
Methods of manufacturing shell beads at prehistoric Mississippian sites in southeastern North America

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RÉSUMÉ⁽¹⁾

Les procédés développés par les artisans préhistoriques mississippiens pour fabriquer des colliers de coquillages ont été reconstitués grâce à des études de reproductions expérimentales, des analyses microscopiques (tracéologie) et des observations ethnographiques. Une étude des données ethnographiques sur la décoration des coquillages dans le sud-est de l'Amérique du Nord est présentée ; les résultats des copies expérimentales et des analyses tracéologiques sont résumés. Les résultats de ces recherches sont utilisés pour reconstituer les techniques de fabrication de colliers de coquillages employées sur le site de Cahokia, en Illinois, et pour analyser la nature de la spécialisation artisanale au Mississippien entre 900 et 1400 de notre ère. Les emplacements où s'effectuait la fabrication de colliers de coquillages sont examinés, et les éléments de standardisation et de spécialisation dans le processus de production sont considérés. Enfin, on traite du rapport entre les systèmes de production artisanale de coquillages et l'émergence d'une différenciation de statut et de sociétés de classe.

ABSTRACT

The processes that prehistoric Mississippian artisans developed to manufacture shell beads have been reconstructed through experimental replication studies, microwear analysis and ethnographic observations. A survey of ethnographic data on shell-working in southeastern North America is presented, and the results of the replication experiments and microwear analyses are summarized. The results of these studies are used to reconstruct the techniques of shell bead manufacturing employed at the Cahokia site, Illinois, and to investigate the nature of Mississippian craft specialization between AD 900 and 1400. The locations where shell bead manufacturing took place are examined, and the evidence for standardization and specialization in the production process is considered. Finally, the relationship between shell craft production systems and the rise of status differentiation and ranked societies is discussed.

(1) French abstract prepared by Pierrette Graindorte.

Introduction

In her introduction to the proceedings of the 1986 Shell Bead Conference in Rochester, New York, Lynn Ceci (1989) stated that the anthropology of shell beads is now an established field of research. Many anthropologists and archaeologists have found that shell beads are more than simple curiosities or primitive ornaments. Detailed studies of shell bead production, exchange and utilization have provided insights into the social, political, economic and ritual behavior of ancient and contemporary societies.

In North America, scholars have studied the *Dentalium* and wampum beads that were used as currency during the historic period and debated whether or not prehistoric Indians used shell beads as primitive money (Arnold, 1987; Becker, 1980; Ceci, 1982; Holmes, 1883; King, 1982; Smith, 1983; Stearns, 1889; Taxay, 1970). While a number of researchers considered the role of shell beads in social and political transactions as well as trade, most of their investigations have focused on tribal or simple chiefdom-level societies such as the Chumash or Iroquois. The role of shell beads in Mississippian societies, the most complex prehistoric polities in North America, has rarely been investigated.

John R. Swanton (1928, 1946) believed that shell beads had been used as a currency in three areas of eastern North America before the period of European contact, and one of these regions was inland from the Gulf of Mexico, in the Mississippian heartland. James A. Brown (1989) argued that shell beads were important components in the social, economic, religious and political transactions associated with the Southeastern Ceremonial Complex.

However, some archaeologists believe that the acquisition of marine shell and the production of beads were organized on the household level. These researchers suggest that shell beads were not made by craft specialists (Brown *et al.*, 1990; Muller, 1987). Ethnohistoric accounts of shell use by the natives of southeastern North America include descriptions of transactions where shell beads served as a medium of exchange (Jones, 1873; Stearns, 1889), but they tell us very little about the methods that were used to manufacture the beads.

Methods of manufacturing shell beads

The techniques that were used to manufacture beads from shell must be reconstructed through the examination of shell artifacts that represent different manufacturing stages (Hammet and Sizemore, 1989; Holmes, 1883: 214-215; Jones, 1873; Titterton, 1938); by replication studies where modern researchers try to duplicate the ancient methods of manufacturing shell beads (Francis, 1989; Morse, 1975; Sierzchula, 1980); and through the microscopic examination of use-wear traces on the prehistoric chipped stone tools that were used to manufacture shell items, particularly the distinctive Mississippian microdrills (fig. 1).

