials were classified as Pre-Neolithic and all extended inhumations and secondary burnt and cremated burials were classified as Neolithic. Another important caveat is that dietary data could not be retrieved from bone because of the poor preservation of bone collagen, so third molars were used, to provide a late childhood 'snapshot' of diet using $\delta^{13}C$ values derived from tooth enamel, a biological tissue that is resistant to diagenetic alterations in humid contexts.

The isotopic data from human tooth enamel presented by Krigbaum (2001; 2005) outline a significant difference in dietary regime between Pre-Neolithic and Neolithic groups as analyzed by burial type. The Pre-Neolithic grouping showed a lower mean $\delta^{13}C$ value (–14.3‰) than the average value observed in the Neolithic burial group (–13.1‰; Fig. 7.37). On this evidence, and barring significant $C_4$ dietary input, he suggested that more individuals in the Neolithic group were consuming plants from a more open environment than the Pre-Neolithic group. The difference between the two samples was statistically significant, demonstrating a clear order of magnitude in diet, the conclusion being drawn that this was likely to reflect a change from foraging to farming. However, a greater range of $\delta^{13}C$ values was observed in the Neolithic group, which suggested differential use of West Mouth by different groups of contemporary people who may have used the site in different ways, and had different dietary regimes. In other words, the heterogeneity of $\delta^{13}C$ values in the Neolithic suggested that diets were potentially more mixed than was observed in the Pre-Neolithic individuals sampled.

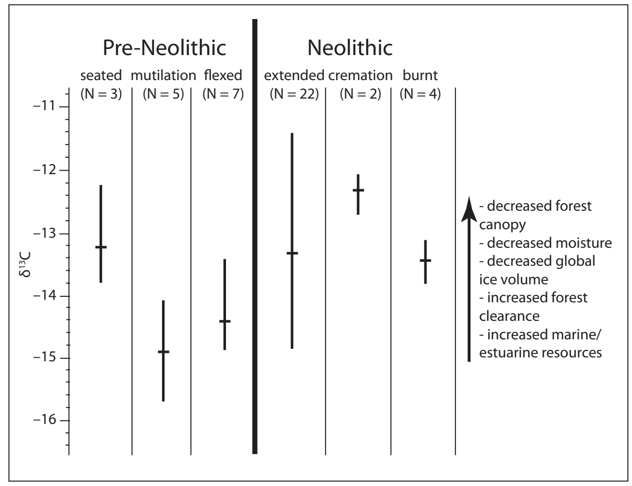


**Figure 7.37.** *Changing trends in δ13C isotope values in Pre-Neolithic and Neolithic human burials, taken to indicate a shift to more open environments (see text for discussion). (After Krigbaum 2005. fig. 4.)*

The interpretation is refined when the data are re-ordered with respect to the re-classification of the burials by LLS, which has shown that some of the sampled flexed burials are not in fact 'pre-Neolithic' but probably date to the period after the Neolithic cemetery. The several individuals classified as 'flexed' had very negative $\delta^{13}C$ values, which undoubtedly exaggerated the average difference in $\delta^{13}C$ values observed between the Pre-Neolithic and Neolithic groups. As palaeoenvironmental analyses have demonstrated (see Chapter 6, and below), there is strong evidence for closed environments for much of the Holocene, although during the Middle to Late Holocene the local environment seems increasingly to have been affected by human clearance activities. As the Neolithic isotopic data demonstrate, the increased heterogeneity of $\delta^{13}C$ values may document a dietary regime shift towards a more closed canopy diet in the latter part of the Neolithic cemetery's history. Extended burial B102, for example, one of the earlier burials in the Neolithic sequence, had a $\delta^{13}C$ value of –13.5‰, close to the average value (–13.1‰) for the twenty extended inhumations analysed, but Burial B103, a secondary burial overlying the feet of Burial B102 and assigned on stratigraphic and $^{14}C$ grounds by LLS to the terminal phase of the Neolithic cemetery, had a $\delta^{13}C$ value of –14.8‰, the same as the Early Holocene flexed burial with the most negative value, Burial B87. The post-Neolithic burials (Chapter 8) also have strong isotopic signals for a closed-canopy diet. The inference is, therefore, that if there was a shift to a diet based more on farming than foraging during the

Neolithic, it appears to have been rather short-lived, with the balance shifting back to foraging by *c*. 2000 BP.

