FROM LATE PREHISTORY TO THE FOUNDATION OF EARLY STATES IN INLAND SOUTHEAST ASIA: A DEBATE

Charles Higham[1], Bryan Manly[2] and Jorge Navarro Alberto[3]

[1] Department of Anthropology and Archaeology, University of Otago, charles.higham@otago.ac.nz

[2] Department of Mathematics, University of Otago, BryanManly@xtra.co.nz

[3]Universidad Autonoma de Yucatan, ganava4@gmail.com

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ABSTRACT

Mortuary data from three Iron Age sites in Northeast Thailand and three in Northwest Cambodia are here reviewed for information on social formation on the cusp of early states. It has been suggested that the three Cambodian sites present evidence for a complex polity with three social tiers and that this contrasts with the lack of any evidence for equivalent complexity in the three communities in the upper Mun Valley of Northeast Thailand. This model is examined and queried on the basis of insufficient data for the Cambodian sites, and contestable statistical analysis. In its place, an alternative is presented, that identifies a critically important climatic deterioration causing increased aridity which stimulated the development of plough-based wet rice cultivation in irrigated permanent fields. In the upper Mun Valley of Northeast Thailand, this coincided with a swift rise in social elites, interred in lineage-based nuclei in which leading individuals were accompanied by unprecedented wealth. Within a century or two, some Iron Age settlements greatly expanded into regal centers documented through texts that mentioned the state of Sri Canasapura. This transition might also have occurred in Northwest Cambodia at the same time, but evidence for this is so far unconvincing.

INTRODUCTION

Beginning in 2011, the research programme "From Paddy to Pura, the Origins of Angkor" has sought to identify and explain the transition from the late prehistoric Iron Age to the foundation of early states in inland Southeast Asia. It began as a three-year investigation through archaeological excavations, of prehistoric and early historic sites in Northwest Cambodia and the upper Mun Valley (UMV) in Northeast Thailand with funding provided by the Australian Research Council to Louise Shewan and Dougald O'Reilly. They directed the excavations of three Iron Age sites in Cambodia at Phum Lovea (PL), Phum Sophy (PS) and Prei Khmeng (PK) (O'Reilly *et al*. 2015, 2020). Simultaneously, Charles Higham and Rachanie Thosarat excavated Non Ban Jak (NBJ) in the UMV, the intention being to trace the roots of social inequality that was a key characteristic of two of the early inland states of Southeast Asia (Higham *et al*. 2019). These are known as Dvaravati, centered in Central and Northeast Thailand, and Chenla, the sites of which are mainly located in Cambodia, before transitioning into the state of Angkor in the early 9th century AD (Figure 1). Excavations in Cambodia ended after three seasons, but the fieldwork at NBJ continued for a further four.

These investigations recognized the potential significance of comparing the Iron Age cultural sequences in two regions in close proximity but separated by the Dang Raek escarpment. This is not a major barrier to contact, as there are numerous easy routes that link the UMV with Northwest Cambodia (Welch and McNeill 1990). That this occurred during the late Iron Age, the period under review, is seen in similar-

ities between ceramic vessels, iron and bronze artifacts and indeed, virtually the entire suite of items chosen to accompany the dead as mortuary offerings. In the event, extending the fieldwork at NBJ by four seasons made available a far larger sample than the Cambodian component, where the excavation of PL opened 64 m^2 in the central part of the site, 30 m^2 at PS and at PK, 64 m^2. At NBJ, however, 700 m^2 were excavated (Figure 2). Human burials are one of the key sources of social information. Ten were recovered at PK, and 14 respectively at PS and PL. In general, the preservation of bone in the three Cambodian sites was uneven. At NBJ, 200 graves were opened, the bone being in an outstanding state of preservation. Radiocarbon determinations from the Cambodian sites placed the occupation between ca. AD 200–500 (O'Reilly *et al*. 2013, 2015), while at NBJ, there was contemporary occupation that extended into the early historic period, ending in about AD 800 (Figure 3; Higham and Kijngam 2020).

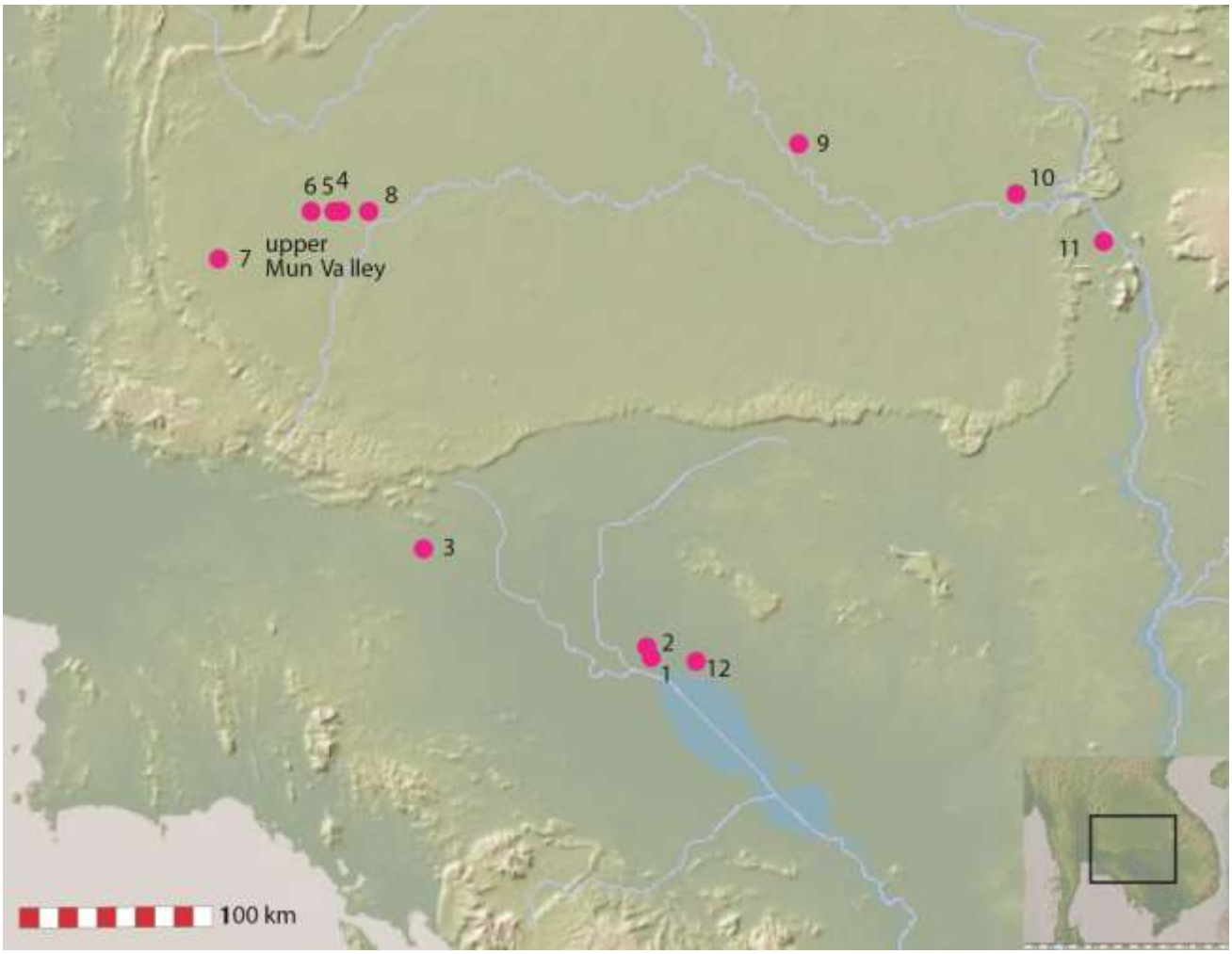


Figure 1. Map showing the location of the sites mentioned in the text. 1. Prei Khmeng, 2. Lovea, 3. Sophy, 4. Ban Non Wat, 5. Noen U-Loke, 6. Non Ban Jak, 7. Muang Sema, 8. Phimai, 9. Wat Ban Song Puay 10. Wat Sa Kaeo, 11. Wat Luang Kao, 12. Angkor. Figure by C.F.W. Higham made using GeoMapApp (www.geomapapp.org) CC BY (Ryan et al. *2009).*

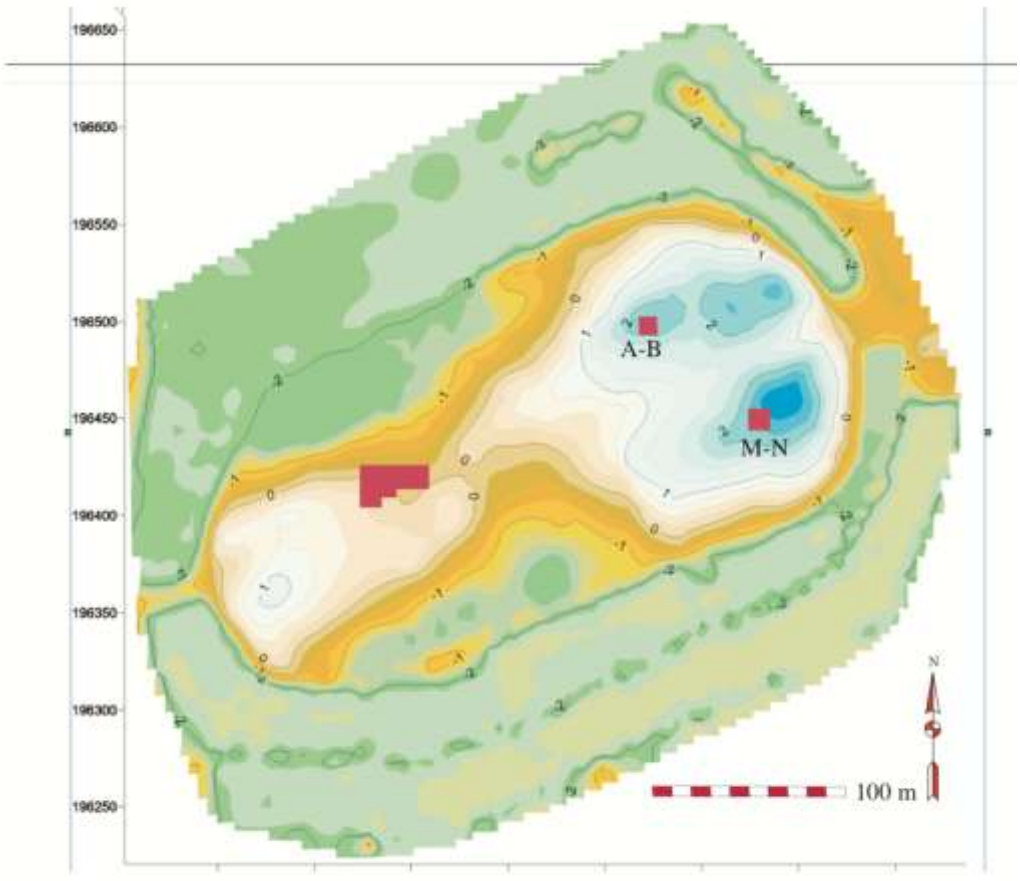


Figure 2. Plan of Non Ban Jak, showing the two mounds within the double set of moats. The areas excavated are in red. The contour figures are meters above or below datum. Figure courtesy of Dr N. Chang.

