GLASS BEADS FROM JAR BURIALS OF THE 15TH-17TH CENTURIES IN THE CARDAMOM MOUNTAINS OF CAMBODIA

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A variety of glass beads were encountered in jar burials dating to the 15th-17th centuries found on rock ledges in remote portions of the Cardamom Mountains in southern Cambodia. These burials represent a mortuary ritual in which defleshed bones, often from multiple individuals, were deposited in large ceramic jars predominantly from Thai kilns. Despite the isolated location, the jars and glass beads suggest that the people buried in the jars were active participants in exchange networks. The identification of different compositional types of glass beads can be related to possible trade networks with the lowlands and maritime Southeast Asia. Using ethnographic analogies with other upland communities in Southeast Asia, the authors also propose that the placement of beads in the jar burials may have been an important part of the mortuary ritual of the Cardamom Mountain people.

INTRODUCTION

During the 15-17th centuries, a group of people who lived in the upland region of southern Cambodia practiced a burial ritual using ceramic jars and hand-hewn wooden coffins. Eleven of these burial sites, scattered throughout the eastern ranges of the Cardamom Mountains, have been identified as part of the Living in the Shadow of Angkor Project (Beavan et al. 2012a). The mortuary ritual, practiced by an as yet unidentified highland people of the Cardamom Mountains, appears to be distinct from the Hindu-Buddhist cremation practices of the lowland states of the period.[1] In the Cardamom highlander's mortuary practice, the defleshed bones of one or more individuals were placed in 52-cm-high ceramic jars (Figure 1). The jars predominantly originated from Thai kiln sources, specifically the Mae Nam Noi and Singburi kilns along the Chao Phraya river system (Beavan et al. 2012b), which supplied maritime trade cargoes. A second, though less common, type of burial receptacle were hand-hewn wooden coffins made from locally harvested logs (Beavan et al. 2012b). These two types of burial containers were then placed in groups on natural rock ledges (Figure 2; Plate IIIA). Associated mortuary goods were minimal, but

Figure 1. Burial with defleshed bones from the Phnom Khnang Peung (KPP) site is carefully moved in a basket (all photos by Alison Carter).

many jars contained glass beads, as well as metal rings and earrings, and rarely, metal knives (Figure 3). The consistency in the use of Thai ceramic jars and the types of burial goods found over the 11 known sites suggest that this previously unrecorded burial ritual was a shared cultural practice of at least one of the ethnic minorities which may have inhabited the upland regions of western Cambodia during this period (Martin 1992, 1997). It is not yet possible, however, to connect this burial practice with the extant regional ethnic groups (e.g., Chong, Pear, Samre, or Sao'ch).

This article focuses specifically on the glass beads found at three of the Cardamom Mountain jar burial (CMJB) sites: Phnom Khnang Peung, Okei, and Phnom Pel (Figure 4). To begin, the glass beads are contextualized through a discussion of the upland/lowland exchange systems during the mid-2nd

Figure 2. The Phnom Khnang Peung jar burial site.

Figure 3. An iron knife (top) and metal rings (bottom) found in jar burials at the Phnom Khnang Peung site.

millennium. A synopsis of chemical analyses of the glass beads is then provided which sheds light on the exchange networks in which the CMJB peoples were participating. The article concludes with a discussion of the use of beads as part of a mortuary ritual, drawing on ethnographic analogies with other upland communities in Southeast Asia. This research expands on a relatively understudied period of bead exchange in Southeast Asia and provides additional information on the trade and consumption of beads by an upland culture in mainland Southeast Asia.

BEADS AND TRADE IN CAMBODIA DURING THE 15TH-17TH CENTURIES

The absolute dating of the CMJB sites by radiocarbon analyses of human bone and coffin wood has placed the ritual practice from cal 1395 to 1650 (Beavan et al. 2012a). The period in which the CMJB people lived was a time of increasing and intensifying trade in Cambodia. This period was also one of transformation in which the socio-

