USE OF FIRE IN SHELL BEAD MANUFACTURE AT CAHOKIA

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This paper reports on the evidence for heat-treatment of marine shell in bead manufacture at the Cahokia site in Illinois. Of burned shell fragments, high percentages of burned columellas were found, suggesting that columellas were targeted for heat treatment. Additionally, the presence of all shell elements reveals that whole lightning whelk shells (*Busycon sinistrum*) were transported to Cahokia for artifact manufacture, probably after being de-fleshed. A columella bead-working reduction sequence is presented.

Key words: bead, Cahokia, fire, shell, trade

Shell beads from archaeological sites generally come in three forms: (1) disk beads made from bivalves or the outer whorl of a gastropod shell; (2) whole shell beads made from such small gastropod shells as marginella or dwarf olive shells that have had the apex ground off; and (3) beads made from the columella of large marine gastropod shells. The third form is the focus of this paper.

Beads made from the columellas of marine shells take many forms and have been termed massive, tubular, barrel, and a host of other cylindrical and spherical terms (Brown 1996; Holmes 1883:223; Moore 1905:154; Ottesen 1979:377). I prefer to call these types of beads columella beads, since this term indicates the portion of the shell from which beads were made. The drill hole in these larger beads runs parallel to the axis of the shell columella.

Columella beads have been recovered in great numbers from Mississippian archaeological sites (Fig. 1). At least 43,277 columella beads made from marine shell were found at Spiro (Brown 1996:283). More than 30,740 columella beads were excavated from Mound 72 at Cahokia (Fowler et al. 1999:136). Baker (1932) and Moore (1905:154) each wrote they had found "many" columella shell beads in Mound C at Moundville, although I was only able to locate 23. At least 91 columella beads were recovered from the Etowah site in Georgia (Kozuch 1998).

Most (88%) columella beads from Cahokia, Etowah, Moundville, and Spiro were made from sinistral shells, and the remaining 12% were made from dextral shells (Kozuch 1998), despite the fact that the overwhelming majority of available gastropod shells are dextral. Additionally, the largest shell in the Atlantic Ocean and Gulf of Mexico is the horse conch (*Pleuroploca gigantea*), yet columella beads were not commonly made from this shell. Sinistral columella beads excavated from Cahokia, Moundville, and Spiro were far more abundant (92-94%) than dextral columella shell beads. The columella beads from the Etowah site were fairly evenly divided between sinistral (51%) and dextral (49%) shells. The Etowah ratios may be a result of the small sample size of 23.

Drilling. The production of chert microdrills for drilling holes to make shell beads has been most extensively studied by Richard W. Yerkes (1983, 1991, 1993), although many others have commented on microdrills from Mississippian sites (Koldehoff and Kearns 1993; Prentice 1983; Trubitt 1995). Yerkes approached the subject of craft specialization using the production of chert microdrills as evidence for shell bead manufacture. The process of making chert microdrills involves breaking chert nodules into smaller pieces to be worked into microdrills or microblades (Yerkes 1991). Yerkes (1983) used experimental archaeology and incident light microscopy (200x) to confirm that chert microdrills, rather than bone or wood, were used to drill shell. The chert microdrills Yerkes replicated and used to drill shell had use-wear patterns that are very similar, if not identical, to archaeological specimens.

At the Cahokia site in an area known as Ramey Field, Mason and Perino (1961) found microdrills in association with shell working debitage. They found "thousands of shell beads and enormous quantities of burned conch columellas and shell scrap" (p. 554). Microdrills have also been found at Cahokia from Powell Mound, the Kunneman Mounds, and the Dunham Tract (Yerkes 1991).