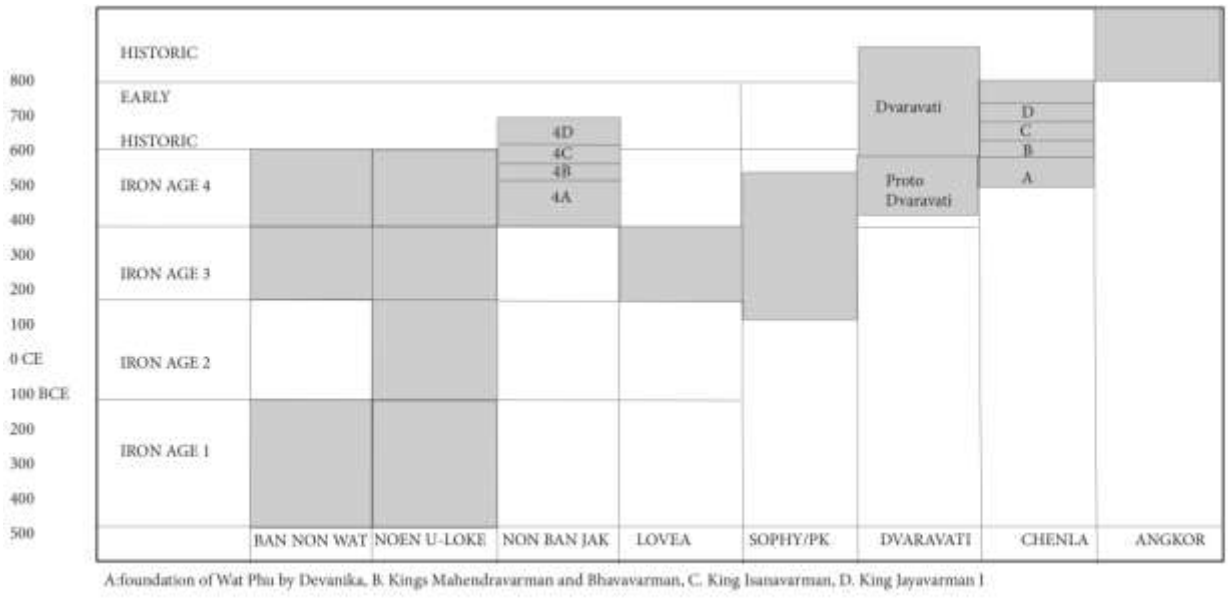


Figure 3. Chronological chart showing the occupation phases of the sites under review and the duration of the early states. Dates for Ban Non Wat: Higham et al. *(2015). Dates for Noen U-Loke: Higham and Thosarat (2007). Dates for Non Ban Jak, Higham and Kijngam (eds.) 2020. Dates for Phum Sophie, Prei Khmeng and Phum Lovea, Scott (2018).*

A: foundation of Wat Phu by Devanike, B: Kings Mahendravarman and Bhavavarman, C: King Isanavarman, D: King Jayavarman I. Note that the chronology covers only the Iron Age for Ban Non Wat. Figure by C.F.W. Higham.

In his PhD thesis that is publicly available through Open Access Theses, Glen Scott (2018) has undertaken the first analysis that compares the human burials from all four sites in a study that has considered the mortuary offerings as reflecting the social status of the deceased, with special reference to bronze ornaments (Table 1). Numerically, these were dominated by bangles, but included finger, toe and earrings collectively described as circlets. He divided these on the basis of the cross section into different types. Other mortuary offerings are generally reflective of similar preferences between the late Iron Age people of the two regions. There are pottery vessels, iron sickles, digging tools, knives and spears whose characteristics reflect comparable materials, techniques and usage. Exotic glass, carnelian and agate jewellery was worn, and there are rare items in gold. Weaving was undertaken, judging from the spindle whorls. Iron was forged and pottery vessels manufactured, but there is no evidence for bronze casting at NBJ. However, there are some differences between the two regions: in the Mun Valley, bronze belts, toe rings and ear inserts were worn and there were silver and lead ornaments. There were more agate pendants, while in Cambodia, more carnelian was found. These differences might reflect the different sample sizes.

SCOTT'S ANALYSES: A NOVEL APPROACH

Scott (2018) has applied the novel approach of taking the average number of these mortuary offerings in each burial, and then computing the standard deviation (SD) from the mean. The results are seen in Figure 4. From this, he identifies three social tiers at PS, generated on the basis of 14 burials (Figure 4, Table 2).

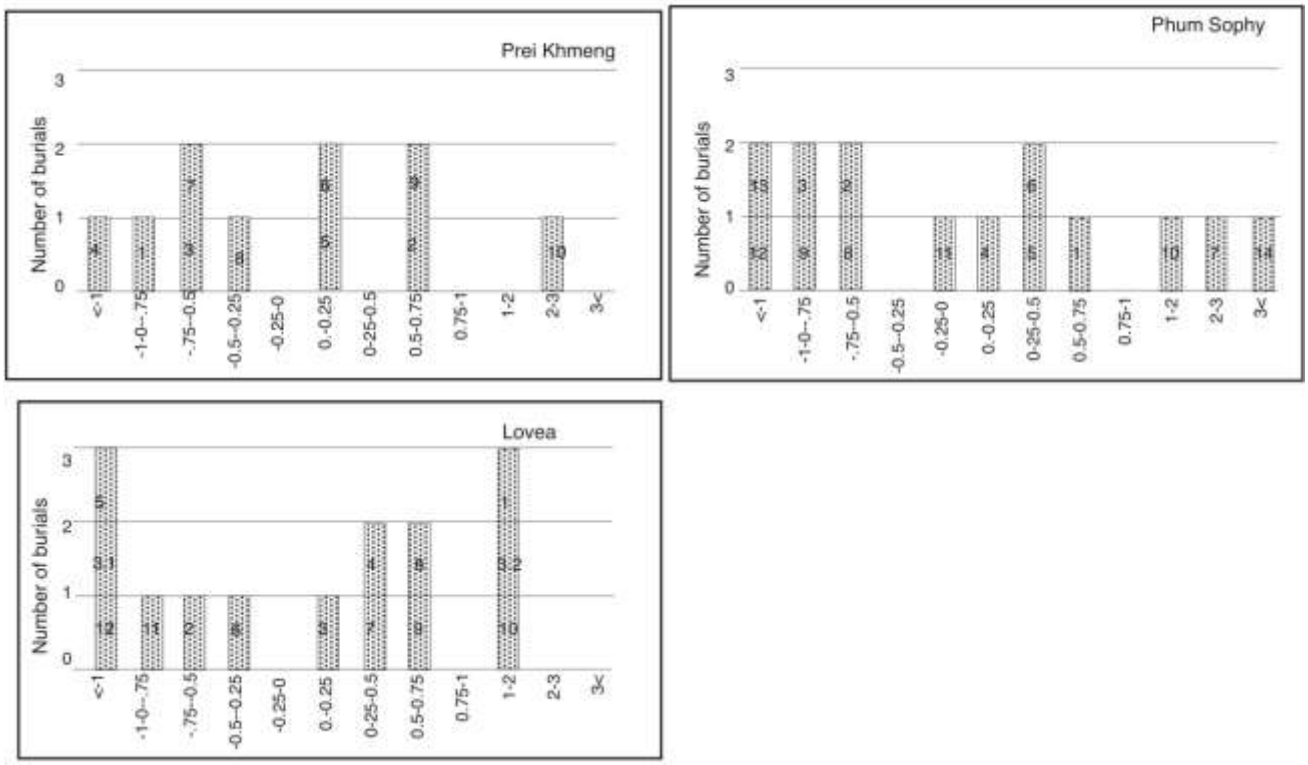


Figure 4. The distribution of burials from the three Cambodian sites on the basis of the standard deviation from the mean number of mortuary offerings. Figure by C.F.W. Higham based on Scott 2018:127, 151 and 176.

Table 1. The number of artifacts in the Iron Age sites under discussion.

Site	PS	PL	PK	NUL 2	NUL 3A	NUL 3B	NUL 3C	NUL 3D	NUL 4	NBJ MP3	BNW IA 1 S
Number of burials	14	14	10	17	8	10	11	1	21	37	78
Bronze bangles	98	51	39	32	99	32	94	150	74	35	27
Bronze anklets	51	0	0	0	15	24	19	0	0	6	22
Bronze rings	66	22	24	65	142	33	265	69	115	87	2
Bronze earrings	3	6	2	2	3	27	15	0	30	20	0
Bronze bells	8	0	11	21	2	1	0	0	0	0	0
Bronze torc	0	0	0	0	1	0	0	0	0	0	0
Bronze belt	0	0	0	0	3	0	4	3	0	2	0
Bronze spiral	0	0	0	0	5	0	1	0	0	0	0
Bronze arrowhead	0	0	0	0	0	0	0	0	0	0	2
Bronze coin	0	0	9	0	0	0	0	0	0	0	0
Iron knives	4	2	4	0	4	3	6	1	10	12	11
Iron bangle	0	0	0	0	0	0	0	0	0	0	10
Iron sickles	6	7	9	0	0	0	0	0	8	11	0
Iron points	34	1	7	0	0	0	1	0	0	1	3
Iron digging tools	12	19	20	0	0	0	0	0	0	0	1
Iron ploughshare	0	0	0	0	0	0	1	0	0	0	0
Iron spears	4	7	2	0	0	0	0	0	1	0	9
Iron chisel	0	0	4	0	0	0	0	0	0	0	9
Iron ring	0	0	0	0	0	0	0	0	0	1	0
Iron object	0	0	0	0	0	0	0	0	0	0	38
Iron billhook	0	0	0	0	0	0	0	0	0	0	1
Lead tool	0	0	0	0	0	0	0	0	0	0	4
Glass beads	2157	811	722	15	510	260	53	600	28	50	0
Glass earring	0	0	0	0	0	0	0	0	0	0	9
Agate beads	8	11	13	5	30	2	0	0	7	5	4
Agate pendant	0	0	0	7	5	4	3	2	3	3	0
Carnelian beads	337	19	1	9	0	0	1	0	0	1	3
Gold items	1	0	1	0	68	0	0	2	53	3	0
Silver items	0	0	0	0	3	0	0	2	1	0	0

Table 1 (cont.). The number of artifacts in the Iron Age sites under discussion.

Site	PS	PL	PK	NUL 2	NUL 3A	NUL 3B	NUL 3C	NUL 3D	NUL 4	NBJ MP3	BNW IA 1 S
Spindle whorls	22	2	0	15	2	9	1	0	0	0	30
Clay pellets	8	0	7	0	0	0	0	0	0	0	7
Ceramic vessels	1	16	23	2	25	17	36	8	35	83	259
Bivalve shell	0	0	0	0	0	1	1	0	1	5	32
Red ochre	0	0	0	0	0	0	0	0	0	5	110
Clay	0	0	0	0	0	0	0	0	0	2	15
Burnishing stone	0	0	0	0	0	0	0	0	0	1	0
Animal bone	0	0	0	0	0	0	0	0	0	0	243
Shell bangle	0	0	0	0	0	0	0	0	0	0	15
Ivory bangle	0	0	0	0	0	0	0	0	0	0	8
Crucible	0	0	0	0	0	0	0	0	0	0	1
Average	29	12	19	10.17	39.75	15.7	41.9	241	16.28	7.8	12.22

PS: Phum Sophy, PL: Lovea, PK: Prei Khmeng, NUL: Noen U-Loke, NBJ: Non Ban Jak, BNW: Ban Non Wat

Source: Scott (2018).