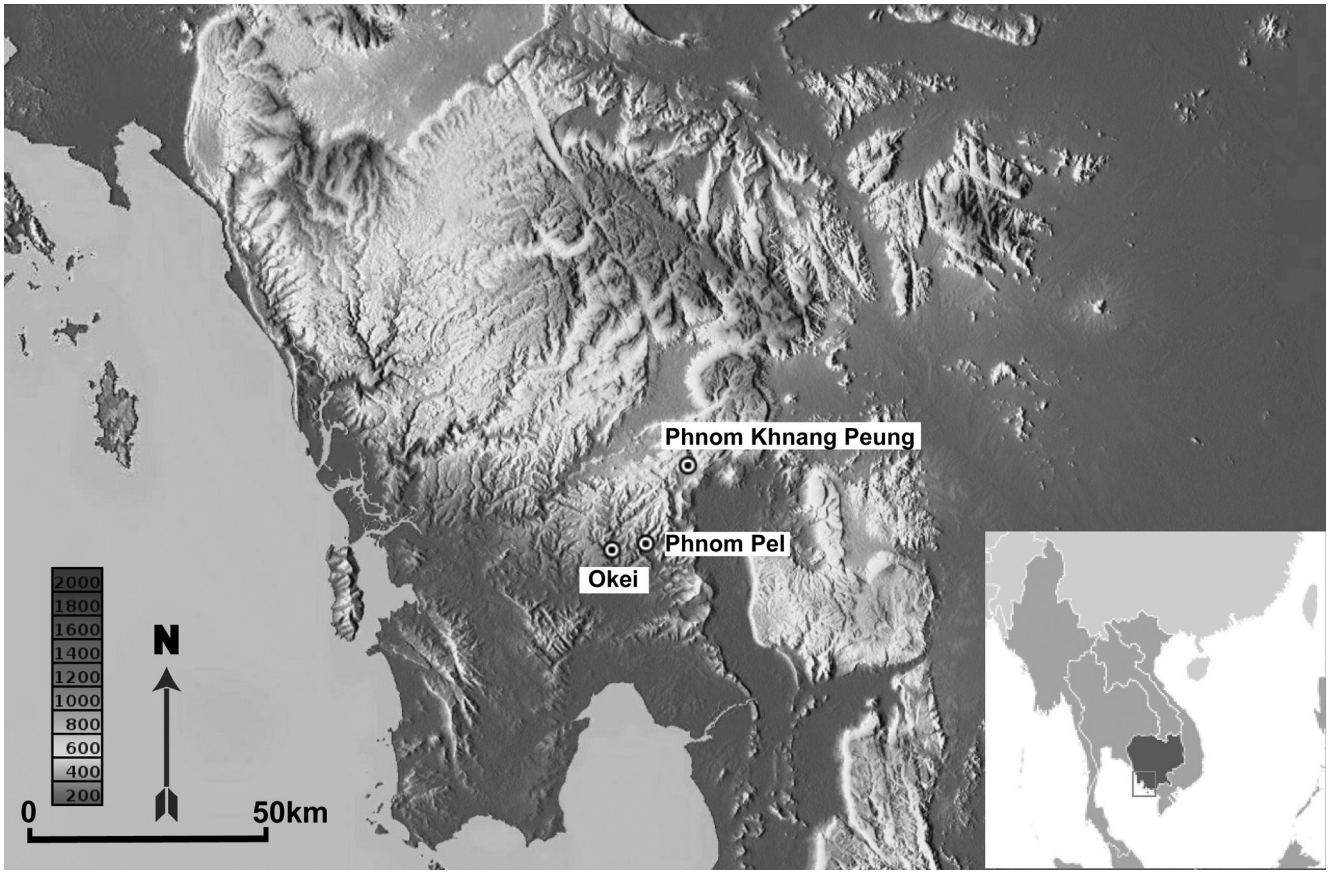

Figure 4. The Cardamom Mountain region of southern Cambodia showing the location of the jar burial sites.

political center of the Angkorian Empire, previously based near modern Siem Reap, moved further south to the area near the modern capital of Phnom Penh. Several historians have noted that this move to the Mekong River system was important for taking advantage of increasing maritime trade with China (Chandler 2008; Vickery 1977). Historian David Chandler (2008:94) has noted that Phnom Penh's strategic location at the convergence of the Tonle Sap, Bassac, and Mekong rivers allowed for control of trade from northern regions such as Laos and the Mekong Delta in the south. The presence of Thai-sourced ceramics at upland and lowland sites also suggests that coastal maritime routes along the Gulf of Thailand were becoming increasingly important.

Forest products from the upland regions were one important component of expanding trade. Products sourced from the Cardamom Mountains, including areca leaves, hardwood, and tree resins, were traded with lowland populations (Zucker 2013:24). The 13th-century Chinese emissary to Angkor, Zhou Daguan, describes desirable forest products such as exotic trees, animals, and animal products such as ivory, kingfisher feathers, and rhinoceros horn, as well as cardamom spice and resin (Daguan 2007:69-70). Sixteenth-century Spanish and Portuguese accounts also describe a variety of exotic trees, tree products, and ivory in circulation (Groslier 2006:116-117). The highland people themselves were also perceived as a commodity by lowland communities which sought cheap slave labor. In the 13th century, Zhou Daguan (2007:58-59) describes people from the mountains working as slaves in Angkorian homes.