*Vertebrate fauna* [PP, RR]

The vertebrate faunal remains studied by PP and RR that are likely to date to the period 4000–2000 BP derive from two areas in the West Mouth: Area A, under and around the rock overhang, and Area C, the Neolithic cemetery. There is no convincing evidence for the presence of domesticated animals such as the domestic pig *Sus scrofa* at this time.

The Harrisson excavations of the upper 24 inches (*c*. 60 cm) of deposit under the rock overhang produced several thousand fragments of animal bone. Although the deposit as a whole is likely to date from *c*. 3000 BP to the present, it is clear from the state of preservation of the bones that many of them, particularly in the upper 12 inches (*c*. 30 cm), must be of very recent age, and these were discounted from the analysis. The radiocarbon date we obtained on charcoal from the 6–12 inch spit in Trench Y/E3, of 2309±27 bp or 2185–2356 cal. BP (OxA-15150 **OxA-15158 IN APPENDIX 1**), is a further indication that the upper 12 inches probably contains a substantial quantity of mixed modern material. Whilst mixing in the lower (12–24 inches) spits cannot be excluded, the surviving stratigraphic evidence and associated radiocarbon dates in Area A indicate that we can be much more confident that the bulk of the material probably dates to the period when the Neolithic cemetery was in use, compared with the dating uncertainties of artefacts found at shallow depths across other parts of the site, as discussed earlier. Charcoal from this spit in Trench Y/E3 yielded dates of 2676±27 bp or 2749–2844 cal. BP (OxA-15159) and 2619±27 bp or 2724–2774 cal. BP (OxA-15160). As in the case of the ceramic assemblage from these spits, many of the animal bones were poorly preserved, demonstrating the effects of weathering and surface erosion caused by repeated wetting and drying, and with slight to moderate levels of surface abrasion and rounding as a result of surface transport and some post-depositional movement.

The faunal sample from Area A tentatively assigned to the Neolithic phase consisted of 820 bone fragments, of which 168 (20.4 per cent) could be identified to family and 130 (15.8 per cent) to genus or higher taxonomic level including nine fragments of human bone (Table 7.13). Pig is the most common taxon represented in the assemblage ($n = 84$), and the four molars that were sufficiently well-preserved to be measured all fall comfortably within the expected range of the wild bearded pig *Sus barbatus*. Other terrestrial game animals represented include sambar deer, barking deer and mouse deer. Arboreal and semi-arboreal taxa include orangutan, leaf monkey, long-tailed macaque, giant squirrel, a flying squirrel, a hornbill and the crested goshawk. In addition there are reptile taxa from large rivers, streams and lowland swamp forests such as the Asian soft-shelled turtle, which buries itself in the silt and mud at the bottom of slow-flowing rivers, lakes and ponds, and the Malayan flat-shelled turtle, which prefers small rivers or swampy water-logged ground. The diversity of this fauna makes it clear that there were areas of closed rainforest as well as more open terrain within hunting range of the caves in the period 4000–2000 BP, much as the palynology implies. Overall, there is little difference in the faunal composition of this admittedly small vertebrate assemblage compared with those of preceding phases of activity.

Molar shape analysis of pig teeth from a Harrisson spit in Area A of the West Mouth (Trench X4 0–24 inches) and from a late Neolithic (though possibly Metal Age) spit at Gan Kira (Trench Y/A10 30–36 inches and Trench Y/D16 6–12 inches) also indicates that they belong to *Sus barbatus* rather than to the domesticated pig *Sus scrofa* (Cucchi *et al*. 2009). A few teeth of domestic pig (a single individual) were found in Lobang Magala E (Medway 1973), one of the caves used for Neolithic burials, but the context of their location as described in the excavation notebook, in topsoil between rocks away from burials, makes it highly likely that they are post-Neolithic.