Table 2. The artefacts associated with burials assigned to the three claimed social tiers at Phum Sophy.

Phum Sophy	Poor tier						Middle tier					Rich tier		
Object	**B2**	**B3**	**B8**	**B9**	**B12**	**B13**	**B1**	**B4**	**B5**	**B6**	**B11**	**B7**	**B10**	**B14**
Bronze bangle	0	0	0	0	0	0	0	0	2	7	0	19	0	0
Bronze ring	0	0	0	0	0	0	11	0	5	2	0	3	0	43
Bronze earring	0	0	0	0	0	0	0	1	0	0	1	0	0	1
Iron knife	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Iron sickle	0	0	0	0	0	0	0	0	0	2	0	2	1	1
Iron point	0	0	0	0	0	0	0	3	0	2	1	10	15	2
Iron digging tool	0	0	0	0	0	0	0	1	1	1	1	2	2	3
Iron spear	0	0	1	0	0	0	0	1	0	0	0	3	0	1
Iron bangle	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Glass beads	4	1	1	0	0	0	3	2	2	3	0	3	6	5
Gold item	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2 (cont.). The artefacts associated with burials assigned to the three claimed social tiers at Phum Sophy.

Phum Sophy	**Poor tier**						**Middle tier**					**Rich tier**		
Object	**B2**	**B3**	**B8**	**B9**	**B12**	**B13**	**B1**	**B4**	**B5**	**B6**	**B11**	**B7**	**B10**	**B14**
Spindle whorl	0	0	0	0	0	0	1	2	6	1	2	1	8	0
Clay pellet	0	0	0	0	0	0	0	2	3	0	2	1	0	0
Pot	1	3	3	3	0	0	10	10	6	8	5	10	8	11
Iron pendant	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bone pendant	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shell pendant	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Shell	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Iron object	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Iron ring	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Bronze bowl	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Bronze necklace	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Agate pendant	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Agate bead	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Carnelian bead	0	1	1	1	0	0	0	0	0	0	0	0	2	2
Gilded earring	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Source: O'Reilly et al. *(2015). Tiers after Scott (2018). Scott has reduced the actual number of glass beads cited in the text to the number of artefacts that comprise glass beads as cited in this table.*

The ‘poor’ group, that is the six graves identified as <.–1 to –.025 SD from the mean, comprises the following individual burials. Burial (B)12 comprised a few disturbed adult bones and no associated mortuary offerings (Table 2). B13, an infant, was represented by a few fragmented remains and again, no grave goods. B9, another infant, was also disturbed in prehistory and was possibly associated with a carnelian bead and three pots, but not with any certainty. The context for B3 was very disturbed, and the adult might have been interred with ca. 10 glass beads, a carnelian fragment and three pots. B2 involved a jumble of bones representing an adult and a child, together with an iron point, one pot, 68 glass beads and some fragments of iron.

There are five burials in the group with ‘medium’ wealth. B1 in fact contained the bones of two adults and a child. B4 was highly disturbed and contained two individuals. B5 was also heavily disturbed and contained the remains of three individuals; however, Scott claimed that the grave goods were associated with just one of the three, a young adult female. B6 was a rare nearly complete interment of a 5–7 year old. B11, a 15–18 year old female, was nearly intact but the upper part of the body, including the cranium, extended beyond the excavated area. Finally, three graves represent the apical top tier of PS society. B7 was a near-intact mid-age to old male. B10 involved two individuals, in which the bones of a child predominated, while B14 was a nearly complete burial of a mid-aged female.

Of the fourteen burials at PL, there are six in the ‘poor’ tier, five in the ‘middle’ and three in the ‘rich’ tier (Table 3). Three ‘poor’ individuals were identified in B3. One comprised just a cranium, associated supposedly with three bronze rings and a digging tool. B2 likewise was represented by a skull, and a handful of post-cranial bones. It was thus a heavily disturbed old male associated with three bronze rings, ca. 12 glass beads, a pot, two clay pellets and some fragments of iron and bronze. Just two bones represent B5, found with two pots, a clay pellet and an iron artefact. B6 was another older male, poorly preserved and found with an iron sickle, seven glass beads, two clay pellets and two pots. Only the upper part of the body of B11 was recovered, with four bronze bangles, a bronze ring, an iron sickle, four glass beads and a bronze coin. B12 is represented by the skull, associated with an iron sickle and a clay pellet.

The ‘middle’ tier involved five graves. The skull and some disturbed long bones of an adult male were singled out from an assemblage representing three individuals in mortuary complex 3. B4, an adult was represented by fragmentary arm bones. Only the upper half of the skeleton of B7 lay in the excavated area. Burials 8 and 9, again, were very poorly preserved: only the ulna was identified for the former, the skull and fragments of radius and ulna for the latter. B8 was a young adult, B9 an adult male. There are three ‘elite tier’ graves. The outline of a skull, the femora and a tibia survived in B1. B3.2 was a young adult, and B10 an older male that survived nearly complete.

The social ranking at PK is determined on the basis of ten burials (Figure 4, Table 4). B4 in the ‘poor’ group was an adult male in a relatively complete state. He wore three bronze bangles and a bronze earring, and was accompanied by an iron digging tool and a pot. Similar offerings were found with the young female in B1—three bronze bangles, an iron sickle and a digging implement, a pot and some glass beads. The fragmentary remains of the infant in B3 were accompanied by a single bronze bangle, an earring, iron sickle, two iron digging tools, 99 glass and eight agate beads. B7, a newly-born infant, was very poorly preserved and, remarkably for one so young, was associated with an iron sickle and four iron digging tools. There was also a bronze bangle, nine glass beads and two pots. Burial 8, an infant aged about 6 months, was associated with a pot, two bronze rings, three iron tools and a few glass beads.

There are four burials in the ‘middle’ social tier. B2 was a mid-aged male with a complement of an iron sickle, digging implements and two spears, as well as two bronze bangles and four pots (Table 4). B5 was the poorly preserved partial remains of a mid-aged probable female.

Table 3. The artefacts associated with burials assigned to the three claimed social tiers at Phum Lovea

Phum Lovea	**Poor tier**						**Middle tier**					**Rich tier**		
Object	**B5**	**B3.1**	**B12**	**B11**	**B2**	**B6**	**B3**	**B4**	**B7**	**B8**	**B9**	**B1**	**B3.2**	**B10**
Bronze bangle	0	0	0	4	0	0	4	6	6	8	6	7	9	1
Bronze ring	0	3	0	1	3	0	1	1	3	0	0	1	4	1
Bronze earring	0	0	0	0	0	0	1	1	0	1	0	2	1	0
Iron knife	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Iron sickle	0	0	1	1	0	1	0	0	1	0	0	2	0	1
Iron point	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Iron digging tool	0	1	0	0	1	0	0	1	1	3	1	0	2	9
Iron spear	0	0	0	0	0	0	0	0	1	1	1	0	1	2
Iron sword point	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Glass beads	0	0	0	1	1	2	4	3	2	2	6	4	3	4
Spindle whorl	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Clay pellet	1	0	1	0	2	2	5	2	1	0	3	5	6	1
Pot	2	0	0	0	1	2	0	3	0	1	2	3	1	2
Iron object	1	0	0	0	0	0	0	0	0	0	0	0	0	9
Bronze coin	0	0	0	1	0	0	0	0	0	0	0	3	0	0
Agate bead	0	0	0	0	0	0	0	0	0	0	3	1	0	0
Carnelian bead	0	0	0	0	0	0	0	0	0	0	1	2	0	0

Source: O'Reilly et al*. (2015). Tiers after Scott (2018). Scott has reduced the actual number of glass beads cited in the text to the number of artefacts that comprise glass beads as cited in this table.*

Table 4. The artefacts associated with burials assigned to the three claimed social tiers at Prei Khmeng

Prei Khmeng	**Poor tier**					**Middle tier**				**Rich tier**
Object	**B1**	**B3**	**B4**	**B7**	**B8**	**B2**	**B5**	**B6**	**B9**	**B10**
Bronze bangle	3	1	3	1	0	2	10	5	4	10
Bronze ring	0	0	0	0	2	0	3	4	5	10
Bronze earring	0	1	1	0	0	0	0	0	0	0
Bronze bell	0	0	0	0	0	11	0	0	0	0
Iron knife	0	0	0	0	0	0	0	1	0	2
Iron sickle	1	1	0	1	0	1	0	0	3	3
Iron point	0	0	0	0	0	0	1	0	2	5
Iron digging tool	1	2	1	4	2	3	0	0	6	0
Iron spear	0	0	0	0	0	2	0	0	0	0
Glass beads	2	4	0	3	1	3	4	7	3	8
Gold hook	0	0	0	0	0	0	0	0	0	1
Clay pellet	0	0	0	0	0	1	2	0	1	3
Pot	1	0	1	2	1	4	3	3	5	3
Iron axe	0	0	0	0	0	2	0	1	0	0
Iron object	0	1	1	0	1	0	0	0	0	0
Iron chisel	0	0	0	0	0	0	0	0	0	4
Bronze object	0	0	0	0	0	1	1	0	1	0
Agate bead	0	8	0	0	0	1	0	2	2	0
Carnelian bead	0	0	0	0	0	0	1	0	0	0

Source: O'Reilly et al*. (2020). Tiers after Scott (2018). Scott has reduced the actual number of glass beads cited in the text to the number of artefacts that comprise glass beads as cited in this table.*

The young adult male in burial 6 wore five bronze bangles and four rings. In addition, there was an iron knife and axe, two agate and ca. 140 glass beads, three pots and some unidentified iron objects. B9, a young male, was found complete. Again, there was a handful of bronze ornaments—four bangles and five rings. Iron occurred as three sickles, two points and six digging tools. Five pots, two agate and ten glass beads completed the mortuary offerings for this individual.

Finally, the apex of the social hierarchy at PK was represented by B10, a young adult female interred wearing ten bronze bangles and

ten rings. Tools comprised four chisels, two knives and three iron sickles. There were five iron points, 95 glass beads, three pots and a gold hook.

These mortuary data are the bedrock for Scott's conclusion that at PS: "The assessment of mortuary assemblages …. potentially distinguishes three economic tiers demonstrated both by general burial wealth and also the use of circlets." (Scott 2018:133). Having found that there was no substantive evidence for a similar pattern at PL, he concluded that at PK: "However, it is possible that a three-tiered economic system was in place at Prei Khmeng as has potentially been observed at the other Cambodian sites. The small number of burials means that there are clear gaps left in the data, but what is present may reflect pieces of the three-tiered system." (Scott 2018:185). Scott proceeded to combine all three Cambodian sites into a single sample of 38 burials, concluding that there are, indeed, three distinct tiers of wealth, and that these reflect the existence of a social system that "lay between a traditional chiefdom and an early state and may best be described as a complex polity." (Scott 2018:273).