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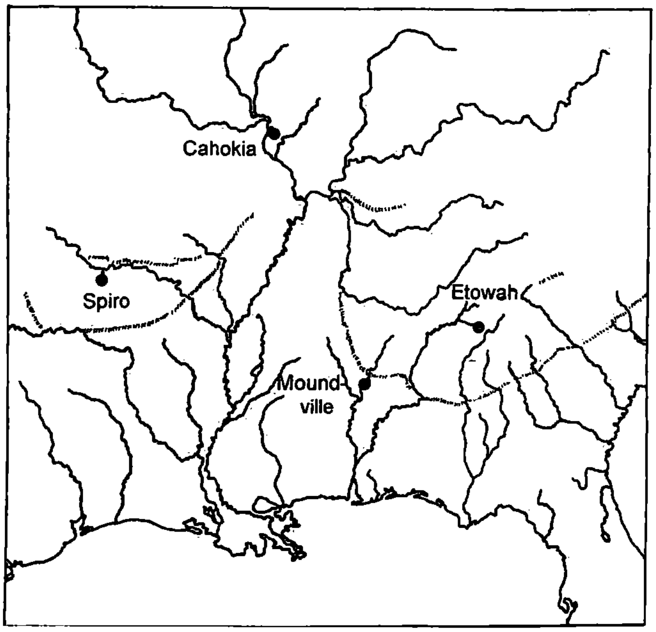

Figure 1. Major Mississippian sites.

Shell bead production areas, inferred by concentrations of microdrills, have been identified at Cahokia and surrounding sites in the American Bottom (Koldehoff and Kearns 1993; Mason and Perino 1961; Trubitt 1996; Yerkes 1991), an area defined as part of the Mississippi River Valley bounded by the mouth of the Illinois River and the mouth of the Kaskaskia River (Fowler 1969:1-5). Other Mississippian sites that have microdrills are Moundville (Peebles and Kus 1977:442), sites in central Tennessee, northern Alabama, western North Carolina, and northeastern Georgia, and the Zebree site in northeast Arkansas (Yerkes 1993:237). Because chert microdrills have not been found in contexts dating to earlier time periods, they are considered a Mississippian phenomenon (Yerkes 1993:240). Additionally, microdrills have been found at only 10% of the sites in the American Bottom (Yerkes 1991:58).

Sectioning. The method used to cut the thick, durable shell columellas into sections is uncertain. Researchers have assumed that some type of lithic tool, such as a sandstone saw or chert cutting tool, was used. The groove-and-snap technique, whereby the columella was cut around the outside and then snapped, was likely used (Pauketat 1993; Trubitt 1995).

THE CAHOKIA SITE

The Cahokia site has provided the materials for a wealth of archaeological research on the development of complex societies, population estimates, exchange of exotic goods, and craft specialization. It has at least 120 mounds (Iseminger 1996:32), including one that covers about 8 square km (5 square miles), the largest mound north of the Mexican site of Teotihuacán. The mounds at the Cahokia site are arranged around many plazas (Fowler 1989:11). Monks mound is about 30.5 m (100 feet) high and covers an area of land 316.1 by 240.8 m (1037 by 790 feet) (Reed 1969). In use since Paleoindian times (8,000 B.C.), Cahokia was continuously occupied through the Mississippian period. Population estimates of Cahokia at its zenith, about A.D.1100, range from 8,000 to 40,000 (Fowler 1989:7; Iseminger 1996), the most cited figure being that of 30,000 to 40,000 residents (Milner 1990:11). Cahokia was abandoned about A.D.1400.

Generic identification of columella beads. It is often possible to identify the marine snail genus used for the manufacture of columella beads. Holmes (1883:223) was the first to note that the beads "often retain the [characteristic] spiral groove as well as other portions of the natural surface." This columella (or spiral) groove slants toward the left or right, depending on the sinistral or dextral shell, respectively, from which it came. The closest readily recognizable analogy is either the "back slash" or "forward slash" of today's computer keyboards. Applying this analogy, sinistral shells have columella grooves with a back slash, while dextral shells have columella grooves with forward slash. Some columella beads retain the columella groove (Fig. 2). The direction of the slant, important in identification of a sinistral or dextral shell, does not change when the bead is rotated 180°.