The vertebrate fauna recovered by the NCP excavations in the area of the Neolithic cemetery in the West Mouth consisted of 2210 fragments from 58 contexts, of which 102 were identifiably human and 115 were identifiable to other families/species. On the evidence of their taphonomic modifications in comparison with the identifiable human bones (often dark brown in colour and heavily weathered), most of the other 1775 'indeterminate' fragments are also probably human. In addition, surface cleaning and excavation of re-deposited and re-worked layers overlying stratified archaeological features produced in excess of 1000 fragments of bone. The variability in the states of preservation of this material suggests that it consists of a mixture of indeterminate fragments of human bone and associated animal bones, re-worked fragments pre-dating the cemetery, and fragments post-dating the burials. The 41 bones recovered from secure grave contexts included small fragments of hard-shelled turtle carapace, the occasional extremity bone of monkey, monitor lizard vertebrae, and pig.

The inclusion of animals is a rarely reported feature of prehistoric burial traditions in Island Southeast Asia, but some other examples do exist for the region. For example, in the fifteenth-century AD burials in

**Table 7.13.** *The number of identifiable specimens (NISP) of vertebrate remains from Harrisson excavations of 'domestic' contexts above 24 inches depth likely to be of Neolithic age in Area A of the West Mouth.*

| Order | Family | Taxon | Common name | NISP |
|---|---|---|---|---|
| Testudines | Geoemydidae | *Cyclemys dentata* | Asian leaf turtle | 1 |
| | | *Heosemys spinosa* | Spiny hill turtle | 1 |
| | | *Notochelys platynota* | Malayan flat-shelled turtle | 2 |
| | | Geoemydidae spp. | Hard-shelled turtle | 20 |
| | Trionychidae | *Amyda cartilaginea* | Asian soft-shelled turtle | 2 |
| | | Trionychidae spp. | Soft-shelled turtle | 4 |
| Squamata | Varanidae | *Varanus* sp(p). | Monitor lizard | 9 |
| Falconiformes | Accipitridae | Accipitridae sp. | Hawk | 1 |
| | | cf. *Accipiter trivirgatus* | Crested goshawk | 1 |
| Coraciiformes | Bucerotidae | Bucerotidae spp. | Hornbill sp. | 1 |
| Primates | Cercopithecidae | *Macaca fascicularis* | Long-tailed macaque | 2 |
| | | *Macaca* sp. | Macaque sp. | 1 |
| | | *Presbytis* sp(p). | Leaf monkey | 4 |
| | | Cercopithecidae spp. | Monkey | 10 |
| | Ponginae | *Pongo pygmaeus* | Orangutan | 9 |
| | Hominin | *Homo sapiens* | Human | 9 |
| Rodentia | Sciuridae | *Petauristinae* sp. | Flying squirrel | 1 |
| | Hystricidae | Hystricidae sp. | Porcupine | 1 |
| Carnivora | Viverridae | *Arctictis binturong* | Bear cat | 1 |
| Artiodactyla | Suidae | *Sus* cf. *barbatus* | Bearded pig | 84 |
| | Tragulidae | *Tragulus* sp. | Mouse deer | 1 |
| | Cervidae | *Muntiacus* sp. | Barking deer | 1 |
| | | *Cervus unicolor* | Sambar | 2 |
| | | | **Total (NISP)** | **168** |