A small number of historical documents specifically describe the trade of beads into Cambodia. Chinese texts from the mid-14th century describe sending yellow and red beads to Cambodia (Rockhill 1915:107). A later Chinese account of travels to Southeast Asia dated to 1436 also describes trading beads to Cambodia (Rockhill 1915:108). A 17th-century Dutch trader, Van Wuysthof, noted that hill tribe communities would exchange forest products with both the Chinese merchants and the Cambodian court in exchange for various metals, bronze objects such as gongs and drums, Chinese ceramic jars, and glass beads (Richter 2000:116-117). It is likely then that the CMJB culture was involved in the trade of forest products with lowland groups and may have obtained glass beads as part of this economic transaction. Morphological and geochemical

analyses of glass beads from the jars offer possible insight on the previously unknown trade relationships these upland peoples had developed.

BEADS FROM THE JAR BURIALS

As noted above, this study focuses on the beads recovered from three CMJB sites (Figure 4). Phnom Khnang Peung (KPP) is the largest of the jar burial sites thus far discovered, consisting of a single rock ledge over 3 m in length, with 40 intact jar burials. Most of the burials were placed in Mae Nam Noi/Singburi maritime-trade ceramic jars (Figure 5; Plate IIIB), with the exception of two burials that used large jars typical of production in Angkorian kilns. These large Angkorian jars may have been produced at the Buriram kilns, situated in what is now northeastern Thailand at the Cambodian border, and associated with ceramic production within the Angkor kingdom during the 11th-13th centuries (Groslier 1981). It is, however, also possible that the jars were manufactured at the recently discovered Torp Chey kiln site located near an ancient highway east of Angkor, which may have been producing ceramics from the 12th to early 15th centuries (Ea 2013) and supplying jars to the central highlands of eastern Cambodia and central Vietnam (Cort and Lefferts 2013; Hendrickson 2008). One Angkorian ceramic jar appears in every one of the 11 known Cardamom jar burial sites, an oddity among the massed Mae Nam Noi/Singburi wares. Prior to work at the KPP site, no human remains had ever been discovered in these types of vessels; at KPP three Angkorian jars were found, two of which contained human remains and grave goods, including glass beads.

A total of 1,332 glass beads were found in 25 of the 40 jar burials at KPP (Figure 6), and 82 glass beads were found in the sediment around the jars. The beads came in a variety of colors, with black, yellow, and blue drawn beads and coiled opaque blue beads predominating (Table 1). The remaining beads considered in this study are from the Okei and Phnom Pel sites. The Okei site consisted of two small ledges, approximately 30 m apart, holding several Mae Nam Noi jars and a single Angkorian jar (Beavan et al. 2012a). Although no human bone was found at this site, 298 glass