The only sinistral shells in the Atlantic Ocean or Gulf of Mexico from which large columella beads can be made are from the genus *Busycon*. These are the snow whelk (*B. laeostomum* [Kent, 1982]), lightning whelk (*B. sinistrum* [Hollister, 1958]), and prickly whelk (*B. pulleyi* [Hollister, 1958]). These gastropods, capable of interbreeding, are recognized as distinct species based on their geographic separation (known as allopatric speciation). Changing zoological nomenclature may have acted as an impediment to some archaeologists trying to identify shell artifacts to the species level. Recent efforts by a team investigating *Busycon* genetics supports the position that all sinistral *Busycon* be relegated to one species (Wise et al. 2002).

The sinistral *Busycon* shells from which beads were made probably originated on the west coast of Florida (Hale 1976; Kozuch 1998). Since good quality chert to work the shells is lacking in Florida (Kozuch

1993), it would have been difficult for Florida inhabitants to make the beads themselves. In the Atlantic Ocean or Gulf of Mexico, the only dextral shells large enough to be suitable for making larger columella beads are *Charonia tritonis* (trumpet triton), *Busycon carica* (knobbed whelk), *Strombus* spp. (pink or milk conch), and *Pleuroploca gigantea* (horse conch).

ARCHAEOLOGICAL SAMPLE

I examined 8,333 marine shell specimens from the Cahokia site (Kozuch 1998) and found 14 species, representing 12 univalve and two bivalve species. Ninety-three percent (n = 7,737) of specimens were small, whole shell beads made from marine snail shells, usually olive shells (genus *Oliva*) or marginellid shells. This large proportion of small, whole shell beads suggests a bias in the data, because most disk beads cannot be identified even to the genus level. Tens of thousands of disk shell beads were excavated from Cahokia, and it can only be assumed that these were made from large marine whelk shells, probably sinistral *Busycon* shells. A total of 372 specimens of sinistral whelk shell of the genus *Busycon* were found. Fragments were found from all parts of sinistral *Busycon* shells, indicating that whole sinistral whelk shells were brought to the site for bead manufacture (Kozuch 1998).

Most columella beads had no remaining columella grooves, so only those that have a columella groove clearly slanting to the right or left are included in my sample. The few specimens with the groove parallel to the drill hole were not included. Ninety-three percent of the finished beads from Cahokia were made from sinistral whelk columellas, but a few were made from dextral columellas (Fig. 3). Unfinished columella beads that show evidence of being worked (either cut or scored) were labeled bead blanks. Columellas without direct evidence of being worked were classified as debitage. No bead blanks or debitage fragments had drill holes. I found evidence for a columella bead-reduction sequence, starting with an unworked (sometimes burned) columella, and ending with a finished columella bead (see figs. 4 to 6).

Burned specimens. The total of 172 burned specimens from Cahokia include beads, bead blanks, and debitage fragments (Appendix 1). A majority of these (125) were whole shell beads made from olive shells (*Oliva* spp.) with burned portions. These olive shell beads were from Powell Mound #2.

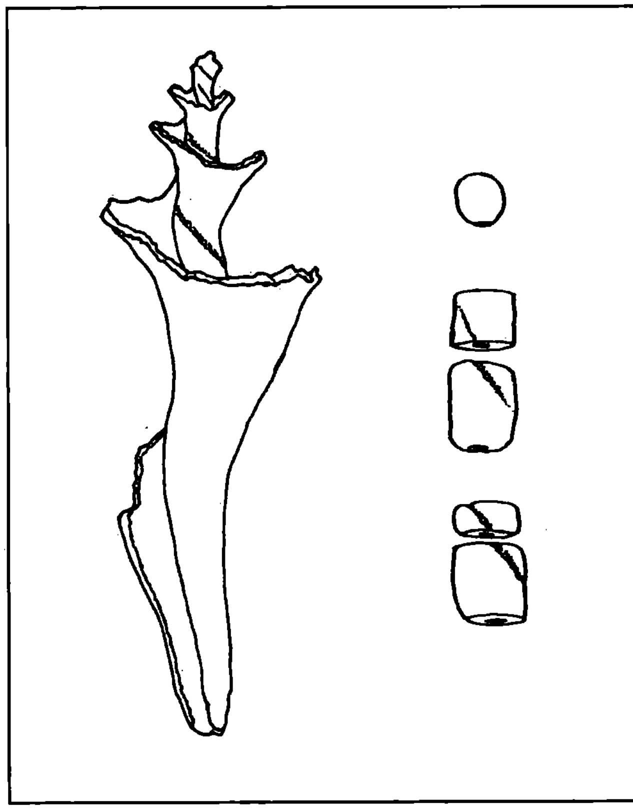

Figure 2. Columella beads from sinistral *Busycon* shell (after Holmes 1883).