the cave site of Lobang Kudih on the Sungei Terus near Beluru, Sarawak, were accompanied by the jaws of domestic pigs and dogs (Medway 1973). Duyong Cave in Palawan is so named because of the *c.* 5000 dugong (*Sirenia*) bones found in association with a number of jar burials of the Early Metal Age (Fox 1970). He reported that a natural platform raised some 1.15 m above the floor towards the rear of the cave was 'literally packed' with sherds of pottery, artefacts and dugong bones, suggesting that dugongs were used as ritual offerings. The complete skeleton of a Philippine long-tailed macaque (*Macaca fascicularis philippinensis*) was found interred without its head, possibly in association with a human burial, in Sa'gung rockshelter (Kress 2004 **NOT IN REFS**). The skeleton was well-preserved and there was no indication that the skull had been removed through disturbance, implying that it had been deliberately removed, along with the axial and axis vertebrae. Articulated remains of dogs have been found at Ille Cave (Ochoa 2006 **NOT IN REFS**).

In the case of the West Mouth material, there is no convincing stratigraphic evidence that the animal bones found in Neolithic graves were associated with the primary Neolithic burial rituals. Although some grave-side food rituals may have occurred, as noted earlier in this chapter, potential animal bone associations that we came across are just as likely, if not more likely, to be a product of depositional re-working. In Burial 211 (NCP Burial 11), for example, remains of wild pig were found in a pit (context 3190) that had been excavated into the grave in the skull area probably as part of the skull retrieval rituals that developed *c.* 3000 BP. The smashed remains of a juvenile domestic pig in the upper fill of Burial B178 (NCP Burial B10), an extended burial, are likely to be associated with a deep birds-nesters post-hole of Metal Age date that disturbed the western end of the burial (Fig. 8.28), and fragments of domestic pig in guano layers overlying Burials 211 and 212 were in contexts (3176, 3178, 3188) associated with Metal Age middening and birds-nesting (see Chapter 8).

**Neolithic societies *c.* 4000–2000 years ago, and the Austronesian hypothesis** [GB, LLS]

The palynological evidence of the Gan Kira core indicates that small-scale clearance activity was a consistent feature of the Niah landscape from *c.* 6000 BP to *c.* 2000 BP (Hunt & Rushworth 2005b), but there is currently no evidence for people using the caves between *c.* 6000 BP and 4000/3500 BP. Thereafter a number of the Niah cave entrances were wholly or primarily used as places of burial by people using a material culture that now included pottery and other artefacts that fit broadly within the Neolithic material culture of Peninsular and Island Southeast Asia. The West Mouth in particular was the focus of intensive funerary activity.

The detailed re-analysis of the funerary archaeology of the West Mouth and Lobang Jeraga by LLS has shown that the transition from primary inhumations to secondary burial involving cremation, via a transitional phase involving skull exhumation, curation, and deposition, was more or less identical at the two sites, *c.* 2700–2500 BP. Similarities in the spatial organization of secondary burial cremations at the two sites, including in the use of earthenware containers as burial containers, are further evidence of shared funerary practices. There were certainly differences in local practice: for example, there was a greater emphasis on colouring bones red, and burying people with shells, at Lobang Jeragan than in the West Mouth, and some of the secondary burials at Lobang Batu Parang had skulls placed on top of leg bones, laid out to align with the heads of other extended burials. Nevertheless, there appears to have been a shared history of developing funerary practices amongst a number of geographically separate but socially related communities living around the Gunung Subis. The ceramic data from the Neolithic burial assemblages support this view. There are subtle differences in the assemblages of the different caves, and in the ways in which they were used in funerary practices, but the similarities between them are more striking than the differences, suggesting that there were clear norms in funerary behaviour with well-recognized boundaries, to which individuals and groups conformed.