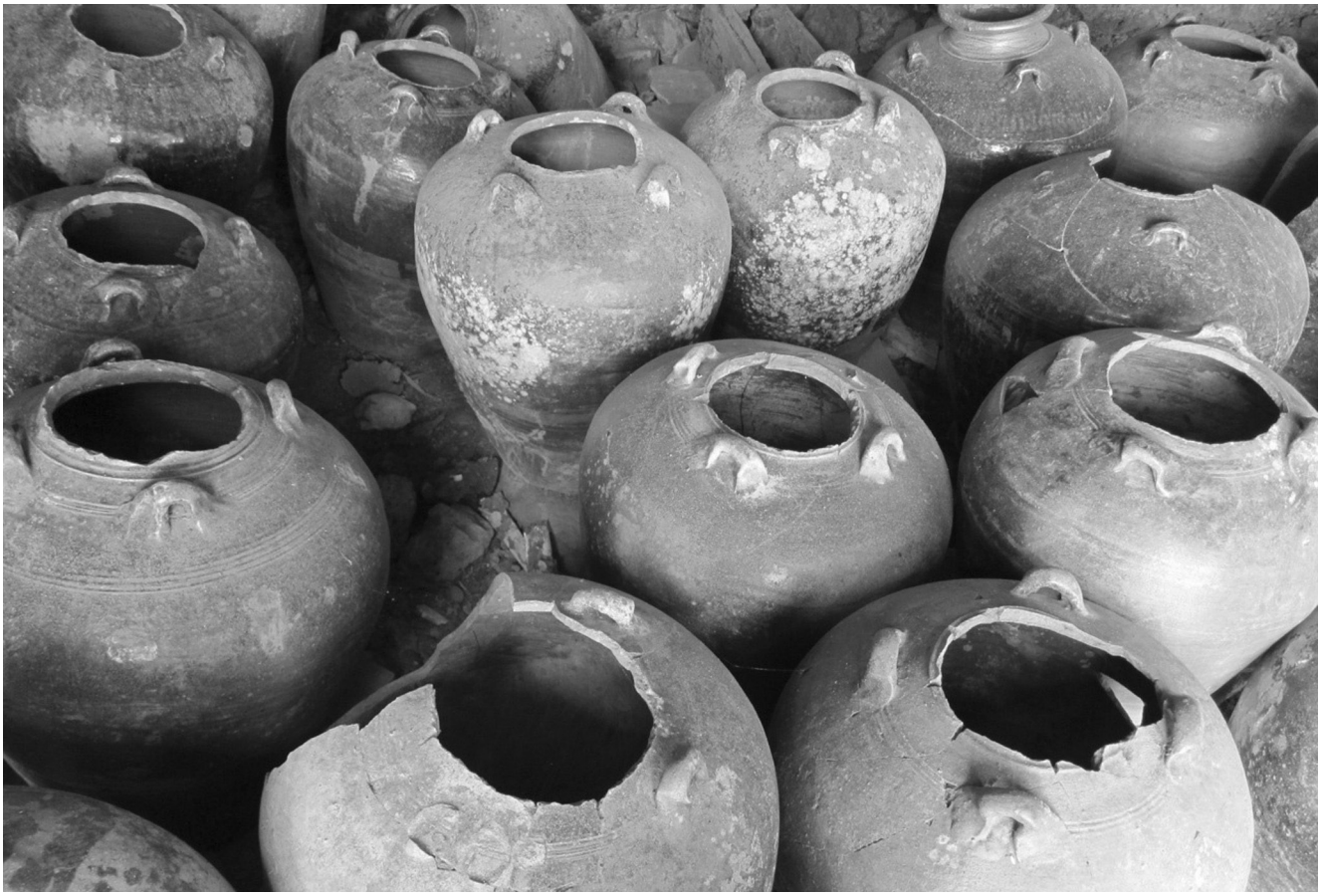

Figure 5. Burial jars at the Phnom Khnang Peung site.

Figure 6. Glass beads in the burial jars were often intermixed with the bones and the detritus that had accumulated over hundreds of years.

beads were collected in the sediments near the Angkorian jar and are believed to be grave goods. The Phnom Pel site contained seven jar burials on two adjoining ledges and a third ledge that contained 12 wooden coffins. Seven glass beads from one of these coffins were examined.

The glass beads from the CMJB sites can be divided into two groups based on the method of manufacture. The first group is comprised of monochrome coiled glass beads where glass was wound around a wire or rod (*see* Plate IVA, b). This bead type is strongly associated with a Chinese manufacturing tradition (Francis 2002). The majority of the coiled beads are opaque light blue or opaque white, with a smaller number in a translucent dark purple (Plate IIIC, a-b). A single coiled reddish-orange bead was identified at Phnom Pel (Plate IIIC, d). In Indonesia and other parts of island Southeast Asia this particular type of reddish-orange bead is known as *mutiraja* and is considered a valuable heirloom by the local population (Francis 2002:186-187). A polychrome bead found at the KPP site has a wavy red design applied to a blue glass base (Plate IIIC, c). This bead is also associated with Chinese glass bead production, most likely for export (Francis 2002:78-80). A single coiled blue bead was found at Phnom Pel; the Okei site contained no coiled beads.

A second group consists of small, oblate, monochromatic beads made from drawn glass tubing which can be clearly identified by the linear striations that parallel the perforation (*see* Plate IVA, a). These beads are typically referred to as Indo-Pacific beads and were widely traded across the ancient world during the 1st and 2nd millennium (Francis 1990, 2002). The drawn beads at KPP come in a variety of colors, including black, yellow, green, dark purple, and blue (Plates IIID and IVB). Yellow and black drawn beads are the most common type found at Okei.

COMPOSITIONAL ANALYSIS

A selection of 74 beads from the three sites mentioned above were analyzed using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) in order to determine the compositions and glass recipes used to produce the beads. This analysis identified four compositional groups that appear to be related to different production centers and likely different exchange networks (a detailed discussion of the compositions is discussed in Carter et al. 2015).

Table 2 presents estimates of the total number of beads in each compositional group based on visual similarities between analyzed and unanalyzed beads within the same context. This was difficult in certain situations as black, yellow, and green drawn beads could look similar to one another but have been made using different glass recipes. As it was not possible to analyze all of the beads found with the burials, an assumption was made that if a bead or beads from a group of similar or identical looking beads within a specific context were identified as belonging to a particular glass compositional type, then the other beads in that group likely belonged to the same compositional type.

