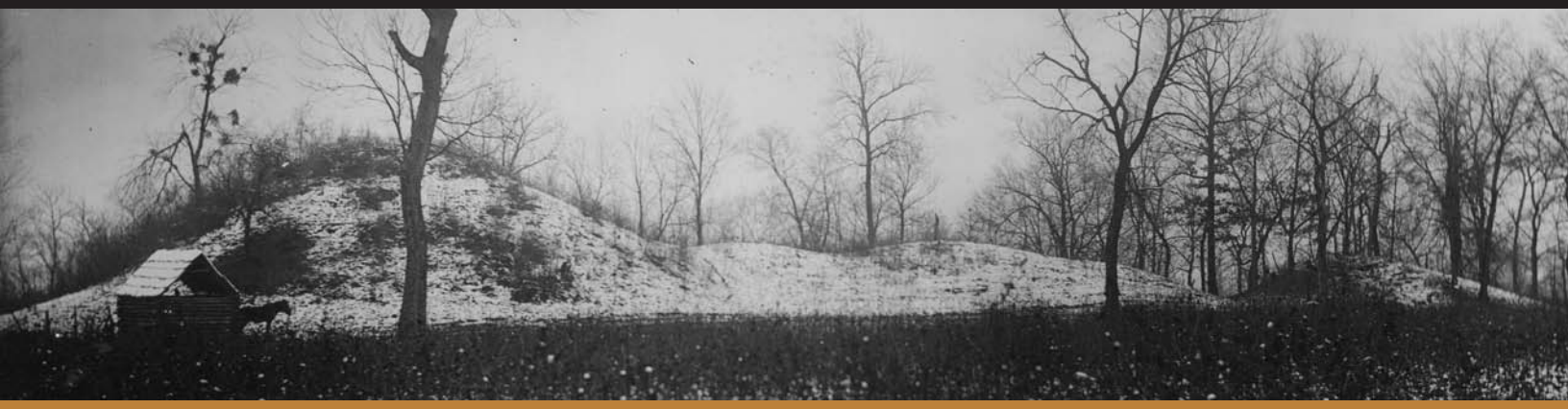
Smithsonian Institution
Scholarly Press

SMITHSONIAN CONTRIBUTIONS TO ANTHROPOLOGY • NUMBER 49



Artifacts from the Craig Mound at Spiro, Oklahoma

April K. Sievert with J. Daniel Rogers

Contribution by Javier Urcid

SERIES PUBLICATIONS OF THE SMITHSONIAN INSTITUTION

Emphasis upon publication as a means of "diffusing knowledge" was expressed by the first Secretary of the Smithsonian. In his formal plan for the Institution, Joseph Henry outlined a program that included the following statement: "It is proposed to publish a series of reports, giving an account of the new discoveries in science, and of the changes made from year to year in all branches of knowledge." This theme of basic research has been adhered to through the years by thousands of titles issued in series publications under the Smithsonian imprint, commencing with Smithsonian Contributions to Knowledge in 1848 and continuing with the following active series:

Smithsonian Contributions to Anthropology
Smithsonian Contributions to Botany
Smithsonian Contributions to History and Technology
Smithsonian Contributions to the Marine Sciences
Smithsonian Contributions to Museum Conservation
Smithsonian Contributions to Paleobiology
Smithsonian Contributions to Zoology

In these series, the Institution publishes small papers and full-scale monographs that report on the research and collections of its various museums and bureaus. The Smithsonian Contributions Series are distributed via mailing lists to libraries, universities, and similar institutions throughout the world.

Manuscripts submitted for series publication are received by the Smithsonian Institution Scholarly Press from authors with direct affiliation with the various Smithsonian museums or bureaus and are subject to peer review and review for compliance with manuscript preparation guidelines. General requirements for manuscript preparation are on the inside back cover of printed volumes. For detailed submissions requirements and to review our manuscript preparation and style guides for authors, visit the Submissions page at www.scholarlypress.si.edu.

SMITHSONIAN CONTRIBUTIONS TO ANTHROPOLOGY • NUMBER 49

Artifacts from the Craig Mound at Spiro, Oklahoma

April K. Sievert with J. Daniel Rogers
Contribution by Javier Urcid

Smithsonian Institution
Scholarly Press
WASHINGTON, D.C.
2011

ABSTRACT

Sievert, April K., with J. Daniel Rogers and contribution by Javier Urcid. *Artifacts from the Craig Mound at Spiro, Oklahoma*. Smithsonian Contributions to Anthropology, number 49, xiv + 231 pages, 163 figures, 11 plates, 48 tables, 2011.—This monograph presents the historical context and detailed descriptions of a remarkable collection of more than 20,000 artifacts from the Craig Mound at the Spiro site in eastern Oklahoma. Spiro is one of the key sites known for the Mississippian Period (AD 900–1500) of the eastern United States. Aside from the cultural importance of the site in regional history, the artifacts from Spiro provide an almost unique glimpse into the ceremonial life and artistic innovations of a people who developed an important but poorly known cultural tradition. Between 1933 and 1936 the Spiro site was looted, and artifacts were sold and traded to many collectors. Subsequently, professional archaeological excavations were conducted, and those collections primarily reside at the Sam Noble Oklahoma Museum of Natural History. The Smithsonian Spiro collection is under the care of the Department of Anthropology at the National Museum of Natural History. The collection came to the Museum through 14 accessions between 1936 and 1986. The largest portion was acquired from Harry M. Trowbridge in 1958. Of particular note in the collection are marine shells engraved with a wide variety of human and animal images. The collection also includes pigments, basketry, clothing with dyed designs, pipes, weapons, ornaments, containers, and figurines made from several different materials. Many of the artifacts are made from raw materials that were acquired by the Spiro people through an extensive trade network extending from the Atlantic to the Pacific Ocean and from the upper Midwest in the north to central Mexico in the south.

Cover image: Detail of Figure 2.1, Craig Mound in 1913 prior to excavation.

Published by SMITHSONIAN INSTITUTION SCHOLARLY PRESS

P.O. Box 37012, MRC 957
Washington, D.C. 20013-7012
www.scholarlypress.si.edu

Text and images in this publication may be protected by copyright and other restrictions or owned by individuals and entities other than, and in addition to, the Smithsonian Institution. Fair use of copyrighted material includes the use of protected materials for personal, educational, or noncommercial purposes. Users must cite author and source of content, must not alter or modify content, and must comply with all other terms or restrictions that may be applicable. Users are responsible for securing permission from a rights holder for any other use.

Library of Congress Cataloging-in-Publication Data

Sievert, April Kay, 1953–
Artifacts from the Craig Mound at Spiro, Oklahoma / April K. Sievert with J. Daniel Rogers ; contribution by Javier Urcid.
p. cm. — (Smithsonian contributions to anthropology ; no. 49)
Includes bibliographical references and index.
1. Spiro Mounds Archaeological State Park (Okla.)—Antiquities. 2. Indians of North America—Oklahoma—Spiro—Antiquities. 3. Indians of North America—Material culture—Oklahoma—Spiro. 4. Material culture—Oklahoma—Spiro—History—To 1500. 5. Mounds—Oklahoma—Spiro. 6. Excavations (Archaeology)—Oklahoma—Spiro. 7. Spiro (Okla.)—Antiquities. I. Rogers, J. Daniel. II. Urcid, Javier. III. Title.
E78.O45S6 2011
976.6'79—dc22
2010042354

ISSN: 0081-0223 (print) / 1943-6661 (online)

♾ The paper used in this publication meets the minimum requirements of the American National Standard for Permanence of Paper for Printed Library Materials Z39.48–1992.

Contents

List of Figures

List of Tables

Preface

In 1992, when I first glimpsed the small galena figurine reposing quietly in the drawer where it had crouched for 30 years, I frankly did not give it much thought. Since then, that figurine has come to embody, for me, the intense specialness of the site of Spiro. Galena Man sits cross-legged, his limbs and facial features crudely modeled in a solid lump of the dull, gray mineral. While in the Craig Mound, he must have been sitting on matting because he still carries basketry impressions and residues. As my work in wringing information from the Spiro collection continued, I gained more and more appreciation for Galena Man, wondering, just what does he represent? He has a kind of power—solidity and an abiding presence that transcends the mineral itself and perhaps even the culture that made him. He commands respect.

There is no doubt that this collection is special, ceremonial, and unique. The legendary engraved shells provide the best glimpse we have into Caddoan iconography. The well-preserved textiles testify to Caddoan artistry and skill. The pieces at the National Museum of Natural History (NMNH) represent a large and varied collection, and this monograph provides a glimpse into that collection. Many of the artifacts have been pictured elsewhere over the last 70 years or so and are thus familiar. Others, like Galena Man, are relatively unknown.

This work began as an attempt to document the large collection from the Craig Mound at Spiro for the Repatriation Office of the NMNH. J. Daniel Rogers spearheaded this project and then hired me to do the bulk of the data collection. Little did I realize that the next year would be spent documenting over 20,000 artifacts and generating more than 2,000 pages of text. The project generated a catalog of Spiro's materials, and a summary report was submitted to the NMNH Repatriation Office in 1992. Since then, Dan Rogers and I have been working on this version, with Dan providing the overall context for Spiro and me giving the basic artifact description. The chapters that follow are organized topically, beginning with Caddoan context, and followed by historical information about Spiro and the collection that ultimately found its way to the Smithsonian Institution. Chapters on containers, textiles, weapons and tools, ornaments, and ceremonial objects follow. Human remains in the collection were analyzed by bioarchaeologist Javier Urcid with the assistance of osteologist

***April K. Sievert**, Department of Anthropology, Indiana University, Student Building 130, 701 East Kirkwood Avenue, Bloomington, Indiana 47405, USA. **J. Daniel Rogers**, Department of Anthropology, National Museum of Natural History, Smithsonian Institution, P.O. Box 37012, MRC 112, Washington, D.C. 20013-7012, USA. **Correspondence:** A. Sievert, asievert@indiana.edu.*

Manuscript originally accepted for publication by Smithsonian Institution Press 27 May 2004; revised manuscript received by Smithsonian Institution Scholarly Press 5 April 2010. SISP acknowledges that a primary factor contributing to the significant delay in publication of this work was the closure of the former Smithsonian Institution Press in January 2005.

Beverly Byrd, both formerly of the NMNH Repatriation Office. These results are presented by Urcid as chapter 9. Finally, Appendix A provides a list of the catalog numbers along with basic data and Appendix B provides a concordance of catalog numbers with references to other published sources on many of the artifacts.

Help came from many quarters. The advice and opinions of James B. Griffin and James A. Brown were invaluable. Candace Green, Karen Dohm, Dennis Peterson, Robert Brooks, Don Wyckoff, and Timothy Baugh offered insights into various aspects of the collection. Bill Billeck provided an immense service by editing the original report to the Repatriation Office. Jai Alterman, Sarah Flores, and Marcia Bakry contributed very substantially to the final editing of text and the preparation of images. Sheree Sievert gave me valuable advice for editing this version. Repatriation photographers Jerome Edwards and Sarah Zabriskie, independent curator Pamela Keech, and James Brown assisted with the prodigious task of taking record photographs. The staffs of the National Anthropological Archives and the NMNH Registrar's Office were continually helpful. Registrar for the NMNH Repatriation Office at the time of the study was Marjorie Wilson. She not only tried to keep me organized, but she also spent huge amounts of time photocopying the resulting 2,500 pages of catalog supplement. Since doing the analysis, discussions with Joe Watkins, Karen Wise, Lane Beck, and Anne Pyburn gave me new perspectives. Valerie Cressler proved invaluable to the effort to correlate the artifacts with references and illustrations published elsewhere, and her work is evident in the concordance (Appendix B). I am indebted to Alex Barker, James Brown, and Bruce Smith for reviewing the manuscript and suggesting improvements. As ever, Mike Snow and Sheree Sievert put up with a lot.

This study is offered as a testament to the important cultural traditions of a people whose descendants are still with us today and are still contributing their own unique perspectives to American diversity and cultural life.

April K. Sievert
Indiana University
Bloomington, Indiana

1

Spiro and the Development of a Regional Social System

J. Daniel Rogers

Beginning in the eighth and ninth centuries AD, a new cultural system took shape in the eastern woodlands of North America, a region extending from the Midwest to the Gulf of Mexico to the Mid-Atlantic. The groups already living in this vast region either adopted or themselves developed a way of life that accounted for some of the most complex social achievements in prehistoric America, north of Mexico. This cultural "style" is referred to as Mississippian and consisted of populations scattered across the region organized into chiefdoms, or what is sometimes referred to as ranked or middle-range societies (Smith, 1990:1–8; Barker and Pauketat, 1992; Bense, 1994; Pauketat, 1994, 2007). As diverse as these societies were, they also shared many attributes, almost always including the cultivation of maize and other native domesticates (Smith, 1986), the construction of earthen mounds, and participation in a religious system known as the Southeastern Ceremonial Complex (Galloway, 1989; King, 2007).

During the last two decades the quality and quantity of the archaeological data have improved, and we are now able to say much more about the nature of these societies. In fact, the eastern woodlands have become a major laboratory for studying the emergence of social complexity and variation within middle-range societies. Archaeologists are now investigating settlement patterns, trade networks, evidence for social hierarchies, social memory and identity, the construction of adaptive systems, and many other factors associated with the rise of social complexity and regional similarities and differences (e.g., Scarry, 1996; Schroeder 2004; Wilson 2010). Throughout much of this research, there has been an emphasis on community and religious centers usually marked by the presence of one or more earthen mounds. Lately, this emphasis has given way to a more balanced consideration of all types of sites, from the grand mound centers like Cahokia (Fowler, 1989; Brown and Kelly, 2000; Pauketat, 2009) to the lowly individual farmsteads (Rogers and Smith, 1995). Even so, it has always been recognized that the mound centers offer great interpretive potential and must be included in any analysis of social change.

The Spiro site is a major mound center, and there can be little doubt that it played a significant role in the development of the prehistoric societies in the Northern Caddoan region, an area including the Arkansas Basin and Ozark

Highlands of Oklahoma, Arkansas, and Missouri. In fact, Spiro was, by all available evidence, a ceremonial center of paramount importance (Orr, 1946; Rogers, 1991a, 2009a; Schambach, 1993; Brown, 1996). Given the relevance of this site in both regional social dynamics and long-distance interactions, it is critical to understand the physical organization of Spiro itself. This chapter evaluates the changing layout of the Spiro site in relation to local and regional developments and assesses the extent to which changes in site organization can be used to evaluate the relationship between regional interaction and the apparent development of increasingly centralized authority. This approach serves to contextualize the artifacts, from both a site and a regional perspective. The final section analyzes Spiro's external relationships in the context of social developments of the Caddoan tradition in the Arkansas Basin and Ozark Highlands.

A CHRONOLOGY OF SITE ORGANIZATION

The Spiro site (Figure 1.1) was utilized for a period of at least 550 years, beginning about AD 900 and ending at approximately AD 1450. Recently, the Spiro chronology has been revised by James A. Brown on the basis of a detailed seriation of grave lots from Craig Mound (Duffield 1973; Brown, 1996:153–167; see also Brown and Rogers, 1999; Rogers, 2006). The analysis prepared by Brown is a sophisticated study not only of the burial associations but also of marker attributes with regional and extraregional significance. The grave lots at Spiro were ordered into four grave periods with several subperiods for a total of seven material and contextual clusters with chronological significance. Rather than the previous four phases, Brown now recognizes five cultural phases. These five phases are Evans, Harlan, Norman, Spiro, and Fort Coffee (Figure 1.2). Each phase is discussed below in relation to the mounds and other features at the site.

Evans Phase Components

The earliest securely recognized components at Spiro are representative of the Evans phase (AD 900–1050 or 1100). It should be noted, however, that some burials at the Craig and Ward Mounds are very similar to those of the earlier Fourche Maline phase. The term Fourche Maline refers to primarily Woodland period hunting and gathering groups that lived across the Caddoan region (Schambach, 1998). The Fourche Maline phase as defined specifically for eastern Oklahoma is based primarily on materials from the Wister Valley and vicinity, 30–40 km south of Spiro (Galm, 1978, 1981, 1984; Galm and Flynn, 1978; Bell, 1980). With the support of numerous radiocarbon dates, the Fourche Maline phase is defined as dating from circa 300–200 BC to AD 700–800 (Galm, 1984:207). Some premound burials at Craig and Ward 1 Mounds and burials from Ward Mound 2 (Rogers, 1980:111) exhibit Fourche Maline characteristics. If the burials in question can be attributed to the Fourche Maline phase, then they probably date to the latest part. The artifacts associated with these burials are characteristic of the Fourche Maline phase but also occur in the later Evans and Harlan phases (cf. Galm, 1984:214–215). Other premound burials at Craig are somewhat more elaborate and include Le Flore Plain ceramics, associated with late Fourche Maline, Evans, and Harlan phases, and larger quantities of ornate artifacts. These burials date to the Evans and the even later Norman phases (Brown, 1996:166). Whether or not it may eventually be possible to isolate a Fourche Maline component, it is apparent that from its beginning the Spiro site was a place of ceremonial importance. There is virtually no indication of a Fourche Maline habitation component on the site; only the earliest burials at the Craig and Ward Mounds indicate how the site may have been used in this phase.

The Evans phase (AD 900–1050 or 1100) marks the beginning of recognizable Mississippian influences and the basic characteristics that were to become Caddoan. At Spiro the Evans phase is defined principally on the basis of a series of burials from the lower levels of Craig Mound (Brown, 1996:137). A series of trade ceramics in these burials indicates the origin of a regional trade network and potentially other types of connections with the Plum Bayou culture in central Arkansas (Rolingson, 1987). Whereas Williams Plain and Le Flore Plain ceramics, of local manufacture, continue to be present, other types also occur, including Coles Creek Incised var. Plum Bayou and var. Lonoke and French Fork-like Agee Incised (Brown, 1996:162). Other than the few burials at Craig Mound, Evans phase assemblages are tentatively also recognized at House 4 and a midden area northwest of Craig Mound (Rogers, 1980:115, 121; Brown, 1996:165).

Harlan Phase Components

The first large-scale utilization of the site occurred in the Harlan phase (AD 1050 or 1100–1250). This phase is named after the Harlan site, another of the mound centers in the region, with its primary utilization concentrated in this time range (Bell, 1972; Rogers, 2009b). During this phase the site continued to expand, both physically and in terms of its role as a ceremonial center. Beginning with

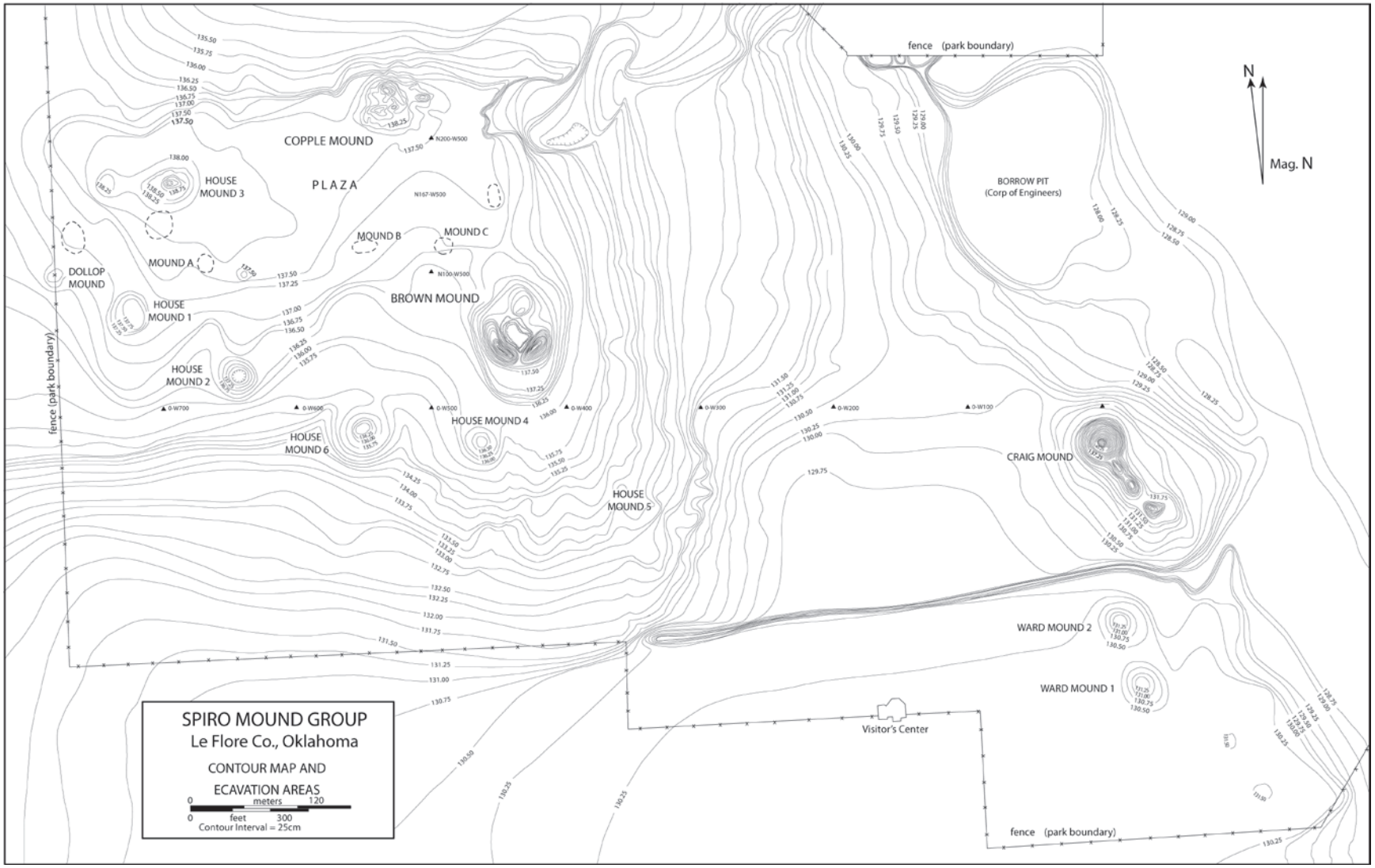


FIGURE 1.1. Contour map of Spiro site showing location of major features and recent excavations. Adapted from Rogers (1982:4) with permission of the Oklahoma Archeological Survey.

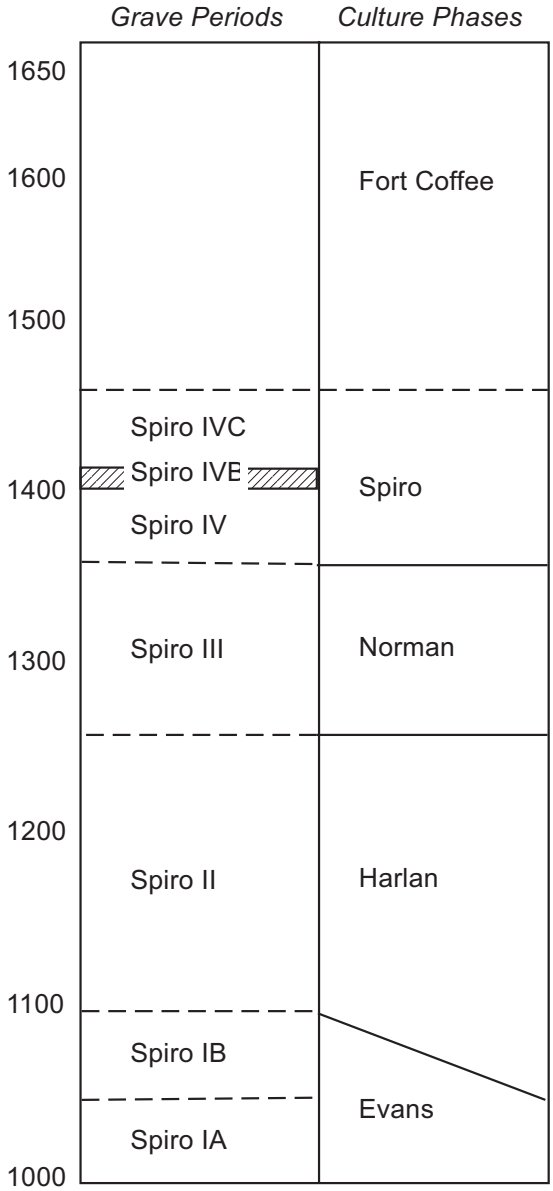


FIGURE 1.2. Grave lot periods and cultural phases. Adapted from Brown (1996:161).

the Harlan phase, it is possible to talk about an overall organizational pattern that served to segregate activity areas for approximately the next 400 years. During the Harlan phase additional burials were placed in the early construction phases of Craig Mound and at Ward Mound 1, a number of domestic buildings were constructed on the lowland portion of the site, and platform mounds and "house mounds" came into use on the uplands. These new constructions produced a tripartite spatial arrangement at the site. Running from west to east, the structure can be characterized as areas relating to rituals of death, daily living activities, and disposal of the dead.

The first of the major spatial divisions, encompassing the western portion of the site, may be inferred to be an area relating to rituals of death. The mounds and other features in this segment of the site signify ritual performances, some of which were apparently linked to mortuary or charnel house activities (explained below). This western area consists principally of a ring of mounds enclosing an area of approximately 2.75 ha, referred to as the "Plaza" (Rogers et al., 1982). The mounds that make up the ring consist of House Mounds 1–4 and 6, Dollop Mound, Copple Mound, and Brown Mound. Also associated with this area are House Mound 5 and Plaza Mounds A, B, and C. Five of these mounds (Dollop Mound, House Mound 5, and Plaza Mounds A, B, and C) were only identified after the resumption of excavations at the site in 1979 (Rogers et al., 1982). The house mounds listed here are not substructure mounds as the term is used in Mesoamerican archaeology but are instead soil mantles built over the remains of presumable special-purpose buildings.

House Mound 5 is a good example of the house mound pattern found at Spiro and other mound centers in the region as well as in other portions of the Caddoan area. Although the Works Progress Administration (WPA) dug some house mounds, House Mound 5 is the only one excavated in recent years using fine-scale recovery techniques (Rogers, 1982). At House Mound 5 a series of three square buildings were discovered, each with four interior support posts and an extended entryway (Figure 1.3). These three buildings averaged roughly 9 × 9 m in size and were built, used, and apparently intentionally destroyed in relatively rapid succession. These buildings, and by implication, the structures associated with other house mounds, are inferred to have served special purposes, perhaps functioning as combinations of charnel houses and the residences of elite functionaries. Bell (1984:229–230) has argued that similar structures at the Harlan site (36CK-6) served a mortuary/charnel house function. The principle evidence for this interpretation comes from the unusual nature of the buildings and their contents. At House Mound 5 the exceptionally large size of the buildings (compared to domestic structures of the same phase) and the possibility that the buildings were intentionally destroyed and subsequently rebuilt over almost exactly the same spot with the same directional orientation lend support to the identification of these structures as having a special purpose. Exactly what this purpose was is hard to say; however, the material remains found in the buildings give some strong clues. Of special note were a few

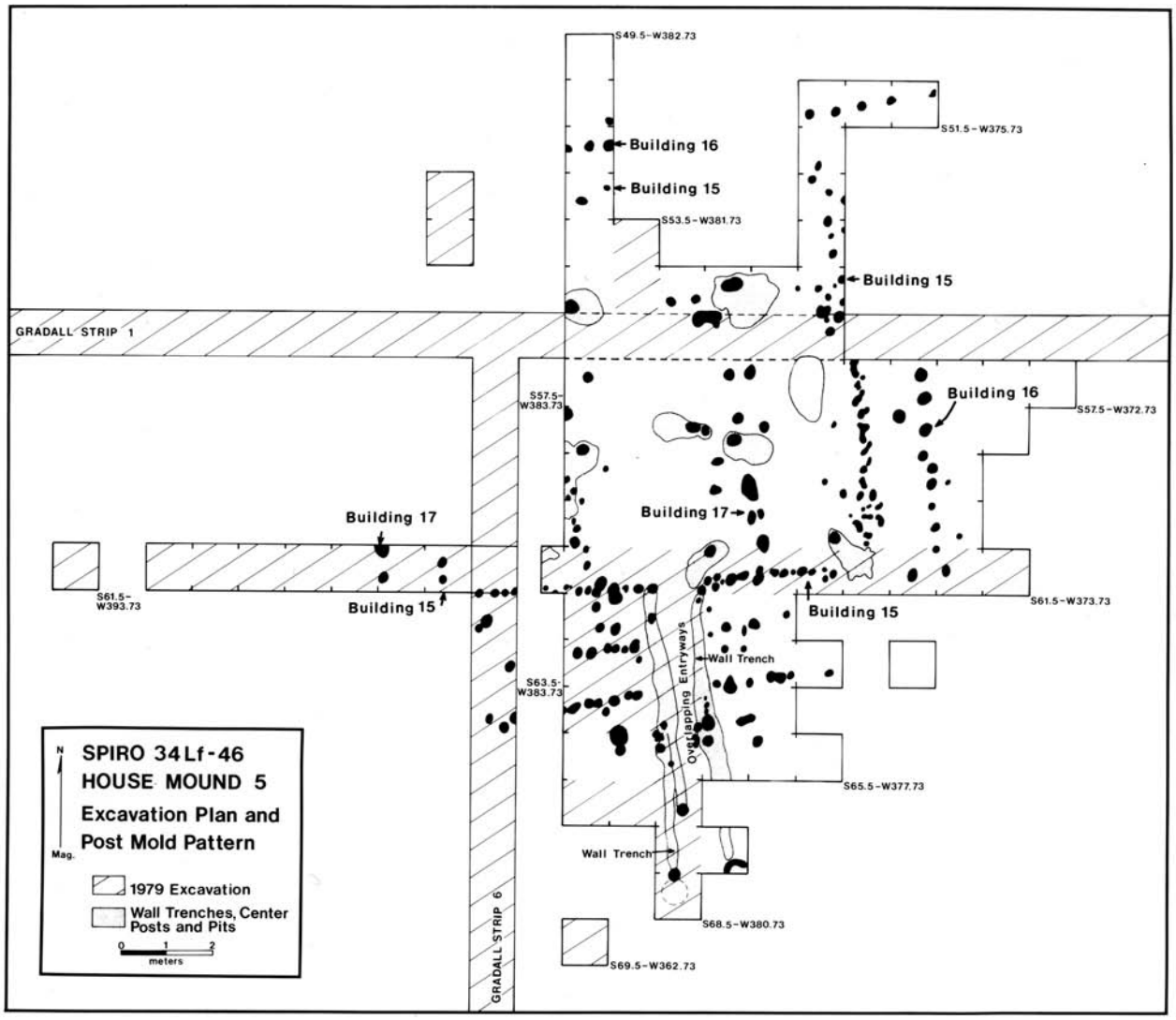


FIGURE 1.3. Excavations at House Mound 5 at the Spiro site. Adapted from Rogers (1982:13) with permission of the Oklahoma Archeological Survey.

fragments of human bone and three ovoid "Class A" bifaces made of an imported chert (Rogers, 1980:168–169). The latter are similar to some bifaces recovered from burials at Craig Mound. The general character of the artifact assemblage was also suggestive of a special function for these buildings. Although the artifacts recovered were not what might be referred to as "high-status goods" (that is, highly elaborate, decorated, or exotic), they did reflect a set of activities not typical of common domestic structures. In particular, tools associated with primary subsistence activities, such as hunting and horticulture, were virtually absent, whereas tools related to grinding and cutting activities were extremely common. It is not clear what was being ground or cut. The artifacts recovered indicate that a special set of activities was conducted at House Mound 5, but it is also probable that the structures were used for domestic purposes by some individuals. This inference is bolstered by the presence of a wide variety of potential animal and plant food remains.

In addition to the platform mounds and house mounds associated with the western portion of the site, there was another type of mound identified as Dollop Mound and Mounds A, B, and C. These four mounds lie in an east–west linear arrangement extending from the western edge through the center of the Plaza (Rogers et al., 1982). The function of these mounds is unknown. The mounds

contain a variety of artifactual debris, consisting primarily of common ceramics and lithics. Although these mounds received only limited testing, there is presently no indication of stratification or evidence of building remains. It may be that these mounds represent the piles of debris produced by a periodic cleaning of the Plaza or were the foundations for poles or other superstructures.

The final type of mound in the Plaza ring consists of the two rectangular platform mounds: Copple and Brown. Brown Mound is the larger of the two and was extensively damaged by pot hunters in the 1930s before excavation by the WPA. Although the pot hunters caused a lot of damage, the WPA crews did identify the remains of a structure on the ground surface under the mound and several discrete mound construction episodes. One extremely interesting characteristic of Brown Mound, discovered by the WPA, is evidence for a subterranean pit that was dug from an upper level in the mound down through the mound and deep into the premound strata (Bauxar, 1953; Brown, 1996:105–112). Whereas information on this feature is incomplete, it may have extended 6 m or more below the original surface. Because of groundwater and time constraints on their lease, the WPA did not explore this feature. In 1982 an attempt to learn more about this pit was initiated by the Oklahoma Archaeological Survey (Rogers et al., 1989). An extremely high water table and limited funds forced curtailment of the project; however, this test did lend support to the existence of the pit as an aboriginal feature.

Copple is the second and smaller of the platform mounds, and like Brown Mound it was also partially excavated by the WPA. In 1982 further testing at Copple revealed a complex history of mound construction and use (Leonhardy, 1989; Peterson, 1989). The structure of the mound included at least three superimposed buildings that had existed at early levels near the center of the mound. There was a considerable amount of "midden" in and near these structures, and as part of the mound construction process, soil had been piled up against the sides of one or more of the buildings. At some point, however, each building had been dismantled, probably after being burned, and the space was filled in with soil. It is also apparent from the presence of ash and burned soil that a number of fires had existed at various times on different surfaces of the mound. A similar history of mound use can be identified at Parris Mound (34SQ-12), located 30 km north of Spiro (Muto, 1978). Leonhardy (1989) notes that mounds are stereotypically described as being built in stages. A layer of soil was piled up and used for some purpose for some time. This initial layer was then covered to make the pile larger and the pile was again used. The pile may have been enlarged several times, either as a platform for some ceremonial structure or as a place to inter the dead. Always implicit in the "construction stage" notion is that the piling of dirt was uniform around the axis of the mound and that each stage was a short-term, single-event phenomenon separated from the succeeding stage by some long-term period of use. Rather than discrete construction stages, it is more appropriate to regard Copple Mound as composed of interior, middle, and periphery deposits.

Whereas mounds were an important focus of research in the western portion of the site, testing of intervening areas did take place. In general, habitation debris outside of the mounds was sparse, although some material was recognized by the WPA in the vicinity of House Mounds 4 and 6, and later testing revealed some midden areas west of House Mound 5, perhaps evidence of additional structures.

The central portion of the site, including the slope down from Brown Mound and the flat area east to Craig Mound, in the Harlan phase, contained evidence of activities relating to everyday life. This area was tested by the WPA, and at least five square, four-center-post houses were excavated. Notes from the testing in this area indicated that as many as 15 additional houses might be present. This number of buildings means that Spiro has the densest concentration of structures known for any Harlan phase site in the Arkansas Basin. The buildings are not especially large, nor are there any associated house mounds. It appears that the houses are simple domestic structures. Although it is possible that these were dwellings for elite, the scarcity of evidence for a sizable Harlan phase population at any other site in the area makes it unlikely that a large (relatively speaking) group of religious or political functionaries resided at Spiro in the Harlan phase. The ceremonial specialists probably lived in the cyclically destroyed buildings buried under house mounds, whereas the buildings in the central portion of the site probably were ordinary domestic structures.

The final site area relevant to the Harlan phase is the eastern portion, including Craig Mound and Ward Mound 1. The principle use for this site area concerns final disposal of the dead, although three possible domestic structures were excavated in the area east of the Ward Mounds. The burials in Craig Mound are associated with very early levels, prior to the major mortuary deposits assigned to the later Norman and Spiro phases. At Ward Mound 1, disturbance by early excavations (Thoburn in 1916–1917) and poor record keeping by the WPA limited the inferences that could be drawn, but this mound (and

probably Ward Mound 2) includes some of the characteristics of the house mounds on the western side of the site. There was probably a structure buried in the mound; additionally, there does not appear to be any stratigraphic differentiation within the mound fill, which might indicate a single construction episode or the continual and gradual addition of soil to the mound. Only nine burials were excavated under controlled conditions. Some 28 additional burials were removed for which there is little information (see Thoburn, 1930). Only three burials were recovered from Ward Mound 2, and none of these were associated with diagnostic artifacts.

Norman and Spiro Phase Components

The detailed chronological analysis of Spiro grave lots conducted by Brown (1996:133–167) made it possible to recognize a series of burials with distinctive material assemblages at Craig Mound that could be attributed to a time frame designated as the Norman phase (AD 1250–1350). In Brown's (1996:137) grave lot sequence, the Norman phase is based on grave period III. At Spiro only the Craig Mound burials can be attributed to the Norman phase; however, within the region there are several components linked with this time frame (Brown, 1996:163–165; Rogers et al., 2000).

In terms of spatial organization, the tripartite arrangement that characterized the Spiro site in the Harlan phase was carried over, with certain important modifications, into the Norman and Spiro phases (AD 1250–1450). During these periods an amazing growth occurred in the number and variety of exotic trade goods associated with the burials at Craig Mound (Brown, 1996: vol. 2). These objects are described in detail and are the principal focus of this volume. The expansion in the trade good inventory is not matched, however, by an expansion of the site. In the western portion of the site there is only inferential evidence that the upper levels at Brown Mound can be attributed to the Spiro phase plus a single intrusive burial in the flank of the mound. The House Mounds and other mounds associated with the Plaza show no indication of use in the Spiro phase. Similarly, the small cluster of buildings that stood in the central portion of the site was abandoned. The population moved from their close association with the ceremonial center to small clusters of houses scattered along the rich farming soils of the Spiro vicinity (see Rohrbaugh, 1982, 1985a, 1985b).

The major utilization of the Spiro site during the Spiro phase is reflected in the numerous and elaborate burials from Craig Mound. During this phase the major portions of the four separate conical units of the mound are constructed. Pot hunter digging destroyed much of the upper portions of the three lesser units, but WPA excavations did recover extensive information from undisturbed areas (see chapter 2). Within the main cone of the mound the pot hunters tunneled into an open cavity they called the "central chamber." Although later excavations revealed that this was not an intentionally constructed chamber, an unusual preservation context did exist within this hollow space, thus allowing survival of an extraordinary assortment of perishable artifacts (Brown, 1996:85–88).

The construction of the main mound unit at Craig Mound is characterized by a series of flat-topped stages, some or all of which are encircled by fences of cedar poles. Presumably, a building (probably a mortuary) stood on the summit of each mound level. A ramp providing access to the various levels may have extended to the north. Of the several buildings that stood at different levels, there is only one, the Great Mortuary, for which any appreciable amount of information exists. This is the mortuary that was revealed in the hollow cavity and partially destroyed by the pot hunters. The Great Mortuary is the largest and the only mortuary that did not have its contents removed prior to dismantlement of the building and the addition of a new layer of soil to the mound. Recent research by James A. Brown (2010) suggests that the organization of the Great Mortuary and other features at Craig Mound potentially represents a spatial cosmology.