The remaining 47 fragments were from sinistral whelk shells, of which 91% (43) were burned columellas, 6% (3) were inner whorl fragments, and 2% (1) an apex fragment. These burned specimens were from three different contexts at the Cahokia site: (1) Kunneman Mound, (2) Ramey Field/Mound 34, and (3) Wilson Mound. The large percentage of burned columellas at Cahokia suggests that fire was used to treat them before fashioning them into beads.

Archaeological contexts of burned specimens. In 1956, Gregory Perino excavated portions of an area east of Monks Mound known as the Ramey Field and Mound 34 inside Ramey Field (Fowler 1989; Mason and Perino 1961; Perino 1959). Mound 34, a conical mound east of Monks Mound, has been mostly destroyed (Fowler 1989:88). Perino excavated a trench through Mound 34, as well as a refuse pit north of the mound, and found pottery from both the Caddo area and the lower Mississippi River Valley (Perino 1959). Lithics from Arkansas also were recovered (Fowler 1989:88; Perino 1959). Brain and Phillips (1996:267) pointed out that all artifacts at Cahokia that relate to the Southeastern Ceremonial Complex are associated with Ramey Field

Figure 3. Finished columella beads from Mound 72, Cahokia. Top row: sinistral beads; bottom row: dextral beads.

and Mound 34. Recent work by James A. Brown and John E. Kelly (2000) using information from engraved motifs from marine shells and ceramics shows that Ramey Field dates to the Moorehead phase, dated to between A.D. 1150 and 1250.

Powell Mound, also destroyed, is 2.6 km west of Monks Mound, about 13 m high, and 94.5 by 54.9 m at the base (Ahler and DePuydt 1987). Powell Mound was constructed in at least two stages. The first was a truncated pyramid mound; the second, a modification of the first, has the final appearance of a rounded linear ridge-top mound (Ahler and DePuydt 1987:3-4). Two burial pits were found between these two mound-building stages. One burial pit had already been destroyed by the time Kelley arrived, the other contained remains of 20 to 30 individuals accompanied by "a very large number of disc shell or *Marginella* [whole shell] beads, but in no instance were both types of beads found with the same burial" (Titterington 1977:2). Ceramics found at Powell Mound indicate construction between A.D. 900 and 1150 (Ahler and DePuydt 1987). In addition to much locally produced pottery, exotic ceramics were found. Of the latter, one sherd was tentatively identified as originating from the Caddo area, and two more (Nodena White-filmed and Red-and-white Painted) came from the lower Mississippi River Valley (Ahler and DePuydt 1987:23). Chert microdrills at the base of the mound indicate a shell artifact workshop (Yerkes 1989:97), probably of the Lohmann phase, about A.D. 1000-1050.

The Kunnemann Mound, 10.64 m high, is located in the Kunnemann Tract (Fowler 1989) about 1.5 km north of Monks Mound and across the channel of Cahokia Creek (Pauketat 1993:8). After Moorehead's excavations in 1921, Preston Holder partially excavated the Kunnemann Mound (#10 and 11) in 1955 and 1956. A publication from Holder's notes was prepared by Tim Pauketat (Pauketat 1993). The Kunnemann Mound had two parts, a conical mound conjoined on top of a lower terrace. In addition to hearth features and human burials, structural remains, such as post pits and wall trenches, were recovered. The mound dates from A.D. 1000 to 1200 (Pauketat 1993:5). Carbonized fabric was recovered, and the quantity of charcoal suggests that a building on the site had burned down (Pauketat 1993:43). Sixty-eight chert microblades, a sandstone saw, and unfinished marine shell beads are evidence of a shell bead workshop. The probable context of the burned shell specimens from Kunnemann Mound dates to the Lohmann phase, A.D. 1000 to 1050 (Pauketat 1993:56).