The largest quantity of beads found at the KPP site belong to the high-alumina mineral soda (m-Na-Al) glass category and specifically the m-Na-Al 2 sub-type which contains high uranium concentrations, and lower levels of barium, zirconium, and strontium (Dussubieux et al. 2010). These beads consist of small, drawn, monochromatic oblates that come in light and dark blues, opaque black, opaque yellow, opaque red, and green (Plate IIID). These beads are similar in composition to m-Na-Al Type 2 beads from the trading port of Chaul, located about 50 km south of Mumbai on the west coast of India, in contexts dating to the 9th-19th centuries (Dussubieux et al. 2010). Similar beads have also been found on the east coast of Africa (Dussubieux et al. 2008). Dussubieux et al. (2010) have suggested these beads may have been manufactured at a site near Chaul, for use in the Indian Ocean exchange with Africa.

Seven yellow glass beads, found at both the KPP and Okei sites, belong to a different high-alumina mineral

Table 1. The Distribution of Drawn and Coiled Beads by Color Within the KPP Jars and Okei and Phnom Pel Sites.

Context	Drawn Black	Drawn Yellow	Drawn Red	Drawn Green	Drawn Blue	Drawn Dark Blue	Drawn Brown-purple	Drawn Amber
KPP Section B1	12	5	2		19			
Jar 2					8			
Between Jar 5 and Jar 6								
Jar 7	2	16			17			
Near Jar 8		1						
Jar 9								
Jar 10					1			
Jar 11	34							
Jar 12								
Jar 14	1	1			3			
Jar 17	15	105		18	3	193		
Jar 19					1			
Jar 21	20			1				
Jar 22				1	1			
Jar 25	150	1				8		
Jar 26	3					1		
Jar 27	1							
Jar 28	2				1			
Jar 29					1			
Jar 30	2	6					6	
Jar 31	1			4				
Jar 32		74				1		
Jar 33		1						
Jar 34	28	2		23		1		1
Jar 35	1	11		3	1	2		
Jar 36	10	3		2	16	1		
Soil around Jar 36	10	1	1	3	3	2		
Jar 37	25	1			15			
Jar 38		5	3					
Phnom Pel	2			2				
Okei	144	152		1				
Totals	**463**	**385**	**6**	**58**	**90**	**209**	**6**	**1**

Table 1. Continued

Context	Coiled Blue	Coiled White	Coiled Purple-black	Coiled Reddish-orange	Coiled Unknown	Poly-Chrome	Yellow Unknown	Total Drawn/ Coiled
KPP Section B1	9	1						**48**
Jar 2	17					1		**26**
Between Jar 5 and Jar 6	5							**5**
Jar 7								**35**
Near Jar 8	7		1					**9**
Jar 9	1							**1**
Jar 10								**1**
Jar 11								**34**
Jar 12	139		51		13			**203**
Jar 14								**5**
Jar 17	4							**338**
Jar 19	1							**2**
Jar 21	122							**143**
Jar 22		3						**5**
Jar 25	3							**162**
Jar 26		11						**15**
Jar 27								**1**
Jar 28	4	1						**8**
Jar 29	58							**59**
Jar 30								**14**
Jar 31	8	1						**14**
Jar 32								**75**
Jar 33								**1**
Jar 34	9	1						**65**
Jar 35								**18**
Jar 36	19				1		6	**58**
Soil around Jar 36								**20**
Jar 37								**41**
Jar 38								**8**
Phnom Pel	1			1	1			**7**
Okei							1	**298**
Totals	**407**	**18**	**52**	**1**	**15**	**1**	**7**	**1,719**

Table 2. Estimated Quantities of Each Glass Compositional Type at the Three CMJB Sites.

Context	Coiled lead-potash glass	Newly found high-alumina glass	m-Na-Al Type 2	m-Na-Al Type 4	Unknown	Total
Jar 2	18		8			**26**
Jar 7		16	17		2	**35**
Jar 9	1					**1**
Jar 10			1			**1**
Jar 11		34				**34**
Jar 12	190				13	**203**
Jar 14		1	3		1	**5**
Jar 17	4	138	196			**338**
Jar 19	1		1			**2**
Jar 21	122		21			**143**
Jar 22	3		2			**5**
Jar 25	3		158		1	**162**
Jar 26	11		4			**15**
Jar 27					1	**1**
Jar 28	5		1		2	**8**
Jar 29	58		1			**59**
Jar 30		8			6	**14**
Jar 31	9		4		1	**14**
Jar 32		74	1			**75**
Jar 33		1				**1**
Jar 34	10		55			**65**
Jar 35		8	9		1	**18**
Jar 36	19		32	6	1	**58**
Jar 37			40		1	**41**
Jar 38			8			**8**
KPP beads around the jars	23		27		32	**82**
Okei	1	296		1		**298**
Phnom Pel	2			5		**7**
Totals	**480**	**576**	**589**	**12**	**62**	**1,719**