THE UPPER MUN VALLEY

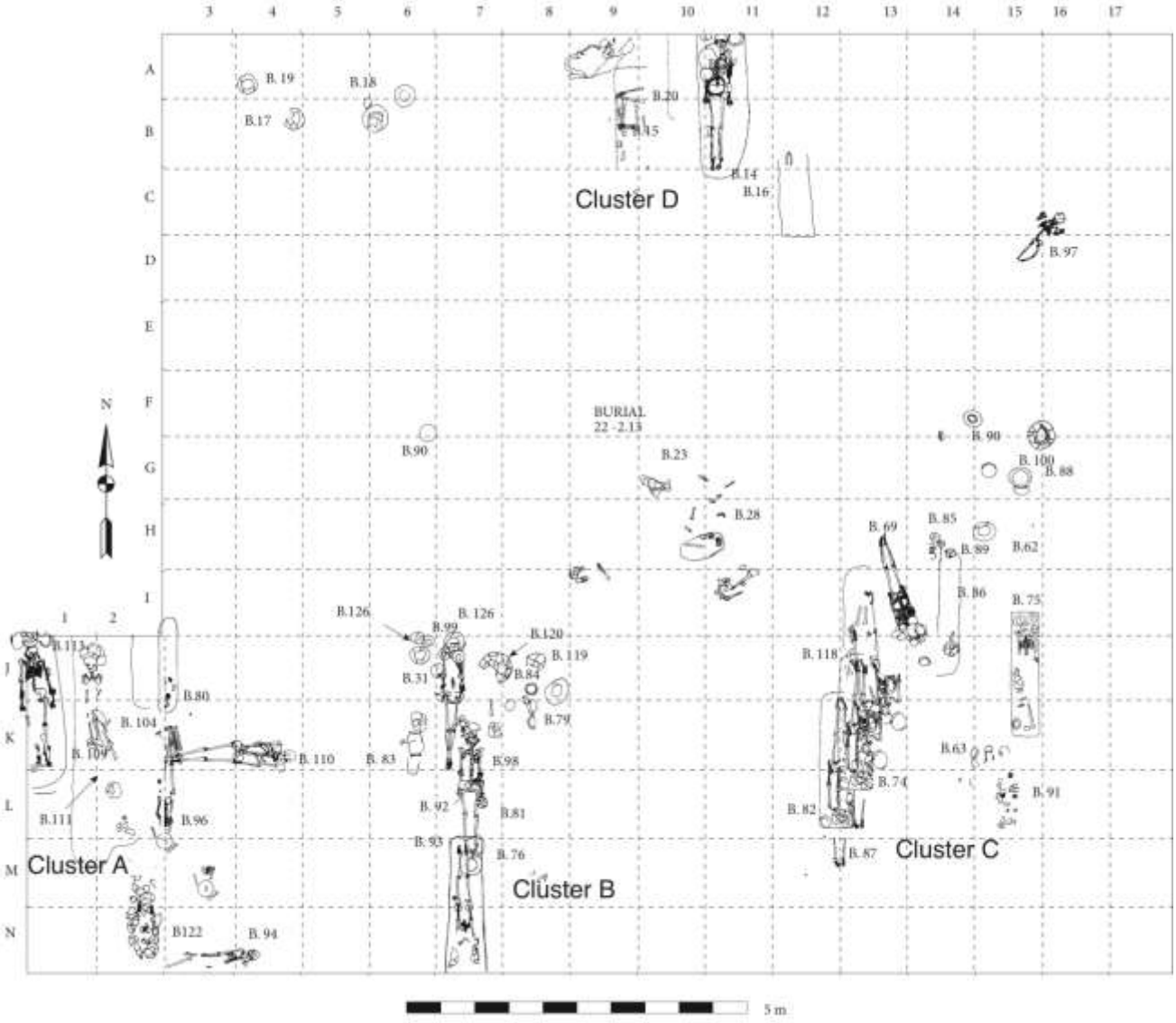
The Iron Age of the UMV has been divided, on the basis of the mortuary record, into four periods described as IA1–4, covering a millennium from about 500 BC. Three Iron Age sites have been employed to provide comparative data with the three Cambodian mortuary samples. At Ban Non Wat, a late Bronze Age cemetery transitioned into IA1 by horizontal creep, providing unique insight into the impact of early exchange contacts ultimately with South Asia. There are two groups of burials distinguished by the orientation of the dead, which have been intensively analysed (Higham and Manly 2012). Our analysis employed principal component statistics derived from complete mortuary sets for each intact burial, and found that several individuals were set apart as being considerably more wealthy than the majority (Higham and Manly 2012).

Noen U-Loke (NUL) is a key site because it encompasses the entire Iron Age (Higham *et al.* 2007; Higham 2011a). It is vital, in considering this mortuary sequence, to appreciate marked changes in the way in which the dead were interred. During IA1, the few graves were not nucleated, although two males were found alongside each other, with impressively wealthy mortuary offerings that included for B27, three bronze torcs, four pierced tiger canine pendants, a massive iron spear, three bronze bangles, shell ear lobe discs, an iron socketed hoe, two bronze spears, red ochre, pig bones and three pottery vessels. With IA2, two tight nuclei of graves were found, in which the dead were interred in graves filled with rice, wearing impressive carnelian and bronze ornaments. IA3 revealed four such nuclei, each containing men, women and infants, that included some individuals of remarkable wealth expressed in their bronzes, exotic gold, silver, glass and agate jewellery (Figure 5). Graves were on occasion lined with clay, and virtually all were filled with rice. With IA4, there were rows of graves rather than nuclei, and mortuary wealth had declined. New artifacts included iron sickles (Figure 5).

IA occupation at NBJ took place during IA4, and extended into the early historic period when Buddhism had been established in the UMV. The IA4 sequence itself was divided into four phases, IA4a–d. Mortuary offerings matched those seen during this period at NUL. There were similar pottery vessels, bronze belts, bangles and rings, gold, agate and carnelian ornaments, iron knives and sickles. There were also significant changes in the placement of the dead. During IA4a, there was a relatively loose grouping of adult and infant burials, but by IA4c, the dead were interred within the rooms of residential houses.

It is this sequence, and IA 3-4 at NUL, that Scott has analyzed in order to compare the social organization of the UMV and Northwest Cambodia during the later Iron Age in terms of mortuary offerings. He has found that on the basis of the standard deviations from the mean, there is no evidence for tiers founded on relative mortuary wealth. He concluded that: "the Iron Age population showcases very minimal wealth" (Scott 2018:237). In all previous analyses of the IA3 cemetery at NUL, great respect

has been given to the presence of four discrete clusters of graves as coherent social entities (Higham and Manly 2012). It is axiomatic that each be considered individually by anyone seeking social information during this vital period. Scott disagrees with this, in his own words:



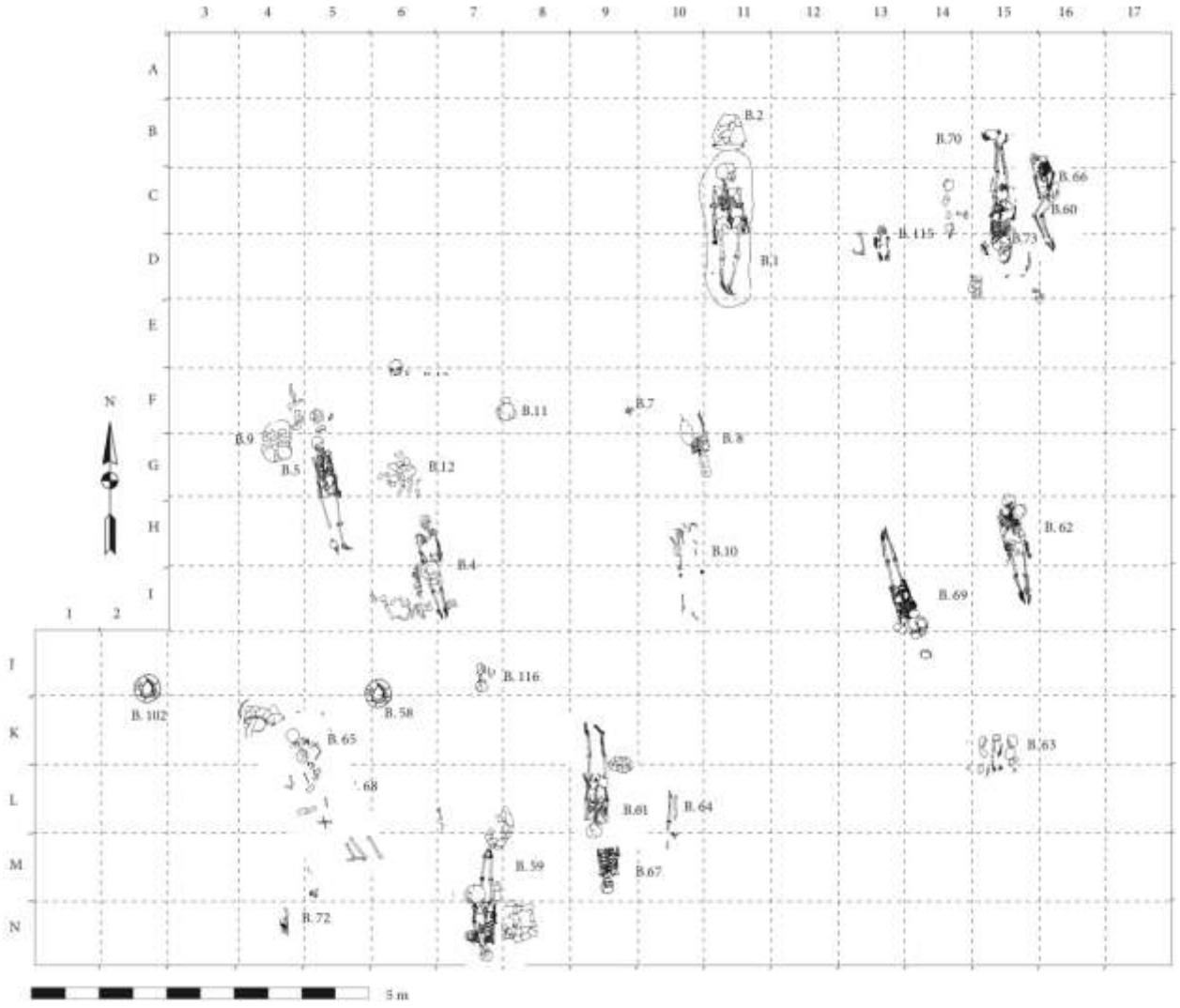


Figure 5. The distribution of graves at Noen U-Loke. Above, mortuary phase 3, with burials in discrete clusters. Below, mortuary phase 4 with burials in dispersed rows. Data from Higham et al. *(2007). Figure by C.F.W. Higham.*

While these clusters may indeed represent social units based on kin or economic relationships, it would be erroneous to focus on these clusters in comparison to the wider archaeological landscape where sites (particularly in the case of Cambodia) have not been excavated to the same extent which could reveal any potential corresponding groups. To compare a socially and spatially defined cluster against an entire population sample would create a sampling bias of targeted verse random sampling. This would doubtless lead to erroneously weighted results and should be avoided. Therefore, while it is useful to note these clusters in MP 4, the entire population is utilized to generate the data sets rather than single clusters (Scott 2018:229).