There is scant information on the Wilson Mound, excavated by Preston Holder, although secondary burials were found (Milner 1984:480). The archaeological phase to which Wilson Mound can be assigned is uncertain, but, based on pottery typologies, it probably dates to the Lohmann phase (Milner 1998:130).

EXPERIMENTAL ARCHAEOLOGY

To understand methods of working large gastropod shells without electric-powered metal tools, I made four shells cups. I purchased lightning whelk shells that presumably came from Florida's west coast. The first one I made was from a small shell about 18 cm long. The second was from a slightly larger shell, about 22 cm long, but very gracile and thin-shelled. The third was from a very large and gracile shell about 37 cm long. The last was from a shell about 26 cm long. Because I only had modern tools, I used a small metal ball-peen hammer to remove unwanted portions of the outer and inner whorls. This was a substitute for the lithic hammers available to Mississippian peoples.

Removal of the outer and inner whorls was relatively easy. I removed the entire columella from all but the largest specimen mentioned above. After the whorls were taken out, however, removal of the columella required more precise hammering. With the smaller specimens, I was able to remove all of the columella by hammering. Employing hammering on the very large shell, I found I could only remove the columella by breaking the outer whorl and ruining the cup.

A crafts instructor at the University of Florida (Ray Ferguson, per. comm.) suggested that I use fire to help make the shell more friable so that it could be more easily worked. Shell that is being exposed to heat releases an odor not unlike burning hair. After the organic constituents have been oxidized, the shell is more brittle and chalky. I followed the suggestion to use a blowtorch. Although Mississippian peoples did not have such devices, they did have means of using directed fire, such as burning pitchpine or small torches. The blowtorch worked well, as long as the heat was not too intense. If the heat was kept focused on one spot for too long, the shell began spalling off, threatening to explode. This made it clear that the application of low, even heat was necessary. Consequently, I directed the small flame evenly over the columella area that I wanted to break. After about an

Figure 4. Unworked, sometimes burned, beads.

Figure 5. Transitional beads.

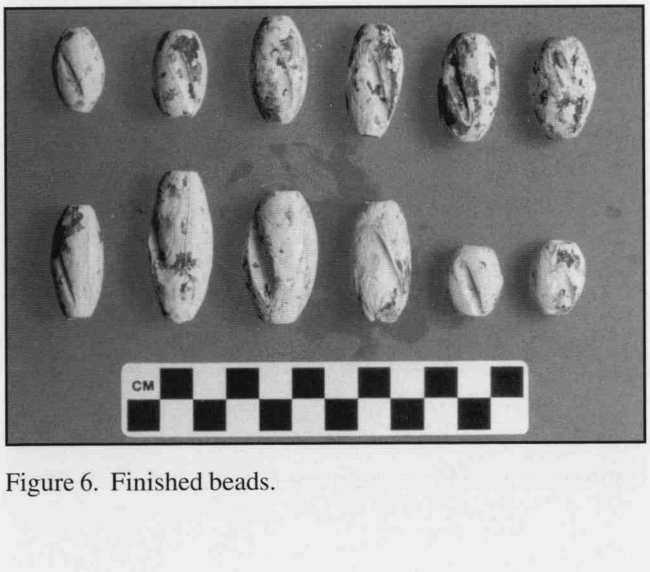

Figure 6. Finished beads.