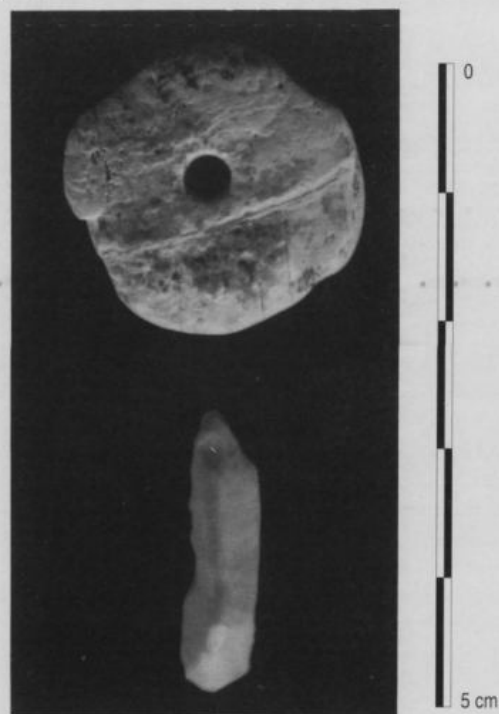


Fig. 1. Marine shell disc bead (top) and Burlington chert microdrill (bottom) from the Cahokia site, Illinois.

Shell Artifacts

Examination of shell artifacts from southeastern North America reveals that large freshwater clam (*Unio*) and marine conch shell (especially *Busycon* species) were used to make disc beads that varied in thickness from wafer thin to 9.5 mm (Holmes, 1883: 222). Marine shell beads are more common