soda glass sub-type: m-Na-Al Type 4. This glass has been identified at sites in Sumatra (12th-16th centuries) (Dussubieux 2009), on the Wrecked Junk of Brunei (15th-16th centuries) (Gratuze 2001), and the site of Muasya, Kenya (17th-19th centuries) (Dussubieux et al. 2008, 2010). The beads are drawn, but differ in appearance from the other high-alumina drawn beads found at the CMJB sites. They are irregularly shaped oblates ca. 3-5.5 mm in size, with large uneven holes (Plate IVB, c). The skewed striations in the glass (Plate IVB, b) appear to be related to the twisting or sagging of the glass during the manufacturing process (K. Karklins 2014: pers. comm.).

The second most common bead type found at the CMJB sites is of lead-potash-silicate glass. The lead-potash compositional group includes all the coiled glass beads, as well as the polychrome bead found at KPP. The lead-potash glass recipe was used in China beginning in the 6th century through the Ming Dynasty (Brill et al. 1991; Fuxi 2009:28; Gratuze 2001:10). These beads appear to have been produced for export to Southeast Asia (Francis 2002:76-78) and similar glass beads and artifacts have been found on the Wrecked Junk of Brunei (Gratuze 2001), the site of Ban Non Wat in Northeast Thailand (Carter and Lankton 2012), and at the post-Angkorian site of Krang Kor, near Longvek in central Cambodia (Tamura 2013).

Francis (2002:76-78) describes two stages of Chinese coiled beads that were widely traded to Southeast Asia. During the 12th century, small (3 mm or less in diameter) coiled beads predominated, but appear to have been replaced around the 16th century by a different and larger type of coiled bead, often with multiple coils (Francis 2002:82). It is these later "multiple wound monochrome beads," as described by Francis (2002:82), which were found in the Cardamom Mountains and elsewhere and determined to be made of lead-potash glass. The presence of this bead type at jar burial sites in the Cardamom Mountains, as well as at lowland and shipwreck sites, testifies to their widespread trade across Southeast Asia during the mid-2nd millennium.

An earlier study of coiled beads in Southeast Asia found that a single color of coiled beads often dominated a site, which was perhaps related to manufacturing centers producing a single color of bead for a certain period of time or local demand for a specific color (Francis 2002:77-78). Opaque light blue coiled beads were the most common at KPP (n=406), with smaller numbers of opaque white (n=18) and dark purple/black (n=53) beads. In this sense, KPP shares a similarity with sites in Brunei that were also dominated by coiled blue beads (Francis 2002:77-78).

The final bead type found at the CMJB sites is composed of a previously unidentified high-alumina glass, with higher concentrations of magnesia. These beads are also monochrome oblates similar in appearance to the m-Na-Al Type 2 beads (Plate IVC). This compositional type is represented primarily by opaque black beads, translucent yellow beads with a somewhat greasy appearance, and smaller quantities of green and translucent purple beads. As beads made from this glass type have not yet been identified elsewhere, it is hypothesized that they may have been manufactured locally in Southeast Asia. Yet, an examination of glass artifacts from contemporary sites is needed to determine how widely traded these beads were, and if their manufacturing location can be identified (for more discussion on this glass type *see* Carter et al. 2015).

The four different glass types identified through compositional analysis are not evenly distributed between sites and within the jars at KPP (Table 2). Additionally, there do not appear to be strong patterns in the distribution of different colors of beads within the KPP jars. Because the jars with beads contain the unarticulated bones of multiple individuals, it is difficult to determine if specific beads were associated with a single individual or had any meaning related to status or identity. One notable observation is the dichotomy of jars at KPP with coiled lead-potash glass beads and those with the newly identified high-alumina glass. With the exception of Jar 17, no jars contain both the high-alumina glass and the Chinese coiled lead-potash beads. This pattern is repeated at Okei which yielded no coiled lead-potash beads.

Absolute dating of skeletal material in the jars has produced a corpus of radiocarbon dates that relate mainly to the 15th century. A Baysian statistical treatment of the radiocarbon results currently suggests that the majority of the burials were deposited within a 15-45 year time span (Beavan et al. 2015). Due to this short but intensive period of site use, it is not clear if the differences between these two bead types and their distribution in the KPP jars and at Okei are temporal or cultural. For the time being, this difference is unexplained; it is hoped that future isotopic or bioarchaeological data may help address this problem.