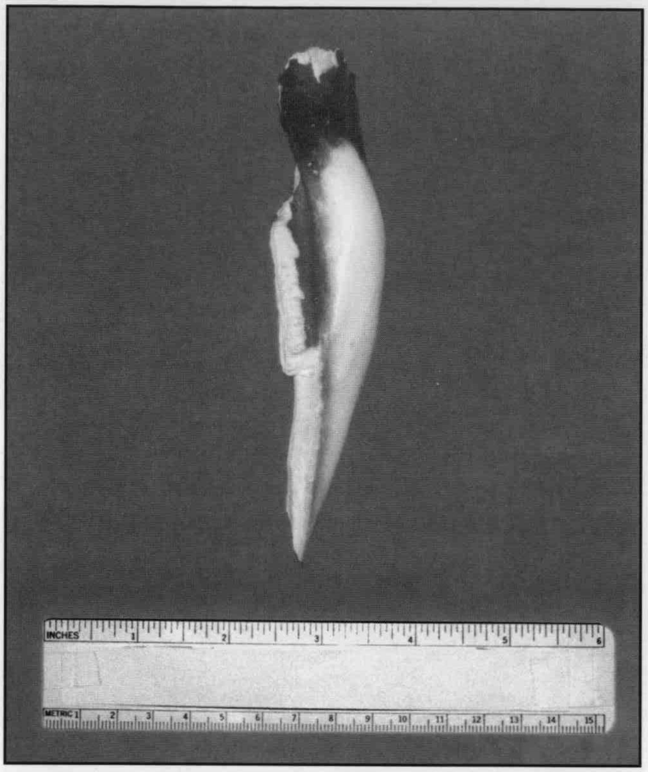

Figure 7. Example of heat-treated *Busycon sinistrum* columella.

hour of heating the desired area on the shell, and after allowing time for the shell to cool a little, I was then able to hammer the burned columella off the rest of the shell without breaking the shell into pieces, thereby demonstrating that the heat treatment had made the shell much easier to work. The resulting burned columella, pictured in Fig. 7, is 145 mm in length.

DISCUSSION

Shell is a durable substance that lends itself well to archaeological studies. Shells are exoskeletons of mollusks, and are made of calcium carbonate crystals in an organic protein matrix (Vermeij 1993:39). Claassen comments on the structure of shell after burning: "Heating shell physically alters the crystallography and compromises the internal cohesion of the structure. Burned shell fractures more easily and weighs less than does unburned shell" (Claassen 1998:61).

Fire can be used as an aid to working shell. High heat burns off the organic constituents of shell, leaving behind a material with a higher percentage of inorganic material and an altered crystallography (Claassen 1998). The large proportion of burned columellas indicates that Cahokians used fire to help separate the columella from the rest of the shell. My own attempts to remove a columella from a large lightning whelk shell supports the importance of heat in shell-working technology. The resulting burned columella from my experiment looks remarkably similar to the archaeological specimens (compare figs. 4 and 7). After heat treatment, the shell material is more chalky and soft and much easier to work into some type of artifact.

Ethnohistoric sources lend credence to the suggestion that heat was used as a tool in shell artifact manufacture. Garcilaso de la Vega (1988:330 [1605]) mentioned in his account of DeSoto's expedition that, in the town of Cofachiqui (in Georgia), pearls were pierced using hot copper needles, supporting the notion that heat was a known method of working shell materials in the Southeast. Another early record (among the Natchez in Louisiana) from Dumont de Montigny (in Swanton 1946:486), stated that shell gorgets were pierced by means of fire. More evidence comes from the archaeological record from the Channel Islands where "bead-makers heated [dwarf olive shell] bead blanks" (Arnold 1997).

Because two contexts in which burned columellas were found have evidence of structural fires, it is not conclusive that columellas were heat-treated. Those two sites, Powell and Kunnemann mounds, had clear evidence of burned buildings. There was, however, no evidence of fire at Wilson Mound, Mound 34, or Ramey Field where columellas were gathered. Clearly, more precise contextual information is required.

At Cahokia, shell debitage was found, including spire, apex, columella, and outer whorl (Kozuch 1998). Most columella beads are from sinistral shells, probably from lightning whelk (*B. sinistrum*), that were transported minus the flesh to Cahokia for artifact manufacture. Some mistakes made during the drilling of columella beads were fixed by filling the faulty drill-holes with fitted shell plugs (Milner 1998:141). These repairs show that special care was taken when making columella beads.