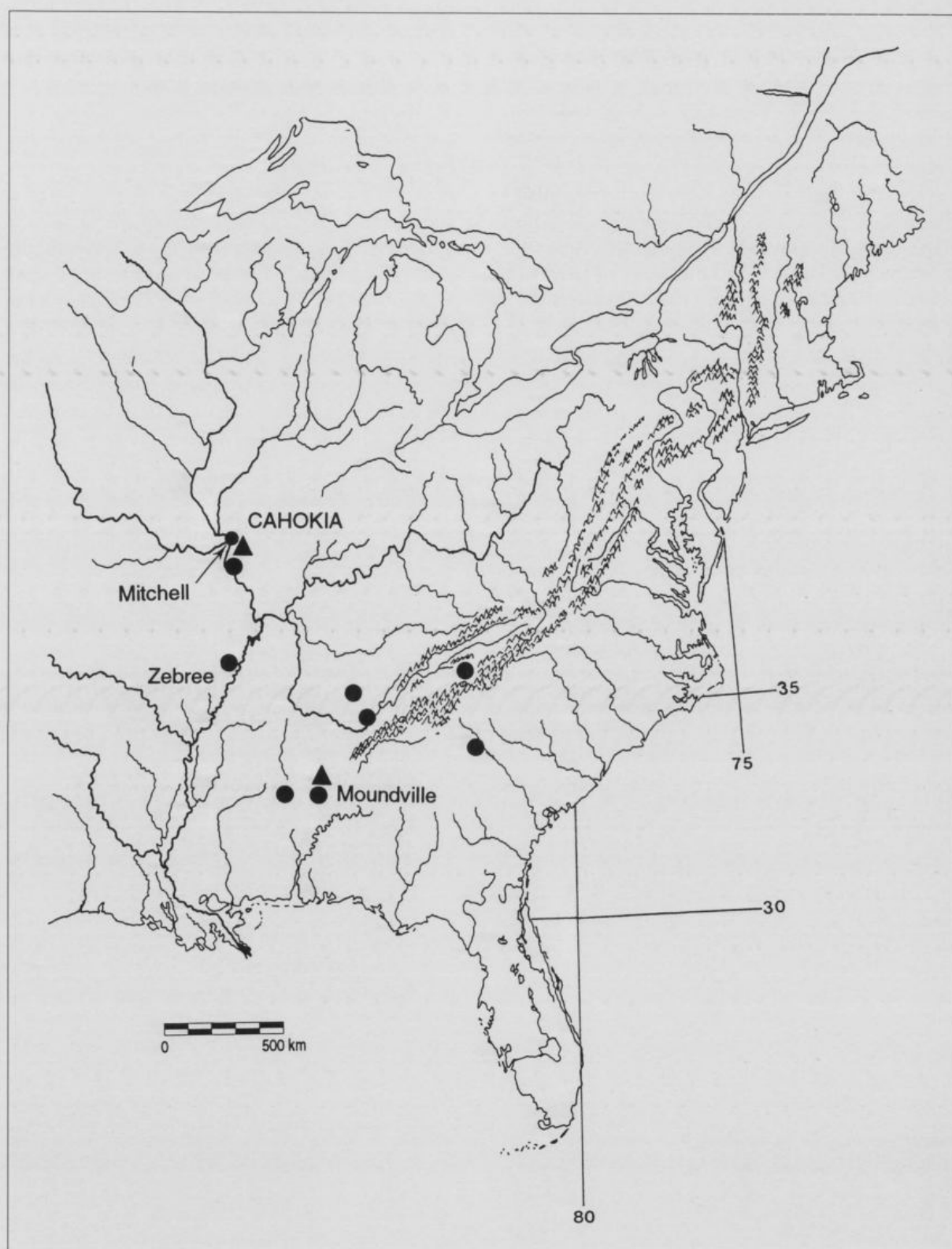


Fig. 2. Map of eastern North America showing the locations of the middle Mississippian sites mentioned in the text. Triangles mark large temple mound centers, dots represent sites or regions where concentrations of microdrills have been found (after Yerkes, 1989a).

at the larger Mississippian temple towns. For example, the Cahokia site in the central Mississippi Valley (fig. 2) is said to have the greatest concentration of marine conch shell artifacts found at any inland site in eastern North America (Parmalee, 1958). The marine shell had to be transported some 1,100 kilometers from the seacoast to the Cahokia site (Yerkes, 1990).

The distribution of shell artifacts at Mississippian sites suggests that large temple towns such as Cahokia, Mitchell and Moundville contained workshops where large quantities of marine shell beads were produced (Smith, 1990 ; Yerkes, 1989a, 1989b). However, small quantities of beads were made in some households at smaller Mississippian villages and farmsteads like the Zeebree site (*ibid.*, Morse, 1975). The data from sites in the Cahokia settlement system suggest that both a local and a central production system (Spence, 1985) existed, with attached specialists (Brumfiel, Earle, 1987)

producing shell beads for the elite at the Mississippian temple towns, while independent craftspeople made shell beads at outlying sites where bead production was not under the control of the Cahokia elite (Yerkes, 1990).

Replication Studies and Microwear Analysis

Several researchers have tried to replicate the ancient techniques that were used to make shell into beads through experimentation, examination of shell artifacts, ethnographic observations and a survey of the literature. Peter Francis, Jr., of the Center for bead research, prepared a summary of his investigations (Francis, 1989) and noted that shell may be used to make beads in two ways. The entire shell may be perforated and used as a bead, or large shells can furnish blanks that can be