The overall conical shape of Craig Mound and the rounded deposit that caps the last of the platform surfaces in the main unit suggests a planned end to the use of this mound. There is, however, no evidence for the construction of a new mound to begin anew the cycle of mortuary use, dismantlement, and final disposal of the dead at Spiro or anywhere in the region. The closing of Craig Mound seems to be associated with major changes in the Arkansas Basin and coincides with the beginning of what is referred to as the Fort Coffee phase (AD 1450–1660; Rogers, 2006). There is no verifiable evidence that the Spiro site was used during the Fort Coffee phase. The definition of the transition from the Spiro to the Fort Coffee phase is closely linked to the apparent decline of the complex status hierarchy represented in the burials at Craig Mound and other regional mound centers (Brown, 1971a; Rogers, 1983, 1995). The decline of the status hierarchy extended to other aspects of Spiroan political and religious organization, including a drastic decline in the construction and use of mounds and a corresponding decrease in exchange of exotic materials such as copper or marine shell (Rogers, 2006).

The truncation of the social hierarchy and the collapse of the eastward-oriented trade network in exotic goods are not reflected in obvious ways at the lower levels of society. The farmers that had lived in the sites surrounding the Spiro ceremonial center continued to do so, and the houses they built were like those of the Spiro phase (i.e., two center posts, rectangular, with an extended entryway).

Patterns of Change

Multiple patterns relating to cultural changes on a local and regional level are evident within the chronological ordering of site components described above. The interpretive position taken here is that a socially "external" agent of change, such as environment, serves to provide a "context of change" that must be considered in conjunction with a variety of social and technological constraints. Several factors—population fluctuations, the availability of appropriate cultigens, the presence of natural resources, individual and collective forms of agency, social constraints on the production of surplus, or factors affecting the centralization of authority—play important roles in understanding the trajectory, extent, or even the general nature of social transformations (e.g., Beck, 2003). Another consideration in understanding the cultural developments in the study region is the potential significance of interaction between local polities. Most of these factors, but especially interaction and trade, are best considered by adopting a regional perspective that allows consideration of the relationship between sites. In the Arkansas Basin and Ozark Highlands the development of an integrated regional perspective has been surprisingly slow to develop. Only since the 1980s have significant efforts been made to integrate information from Arkansas, Missouri, Oklahoma, and Texas (cf. Brown, 1984a; Kay et al., 1989; Perttula, 1989; Rogers, 1989, 1991a, 1991b). These studies have highlighted the cultural connections between regions, primarily during the Mississippian period (AD 800–1500), although connections extend far deeper in time (cf. Anderson and Sassaman, 1996).

From a regional perspective the events and processes responsible for the expansion of Spiro during the Evans and Harlan phases (AD 1000–1250) or the establishment of other mound centers in the region are very poorly known. However, the late Fourche Maline and Evans phases represent the beginning of a ranked form of social organization associated with the Emergent Mississippian (AD 800–1000) across the Midwest and Southeast (cf. Smith, 1990). The beginnings of the Mississippian are linked to a widespread phenomenon with no single point of origin but, rather, with the relatively synchronous development of similar social and material systems in a number of different regions (Phillips et al., 1951:451; Smith, 1984:20). In the Spiro area, changes are a part of the regional Caddoan manifestations also associated with cultural developments in northwestern Louisiana, eastern Texas, southwestern Arkansas, and southern Oklahoma. Although clearly part of the Caddoan tradition, the area of the Arkansas Basin and Ozark Highlands presents local differences that form a distinctive variation on the overall Caddoan theme.

The chronology of cultural developments in the Arkansas Basin and Ozark Highlands is outlined above in the context of the growth and change of the Spiro site itself. These developments have their origin in the transition from the Late Woodland to the Mississippian. The Late Woodland time frame (ca. AD 600–900) in the study area falls largely into what is locally referred to as the Fourche Maline phase (Galm, 1984; Rogers, 1991a:224–225) and is characterized by hunting and gathering groups that used the bow and arrow and made simple forms of pottery. Although there is some evidence for the presence of groups with Kansas City Hopewellian affiliation, these peoples seem to have had little influence on later developments in the area. In contrast, there is a strong material continuity between the Fourche Maline and the Emergent Mississippian of the Evans phase. There is also some continuity in settlement location, but the transition to the Evans phase is characterized by a variety of social and technological changes that are far more significant than the areas of constancy with the earlier hunter-gatherer adaptations. Around AD 900 several mound centers were established in the region, representing a sharp contrast to previous settlement patterns. The new settlement system is organized hierarchically, and sites tend to be located with access to soils suitable for horticulture. At several of these centers there is good early evidence for complex ceremonial activities associated with the construction and use of mounds, mortuary activities, and special-purpose buildings, such as the structures mentioned earlier for Spiro's House Mound 5. The Harlan phase is also characterized by increased evidence for horticulture, substantial architecture, expanded levels of long-distance exchange, and sharply different forms of social organization.

The implications of the transition from the Fourche Maline to Evans phase for the organization of social control are especially significant. In kinship-based societies, presumably characteristic of the Fourche Maline phase, authority is often structured and legitimated by ancestral sanctions (Meillassoux, 1960). Fourche Maline sites in

many cases show long periods of continuity in their utilization and are also places for the burial of the dead. These sites embody a conceptual continuity between the activities of the living and the sources of authority provided by the ancestors. With the beginning of the Harlan phase there is an abrupt departure from the settlement continuities of earlier times, probably associated with the redefinition of the basis for authority and patterns of organization at all levels of society (Rogers, 1996:56–57). Evidence from the Evans and Harlan phases (Rogers, 1983) strongly indicates the presence of a ranked, chiefdom or middle-range type of social organization. In these types of societies authority is tied to positions recognized through hereditary linkages; however, social control tends to cut across strict lineage relationships to encompass larger segments of the population. The basis for authority is generally through direct access to the supernatural, rather than by appeal to the ancestors as intermediaries. The historic period in the Southeast offers good comparative examples of chiefly authority being derived from supernatural sources, such as among the Natchez in the Lower Mississippi Valley or the Hasinai Caddo of east Texas (White et al., 1971; Rogers and Sabo, 2004).

The settlement pattern of the Evans and Harlan phases, especially concerning mound centers as the loci of major ceremonial activities, is very different from prior patterns as seen in the Fourche Maline phase. This major difference provides a basis for interpreting the Fourche Maline/Evans transition. However, the social, technological, and environmental "mechanisms" responsible for instigating the transition are, not surprisingly, poorly known; even so, some suggestions may be offered. In particular, increasing evidence for exchange and long-distance interaction is probably closely related to the general phenomenon of Mississippian emergence (Rogers, 1991a). On a local basis, control of exchange may have provided a means for individuals in positions of some authority (e.g., lineage heads) to gain wealth, prestige, and access to objects and information of ritual significance. Attempts by individuals to consolidate authority could lead to a cycle of increasing control, ultimately contributing to the new form of social organization. Attempts by individuals to consolidate power are seen as a principal mechanism, although there are certainly other key variables in the equation. The availability of appropriate technologies and environmental opportunities are especially important. In this regard, the Arkansas Basin and Ozark Highlands were relatively sparsely inhabited and represented a region ripe for the expansion of a horticultural adaptive strategy. The available data provides no basis for suggesting that environmental conditions in the AD 700–900 period would have significantly deterred the practice of horticulture in the region (Henry, 1978; Henry et al., 1979). With regard to the technology of maize horticulture, there is currently little evidence for the cultivation of tropical or indigenous cultigens from Fourche Maline sites. But the necessary technology could have easily been made available at the Evans phase (AD 850–1250) transition through the expanding interaction networks. There is confirmation of maize in the Southeast by around AD 400 (Icehouse Bottom site; Smith, 1986:44), plus there is evidence for maize (Maiz de Ocho) of Southwestern origin by AD 780 at the Davis site, an early Caddoan site in Texas (Story, 1981:149).

Often a strong link has been made between sedentism and the adoption of agriculture, and it would seem that this is justifiable, to some extent, in the Northern Caddoan case. There are, however, extenuating circumstances, and as various researchers have pointed out, it may be inaccurate to link sedentism and agriculture too closely (Hitchcock, 1982:224–225, 230; Powell, 1983; Rafferty, 1985:134). In the Arkansas Basin and Ozark Highlands, maize or other cultigens are a relatively small component of paleoethnobotanical samples prior to AD 950 (Wyckoff, 1980:419), and even after that date maize, in any Caddoan site, is relatively scarce compared to sites in other areas of the Southeast (Schambach, 1982:191). This absence indicates that maize may not have played a strong role in the initial transition to sedentism in the study area. Throughout the Caddoan sequence maize was heavily supplemented by wild plants foods (Rogers, 2011). In terms of sedentism the Northern Caddoan area may again prove to be a contrast with adaptive systems further to the east. An unexplored but still conceivable issue is that the continued emphasis on collecting and hunting wild resources was linked to periodic abandonment of settlements for purposes of conducting hunting and/or gathering expeditions. The data necessary to investigate this issue are, as yet, largely unavailable. Whether or not the Northern Caddoans did occupy their dwellings year-round, population densities were low and settlements were well dispersed across the landscape, which would have expedited access to not only a variety of natural resources but also soils suitable for agriculture (Wyckoff, 1980). The relatively small population and dispersed farmsteads of the Caddoan settlement system have been viewed as a strategy for mitigating the effects of a region with unpredictable rainfall (Schambach, 1982:192).

With the establishment of mound centers such as Spiro in the AD 800s and 900s the settlement system takes on a hierarchy of site complexity that correlates with the ranked forms of social organization associated with the

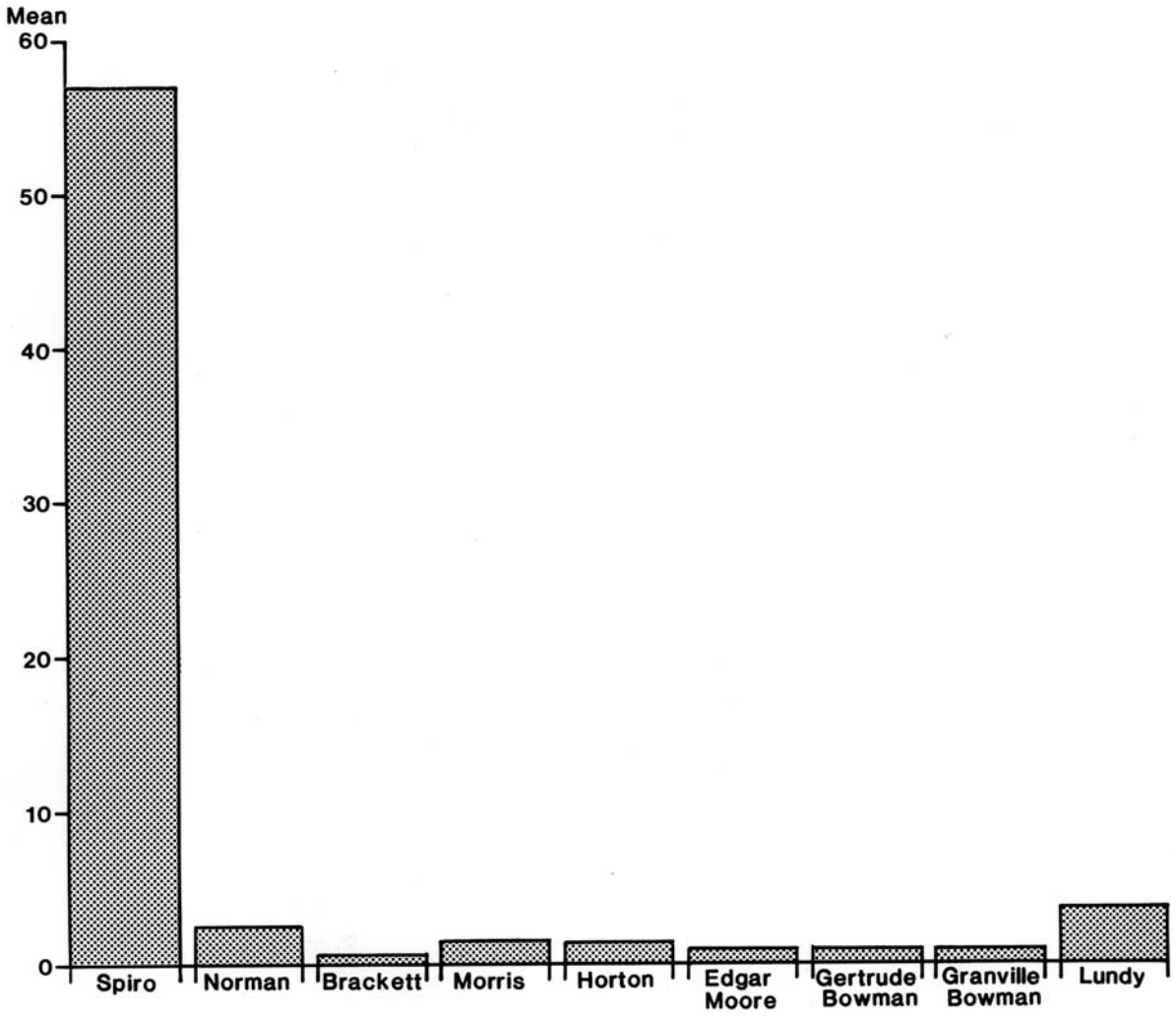


FIGURE 1.4. Comparison of mean number of "high-status" artifacts per burial from selected Spiro phase (AD 1250–1450) sites. From Rogers (1983:69) with permission of the Oklahoma Archeological Survey.

Mississippian period (Brown et al., 1978). During the Evans and Harlan phases (AD 1000–1250) the Harlan and Spiro sites are roughly on the same level of complexity, although there are indications that even at this early date Spiro incorporates some subtle differences that would seem to place it at the apex of the settlement system. Namely, there is a wider variety of exotic and presumably high-status artifacts associated with the burials at Spiro than at any other site in the region (Figure 1.4). This fact is considered an indication of the level of control Spiro exercised over the exchange of objects used as status markers and symbols of authority and ideological legitimation (Rogers, 1996). By the succeeding Norman phase (AD 1250–1350) Spiro accounts for the vast majority of exotic prestige goods. The variation in the presumed control of exotic trade items by Spiro in the Evans and Harlan phases does not necessarily mean that the Northern Caddoan region was operating as a single polity at this time. It is entirely conceivable that two or more systems were in operation at various times during these phases (Rogers, 1983:60), although as Berthoud and Savelli (1979:748) point out,

> the exercise of political power is strengthened by privilege; simultaneously, privilege increases with the permanence of power. Prestige goods therefore become what Baudrillard calls a "sign value", embodying the ideology of domination.

As such, Spiro's role in the region may have been enhanced by an early control of exchange ties with the East, closely linked to participation in the Southeastern

Ceremonial Complex. By the Norman phase the largest population concentration is in the immediate vicinity of Spiro, further supporting the notion that Spiro is in some way dominating, if not literally controlling, the ideological, social, political, and economic interactions in the region.

The transition from the Harlan to the Norman phase incorporates a number of changes in addition to the centralization of control at the Spiro site. Domestic and ceremonial architecture changes across the region from large (mean floor area of 46 m^2) square, four-center-post buildings to smaller (mean floor area of 37 m^2) rectangular, two-center-post structures. Such a change has strong implications for the composition of the household plus changes in kinship organization on a larger scale (Rogers, 1995). There is also evidence for shifts in settlement distribution in the region (Wyckoff, 1980:514) and for a number of changes in artifact styles. The changes in building type and settlement location are also linked to apparent changes in regional population levels. A review of information on buildings from the Harlan and Spiro phases (excluding those with special or presumed ceremonial functions) was made in order to compare the relative number of structures and the mean floor area for each period. If these data are used as a rough indication of population trends, then the far greater number and larger size of domestic buildings in the Evans and Harlan phases in comparison to the Norman and Spiro phase suggest that the earlier periods had the greatest population. Population seems to decline in the Norman and Spiro phases, with the trend continuing into the following Fort Coffee phase (AD 1450–1660) and ending with the eventual abandonment of the region in the protohistoric period.

Admittedly, the data for suggesting this population trend are suspect on the grounds of unsystematic sampling, yet if the inclination holds true under eventually closer scrutiny, then an inverse relationship would exist between population and social complexity. Such a relationship is contrary to the cultural evolutionary argument that generally acknowledges a link between population increase and augmented social complexity. It may be that the changes recognized as taking place between the Harlan and Norman phases are not sufficiently sweeping to be considered as significant from a cultural evolutionary perspective. Perhaps this is true, but it is also relevant to consider the actual or potential role played by a process such as the centralization of authority, as far as population fluctuations are concerned. Increased social complexity of this type does not inherently require an increased population, nor is it necessarily a response to social or environmental stress. It is not requisite to view increased complexity as a form of intensification. With increasingly centralized authority there will, however, be a leadership-based demand for increased production to supply the consumption needs of the elite and for their participation in long-distance exchange, but that increase could be met by shifting production rather than a long-term response such as increasing population to increase production. What seems to have been happening in the Spiro case is a mode of social intensification at the elite level but not necessarily at the level of household production. It was noted some time ago (Plog, 1974:120) that in the Southwest, social intensification and increasing agriculture correlated with a decline in population. Whereas Johnson (1982) observed this on a cross-cultural basis, the correlation between population and organizational complexity is relatively weak when comparisons are made using fine-grained population level estimates. These observations open the door to a more varied and realistic interpretation of the relationship between population levels and social change.

CONCLUSIONS

The Spiro site was, throughout its history, an integral and often dominating part of the trends in social and technological change characterizing the late prehistory of the Arkansas Basin and Ozark Highlands. It was one of the first mound centers established in the region (perhaps sometime between AD 850 and 950), and it continued to grow in importance until the collapse of the chiefdom level of social organization around AD 1450. During the Mississippian period, mound centers in the Caddoan area tended to be "vacant" or sparsely inhabited. Spiro certainly fits this pattern, especially during the Norman and Spiro phases. This was the time in which most of the elaborate burials were placed in Craig Mound, but it was also a time of less extensive but more focused use of the site. It is likely that very few people lived at Spiro during the Spiro phase, perhaps only those individuals responsible for certain ceremonial duties. Activities at the site were concentrated on the sequentially constructed buildings at Craig Mound and perhaps the buildings that may have stood on the upper layers of Brown Mound. Other than these structures, probably no more than two at any one time, there is no other evidence for buildings at the site. This pattern of vacant ceremonial centers may be viewed as a physical reflection of the conceptual and cosmological separation of the elite, or at least the context of ceremonial activity, from ordinary people and domestic activities.

At about AD 1450 activities at Spiro came to an end, probably associated with the collapse of the social system and the general decline of the Mississippian chiefdoms across the Southeast beginning about this time. As with the beginning of ranked forms of social organization in the Caddoan area, their decline also seems to have been linked with developments further to the east. Whether environmental variability played a significant role in the demise of the Spiro system, it does seem that change in the level of interaction with the East was a critical factor. A decline in the exchange of exotic goods from the East may have severely impacted the material sources of chiefly ideological legitimization and eroded one aspect of the basis for authority. Complex chiefdoms are inherently unstable and prone to decentralization. If trade with the East was on the decline, for whatever reason, the upper levels of Spiro society may have been unable to bridge the symbolic gap. Although farming households continued to live in the region, mound construction and other evidence for centralized authority disappeared.

2

History of Spiro Research

April K. Sievert and J. Daniel Rogers

Several writers have told or retold the story of the excavations at Spiro (Clements, 1945:48–66; Orr, 1946; Hamilton, 1952:23–35; Brown, 1966a:23–35, 1996:43–62; Hamilton et al., 1974:1–5; Phillips and Brown, 1978:1–8; Rogers, 1980:10–21; La Vere, 2007). The episodes in Spiro's excavation reflect the changes in the way archaeology has been conducted in North America during this century. First, the site was subject to severe damage as treasure hunters sought saleable artifacts. Then, a massive WPA effort systematically removed huge amounts of fill, still with a goal of artifact recovery and only secondarily to understand the ways in which objects became part of the archaeological record. Finally, excavations in the 1970s and 1980s used a problem-based research approach. The chaotic digging by the early commercial relic hunters is particularly relevant here because the Smithsonian collections derive from these early excavations. Subsequent WPA excavations recovered materials that serve as the comparative collection to this one. Later excavations revealed site chronology, habitation, and site structure and provide the basis for interpreting Spiro. Discussion of these episodes of archaeology at Spiro and work done using these collections provide a framework for study of the materials from the site that are at the Smithsonian Institution.

EARLY AND COMMERCIAL EXCAVATIONS AT SPIRO

The first recorded excavations at the Spiro site took place in 1916–1917 and were conducted by Joseph B. Thoburn, a historian from the Oklahoma Historical Society (Thoburn, 1930, 1931:64–69). Thoburn photographed the site prior to any excavations (Figure 2.1). Thoburn excavated Ward Mound 1 in an attempt to prove that the small "prairie mounds" of eastern Oklahoma were the remains of collapsed earth lodges, similar to those occupied by such groups as the Pawnee or Arikara. Thoburn's excavations revealed the remains of a burned structure and several burials, which were, for him, reasonable confirmation of the human origins of the small mounds dotting the landscape. Subsequent geological and archaeological work illustrates that Thoburn's use of Ward Mound 1 as a test for his earth lodge hypothesis was inappropriate. The so-called prairie

FIGURE 2.1. Craig Mound prior to excavation, as photographed by Joseph Thoburn in 1913. Photograph courtesy of the Research Division of the Oklahoma Historical Society (Thoburn Collection 196.2.1).

mounds, though still not completely understood, are geological in origin, not made by people (Brown, 1996:10). Thoburn's contribution was that he identified the prehistoric remains of eastern Oklahoma, including Spiro, as belonging to people of Caddoan origin (Thoburn, 1931:60). Caddoan is a term that refers both to a group of related languages and the cultural traditions that emerged in the four-state region of Texas, Louisiana, Arkansas, and Oklahoma (Rogers and Sabo, 2004). The concept of Caddoan is a theme that still underlies most research on the late prehistoric phases of eastern Oklahoma and has recently been expanded to include the Ozark Highlands of Arkansas and a portion of Missouri (Brown, 1984a; Kay et al., 1989; Perttula, 1989; Rogers, 1989).

Following Thoburn's work, the Spiro site remained untouched until 1933 when the Vandagriff (also spelled Vandigriff and Vandergriff) brothers dug a trench into the center of Brown Mound. In the summer of 1933, Joseph W. Balloun began hunting for relics in the southern portion of the "Great Temple Mound," marking the earliest recorded digging into the mound now known as the Craig Mound (Figure 2.1). The northern portion of the Craig mound containing the primary cone belonged to a different property owner than the southern portion. It had belonged for years to Aunt Rachel Brown, who allowed no one on the property, thereby effectively protecting the site. At her death the property passed to William Craig, who also protected the mound, and it is from his family that the name derives. When he died, the land passed to two grandchildren who were still minors. Their guardian, George Evans, held stewardship of the property in 1933 (Clements, 1945:52).

Later in 1933, six men formed a group, adopted the name Pocola Mining Company, and approached George Evans to acquire a two-year lease to excavate in the northern section of the mound. One excavator was John O. Hobbs, who lived near the Craig Mound and farmed near there with his Native American wife for many years. Other relic hunters in this group included William and Kimball A. MacKenzie, a father and son from Le Flore County (Clements, 1945:54). The remaining excavators were contemporaries of the younger MacKenzie and included Glenn Cooper of Booneville, Arkansas; James Vandargriff of Paeola, Arkansas; and R. W. Wall (Hamilton, 1952:25). They began work late that year. For nearly two years these excavators concentrated on the lower (southernmost) three mounds, presumably because desirable relics could be found at relatively shallow depths. Eventually, anthropologists at the University of Oklahoma, including Forest Clements and David Baerreis, were alerted to the destruction at the site. In 1934, Clements prepared the National Park Service Survey form (BAE manuscript 4845 in the National Anthropological Archives) for the official recording of Spiro or, as it was then called, Scullyville Mounds. This report states that the Pocola or "Poteau" Mining Company leased the property. Anthropologists, who were appalled by the destruction of the Craig Mound, were eventually able to gain the support from the public and state legislators needed to initiate legislation to restrict excavation of archaeological sites in Oklahoma to qualified researchers only, and this restriction was supposed to take effect in 1935. Unfortunately, they were not in time to halt the destruction of the mortuary features at Craig Mound.

The relic miners desisted digging in July of 1935, when the licensing requirement took effect. However, the legislation proved difficult to enforce, and Clements, its major proponent, left the area to conduct research in California. The excavators soon returned, knowing that they had but little time to continue digging before either the state forced them to desist or their lease expired in November of that year. At that time they had scarcely explored the largest and potentially richest portion of the northernmost mound. In the late summer of 1935 the Pocola Mining Company tried a time-saving tactic: tunneling. The men of the company had been miners, so tunneling was a natural alternative strategy. Tunneling proved to be remarkably lucky and effective when these men struck a large mortuary feature replete with funerary offerings, including copper, textiles, wood, and a large number of engraved *Busycon* cups. The men dug several tunnels that met in the center of the mound, where they reported discovering a central chamber virtually brimming with artifacts. Word spread quickly, and artifact dealers arrived to purchase materials on the spot. Materials continued to sell throughout 1936 and later, perhaps aided by a newspaper article by MacDonald (1935) that appeared in the *Kansas City Star* proclaiming "A 'King Tut' Tomb in the Arkansas Valley."

The Pocola Mining Company finally stopped digging when their lease expired on 27 November 1935, but not before a substantial inner portion of the mound had been destroyed. Furthermore, at the cessation of their digging, the looters used dynamite to collapse their tunnels. Figure 2.2 shows the mound after the commercial excavations ceased.

Although they may have been aware that damaged artifacts would not bring as high a price, the commercial excavators worked in a style that was not conducive to preservation. It became clear after later excavation that entire burials were contained in baskets and that a large amount of perishable textiles was present. An inestimable amount of textiles, engraved shells, and wood was probably destroyed during the tunneling procedure. Clements (1945:56) describes the scene when he returned from California later in 1935.

> Sections of cedar poles lay scattered on the ground, fragments of feather and fur textiles littered the whole area; it was impossible to take a single step in hundreds of square yards around the ruined structure without scuffing broken pieces of pottery, sections of engraved shell, and beads of shell, stone, and bone. The site was abandoned; the diggers had completed their work.

PROFESSIONAL EXCAVATION AT SPIRO

In 1936, the Oklahoma Historical Society obtained the lease for the Craig property at auction. Clements began directing systematic excavation of the remainder of the damaged Craig Mound with the aid of the WPA (Figure 2.2). In two seasons, until November of 1937, University of Oklahoma and WPA personnel removed nearly the entire area of the mound that fell on Craig property. The number of workers employed in the excavations was large, and the experience of the supervisors was limited. One result was confusing and scanty provenience and stratigraphic information on the numerous burials recovered from the mound. However, Clements filed a WPA report (1935–1938, NAA Report 4844) that contains information regarding original archaeological context. The Craig Mound was nearly leveled during these excavations.

FIGURE 2.2. The north cone of the Craig Mound during excavation by the WPA. Photograph taken by H. M. Trowbridge on 6 September 1936 (Trowbridge Catalog in Waldo Wedel correspondence file, National Anthropological Archives, National Museum of Natural History).

WPA crews worked between 1936 and 1941 to excavate the vestiges of mound remaining on the adjacent Brewer property as well as other mounds and house floors around the site. In 1941, World War II brought an end to the WPA work before any significant site report could be published. A fair amount of publicity was accorded to the excavations at Spiro due in part to the spectacular nature of the artifacts, which was enhanced by the excellent preservation. For example, a photo feature in *The Daily Oklahoman* (Sunday, 13 December 1942) entitled "Soonest Sooners" focused on the WPA excavation and on Clements' and Baerreis' work at Spiro.

Publications on the Craig Mound during the postwar period ensued and included Burnett's (1945) study of materials that the Museum of the American Indian, Heye Foundation, had received and, in the same volume, Clements' "Historical Sketch of the Spiro Mound." Two articles appeared in *American Antiquity* and would therefore have received a relatively wide circulation: Orr's (1946) treatment of the general archaeology and Bell's (1947) paper on trade. Hamilton (1952) produced a major publication on the looted objects from Spiro in a special issue of *Missouri Archaeologist*, to which James B. Griffin also contributed.

The WPA project turned up a large amount of material similar in style to and, in some cases, refitting to that recovered by the commercial relic hunters. From these excavations, it was clear that the Craig Mound had contained a mortuary deposit unique in size and complexity. Some burials along with considerable funerary offerings had been placed on litters made of cedar poles. Other burials were made in baskets. Although the WPA project resulted in the recovery of a large amount of material, including intact burials, the mining operation into the center of the mound clearly struck the densest deposit of material. Near the end of the excavations an interested student named Robert E. Bell took a number of photographs of objects and the work of the relic hunters. Robert Bell was

later to become professor of anthropology at the University of Oklahoma and the principal scholar studying the prehistory of the state (Merriam and Merriam, 2004). Additional details of Craig Mound are described in chapter 1.

After World War II, the site slipped into relative obscurity, and no further excavation was attempted for 30 years. With the construction of the Arkansas River Navigation System in the late 1960s, Spiro once more began to receive attention. Much of the area occupied by the site was scheduled for use as a borrow pit associated with the construction of a nearby lock and dam on the Arkansas River. If not for the forethought of a few individuals, much of the site would probably have been lost. The state leased the property and began development as an archaeological park, which included reconstructing the Craig and Ward Mounds in 1970 and opening a visitor's center in 1978 (Rogers, 1980:21). In 1970 the area of the Craig Mound was excavated with the goal of correlating WPA maps with extant topography (Wyckoff, 1970). Remnants of the Craig Mound were located during this effort, and the fortuitous discovery of the remains of a cedar pole that had been recorded in WPA notes allowed for correlation with the old WPA grid.

Although a report on the engraved shells compiled by Duffield appeared in 1964, a comprehensive report of the Craig Mound excavations conducted by the WPA was not published until the 1960s and 1970s when James A. Brown undertook that task of analyzing the artifacts and records from the site. His analysis was published by the Stovall Museum of Science and History and the University of Oklahoma Research Institute as a series of reports designated as Spiro Studies (Brown, 1966a, 1966b, 1971b, 1976; Brown and Bell, 1964).

Between 1979 and 1982 systematic research was once again undertaken at Spiro (Rogers, 1980, 1982, 1983; Rogers et al., 1982, 1989). The principle objective of this work was to understand Spiro's organizational characteristics during the four chronological periods represented at the site and to relate these patterns to larger-scale trends in the Arkansas Basin and Ozark Highlands. To fulfill this objective, test excavations were conducted in the "village area" on the lowland portion of the site (Rogers, 1980). On the upland area, five previously unidentified mounds were tested, one of which was excavated extensively (Rogers, 1982). Test excavations and a magnetometer survey were conducted in the so-called Plaza area (Bennett and Weymouth, 1982; Rogers et al., 1982). Subsequent to these excavations, additional nondestructive remote sensing research was conducted in 1994 (Goodman et al., 1995) and 2006.

A NEW SYNTHESIS

In 1996, Brown combined and updated his original analyses into a major new two-volume study, *The Spiro Ceremonial Center,* bringing the early excavations at Spiro into focus again, fully 60 years after the relic-hunting episode that first brought fame to the Craig Mound. Brown reworked the Craig Mound chronology and synthesized a new picture of the Great Mortuary, the burial feature at the center of the Craig Mound, from which the Smithsonian collections originate.

The only other person to publish specific information about the central mortuary feature was Hamilton (1952). When Hamilton attempted to recover information regarding the commercial excavations, he talked to members of the original excavation team. He published a description of the Craig Mound deposit as John Hobbs recalled it (Hamilton, 1952:29–31). The interior of Craig Mound was alleged to contain a hollow structure, and a diagram was published by Hamilton (1952: pl. 5) and later by Brown (1996: fig. 1-28). At the time of his first Spiro Studies in the 1960s, Brown largely dismissed the reports that there had been a hollow tomb at the center of the Craig Mound. Tombs would be uncharacteristic of any North American mortuary treatment. However, Brown (1996:85–94) reanalyzed the reports of an airspace at the center of Craig Mound, and he now thinks that an airspace did exist, mostly as an artifact of mound construction and settling. The huge piles of artifacts could have settled beneath a system of cedar posts that leaned inward. The general lack of crushing of many objects suggests they were protected in a hollow void, although not an intentionally created void. Furthermore, the work of the relic hunters served to enlarge any airspace that may have been there, thereby making it seem larger and more discrete.

Brown refers to the central portion of the Craig Mound, with its well-preserved caches, as the Great Mortuary. He has also been able to characterize the burials in the Great Mortuary deposit, identifying litter burial heaped with shell cups, textiles, and shell beads. Careful study of the grave lots associated with the Great Mortuary and with other levels and contexts at Spiro has enabled Brown to seriate the grave lots into a chronological sequence. The Great Mortuary burials constitute a period identified as Spiro IVB, which dates to around AD 1400 (Brown, 1996). The way that the Spiro IVB period fits into the overall sequence at Spiro in terms of Brown's (1996:133–134,161–164) chronology is summarized in Figure 1.2, with revisions from Rogers (2006).

The grave lot sequence will be referred to elsewhere in this report because it provides a way of associating the material from the commercial excavation with the material from the WPA excavations. Some artifact types have more limited distribution, while others occur throughout the sequence. Brown discussed associations and distributions in terms of his grave lot seriation. For the sake of comparability, the present text will also.

3

Spiro Collection at the Smithsonian

April K. Sievert

ACCESSION HISTORY

The members of the Pocola Mining Company, the relic hunters who first dug into the main mound at Spiro, marketed their finds to collectors and relic dealers, many of whom visited the site. Hamilton (1952) wrote that there were three dealers who purchased most of the artifacts directly from the miners: Joe Balloun, the first relic hunter at Craig Mound; G. E. Pilquist of Dardanelle, Arkansas; and J. G. Braecklein. These people, in turn, resold material to other dealers or collectors. Word of the finds at Spiro Mounds reached the Smithsonian Institution quite early. Jack Reed of Fayetteville, Arkansas, traveled east with a number of artifacts that he showed to scholars. He apparently appeared at the Smithsonian with Mr. McRoy and Mrs. Lake of *Fortune* and *Time* magazines on 18 May 1936 to exhibit 12 shell cups, shell gorgets, a small wooden mask with shell eyes and ear plugs, a string of pearls, textiles, and matting. Reed said, "Shells had been thrown out of trenches or burial chamber," a space he described as having textile-covered walls and roof timbers (National Museum of Natural History, 1960).

Much of the material found in the commercial excavation made its way to serious collectors who amassed large collections from this operation. It was through these collectors, who eventually sold or donated their collections to the museum, that the National Museum of Natural History (NMNH) accessioned materials from Spiro (see Table 3.1). There were 14 donations or sales of material from Spiro to the Smithsonian during the 50 years between 1936 and 1986. Only Braecklein and Trowbridge provide information regarding the original archaeological context for some artifacts. Information regarding collectors and their donations to the Smithsonian is derived from the museum's accession files housed primarily in the Office of the Registrar of the NMNH along with supplemental documentation from correspondence or other materials in the National Anthropological Archives.

Early Years: 1936–1958

Dealers purchased directly from the miners then sold the artifacts they acquired to relic collectors and other dealers. George Braecklein, one of the collectors to

witness the commercial excavation, was an architect with Braecklein, Besecke & Swanson of Kansas City, Missouri. Braecklein is credited with gathering objects personally and later distributing them to other collectors. He apparently purchased some objects from John Hobbs, an original member of the Pocola Mining Company team. Braecklein was the first to bring materials from Craig Mound to the attention of the Smithsonian Institution. In 1936, not long after the cessation of commercial excavation, Braecklein wrote to the Smithsonian and then loaned a crown-type mace chipped from jasper (as it was then identified) and a catlinite pipe to the Smithsonian so that the NMNH could make casts for the museum collection. The chipped mace was recorded as having been "found in hematite bed, one end next to a cremation" (National Museum of Natural History, 1936). Later in 1936 these pieces were returned to Braecklein, along with complimentary casts made at the NMNH. Ultimately, Braecklein transferred these and other artifacts to another collector, Harry Trowbridge, who later sold them to the NMNH. Therefore, the catlinite pipe (423152) and the mace (423197) ultimately returned to the Smithsonian. Many of the materials at the NMNH passed through the hands of George Braecklein. Braecklein also indicates that he personally picked up or found objects that came out of the mound, so in some cases Braecklein was the original collector. Apparently, during December of 1935 and January of 1936, Braecklein continued to locate artifacts that he later distributed to collectors.

Several of the pieces in the collection bear Braecklein's initials in pen and ink as well as brief descriptions of provenience. The early acquisition of plaster casts was followed soon thereafter by a larger donation of artifacts from Braecklein in 1937, when he sent over 90 items, comprising sherds, beads, and lithic artifacts. In 1938, Braecklein contacted Dr. Setzler at the Smithsonian and made another donation, this time including bone artifacts, beads, and pipe fragments.

Between 1937 and 1958, the Smithsonian acquired small lots of artifacts from Spiro. These included a textile received in 1937 from D. I. Bushnell, Jr. In 1943, Henry Hamilton donated nine lots of textiles, including one piece of twilled matting with copper adhering, shredded fibers, colored cloth fragments, and other fragments of feathers, hair, and cloth. He had purchased these from various dealers. In 1950, Edna Graham, the widow of collector Judge William Graham, donated his relic collection. This collection contained material from across the United States, including a few pieces from Spiro—shell beads that Graham had purchased from H. T. Daniel and copper pins that he received from G. E. Pilquist.

Accession number 206664 from the University of Oklahoma in 1955 consists solely of a plaster cast of a shell recovered during the WPA excavation.

The Lightner accession shown in Table 3.1 was not an outright donation, but a loan, and these artifacts are no longer at the Smithsonian. However, circumstances surrounding the loan are indicative of the way in which objects from Spiro spread about the country. In 1956, Clifford Evans, then an associate curator in the Division of Archaeology at the Smithsonian Institution, happened into the Lightner Museum of Hobbies in St. Augustine, Florida. Evans noticed seven engraved shells on the bottom shelf in a case of Native American exhibits. He recognized that these could well be from Spiro, or at least they closely resembled the engraved shell cups found in abundance at Spiro. Evans immediately inquired about the objects, their provenience or any catalog data that may have existed. Cecil Zirkan, General Manager of the Lightner Museum, replied on 13 January 1956 that "unfortunately, Mr. Lightner had died before the catalog of the collections were completed, and no data of any sort existed" (Zirkan, 1956).

Zirkan suggested that the Lightner Museum send the shells to the NMNH for examination. This procedure was carried out, and the artifacts were repaired, refit, photographed, and judged to be excellent examples of shell engraving from Spiro. These artifacts had not been reported or listed in any publications that discussed the shell engraving from Spiro (such as Hamilton, 1952). The NMNH and Lightner Museum agreed on arranging an

TABLE 3.1. National Museum of Natural History (NMNH) accessions of material from Spiro.

NMNH accession number	Year	Donor
137937	1936	Anthropological Laboratory, NMNH
145540	1937	J. G. Braecklein
145859	1937	D. I. Bushnell, Jr.
150758	1939	J. G. Braecklein
166197	1943	Henry W. Hamilton
187689	1950	William J. Graham via M. Edna Graham
206664	1955	University Museum, University of Oklahoma
210052	1956	Lightner Museum of Hobbies
217907	1958	Richard G. Slattery
228126	1960	Harry M. Trowbridge
249362	1963	Smithsonian Institution
272249	1966	Richard K. Meyer
350434	1986	R. King Harris
358176	1986	J. Allen Eichenberger

"indefinite loan" of the materials to the Smithsonian so that they could be included in an exhibit on North America. This meant that the NMNH could keep the shells indefinitely but that ownership was still vested with the Lightner Museum of Hobbies and that at any time, the Lightner Museum could request that they be returned. In 1973, the Lightner Museum did request return of the shells to place them on display in a totally renovated museum. Therefore, in 1974, four of the shell fragments (411904–411907) were returned to the Lightner Museum and are no longer in the collection at the NMNH. However, three fragments (411901–411903) were on display at the Smithsonian at the time and were not returned to Florida until the late 1980s, when the artifacts were removed from display.