The time span during which columellas were burned is not long, from A.D. 1000 to 1250. Additionally, burned columellas appear during the second half of the Mississippian period, from A.D. 800 to 1450. Considering the time-depth of whelk shell-working practices in North America (Carstens and Watson 1996), evidence for heat-treatment of shell shows up very late.

There may not be any visible evidence from a finished columella bead that the columella from which it was fashioned had been heat-treated. The outer burned portion was probably ground off, thereby erasing traces of burning. Also, the organic constituents in shell beads naturally degrade while in the ground, making it hard to tell if it has been burned. More studies are needed to determine if burned shell can be distinguished from shell that has disintegrated due to acidic soil conditions or natural oxidation.

The topic of craft specialization in marine-shell bead production has relevance to the question of social complexity among Mississippian cultures (Muller 1987; Pauketat 1987; Prentice 1983), and the socio-political aspects of Cahokia as a bead-production center are still being explored. At Cahokia, production of shell beads was emphasized almost to the exclusion of cups, gorgets, and other shell artifacts (Kozuch 1998). Among Mississippian archaeological sites, this emphasis at Cahokia on beads stands out as somewhat anomalous. Some researchers believe that bead making was a centralized activity; others think that shell artifact manufacture was not centralized and was performed at the household level (see Milner 1998; Pauketat 1993; Prentice 1983; Trubitt 1995; Yerkes 1983). If shell beads at Cahokia were intensely sought after, then some type of control may have existed over the distribution, though perhaps not the production, of such a desirable product.

Many questions remain. For instance, how were columella beads that reached over 2 cm in length drilled? Some researchers have suggested that long hardwood sticks or porcupine quills were used in combination with sand to make the drill hole, but these items would be very difficult, if not impossible, to detect in the archaeological record. Columella bead replication studies also need to be performed to compare the amount of time it takes to manufacture a bead from burned and from unburned columellas. Presently I am in the process of replicating columella beads, and it is hoped that the results of this work will shed light on the lost methods of columella bead manufacture.

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APPENDIX: CAHOKIA BURNED SHELL ARTIFACTS

ISM	Illinois State Museum, Springfield, IL
LOA/UI	Lab of Anthropology, University of Illinois, Urbana-Champaign, IL
NMNH	National Museum of Natural History, Washington, DC