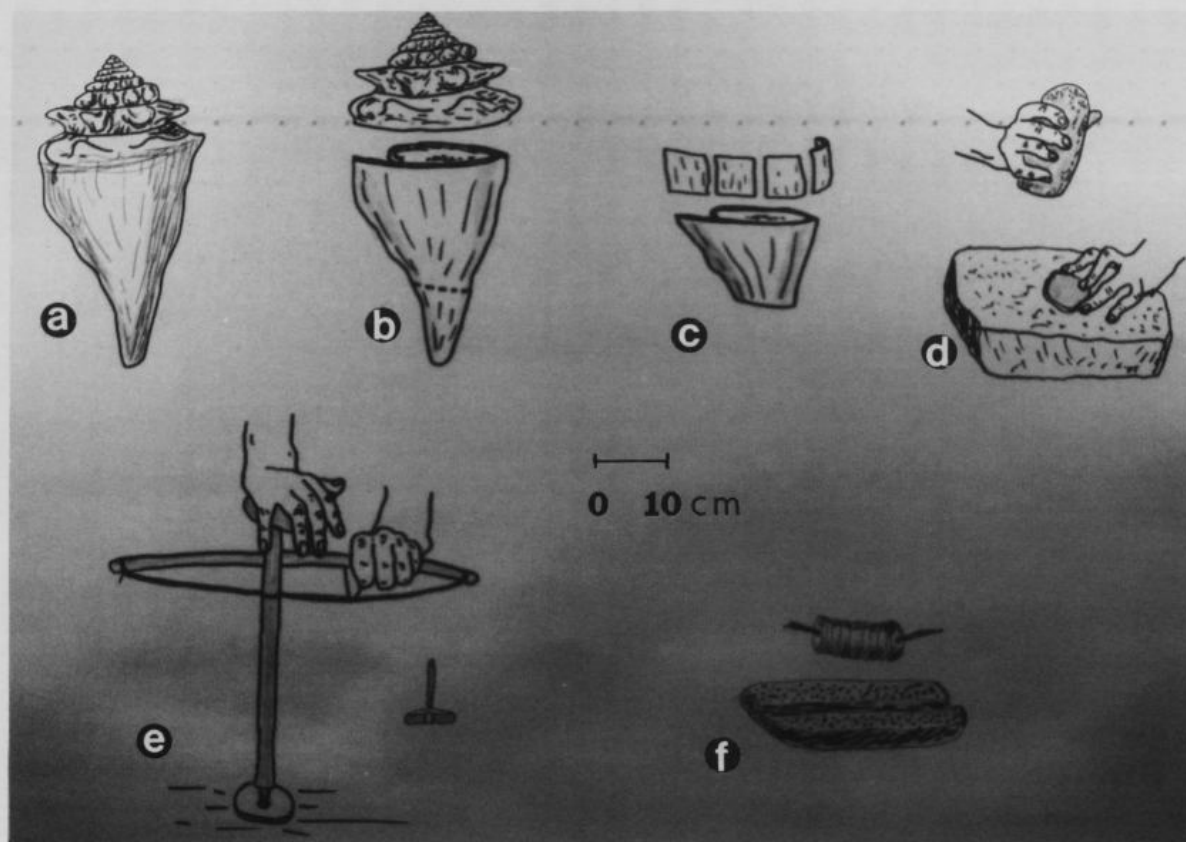


Fig. 3. Reconstructed methods of manufacturing disc beads from conch shell. **a.** *Busycon* shell. **b.** Removing the outer portion of the conch shell. **c.** Cutting out rectangular bead blanks. **d.** Rounding off the corners of the bead blanks with a hammer stone. **e.** Perforating the bead blanks with a bow drill. **f.** The heishi technique of finishing the strung beads with a grooved abrader. After Francis (1989), Sierchula (1980).

shaped into beads. In Mississippian society, entire *Marginella* and *Anculosa* shells were made into beads, but disc beads made from parts of *Busycon* and other large marine conch shells were more common and ubiquitous (Brown, *et al.*, 1990 : 270). Several archaeologists have tried to identify the techniques that were used to manufacture these disc beads (Holmes, 1883 ; Morse, 1975 ; Sierzechula, 1980). In these studies, the outer portion of conch or whelk shells were removed either by indirect percussion with an antler punch and wooden baton (Sierzechula, 1980 : 32), or by incising the shell with a chert flake and breaking off shell bead blanks by hand (Morse, 1975 ; also see Francis, 1989). A hammer stone was used to round off the corners of the shell bead blanks before they were perforated with a chipped stone microdrill (fig. 3).

Several different methods were used to drill the shell beads in the replication experiments. Ethnographic reports of shell bead manufacturing are rare (Gijn, 1990 : 47), but 18th century accounts of southeastern Indians describe a technique where an iron nail stuck in a cane or reed is rolled on the thigh with the right hand, while a bit of shell is held in the left hand until it is drilled through (Lawson, 1860). This was described as very tedious work, and modern replication experiments have shown that it was very time consuming (fig. 4). Modern experimenters found that the bow drill (fig. 3) or pump drill was much more effective for drilling shell beads (Francis, 1989 ; Sierzechula, 1980) ; however, I have not been able to find any ethno-historical reference that describes the use of the bow drill or pump drill by southeastern Indians.

An alternate method of drilling that seems to have been as effective as using a bow drill was to rotate the reed drill shaft between the palms of both hands with a downward pressure exerted at the same time (Francis, 1989 ; Morse, 1975 ; Sierzechula, 1980). This is the same method that was used by the southeastern Indians to start a fire with a fire-drill (Swanton, 1946 : 423), and it also could have been used to bore holes in shell beads (fig. 5).

Jeanne Arnold (1987 : 26) notes that the Chumash Indians used this fire-drill technique to manufacture shell beads in workshops, at sites on the Santa Barbara Channel Islands in California.

Microwear analysis of chipped stone microdrills from Cahokia revealed that a very regular pattern of striations was present on many of the implements



Fig. 4. Stephen Paris demonstrates how to perforate a shell bead blank by rolling a cane shaft (tipped with a chert microdrill) on his thigh.