He found in this analysis of all IA3 graves at NUL that there was a large number of poor individuals, only a handful of them wealthy, and no clear grouping into tiers (Figure 6).

Scott has analyzed the IA4 burials at NBJ on the basis of each phase, and by amalgamating all into one sample (Figure 6), he concluded that most were at the poor end of the spectrum, and that while the burials increased in wealth, there were no breaks, and no social tiers. In his own words (Scott 2018:2013): "rank and wealth were more closely aligned with fluid, non-

delimited constructs rather than a tiered hierarchy. Certainly, while there are differences in assemblages for the very poorest and richest at either end of the spectrum, this appears to have occurred through gradual shifts rather than strongly emphasized class boundaries." In sum, this was a heterarchical rather than hierarchical society. Thus, he concludes that these contemporary Iron Age societies, located just 175 km apart, present quite different social characteristics.

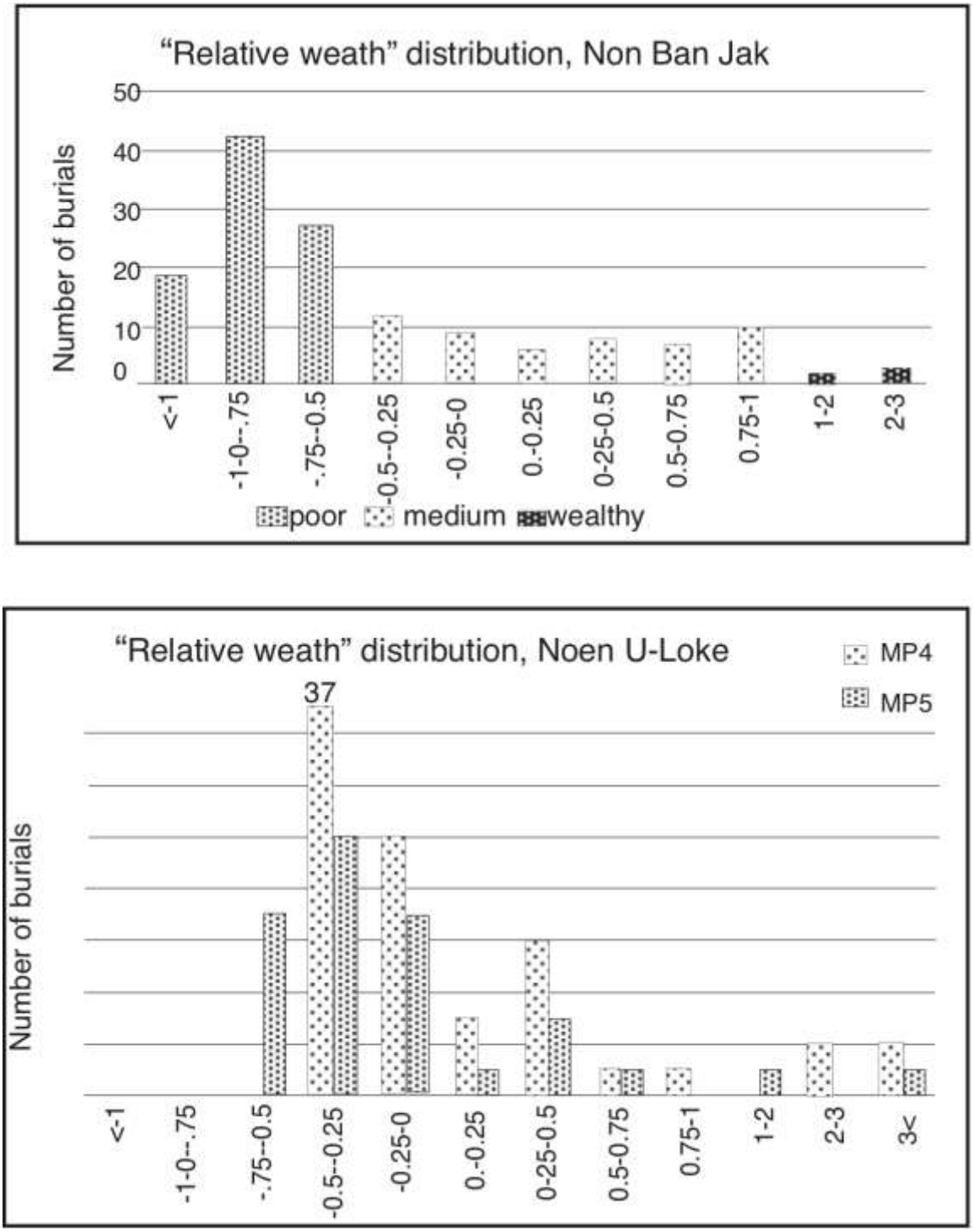


Figure 6. The distribution of burials from Noen U-Loke and Non Ban Jak, on the basis of the standard deviation from the mean number of mortuary offerings. Figure by C.F.W Higham, based on Scott 2018 (211, 227).

DISCUSSION

Scott's basic premise is that mortuary offerings, particularly bronze circlets, reflect the wealth and status of those interred. By examining these variables, it is possible to test the model that there were significant regional differences in the pathway to the generation of early states. Three social tiers as identified by mortuary offerings in the three Cambodian sites, he concludes, reflect social classes that indicate a complex society close to an early state, whereas lack of such tiers in the UMV is more compatible with a simple chiefdom.

Is there acceptable evidence for three social tiers in the Cambodian sites? We suggest not. The sample sizes are too small for meaningful social interpretation. There are, however, more detailed reasons to dispute Scott's conclusions. In determining the wealth of a prehistoric interment, it is critical to have a complete set of data represented by an intact grave. Otherwise the data sets are by definition, inaccurate. One might also question the validity of amalgamating adults and infants in the statistical analyses since it is self evident that the latter were not endowed with the same range or quantity of mortuary offerings. Only complete graves have been included in all published analyses of the upper Mun sites (Higham and Manly 2012). This is not the case for PL, PS or PK. It is axiomatic that the raw data for an incomplete burial are unrepresentative. The majority of the burials in the Cambodian sites fall into this category.

One can also call into question the statistical methodology chosen by Scott to identify three social tiers. Simply put, a sample comprising a handful of graves, as in all three Cambodian sites, might spuriously furnish the appearance of three social tiers while at the same time having only a modest number of mortuary offerings.

Figure 7 shows the actual quantum of grave goods for all sites under review. The dead at PK and PL were actually no wealthier than those of the alleged heterarchies of the UMV. In fact, they were markedly poorer than NUL IA3. Only at PS was one woman interred with unusual wealth. This is further explored by subjecting all the 37 Cambodian "burials" identified by Scott, to a principal component analysis (Figure 8). The large nucleus centering on scores of 0 for PC1 and 2 are poorly endowed burials. Half the burials from PS are more widely distributed, and *prima facie*, might involve three groups as determined by wealth. However, one must first examine why they are separated from the majority. B14 is a particularly wealthy female. B7 was moderately wealthy in terms of bronze ornaments, but it was particularly distinguished by being interred with 10 iron points. B10 contained the bones of more than one individual, most coming from a child aged 6–9 years. Again, it was set apart on the basis of 15 iron points and eight spindle whorls. There is also a group of four burials from PS that correspond to Scott's middle tier of mortuary wealth. B1 included bones from three individuals. The two individuals identified as B4 were so heavily disturbed as to be worthless for social identity. Burals 6 and 11 are by no means particularly wealthy.

We have also compared all adult burials from the three Cambodian sites with those from IA3–4 in the UMV on the basis of a principal component analysis (Figure 9). During IA3 at NUL, a handful of wealthy individuals are distinguished from the great majority. The man in B14 from IA3 cluster D is the richest of all. Others clearly demarcated by wealth are B69 and B62 from MP3 cluster C (male and female), and B113 from MP3 cluster A (female). Burial 1 from NUL MP4 is also relatively wealthy. PS B14 is the only relatively wealthy individual from the three Cambodian sites. It could be argued that a small number of burials are separated from the vast majority in figure 8, and thus might represent Scott's moderately wealthy group. These comprise three individuals from NBJ; B21 from IA4a, B190 from IA4B, and B75 of IA4c. There are two individuals from NUL (B73 MP4 and B76 MP3 cluster B) and B7 from PS. We have computed the PCA values for NUL cluster 3C and PS. Both reveal a similar pattern: a concentration of relatively modest burials, separated from three wealthy individuals. In the case of NUL, the poor are dominated by infant jar burials but for PS, by incomplete or disturbed graves (Figure 10).

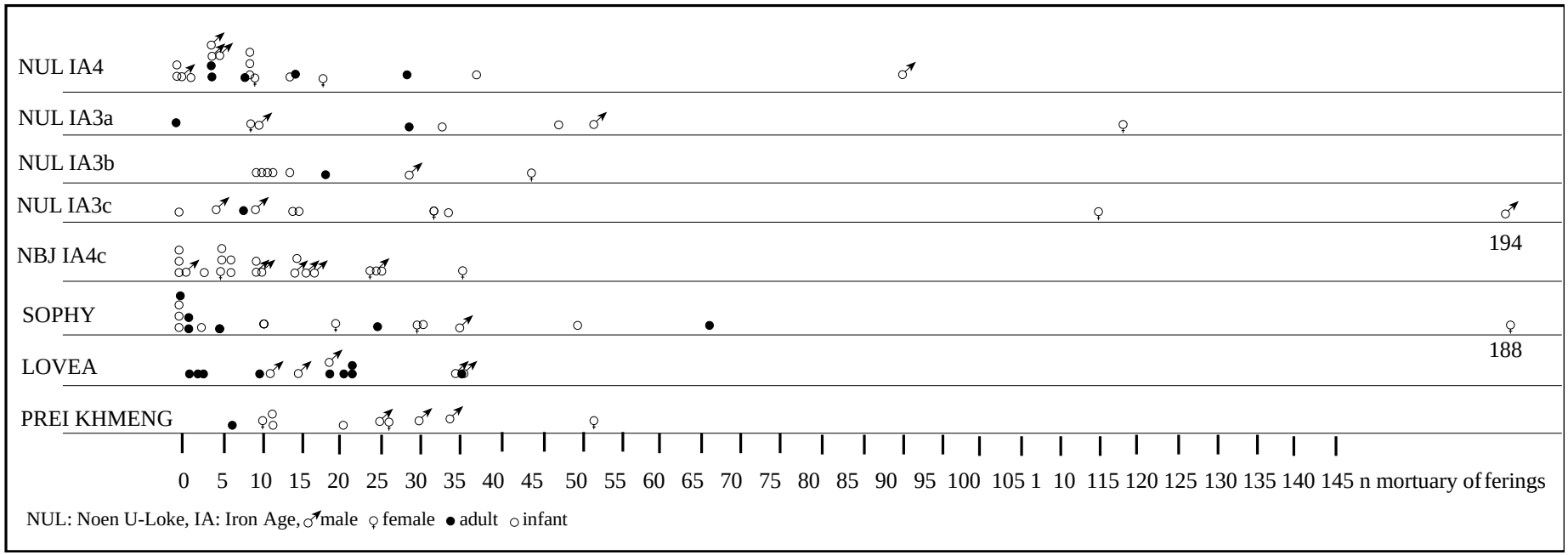


Figure 7. The number of mortuary offerings in graves from the sites under review, denoted by age. Figure by C.F.W. Higham.