Provenience	Taxon	#	Artifact Type	Length (mm)	Comments	Elements
Powell Mound #2	*Oliva* spp.	4	bead		fragments	apex
Powell Mound #2	*Oliva* spp.	9	bead		fragments	apex
Powell Mound #2	*Oliva* spp.	6	bead		fragments	columella
Powell Mound #2	*Oliva* spp.	42	bead	59.4	fragments	siphonal canal & lip
Powell Mound #2	*Oliva* spp.	9	bead	52	fragments	columella & siphonal canal
Powell Mound #2	*Oliva* spp.	44	bead		fragments	
Powell Mound #2	*Oliva* spp.	3	bead		fragments	outer lip
Powell Mound #2	*Oliva* spp.	8	bead		fragments	lip
Kunnemann Mound	*Busycon* cf. *sinistrum*	1	bead blank	71.1	Preston Holder Collection, cut on posterior end	columella
Kunnemann Mound	*Busycon* cf. *sinistrum*	1	bead blank	60.1	Preston Holder Collection, cut on posterior end	columella
Kunnemann Mound	*Busycon* cf. *sinistrum*	1	bead blank	49.9	Preston Holder Collection, cut on posterior end	columella
Kunnemann Mound	*Busycon* cf. *sinistrum*	1	bead blank	43.5	Preston Holder Collection, cut on posterior end	columella
Kunnemann Mound	*Busycon* cf. *sinistrum*	1	bead blank	79.4	Preston Holder Collection, cut on posterior end	columella
Kunnemann Mound	*Busycon* cf. *sinistrum*	1	bead blank	53.0	Preston Holder Collection, cut on posterior end	columella
Kunnemann Mound	*Busycon* cf. *sinistrum*	1	bead blank	64.2	Preston Holder Collection, cut on posterior end	columella
Kunnemann Mound	*Busycon* cf. *sinistrum*	1	bead blank	88.5	Preston Holder Collection, cut on posterior end	columella
Kunnemann Mound	*Busycon* cf. *sinistrum*	1	bead blank	49.6	Preston Holder Collection, cut on posterior end	columella
Ramey Field, Mound 34	*Busycon sinistrum*	1	debitage	72.1	1956 Perino excavations	post. ½ of shell-ant. colum burned
Ramey Field, Mound 34	*Busycon sinistrum*	1	debitage	86.8	1956 Perino excavations	post. ½ of shell w/ant. columella burned
Ramey Field, Mound 34	*Busycon sinistrum*	1	debitage	99.5	1956 Perino excavations	post. ½ of shell w/ant. columella burned
Ramey Field, Mound 34	*Busycon* cf. *sinistrum*	1	debitage		1956 Perino excavations	partial shoulder & apex
Ramey Field	*Busycon* cf. *sinistrum*	1	debitage	4.8	1956 Perino excavations	columella only
Ramey Field	*Busycon* cf. *sinistrum*	1	debitage	3.1	1956 Perino excavations	columella only
Ramey Field	*Busycon* cf. *sinistrum*	1	debitage	8.1	1956 Perino excavations	columella only
Ramey Field	*Busycon* cf. *sinistrum*	1	debitage	7.3	1956 Perino excavations	columella only
Ramey Field	*Busycon* cf. *sinistrum*	1	debitage	12.7	1956 Perino excavations	columella only
Ramey Field	*Busycon* cf. *sinistrum*	1	debitage	6.2	1956 Perino excavations	columella only
Ramey Field	*Busycon* cf. *sinistrum*	1	debitage	4.2	1956 Perino excavations	columella only
Ramey Field	*Busycon* cf. *sinistrum*	1	debitage	11.7	1956 Perino excavations	columella only
James Ramey Mound	*Busycon sinistrum*	1	debitage	71.9	cut columella?	columella only
Powell Mound #2	*Busycon sinistrum*	1	debitage	92.8		columella only
James Ramey Mound	*Busycon sinistrum*	1	debitage	106.8		columella only
James Ramey Mound	*Busycon sinistrum*	1	debitage	26.5		inner whorl
James Ramey Mound	*Busycon sinistrum*	1	debitage	33.7		inner whorl
James Ramey Mound	*Busycon sinistrum*	1	debitage	38.2		inner whorl
Madison Co.	*Busycon sinistrum*	1	debitage	98.4	Cyrus Thomas & Powell	columella
Madison Co.	*Busycon sinistrum*	1	debitage	153.3	Cyrus Thomas & Powell	columella, frag outer whorl
Madison Co.	*Busycon sinistrum*	1	debitage	147.2	Cyrus Thomas & Powell	columella, frag outer whorl

(cont.)

Appendix: Cahokia burned shell artifacts (cont.)

Provenience	Taxon	#	Artifact Type	Length (mm)	Comments	Elements
Madison Co.	*Busycon sinistrum*	1	debitage	151.5	Cyrus Thomas & Powell	columella, frag outer whorl
Madison Co.	*Busycon sinistrum*	1	debitage	169.8	Cyrus Thomas & Powell	columella, frag outer whorl
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	64.2	Preston Holter collection	cut on anterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	88.5	Preston Holter collection	cut on anterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	49.6	Preston Holter collection	cut on anterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	71.1	Preston Holter collection	cut on anterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	60.1	Preston Holter collection	cut on anterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	49.9	Preston Holter collection	cut on anterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	43.5	Preston Holter collection	cut on anterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	79.4	Preston Holter collection	cut on anterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	53.0	Preston Holter collection	cut on anterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	35.6	Preston Holter collection	cut on posterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	78.3	Preston Holter collection	cut on posterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	61.0	Preston Holter collection	cut on posterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	61.3	Preston Holter collection	cut on posterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	78.2	Preston Holter collection	cut on posterior end
Wilson Mound	*Busycon* cf. *sinistrum*	1	bead blank	38.5	Preston Holter collection	cut on posterior end