In 1958, Richard Gates Slattery of Rockville, Maryland, donated a few Spiroan objects as part of a larger collection of artifacts collected from Maryland, the District of Columbia, and 22 other states (accession 217907). Slattery was described at the time as a "knowledgeable amateur" and an officer in the Maryland Archaeological Society (unpublished, National Anthropological Archives Reference Guide, p. 419).

Accession 249362 represents the accession of a cast made by the Smithsonian of a blade originally collected by Braecklein.

The Trowbridge Acquisition

One of the major collectors of artifacts from Spiro was Harry M. Trowbridge of Bethel, Kansas. His collection consisted of 3,191 specimens, including some extremely well preserved textiles. Trowbridge amassed the collection between 1935 and 1952 from dealers and collectors who had, in turn, gotten them from the mound's looters during the 1933–1935 commercial excavation. Trowbridge's collection was already legendary, and many of his artifacts had been illustrated in Hamilton (1952) and Burnett (1945).

Trowbridge was keenly interested in the scientific value of his collection and was especially intrigued by the textiles. He had made contact with the Smithsonian through Waldo Wedel, then an assistant curator, as early as 1936, when he sent Wedel a bit of yarn from a Spiro textile. By 1937 Trowbridge had sent textile samples to be analyzed for composition (Whitford, 1941; Willoughby, 1952). In 1938 he published a short report on an "Analysis of Spiro Mound Textiles" in *American Antiquity* (Trowbridge, 1938:51–52). He also wrote a brief report of the results of fiber testing done at the National Bureau of Standards in 1937 and published it in the *Journal of the Illinois Archaeological Society* (Trowbridge, 1944). According to a 1942 letter from Trowbridge to Wedel, Trowbridge relays the information that much of his Spiro material was at that time on display at the Kansas City Museum, Kansas City, Missouri (a fact also noted by Hamilton, 1952). "The museum offered the best room in the building, and built in addition, a fire-proof room for the Spiro textiles, out of waste space opening off of the other room . . . In six large cases in the main room are most of the relics" (National Museum of Natural History, 1960).

Wedel and Trowbridge established a cordial and familiar correspondence. When Trowbridge's collection was accessioned, Wedel was the chair of the Department of Anthropology, and he handled much of the administration of this large accession.

On 14 May 1958, Trowbridge wrote a letter to Remington Kellogg, director of the U.S. National Museum, offering his collection for sale for $20,000. By 20 May a purchase order, number 38446, had been prepared, indicating how important this collection was deemed by the NMNH. However, it was not until early in 1960 that the collection was received and completely cataloged into the collection of the NMNH. Although it is not precisely clear from Trowbridge's correspondence, it seems as though his actions may have been prompted partly by a desire to see his collection in the hands of people who would appreciate and use it and perhaps partly from financial need. At the time of the transaction, Trowbridge wrote the following passage in the preface to his catalog on 27 June 1958, and it describes well his attitude toward the collection.

> For twenty-two years he has felt the joy and the anxiety of a trustee, delegated by the fates to preserve these evidences of a people skilled in many arts. The mound material has been virtually a member of the family, the textiles having had in recent years their own light-proof and fireproof room, and the other specimens similar space adjoining. He gives them up as one would an old friend, but tempered with the knowledge they will be under the expert and enduring custody of the basic research and education center of our country, – the Smithsonian Institution.

Unlike most of the other donors of artifacts from Spiro, Trowbridge kept records of his collection and maintained a catalog. He had assigned each artifact a number and recorded from whom he received the objects as well as any other information regarding the original

circumstances under which the artifacts were obtained. His records provide the only extant link to the original archaeological context for any materials in the NMNH's collection derived from commercial excavations.

In many cases, he recorded which of the original members of the Pocola Mining Company excavated particular pieces, and he recorded from whom he purchased various pieces. His suppliers included Joseph W. Balloun, J. G. Braecklein, H. T. Daniel, Albert H. Hansen, John Hobbs, Kenneth G. McWade (the only dealer not specifically mentioned by Hamilton, 1952), G. E. Pilquist, H. I. Player, and Lyle A. Stephenson. In 1958, Trowbridge prepared an abridgement of his own catalog and sent it to Wedel. A series of letters written between Trowbridge and Wedel in 1965 describe drawings that Trowbridge had loaned the museum but which ultimately had been returned to Trowbridge.

Harry Trowbridge died following a massive stroke in 1969 at the age of 81. He had been a serious amateur archaeologist throughout most of his life. He was born in 1888 in Blue Mound, Kansas, served in army intelligence during World War I, and graduated from the University of Kansas (*Kansas City Star*, 1 July 1969). Trowbridge served as president of the Kansas City chapter of the Missouri Archaeological Society. After he retired, he devoted most of his time to establishing and acting as curator for the Wyandotte County Museum in Kansas City, Kansas. This museum still retains Trowbridge's papers and, presumably, Trowbridge's original documentation regarding the Spiro collection (J. Brown, Northwestern University, personal communication, 1992).

It is apparent from reading his notes and letters that he treated the materials from Spiro with great respect. Many of the textiles in his collection had been bundled originally, and Trowbridge himself had painstakingly unrolled several of these. Trowbridge then housed them under glass in wooden frames. Although in hindsight this may not have been the best way to treat the objects, he was clearly motivated by a desire to save them from perishing. When it came time to ship them to the NMNH, he contacted Wedel for clearance to ship the textiles standing up on end, rather than lying flat. Trowbridge felt that the potential damage from slippage in the frames (although they appear to have been well constrained within their frames) was lower than potential damage should the glass break during transportation.

Trowbridge's collection comprises roughly one half of the collection in the NMNH. The other major acquisition came from Richard K. Meyer of Peoria, Illinois, in the late 1960s.

The Meyer Acquisition

Richard K. Meyer of Peoria, Illinois, began collecting in the 1930s and by the 1960s had amassed an impressive collection that included artifacts of pottery, stone, shell, wood, bone, and copper. Meyer appreciated the aesthetic qualities of materials from Spiro, and his collection contained some of the more remarkable artistry from the Craig Mound. For example, Meyer had collected rare wooden figurines, which were well preserved and remarkable for their detail. Engraved shell is particularly plentiful in his collection.

Meyer did not catalog his collection as Trowbridge had done, so there is no information pertaining to who his suppliers were or where in relation to the Craig Mound certain artifacts might have been recovered. Hamilton (1952) reports that Meyer was a student at the time of the excavation and that he traveled directly to the site to acquire materials.

Meyer had at one time sent his collection to the National Textile Museum in Washington for study. The acting head of anthropology for the National Museum of Natural History, Richard B. Woodbury, apparently heard of the collection through Alan Sawyer of the National Textile Museum. Woodbury's first correspondence with Meyer was on 26 June 1965, when he wrote Meyer inquiring about the collection and expressing NMNH's interest in acquiring it. Meyer was interested in donating the collection because it would amount to a significant charitable contribution with substantial tax advantages. That many items were at the National Textile Museum proved to be extremely convenient because when the materials were donated to the Smithsonian, many of them were already in Washington. Meyer personally delivered other items on 23 May 1966. At that time Meyer was directing the Lakeview Center Museum in Peoria, Illinois.

Meyer's accession was rather complicated in that not all materials were listed as being donated in the same year. Meyer wanted to maximize the tax advantages of the large donation, so he requested an accession process that would allow approximately one-third of the materials to be formally accessioned in each of three years, 1966, 1967, and 1969. Steven Williams at the Peabody Museum, Harvard University, appraised the materials in this collection for tax purposes. After this appraisal was rejected by Meyer as being too low, the collection was reappraised by Andre Emmerich of the Andre Emmerich Gallery, New York City. George Metcalf inventoried the objects upon arrival at the NMNH, and Beth Gibson implemented conservation of some items.

Later Accessions

More than a decade passed before the next donation of materials from Spiro. In 1980 the large collection of Plains artifacts belonging to R. King Harris of Dallas, Texas, was sold to the Smithsonian. Although the museum actually received the materials in 1981, they were not formally accessioned until 1986. When Harris died in 1980, his collection and personal papers were also sent to the Smithsonian. The National Anthropological Archives houses his extensive document collection, which includes both a biography of the man and a bibliography of his work. Harris was a dedicated amateur born in 1912 who studied engineering at Southern Methodist University until the advent of the Great Depression cut short his college career. He became deeply interested in Texas archaeology and conducted excavations across the state. Harris was also a codeveloper of the Caddoan Conference. His biography indicates that materials were kept first in a china cabinet in his dining room and then in a museum in the back yard when the collection exceeded the size constraints of the dining room.

The materials that Harris collected are the only fragments that are not from the commercial mining operation. Harris had visited Spiro Mound, probably during the late 1950s, and collected material from the surface. Therefore, although it is certain these materials are from Spiro, it is less certain where they came from at the site. All of these artifacts are weathered, supporting the information that they were indeed found on the surface. They comprise lithic tools (steeply retouched tools and points), potsherds, and engraved shell fragments. Presumably, the shell fragments derived from excavation back dirt, although this is not certain. These materials cannot be clearly associated with a mortuary context.

The final acquisition is that of a set of casts made of artifacts from North America. Referred to as the Eichenberger cast collection, it did contain examples of Spiroan materials.

PREVIOUS STUDIES OF THE SMITHSONIAN MATERIALS

Conservation

During the 1970s conservation scientist Joan S. Gardner worked extensively with the collection. She was particularly interested in textiles and worked with many of the pieces in the collection. She prepared cards containing photocopies of the original catalog cards and kept her own notes on conservation measures taken, identifications that she elicited, and stylistic and descriptive observations. These cards were of inestimable aid in producing this report. In many cases, Gardner's records also include Polaroid photos of the objects that can be used for identification and study. These records are maintained in the Anthropology Conservation Laboratory as part of the collections management records of the Department of Anthropology.

Research

Although Orr (1946) wrote a general treatment of Spiro's archaeology, Hamilton's report in 1952 provided a more extensive overview of archaeological materials from the site. Hamilton was a serious avocational archaeologist who surveyed materials from all of the major collectors of Spiroan artifacts around the Plains and Midwest. Hamilton consulted with collectors and photographed pieces from their collections. Much of what he pictured and discussed includes materials now at the Smithsonian.

Clements published a report in 1945 of the history of the WPA excavation and submitted a summary report to the WPA. However, an in-depth report of the findings from the WPA work was not completed at that time. It was not until Brown tackled the materials in the 1960s that a comprehensive interpretive analysis of Spiro came about. Brown's work does refer to materials held in collections other than those from the WPA excavations, and in this context some of the materials in the Smithsonian were referenced.

Studies of iconography have in some cases utilized design elements on Spiroan materials at NMNH. Fundaburk and Foreman (1957) compiled illustrations on Mississippian Southern Cult iconography, and their work also provided a venue for discussing some of the materials in the collections of the Smithsonian.

Shell in particular has been well documented. Duffield (1964) wrote an encyclopedia of designs on shell and utilized materials from the Smithsonian. In the 1970s Philip Phillips of Harvard University and James A. Brown undertook a massive project to correlate all engraved shell fragments by making rubbings, grouping designs by shape, and refitting portions of single shells by matching the tracings. In 1974 Joan Gardner at the Smithsonian joined this project and provided tracings of shells that had not been previously surveyed. This project culminated in a six volume work, later condensed into two tomes, which include basic descriptions of shell engraving technology,

illustrations of all shell fragments known, and interpretation of manufacturing and iconographic styles (Phillips and Brown, 1978, 1984).

Textiles were also of considerable interest. Trowbridge (1938) published early on the textiles, and his study was followed by a discussion by Whitford (1941) regarding vegetal textile identification. King and Gardner (1981) published a more intensive study of the textiles. Kuttruff (1988) produced a doctoral dissertation on Mississippian textiles and took samples from the NMNH's collection for analysis.

Hamilton et al. (1974) analyzed copper materials from Spiro, and their report gives a nice overview of the various patterns and styles present on embossed copper sheets. Some of the materials in the NMNH collection are featured in that report.

A concordance that references prior discussion or illustration of the materials in the collection of the NMNH is included in Appendix B of this volume. This concordance should facilitate further research using the materials and enable the study of the iconography by referencing illustrations in Phillips and Brown (1978, 1984).

THE PRESENT STUDY

Materials are presented and discussed in a similar format to that utilized by Brown (1976, 1996) in his analysis of Spiro collections from the WPA excavation and other sources. This should maximize comparability of the data presented here, thus facilitating any attempts to correlate information from the two primary collections. However, different nomenclature is used in some instances. Brown employs the term "sociotechnic" to refer to those items that are in some way grand versions of what would otherwise be everyday kinds of artifacts. I sometimes refer to such unusual, exaggerated, or ritual objects as being "special-elite," a word that subsumes both special social function and ceremonial meaning. Otherwise, my categories for discussion are similar, although I do not make a clear dichotomy between utilitarian and special-elite artifacts based just on form. This distinction may be turbid because of the clearly ceremonial nature of this mortuary deposit. Even if objects appear to represent utilitarian items, they still may be imbued with ritual aspects and therefore may be accorded special treatment or deposition.

Phillips and Brown (1978:18) distinguish among five general functional contexts: (1) utilitarian equipment, (2) weaponry, (3) ornaments for the hair, head, or neck, (4) ritual objects such as pipes, shell cups, and figurines and (5) perishable containers and clothing. Brown's 1976 report and his 1996 revision concerning the artifacts also reflect this general division as well as heeding broad raw material or manufacture categories. My approach also uses a combination of functional and raw material categories. The first step in organizing this collection for study involved assigning each catalog entry to a raw material type. The seven types include (1) lithic, (2) ceramic, (3) textile, (4) bone, (5) shell, (6) metal, and (7) other artifacts. In many cases, however, the artifacts are composite and possess elements from more than one material type.

Material types also cut across functional categories. With a collection of the complexity of that from Spiro, working with material type only as the primary grouping is unsatisfactory. Rather, I created a grouping based on a combination of function, raw material, and manufacture. Artifacts are grouped analytically into (1) vessels of ceramics, shell, and stone, (2) fiber artifacts that include woven and braided objects along with basketry, (3) weaponry and extractive tools, many of which are stone, (4) ornaments that include beads, pendants, gorgets, and objects of various raw materials, and (5) ritual and special objects, including pipes and other artifacts again of various materials. An overview of the collection is shown in Table 3.2.

In analyzing the collection, information was drawn from two sources.

Historical Sources

Descriptive, conservation, and historical information regarding these artifacts derives from catalog and conservation records. Included herein are any accession files and extra notes regarding provenience that might have been located. Information from old descriptions or evaluations for the artifacts documents the history of interpretation of this collection. When Trowbridge sold his collection to the Smithsonian, he prepared a condensation of his own records as a catalog that he gave to Waldo Wedel. This catalog contains information regarding dealers from whom Trowbridge bought artifacts. This document is available in the National Anthropological Archives in the Waldo Wedel personal correspondence file under "Trowbridge."

Artifact analysis

Artifact analysis included examining, describing, measuring, and photographing the artifacts. The types of data included in the study comprise the following:

TABLE 3.2. Summary of the Spiro collection in the NMNH.

Artifact group and subgroup	Artifact count (whole and partial)
Containers	
Ceramic	322
Shell	907
Other	4
Textiles	
Cloth bundles or pieces	107
Baskets	34 [a]
Cordage	260
Weaponry and extractive tools	
Small projectile points	166
Large projectile points	12
Large bifaces	15
Sword-form bifaces	10
Maces	4
Celts	15
Other lithic tools	26
Ornaments	
Earspools	211
Shell beads	22,028
Stone and copper beads	59
Pendants	112
Gorgets	54
Ritual and special objects	
Pipes	33
Copper	382
Human effigies	9
Wood	92
Bone	43
Total count	**24,905**

[a] Includes 2 lots.

1. Volumetric data with sizes and weights of artifacts allow comparison with materials described by Brown and others.
2. Detailed measurements may contribute to a better resolution in the chronology represented by material from Craig Mound. Some attributes may have chronological relevance. Information such as sherd thickness can be used to differentiate some chronological ceramic types.
3. Stylistic information includes components of design and iconography, which provide information about symbolic systems and can aid in both an assessment of meaning and in linking the objects from Spiro to other archaeological contexts.
4. Raw materials can point toward trade relationships and intergroup interaction.
5. Manufacturing indicators suggest how craft production at Spiro may have been organized. Spiroan artifacts represent a high degree of workmanship and skill, and such craft working is still not completely understood. It has been suggested that much of the material may have been traded in, as evidenced by the raw materials utilized. Manufacturing details are helpful in sorting out some of the organizational and situational aspects of production.
6. Use and wear indicators contribute to interpreting how artifacts function within the contexts that engendered their use. There is still much we do not know about the specific nature of artifact usage in ceremonial situations, and often, a designation that an artifact was for "social display" lacks depth.
7. Residues can indicate contexts for use. In other cases residues represent the sole vestige of the original archaeological depositional environment.

There are three additional considerations to make in an analysis of this particular collection, and these stem from the nature of excavation, distribution, and acquisition of artifacts by collectors. The first is the possibility of fraudulent artifacts being included in the collection. Hamilton (1952) believed that the proportion of fake artifacts in the collection would be small. First, there were relatively few people handling the materials at the site, and they were distributed very quickly. Second, even the fine art from Spiro did not bring high prices because the massive amounts of relics distributed from Spiro increased the supply to the extent that they flooded the market for antiquities (Hamilton, 1952). Suspected fakes included copper pins and beads. Hamilton also mentions some double-platform pipes being faked.

The second consideration is the inclusion of artifacts that are not from Spiro at all but are otherwise prehistoric artifacts. Collectors of relics were not always experts in North American archaeology, although many were. Therefore, it would not have been unlikely for dealers to market non-Spiroan artifacts as reputedly deriving from Spiro. For example, there are some potsherds from the Southwest in the collection (see chapter 4) that may not have come from Spiro.

A final consideration concerns artifacts from the Craig Mound whose integrity has been compromised. In some cases, dealers may have sought to increase the chance for sale by reconstructing broken artifacts, thus rendering imperfect objects "whole" to consumers who put a premium on the perfect. Fillers, pigments, and adhesives may all have been put to this task. In addition, damaged portions of artifacts may have been rebuilt or even removed and then reconstructed.

These three factors pose a challenge to analysis. Since this report is designed to give a complete description of the collection, I paid considerable attention to recording details that may help to assess the effect of these factors.

There are only a few human remains in the collection. These are not from discrete burials but represent bones picked up at random at the site. Bioarcheologist Javier Urcid, formerly of the Department of Anthropology Repatriation Office in Smithsonian's National Museum of Natural History, presents the analysis of these remains in chapter 9.

Throughout the discussion, specific objects are referred to by catalog number. For this collection it became necessary to assign subnumbers to refer to specific items within larger lots. Although each object could not be considered separately (there are nearly 25,000 individual objects, including beads), artifacts were divided into subunits that would be analytically meaningful. Therefore, catalog numbers include my subnumbers, prefaced by "s" in cases where there is more than one object or entry per catalog number.

4

Containers

April K. Sievert

The Smithsonian collections from Spiro include containers and container fragments of ceramic, shell, stone, wood, and basketry. Baskets and basket fragments were found throughout the Craig Mound and will be included with the chapter 5 treatment of textiles. Ceramic vessels include a few whole pots and numerous sherds. In far greater numbers are containers made from the shells of large whelks of the genus *Busycon*, a univalve that inhabits the Gulf of Mexico.

CERAMICS

Style

Ceramics of the Harlan and Spiro phases have been well described (Bell, 1953; Suhm et al., 1954; Brown, 1971b, 1996; Rogers, 1980 Bell, 1984; Fischbeck et al., 1989). Descriptions of ceramics must account for the variability inherent in typologies, the descriptive criteria used, and the differing opinions of analysts. The typology used here follows Brown (1971b, 1996) and Rogers (1980). James A. Brown (Northwestern University), James B. Griffin (National Museum of Natural History), and J. Daniel Rogers were also consulted regarding ceramic classification. Because ceramics from the WPA excavations at Spiro had been classified by Brown as part of his work, an attempt was made to place sherds from the NMNH collection into the same classificatory scheme to maintain comparability between these two collections.

Variables shown below serve to characterize the regional ceramic styles. Nomenclature and criteria used are summarized in Figure 4.1. Variables noted include the following:

1. Vessel form is the form of the vessel in respects to three different shapes, namely, bowl, jar, or bottle. Subcategories describe the kind of bowl or jar, e.g., carinated. The presence of slip is an indicator that was useful in deciding vessel form on the basis of body sherds. According to J. A. Brown (personal communication, 1992) jars were not slipped, whereas bowls were. Therefore, for slipped body sherds, a designation of bowl is reasonable, especially if the slip occurs on

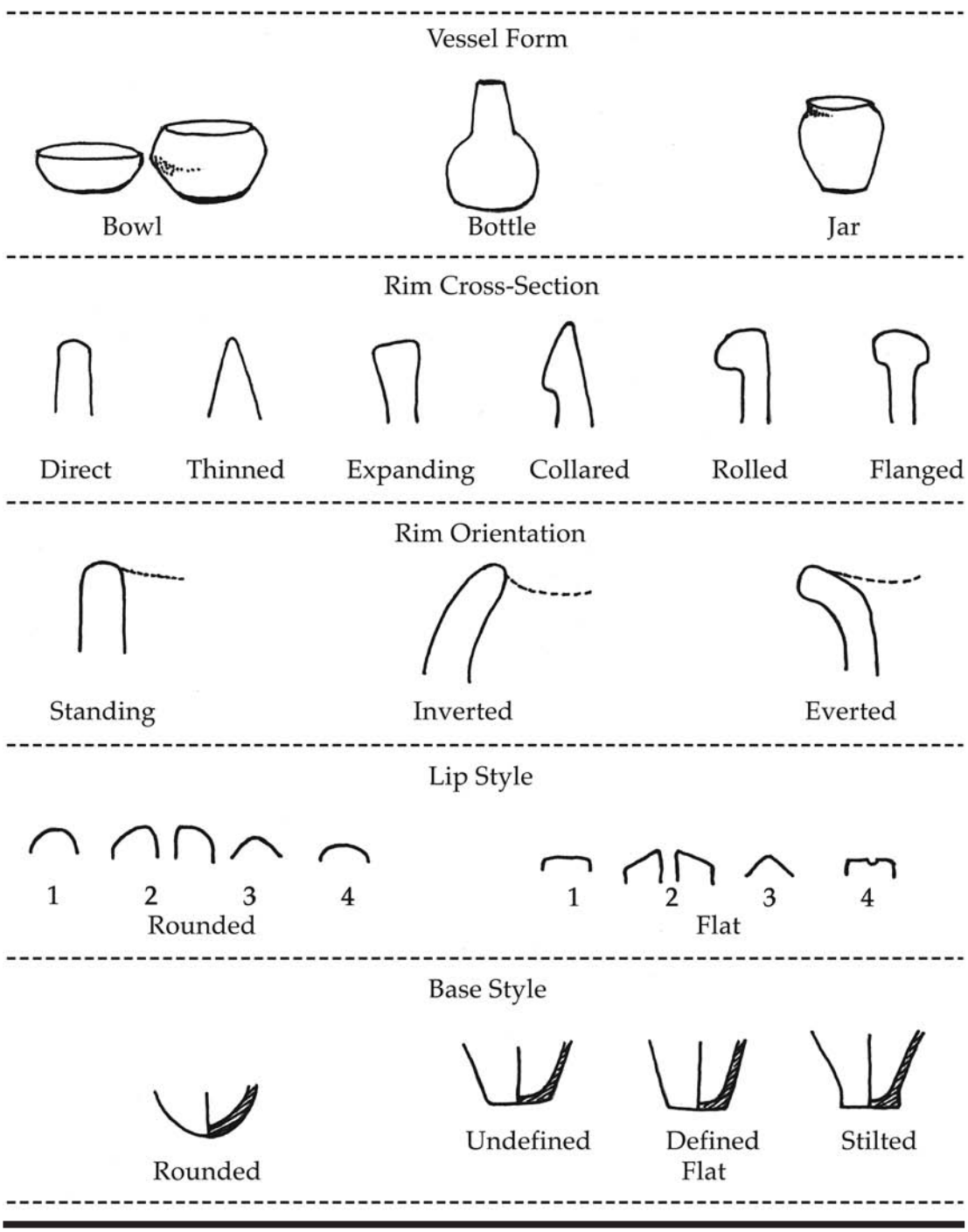


FIGURE 4.1. Ceramic attributes and key. After Brown (1971b:fig. 2; 1996:333).

both faces. Bottles can have slip only on the outer surface, and bottle sherds will not be smooth on the inner surface.

2. Rim cross section is the shape of a cross section of the rim.

3. Lip form is the method of finishing off the lip, either flat or round, with variations shown in Figure 4.1.

4. Rim orientation indicates rims can be standing, inverted, or everted.

5. Bases can be either flat or round. Flat bases may have margins that are rounded, defined, or stilted. Round bases may be quite spherical, in which there is no appreciable change in arc from the body to the base, or they

may be truncated, in which case there is a change in direction for the body as it meets the base.

6. Surface treatment possibilities include slipped, smoothed, burnished, and polished, with decorations that are incised, engraved, and painted.

7. Color can be useful for distinguishing pastes and for analyzing firing.

8. Paste composition can be characterized according to texture: fine, medium fine, medium, medium coarse, and coarse.

9. The temper composition is really apparent temper because petrographic analysis has not been done.

10. Wall thickness can be useful for distinguishing between ceramic styles or vessel forms when the pastes are similar.

11. Size is a useful indicator of vessel function and is relevant to an understanding of pottery manufacture.

Table 4.1 shows the number of sherds, weights, and mean wall thickness recorded for the various ceramic types.

Raw Material

Raw material is divided into two analytical components, paste and temper. In most cases the paste is fine-grained grayish clay. Temper can include grog, grit, bone, and shell with inclusions of charcoal, sand, mica, and shale. Brown (personal communication, 1992) sees ceramics with sand in the paste as exotic. There were several sherds with sand in the paste, some of which are probably truly from the Spiro mounds. There are others with

TABLE 4.1. Sherd counts, measurements, and stylistic references for the various ceramic types. A dash (-) indicates that data are not available.

Style and subgroup	Number sherds	Mean wall thickness (cm)	Total weight (g)	Stylistic reference(s)
Grog tempered				
Williams Plain	23	1.14	825.2	Brown (1996:343); Rogers (1980:150)
Leflore Plain	19	0.62	426.6	Brown (1996:346); Rogers (1980:153)
Smithport Plain	1	0.56	809.9	Brown (1996:348)
Undifferentiated plain	34	0.71	865.4	Brown (1996)
Undifferentiated incised	3	0.61	31.1	Brown (1996)
Crockett Curvilinear Incised	6	0.58	582.4	Brown (1996:358–359)
Pennington Punctate	2	0.62	29.0	Brown (1996:360)
Friendship Engraved	1	0.66	42.9	Brown (1996:376)
White Engraved	1	0.74	-	
Haley Engraved	1	0.56	74.3	Brown (1996:377)
Hatchel Engraved	1	0.64	109.3	
Slipped				
Poteau Plain	34	0.80	1,802.9	Brown (1996:405)
Sanders Engraved	6	0.77	431.7	Brown (1996:403)
Sanders Plain	109	0.77	2,121.9	Brown (1996:401–403); Rogers (1980:154)
Sanders Plain/Old Town Red	26	0.69	1,249.1	Brown (1971b, 1996:404)
Sanders Plain/Clement Redware	2	0.61	196.5	Sanders: Brown (1996); Clement: Brown (pers. comm., 25 Mar 1992)
Undesignated bowl	1	0.72	637.2	
Undesignated slipped	4	0.78	36.0	
Shell tempered				
Woodward Plain	20	0.80	770.4	Brown (1996:389); Rogers (1980:157)
Effigy	2	0.65	92.0	
Undifferentiated plain	4	0.56	41.4	Brown (1996)
Undifferentiated incised	1	0.55	13.8	Brown (1996)
Other				
Southwestern	6	0.56	225.0	
Polychrome	1	0.78	33.0	
Unclassified	5	0.55	266.7	
Glazed	1	0.72	21.0	
Total sherds	**314**			

extremely sandy pastes that appear to be from pots of the Puebloan Southwest and therefore are unlikely to be from Spiro at all.

Manufacture

With the exception of a tiny pinch pot (448930), the ceramic vessels are built by coiling. Walls are generally well smoothed, and most are burnished or even polished to a high sheen. Slipped vessel surfaces are burnished as well. Some of the pots are evidently quite large, as suggested by the low arc of curvature for some large body sherds. This is especially true of Sanders Plain. Handles and adornos are modeled.

Use

Some pottery in the collection exhibits signs of use, indicated by residue on the inner surfaces of the sherds. The whole pots do not appear to have been heavily utilized. One bottle has a worn patch on one side, and a base contains green pigment. Utilitarian pots used intensively will tend to break preferentially over wares that are less intensively used. Therefore, whole pots probably represent the less utilitarian among the ceramic wares.

The collection contains six complete vessels and three more partial vessels. Vessels complete enough for vessel dimensions to be measured are listed in Table 4.2. Vessel cross sections are shown in Figure 4.2. Three of the complete vessels, the carinated bowl designated White Engraved, the gourd-form bowl, and the Smithport Plain bottle are unique in that there are no sherds from these styles, just the complete vessels. There are numerous fragments from red oval bowls. (See the specific sections for Sanders Plain and Old Town Red for a discussion of classification of these oval bowls.)

Grog-, Grit-, and Bone-Tempered Types

These types were the most numerous and the most varied in style and decoration. They include plain, incised, and slipped wares.

Williams Plain

This is a relatively thick, grog-tempered ware. In three cases, the temper also contains grit, bone, and small amounts of shell. For the four sherds for which the rim orientation could be estimated, three are everted and one is standing. The lips are flat or rounded and are either rolled, thinned, or direct in cross section.

Color for Williams Plain is highly variable, with hues ranging from light yellowish brown to very dark gray and black. Included are reddish browns and various shades of brown and gray. The colors cluster around a hue of 7.5 YR in the Munsell soil color chart.

One partial vessel is probably Williams Plain (448648 and 448643). This vessel is a globular jar having a flat base and everted rim. It has the form of a restricted jar (see Table 4.2) with an everted rim. The bowl is heavily coated with residue that appears to have been heated. Along a broken edge are crystals of unknown composition. The temper in some cases appears to contain a small amount of shell or shell-tempered grog.

TABLE 4.2. Characteristics of complete vessels in the National Museum of Natural History (NMNH) collection. A dash (-) indicates not applicable.

Style	Form	Length (cm)	Diameter (cm)	Height (cm)
Crockett Curvilinear Incised	Cylindrical jar	-	11.53	9.58
Undesignated	Spouted bowl	21.5	12.38	16.80
Sanders Plain/Old Town Red	Oval globular bowl	16.8	11.87	7.69
Sanders Plain/Old Town Red	Oval globular bowl	18.0	11.80	8.00
Sanders Plain	Oval globular bowl	16.7	11.10	7.50
Smithport Plain	Bottle	-	16.40	23.90
Williams Plain	Restricted jar	-	8.76	8.37
White Engraved	Carinated bowl	-	24.50	14.20
Undesignated	Pinch pot	-	2.33	1.83

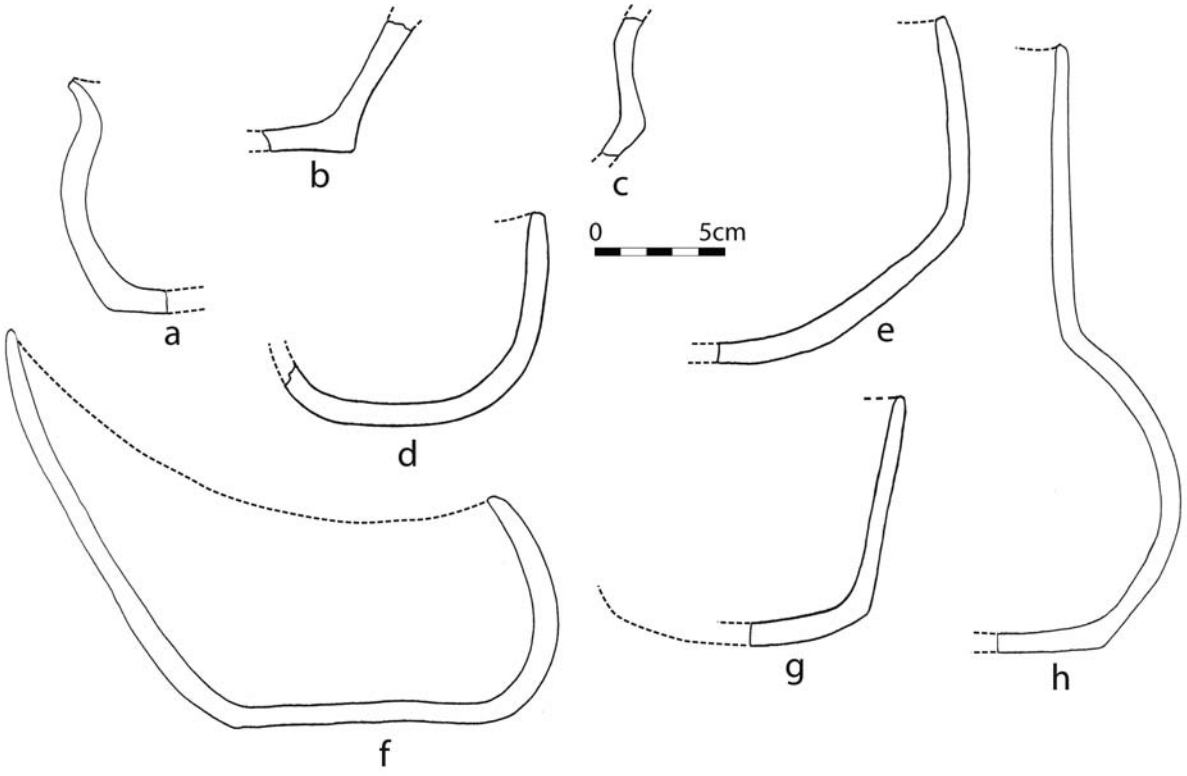


FIGURE 4.2. Ceramic vessel profiles: a, Williams Plain (448948); b–c, Williams Plain, base and carinated body sherds from two different vessels; d, Sanders Plain oval bowl (448641s03); e, White Engraved bowl (423148); f, Coles Creek gourd-form bowl (423145); g, Crockett Curvilinear Incised bowl (423147); h, Smithport Plain bottle (423144).

Leflore Plain

Similar to Williams Plain in paste, this ware is generally thinner and the colors lean toward grays and black. Surfaces tend to be burnished as opposed to merely smoothed. Vessel forms include bowls and jars. The five rim sherds demonstrate that the lip cross section is direct, and the orientation of the rim is either standing or everted. Lips can be either flat or rounded. Temper contains a bit more grit, bone, and sand than does the Williams Plain. Differentiation between Williams and Leflore Plain wares were made on the basis of wall thickness and surface treatment. Table 4.1 indicates that the mean thickness for Leflore Plain is nearly half that recorded for Williams Plain.

Smithport Plain

One complete bottle (423144) is present (see Table 4.2). This bottle has a flat base, well-rounded spherical body, and a long neck that is missing the rim (Figure 4.3a). On one side there is a pitted patch approximately 7 cm in diameter, apparently caused by the vessel being knocked or rested repeatedly against a hard surface. The apparent temper is grit with some bone. Firing clouds are present on the body, which varies in shades of brown and gray (hue 10YR on the Munsell soil color chart). The inner surface is dark gray. The outer surface is smoothed but not burnished. James A. Brown (personal communication, 25 March 1992) suggested that this vessel is possibly an import from Arkansas.[1]

Crockett Curvilinear Incised

One complete vessel (Figure 4.4), a base and rim sherd from another vessel, two refitted rim sherds, and a base represent this type. These vessels are low-carinated cylindrical bowls. Decoration includes incised and punctated design on burnished surfaces. The single complete vessel (423147) has a motif representing the apical end of a shell, and this motif is repeated four times (Figure 4.5a). These

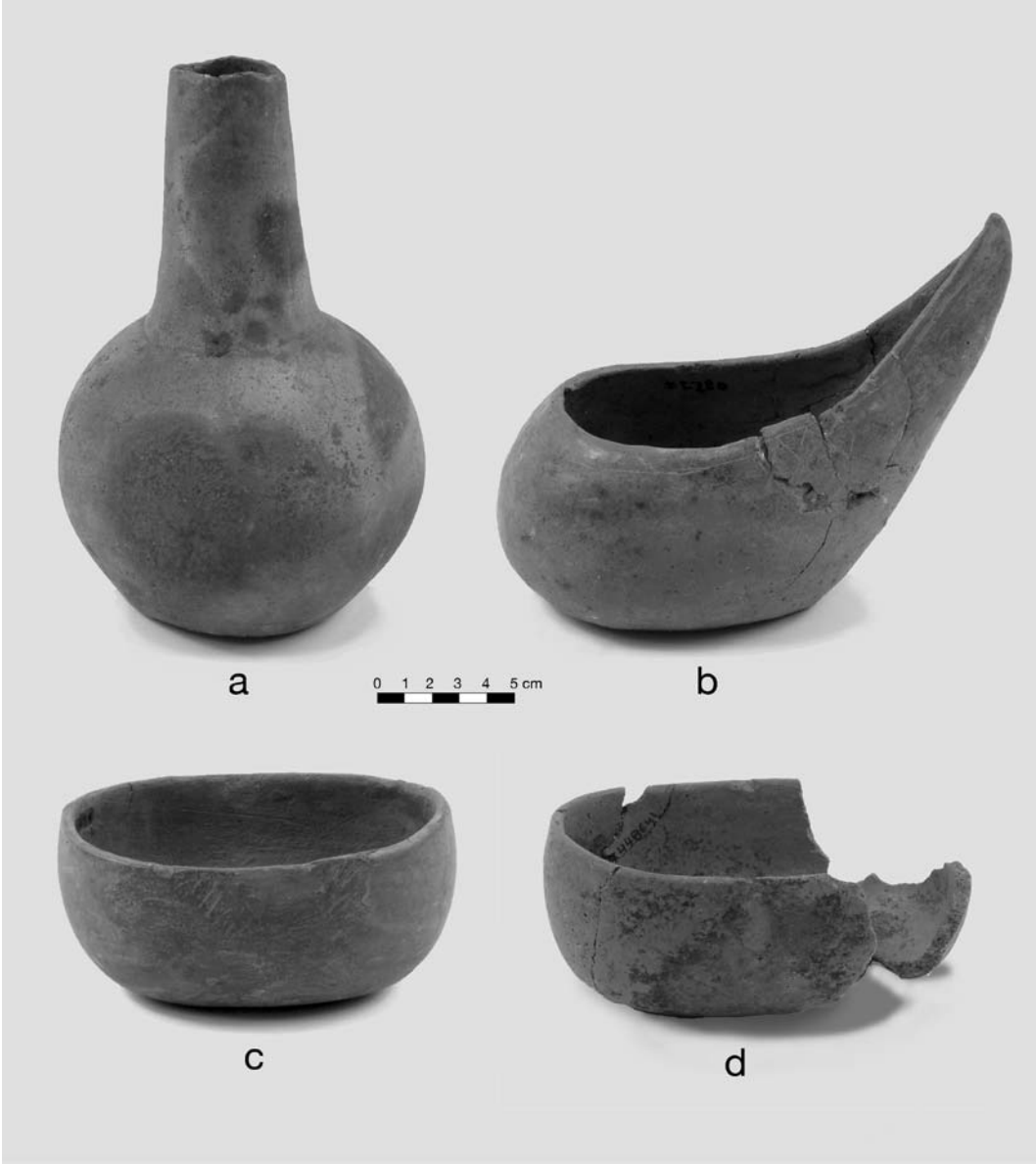


FIGURE 4.3. Whole and partial vessels: a, Smithport Plain bottle (423144); b, Coles Creek redware bowl with hatched decoration (423145); c, Sanders Plain oval bowl (448641s03 or 423146); d, Sanders Plain/Old Town Red oval bowl (448641s01).

incised circular motifs are not connected but are separated by a biconcave shape thickly punctated within. The knobs that would naturally occur on the apex of a whelk shell are simulated with punctation. The incising is shallow, but the punctations are deep and done using a reed tool with a maximum diameter of 3 mm. The design was punctated as the maker held the bowl mouth up and inserted the tool obliquely (see rollout diagram Figure 4.5a). The rim is circled with horizontal incised lines. The jar appears to have been mended and reconstructed, perhaps by the dealer who sold it. Tenacious black sooty residue is present on the inner surface. A different well-blended black residue covers mends and was likely applied by the dealer/reconstructor. One fingerprint is evident in the clay.