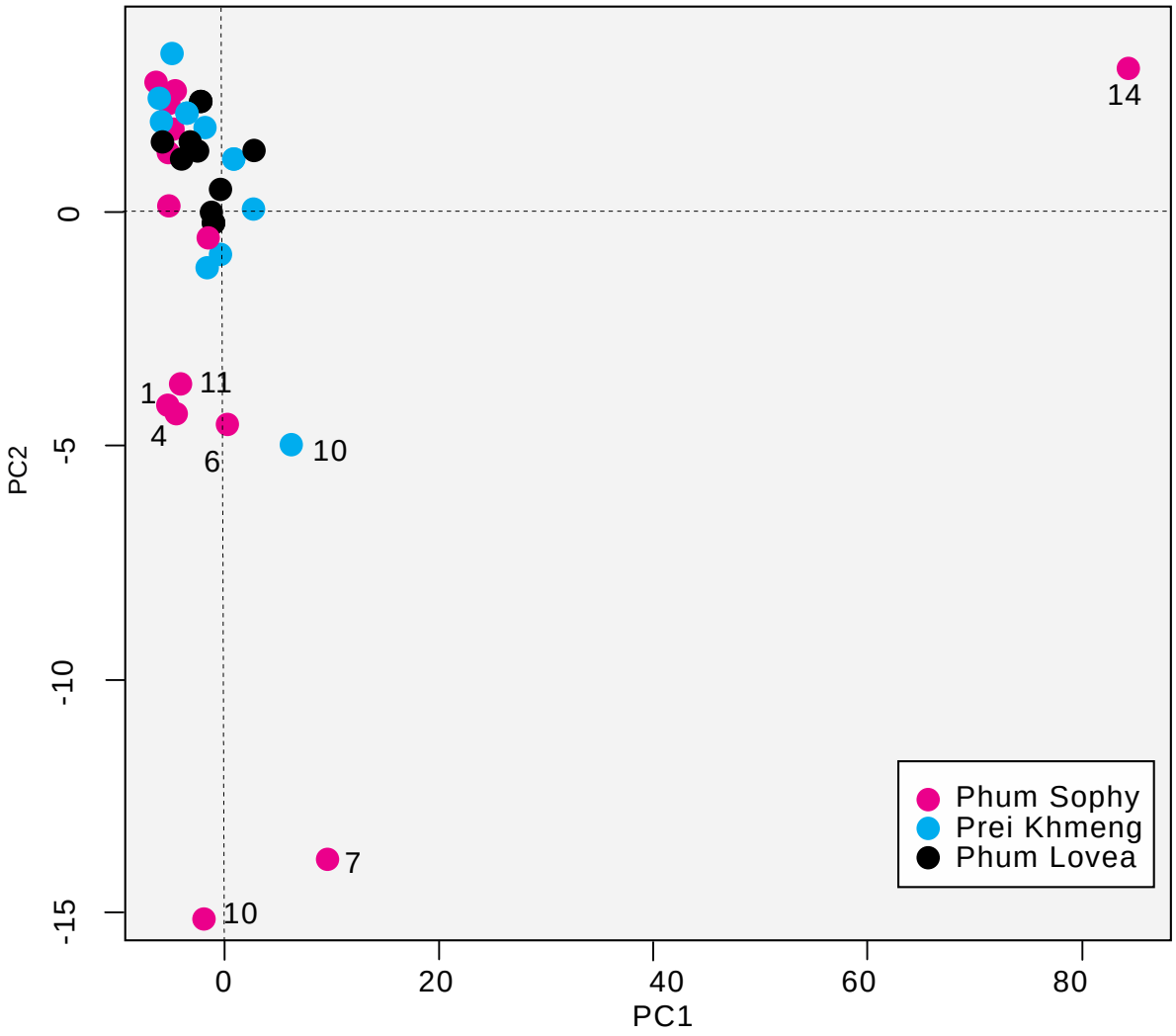


Figure 8. The three Cambodian site burials on the basis of the values for Principal Components1 and 2. Figure by C.F.W. Higham from computing by B.F.J. Manly and J.N. Alberto.

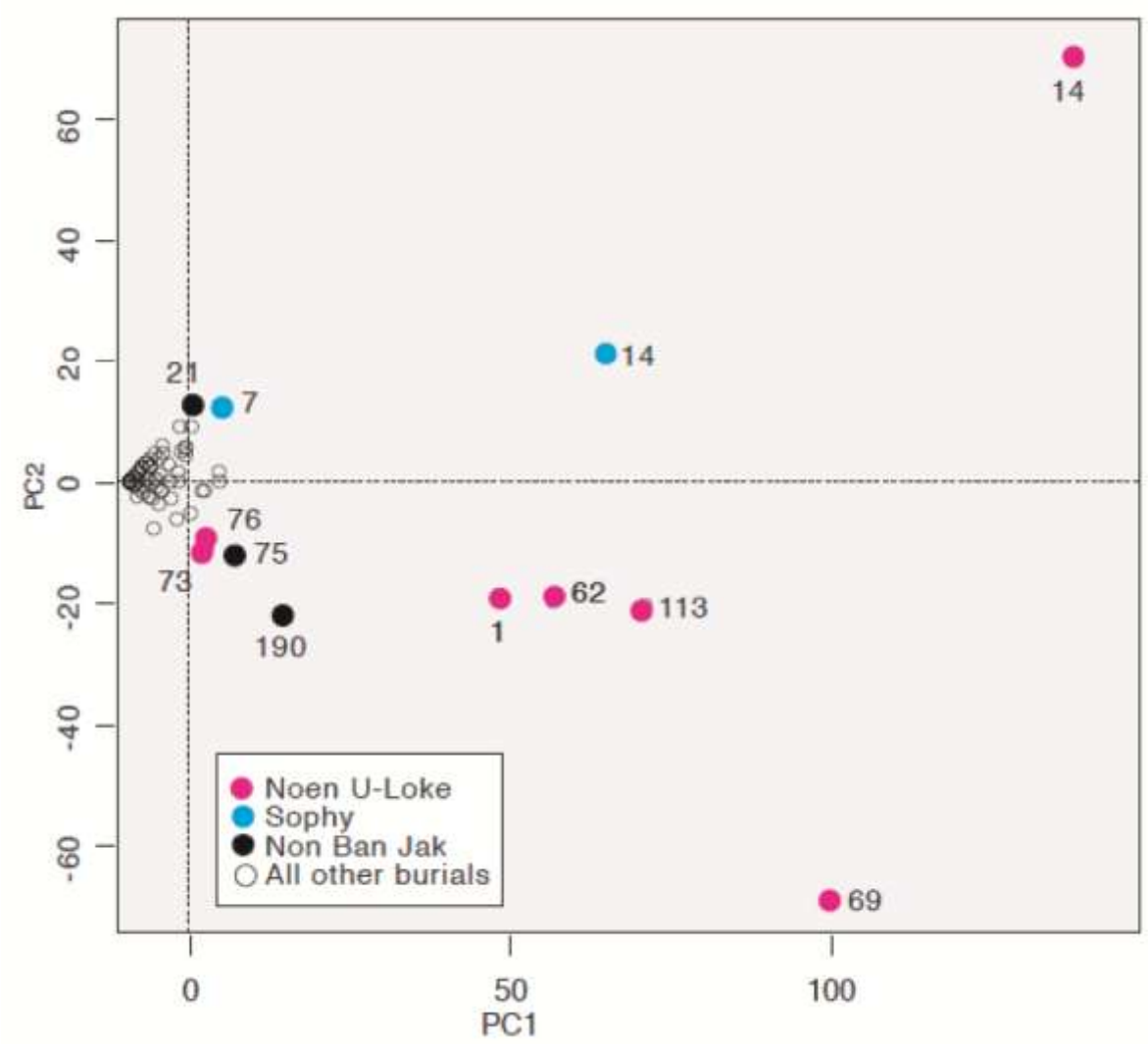
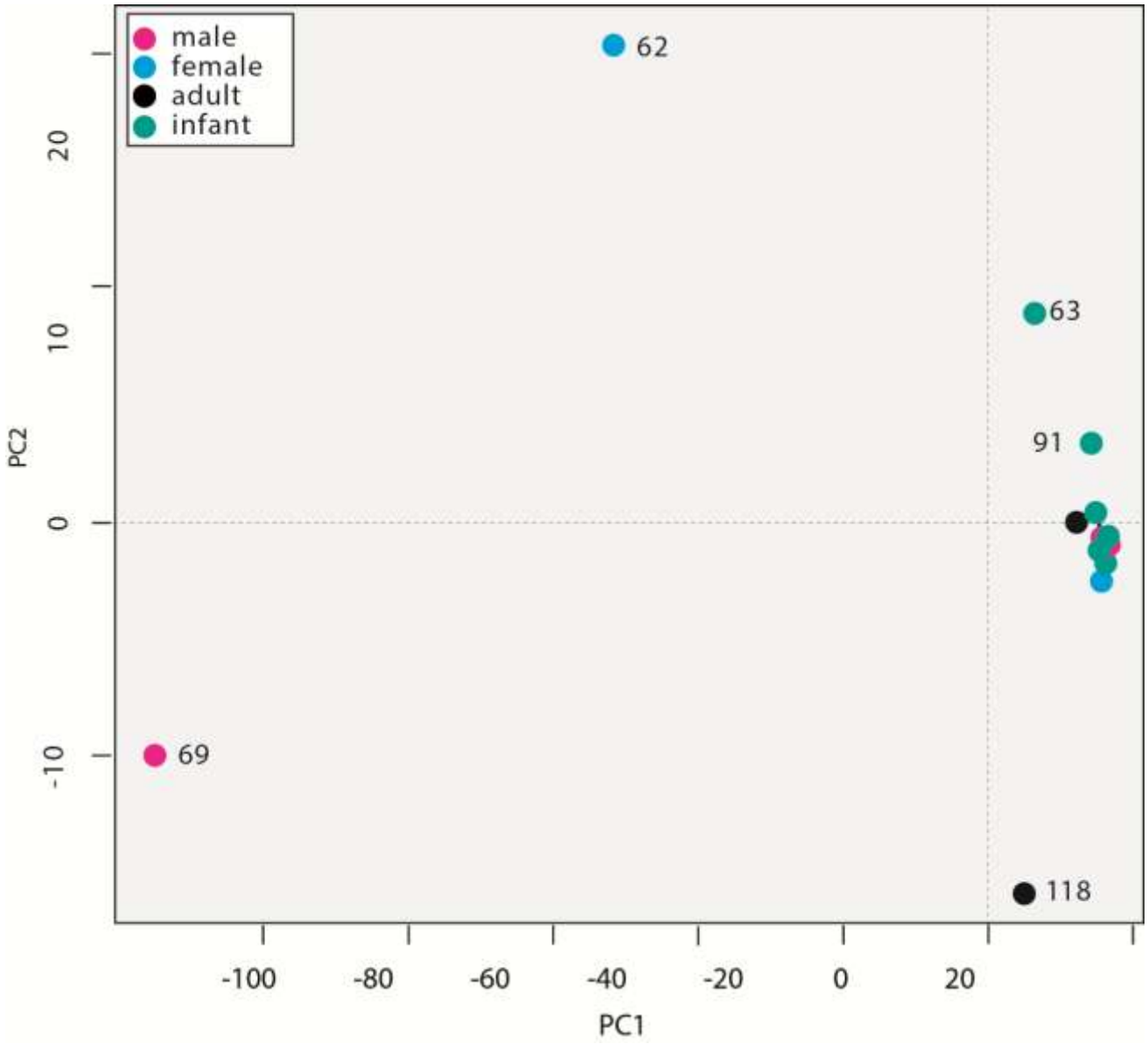