The burial rites appear to have focused on the veneration of immediate and recent ancestors. Data from ethnographically-documented societies suggest that the rites associated with cremation burials often include large feasts associated with gaining status for the participants, though there is no evidence for feasting in the Niah archaeological record (Dietler & Hayden 2001; Tillotson 1989). The rapidity and ubiquity of changes in funerary rites at Niah, and the limited amount of variation in any particular phase, could imply that ritual knowledge was held by a restricted number of individuals. The regularity of the rows of inhumations in the West Mouth (Fig. 7.8) suggests that people were buried in defined social groups, probably familial lineages, but there is no evidence for any significant status differentiation. The spatial relationships between male and female graves in the West Mouth imply that these Neolithic societies may have been organized according to a matrilocal system of residence, in which a husband moved to his wife's household on marriage, though the strontium isotope signatures show that non-local women were also marrying into the community on occasion. Similarly, age and gender appear to have been marked in death in the way the body was laid out, but differences between the West Mouth and Lobang Jeragan arm positions imply that there were subtle distinctions in social norms between neighbouring communities.

A possible interpretation of the complexities in the data within and between the different burial sites is that different lineages with distinct ancestral traditions used different parts of the Niah Caves to bury their dead, and that marriage partner exchange was a feature of these societies. No doubt much of the latter was at a comparatively local scale. It is noteworthy that the Niah burial pottery has specific similarities with material used at Lobang Angin in the Mulu Caves 80 km to the southeast but only the most general similarities with pottery at sites beyond that distance. One of the three non-local individuals in the West Mouth identified from their strontium/lead ratios, the adult individual in Burial B160, a multiple secondary non-burnt burial, had a heavy isotope signature comparable to three samples from the Lobang Angin burials (Valentine *et al.* 2008), evidence perhaps that people as well as ceramic material and traditions were moving between the Mulu and Niah areas.

The Austronesian model predicts a clear dichotomy between the indigenous foraging population and incoming Neolithic farmers, but as this chapter has demonstrated, the Niah evidence clearly does not support this, on several counts. The West Mouth burials show clear linkages between Early Holocene and Neolithic funerary practices, especially in the use of flexed burial in both periods, despite the *c.* 4000-year gap between the two phases of use. Non-metric and metric analyses of skull morphology show that the two populations were fundamentally the same, apart from a reduction in jaw and teeth size that, as with other populations elsewhere in the world, is likely to have been the result of dietary change. In physique and morphology the populations in both periods were very like those of the wider region, confirming the inferences from patterns of genetic diversity in present-day populations that there is no evidence that Island Southeast Asian people had a Taiwanese ancestry (Hill *et al*. 2007 **NOT IN REFS**; Oppenheimer & Richards 2001).

The stone technologies used at Niah in the Neolithic were fundamentally similar to those used in the Early Holocene, dominated by the casual production of unretouched flakes, but with significantly greater use of polished stone adzes and sandstone grinding stones. Functions identified by microscopic studies of use wear and residues include scraping soft plant, cutting and chopping hard materials, grinding mineral pigment, and processing fibrous and starchy plants, the latter probably including palm and yams.

The faunal evidence indicates that the hunting systems of the Early Holocene and Neolithic people at Niah were fundamentally similar, with no evidence that Neolithic people kept domestic livestock. The likely absence of the domestic pig at Niah at this time (Cucchi *et al*. 2009) fits with genetic studies of regional pig populations (both ancient and modern), which have concluded that, if there was an Austronesian/Neolithic dispersal from Taiwan to the Philippines, Borneo, and Sulawesi to New Guinea *c*. 4000–3000 BP, it is very unlikely to have included transported domestic pigs (Larson *et al*. 2007 **NOT IN REFS**). Domestic pig, with origins probably in the southern Chinese region, is reliably dated by a direct AMS date on a pig tooth to 4500–4200 BP at Nagsabaran in the Cagayan Valley on the northern Philippine island of Luzon (Piper *et al*. 2009), but there is currently no firm zooarchaeological evidence for its occurrence further south during the Neolithic, including at Niah.