Other examples of Crockett Curvilinear Incised ceramics include two refitting pieces from a single bowl: rim sherd 448942s18 and base sherd 448644s01. This vessel is decorated with three horizontal lines around the rim, a curvilinear

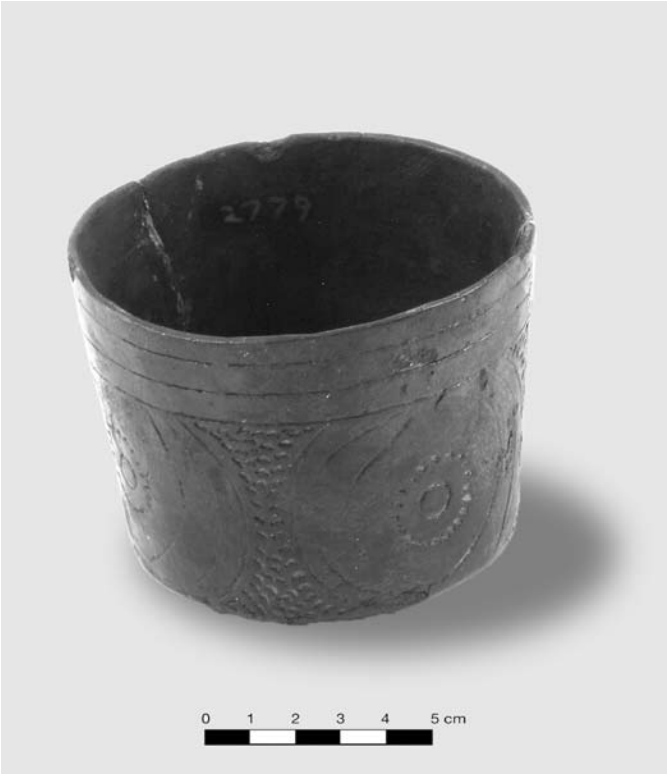


FIGURE 4.4. Crockett Curvilinear Incised bowl (423147).

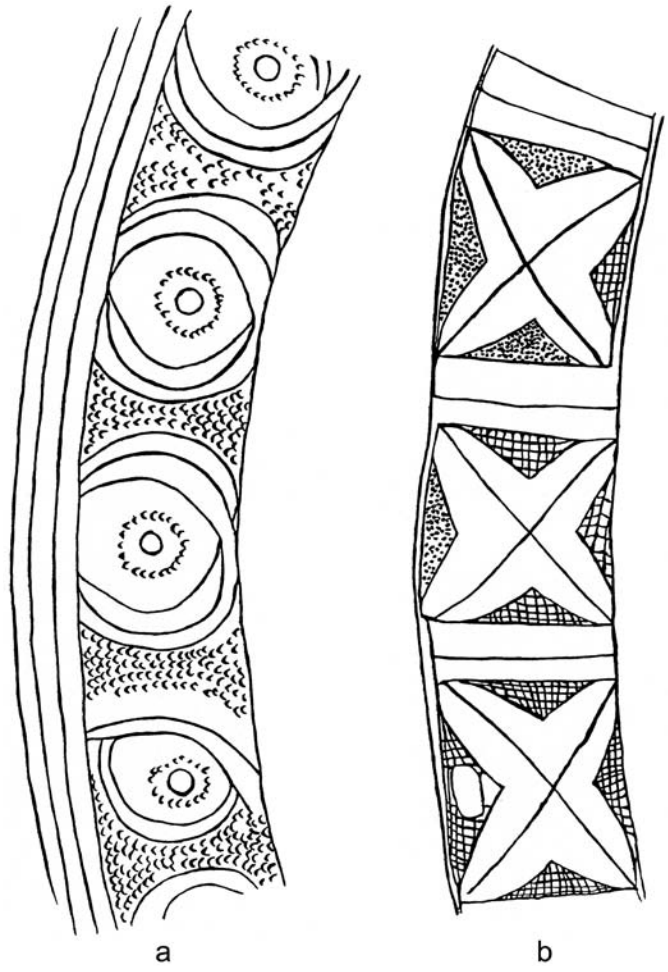


FIGURE 4.5. Rollout of design from two incised vessels: a, 423147, Crockett Curvilinear Incised; b, 423148, possibly White Engraved.

design, and punctations done with a stick. The surface is burnished. This vessel is notable because it contains a thick deposit of what appears to be glauconite (a greenish mineral) in the base. The green residue underlies a buff-colored silt-like sediment. A base sherd from a separate cylindrical bowl (448642s02) exhibits a similar greenish mineral deposit. The presence of mineral deposits such as glauconite, which are clearly nonedible materials, indicates that these cylindrical bowls were probably for something other than food processing. A ritual or craft use seems likely. Perhaps these were used for preparing pigments used in painting.

Pennington Punctate

This ware is represented by two refitted rim sherds from bowl 448642s17 (Figure 4.6). The type is indistinguishable from Crockett Curvilinear in paste, but there is some difference in incised design, with Pennington incising conforming to geometric and especially triangular elements as opposed to the circular and spiral patterns seen on Crockett. The example here carries design elements of both types. Diagonal elements laid out in a horizontal band around the rim are characteristic of Pennington Punctate. The concentric rings under this diagonal element are more characteristic of Crockett. Punctations are made using a reed that is set nearly perpendicularly to the surface, leaving a well-rounded small circle.

Friendship Engraved

This ware is distinguished by having small raised ridges on the neck of the vessel and is represented by only one sherd (448642s19). One of these ridges is clearly visible on the right side of this body sherd from a bottle. The grit-tempered ware is black on the outer surface and pinkish on the inner surface. There is also a brown stain on the inner surface. Tool and smoothing marks are visible on the inner surface. Across the little diagnostic vertical ridge there are two fine hatches that form part of the overall design. The

FIGURE 4.6. Pennington Punctate rim sherds (448642).

variety derives from southwest Arkansas, probably the Ouachita Highland area (Suhm et al., 1954:274).

White Engraved

This designation was given to a large simple-carinated bowl (423148) with a band of motifs formed around a cross or "X" pattern along the upper outer edge (Figures 4.5b, 4.7). The paste is gray clay with a medium-fine texture, and it is tempered with grit, charcoal, and very fine shell. The bowl has been reconstructed using some form of glue or filler mixed with coarse grog that is plastered over breaks. The joins have become dry and brittle. The surface is burnished, incised, and punctated. The horizontal block design consists of large X's in squares. The spaces between the X design and the square are filled either with hatching or tiny punctations done with a stick. Incised lines define each square, and there is an extra vertical incision between each motif. Faint rippled horizontal polishing toolmarks are present on the inside. This type is not listed by Brown (1971b, 1996) as coming from the WPA excavations at Spiro. This type designation is based on a suggestion from James A. Brown. There are no other sherds of this type. This bowl in particular may be relatively late and may resemble styles employed by Native Americans after the arrival of Europeans.

FIGURE 4.7. Carinated bowl, possibly White Engraved (423148).

Hatchel Engraved

Hatchel Engraved is represented by one sherd from the body of a bottle (448642s15). It has heavy, probably culturally relevant, residue on the inner surface. The outer surface is engraved and burnished, whereas the inner surface displays the rough surface and toolmarks typically seen on bottles. The design is without the parallel lines that Suhm et al. (1954:290) record as usually dividing the circular panels found on this type. Four parallel lines ring the neck, and one lower down defines the top of a decorated panel (Figure 4.8a). The area between circular motifs is filled with smaller circles, and the bands between motifs are filled with cross-hatching. Temper is grit and grog, and the color is a very dark brown (10YR3/2).

Haley Engraved

One large body sherd has the geometric pattern of bands of narrow parallel lines characteristic of Haley Engraved (Suhm et al., 1954:284). The design has a vertical orientation overall. Incised grooves are U-shaped and were probably executed using a finely pointed stick tool (Figure 4.8b). Tiny spurs extend out from the outermost lines of the L-shaped notched bands, making these lines appear thorny. The temper is grog, and the sherd is very dark gray. This relatively late style shows similarity to the Braden shell engravings that include ticked concentric ovals. Brown (1971b:129) writes that Haley is known from a post-Great Mortuary burial as well as a Great Mortuary burial and the general collection. The sherd shown in Figure 4.8b closely resembles the cylindrical bottle shown in Brown (1971b: fig. 18f; 1996: fig. 2–31f).

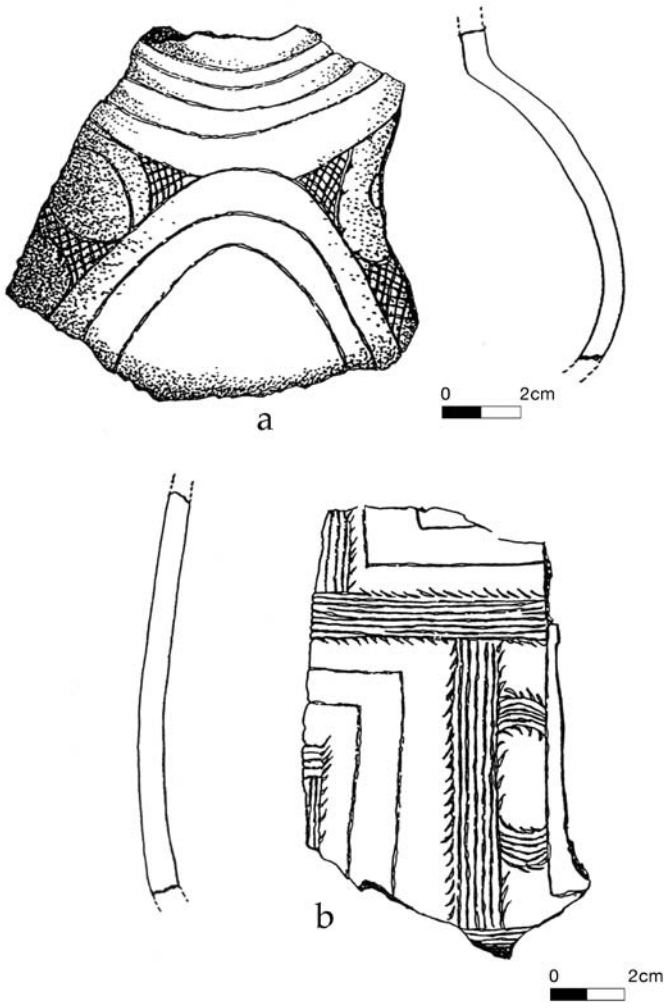


FIGURE 4.8. Incised sherds: a, 448642, Hatchel Engraved; b, 448642, Haley Engraved.

Undifferentiated Grog-Tempered Plain

This category includes sherds that were ambiguous or that did not fit into established types (*n* = 34). There is considerable variation in temper and paste within this group. Two refitting sherds (448642s03), for example, contain a considerable amount of charcoal in the paste along with grog. Some of the undifferentiated sherds display residues. Sherd 448642s09 is from a base and has a tenacious residue on the outer surface. Also, 448642s11 is coated on the inner surface with a thick dark reddish brown material. Although it could well be postdepositional, this material could just as well be associated with use or treatment. Within this undifferentiated group, pastes vary from medium coarse to medium fine in texture. Two sherds (448642s02 and 448642s09) contain some sand. Most of the sherds in this group have surfaces that have been smoothed or, in the case of nine sherds, burnished.

Undifferentiated Grog-Tempered Incised

Undifferentiated incised sherds are less common (*n* = 3). There are two sherds with curvilinear incised lines (448646s03), and they appear to be from the same pot. Another sherd (448642s20) has a dark gray paste of medium-fine texture and grog temper. The engraved design consists of four parallel horizontal lines. This rim sherd from a jar exhibits a thinned and rounded rim with an inverted orientation. It has some shell residue on its badly eroded exterior surface.

Shell-Tempered Wares

Woodward Plain

Woodward Plain is the most common type of shell-tempered ware in eastern Oklahoma. It is a plain, heavily shell-tempered ware without slip. The surface is usually smoothed and occasionally burnished (but burnished to a lesser degree than are some of the other types). Colors range from light brown to dark gray, with the preponderance of pieces in the gray category. Brown (1996:390) refers to Woodward Plain as a regional variant of Mississippian Plain, the ubiquitous shell-tempered ceramics of the southern Mississippi Valley. The most common shapes are jars and bowls. The Smithsonian collection includes 20 Woodward Plain sherds, comprising 16 body sherds, 2 base sherds, and 2 rims. Of the two rims, both are direct and standing. The lips are in one case rounded and the other case flat. Four of the sherds (515780s01) were recovered from the surface at Spiro and are not directly associated with the commercial digging in the 1930s.

Effigy

Two adornos or rim ornaments from pots are also present (Figure 4.9). One effigy is in the form of a human head with simple molded features. The face measures 6.6 cm long by 5.0 cm wide. The sherd was heavily tempered with shell that has since been badly leached.

The other is an effigy handle from a negative painted vessel. This resembles a duck's bill and is decorated in black pigment on a buff ware. The background is painted black, leaving a motif of unpainted dots. Perhaps this style associates with the style Neelyville Negative Painted, listed

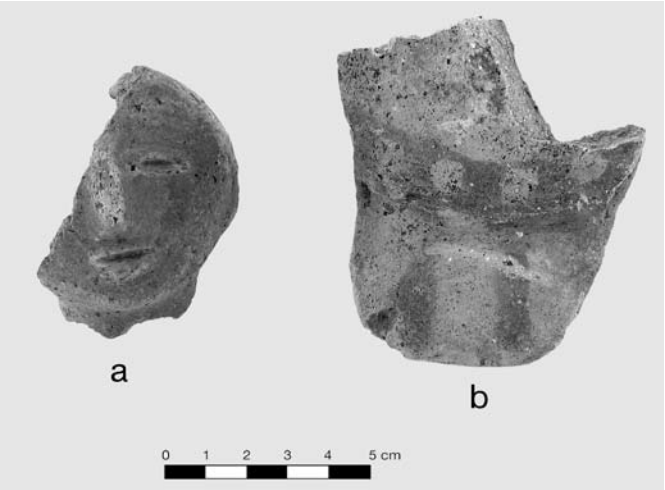


FIGURE 4.9. Effigy adornos: a, human head effigy adorno (448649); b, negative painted vessel handle (448643s08).

by Brown (1971b) as occurring at Spiro. This sherd is shell tempered, measures 8.25 cm long by 7.62 cm wide, and is 3.74 cm high. Several styles of negative painted ceramics are recorded for Mississippian contexts in the lower Ohio valley (Hilgeman, 1985). Hilgeman finds that negative painted wares were produced between AD 1250 and 1450 and that a black-on-red slipped ware predates black on buff. The example from the Spiro collection is black on buff. It was likely to have been imported because this type of decoration was used at relatively few areas, including sites on the Ohio River such as Angel and Kincaid, in the Cairo lowlands, and near Nashville (Hilgeman, 1985:195).

Undifferentiated Shell Tempered

Two contexts include unidentified plain shell-tempered ware (448642s12 and 448642s13). These are undesignated primarily because they are both badly burned, and charring may obscure details. Another, 448642s20, is an incised and punctated sherd that is tempered with shell. Sherd 448646s05 shows toolmarks on the inner surface and was perhaps from a bottle. The outer surface is smooth and black.

Slipped Wares

Poteau Plain

Poteau paste is similar to that of Woodward Plain, but the vessels are slipped. A number of sherds were slipped with deep red clay; others received a thin slip much lighter in color. For those with a light-colored slip, it was sometimes difficult to identify the slip as being distinct from the paste.

Undesignated Bowl

However, one bowl (423145) is a vessel that mimics the shape of a gourd or possibly a shell vessel (Figures 4.2f, 4.3b). Horizontal incising around the rim is reminiscent of the decoration often seen on Coles Creek Incised ceramics (Thorne and Broyles, 1968:110). The temper is grog, bone, and shell. The unusual characteristic here is a red slip that was applied to both the inner and outer surfaces. Although Coles Creek, a shell-tempered ware, is not customarily slipped, Brown (1971b) lists one Coles Creek vessel as bearing a red slip. The shape of the pot is that of a spouted vessel, with an incurved rim opposite the spout. A similar, though not identical, form can be seen in Brown (1996: fig. 2–20a), who describes it as Coles Creek Polished Plain. The piece, however, could be considered to be of undesignated style. Both Griffin (1952) and Hamilton (1952:41) point to an analog in a vessel pictured by Moorehead in his work on Cahokia (Moorehead, 2000: pl. XVII, fig. 6). The pot he shows from the Sawmill Mound site is more globular, and the spout has a clear break in the form at the point at which the spout extends outward.

Sanders Plain

Sanders Plain is a relatively fine ware with a medium finely grained paste and grog temper. Many pieces are heavily slipped in red. The designation was given to all nondecorated red-slipped, grog-tempered body sherds in the Smithsonian collection. Sanders Plain is well made, has medium-fine texture, and is tempered with grog and grit that can include a smaller percentage of shell. In most of the sherds represented, the core is black. The color is often quite brilliant at 10R4/8 on the Munsell soil color chart. Sanders Plain sherds make up the bulk of the ceramic collection. Neck sherds indicate that at least two bottle forms are represented (448641s19 and 448645s01).

Sanders Plain/Old Town Red

Thorne and Broyles (1968:78) list Old Town Red as a shell-tempered ware. Brown (1996:401) describes the ware as having either grog or shell temper. The vessel form represented is that of the oval globular bowl (see Brown, 1996: fig. 2–36b, for an identical vessel). Brown

differentiates between Old Town Red bowls of oval form and similar Sanders Plain bowls depending on the morphology of the base (Brown, 1971b:180; 1996:404), with Old Town Red bowls having a rounded base and Sanders Plain always having a flat base. The examples of oval bowls in the NMNH collection are not absolutely flat, nor are they truly rounded, a fact that emphasizes the problems inherent in creating and using ceramic typologies. James B. Griffin, National Museum of Natural History (personal communication, 1992) stipulated that Old Town Red has limestone in the temper—these bowls do not.

There are at least five such vessels represented. Three of them are complete enough to offer overall pot dimensions (Table 4.2). There is some variation in the relative roundness of the base, and several bases could sit without rocking. There is one complete (reconstructed) vessel (423146). A dull red material has been applied over the original pot surface, and it is difficult to tell how much of the actual pot remains. The whole pot is from Trowbridge's collection, whereas the fragmentary pots are from Meyer's. One base was refitted from four separate sherds in Meyer's collection, and the numerous other sherds might be refitted into more complete pots. This vessel type is the most numerous in this collection. The incidence of this type and many similar bowls is unlikely to be coincidental, and it is reasonable to speculate that they were part of a cache. Although it is debatable whether they are best designated Old Town Red or Sanders Plain, that they fall into such a narrowly defined pattern in form is not. The bowls are all very similar. Some contain residues, notably patchy black films that can appear on inner or outer surfaces.

Sanders Engraved

The paste is identical to Sanders Plain. Decoration most often consists of hatching along the rim. There are four rim sherds and two body sherds with portions of the incised rim intact (Figure 4.10a,c). Four sherds are engraved on the inner surfaces of the rim. These derive from vessels that have quite deep profiles (Figure 4.10a). The vessels have a very shallow curvature but still probably fall within the range for Sanders Engraved vessels.

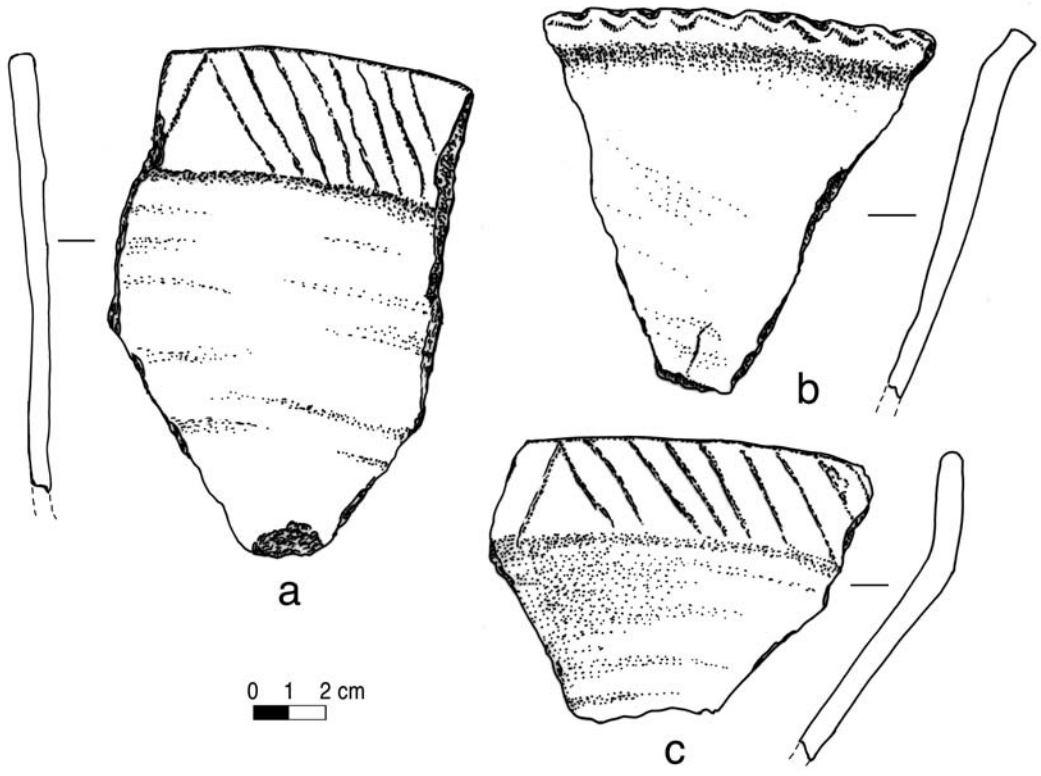


FIGURE 4.10. Slipped and decorated rim sherds: a, Sanders Engraved rim with engraving on inner surface; b, Clement Redware (448641); c, Sanders Engraved with engraving on outer surface.

They also have a black grog temper and paste identical to the other Sanders sherds. Two rim sherds (448642s12 and 448645s04) exhibit engraving on the outer rim surface and are from bowls that have standing rims (Figure 4.10c). The lip is direct and rounded both for the bowls with the engraving on the inner surface and for the bowls with engraving on the outer surfaces. Body sherds from these vessels that show no evidence of the engraving were collapsed into the Sanders Plain category.

Sanders Plain/Clement Redware

There are only two sherds of this type (448641s16), characterized by a deep profile and scalloped everted rim (Figure 4.10b). They appear to be from the same vessel. The temper is a black grog mixed with grit and a small amount of shell similar to that found in some of the Sanders sherds. The sherds are not from a carinated vessel form. The alternate designation as Clement Redware derived from personal communication with James A. Brown (25 March 1992).

Other Ceramic Pieces

Other ceramic elements include nodes, lugs, or handles. There is one strap handle from a highly polished red slipped vessel. The handle is 4.81 cm long by 3.44 cm wide, with a thickness of 1.89 cm, and consists of two refitted sherds (448647). An irregularly shaped, sand-tempered node or appliqué that is 2.87 cm long (448645s05) exhibits indentations and a yellowish red color. A miniature pinch pot (448930) no bigger than a fingertip (2.33 cm in diameter and 1.83 cm high) completes the inventory of miscellaneous vessel parts.

Other wares

In addition to these wares, there are sherds that appear to be from a far-removed archaeological context. In particular, there are six sherds from black-on-white painted vessels, white slipped and blackened sand-tempered wares (Figure 4.11). They are characteristic of Southwestern ceramics styles. Although it is possible that these sherds demonstrate interaction and trade with cultures of the American Southwest, it is also possible that these sherds are not from Spiro at all. In his study of over 15,000 sherds from the WPA excavations, Brown (1971b, 1996) does not record a single sherd of Southwestern construction or decoration. Because of the loss of provenience for this material as it was passed from antiquities dealer to collector, it is possible that some artifacts were reputed to have come from Spiro, when, in fact, they did not. All

FIGURE 4.11. Non-Caddoan Southwestern sand- and grit-tempered sherds with black-on-white design (423151).

of the Southwestern sherds were from the collection made by Harry Trowbridge, and he did not receive these sherds until six years after the commercial artifact mining ceased. The black-on-white sherds remain enigmatic.

One polychrome sherd from a bowl rim is present. Its source is unknown. The colors are red, orange, and black. This thinned rim has a flat lip and is inverted. The sherd is only about 5 cm wide, and relatively little of the design is visible. The decoration consists of a red rectilinear design outlined in black against an orange field. The color of the sherd interior is light red, and the paste is gray. This sherd is of the same lot as the black-on-white material (423151s09). Cultural affiliation for this piece is unknown.

In addition, from the same lot (423151s10) there is a piece of glazed earthenware. The glaze is on the inner surface and along the rim on the outer surface. Again, the provenience of this sherd is questionable.

The final group recorded as unclassified consists of five sherds, two from Meyer's collection (448644s03, a base sherd, and 448645s05, an appliqué) and three from Trowbridge's (423151s08). The appliqué piece has sand temper without grog. It is globular in shape and has one deep, one shallow, and two irregular indentations. The exterior surface and paste are yellowish red; the interior surface is very dark gray. The back or bottom appears broken, as if it had been attached to something, hence the designation as an appliqué. The base sherd is black on the interior surface and in the core and very dark brown on the exterior surface. The surface has been burnished, and the paste is tempered with a mixture that includes grog, grit, and possibly bone. The three unclassified sherds from Trowbridge's collection include two rims and one body sherd of a smoothed, gray, sandy ware tempered with very fine grog. These two rims are everted. The three sherds are not typical of Mississippian ceramics from the region.

SHELL CUPS

Shell vessels make up the bulk of the Spiro collection (>130 kg). A minimum of 330 shells made up of over 915 fragments is present. Whole vessels had been given separate catalog numbers by the NMNH, whereas individual fragments were usually grouped into lots (e.g., Plates 1–11).

Joan S. Gardner examined shells in the Spiro collection in the mid-1970s. She performed necessary conservation measures and made a considerable effort to match similar shell designs and refit shell fragments. This was done partially in the context of the shell iconography study performed by Phillips and Brown (1978, 1984). Even after the original tracings of shells were made for the Phillips and Brown work, Gardner traced shell engravings at the Smithsonian and then forwarded those to Phillips, who was able to refit a considerable number of such designs. Gardner refitted many shells together and researched motifs represented.

Phillips and Brown (1978, 1984) discuss many of these shells in their work on the shell engravings and iconography. In some cases the various designs on the shells can be linked to designs on other media, such as pottery and copper (Brown and Rogers, 1989). Because the shell component of the Spiro collection provides such a rich and varied corpus of iconography, it has also been the best studied.

For the present study, shell fragments were grouped for analysis using several different criteria. If style could be easily determined, style was used; if style was uncertain but subject matter was specified, then subject matter was used (e.g., feet or feathers). If subject matter was not distinguishable, shell portion present was used (e.g., distal tips, apices). This applies especially to 448880, a lot of fragments containing 178 fragments that were combined into 44 different groups for analysis.

Condition and Conservation

Condition of shells as discovered by Joan Gardner is noted on her record cards. In many cases shells had yellowed because of the breakdown of old consolidants or conservatives. She removed excess polyvinyl acetate (PVA) with acetone that lightened the shells significantly, so that very few are found today that have yellowed.

The shells from the Trowbridge collection are in poorer condition than those from the Meyer collection. They are whiter, chalkier, and lighter in weight overall. (Refer to the section on columella pendants in chapter 7 for a brief discussion of possible causes for differences between the Meyer and Trowbridge collections.)

The unengraved shells in the collection had not been given the attention that the engraved shells received. Some of these were never treated, yet others have thick coats of a preservative that has yellowed (especially 448883). Those that have never been treated are chalky, flaking, and fragile. The best-preserved interior residues are found on unengraved shells. In many cases this interior residue is thick and powdery. It is likely that decreased handling of unengraved shells has helped to preserve this residue.

Raw Material

The prevalent type of shell used is that of the sinistrally whorled whelk, *Busycon sinistrum* (catalog

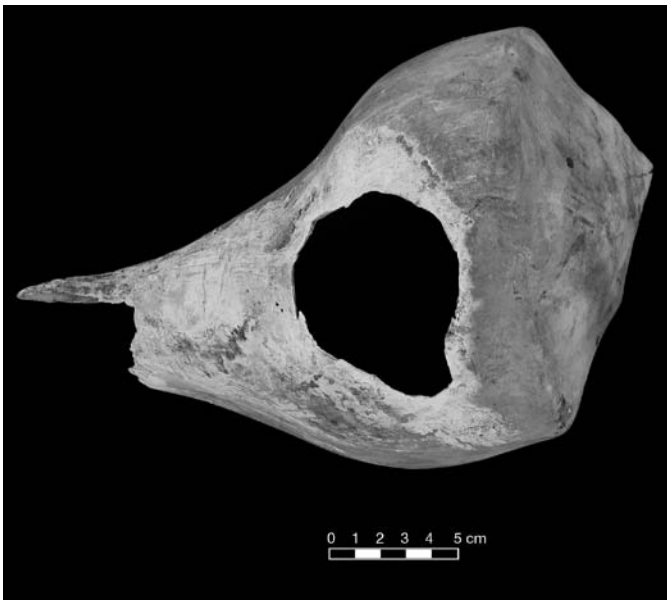


FIGURE 4.12. *Busycon* or whelk shell, outer surface (542538).

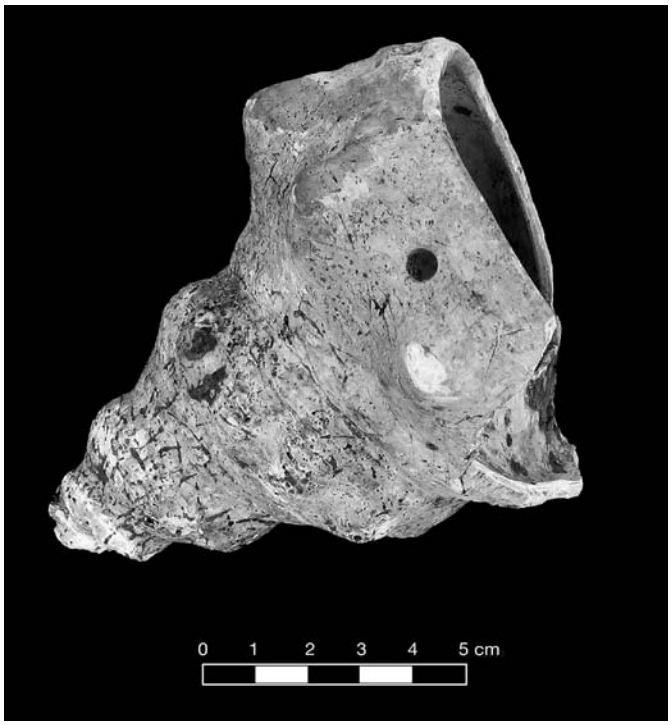


FIGURE 4.13. Engraved *Pleuroploca* or conch shell (423288).

notations use the nomenclature *B. contrarium* Conrad 1840 or *B. perversum* Linné 1758). See Figure 4.12. The taxonomy of the genus *Busycon* has been reexamined for archaeological purposes (Pendergast, 1989:105) on the basis of a revised taxonomy developed by malacologists (Turgeon et al., 1988). The name *Busycon pulleyi* Hollister 1958 now subsumes the classifications *B. perversum* Linné, *B. perversum pulleyi* Hollister 1958, and *Fulgur perversa*. This group includes the prickly whelk found in the Gulf of Mexico from just east of the Mississippi Delta to the Yucatan. The name *Busycon sinistrum* Hollister 1958 now refers to the lightning whelk, previously called *Busycon contrarium* Conrad 1840. This mollusk ranges from New Jersey to the Gulf of Mexico. In the Gulf of Mexico, it blends with *B. pulleyi*. The lightning whelk ranges in length from 10 to 40 cm and is the shell primarily used for the Spiro shell engravings. It appears that the left-handed whorl is the typical pattern for such whelks.

Several pieces of *Pleuroploca gigantea* (conch) are present (Figure 4.13). *Cassis madagascarensis* shells were utilized especially for gorgets, for which they were cut, the ends smoothed, and the edges incised with small, hatched lines. Shells other than *Busycon* are rarely engraved, although there are fragments of *Pleuroploca* in the collection that have been engraved (423288).

Residues

Basketry impressions are frequently visible on the outer surfaces of the shells (n = 28). In most cases the residue is located on the body of the piece, that is, on the underside when the shell is held as a vessel (Figure 4.14).This location indicates that shells were probably placed in the mound with the cup opening up. In one case the opposite is true; 448860 exhibits textile-based residue along the edges, as though the vessel were seated in a thick pile of fabric, with the shell's design showing.

On the interior surface of some of these shells are residues that appear to have resulted from evaporating fluids. The result is a series of rings on the inside. Usually, the residue found in these shells resembles a silty sediment and is light brown or yellowish brown (Figure 4.15). In other cases darker brown stains are visible on both inner and sometimes outer surfaces. These stains appear to be the result of a natural taphonomic process operating on the shell. There is also a very different residue that is distinctly yellow in color. It usually stains the inner surface and is not found on the outer surface. Where thin, it resembles a dull stain; where thicker, it appears grainy and in some

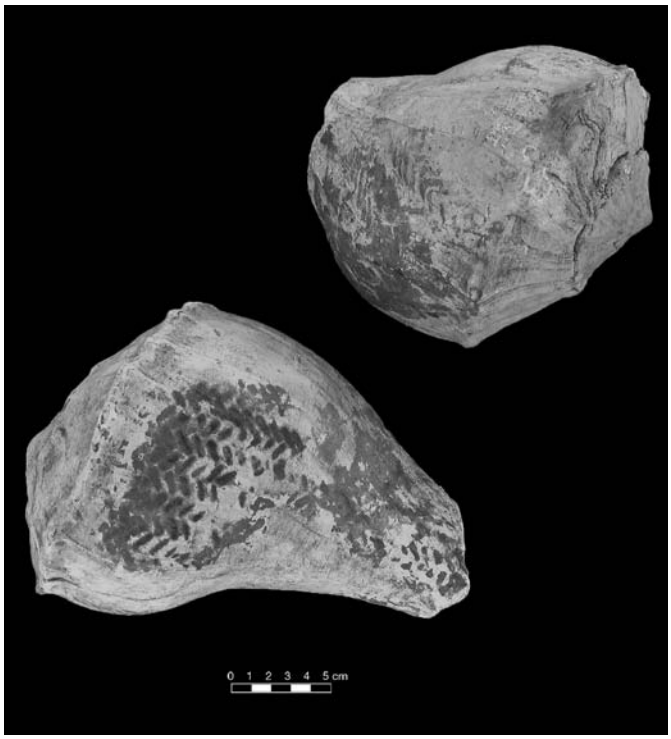


FIGURE 4.14. Unengraved shell cups with exterior basket impressions (423232s02 and 423232s04).

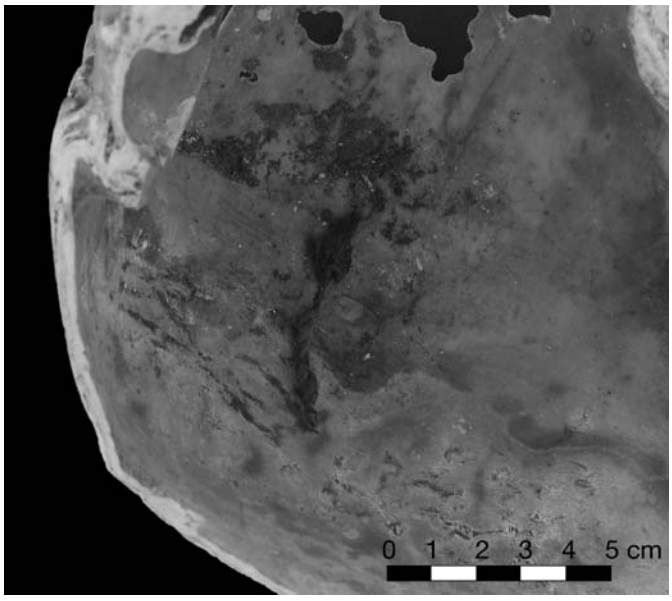


FIGURE 4.15. Residue on interior shell surface (423239).

areas resinous. A different powdery brown residue occurs on some unengraved shells.

Cup 423269 is a Braden C style vessel with red grainy or crystalline residue on the inner surface. The surface is stained as though a fluid evaporated. This could be a culturally relevant residue.

Manufacture

Phillips and Brown (1978) describe in depth the manufacture of the shell containers. In making a shell cup, the columella and a portion of the outer wall are removed (Figure 4.16). Usually, the right side of the shell (when viewed from the outer side with the apex positioned at the top) is left unworked. The shoulder is sometimes cut away at the opening. Other times the shoulder is left intact and then cut to remove the columella. This occurs along the body wall approximately 1 cm from the shoulder.

The surface is usually ground smooth. Most *Busycon* have some form of ridge or knobs occurring at the shoulder. Knobs are usually removed, although in rare cases, these have been modified as a part of the decoration. In one case these knobs were incorporated into the design.

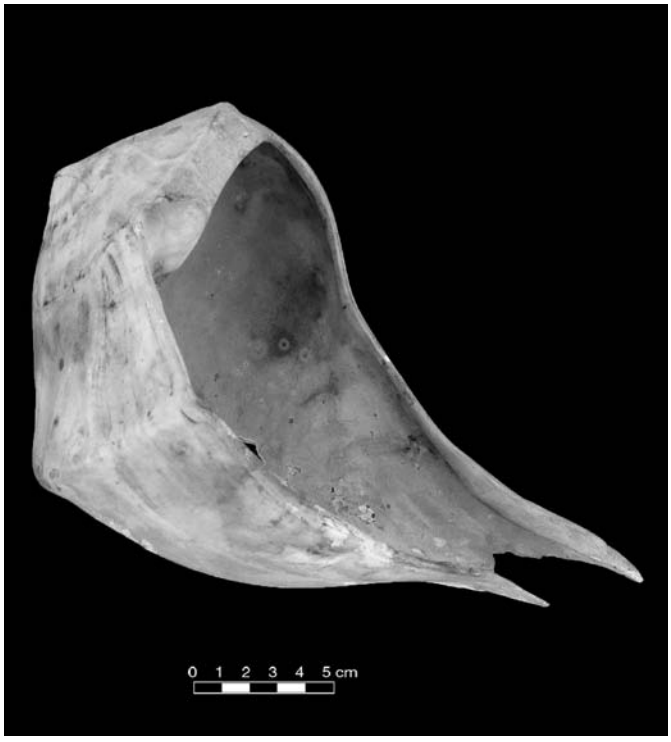


FIGURE 4.16. Well-preserved cup showing form of finished artifact (542538).