Figure 9. Noen U-Loke, Non Ban Jak and Phum Sophy site burials on the basis of the values for Principal Components 1 and 2. Figure by C.F.W. Higham from computing by B.F.J. Manly and J.N. Alberto.


male
female
adult
infant
62
63
91
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118
PC2
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-10
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-80
-60
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PC1

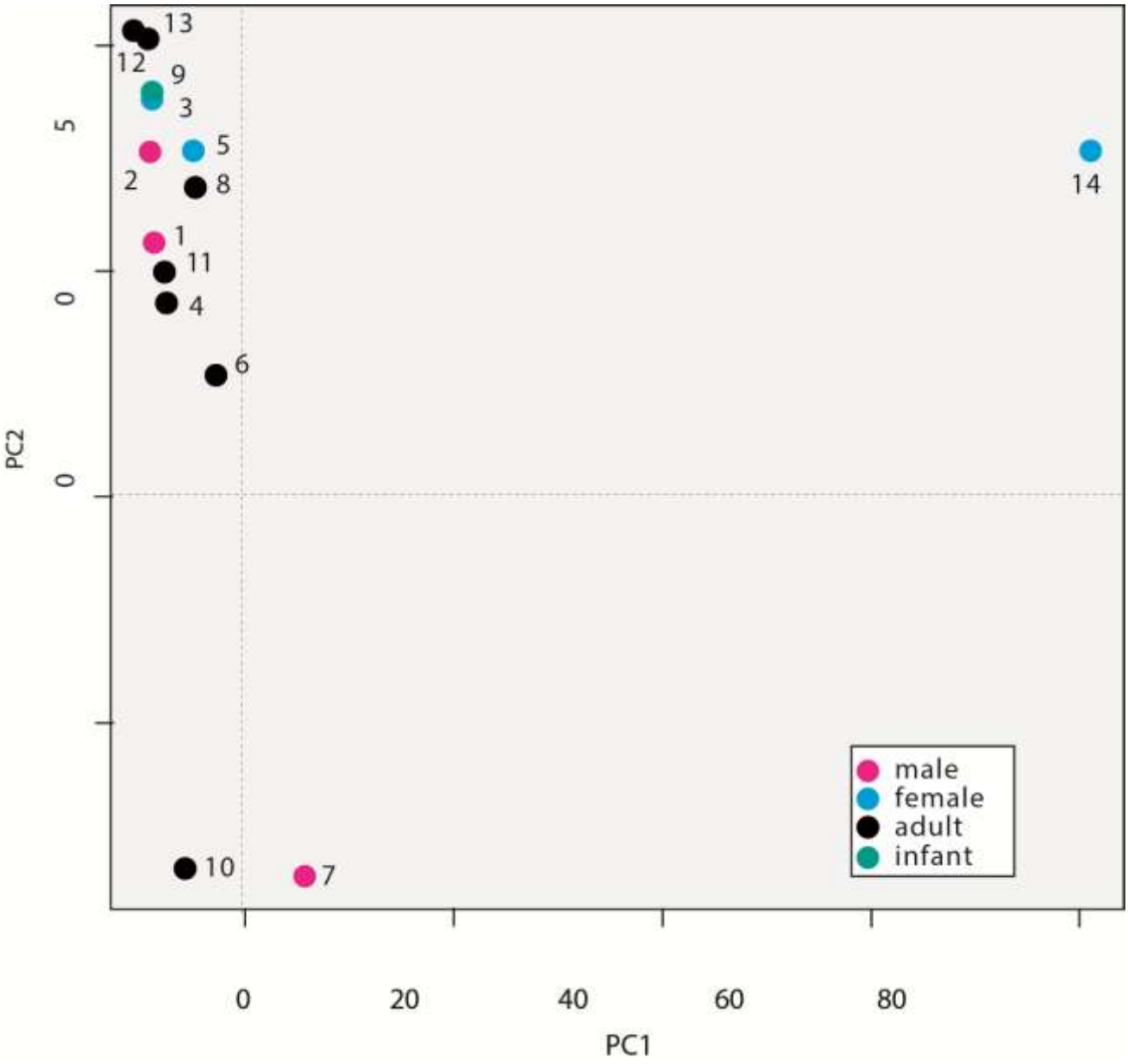

Figure 10. Above: Noen U-Loke Iron Age 3 cluster c burials on the basis of the values for Principal Components 1 and 2. Below: Phum Sophy burials on the basis of the values for Principal Components 1 and 2. Figure by C.F.W. Higham from computing by B.F.J. Manly and J. N. Alberto.

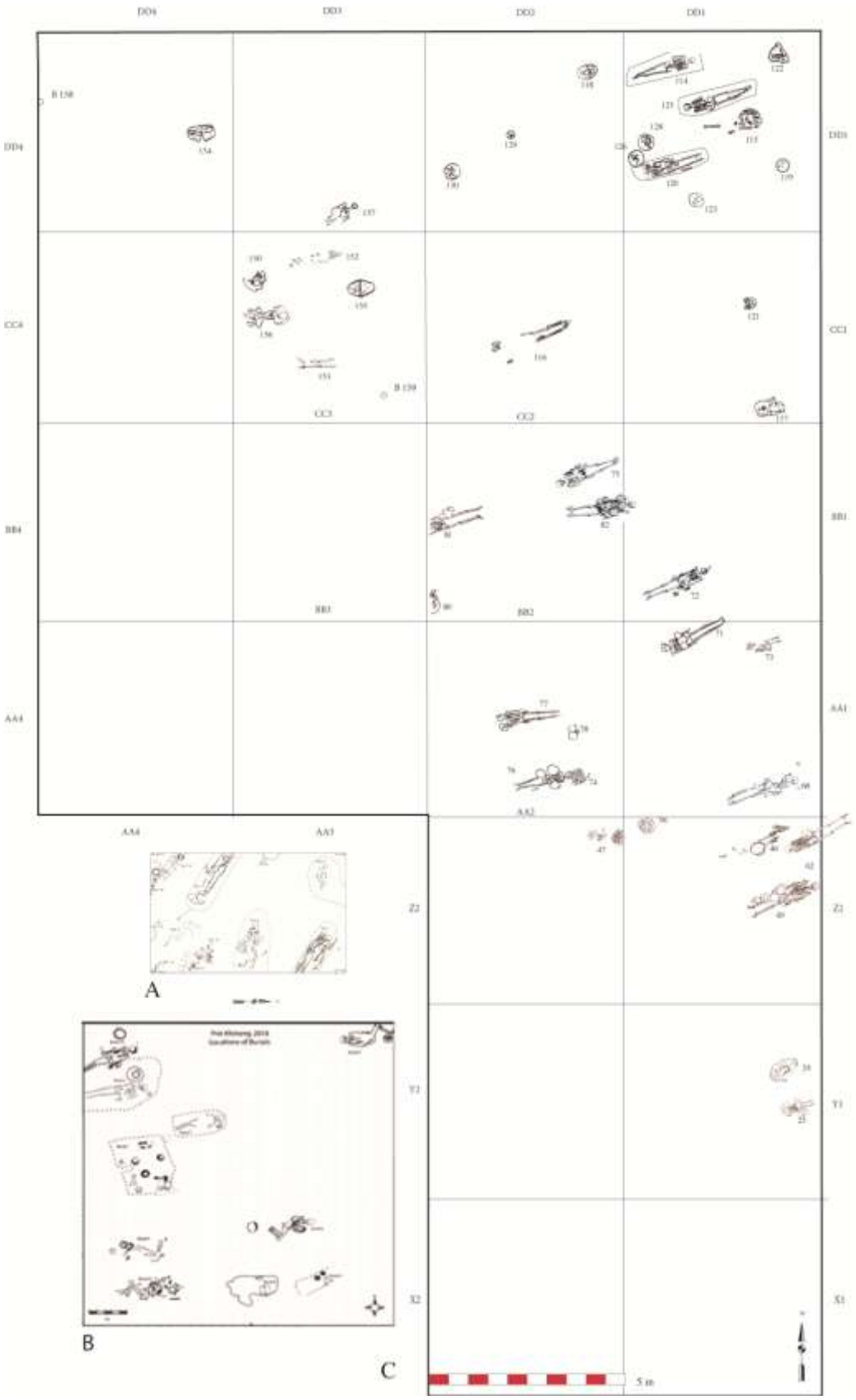

Figure 11. A and B. The excavated areas of Phum Sophy and Prei Khmeng upon which Scott has concluded that there are three social tiers representing a complex society. No corresponding mortuary plan for Phum Lovea is available. C: one of the excavated areas on the western mound at Non Ban Jak that comprised residential burials. Figure by C.F.W. Higham. The plan of Phum Sophy and Prei Khmeng burials courtesy of Dr D. O'Reilly.

It is also necessary to invoke cemetery patterning in order to investigate the social implications of how individuals were grouped. This is one key reason why we decided to expand the areas opened at NUL and NBJ over multiple field seasons. Figures 5 and 11 shows the relative areas and the mortuary patterning at NUL IA3, NBJ IA4c (western mound area only) and PS. Corresponding plans for PK and PL have not been made available to the authors. At NUL, there were tight nuclei. NBJ during IA4c practiced residential burial in houses. There appears to be a row at PS that within an area of 5 by 3 metres, included members of all three claimed social tiers, rich and poor, social elites, middle class and commoners interred cheek by jowl. Scott's tiers would be decidedly more convincing had an elite enclave or lobe of a cemetery been defined, as during the early Bronze Age at Ban Non Wat (Higham 2011b).