The evidence for cultivation is ambiguous and contradictory. The stable carbon isotopes possibly indicate that Neolithic diet involved a larger proportion of food from open environments than the diet of Early Holocene people at Niah. The palynological record from Loagan Bunut and the two Niah cores present a consistent story through the Holocene of small-scale clearance activities in the thick forests that covered the coastal lowlands of Sarawak. The rice phytoliths from Loagan Bunut discussed in the last chapter suggest that domestic rice could have been in Borneo as early as 8000 BP as part of the population upheavals and extensive exchange systems that characterized the Early Holocene 'maritime interaction sphere' identified by Bulbeck (2008) linking coastal Southeast Asia/East Asia and Island Southeast Asia consequent to the flooding of Sundaland. In terms of direct macroscopic remains, domestic rice is definitely at Gua Sireh in western Sarawak *c*. 4500 BP, is possibly at Ulu Leang 1 in South Sulawesi *c*. 4000 BP (Paz 2005), and may be in the Marianas *c*. 3500 BP, though the first directly dated rice there dates to the last 1000 years (Hunter-Anderson *et al*. 1995).

The first direct evidence for domestic rice at Niah consists of rice grains in sherds from fourteen of the West Mouth burials (Doherty *et al*. 2000). Fabric examination by CD has found rice in fourteen of the 1457 NCP sherds, representing fragments of seven vessels likely to be of Neolithic age. The sherds containing rice came from a range of the vessel forms and decoration types represented in the cave, including the jar burials B190 and B221 stacked on top of each other (Fig. 7.28), but not from double-spouted or three-colour-ware. The rarity of the husks and grains suggests that their inclusion during the process of potting was accidental rather than deliberate, in sharp contrast with the husk-filled fabrics used for a number of vessel types in late Metal Age assemblages (Doherty *et al*. 2000; and see Chapter 8). The lack of harvesting debris means that it is difficult to judge whether the occasional rice husks and grains in the Neolithic sherds derive from crops grown locally or at a distance and obtained by exchange, and it is not possible to say whether the very few sherds with rice grains in them derive from local or imported wares. Whether or not Neolithic people at Niah grew rice near the caves or obtained it by trade, the main plant foods in terms of calorific input into Neolithic diet appear to have remained tubers, fruits, and nuts obtained by the same mix of 'forest foraging' and 'forest management' that had characterized the lifeways of people using the Niah caves in the Early Holocene. Intriguingly, whether or not rice was being cultivated by the Neolithic communities around Niah, the isotopic signatures of the people buried in the final phase of the West Mouth Neolithic cemetery *c*. 2500 BP are 'closed canopy', suggesting an abandonment of whatever cultivation was being practised and a return to forest foraging.

The Austronesian voyager-farmer model as currently presented looks increasingly unfit for purpose. Certainly there were significant changes in material culture across much of coastal Mainland Southeast Asia and Island Southeast Asia during the period when Neolithic burial practices began in the Niah Caves, but communities did not adopt wholesale the package of Austronesian or Neolithic material culture, just selected parts of it (Higham 2004; Mijares 2007). The distributions of pottery types, stone adzes, shell beads and tools, obsidian — the latter involving material being transported *c*. 3500 km westwards from New Britain to Bukit Tengkorak in Sabah, for example (Chia 2003) — and other artefact categories perhaps including textile technologies, demonstrate that 'Neolithic' communities in Island Southeast Asia were differentially linked in a complex series of overlapping distributional axes (Fig. 7.39). These similarities in material culture led Bulbeck (2008, 44) to conclude that 'the Austronesian diaspora had very little to do with the migration of a farming complex, and everything to do with the traffic of valuable goods (including fauna) and technology'. People adopted parts of the Neolithic package acting within historically and locally contingent circumstances that archaeologists have hardly begun to investigate. The complexity of Neolithic societies at Niah, and of their subsistence strategies and social practices, demonstrates how far