Human faces were engraved around the knobs such that the knobs became the noses for the faces. In some cases, toolmarks from grinding the surface can still be seen. For cups, the inner surface is never decorated; for gorgets the inner surface is often decorated.

Engraving or incising appears to have been done using a sharp tool, probably lithic, given the V-shaped profile of the engraved lines. Shell is a hard and brittle material and, unless fresh, is difficult to work. Many of the incised lines are typified by false starts and overcutting, typical results of working rounded surfaces using chipped-stone cutting tools (Figure 4.17). In most cases the designs are incised; however, in a few cases the designs have excised elements. It appears that a dark pigment was rubbed into the incised lines in order to make the design stand out.

Holes are often drilled into the distal and/or apical portions. These are consistently drilled from the outside through to the inside. On the apex, the hole is usually located in the center of the opening that has been cut to create the vessel. It is usually approximately 1 cm in toward the apex from the rim. More rarely, this hole is on the body wall between the shoulder and the rim. Holes drilled through apical and distal end range in diameter from 0.3 to 0.7 cm. The mean is 0.47 cm, suggesting that medium to medium-large drills were used. The drills were probably stone because the holes are either contracting or, more rarely, biconical. Furthermore, shell is a hard material and not easy to drill. It would require a durable drill bit. It is possible but by no means certain that abrasives were used in the drilling process.

FIGURE 4.17. Detail of incised surfaces showing toolmarks and overcutting (448858).

Use

These cups appear to be well used. In many cases the interior surface exhibits fine, long striations as though the inner surface had been scoured. Often, these striations underlie residue or sediment, testifying to the prehistoric origin of these damage lines. Inner surfaces are naturally smooth, and there seems to have been little reason to scour the inner surface in the context of manufacture.

On one Braden B fragment (448880s29) there is a curious arrangement of four tiny holes drilled around a larger worn hole (Figure 4.18). Perhaps these holes are the vestiges of an attempt to patch a cup that developed a leak. This arrangement implies reuse, but as of yet there is no way of knowing how long the use life of one of these vessels might be. They are breakable and might easily be damaged during use. Most of the shells, even nearly complete ones, lack the distal tip. Few unattached tips are present in the collection. It is possible that this type of breakage typifies use damage when a heavy vessel containing fluid was

FIGURE 4.18. Drilled holes in shell apex perhaps indicating a repair (448880s29).

held by the weakest part, the tapering handle. If such damage had occurred during use, it would follow that distal tips might be discarded elsewhere. However, the artifact miners could easily have overlooked distal shell fragments even had they been present in the Craig mound. Overall, the best indicator of use may be the residues remaining in the vessels.

Hamilton (1952) mentions that unengraved shell cups were reported to have held clay pigment. Such a use is intriguing and plausible. A spongy, powdery brown residue found on unengraved shells does appear claylike. Another pigment, probably glauconite, is present in the collection from Spiro, but none was noted on the inner surfaces of unengraved shells. Instead, it is found on the interior surfaces of ceramic vessels.

Taphonomy

Many shells have holes in varying sizes on one or more faces. Usually, these holes are accompanied by greater deterioration of the shell. These holes were caused either by intentionally punching holes in them (perhaps in an effort to ceremonially kill the objects) or by preferential deterioration of those areas that were in contact with the ground surface on which the shells rested (Figure 4.12). If the shells were simply broken, then there seems to be no reason why these areas would have incurred greater deterioration in areas adjacent to the holes. Most appear worn through, not punched through. If this is the case, the location of holes might be indicative of the positions and orientations that the shells may have assumed in the mound, i.e., resting on the rounded surface. This wear pattern corroborates information from basketry impressions that imply the shells sat with the openings facing up. Worm action is also indicated.

Design Styles

Each engraved shell was given the style designation assigned by Phillips and Brown (1978, 1984). There are six possible styles based on two major schools with three phases in each. The primary division is between the Braden and Craig schools. These styles are distinguished according to the way in which the space available on the shell surface is used by the artist, the iconographic elements, and workmanship. Several items in the NMNH collection are not pictured in Phillips and Brown, and these were assigned to styles where possible (Table 4.4).

Braden style engraving differs from Craig in the execution of the incising. The overall appearance of Braden A and B style engravings is one of greater control. There is little overcutting where lines that were meant to stop at a given boundary cross the boundary limit. Craig style engraving is replete with this characteristic of execution. With Braden style engraving, areas to be filled or hatched were incised first, and then the outlines were done. The best way to achieve such control, based on my experiments with shell engraving, is to outline the area to be filled with a partially carved line. This line clearly marks a delimiter and provides a natural stop for a tool meeting the incision from another direction. Then, the interior of the design element can be incised. Finally, the outline areas are finished and deepened, thereby eradicating many small overcuts made when the interior portions were carved up to the outline. With Braden style engraving, areas to be filled or hatched do appear to have been completed first, and then the outlines were done. With Craig engraving, lines tend to be shallower and narrower, and there is much less excising. Excising is common with Braden style engraving, especially with the earliest, Braden A.

Apparently, the Braden and Craig styles are more or less contemporaneous. Within each school the style of execution changes over time. Braden A and Craig A styles contain the most detail. Designs are intricate and often very finely done. Human figures are common among the motifs. During Braden B and Craig B, designs become bolder and less detailed. Animal figures abound. Braden B is devoid of full-bodied humans. Craig B offers a plethora of stylized animals, fantastic figures, and composite animal/human creatures. During Braden C and Craig C the styles become the simplest. Highly stylized patterns, often poorly executed, are frequent. Braden C examples appear crude compared to Braden A. Craig C designs are bold, large, and simple. They adhere closely to specific themes. Craig C is usually sketchy, and the execution shows much overcutting and tool slippage. However, when a desired line was actually cut, it was deepened and widened to the point where the slippage seems inconsequential or hardly noticeable.

There is variability in the execution of incising shells that extends beyond style boundaries. Sometimes there is variability on a single vessel, with some lines being deep and confident and others being sketchy.

The cups present in the NMNH collection are subdivided into the groups shown in Table 4.3. Maximum size values are included to give the upper size limit. The maximum sizes for each group have been averaged to produce an average upper limit on size. Maximum values are given in order to emphasize just how large these artifacts are.

The total minimum number of individuals (MNI) of 330 underestimates the total number of separate shell

TABLE 4.3. Characteristics of shell cups in the NMNH collection.

Style	Fragment count	Shell MNI [a]	Weight (g)	Maximum length (cm)	Maximum width (cm)	Maximum height [b] (cm)
Braden A	115	38	8,667.2	30.0	18.5	11.5
Braden B	63	35	14,182.7	35.2	20.2	13.0
Braden C	30	20	9,421.2	33.2	22.3	16.2
Craig A	90	29	6,126.3	33.4	18.4	12.8
Craig B	155	63	20,268.4	34.5	21.0	15.0
Craig C	57	41	22,449.2	34.9	21.0	14.3
Unengraved	230	80	46,072.1	31.3	20.0	12.8
Unclassified	121	18	4,668.4	24.5	19.8	11.8
Various	46	6	2,543.1	16.0	10.7	-
Total count or *mean value*	**907**	**330**	**134,398.6**	*30.3*	*19.1*	*13.4*

[a] MNI, minimum number of individuals.

[b] A dash (-) indicates data nonexistent or not available.

vessels represented. Some analytical units consist of shell fragments having similar designs. Each of these is counted simply as one vessel in the Table 4.3. Of the total MNI, 80 are unengraved, placing the estimate of engraved shells at 220. It is possible that there may still be matches among the shell fragments present. With the aid of Phillips and Brown (1978, 1984) a concerted effort was made to match fragments; however, it is possible that refits were overlooked.

Braden A

Thirty-eight entries fall under Braden A. There are many loose fragments in this designation. Meticulous execution of design and greater detail typify Braden A shells. Usually, shell designs in Braden A are not oriented according to the axis or surface area presented by a shell. Instead, motifs may be scattered at random across the surface. The shell apex is not treated as a separate plane. Rather, the design spills over onto the apex (Phillips and Brown, 1984:ix–x.) Humans are shown in naturalistic proportions. Often, the body is decorated with closely spaced hatching. Accessories are plentiful and highly detailed. Beads are usually rendered as spherical. Bilobed arrow headdresses are common.

Some of the more frequent themes include intertwined snakes, a motif referred to as "amphisbaena" by Phillips and Brown (1978) (Figure 4.19). Some snakes are shown from above so that only the dorsal markings show, but most are viewed from the side and exhibit two distinct bands of design, representing the dorsal markings and underbelly of the snake. In one case the design spills over onto the columella stump. Using the stump as part of the design field is extremely rare and occurs only with the Braden A intertwined snake theme cups (448838).

FIGURE 4.19. Braden A style entwined snake motif (448791).

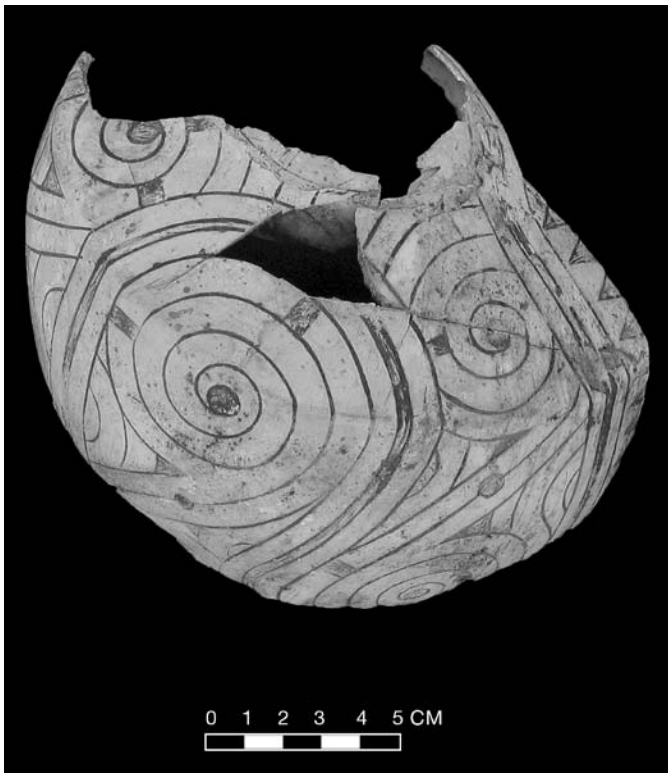


FIGURE 4.20. Braden A style cup showing spiral designs similar to Spiro Engraved ceramic styles (448827).

There are also motifs that are similar to pottery styles, primarily Spiro Engraved (Figure 4.20). On these shells the entire surface is filled with spirals and curvilinear patterns. On another variety with geometric motifs, rayed concentric barred ovals and rectilinear designs referred to as Davis rectangles are present and are usually combined on the same shell. Sometimes these are bordered by a sawtooth pattern that runs along the rims.

Overall, the impression is of considerable detail and great skill in incising. The time spent in carving individual shells must have been considerable. Careful incising has created smooth curves, finely rendered circles, and deep excision of some design elements.

One of the more unusual motifs (448865) is a mortuary figure identified by his long, spindly, knobby, skeletal legs. The mouth is shrunken in death. Included in this figure is the only rendition of human genitalia seen on humans depicted on shells (Phillips and Brown, 1978: pl. 21). Again, the detail on this cadaverous form is finely rendered.

Braden B

These designs consist primarily of animal themes and include some human heads. No full human figures are present. There are 33 separately analyzed examples. Common iconographic motifs include broken maces, arrows, and bones. Disembodied human heads are frequent. Snakes and intertwined snakes are still present, but the style is less controlled and more variable (Figure 4.21). Birds and composite animals are also present. Some designs adhere to a horizontal layout. In addition, the apex begins to be treated as a separate plane and is incorporated into the overall design accordingly.

Cup 423257 shows two birds, one facing up, the other down (Figure 4.22). They have long beaks, and the feet are well detailed. A serpentine border design shows tails crossing at the distal tip. This is an example of orientation using so-called "court card" symmetry after the type of symmetry found on playing cards (Phillips and Brown, 1978: pl. 89). This layout is found also in Craig B designs.

Another interesting shell combines a number of motifs. Cup 448785 (referenced in Phillips and Brown, 1978: pl. 62, as 488880-B) exhibits human heads with forked and streaming eyes, bilobed arrows, ogees with streamers, maces, perforated pulley earspools, facial markings,

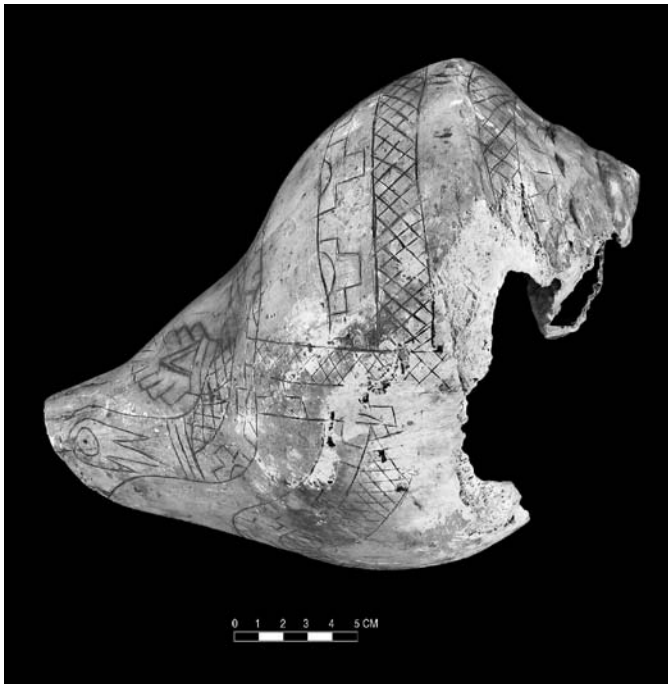


FIGURE 4.21. Braden B snake motif (423249).

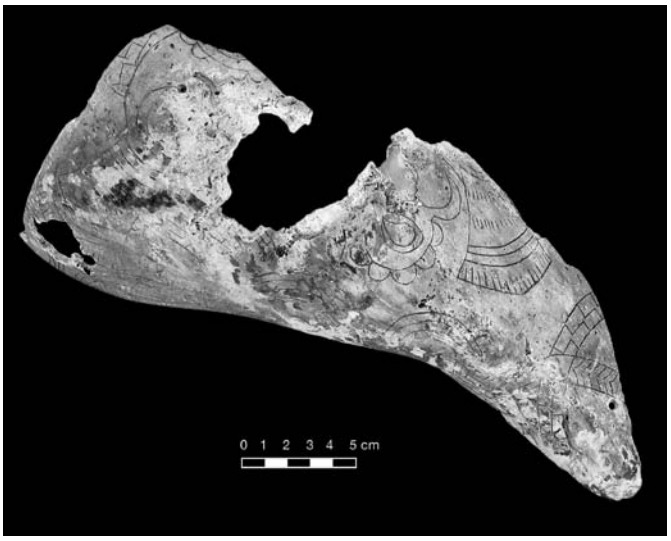


FIGURE 4.22. Braden B bird motif with court card symmetry (423257).

FIGURE 4.23. Mace, ogee with streamers, human head, and bilobed arrows on two sides of Braden B style shell (448785).

beaded forelocks, and a headdress. One mace is tied with a raccoon binding, and another has a tassel hanging from one of the protuberances on the top of its crown (Figure 4.23). Perhaps this is what these protuberances were designed for. Fiber or something adheres to the inner apical surface, and there are stains from fluid evaporation on the inner surface, but these have been scoured. At any rate, the motifs in Braden B designs are oriented toward weaponry and warfare.

Unfinished shells found their way into the deposit as well. For example, 423263 is a relatively small Braden B cup that is unfinished. The outer shell surface exhibits many striations. A snake figure is visible from only one body arc.

Braden C

These are crude, simple patterns splayed out over the shell surfaces. Execution is typically very poor with considerable tool slippage, overcutting, and jerky rendition of curves. The number of examples is less common. There are 20 separate data entries represented.

One Braden C cup (423259) has copper residue on the inner surface along the right edge. This cup had been resting on copper, a rarity among these shells. Instead, most seem to have been placed on basketry, away from copper, judging by the paucity of copper residue or staining on engraved shells.

Serpent designs are common, but the rendering is quite different from those done in Braden A style. Cup 448809 shows the popular entwined snake theme, but the craftsmanship is sketchy and simple (Figure 4.24). There is one unfinished snake cup (448793).

Scenes suggesting warfare continue. Cup 448809 is sketchily executed and almost appears unfinished. In the design a face hangs from a mace and has one eye outside on its forehead. Raccoon bindings are present on another mace. These are combined with snakes that are cross-hatched and intertwined. Feathers hang from both the

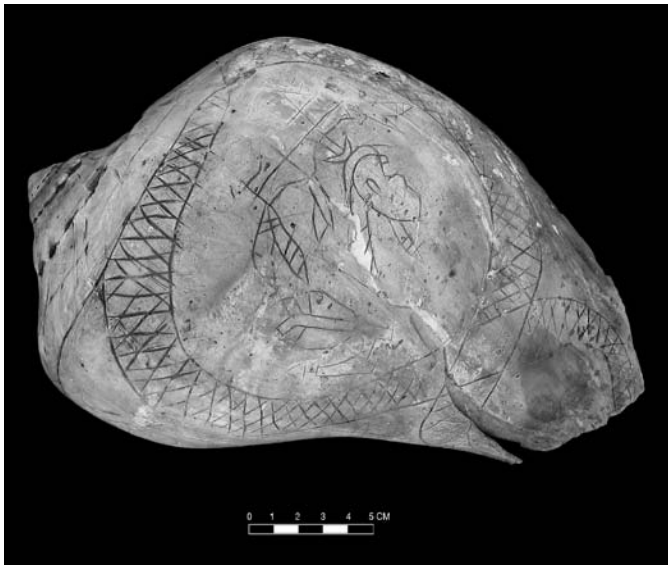


FIGURE 4.24. Snake and warfare motifs in Braden C style (448809).

maces and the head. Another cup in which a snake attacks a lizard (448830) may be metaphorical for warfare.

Scenes of death are present as well. Cup 448864 is unusual because it depicts a skull with hair. The execution is poor, with considerable overcutting and slippage. This shell exhibits the characteristic deep yellowish brown discoloration on the inner surface, as though some fluid sat here and altered the shell (Phillips and Brown, 1978: pl. 103).

One cup that is not featured in Phillips and Brown (1978) is 423252 from the Trowbridge collection. It may depict an armadillo and, if so, is the only such depiction known. The long-snouted animal appears alongside a bird in flight and displays four vertical lines on the body. These lines could easily represent the segmentation characteristic of armadillo markings. The four feet are shown as flag-shaped "hooves." Armadillos would not be unexpected in eastern Oklahoma.

Geometric patterns are not uncommon (Figure 4.25a,b). Spiral patterns like those found on the exquisitely carved Braden A shells are also present, but again, they are more simply rendered, with shallower incising.

Craig A

Craig A is the least numerous among the Craig style shells. Twenty-nine analytical units are present (cups or small lots of similar shell). Craig A style cups exhibit a fair amount of detail. Craig designs utilize the shape of the shell as a field for the artwork. Human figures are rendered naturalistically.

In one instance the shell is not merely incised, it is carved in low relief. This harkens back to the excision present with some Braden A forms. Cup 423296 features horizontal registers of human heads. The surface is well polished and there are no whittle marks. Raised carved beading (convexo-cylindrical beads laid end to end) separate registers of right-facing heads. This includes an apex (423296) and (423297) distal fragment (Figure 4.26). The apex has shallower relief, and the heads are frontal view, rather than profile. Phillips and Brown (1984: pl. 159) tentatively place them together, and the Trowbridge numbers are sequential. There are so few low-relief carvings that it would not be unlikely that they match. (For the present study, a fragment numbered 448846 was added to this context.) The heads so modeled present one of the rare representations of unperforated earspools among the depictions of people on the shell cups.

Other motifs include raccoon bindings, petaloid border treatments that frame portrait heads, crosses, and avian themes. The birdman theme is prevalent. For example, 448825 is a shell with a very ornate and complicated design showing a figure wearing three very long vertically hanging plumes (Figure 4.27). One knee is raised to the figure's right in dancing, and the arms swing to the figure's left. The character is quite animated. The man wears an apron that has a square plate in the center. Lines extending out from the plate could be hair decorated with convexo-cylindrical

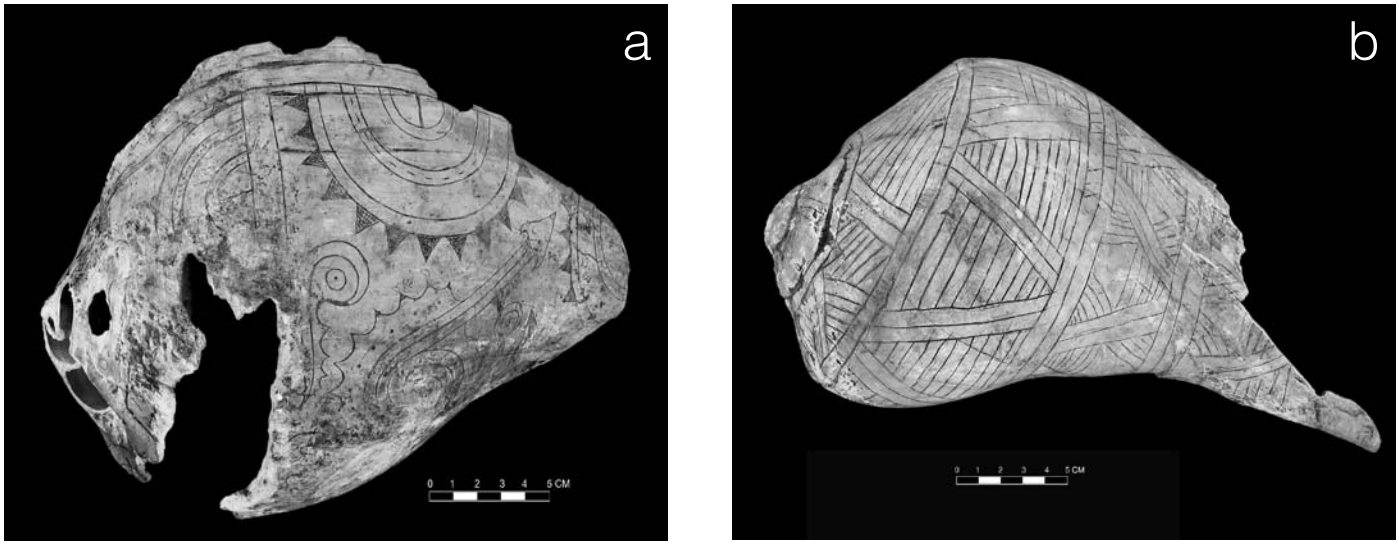


FIGURE 4.25. Spiral patterns executed in Braden C style: a, 448816; b, 423250.

FIGURE 4.26. Distal fragment of Craig A style cup excised in low relief with incised decoration (423297). Depicts human heads arranged in horizontal registers.

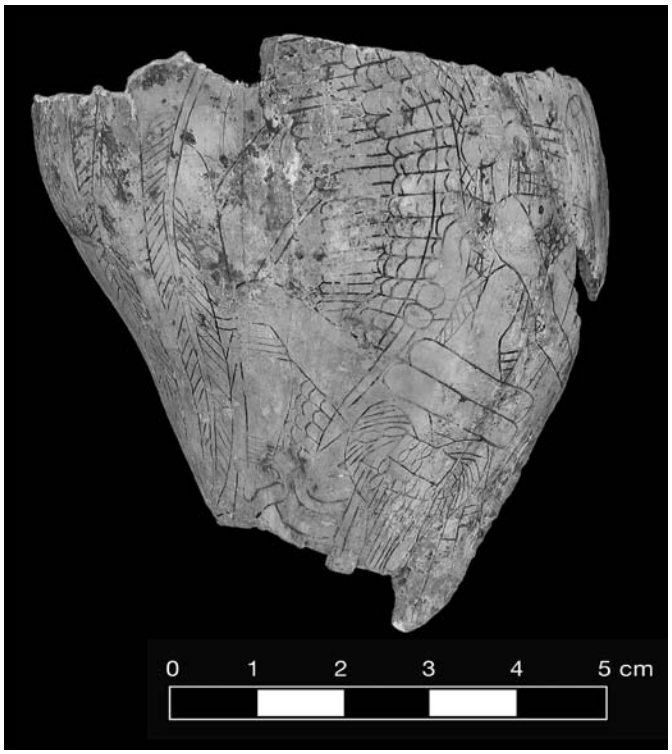


FIGURE 4.27. Craig A style carving showing birdman theme (448825). Note beaded apron, forelock, avian characteristics, and leg raised in movement.

beads. The part-human face has a beak. The person wears a beaded forelock, feather plumes, columella pendant inscribed with apical banding, apron or scalp plaque below the waist, perforated pulley earspool, and two rolls about the waist. There is an orange organic residue inside the vessel. Manufacture is complex as well in that there is both incision and excision. Joan S. Gardner (unpublished notes, 1970–1971, National Museum of Natural History, Department of Anthropology conservation files) observed that the hand is similar to that of the mortuary figure on cup 448865.

One unusual cup is 448871s01. The subject matter here is a bison that has been shot (Figure 4.28). This design is one of the few that refer directly to animals of the Great Plains. Another (448874s03) also depicts a bison; however, this time the head is shown in frontal view.

Craig B

The Craig school offers up a remarkable bestiary. More of the shells (n = 63) fit into Craig B than into any other style. Common themes include hands and hand-in-eye motifs arranged in horizontal registers, birdmen that occupy the

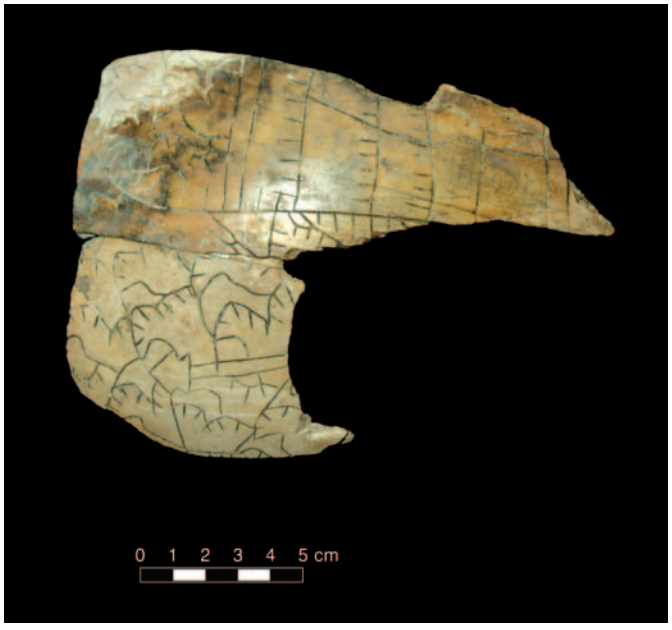


FIGURE 4.28. Fragment of Craig A style cup (448871s01) depicting a bison flank (in lower section) shot with an arrow.

FIGURE 4.29. Craig B style cup showing fabulous animal with complex forked-eye motif (448821). The animal appears to be drinking from a shell cup.

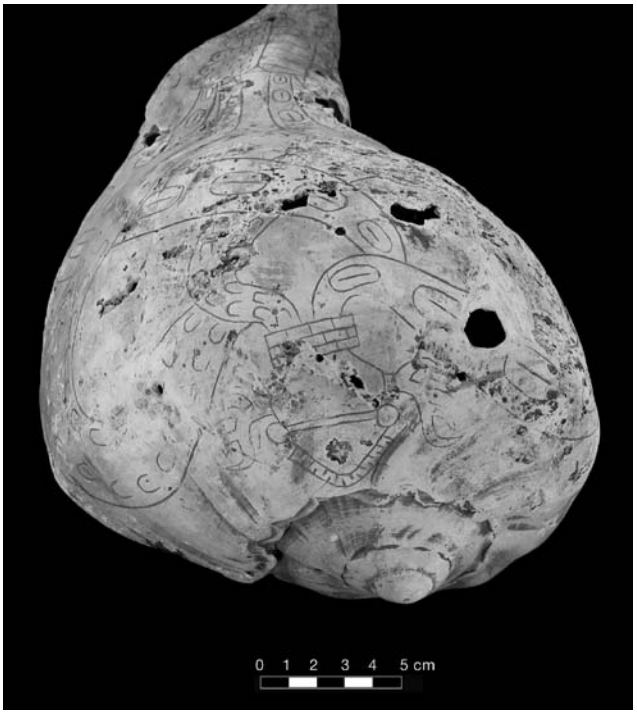


FIGURE 4.30. Fabulous beast with serpentine, avian, and raccoon features (423236).

full plane, and composite animals having serpentine, avian, arachnid, and feline characteristics (Figures 4.29, 4.30). Interesting things are done with symmetry, including the arrangement of four serpent-birds into a swastika formation. Raccoons achieve prominence and several fabulous animals have raccoon eyes. Raccoon bindings are shown on objects and on humans, and these are wrapped thrice around the object to which they are bound. Certain other characteristics exclusive or nearly exclusive to Craig B include the depiction of a double hair bun on the top of the head, a bent feather headdress, and two beads on the forelock. Spiders are present in Craig B but do not appear in the Braden style of any phase. Bird representations abound (Figure 4.31). Fish and other fabulous composite animals appear. Other motifs include the pear-shaped, forked eye (in which one fork is truncated) and cross-in-circle (Figure 4.32).

As in the Braden school, figures are simpler in Craig B than in Craig A. Figures such as those shown in Figure 4.33 are decorated with bead bracelets and anklets; however, the beads are rendered as grids. In manufacturing, sometimes the apex was cut back so that the vessel could lie flat when turned upside down. Designs were usually oriented vertically on the vessel.

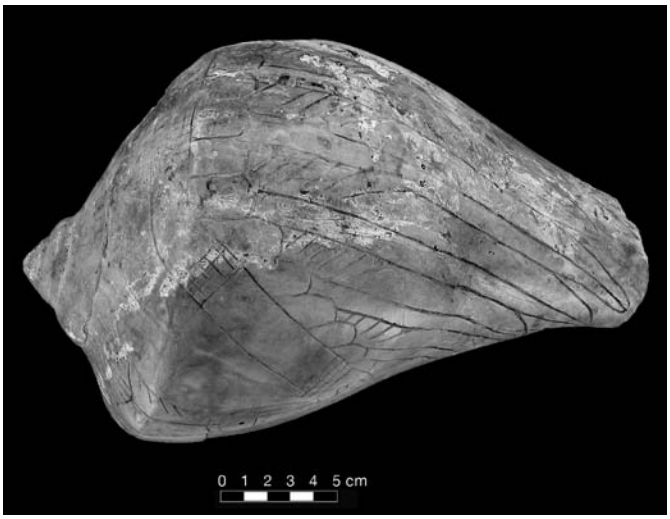


FIGURE 4.31. Craig B cup depicting avian characteristics (448787).

Craig C

Craig C is well represented with at least 40 examples. Workmanship is bold and designs are simplified and stylized. Throughout the Craig school humans become quite stylized. By the time of Craig C, humans have lost

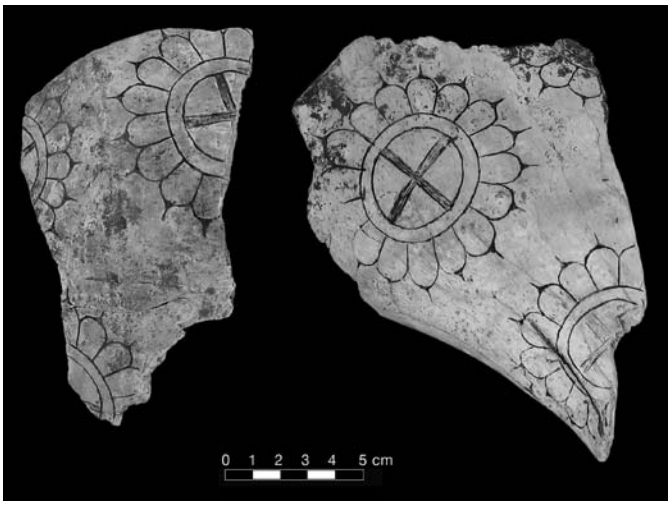


FIGURE 4.32. Craig B petaloid sun icons free floating across the field (423287).

the pelvic region entirely and legs extend directly from a dropped belted waist.

Prevalent themes of this style include the snake and talon motif and the "men facing a forked pole" or "busk" theme. There are multiple examples of very similar designs in each of these categories. The workmanship and style represented in the talon and snake motifs are so similar that it seems likely that the shells were produced by the same craftsperson. The snake and talon motif shows one snake on the apex and another on the body, the apical snake usually faces right while the lower one faces left (Figure 4.34). Three eagle or hawk talons are fit between the two snakes, and one talon is shown on the distal portion of the shell, below the lower snake. There are six shells with this design.

The forked pole theme is another common one (Figure 4.35). Here two men face one another, separated by a forked pole (or sometimes a serpent pole). They usually

FIGURE 4.33. Craig B cup showing man and snake themes (448858).

FIGURE 4.34. Craig C style cup at two different angles showing snake and talon motif (448813).

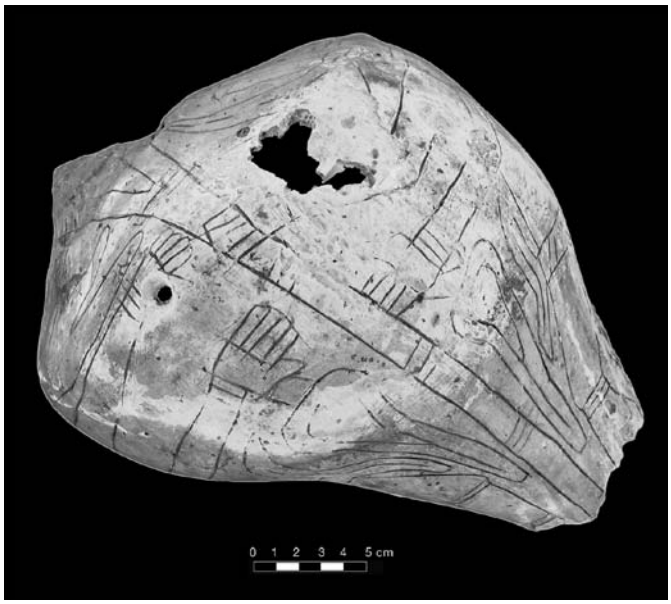


FIGURE 4.35. Craig C cup depicting two men facing a pole (423243).

have large woodpecker heads extending from the front of their belts. There are 11 shells having designs that follow this theme. Similar designs depict a man facing a serpent staff. Five shells fall into this group.

There is remarkable consistency in the designs falling into the major themes in Craig C. Birdmen and hand-in-eye motifs reoccur as in Craig B, but the designs become simpler and bolder. Barred ovals are common.

Overall, the styles change from being highly involved and painstakingly executed to less carefully done and simpler. Although most of the materials in the Smithsonian's collection were reported in Phillips and Brown (1978, 1984), several were not. These fall into all of the major styles and are presented in Table 4.4. They include common themes such as the snake and talon motif shown in cup 423253 (Figure 4.36).

Unengraved Shells

The Trowbridge collection contains 31 shells cataloged as number 423228. These shells were not

TABLE 4.4. Engraved shell fragments in the NMNH collection not reported in Phillips and Brown (1978, 1984).

Catalog number	Fragment type	Style	Motifs / notes
378246	Gorget	Type 9	Hatching
378262	Gorget	Type 1	Sun disc; possible refit with catalog number 448741
423238	Damaged cup	Craig C	Birdman holding serpent staff; shown in Hamilton (1952: pl. 92B)
423252	Cup, distal portion missing	Braden C	Large bird in flight with armadillo-like animal; assigned Braden C because of poor execution and lack of detail
423253	Apex and body	Craig C	Rectangles, chevrons, woodpecker heads; complete except for large hole in body; snake and talon theme; may fit center in Phillips and Brown (1984: pl. 333C)
423277	Body	Braden B	Long bones
423291	Distal	Braden B	Snake markings vessel
423294	Gorget	Type 5	Plain with drilled holes
423343	Gorget	Irregular	Bone gorget with concentric circles and scalloped line
448740	Gorget	Type 1	Sun circle (aka Moundville circle)
448743	Gorget	Mask	Apical fragment that uses the shell apex as the nose for the otherwise incised facial feature
448744	Gorget	Unclassified	Fenestrated; possible cross-in-circle design
448757	Gorget	Type 2	Unclear decoration on inner surface
448822	Cup	Craig C	Paired figures facing a pole; similar to Phillips and Brown (1984: pl. 317)
448824	Cup	Craig C	Perhaps two figures with a pole; woodpecker head at waist
448839	2 distal	Craig C	Man, mace, bird head belt
448840	Apical	Craig B	Pear-shaped motif floats about the apex; the rest is shown in Phillips and Brown (1984: pl. 267)
448843	Left distal	Braden A	Concentric semicircles, possible Davis rectangle; Hamilton (1952: pl. 137A)
448853	3 various	Craig B	Hands with eyes
448858s03	Apical body	Craig C	Bird man
448858s11	Fragments	Craig A, B	Snake man
448860	Shoulder and apex	Braden A	Bilobed arrow, human head, forked eye; Phillips and Brown (1978: pl. 12) show body fragment, but large piece of shell has been added through refitting

(*continued*)

TABLE 4.4. *Continued*

Catalog number	Fragment type	Style	Motifs / notes
448866s01	6 various	Braden	Snakes, twined snakes
448867s02	Apical fragment	Craig A	May match Phillips and Brown (1984: plate 182); woodpeckers
448869s01, 02	6 various	Craig	Feathers and forelocks; barred oval
448871s02	1 distal (448866)	Braden B	Broken arrow
448871s03	Apical	Braden A	Arrowheads, arrow fletching
448876s02	16 various	Braden A	One linked to Phillips and Brown (1978: pl. 37a), others are not; rayed concentric barred ovals
448876s04	10 various	Braden A	Spiro engraved ceramic design
448877s06	11 various	Braden A	Davis rectangle and barred ovals
488880s05	1 distal, 1 apical	Craig A	Eagle, bead grid
448880s08	9 various	Braden A	Intertwined snake theme, concentric dotted circles; 4 found in Phillips and Brown (1978, 1984), 5 not
448880s13	3 distal	Braden B	Bi-triangular arrows
448880s14	Apex and body	Craig B	Barred ovals, snake
448880s16	Body	Craig C	Birdman
448880s17	Body	Craig C	Forked pole theme
448880s26	Body	Craig A	One small fragment
448880s29	1 body	Braden A or B	Amphisbaena
448880s34	39 various	Unclassified	Various (both schools)
448880s38	9 various	Unclassified	Exfoliated surfaces
448880s40	1 body	Unclassified	Bird or snake form
448880s42	10 various	Unclassified	Human form, sash, snaky bits
448880s43	7 various	Unclassified	Poor condition, uninterpretable
448880s44	2 worked scales	Unclassified	Worked alligator gar scales
448881	3 fragments	Unclassified	Brickwork pattern, hemicircle, arrow point
448882	Shoulder	Braden A	Amphisbaena
515786	1 body	Craig	Wings

FIGURE 4.36. Apical fragment of Craig C snake and talon cup (423253).

specifically tagged with subnumbers because they can all be cross-linked by using their Trowbridge number.[1] Meyer's collections also contained a large number of unengraved shells. These are grouped into lots numbered 448883 and 448728. The unengraved vessels show that while shell cups were often engraved, this was by no means standard.