Fig. 5. Perforating a shell bead blank using the fire drill technique.

and that the striations were oriented normal to the long axis of the microdrills (fig. 6). In an earlier article (Yerkes, 1983 : 511), I concluded that these regular striations suggested that the Cahokia microdrills were hafted and used with the bow drill, since I only observed the regular patterns on the experimental microdrills that I had used in a simulated bow drill. After looking at the results of replication studies cited above, I believe that these regular striation patterns could have been produced on microdrills that were hafted on shafts that were rolled between the palms of both hands (the fire-drill technique) or used with some sort of mechanical assistance such as the bow drill. However, I do not believe that the shell beads that were made at Cahokia were drilled by rolling the drill shaft along the thigh or by holding a microdrill in the hand and twisting it back and forth.

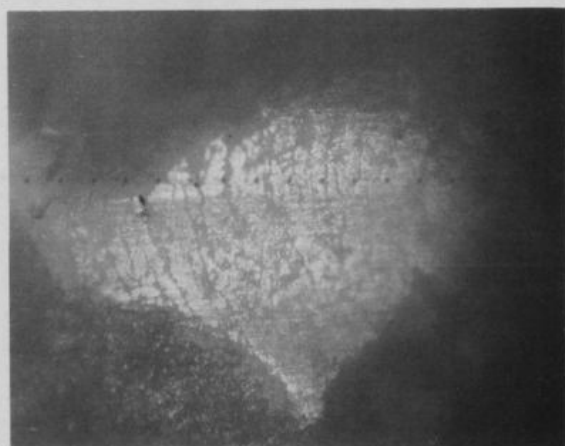


Fig. 6. Shell polish and regular pattern of striations on microdrill from the Powell Mound at the Cahokia site (as seen with an Olympus BHM microscope at 100x).

After the bead blanks were bored, they probably were strung together and rubbed across a flat or grooved stone (fig. 3). Peter Francis (1989 : 31) called this process the *heishi* technique, since *heishi* means shell bead in the language of the Santo Domingo Pueblo Indians of New Mexico, where he saw native bead makers use this method to finish and polish disc beads. However, Francis noted that the technique was widely used, as has been archaeologically identified in India, Thailand, and North and South America (*ibid.*).

The social context of shell bead production

Prehistoric Mississippian artisans seem to have manufactured shell disc beads with techniques that were widely used in both the Old and New Worlds. However, there is some evidence for economic specialization (Arnold, 1987), since the marine shell raw material is concentrated at possible shell bead workshops within large Mississippian centers such as Cahokia and the Mitchell site on the American Bottom (Brown *et al.*, 1990 ; Yerkes, 1989a, 1989b, 1990), and the shell bead makers used standardized chert microdrills to bore holes in the shell beads. The microdrills are part of a distinctive Cahokia Microlithic Industry, and they are not found in Woodland stone tool assemblages from eastern North American sites (Mason and Perino, 1961 ; Yerkes, 1983).

The microdrills represent a technological improvement in the process of manufacturing shell disc beads, but they may indicate that the Mississippian economy was reorganized to facilitate the production of large quantities of marine shell disc beads. Beads and beaded garments were some of the craft items that members of the Mississippian elite used as prestige goods and tokens for social and political transactions as well as economic activities (Steponaitis, 1986).

In a recent discussion of Mississippian trade and the evolution of exchange relations, James Brown, Richard Kerber and Howard Winters examined the role of shell beads in the Prestige Goods Economy of Mississippian polities. They conclude that marine shell disc beads would serve as a stock of readily accepted, locally manufactured valuables that were essential to make payments for all manner of social debts (Brown, *et al.*, 1990 : 270).

They suggest that beads could be produced with simple, but time-consuming, methods, and that they would be found at sites throughout the Mississippian settlement system, but occasionally in considerable concentrations (*ibid.*).

While I would agree that Mississippian shell disc beads should be treated as prestige goods rather than as a primitive currency, and that the distribution of shell beads, bead manufacturing refuse and chert microdrills at sites in the Cahokia Mississippian settlement system indicates that these prestige goods were produced at workshops in the

largest temple towns and at some of the households in smaller villages and farmsteads (Yerkes, 1989a, 1989b, 1990), it seems that the production system at the Cahokia and Mitchell sites had developed far beyond the scale and complexity of local household activities. The large quantities of microdrills manufactured at microdrill workshops at Cahokia and the amount of shell beads that were apparently manufactured at other craft areas suggest that attached specialists were at work producing these prestige goods for budding elites who were

trying to establish their rank and standing in Mississippian society. These activities may have led to a reorganization of the Mississippian economy in a unique form that was not found in other prehistoric or historic societies in the Eastern Woodlands of North America.

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