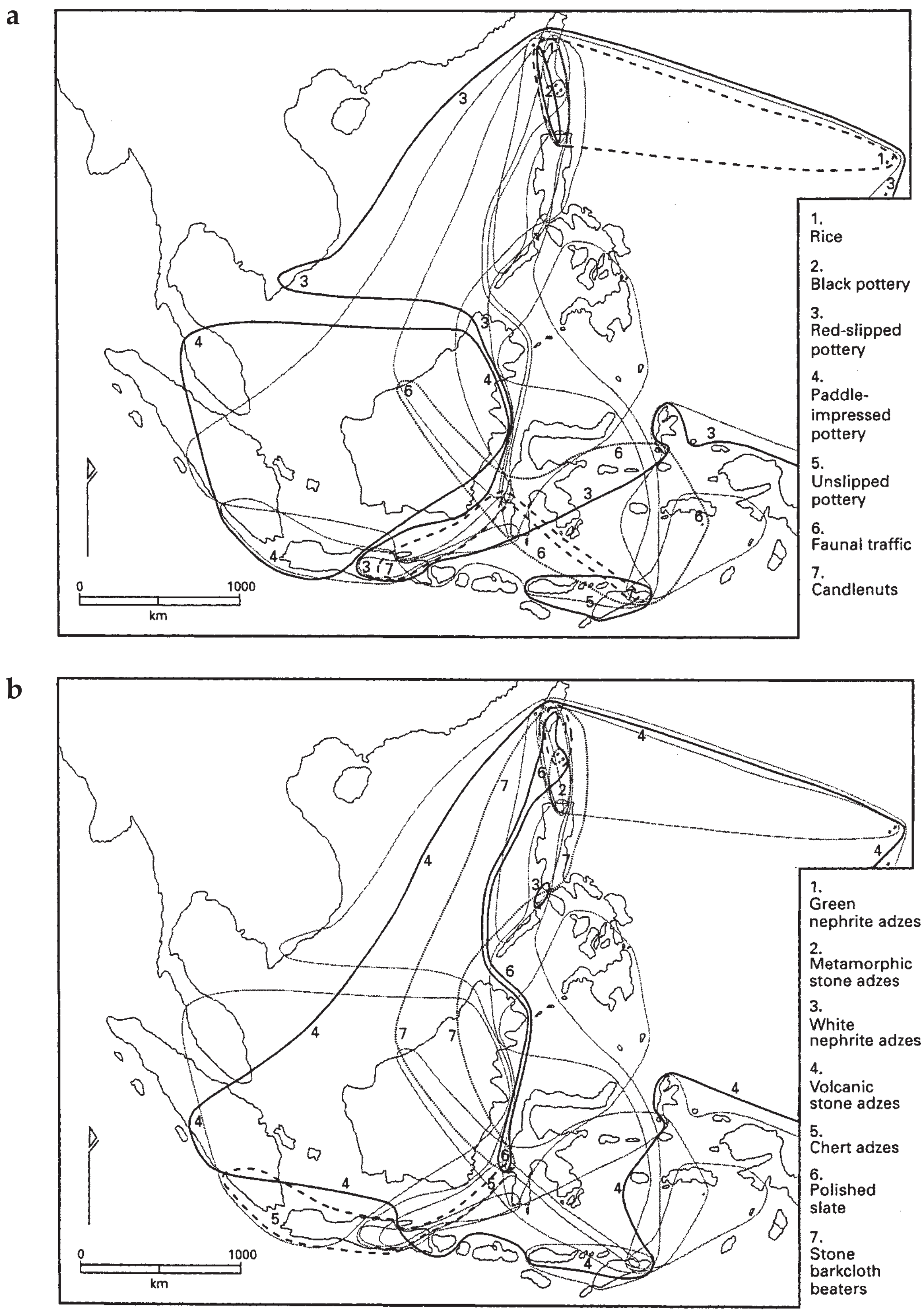


**Figure 7.39.** *Distributions across Island Southeast Asia and adjacent regions* c. *4000–2500* BP *of (a) pottery, economic plants, and transported fauna and (b) polished stone tools. (After Bulbeck 2008, figs. 4 & 6.)*

local research histories have come, but also just how far they will still have to develop before we shall be able to replace the simplistic Express Train model of Austronesian culture change with something more satisfactory (Chapter 9).