WOODEN VESSELS

Two fragments from wooden effigy bowls are present (Figures 4.37, 4.38). One represents a handle on which an animal effigy, in this case a feline, stands (448893). This handle was carved from one solid piece of cedar, as pictured in Hamilton (1952: fig. 29B). Toolmarks are very vague. The face is disproportionately large compared to the body. Four legs are realistically modeled with paws exhibiting four toes. A long tail is connected to the flat semielliptical handle. The face is turned slightly toward the left, and the mouth has been carved out. Mouth and snout are damaged. Size is 12.4 cm long, 9.84 cm wide, and 12.8 cm high. Large

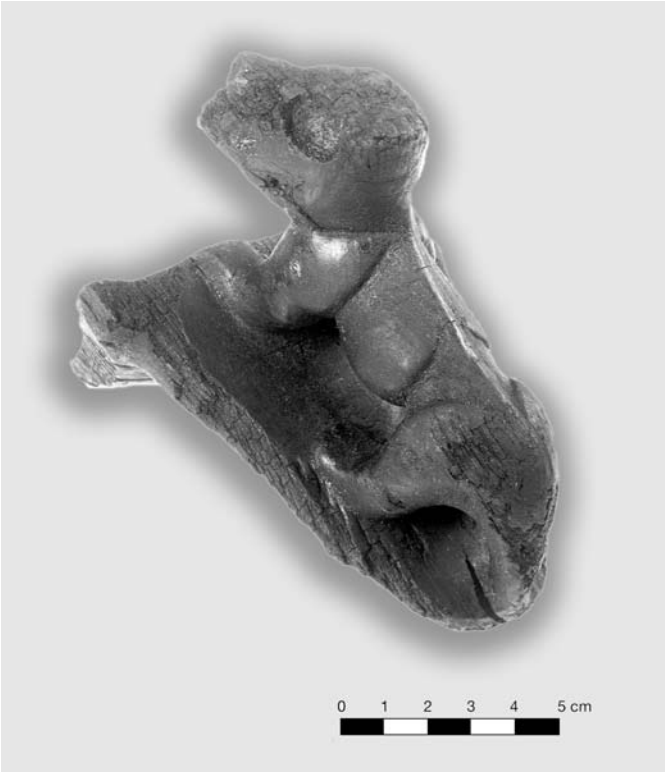


FIGURE 4.37. Wood animal effigy bowl handle (448893).

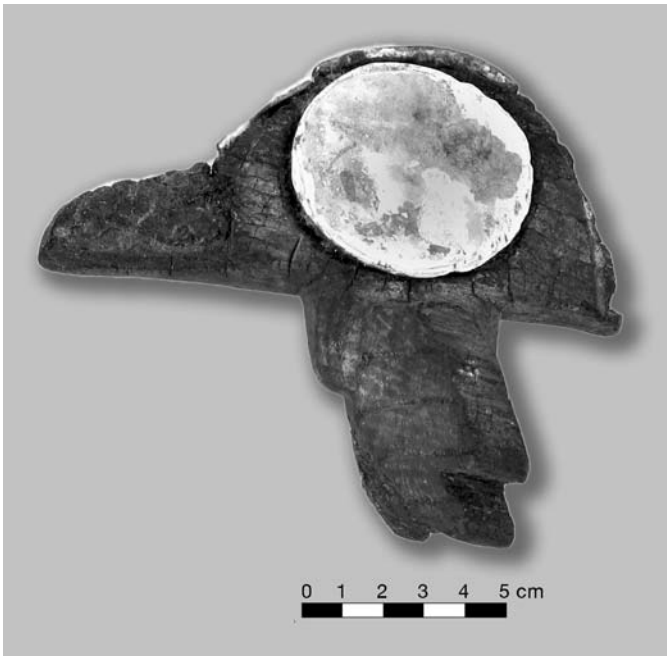


FIGURE 4.38. Wood bird head effigy perched on bowl rim (448894).

eye spots have been excised for inlays. The bowl sides have concentric rings incised below the handle.

The second fragment is that of a bird head effigy figure perched on the rim of the bowl (448894). The bird faces inward. It has disproportionately large shell disk eyes. Rectangular shell insets were glued along the crest of the head and down onto the beak. Four concentric rings are incised around the outside of the bowl. There is a trace of basketry matting on the crest (the fiber is 0.4 cm wide). Residue remains in the locations where shell insets are missing; perhaps this is aboriginal glue. Large eyes are made of inset concave shell discs (5.50 cm diameter average). The face is narrow at 2.5 cm and along the width of the head is a crest formed by three insets of shell. The posterior inset (5.25 cm long) is missing. The middle is 4.9 cm and has the matting impression on it. The anterior inset is 2.8 cm long. The beak is 4 cm long and also had insets, but those are missing. The bird faces out from the bowl. This entire vessel from which the piece was broken would have been huge judging by the shallowness of the arc. There are a total of seven shell insets. The piece is also pictured in Hamilton (1952: fig. 29A).

STONE BOWLS

There are two stone vessels in the collection (Figures 4.39, 4.40). Both appear to be marble (or other calcareous stone) and are badly fragmented but have been refitted. The manufacturing technique is similar for both. An effigy figure is shown peering out from the rim on both bowls. On the opposite side is a tail-like handle. Vessel 423149 has three incised lines around a raised collared rim (similar to the wooden vessels). These lines dip down to become concentric half circles around the human effigy and the handle. The human head is only 3.00 cm wide and 7.05 cm high. It rises 4 cm above the rim. Features are modeled in relief, but they are very faint because of the surface erosion. In spots, the original surface is visible, and where so, it is highly polished. Ears and hair bun or ponytail are modeled on the sides and back of the head. Facial features include a low nose, what may have been an open mouth, and faint eyes. The neck protrudes from the side of the bowl like a figurehead on a ship. The vessel consists of 13 fragments refitted and held with epoxy. Dimensions are 21.2 cm long × 19.0 cm wide × 12.5 cm high. Weight is 1,170.90 g.

The other bowl (423150) weighs 870.40 g, is 21.2 cm long, 18.8 cm wide, and 11.4 cm high. Five concentric rings are incised horizontally around the raised collared rim. They also dip down to become semicircles around the

FIGURE 4.39. Limestone bowl with human effigy adornment (423149).

FIGURE 4.40. Limestone bowl with snake head adornment (423150).

effigy snake head. Toolmarks are obliterated by deterioration. A section of wall has fallen out because of a weakened epoxy join. The effigy snake head is 2.65 cm wide, 6.36 cm high, and 5.35 cm deep. It is similar enough in design, execution, and raw material to have been made by the same artist that produced 423149. In each case the handles are flat shelves extruding out from the rim but not elevated above the rim. The incising simply follows the contours of the handle, without dipping down below the handle. This bowl consists of 35 fragments refitted and held with epoxy.

OTHER CONTAINERS

Other containers include baskets, bags, sacks, or pouches. Basketry, because it resembles textiles in manufacture, is treated in the next chapter. Other bags or containers could be made from rawhide, leather, or textiles. Chapter 8 includes a discussion of leather. Brown (1996) includes cedar pole litters as containers. Although technically these are containers, in this publication they are included along with other special ceremonial objects and discussed in chapter 8.

NOTE

1. A master list of equivalent numbers can be found in Appendix A.

5

Fiber Artifacts

April K. Sievert

The textiles from Spiro are among some of the best preserved examples of native North American textiles outside the arid Southwest. Included are examples of woven fabrics, plaited strips, and cordage. There are also examples of matting and basketry. All of these types are grouped here in a chapter predicated on grouping artifacts of similar manufacture and raw material usage rather than on function per se. Uses for the textiles include bindings or wrappings, clothing, coverings, and containers. Most of the textiles derive from the Trowbridge collection. Trowbridge attempted to salvage the material and described his acquisition thus (Trowbridge, 1938:52):

> On the whole, the material is in a remarkable state of preservation. The first specimens reached me about three weeks after they had been excavated, and were quite damp. It is thought this dampness is a feature of recent years only, pits having been sunk by relic hunters and letting surface water into the central portion of the mound.
>
> Most of the fabrics appeared to have been folded when placed in the mound, but responded, in the case of the larger pieces, to careful manipulation. . . . These were pinned to fibre board and underwent a stretching process of weeks, the pins being moved outward a trifle each day. At the same time, quantities of lime, probably from shell, and perhaps from soft shell ornaments originally decorating the garments, were removed bit by bit.

Some of the materials have been examined or analyzed at various times, usually for identifying fibers used in their construction. Trowbridge (1938) was the first to publish on these textiles when he wrote up a report based on analysis performed at the National Bureau of Standards on samples that he had sent to the Smithsonian in 1937. In 1941, A. C. Whitford at the American Museum of Natural History reported on the identity of vegetable fibers that he examined (Whitford, 1941:15), and his designations have been retained in the NMNH catalog records. Hamilton (1952: pls. 140–152) includes plates of several of Trowbridge's textiles, including most of the large pieces. Willoughby (1952) also wrote about the textiles, in a companion piece to Hamilton's study of the artifacts. Burnett (1945) discussed Spiro textiles primarily from the collection of the

Museum of the American Indian, Heye Foundation, now in the collections of the National Museum of the American Indian. Baerreis (1947) produced a short article on the basketry. Brown (1976) reported on textiles in his report on the materials from the WPA excavation. King and Gardner (1981) produced an article reviewing the techniques and materials used in producing the textiles in the NMNH. In 1978, Hoffman produced a Master's thesis on the subject of the conservation of Spiro textiles. The most in-depth analysis was that of Kuttruff (1988), who included Spiro textiles in her sample for her study of Caddoan textiles. Kuttruff's work contains significant analysis of techniques, raw materials, and styles as well as a complete review of research done on textiles from Spiro. She used 37 samples from textiles from the Smithsonian collections. Rogers et al. (2002) analyzed 101 feather samples from numerous textile fragments to determine the bird species represented.

The analysis presented here is primarily an inventory. None of the reports listed above has summarized the extent of the NMNH collection or listed the contents of the collection by type. The collection comprises several large, nearly complete pieces, numerous fragments of all sizes, and odd lots of jumbled fibers. Many of the fragments may have derived from single artifacts; however, with time and handling, much of the association between fragments has now been lost. A brief discussion regarding numbering and cataloging is warranted to put Trowbridge's complicated collection in perspective.

FIGURE 5.1. The contents of one of Trowbridge's boxes of textile fragments (423372).

Trowbridge housed his collection of textile fragments and relatively complete pieces in walnut boxes (Figure 5.1) or under glass in walnut frames and gave them all catalog numbers. In most cases, he assigned separate numbers for separate items, provided they were stored as separate discrete objects, which applies to most of the larger textile fragments. Smaller fragments were stored in boxes or cases and were numbered by him according to the case in which they were stored. For example, his artifacts numbered 2719 were all from one box. He differentiated among items by assigning alphabetical suffixes. Presumably, his numbers reflect best the original association among pieces. When these items were transferred to the Smithsonian, museum catalog numbers were assigned. These reflect Trowbridge's original groupings. Trowbridge's cases with numerous fragments were each assigned a single number. For example, all pieces designated 2719 by Trowbridge were given a catalog number of 423373. Through time, the assignment of Trowbridge's numbers has become muddled. For example, there are items marked 423373 (2719-F, H, L). In this case, the item is a single fragment of twined cloth. Since it was known that Trowbridge's numbers referred to discrete objects, there is no way a single fragment could be from each of 2719-F, 2719-H, and 2719-L; rather, it must be from only one of these. Because of this problem, the relationship of such objects to other objects labeled 2719-F, H, or L cannot be reconstructed. Trowbridge did, however, leave original photographs of the items in his collection. These include photographs taken of his boxes, and the objects within the boxes are labeled with their subletter. These photographs are in the Trowbridge catalog among Waldo Wedel's correspondence in the National Anthropological Archives.

After coming to the National Museum of Natural History, most textile pieces were conserved and placed in safe mounts that facilitated examination. During the 1970s conservator Joan S. Gardner placed many of these materials between sheets of Plexiglas. All but two large pieces and several smaller fragments were so conserved. Fragments similar in style were combined within the same subnumber context. Subgroups were designated within catalog numbers on the basis of storage status. Some of the lots with large numbers of pieces were stored in Riker boxes. Because of the fragility of these materials, artifacts so housed were not handled for this study, and subnumbers were not

written on the boxes. At most, the lid was removed for a better view. During the 1990s, conservation of the textiles was further upgraded with new storage boxes with glass lids. Materials can now be observed without handling.

Any object of interwoven or plaited fibers was designated as a textile. In many cases, a single catalog context will contain both textiles and other materials such as shell beads or copper fragments. Still, there is a limited number of object types, which include the following:

1. Cordage is spun or unspun fibers plaited or twisted into a yarn, rope, or braid.

2. Cloth is textile made from fibers spun into cordage and then interwoven to form a sheet. The term is used interchangeably with "fabric," a term employed by Kuttruff (1988) to refer to the same sort of artifact.

3. Basketry is material made from strips of vegetable material, plaited, coiled, or interlaced to form a container or sheet. In some cases the objects were classified as mats if it was clear that the original piece had been flat.

4. Sample refers to bits of textiles used as samples. Many of these are prepared as microscope slides.

The above categories comprise the larger divisions among the textile groups. Note that basketry is included here along with other fiber constructions. The similar processes of manufacture link these artifacts even though the functions of the artifacts vary. Cordage either acted as the first step in the construction of woven textiles or was the desired product and was used for tying and holding objects and stringing beads. Cloth may have been used for garments, including capes or kilts, or for blankets. Basketry is used to make mats or containers into which other burial accessories were placed.

Textile styles are listed in Table 5.1. The count column refers to the number of catalog contexts for which the style is recorded. By multiplying the number of contexts by the count per context, the minimum number of fragments in the category is derived. Sizes of the largest members of the category are included as well.

RAW MATERIALS

An array of plant and animal fibers was utilized (see Table 5.3 on page 72 for a summary of identifications). Fur and feathers were spun into yarns. The predominant animal hair used was rabbit. In his 1977 analysis of Spiro textiles, Michael A. Bogan (National Museum of Natural History, Department of Anthropology, Smithsonian Institution, unpublished manuscript) suggested that the most likely species included *Sylvilagus floridanus* (eastern cottontail), *Sylvilagus aquaticus* (swamp rabbit), and *Lepus californicus* (black-tailed jackrabbit). Feathers were acquired primarily from turkeys and also from geese. Rogers et al. (2003) examined 101 textile samples from the collection microscopically in order to determine more specifically which species of birds are represented. Of this sample, which yielded 85 examples of feathers, 77.6% were turkey (*Meleagris gallopavo*), 17.6% were goose (*Branta canadensis*), and 4.7 were trumpeter swan (*Cygnus*, cf. *buccinator*) (Rogers et al., 2002:245). These authors point out that although raptorial birds and woodpeckers are present in artistic representations, their feathers do not appear to have been used in textile production. Vegetable fibers include cane and pawpaw fibers (Whitford, 1941) as

TABLE 5.1. Styles of textiles in the National Museum of Natural History (NMNH) collection.

Object	Style	Occurrences	Minimum fragment count	Maximum length (cm)	Maximum width (cm)
Cordage	Braid	13	53	41	18
	Yarns	17	47	17	18
	Wrapped basketry	3	7	11	4
Cloth	Twined tapestry	36	76	28	33
	Spaced weft twining	24	70	61	139
	Wrapped warp twining	24	113	31	64
	Simple weave	1	1	45	148
Total		**118**	**367**		

well as numerous unidentified fibers. Plant fibers include very few seed hairs (Kuttruff, 1988).

CORDAGE

For cordage, style was assigned on the basis of ply and twist direction. Therefore, the two major classifications of cordage were Z-twist and S-twist. Ply was simply designated as one-ply, two-ply, and so on. Cordage was encountered in the context of the textile collection and in combination with artifacts that are stored separately from the textiles. In addition to braided or twisted cords, I also included a type of weaving in which basketry fibers, such as cane or grasses, are wrapped with yarn.

Yarn

Yarn refers to spun or unspun fibers that are twisted into a usable length (Figure 5.2). Usually, the yarns will be composed of more than one ply, most often two but occasionally three or more. Yarns with more than two plies seem to have been preferred for stringing beads and are not common in woven cloth. Yarns will be the components of other textile constructions. On the other hand, they may also be utilized as for stringing beads or possibly sewing. Yarns are manufactured from both vegetable and animal fibers.

FIGURE 5.2. Yarns (423375).

Yarns vary greatly in diameter. The finest are less than 1 mm in width, while the average is 0.3 cm. When possible, ply number and twist directions were recorded. For the yarn category, the fragment count is underestimated. Much of the material in this category consists of loose yarns from unraveled cloth. In cases for which there were several groupings of yarn fragments present in a context, the number of separate groups of yarn was counted, rather than the number of strands within each group.

There are a number of pieces of yarn or cordage utilized for tying objects together or stringing beads. The composition of these yarns varies. In some cases, the yarns or cords appear to be of animal hair; in others they are vegetable. No yarns made of feathers appear to have been manufactured into cordage that would be used for fastening or stringing. The only example of cordage demonstrably used for tying is artifact 448939s01.2, a piece of two-ply, Z-twist cordage used for making a bundle of four mammal leg bones (Figure 8.22). It is a thick yarn of a stiff vegetable fiber. It is glossy and well preserved, suggesting that some preservative has been used on it.

Beads are strung on cordage in several cases. Lot 448714 contains four examples of cordage as part of a group of tubular copper beads and copper pin fragments. The cordage was used to string the beads and may have been well preserved because of its contact with the copper. In one instance (448714s06.2) the cordage consists of a two-ply, S-twist string on which two copper beads remain strung. A thicker gauge Z-twist yarn (448714s07.2) manufactured by braiding three strands of a two-ply cord together retains three intact tubular copper beads (Figure 7.21a). There are also two loose fragments of string in this context (448714s08 and 448714s09). These consist of a three-ply S-twist cord and a narrow, fine, Z-twist two-ply string, respectively. The same context contains tubular copper beads that retain the original cordage inside the center bore but for which the characteristics of the cord cannot be determined (Figure 7.21b).

Another composite artifact (448934) is a large rectangular basket filled with beads, many of which are still strung on the original cord (although in most cases this cord has decomposed). The cord in this case is of vegetable fiber. Composite artifact 423381 (Figure 5.3) is a piece of wood wrapped with two-ply Z-twist cordage.

FIGURE 5.3. Cord-wrapped paddle (423381).

FIGURE 5.4. Braid (423384).

Braid

Braid is manufactured of several plies that are plaited or interlaced together. Plaiting is an easy way to create ropes or cords of different sizes that can then be used in multiple ways. Plaiting can be accomplished to produce wider cord than that produced by twisting, and some of these may have been used for headbands, belts, or ties. Mean length is 5.1 cm for braided cordage in the collection. One knotted piece of braid (423384) adheres to a piece of copper (Figure 5.4). At least six strands of two-ply S-twist yarn are plaited into a rope. There is a second type of cord consisting of a thicker Z-twist two-ply yarn that extends out from under the knot on the copper sheet. The fiber appears to be hair.

Some braids were often quite colorful. Planned use of red, black, and light brown yarns yielded a braid with a chevron design (Brown, 1976: fig. 68c). Braiding was a technique also used in finishing off garment edges. In this case, hanks of loose warps or wefts were left long, then plaited into a braid about 3 cm wide, and then divided and plaited, usually into four smaller braids, thus effectively creating a tassel. Other braids are quite thick. Figure 5.5 shows many strands of two-ply Z-twist yarn combined into a thick rope (423382).

Wrapped Basket Fiber

This category presents a different concept in creating cordage. Strips of cane or other vegetable material (like those used in making matting or basketry) are wrapped with medium-fine yarns (423372s03, 423373s22). Usually the finished cordage is about 1 cm in diameter. It would have been flexible when fresh, but stiffer than other braids produced solely of spun fibers. The yarns used in wrapping were invariably dyed. Red, black, and a natural light brown are evident. It is possible that what appears now to be light brown was once a brighter yellow. Combining these resulted in cordage that was colored in alternating bands having high contrast, resembling the black, red, and yellow markings on king or coral snakes.

FIGURE 5.5. Braided rope (423382).

CLOTH

Styles

Styles were assigned according to how the cloth was woven. Methods of weaving present in this and other Spiro collections are outlined by King and Gardner (1981:132) and include plain weft twining, spaced weft twining, twined tapestry, oblique twining, wrapping, oblique interlacing, and plain weave. Twining is the most common and involves interlocking pairs of weft yarns around the warps. In twining, the warps may be single, paired, or paired alternating (Brown, 1976; Kuttruff, 1988). Furthermore, the wefts can be wrapped, resulting in an overall S- or Z-twist. Fabrics can be constructed using one or both of the twisting directions. In some cases, such as the tapestries, the direction varies from row to row, resulting in a countered weft twining.

Much of the cloth is fragmentary; however, there are eight large pieces that represent unrolled bundles. These appear to be the major portions of actual garments. They are referred to as mantles and skirts in the collection records. One (423353) has ties on either end, which suggests that it was indeed tied about the body, possibly about the waist or neck (Figure 5.6). Large fabrics without ties may have been draped over the back (Brown, 1996:620).

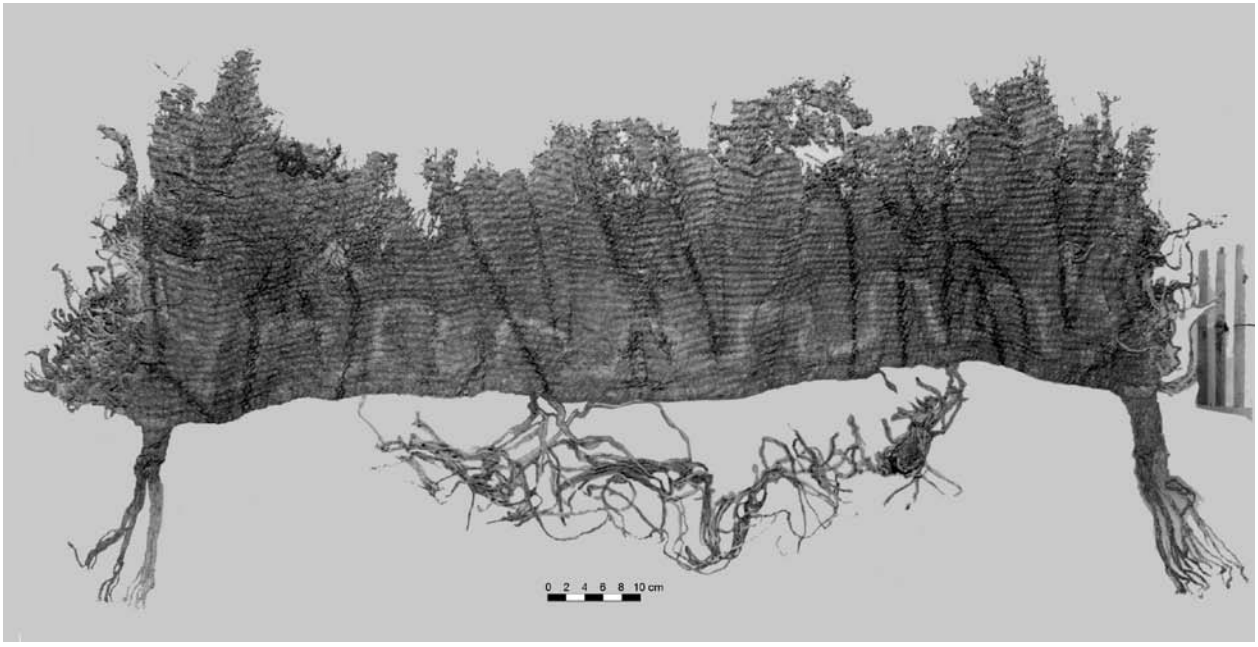


FIGURE 5.6. Twined and resist-dyed cloth with ties (423353).

Spaced Weft Twining

Medium-gauge yarns are used in making a spaced weft twined cloth. There are seven bundles of spaced weft cloth that have not been unfurled (Figures 5.7, 5.8, 5.9). The remainders, which have been unfurled, demonstrate that several different cloth types are manufactured using this technique. In one type, the warps consist of a relatively wide gauge yarn approximately 3 mm in diameter. Wefts are sometimes missing in this type, leaving skeletal

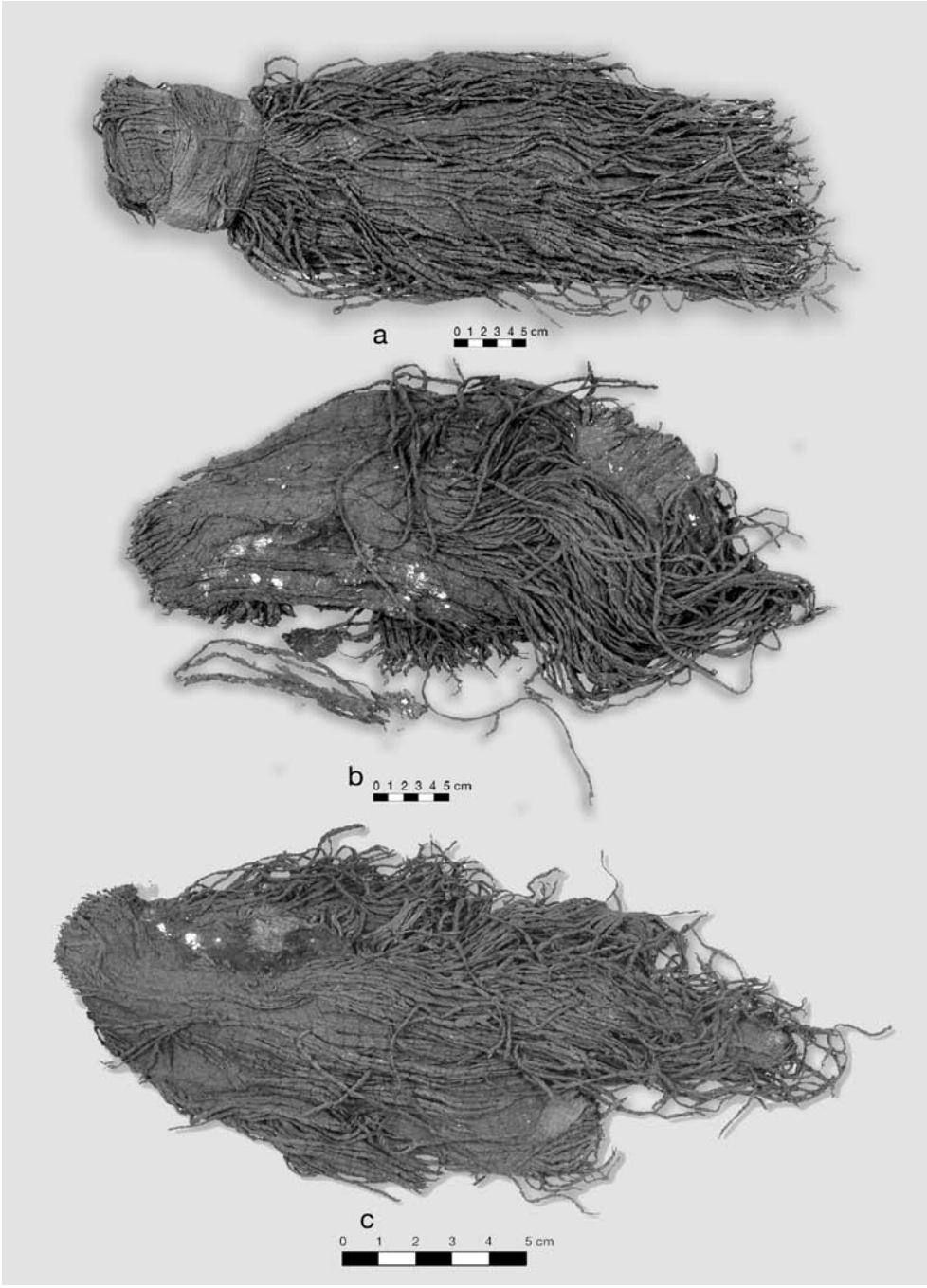


FIGURE 5.7. Bundles of spaced weft twining: a, 423361; b, 423360, wefts decomposed; c, 423362, wefts decomposed.

FIGURE 5.8. Bundle (423364), spaced weft twining.

warps. The appearance now is that of large hanks of fringe, composed solely of the well-preserved warps as in bundle 423361 (Figure 5.7a). These are the so-called fringed skirts reported by Willoughby (1952). It is reasonable to agree with Kuttruff's communication to James Brown (1996:621) that these were not intentionally fringed—they only appear that way because the wefts are missing. This cloth is most often made from what appears to be rabbit hair and dyed red. The red has faded to a muted reddish brown. The missing wefts have, however, left impressions on the warps. The wefts appear to have been a completely different yarn from the warp, very fine, and of a material that has decomposed. The spacing between wefts averages 1 cm, meaning that the overall weave was fairly loose.

Another type of spaced weft twining involves warps similar to those described above, but they are twined using weft of similar composition and weight to the warp. Five of the large bundles unrolled by Trowbridge fit this category: 423353 (Figure 5.10), 423354 (Figure 5.11, 5.12), 423355, 423356 (Figure 5.13), 423357 (Figure 5.14). In these cases both warps and wefts were preserved. Spacing between wefts was less than 1 cm. In the case of large framed textile 423353 (Figure 5.6), the wefts are spaced 0.6 cm apart and are made from similar yarn to the warp. This particular cloth exhibits three fringed selvages. The pattern of twining for 423353 calls for alternate paired wefts.

A third type of spaced weft twining involves a completely different yarn used to make an unusually fine small weave (423379). The yarn is fine, approximately 1 mm in

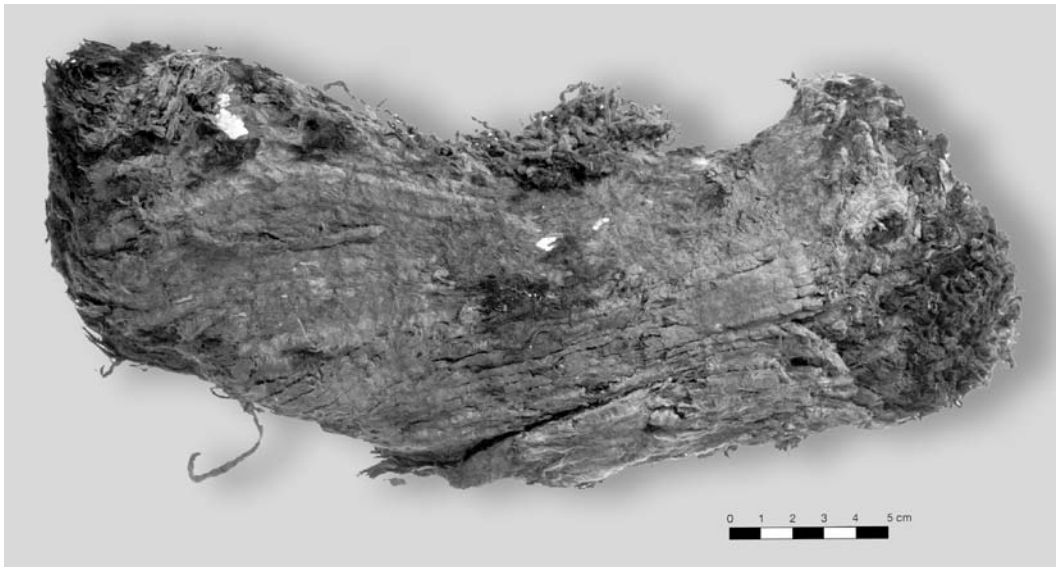


FIGURE 5.9. Bundle of cloth (423366), spaced weft twining.

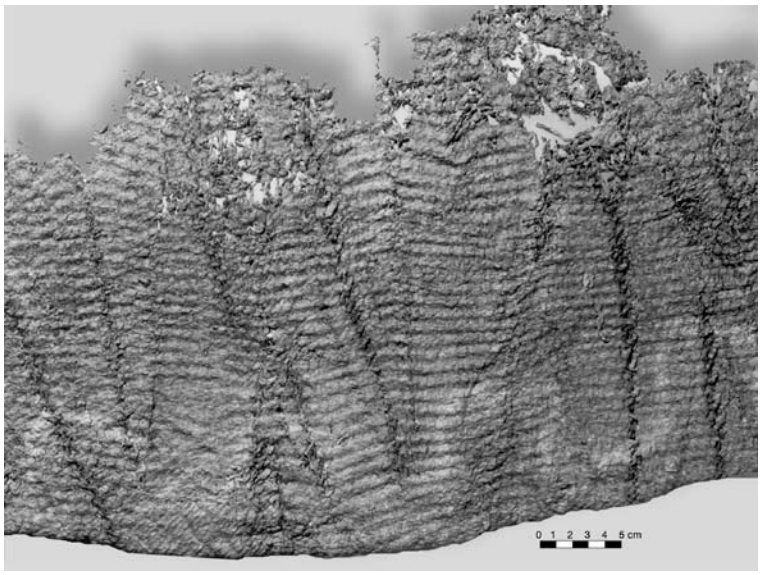


FIGURE 5.10. Spaced weft twining (423353) showing resist dye pattern.

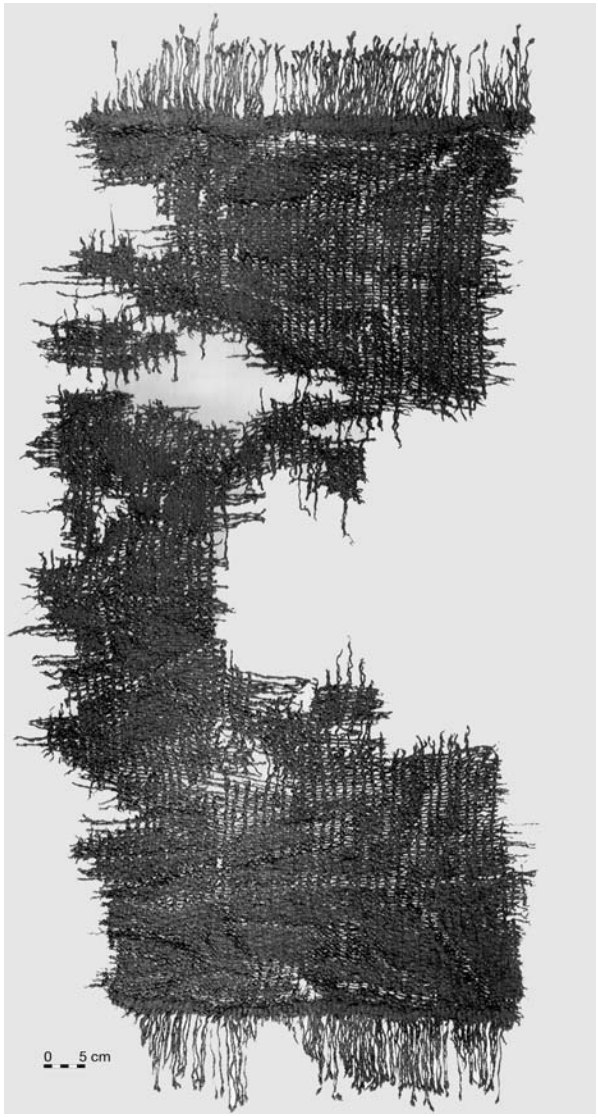


FIGURE 5.11. Spaced weft twining (423354).

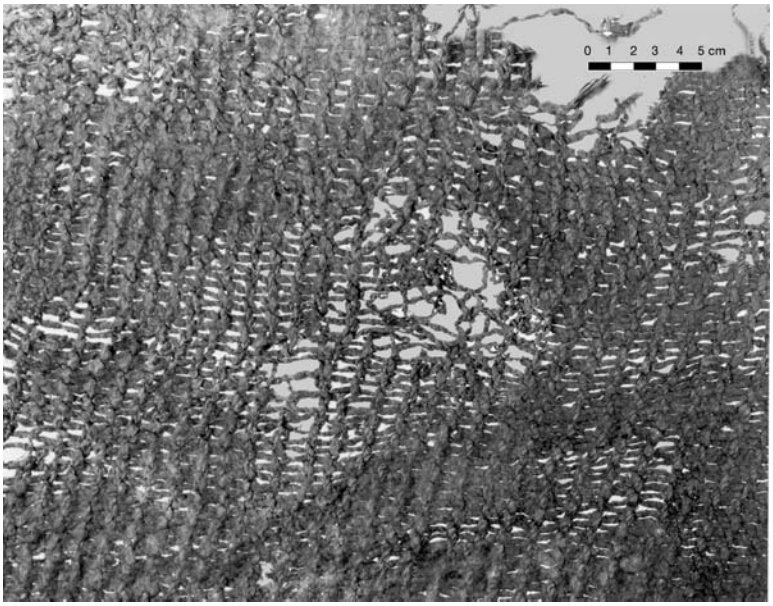


FIGURE 5.12. Spaced weft twining (423354) close-up.

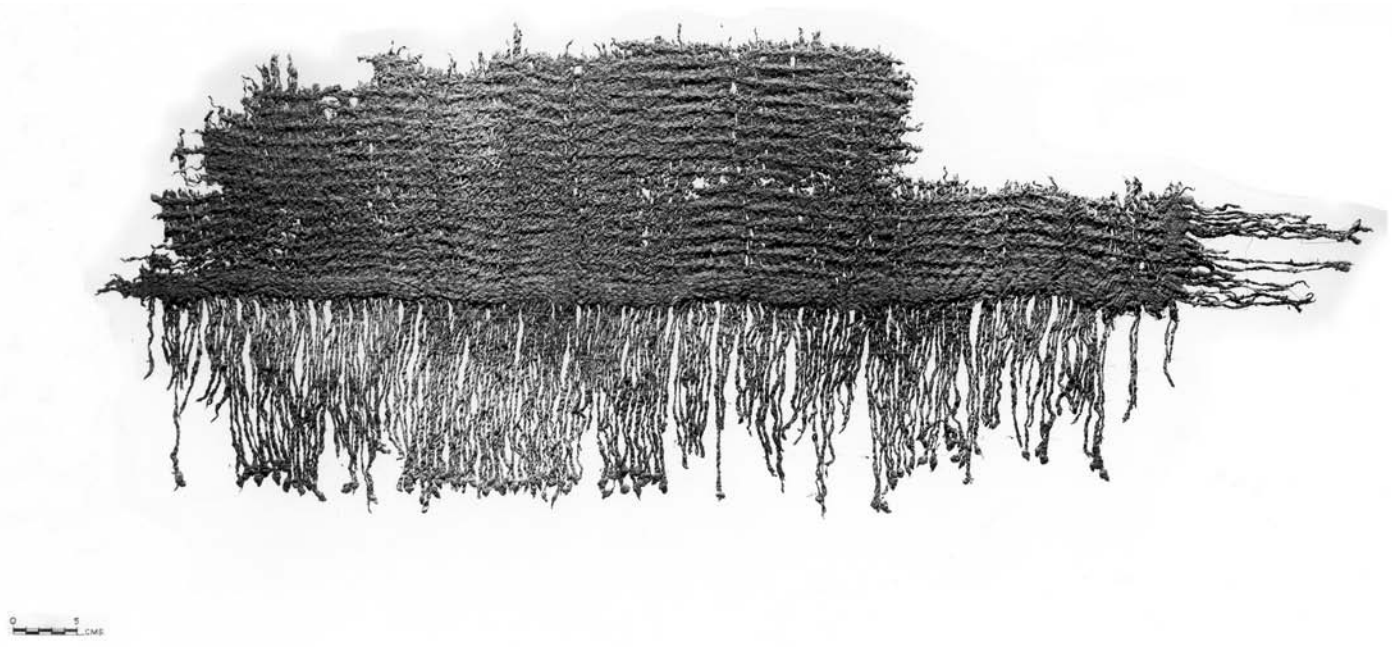


FIGURE 5.13. Spaced weft twining (423356).