BEADS AND MORTUARY RITUAL

The meaning the recovered beads held for the CMJB peoples remains unknown, but analogies with other Southeast Asian upland communities provide a starting point for considering this question. Ethnographic and ethnohistoric accounts of upland communities in mainland and island Southeast Asia have detailed the importance of beads as heirlooms (e.g., Adhyatman and Arifin 1993; Francis 1989, 1992; Munan 2005). In these communities, beads serve as markers of status and identity, hold important ritual or magical power, and are important wealth objects (Francis 1989, 1992; Munan 2005). As Francis (1992:13) notes, beads and other objects become heirlooms "according to spoken or unspoken rules in each society which has them." The process for passing down beads from generation to generation also varies greatly between different communities (Francis 1989, 1992). Some heirloom beads seen in Southeast Asian communities today, or in the recent past, date back several hundred to a thousand years (Francis 1992). Chinese coil beads are especially popular among several upland communities including the Akha of Thailand, the Paiwan of Taiwan, and the peoples of the lesser Sundas, as well as Indonesia (including the Toraja of

Sulawesi) and Borneo in general (Adhyatman and Arifin 1993; Francis 1989, 1992; Munan 2005). It is possible that beads found in some of these communities today could have been traded through the same networks as the beads found at the KPP site.

By definition, heirloom beads are not removed from circulation and deposited in burials, but are instead passed on to other family members, though beads often play important roles in mortuary ritual. Among the Kalinga of the Philippines, beads are usually placed on the corpse, but are then removed before burial. A few beads may, however, be placed with the body in the grave (Francis 1992:6). A similar practice is carried out among the Kelabit of Borneo, where a few beads may be buried with corpses, with the rest becoming heirlooms (Francis 1992:9; Munan 2001:30). Munan (2005:6) relates that among the Kayan, beads are used by the dead in the afterlife and that "a person buried without beads would be blind, lame, and deaf in the underworld." The Melanau people also place beads with a corpse, wrapping them around the jaw to keep the mouth in position. During burial, the beads may be placed in the coffin to be used in the afterlife, placed in the coffin temporarily and then later removed, or left on top of the coffin. This latter practice "refers to the time when the Melanau deposited their dead above ground, on wooden scaffolding or in tall carved pillars depending on the deceased's social status" (Munan 2005:63). The Toraja of Sulawesi traditionally buried their dead in caves and cliffs, "sometimes with full-sized dressed effigies in front to guard the valuables buried with the deceased" (Francis 1992:11). It is not clear if beads were included as grave goods, though Francis (1992:11) notes that glass beads, including Chinese coil beads, are among those kept in heirloom bead collections today. On the coast of Borneo, the mortuary ritual appears to have changed over time. Beads were initially buried with their owners until the 10th century when they were removed from graves and kept in circulation as heirlooms (Francis 1989:30, 1992:10).

Few glass beads have been found at lowland sites contemporary with KPP. One important exception is the site of Krang Kor located near the post-Angkorian capital of Longvek, Cambodia. Blue and yellow coiled lead-potash-glass beads similar to those at KPP were found in a burial at the site (Tamura 2013). Beads of other glass types, like those identified at KPP, were not found. It is possible that glass beads were widely circulated within lowland communities as seen in upland groups, though a lack of archaeological research on sites dating to the 15th-17th centuries makes this assessment difficult.

The origins of the CMJB mortuary ritual are obscure. Burials in jars, usually underground, were common during the prehistoric and early historic periods of mainland Southeast Asia, (e.g., Halcrow et al. 2008; Higham 2014:116, 211-212; Indrawooth 1997; Reinecke 2009) over a thousand years earlier than the appearance of jar burials in the Cardamom Mountains. There is no record of exposed jar burials as practiced in the Cardamom highlands during the historic periods in Cambodia, but a number of cultures in island and mainland Southeast Asia have practiced comparable mortuary rituals, exposed jar burials in particular (Beavan et al. 2012a:3). For example, several ethnic groups in Borneo practice elaborate mortuary rituals involving a two-step process in which defleshed or cremated skeletal remains are placed in an above-ground or raised mortuary structure inside a coffin or jar (Winzeler 2004:40-41). The exposed stoneware jar burials in Borneo's Kelabit highlands and in Berawan may date to about the 14th-16th centuries (Harrisson 1962, 1974; Metcalf and Huntington 1991:74-83). The Lawa hill people of Tak Province between Thailand and Burma also practiced exposed jar burials between the 14th and 16th centuries, as inferred from associated Chinese blue-and-white ware and Burmese and Sawankaloke ware (Pitiphat 1992:11-15; Shaw 1985:93-102, 1986:10-13), but the human remains in these vessels were cremated. While the Lawa example provides a regional and chronological possibility for cultural transmission of the Cardamom exposed jar burial practice and use of assorted exotic ceramics, the majority of other jar burial practices have significant geographical separation from the Cardamom highlands (e.g., those of island Southeast Asia).