What, in fact, was being placed with the dead in the Cambodian sites and what social information do these artefacts convey? A universal characteristic of all five sites was a surge in the quantity of bronze ornaments, particularly bangles and rings but in the Mun Valley, also torcs, spirals, ear inserts and belts. Multiple rings were now being cast in open molds. Exotic gold, silver, carnelian and agate beads, rings and bangles were worn. It is the iron artifacts placed with the dead that are the most telling. With IA4, sickles, knives, machetes, hoes, digging tools and spears were being forged, and in the upper Mun sites, one also finds heavy socketed ploughshares. Clearly, agriculture was a key factor. The single member of the rich tier at PK was interred with three sickles. Two of the three in the rich tier at PL were accompanied by sickles, and all three elites at PS were found with at least one sickle. Can one conclude that the aristocratic elite in all three sites, interred with their sickles alongside commoners, joined the plebeians to harvest rice?

This point is reflected in an earlier report on the site of PS (O'Reilly *et al*. 2015:69) which concluded that:

> Phum Sophy was an agrarian village whose occupants engaged in regional trading networks, metal-working, textile production and, possibly, ceramic production and whose burials reveal differential wealth in terms of their mortuary assemblage. The inhabitants of PS maintained an agricultural economy evidenced by the inclusion of implements such as sickles, knives and hafted digging tools in interments and found throughout the stratigraphy.

O'Reilly and Shewan (2016:475) have said of PL that it is "devoid of evidence for a striking differentiation in wealth".

A NEW MODEL

The Paddy to Pura project began with the ambitious aim of identifying the prehistoric roots of the kingdom of Angkor, founded in the early 9th century. The UMV sites have not been subjected to looting, and are not currently occupied. This has permitted large areas to be opened, and therefore, more comprehensive samples not only of human burials, but also the many other sources of data so vital to generating a model of social change leading to the foundation of early states. Archaeological and epigraphic evidence pinpoint ca. AD 400–800 as the period of transition, when early states under the generic term Chenla in Cambodia, and Sri Canasapura or Proto-Dvaravati in the UMV, were crystallizing out of late Iron Age communities (Higham 2016). Any examination of this period must incorporate as detailed a chronological framework as possible in which to weigh the evidence (Figure 3).

The cultural sequence at NUL covers the entire Iron Age and is divided into four periods, IA1–4. IA3 has been dated to ca. AD 200–400 and IA4 to AD 400–600. At NBJ occupation was restricted to IA4 and there are four phases, IA4a–d. IA4d here extends to about AD 700, by which time the occupants had adopted Buddhism and had a material culture closely matching that of the Dvaravati states of Central Thailand. Murphy (2016) has suggested that IA4 could, in fact, be known as the proto-Dvaravati, when the first signs of early states were evident in the archaeological record of the Khorat Plateau. According to the available radiocarbon determinations, occupation of the three Cambo-

dian sites fall into IA3 with a possible extension into the early part of IA4.

A model for the transition into centralized early states in the Mun Valley has been published with the following key inputs (Higham *et al*. 2019). There was a marked deterioration in the strength of the monsoon from ca. AD 200, that involved a decline in rainfall (Wohlfarth *et al*. 2016). This would have had a serious impact on rain-fed rice cultivation. With this onset of aridity, communities in both areas under discussion constructed banks round their settlements to conserve water. At NUL this involved five moat/reservoirs covering a linear distance beyond the settlement of about 200 m. Two such moat reservoirs ringed NBJ (Figure 2). Air photographs have revealed further earthworks or distribution canals issuing from the reservoirs that linked with permanent rice fields demarcated by low banks to manage the flow of irrigation water (Parry 1992). Such banks have been mapped by Hawken (2011) round PL and other sites in its region. These developments are contemporary with IA3 at NUL, a period that witnessed the first evidence for the forging of iron ploughshares. Ploughing, involving animal traction, brings under cultivation much more land than hoeing with manual labour (Goody 1971). The demarcation of improved land in the form of individual rice fields within range of irrigation canals opens the opportunity for private land ownership, a key to social change long since stressed by Rousseau (1762). Flotation has furnished the botanic samples that have pinpointed through rice field weed frequencies, the transition from dry land to wet field rice cultivation (Castillo *et al*. 2018).

This is why it is crucial to analyze the tightly nucleated groups of burials at NUL as social units rather than blur social information thus derived by amalgamating them. We find that burial rituals were greatly enhanced with IA3, as aridity set in and the reservoirs were constructed: graves for some were lined and capped with clay, and the dead were covered in rice, even to the extent of filling infant mortuary vessels. Some of the dead wore a staggering quantity of bronze circlets, the very symbol, according to Scott, of social status and wealth. Facts speak for themselves. Burial 14 at NUL wore 224 circlets, including 75 bangles on each arm. Burial 69 wore 187. Thus two individuals wore 411 bronze ornaments, compared with just 362 from 38 burials in the three Cambodian sites. In terms of the average number of mortuary goods, IA3 cluster A at NUL scored 39.75 and cluster C, 41.9, far more than any Cambodian sample. Rather than take standard deviations away from the mean and conjuring up social tiers, we have applied principal component analyses and found that three of the four nucleated groups contained one or more outstandingly wealthy individuals, whom we have cited as representing the rapidly emerging elite. Nor was wealth in the UMV derived solely from rice surpluses. It is to this day, renowned as a source of salt and the IA moated sites are often ringed by salt production loci (Rivett and Higham 2007).

The transition from IA3 with its wealthy elites in nucleated graves to IA4 took place by ca. AD 400. At NUL, mortuary offerings fell in quantity, and the dead were laid out in rows, many of whom were buried with their iron sickle. The later prehistoric occupation of NBJ began in IA4 and we have traced four phases. The first phase, probably the founders of a new settlement, involved rather flimsy houses and a cemetery that comprised a loosely arranged group of adults and infants. Again stressing the essential of tracing change through time and not amalgamating phases, by IA4C the houses were splendidly constructed with wide foundation walls which faced narrow town lanes. Residential burial was now the norm, graves being found under the house floors.

Something major happened between IA3 and IA4 in the UMV that can only be considered within the broader picture of the dated early historic cultural sequence. Inscription K.365 discovered at Wat Luang Kao (Figure 1) records the presence of the exalted king Sri Devanika at Lingapura. The style of the script places this text in the 6th century AD (Vickery 1998). There is a continuous thread of epigraphic evidence that cites the emergence of early states north and south of the Daeng Raek escarpment. In the former, inscription K.1096 at Wat Sa Kaeo mentions a King Nrpendradhitpativarman

(Lorrillard 2014). Inscription K.404 mentions King Jayasinhavarman, while K.1082 from Wat Ban Song Puay (Figure 1) cites King Paravarasena and a capital named Sankhapura. An 8th century text from Phimai, K.1000, mentions King Sauryavarman, a person who may have been connected to a state of the UMV known from several sources as Sri Canasapura . Emerging from near the Tonle Sap in Cambodia, a prince named Mahendravarman led a military expedition up the Mun Valley in AD 598 (Lorrillard 2014). He was the son of one Viravarman and grandson of Sarvabhauma, so his ancestry must go back well into the 6th century.

Archaeologically, this transformation is reflected in the foundation of sites such as Muang Sema. Located 65 km west of NBJ, it began as a typical moated Iron Age site that was greatly expanded to enclose 150 ha and incorporate Buddhist religious monuments (Figure 12). A 7th century Sanskrit text records donations of slaves, cattle and buffaloes to this monastic community by the king of Sri Canasapura (Revire 2014). Three further inscriptions mention a royal dynasty, and gifts to Buddhist foundations of rice fields, cattle and gold and silver utensils. Muang Sema was probably one of several early state centers in the UMV, another strong candidate being Ban Suai that underlies the later Angkorian city of Phimai. It is worth reciting Lorrillard's interpretation of the epigraphic and archaeological evidence when he wrote that "the introduction of new Indic concepts and forms of aesthetic expression, must have developed rather rapidly under political impetus….it is highly probable that additional land routes were also rapidly established across the Dang Raek range, especially in its westernmost part" (Lorrillard 2014:198).

To the agricultural revolution involving wet rice agriculture that took place during IA3, it is now necessary to add the clear evidence for influences, almost certainly coming from Central Thai Dvaravati states, over the Petchabun pass to the UMV. This would have brought the Buddhism so clearly evidenced at Muang Sema, as well as to NBJ during IA4, most clearly seen in a lion terracotta (Figure 13). The Buddha was often referred to as the lion of his clan. By the latest occupation phase at this site, while inhumation burial continued, we find Dvaravati ceramics and a statuette of the Buddha (Figure 13). Thus the decline in wealth during IA4 took place as the regal centers of early states were rapidly forming in the same region. It is a tenable hypothesis that the transition into residential burial at this juncture was a means of expressing family ownership of rice land during a period of centralization, competition, political upheaval and conflict.

CONCLUSION

We suggest that Scott's conclusion that there was a three-tier social system in Northwest Cambodia during the late Iron Age reflecting a complex polity cannot be sustained because his samples are too small. They incorporate incomplete human burials, mix adults with infants and the statistical methodology is questionable.

Much larger samples from larger excavations are needed to investigate the transition from late prehistory to the foundation of early states in Northwest Cambodia. These need then to be combined with environmental and economic evidence to provide a tenable model of change. This has been undertaken in the Mun Valley at two sites where Scott's statistical modeling has furnished incorrect conclusions based on inappropriately combined samples that he claims, reflect a heterarchic social order with no clear social tiers. In fact, there was during IA3, a nexus of interrelated and seminal changes. These began with increased aridity which stimulated an agricultural revolution involving plough agriculture in fixed fields irrigated from the moat reservoirs constructed round the Iron Age settlements. Ownership of improved land enriched emerging social elites now interred in demarcated burial clusters. Production of rice surged, surpluses being used to cover the dead in their graves. Salt production on an industrial scale added to the generation of wealth, and the strategic location of these sites across a major and long-established trade artery brought exotic goods and ideas to this inland region.

Figure 12. Aerial view of Muang Sema. The small moated area to the south is the Iron Age settlement, and two major expansions are visible to the north. These contain the foundations of Buddhist monuments. Muang Sema was probably a regal centre of the early state of Sri Canasapura. A: The Iron Age moat and bank, B: The first historic period extension bank, C: The later historic extension bank, D: The historic period citadel. Courtesy Maps Version 2.0 (2131.25.4.7.1) Copyright © 2012–2018 Apple Inc.

Figure 13. The occupation of Non Ban Jak extended from the latest Iron Age into the period when Dvaravati states were crystallizing in the Upper Mun Valley. The lion terracotta dates to Iron Age 4, while the Buddha statuette and the Dvaravati ceramics post date the late prehistoric occupation. Figure by C.F.W. Higham.

There was then a rapid transition into early states as represented by the expansion of one such moated site at Muang Sema into a regional regal center probably mentioned in contemporary texts as Sri Canasapura. Rulers now with exotic Sanskrit names, made meritorious donations to their Buddhist foundations. Meanwhile, occupation continued in rural settlements. These small towns featured well-constructed houses, lanes, residential burial, Central Thai ceramics typical of the Dvaravati polities, and the adoption of Buddhism.

The three centuries from about AD 500 thus witnessed the rise and fall of a plethora of statelets that coalesced under the charismatic Jayavarman II into the kingdom of Angkor in the early 9th century, but there is no valid sustaining evidence for the transition into early states, yet, from Northwest Cambodia. There is every reason to anticipate that more extensive excavations will remedy this gap.

ACKNOWLEDGEMENTS

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