FIGURE 5.14. Spaced weft twining (423357).

diameter, and appears to be vegetable (Figure 5.15). The warp and weft are of the same fiber. King and Gardner (1981:126) cite Whitford's report that this fiber may be *Amsonia ciliata,* dogbane or bluestar. Weft spacing is approximately 3 to 4 per centimeter. This produces a tight weave. The border is close, forming the selvages.

Wrapped Warps

For some cloth the warps are spun and twisted from vegetable or other fiber, and then this cordage is wrapped with dyed feather strips. The effect is a strikingly soft and lustrous fabric. These fabrics were dyed in black, red, or yellow. The wefts are in most cases missing, but they appear to have been fine yarns worked in a spaced weft twining. The wefts are invisible, as they are hidden beneath the tendrils of the feather from the wrapped warps. These fabrics were bundled, as were the other twined textiles. Bundles of this type tend to be smaller and more fragile than the twined cloth constructed of hair. There are four bundles that have not been opened.

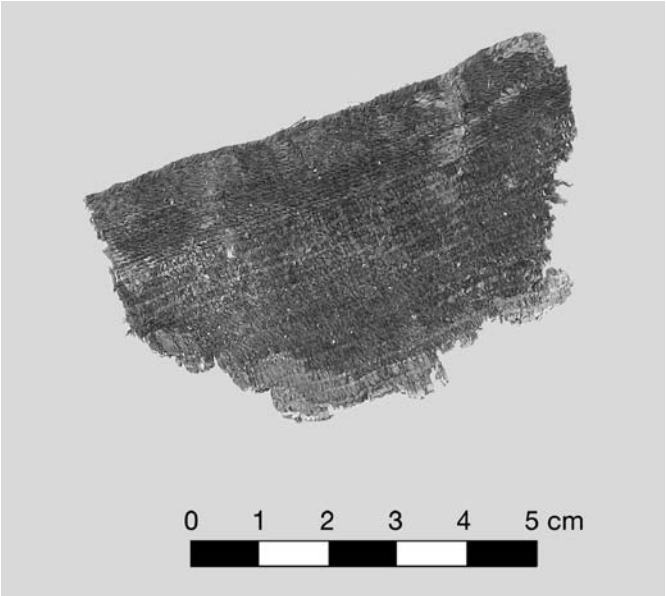


FIGURE 5.15. Spaced weft twining, tight weave (423379).

FIGURE 5.16. Twined tapestry (423373s24).

Twined Tapestry

Tapestry refers to twined fabrics with tightly packed, paired wefts. Twining with single colors was done in patches or blocks, which followed a pattern to create an overall design. These fabrics are usually made from fine-gauge predyed yarns. Yarns of contrasting colors are used to provide outlines (usually black, but sometimes red). The most intricate fabric designs known from Spiro are produced using this method (Figures 5.16, 5.17, 5.18). In twined tapestry, the black outlining wefts are usually of thicker yarn than the inner areas. This thread does seem to outlast the others and often extends beyond the limits of the preserved mesh. In some cases, traces of a pattern outline are present, but the yarn used to fill in the space is largely missing. The colors found in this type of weaving are strong and, when originally produced, would have been brilliant. When samples of tapestry wefts from fragments of textile number 386188 were analyzed at the Smithsonian's Conservation Analytical Laboratory (CAL, now renamed the Museum Conservation Institute) in 1976, they were found to consist entirely of feather and contained no mammal hair or vegetable material.[2] Down, most likely from turkeys or waterfowl, was spun into this type of yarn. Kuttruff (1988:206) reports that rabbit hair was used for some of the twined tapestry weaving, including the large fragment showing human faces with forked-eye motifs (423373). The yarns used in the tapestry twining are quite fine, approximately 1.5 mm in diameter. Although some tapestries were worked in three colors, red, black, and light brown (referred to as tan in the literature), in some, a fourth color, brown, is indicated as well. There is considerable variation in shade.

In the tapestry cloths, the warps have often decomposed, leaving skeletal wefts. Therefore, warps must have been of a different material entirely. Kuttruff (1988:206) reports that for some, unspun strips of vegetable material were used for the warps.

Simple Weave

This weave is a simple over one and under one weft weave. It is rare but does appear in one large decorated fabric piece (423358s01) shown in Figure 5.19. Although the weave is different from the spaced weft twining, the yarns and colors used appear to be similar.

FIGURE 5.17. Twined tapestry (423373s25).

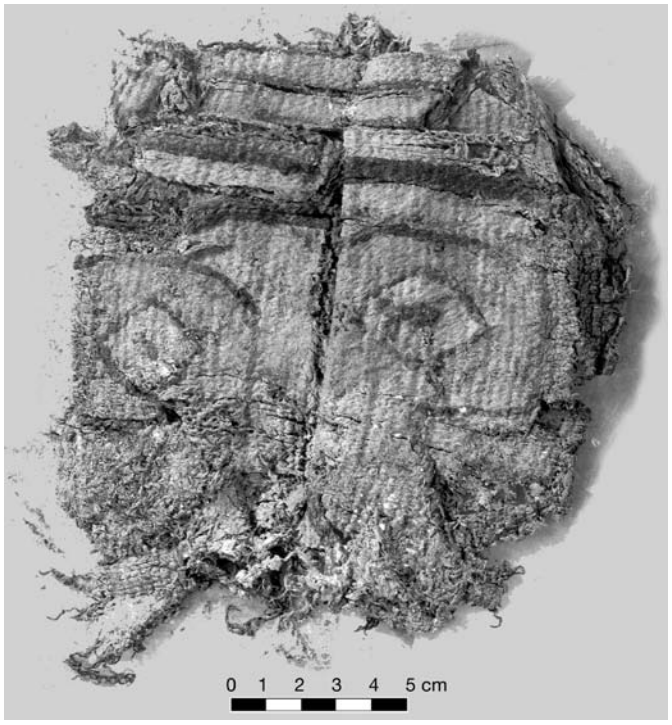


FIGURE 5.18. Twined tapestry showing human face (423373s27).

Fabric Decoration

For twined tapestry textiles, braids, and feather-wrapped fabrics, the yarns appear to have been colored prior to weaving. Kuttruff (1988:117) noted that as many as six different colors may have been used in textiles from Spiro. Dyeing was presumably done using traditional dyes, such as black walnut and madder. The other major method of decoration was the creation of patterns using a resist dyeing method (batik is one such method). The technique is clearly depicted on several of the large unrolled textiles from the Trowbridge collection (Figures 5.6, 5.10, 5.19, 5.20). These textiles are twined, with the exception of the one simple weave cloth. Patterns are placed around the borders and comprise concentric hemicircles (423355), ogee, and key motifs (423353). Usually, the fabric is a soft shade of red or dusky red, while the design is now a light brown (tan or buff) color.

The designs are most intricate among twined tapestries because the method of weaving using different colored yarns allows creating patches of different color with greater facility. The twined tapestry motifs include geometric and human facial motifs (Figure 5.18). Many fragments are small, and therefore, it is difficult to estimate the range of variation among motifs employed.

Beads and Textiles

A note from Trowbridge (National Museum of Natural History, 1960) says "all the beads in tray 2721 were exposed when the entire textile collection was being cleaned and unfolded." Therefore, these could be from any textiles in the entire collection, and there is no way to match them with the textile with which they may have been associated originally, nor is it known whether they were attached to the cloth in some way or simply deposited in association.

FIGURE 5.19. Simple weave cloth with resist dye decoration (423358).

FIGURE 5.20. Close-up of simple weave cloth with resist dye decoration (423358).

Function and Use

The majority of the textiles were bundled. There is no evidence to suggest that textiles were placed unbundled into the Great Mortuary. Trowbridge unfurled eight large textiles during the late 1930s and placed them between glass in walnut frames.[3] Joan Gardner remounted six of these. Several of the large fragments are still bundled. Two textiles that were on exhibit during Gardner's project were not remounted (423359 and 423355) and as of 1992 were still within Trowbridge's original walnut frames.

BASKETRY

The term "basketry" is used to refer to any object interwoven of relatively wide strips of vegetable material. Fibers used in basketry include cane or reed. There is one complete basket, several fragments of baskets, and a considerable number of basket impressions on other pieces. Baskets can be distinguished between twilled and woven baskets and wicker. Wicker differs from other basketry in that it involves the use of a support structure around which the baskets are made. There was very little wicker present in or suggested by the collection. In at least one case a mat contained a support structure, and this support is of similar fiber as the matting it supports.

In most cases it is difficult to tell whether a basketry fragment derived from a shaped basket container or from

a flat mat. Since many baskets were rectangular, no curvature would be expected for their fragments. Often, the fragments are small, and although weave can be reconstructed, overall size and shape cannot. Selvage edges are rare.

Manufacturing is usually done in a twill pattern, although there are examples of coiled baskets. Twill plaiting is done by lacing wefts over and under more than one warp and then offsetting the next weft to create a herringbone pattern. Brown (1976, 1996) uses a simple method for characterizing woven patterns by counting the number of warps that a weft crosses over, then the number it crosses under. For example, if the weft crosses over two and under two, it can be denoted 2-2. This is similar to the way in which Baerreis (1947) refers to baskets. The width of fibers used in basketry ranges between 0.3 and 0.57 cm. The average width is 0.43 cm, with a standard deviation of 0.09 cm for fiber width. The total number of discrete basketry fragments or lots of fragments is 34. The incidence of basketry is recorded in Table 5.2.

Square Shallow Baskets

The single complete specimen is a large flat basket lined with leather (Figure 5.21). It contains beads, copper fragments, and shell fragments. This artifact (448934) is unique in that it retains much of its contents (Hamilton, 1952). The basket is well preserved and measures 54 cm long by 29 cm wide by approximately 10 cm deep. The basket has collapsed in on itself, but the selvage or basket rim is present on three sides. One side is damaged. A second basket fragment with intact edge sits on top (the lid), covering some of the beads within. This second fragment is not shown in the illustration in Hamilton. This suggests that it was replaced on top during rehousing at some point. There is no reason to doubt that this fragment does belong to this artifact. The size is in the same range as that reported for a group of twelve similar flat rectangular baskets in the collection of the University of Arkansas (Brown, 1996:414; Horton and Sabo, 2011).

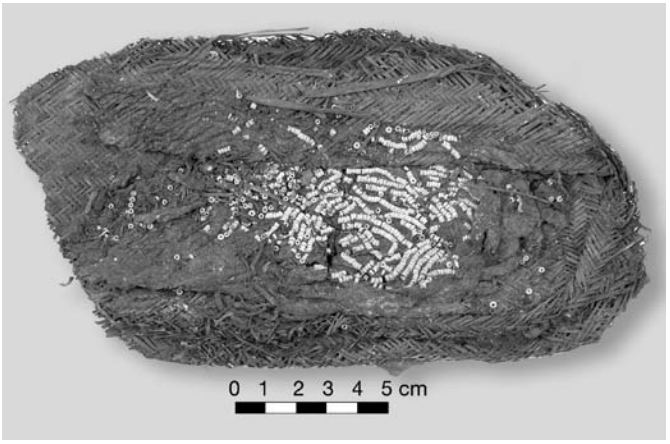


FIGURE 5.21. Square shallow basket, 54 × 29 cm (448934).

The weave is a twill done with fibers of 0.3 cm diameter in a 3-3 pattern. Some of the material found within the basket has become separated and is stored in small boxes alongside the basket. The basket is lined with fabric

TABLE 5.2. Characteristics of basketry in the NMNH collection. A dash (-) indicates that data are nonexistent or not available.

Catalog number	Subnumber (if any)	Object	Style	Length (cm)	Width (cm)	Count	Comments
423388		Basketry	Twill	6.5	4.5	3	Fragment
423387		Basketry	Twill	13	5	1	Selvage fragment
448778	s01.2	Basketry	Twill	8.1	3	2	Fragments
386185	s01	Basketry	Twill	15.7	4.43	1	Rim fragment
423386		Basketry	Twill	2.5	1.5	1	Fragments
423224	s01.2	Basketry	Twill	7	6.6	5	Fragments
448922		Basketry	Twill	75	11.5	2	Mat selvage fragment
448934	s01.1	Basketry	Twill	54	29	1	Complete
386186	s01	Basketry	Twill	17	12	1	Fragment
448914		Basketry	Loose fibers	-	-	1 lot	Fragments
448927	s01.2	Basketry	Twill	7.35	4.13	1	Fragment
448934	s07	Basketry	Unclassified	25	1	12	Fragments
448934	s05	Basketry	Unclassified	-	-	1 lot	Fragments
423389		Basketry	Coil	7	7	1	Basket bottom
423390		Basketry	Coil	20	6.5	1	Fragment

that supports numerous strings of shell disc beads. This cloth is 41 cm wide by at least 8 cm long. It is difficult to determine the original form of the cloth because the fabric is wadded up and smashed under the weight of the other objects that were in the basket. Along one edge, running along the basket selvage, is a braided tassel, which is really the only part for which a clear style can be seen. Over 500 shell beads repose on the fabric. Many of these are still strung on a vegetable yarn. In addition, there are approximately 1650 more beads that have become detached and are stored in a separate box. Also in separate boxes, but presumably from the same basket, are three medium-sized spherical beads with straight bores, one piece of engraved shell, loose basketry fibers, and approximately 60 fragments of sheet copper weighing 100 g.

Coiled Baskets

There are two examples of coiled baskets in the collection (Figure 5.22). These baskets were manufactured by stitching together a coiled structural fiber using a narrower, thinner fiber. One example is the center or bottom of a coiled basket (423389). The other is a piece from the side of a coiled basket or mat (423390). For this piece, the center or beginning of the coil is not present. Both are from the Trowbridge collection. Coiled baskets are unusual at Spiro, according to Baerreis (1947), who discusses the basketry present in the University of Oklahoma collection and in the McDannald collection.

Twilled Matting or Baskets

Twilled matting refers to basketry done in characteristic twill plaiting but without the curvature expected for some containers. Most pieces are too small to exhibit curvature, so much of what appears to be matting may actually be small fragments from containers. Rectangular shallow baskets will not exhibit curvature, even though they are containers. Baerreis (1947:7) discusses the incidence of matting as a common artifact among historic

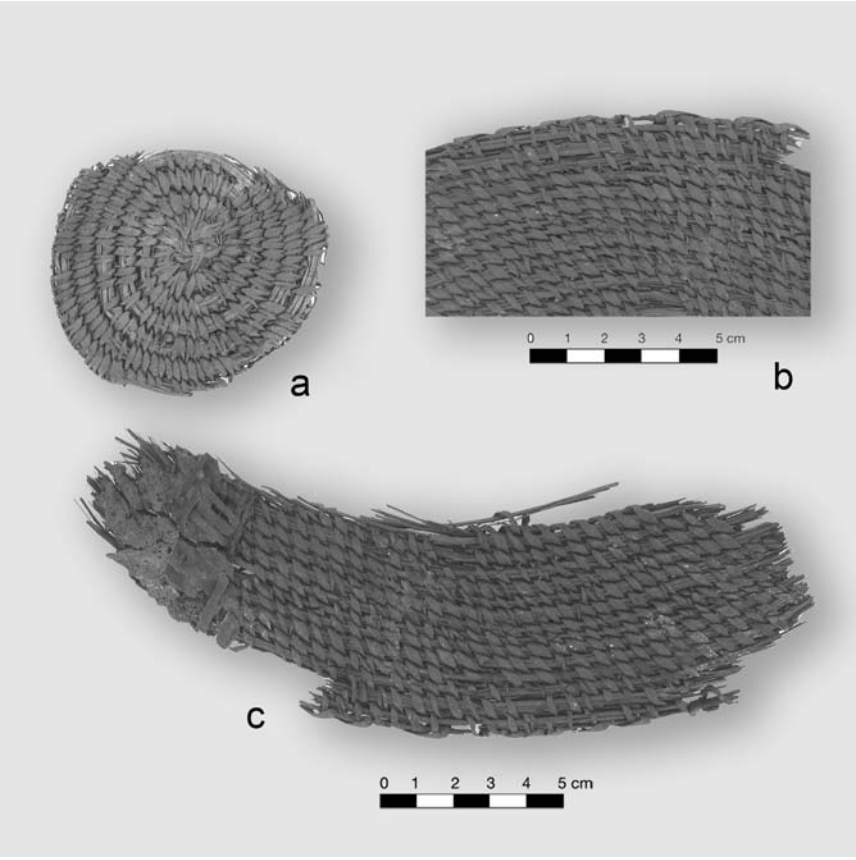


FIGURE 5.22. Coiled baskets: a, 423389; b, c, 423390.

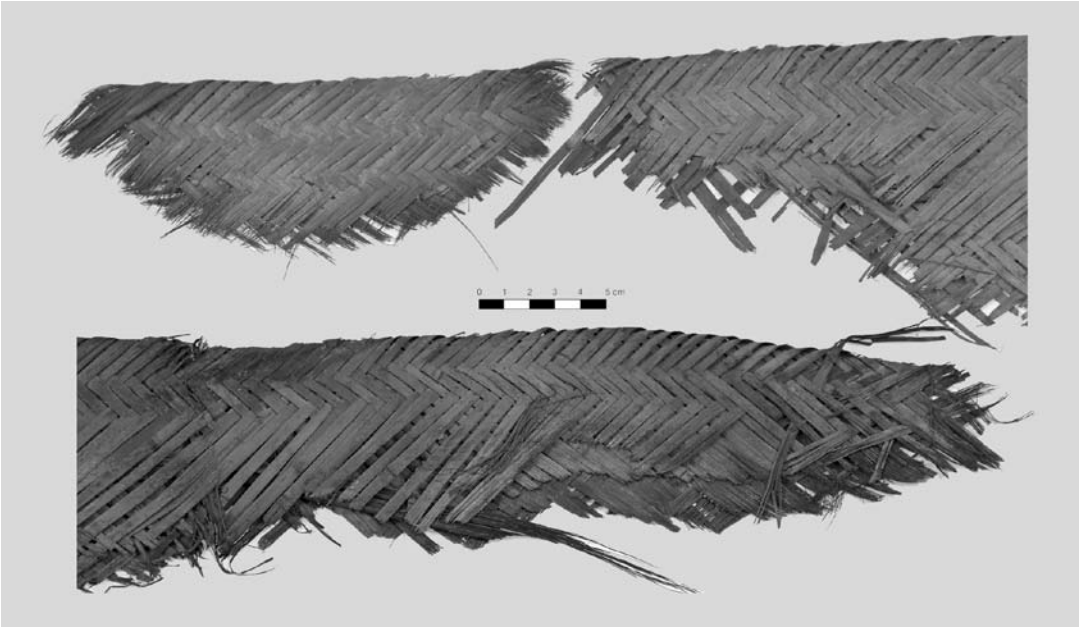


FIGURE 5.23. Large mat or basket fragments (448922).

groups of the southeast, such as the Natchez, Chitimacha, and Taensa. The largest piece of basketry that may be matting in the NMNH collection is a long selvage edge fragment, 75 cm long and almost 12 cm wide (448922). It consists of two fragments laid end to end (Figure 5.23) and is a large matlike creation consisting of three layers of twill work. This piece from the selvage and shows clearly how one layer was folded over and reworked to finish off the edge. A long wide piece of woody cane runs along the piece between the layers. This probably served for support. The twill is a large weave; however, the twill for both pieces does not match. The larger piece is plaited in a pattern of 7-3, and the smaller piece is 6-2. Brown (1996:414) cautions that for those artifacts that are demonstrably mats, the twill pattern is always a regular weave of 1-1. Therefore, the twill in this case better resembles that of a basket. Both fragments are three layers thick. Edges are frayed more on the smaller piece.

Other examples of twilled basketry are present in much smaller fragments. Some adhere to copper (Figure 5.24a). The twill weave can be used to produce variation and hence regular patterns in the overall design (Figure 5.24b).

Open-Work Weave

Another type of woven mat is a very loose weave, with as much as 2 cm between fibers in the basketry. This is evident in two cases: one is a small bit of basketry adhering to copper plating; the other is an impression only. The latter is an impression on a large piece of leather. The leather apparently rested on the matting and conformed to the mat surface (448934s08). Although this object has the same catalog number as the large shallow basket containing strung shell beads, it is uncertain whether or not this truly came from that artifact.

Twined Matting

There is one example of twined matting made from wide yarns of vegetable bast fibers (448913). Kuttruff (1988:207) reports that this fragment was not dyed and was woven in a spaced twined mesh using single warps. She reports six yarns per square inch. The entire piece is over 15 cm long and 10 cm wide.

Basketry Impression

Many artifacts exhibit impressions of basketry. Nowhere is this more evident than with the engraved shells. Thirty shell cups carry basket impressions. On the shells the basket impressions appear as patterned staining on the surface. They occur in small patches or cover a large portion of the shell surface. The impressions are almost invariably on the rounded surface of the shell, indicating that the shells were placed aperture up in the mound. Basket impressions are seen on clay and stone objects too.

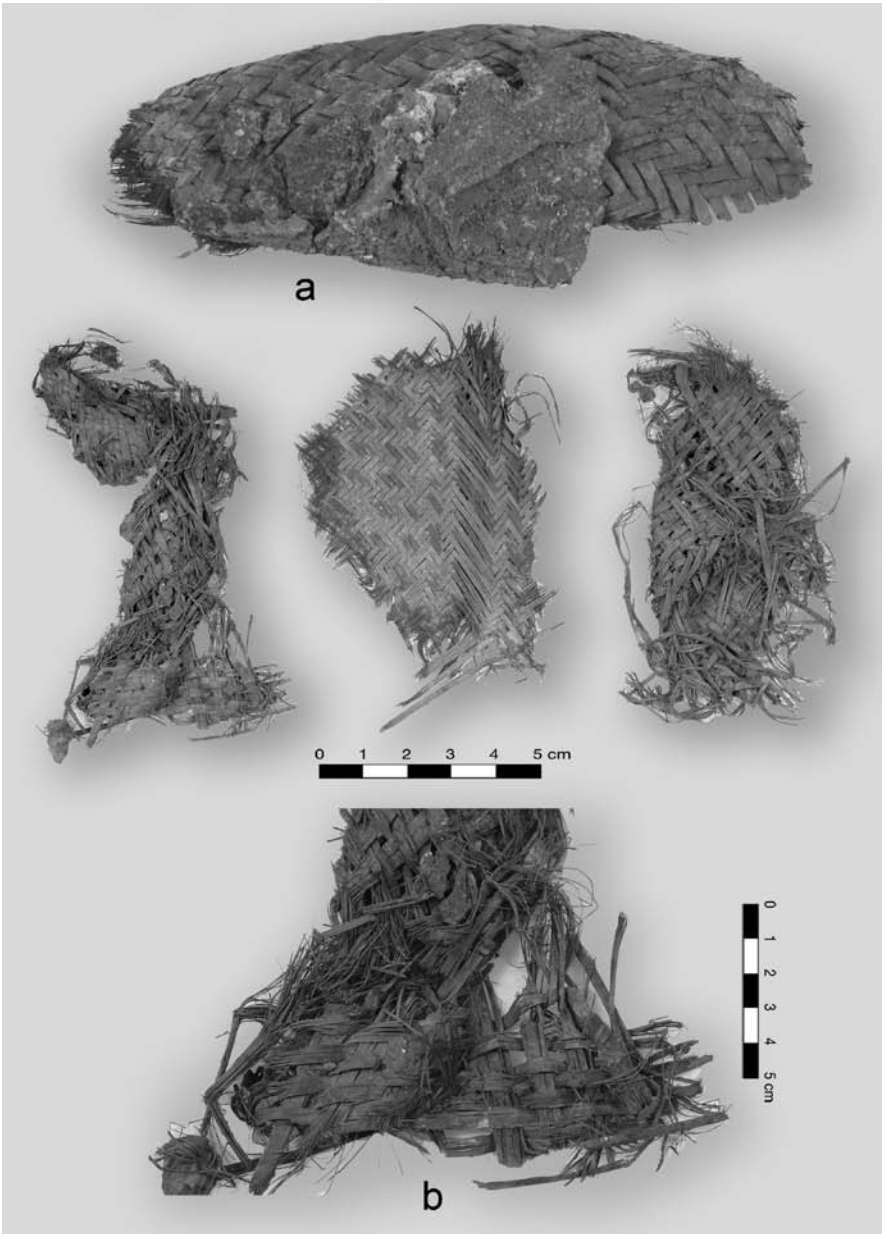


FIGURE 5.24. Twill basketry: a, curved basket section (386185); b, twill matting (432385).

At least three limestone earspools exhibit clear basket imprints, as does a figurine made of galena.

FIBER IDENTIFICATION

Several attempts have been made to identify fibers used to manufacture these textiles and baskets. The first person to have fibers analyzed was Trowbridge. He sent materials to the Smithsonian, which had them analyzed by the National Bureau of Standards (now the National Institute of Standards and Technology) in 1937. Analytical results of Trowbridge's NBS inquiry were published the following year (Trowbridge 1938). Several samples (B, C, D, F, G, J, K, and L) were reported to be rabbit hair, with a remote possibility of them being from a related animal, such as either squirrel or rat. Two samples (D and G) were rabbit hair wrapped around a vegetable material warp that might have been wood or bark. Two other samples (A and E) were feathers. Sample A was composed of feathers with strips of skin wrapped around a two-ply vegetable material thread. A more extensive analysis of feathers used in textiles was

TABLE 5.3. Fiber identifications for Craig Mound textiles.

Catalog number [a]	Identification	Source
423372 (2718K)	*Nolina georgiana* (yucca)	Whitford (1941)
378240	Rabbit and unidentified	Bogan (unpublished) [b]
386188	Feather	CAL report 2089 [c]
423353	Rabbit	Bogan (unpublished) [b]
423353	Fur fiber	Kuttruff (1988:205)
423361	Rabbit and canid?	Bogan (unpublished) [b]
423365 (2717C)	*Asimina tribola* (pawpaw)	Whitford (1941)
423366 (2717E)	*Asimina tribola* (pawpaw)	Whitford (1941)
423367 (2717H)	*Asimina tribola* (pawpaw) and *Arundinaria tecta* (cane)	Whitford (1941)
423367	Rabbit and rodent?	Bogan (unpublished) [b]
423368	Feathers (goose and turkey)	Bogan (unpublished) [b]
423368	Vegetable fiber	CAL report 2090 [c]
423370	Turkey feather, rabbit	Bogan (unpublished) [b]
423371 (2722D, I)	*Arundinaria tecta* (canebrake)	Whitford (1941)
423372 (2718K)	*Asimina tribola* (pawpaw)	
423372	Rabbit and some turkey	Bogan (unpublished) [b]
423373	Warp, vegetable; weft, fur	Kuttruff (1988:206)
423373	Rabbit and unidentified (mustelid?)	Bogan (unpublished) [b]
423374	Rabbit and unidentified	Bogan (unpublished) [b]
423377a	Rabbit, small rodent, turkey	Bogan (unpublished) [b]
423377b	Rabbit, turkey, small rodent	Bogan (unpublished) [b]
423378	Rabbit	Bogan (unpublished) [b]
448913	Bast fibers	Kuttruff (1988:207)
448917	Rabbit	Bogan (unpublished) [b]
448917	Bundled plant material	CAL report 2091 [c]

[a] Numbers in parentheses are the original Trowbridge catalog numbers.

[b] Michael A. Bogan, Smithsonian Institution, National Museum of Natural History, Department of Anthropology, Spiro Textile Analysis, unpublished manuscript, 1977.

[c] Unpublished reports of the Museum Conservation Institute (formerly Conservation Analytical Laboratory [CAL]), various dates. Smithsonian Institution, Washington, D.C.

conducted by Rogers et al. (2003). Finally, sample H was identified as hair, possibly "buffalo or bear, or perhaps dog or horsehair" (Trowbridge 1938:53). We now know that the sample could not have been horsehair, as the archaeological context dates at least two hundred years before the Spanish introduction of horses to North America.

Whitford studied vegetable fibers in 1941. Joan Gardner elicited identifications from the Conservation Analytical Laboratory and from Michael A. Bogan, who produced a short summary of his findings. Supplemental notations on Bogan's report were made by Roxie Laybourne, an expert on feathers. The same slides were also examined by Douglas Deedrick of the FBI, who agreed with the identifications (M. A. Bogan, unpublished; see Table 5.3, footnote b). Kuttruff (1988) examined fibers as part of her research. Textile identifications made during these earlier studies are summarized in Table 5.3.

Rogers et al. (2002:246) published a report on the microscopic study of 106 feather samples used in a number of textile fragments from the NMNH collection. Most prevalent were wild turkey (*Meleagris gallopavo*), Canada goose (*Branta Canadensis*), and swan (*Cygnus* sp.), in that order. Feathers from raptorial birds appear not to have been used in constructing textiles (Rogers et al., 2002:249).

NOTES

2. See CAL reports 2089, 2090, 2091 (Smithsonian Institution, Museum Conservation Institute, unpublished).
3. Object 423352 was never located (a large fabric in Plexiglas). A temporary specimen removal card for 423352 dated 1989 and signed by Natalie Firnhaber indicates the destination was Smithsonian's Museum Support Center, where the object is probably located at A120305003.

6

Weaponry and Extractive Tools

April K. Sievert

This chapter treats objects used in resource extraction—farming, manufacturing, or hunting—as well as tools that may have served in warfare-related activities. These artifacts are generally made from lithic materials. The category includes weaponry, artifacts presumably used for hunting or warfare (smaller projectile points), and boatstones or other parts of composite artifacts. In addition, there are lithic artifacts that probably represent a range of functions. Special or symbolic weaponry—large, ornate, and decorated objects such as maces or sword-form bifaces—probably served important social or ceremonial functions. Extractive implements comprise tools that were designed to obtain or process resources or raw materials and include chipped- and ground-stone spades, drills, and scrapers.

CHIPPED LITHIC WEAPONRY

Chipped lithic weaponry can be divided into three major groups: small haftable points, larger haftable points, and large bifaces that vary widely in form and may or may not have been hafted. Excavation techniques utilized by the Pocola Mining Company may not have been conducive to the recovery of small lithic tools, and that there are any small projectile points at all is remarkable. Caching may have contributed to the recovery of small chipped lithics. There is little or no minimally modified lithic material, either because debitage was overlooked by the excavators as worthless or because it was not included among grave offerings.

Style

Chipped lithic tools were examined for edge modification, morphological characteristics, traces from use, manufacturing traces and workmanship indicators, raw materials, and styles. Fairly complete point typologies exist for the southern Plains and can be useful for making chronological interpretations. Therefore, small projectiles and larger haftable bifaces were assigned to known types styles for the sake of communication and comparability. Characteristics

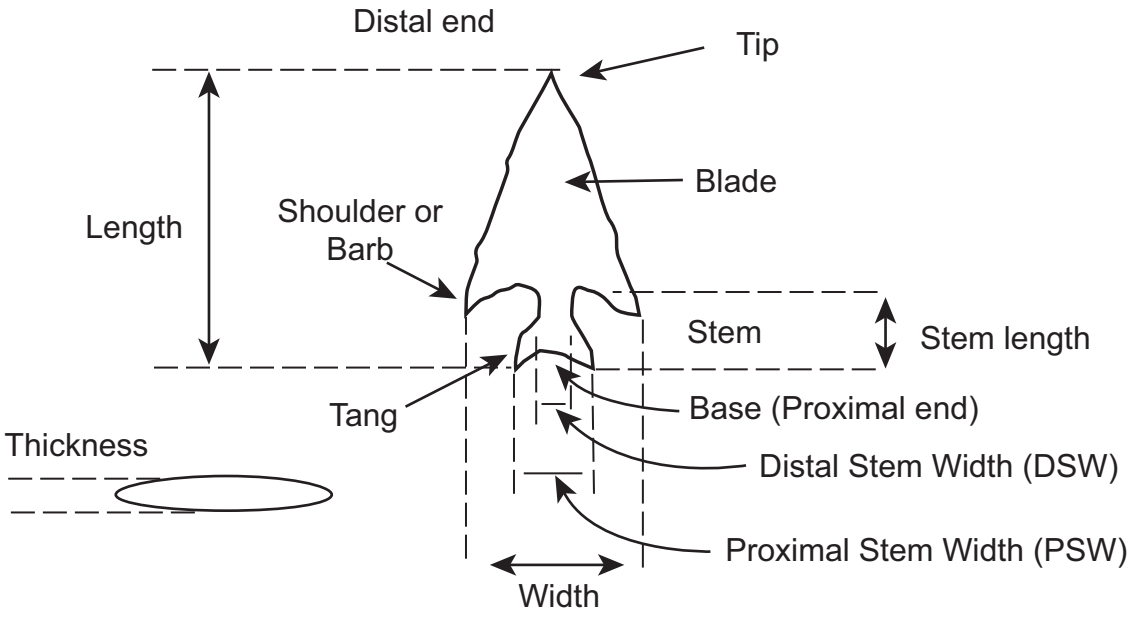


FIGURE 6.1. Diagram of a flaked lithic artifact showing nomenclature and measurements. After Brown (1976, 1996), Rogers (1980).

of small point styles that occur in and around Spiro were compiled from Bell (1958, 1960), Perino (1968, 1970), Brown (1976, 1996), and Justice (1987).

Metric attributes include total axial length, stem length, maximum width of blade, distal stem width (minimum haft width for Brown), proximal stem width (basal width), and thickness. Nomenclature for bifaces is shown in Figure 6.1.

Two ratios in particular are useful in assessing morphology and workmanship. These are the thickness to width (T/W) ratio and the proximal stem width to blade width (PSW/BW) ratio. The T/W ratio offers the relative degree of bifacial thinning. The PSW/BW ratio gives the relative narrowness of the base, which can be useful for looking at the differences between stemmed and notched points or in distinguishing side-notched Reed points from wide-based Washita points in ambiguous cases.

Manufacture

Edge modification was described in simple terms of bifacial or unifacial retouch and the relative fineness of the knapping. Other manufacturing variables of importance include characteristics of basal and tang retouch and the presence of barbs. Blade outlines were categorized into triangular, ovate, incurved, excurved, and recurved forms as shown in Figure 6.2. Base shapes can be concave, convex, or straight.

Hafting

Nearly all points in the small projectile class have a retouched hafting element of some type, consisting of shoulders, stems, or notches. In Figure 6.1, the hafting element is referred to as the stem. The biface shown in Figure 6.1 displays long extended barbs. Not all tools exhibit such an exaggerated barb. If a piece has no over extended barb, it is

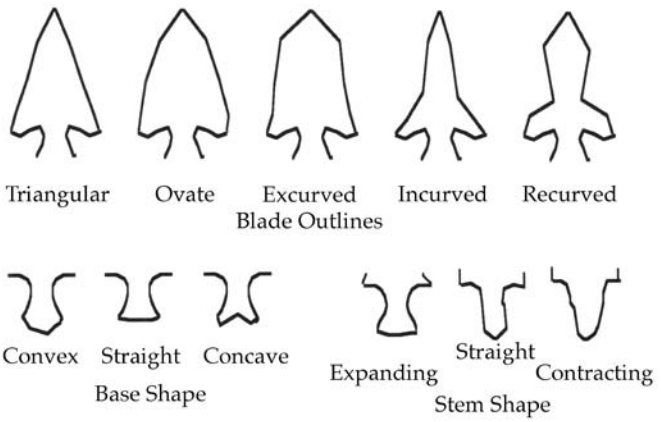


FIGURE 6.2. Attributes of biface form.

said to possess a shoulder. In some cases, the base, stem, or shoulders have sustained some damage from twisting motion. This suggests that at least some of the projectiles found at Spiro may have been used. The majority appear not to have been used. There are no traces of hafting materials, such as mastic. Given the excellent preservation at Craig Mound, this seems unusual. It seems unlikely that these tools were hafted at the time when they were placed in the mortuary feature because contact with copper should have contributed to preservation of some hafting compounds had there been any. On the other hand, cleaning by collectors may have removed traces of hafting materials. There are no traces of bindings or wooden handles present either.

Lithic Raw Materials

Raw materials derive from a wide variety of locations, and these are important for understanding cultural relationships suggested by social contact and trade. Identification of lithic material was based on visual characteristics and therefore must be considered "apparent" rather than certain. Identifications were made with the assistance of a reference collection of lithic raw materials collected and described by Dickson (1989). Samples of all known varieties from the Ozark Highlands, Flint Hills, and Ouachita Highlands are present in this reference collection. Dickson (1989) classifies these according to geological formation, including subtypes and varieties. Using this reference set, raw material designations could be made. Banks' (1990) study of major raw materials contains a comprehensive study of raw materials from a wider range than represented by the available reference collection, and this source proved to be invaluable. Lithic raw materials derive primarily from four general locations.

Southern Ozarks

Most of the lithic materials are expected to derive from sources in the Southern Ozarks. This area produces the varieties of chert sometimes referred to as Boone chert, but there is considerable variation in the materials from the formations in the region. The following chert varieties from various formations have been identified for the Spiro material from the NMNH. Type descriptions were compiled from Dickson (1989) and Banks (1990).

Ordovician Cotter. Ordovician Cotter, including Jefferson City Cotter, has distinctive banding in gray shades.

Pitkin. Pitkin chert is a highly distinctive dark bluish gray to black chert with a slightly milky appearance.

Mississippian Compton. Mississippian Compton can be waxy and occurs in blue-gray and tan combinations.

Mississippian Reed Springs. Mississippian Reed Springs cherts come in grays and tans; one variety is green. Several varieties have dark splotches surrounded by a light "halo." Texture is usually fine, and many varieties are vitreous or have a waxy luster. Blue-gray varieties weather to tan. This might not be easily differentiated from the Boone varieties discussed below.

Burlington/Boone. Cherts from the following formations have been included under the name Boone: Keokuk, Elsey, and Burlington. The Elsey Formation yields cherts in cream to light gray, with a rough texture and dull luster. Keokuk Formation cherts are generally lighter in color than Reed Spring, often with wispy and hazy darker or lighter patches. Most varieties are peppered with tiny spots, giving an overall hazy or dusty appearance. These are duller and less vitreous than Reed Springs varieties. They occur in larger nodules than Reed Springs; consequently, they are used for large artifacts. Burlington chert is usually whitish to blue-gray and is improved by intentional heat treating.

Flint Hills

This area of southern Kansas and north central Oklahoma produces some highly distinctive cherts known to have been used prehistorically.

Florence (Kay County). This highly distinctive chert from the Florence Formation is characterized by a light brownish gray to pinkish gray color and concentric narrow banding in alternating light and dark colors. At Spiro it appears especially among large ovoid bifaces (Brown, 1976, 1996).

Ouachita Mountains

Arkansas Novaculite. Novaculite accounts for 31% of the total chipped lithic collection. The presence of novaculite is culturally relevant because it clearly indicates contact with areas to the southeast of Spiro. The texture of novaculite when unheated is distinctive. Extremely fine grain size and crystalline structure result in a sugary texture. Novaculite may also have been heated to improve flaking qualities. The relative increase in translucence from heating is variable. Novaculite flakes in such a way that lipped hinge terminations result in fracture planes being clearly visible on the surface, even though most novaculites are fairly opaque. This results

in translucent slivers that are clearly visible on artifact surfaces.

Devonian Woodford. The Devonian Woodford Formation (from the Ti Valley) contains a dark, vitreous, and fine chert, excellent for knapping.

Mississippian Pierson. The Mississippian Pierson Formation produces reddish and bluish varieties, which can be waxy.