Perhaps the most tantalizing connection of the jar burials to a living population is a mortuary ritual involving the construction of funerary towers (*phnom yong khmaoch*) as practiced by certain communities in the Cardamom Mountains today and in the recent past. Zucker (2013:89-90) describes two types of funerary towers. The first and more common type is a tall, temporary, wooden structure under which a body is cremated. These small towers are houses for the spirit of the deceased, which eventually decay and collapse over time. The second type is a more permanent tower in which the cremated remains are placed. This practice of elevating the remains, physically and/or spiritually, may be related somewhat to the practice of the CMJB people of placing jars on mountain rock ledges. Villagers in one area also described to Zucker (2014: pers. comm.) how their ancestors would place the ashes of their relatives in bowls or ceramic jars and place them under a boulder located near their old village off an oxcart trail. Although the relationship between the more recent *phnom yong khmaoch* mortuary practices and the jar burials of the 15th-17th centuries is not clear, they are notable for being distinct from the traditional Buddhist funerary practices of lowland Cambodia.

The cultural symbolism of the glass beads and their role in mortuary ritual in the Cardamom Mountains is still under debate. Although it is currently impossible to draw specific conclusions regarding the use and deposition of beads among the people who practiced the Cardamom jar burial ritual, similarities with other upland communities in Southeast Asia can provide hypotheses to be tested against additional data to be collected from ongoing work in the Living in the Shadow of Angkor Project.

CONCLUSION

Despite the isolated mountain locus of the Cardamom Mountain sites and a likely cultural separation from the Angkorian polity (Beavan et al. 2012a), the evidence from the glass beads suggests that the people buried in the jars were integrated into wide-reaching bead exchange networks that spanned lower mainland and island Southeast Asia, perhaps extending across the Indian Ocean. Ethnographic research suggests that upland communities in this area have long had a westward orientation towards the sea, along routes traveled by elephant and oxcart (Zucker 2013:24-26), while historic documents note connections to the lowlands to the east. The observations drawn from the large dataset at Phnom Khnang Peung, including the diversity in bead types and especially the presence of certain bead types in specific burial jars, suggest the CMJB people were likely participating in multiple trade networks.

The antiquity of certain types of heirloom beads present in Southeast Asia today suggests that during the mid-2nd millennium, beads were desirable and valued by upland communities across Southeast Asia (Francis 1992:14). The use of beads in the CMJB culture sites may represent a similar valuing of beads as seen in other upland communities in mainland and island Southeast Asia. While these similarities may hint at the possibility that regional cultural practices influenced the CMJB peoples, extreme caution must be taken with this observation due to unreasonable geographic distance or chronology. Nevertheless, the Cardamom highlanders do appear to have had more cultural similarities with upland mortuary practices than with their lowland neighbors in Cambodia.

Ethnic minorities in Southeast Asia have been largely overlooked in both the historical and archaeological sources. Yet, the importance of forest products during the mid-2nd millennium likely means they were key participants in the increasingly globalized exchange networks of this period. Beads from the CMJB sites are material indicators of the exchange networks in which these upland people were likely playing important roles. Although the exact nature of exchange is still unclear, the different glass beads found at CMJB sites link these upland communities with lowland communities and broader Chinese trade networks (coiled lead-potash glass beads), possible Indian Ocean exchange networks (m-Na-Al Type 2 beads), island and maritime Southeast Asia (coiled lead-potash beads and m-Na-Al Type 4 beads), and perhaps more localized Southeast Asian exchange (the newly identified high-alumina glass). While there are still many remaining questions regarding the CMJB peoples and other upland and lowland communities, as well as their ancestors and descendants, the findings reported here provide an important first step in situating these upland communities in the regional exchange networks of this seminal period of mainland Southeast Asian history.

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ENDNOTE

1. It should be noted that Angkorian and post-Angkorian mortuary ritual is still poorly understood and was perhaps quite variable. The late 13th-century Chinese ambassador to Angkor, Zhou Daguan (2007:66-67), mentions several different burial rites practiced by the Angkorian Khmers. Recently, a post-Angkorian coffin burial was excavated at the site of Krang Kor, but no skeletal material was preserved (NARA 2013).

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