Red River

Red River Jasper. At least one variety of jasper, a dark brown to olive green variety, derives from the Red River basin in Texas. This opaque silicate was used for some projectiles in the NMNH Spiro collection. Brown (1996:649) refers to this material as ranging in color from buff to dull orange, brown, and red.

Texas Panhandle

Alibates Agatized Dolomite. Alibates agatized dolomite derives from Upper Permian formations along the upper reaches of the Canadian River. A major source of Alibates used in prehistory is the quarry located in the Texas Panhandle, although very small amounts of alibates also occurs in the terraces of the Washita River and in gravels along the Arkansas River (Potter County Historical Survey Committee, 1964; Thurmond, 1991). Alibates is characterized by waxy luster, some translucence, and wide concentric banding. One large mace from the Spiro collections may be manufactured from alibates, a material that resembles agate.

Other Sources

Smoky Hills (Niobrara) jasper comes from Kansas. Other varieties such as Dover chert from Tennessee and Mill Creek chert from Illinois appear in sword-form bifaces and maces. Mill Creek chert is a medium-grained material, opaque, and with a matte luster. Fine-grained Dover chert is often streaked with darker black or gray vitreous inclusions (Brown, 1996:647–648). Numerous other lithic materials of unknown source were utilized for chipped- and ground-stone tools.

Use and Curation

It is expected that tools will exhibit some forms of damage that might have occurred while the object was used kinematically (with active motion) and curated (kept and transported). The evidence for use is discussed in the context of each artifact style. General characteristics of use that can be evaluated for assessing the function of tools are discussed briefly as follows.

Types of damage that are useful in assessing wear include edge damage, striations, and polishes. Most polishes are invisible under stereomicroscopy, so these are of lesser importance here in assessing damage. Edge damage can derive from use, manufacture, and postexcavation damage. Edge damage consists of small flake scars removed from along the edges of tools. Certain types of edge damage are highly diagnostic. For example, impact fractures are small flake scars that are removed at the distal tip of a tool upon impact when that tool is used in projection (using a bow or atlatl). The point of impact is clearly shown as a cone of percussion. Lateral edge damage may signify use in cutting or sawing. Damage to the tang, base, or barbs can occur as impact forces the load onto the area of the tool that is firmly affixed to the haft or handle. Snap fractures occur if a tool breaks through the medial section as a result of use, manufacture, or postutilization processes. A snap fracture generally exhibits no bulb or cone of percussion, although it may possess a lip or hinge. The other type of fracture that is common is the shear fracture caused when a rotating projectile experiences torque when striking a solid. This spin causes fragments of the tool literally to twist off. Types of visible damage are shown in Figure 6.3.

Damage from curation will be more subtle and can arise from prehistoric or modern manipulation. It develops in places where artifacts rub together during storage, either in a box or drawer after it has been collected or while wrapped loosely in cloth or leather sacks during in the prehistoric past. Curation wear appears as smoothing to dorsal ridges, especially if the tools are carried or moved about. The wear need not always occur only on facial ridges, however, as barbs or tang elements may be damaged while the arrows are grouped in quivers or bundles.

Small Projectile Points

Small projectile points include any bifaces or unifacially worked pieces displaying pointed distal tips and modified hafting elements. A wide variety of small point styles can be expected during Harlan and Spiro phase occupations in the region of the Spiro site (Figures 6.4–6.11).

Clements et al. (1935–1938:263) noted in their WPA report on the lithic materials from Craig Mound that

> projectile points are uniformly small, thin, and finely flaked. Many of them have serrated edges

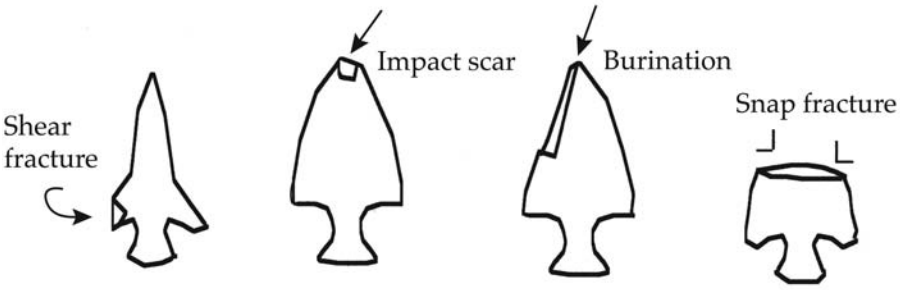


FIGURE 6.3. Common forms of damage to projectile points.

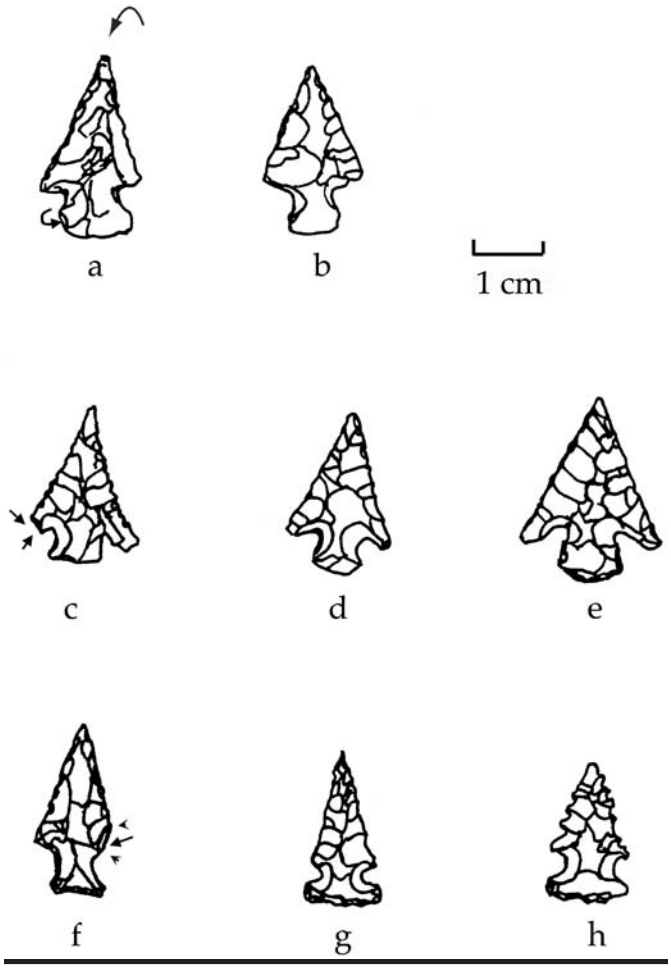


FIGURE 6.4. Small projectile points: a, 423181s01 showing impact flake at tip; b, 423181s02; c, 423182s03 Agee point with damage to barb; d, 423182s02 Agee point; e, 423182s01 Agee point; f, 423181s01; g, 423181s02 Reed point; h, 423181s03.

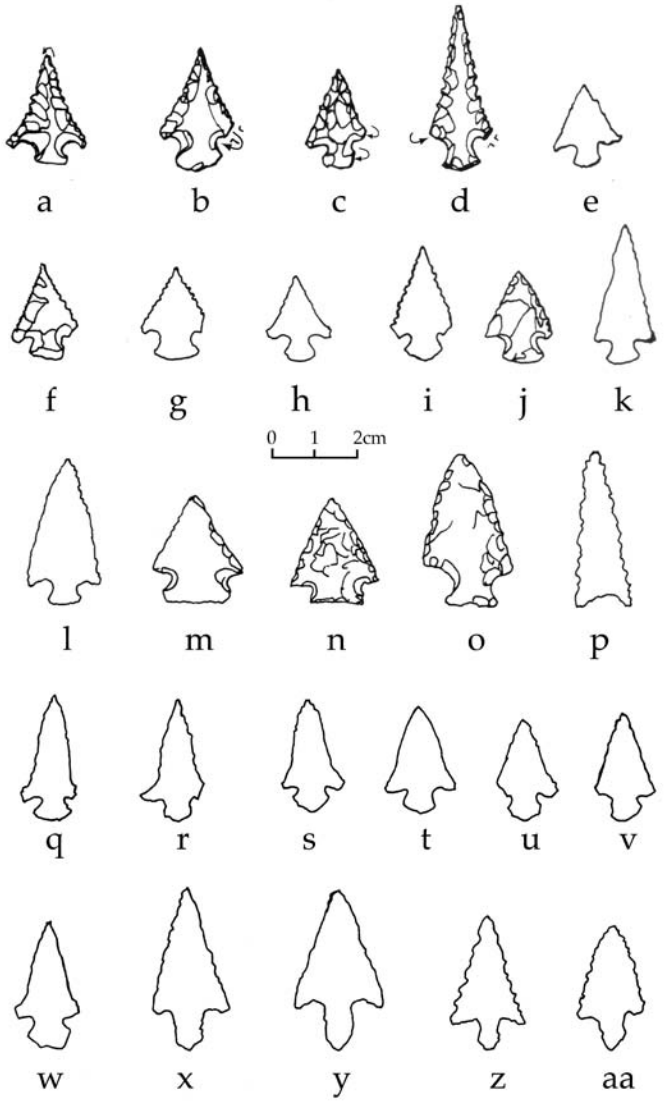


FIGURE 6.5. Small projectile points (423192): a–j, 423192s01–s10 Agee; k–o, s11–s15 corner-notched points; p, s16 Maud point; q–aa, s17, s19–s27 Ashley (recurvate), Agee, and Perdiz (stemmed) points.

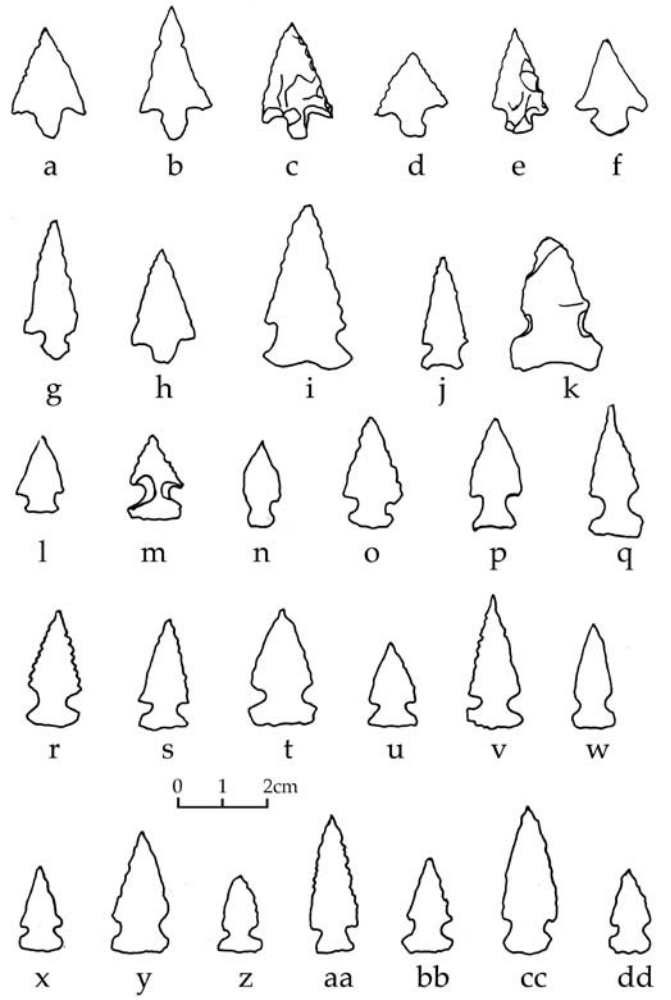


FIGURE 6.6. Small projectile points (423192): a–h, s28–s35 Perdiz, Alba, and Agee points; i, s36 Martindale point; j, s37 Haskell; k, s38 side-notched point; l–t, s39–s47 Reed points; u, s18 Reed point; v–dd, s49–s57 Reed and Keota points.

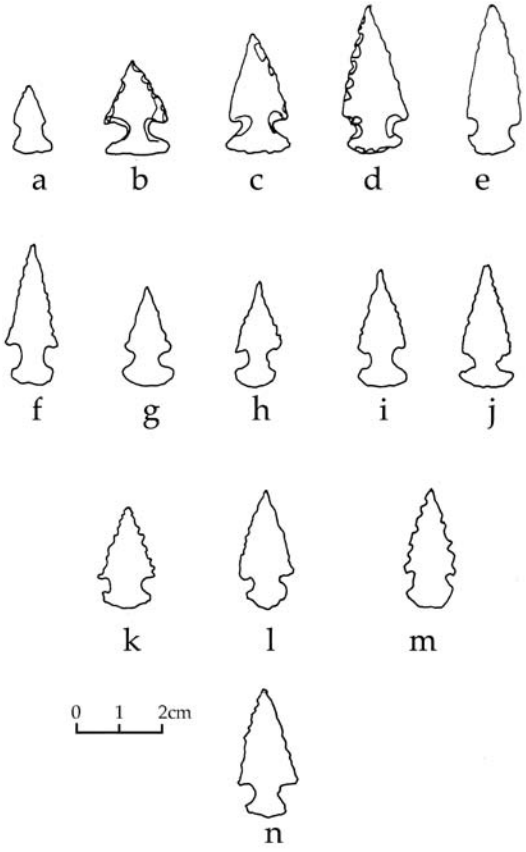


FIGURE 6.7. Small projectile points (423192): a–e, s58–s62 Reed and Keota points; f–m, s64–s71 Reed/Keota variety; n, s63.

and either diagonal or transverse notches. They belong unmistakably to the Lower Mississippi culture, and were found literally in thousands. In many cases they seemed never to have been used, but were manufactured solely as votive offerings. They were commonly found in heaps of several hundred piled between heads of a burial or were sometimes arranged in a definite pattern with the points turned one way.

Small projectile point styles and raw materials are shown in Table 6.1. Raw material usage is described more fully in discussing each point style individually.

Stemmed Points

Stemmed points include Alba, Hayes, Hayes Short, Perdiz, and Bonham point styles. Brown (1976) uses the characteristic of wide haft opening to demarcate this group of points. They are barbed and the stems may be well thinned to a semicircular basal outline (Alba), narrow and pointed (Perdiz), or left unretouched (Hayes). Varying degrees of retouch on bases and tangs can muddy the distinction between Alba, Hayes, Hayes Short, and Perdiz. In some cases, what appears to be extremely fine retouch on tang elements may be spontaneous retouch produced during notching.

Alba

Brown (1996:439) describes Alba points as having wide haft openings and wide stems with straight sides and links them to Spiro II grave lots. Most of the nine Alba

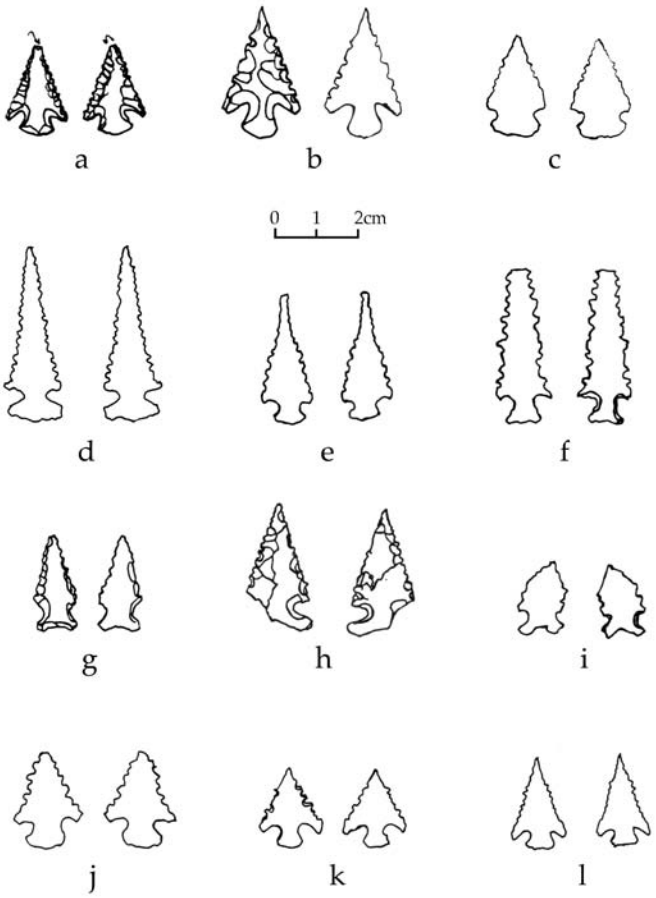


FIGURE 6.8. Small projectile points (448650): a, s01 Agee; b, s02 Rockwall; c, s03; d–f, s04–s06 Sequoyah; g, s07 Haskell; h, s08 Morris; i, s09; j–l, s10–s12 Agee.

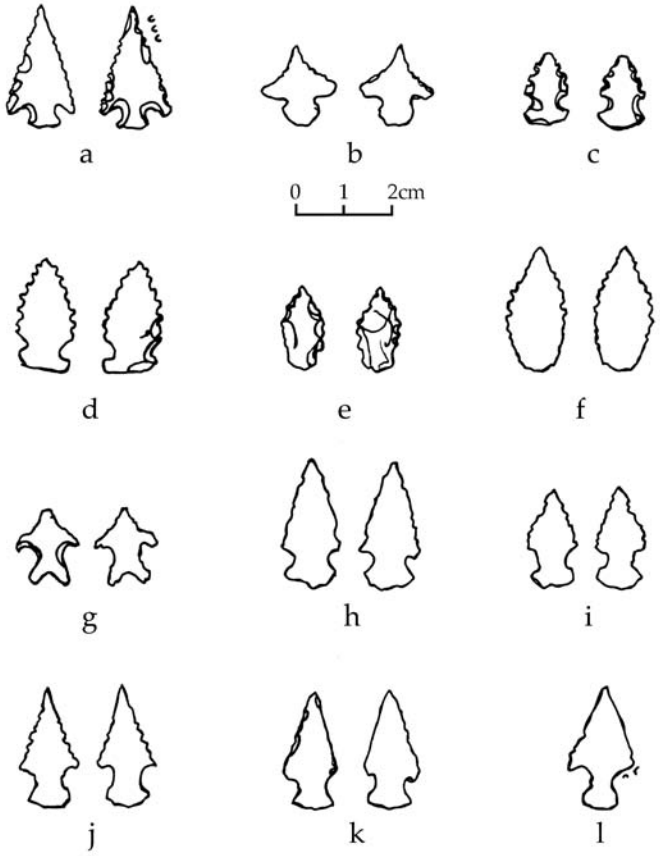


FIGURE 6.9. Small projectile points: a–f, 448650s13–s18 various; g, 448651s01 Edwards; h–l, 448651 s02, s07, s17, s21, s20 various.

points in the Smithsonian collection are barbed. Brown (1996) stresses that retouch on the base and tang for Alba points varies, and in one case from the Smithsonian collection (423192s31) the basal retouch is minimal. In all cases but two, the lateral retouch is of very fine or fine quality, with regularly spaced pressure flaking and maximal thinning. One point is only shallowly retouched, and another is unifacially retouched. Of the nine Alba points, two are recurved, and the rest triangular. None are broken.

Use. One point sustained snap fractures on both barbs (448651s43). Two more are damaged at the shoulders. All of this damage could be related to excavation damage as easily as wear.

Residues. Residues are present on two artifacts. On one, the residue consists of a reddish brown sediment; on another it appears resinous.

Raw Material. Cherts primarily from the Southern Ozarks are represented, including Reed Springs and Boone varieties. There are three tools of novaculite, and one is Red River jasper. Brown (1996:439) found relatively more novaculite in the sample from WPA excavations, where it comprises 85% of the total.

Hayes

Hayes points have minimally retouched and somewhat pointed stems, but they are otherwise barbed like Alba points. Brown (1996:440) places them firmly in Spiro II contexts. For Hayes points in the Smithsonian collection, thinning and pressure flaking is less fine than on the projectile points designated Alba. Three are essentially unifacial. One is serrated (423192s32). None of the nine points really have pointed bases, which according to Bell (1958:32), is a fundamental characteristic. However,

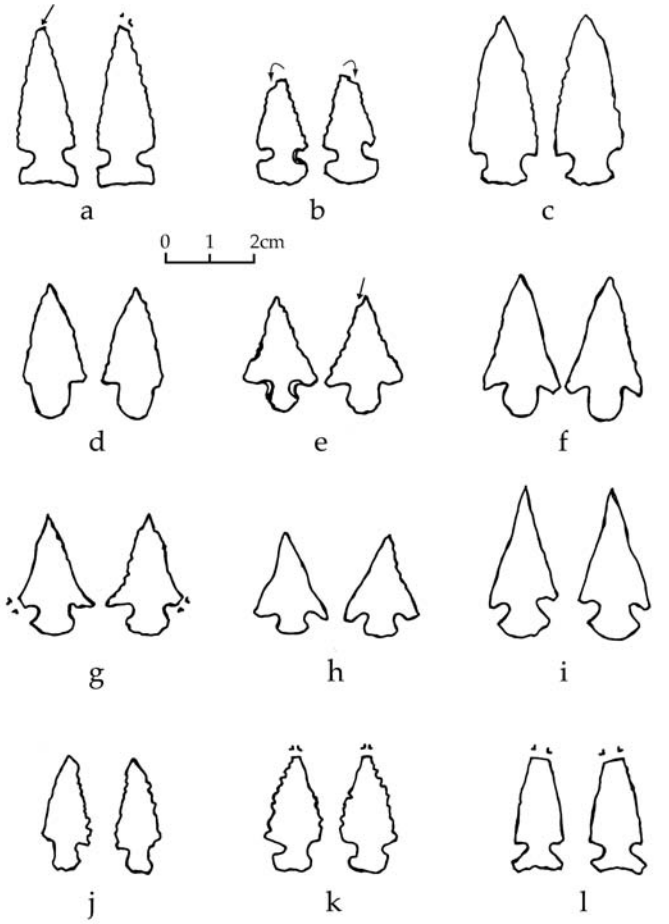


FIGURE 6.10. Small projectile points (448651): a, s03 Reed; b, s04 Keota; c, s05; d, s08 Alba; e–f, s24–s25 Alba; g, s06 Ashley; h, s28 Agee; i, s42 Agee; j–k, s09–s10; l, s12 Haskell.

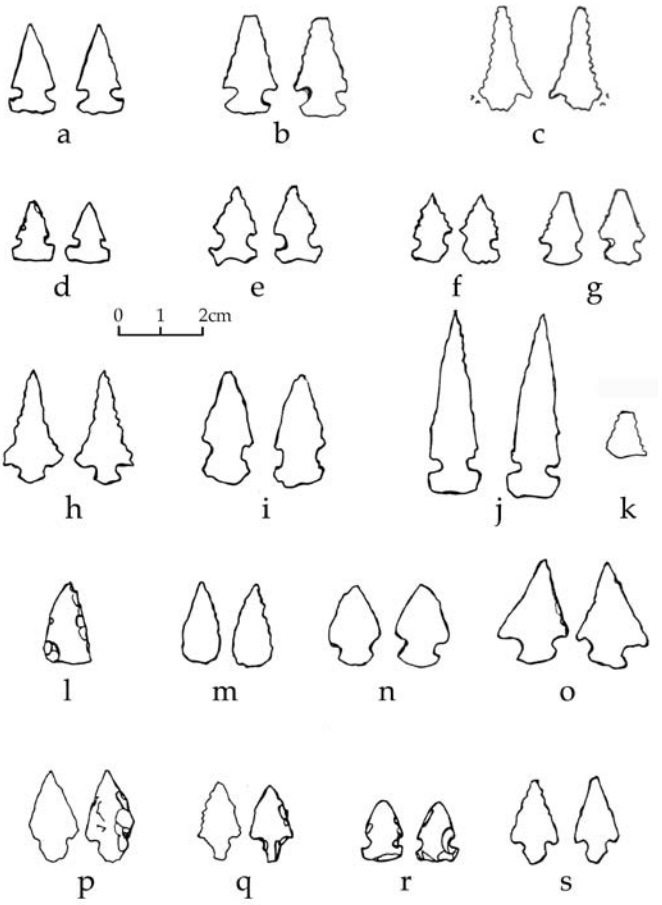


FIGURE 6.11. Small projectile points (448651): a, s13 Reed; b, s15; c, s16; d, s14; e, s18; f, s27; g, s38; h, s14; i, s23; j, s11; k, s31, l, s26 Fresno; m, s22 unshouldered; n, s29; o, s30; p–s, s32–s35.

seven have bases that are highly convex and that form an angular juncture with the proximal corner of the notch. Two are nearly straight based but are classified as Hayes because of their lack of stem retouch. Blade outlines are triangular in two cases, incurved in three cases, and recurved in four cases.

Use. Four points exhibit signs of damage that could be either from use or other mechanical process. One has polished ridges (423192s22) that might indicate curation.

Residues. There are no residues beyond sediment on 448651s19.

Raw Material. The nine tools are nearly evenly divided between chert (n = 5) and jasper (n = 4). In one case the jasper is banded. Brown (1996:440) reports that jasper made up the larger portion of Hayes points in the WPA collection.

Hayes Short

Brown (1966:440) classifies them as perhaps later than Alba and Hayes points, with caches associated with Spiro III and IV grave lots, while being found singly in Spiro II grave lots. There are two Hayes Short points in the Smithsonian collection. One has a triangular outline, and the other is incurved. Bases are strongly convex. Bifacial retouch is either fair or moderately fine. Dimensions are 1.68 and 2.04 cm in length, 1.09 and 1.55 cm in width, 0.35 and 0.37 cm in thickness.

Residue. None.

TABLE 6.1. Small projectile point styles and raw material summary.

Style	Quartz	Novaculite	Chert	Jasper	Unclas.	Unknown	Style total
Agee	1	12	10	1	0	1	25
Alba	0	3	5	1	0	0	9
Ashley	0	2	2	1	0	0	5
Ashley Chocoville	0	0	1	0	0	0	1
Bonham	0	0	1	0	0	0	1
Bonham Tahlequah	0	0	2	0	0	0	2
Collier	0	1	2	0	0	0	3
Coryell	0	0	2	0	0	0	2
Edwards	0	0	1	0	0	0	1
Fresno	0	0	2	0	0	0	2
Haskell	0	0	4	0	0	0	4
Hayes	0	0	5	4	0	0	9
Hayes Short	0	1	1	0	0	0	2
Homan	0	1	0	0	0	0	1
Keota	0	1	9	0	0	0	10
Martindale	0	0	1	0	0	0	1
Massard	0	2	10	0	0	0	12
Maud	0	0	1	0	0	0	1
Morris	0	0	3	0	1	0	4
Nodena	0	0	2	0	0	0	2
Perdiz	0	0	6	0	0	0	6
Reed	0	2	10	0	0	0	12
Reed/Keota cluster	0	5	6	0	0	0	11
Rockwall	0	0	2	0	0	0	2
Scallorn	0	3	9	0	0	0	12
Sequoyah	0	1	3	0	0	0	4
Unclassified	0	0	8	0	0	0	8
Unclassified corner notch	0	0	4	0	0	0	4
Unclassified side notch	0	0	1	0	0	0	1
Uniface	0	0	1	0	0	0	1
Washita	0	1	1	0	0	0	2
Washita garvin	0	0	2	0	0	0	2
Washita chaffee	0	0	1	0	0	0	1
Washita peno	0	0	2	0	0	0	2
Young	0	0	1	0	0	0	1
Material total	**1**	**35**	**121**	**7**	**1**	**1**	**166**

TABLE 6.2. Alba points measurement summary (n = 9).

Measurement	Mean	Extremes	Standard deviation
Length (cm)	2.85	1.89 / 4.51	0.75
Width (cm)	1.56	1.2 / 2.11	0.27
Thickness (cm)	0.32	0.28 / 0.36	0.03
Proximal stem width (cm)	0.77	0.59 / 0.96	0.13
Distal stem width (cm)	0.68	0.57 / 0.82	0.08
Stem length (cm)	0.71	0.55 / 0.82	0.09
Thickness/width ratio	0.21	0.17 / 0.3	0.04
Width/proximal stem width	2.07	1.36 / 2.69	0.45

TABLE 6.3. Hayes points measurement summary (n = 9).

Measurement	Mean	Extremes	Standard deviation
Length (cm)	2.45	2.07 / 2.71	0.18
Width (cm)	1.41	1.14 / 1.64	0.15
Thickness (cm)	0.35	0.23 / 0.52	0.11
Proximal stem width (cm)	0.72	0.5 / 0.95	0.14
Distal stem width (cm)	0.64	0.55 / 0.85	0.09
Stem length (cm)	0.56	0.45 / 0.7	0.08
Thickness/width ratio	0.26	0.15 / 0.46	0.11
Width/proximal stem width	2.04	1.2 / 2.8	0.42

Raw Material. One is novaculite and the other is chert (possibly Burlington).

Homan

The single point classified as Homan is novaculite, incurvate, and 1.75 × 1.08 cm in size. It is finely retouched and has a use-related break at the tip. Brown (1996:444) found that novaculite was the preferred material for Homan points, which are characterized by narrow haft openings. They were included in a Spiro IB cache.

Bonham

The one Bonham point (448651s33) has bifacial retouch with slight serration. Burination-type flake removal forms both sides of a narrow tang. This might have been either deliberate in manufacturing design or a use (impact) stress fracture. As it stands, the parallel sides of the stem were used as the criterion for assigning it to this type.

Length is 1.83 cm, width is 1.03 cm, and the artifact is 0.41 cm thick. Proximal stem width is 0.38 cm, whereas the distal stem width is 0.45 cm, indicating that the stem contracts slightly. A high width to stem width ratio of 2.71 is in keeping with Bonham styling. The base is pointed and the blade triangular.

Bonham Tahlequah

There are two points of this style, one each from the Trowbridge and Meyer collections. Overall, retouch is medium fine. The point numbered 423192s30 is 2.52 cm long by 1.6 cm wide and 0.4 cm thick. The straight-sided and straight-based stem narrows from 0.5 to 0.41 cm to the proximal end, resulting in a very high width to stem width ratio of 3.9. It is made from a heat-altered chert. The second, 448651s09, is made from the distinctive Pitkin chert and measures 2.62 cm in length, 1.06 cm in width, and 0.42 cm in thickness. It has sustained a shear fracture to the base and slight shoulder damage. Brown (1996:440) found Bonham Tahlequah points in an early cache, in a Spiro IA grave lot.

Perdiz

There are six Perdiz points, and all but one of these has a triangular blade outline; the other is ovate. Bases are either pointed or convex but narrow. Mean length is 3.23 cm, the shortest is 2.5 cm, and the longest is 3.79 cm. Width ranges from 1.57 to 2.09 cm, with an average of 1.75 cm. The tools are moderately thin, ranging from 0.26 to 0.43 cm in thickness. The thickness to width ratio is low, ranging from 0.14 to 0.27. Stem length ranges from 0.49 to 0.67 cm. One is heat altered and one shows mechanical damage. Perdiz points are distinctive because in three cases they were made on thin flake blanks (contributing to the low T/W ratio). One is coarsely serrated. Brown (1996:439) notes that Perdiz points do not appear to have been cached in quantity in the Craig Mounds graves but appear as isolated finds in Spiro II and Spiro IV grave lots.

Use. One has edge damage near the tip (423192s24). Two display either irregularity or edge damage on one edge.

Residues. None.

Raw Material. At least four appear to be manufactured from chert from the Reed Springs Formation. One may be Reed Springs or Jefferson City–Cotter Undifferentiated. The sixth is probably a Boone chert.

Corner-Notched Points

The next group includes points that are corner notched or seen to have a narrow haft opening according to Brown (1976, 1996). The distinction between Agee, Rockwall, Ashley, and Homan in this group is sometimes unclear. Collier and Coryell styles are included here as well.

Agee

There are 25 Agee points in the collection, making Agee points the most common style represented. Summary measurements are given in Table 6.4. Fourteen are serrated, and nearly all are characterized by fine bifacial retouch. Bases may or may not be retouched. Ninety-two percent have either triangular or incurvate blade shapes, with triangular blades more common and accounting for

TABLE 6.4. Agee points measurement summary (n = 24).

Measurement	Mean	Extremes	Standard deviation
Length (cm)	2.42	1.88 / 3.82	0.43
Width (cm)	1.59	1.29 / 2.1	0.2
Thickness (cm)	0.37	0.24 / 0.7	0.1
Proximal stem width (cm)	0.83	0.6 / 1.16	0.16
Distal stem width (cm)	0.62	0.47 / 0.83	0.09
Stem length (cm)	0.56	0.39 / 0.73	0.1
Thickness/width ratio	0.23	0.12 / 0.36	0.6
Width/proximal stem width	1.95	1.25 / 2.53	0.36

60% of the total. One point is slightly ovate and one is slightly excurvate. Two were clearly manufactured on flake blanks. Brown (1966:441) places Agee points in early components at Spiro on the basis of inclusion in Spiro IA, IB, and II grave lots. They may also have been reinterred in later Spiro IV contexts in the Great Mortuary.

USE. Damage from use is expected to occur in the form of shear fractures to barb or tang elements, distal damage, and damaged serrations. Among these artifacts, 10 have damaged barbs or shoulders, some apparently resulting from torque. Four tools are blunted or hinged at the tip, suggesting use. The most likely candidates for tools actually having been fired include 448651s16 and 423192s04. Point 448651s16 has a small bending snap fracture at tip and one broken barb. The base appears to be missing its corners. Point 423192s04 has snap/shear fractures on the shoulders, and the tip has been blunted by a hinge fracture, which could have been caused during manufacture or use. One tool (423192s08) is polished on the ridges, and this could have developed from curation.

RESIDUES. No residues are present, with the exception of soil on two points.

RAW MATERIAL. The most common raw material is novaculite, which accounts for 48% of the total. Brown (1966:441) found a much higher proportion (85%) of novaculite from the WPA samples of Agee points. Forty percent are chert from the Southern Ozarks. Of the Ozark chert points, two are of Pitkin chert, and three appear to be of the general Keota and Burlington Formations. There are also two that appear to be from the Reed Springs Formation. In moving to sources farther away, one point appears to be made from Kay County chert, although this is tentative because of the difficulty of assigning chert types on the basis of the small surface area sample presented by small points. At Spiro, Kay county chert was used primarily for making large bifaces, not small points. There is also one Agee point finely chipped from quartz crystal. One point is from Red River jasper, and another is of an unknown material.

Rockwall

Closely related to the Agee style is the somewhat larger and more robust Rockwall style. Rockwall appears earlier than Agee over much of its range and may well be the precursor to the Agee style. Brown (1996:441) shows Rockwall points in conjunction with Spiro IA and Spiro II grave lots, where they often occur along with Agee and Ashley points. Rockwall points are barbed, and they may have deep serrations.

There are only two Rockwall points recorded for this collection. One is serrated coarsely, and the other is nonserrated. Both are well barbed. Lengths are 3.15 and 3.44 cm for points 448650s02 and 448651s42, respectively. The points are 1.83 and 1.54 cm wide, respectively.

Sequoyah

Sequoyah points are similar to the Agee general pattern except that they customarily have long narrow blades often embellished with coarse serration. Four Sequoyah points are present in the Smithsonian's collection from Spiro. The basal morphology is variable, with two being straight and one slightly convex. There are three such points present in the Meyer collection. One problematic point from the Trowbridge collection (423184) was tentatively assigned to this category. The artifact has a rather wide blade for Sequoyah points, but its serration is coarse, and the point would fit into the group on that basis. The blade tapers somewhat at the tip, another characteristic of Sequoyah points. These points range from 3.11 to 4.23 cm in length, 1.22 to 1.41 cm in width, and 0.37 to 0.39 cm in thickness, yielding a high T/W ratio of 1.07–1.75.

Justice (1987:223–224) treats Sequoyah as an outgrowth of the Scallorn cluster dating from AD 1000 to the end of the Spiro phase. He considers these the most common and typical points found from Spiro phase contexts at Spiro. Furthermore, Justice reports that although Sequoyah points spread as far north as southwestern Indiana, they are not found in appreciable quantities to the south of Spiro, as the Alba cluster varieties are. Brown (1966:443) reports that Sequoyah point caches are present in Spiro II and Spiro IV grave lots; however, these points do occur in small amounts spanning the time from Spiro IA to Spiro IV.

RAW MATERIAL. One is a light pink novaculite (423184), and three are unidentified cherts. Brown (1996:443) reports a range of materials for the points from the WPA collections, including jasper, various cherts, and a small amount of novaculite.

Ashley

Ashley points are similar to Agee in style, but with longer stem lengths relative to the tool width. Brown (1996:442) reports that one cache of Ashley points derived from an early (IA) Craig Mound grave lot and that its later inclusion into the Great Mortuary was fortuitous.

The five Ashley points are all finely bifacially retouched. They are, by definition, strongly recurved in outline and well barbed. The amount of retouch on the base

varies. The mean length is 2.52 cm, with a minimum of 2.21 cm and a maximum of 3.09 cm. Width ranges from 1.24 to 1.78 cm; however, this range underestimates the width because of damage to the barbed shoulders. Thickness ranges from 0.29 to 0.36 cm.

Use. All Ashley points are damaged at the shoulders; however, they are not damaged at the tips.

Raw Material. These are equally split between chert and novaculite. One of the chert points is a fine-quality black chert that may be of the Mississippian Bayou Menard Formation.

Ashley Chocoville

The single projectile in this style is a classic example of the type, which Brown (1996:442) refers to as a sociotechnic counterpart to the Ashley type (Figure 6.13a). It has a pair of extra notches along the lateral edges and is made from a fine-quality, lustrous light gray chert that appears to be from the Reed Springs Formation (423187).

Coryell

The two Coryell points are bifacially retouched in a fine or medium-fine manner. They are 2.0 and 3.4 cm in length and 1.42 and 1.94 cm in width, respectively. The smaller is 0.44 cm thick, and the larger is well thinned at 0.28 cm thick.

Use. Artifact number 448651s47 has polish on most ridges, probably from prehistoric curation.

Raw Material. The polished artifact is of an unknown chert; the other, 448651s20, is made from a chert likely from the Reed Springs Formation.

Collier

There are three Collier points. All have fair workmanship in that bifacial retouch is minimal, steep and shallow, or just shallow. Two exhibit stepping or humping from poorly controlled flaking. They vary in size. Lengths range from 1.94 to 3.85 cm.

Use. One exhibits edge damage.

Raw Material. White novaculite was used for one. The other two are chert, from southern Ozarks sources.

Martindale

A single Martindale point, 423192s36, exhibits bifacial retouch and a manufacturing error on one lateral edge. Stepped terminations create a hump, so the piece is irregular in cross section. It has the characteristic "fish tail" base (Bell, 1960) and is somewhat translucent. Martindale points were used between 5000 and 1000 BC, so they represent an earlier intrusion into the collection. The length is 3.67 cm, width is 1.81 cm, and the tool is 0.59 cm thick.

Residues. A very dark brown residue is present on basal ridges. The probable age of this piece would make it highly unlikely for this to be mastic for hafting.

Raw Material. The waxy lustered raw material is dotted with whiter inclusions and resembles Reed Springs chert.

Massard

Massard points are corner-notched varieties without barbs. Brown (1996:440) lists these as appearing in Spiro II through Spiro IV grave lots.

Among the 12 Massard points, one is ovate, one is incurved in outline, and the rest are triangular. Four have straight bases, whereas eight are subconvex to convex. Two are broken at the shoulders. Measurements are given in Table 6.5.

Use. Six points exhibit damage traces that may be use related. These are manifested as shear fractures or burination at the shoulders and, in one case, distal damage consistent with impact.

Residues. One has a brown stain, and another has a brownish sediment adhering to the surface.

Raw Material. One is clearly novaculite from the Ouachita Mountains of Arkansas. Another is possibly a heat-altered novaculite that resembles chalcedony. Chalcedony would be an unusual material for this area. Heat alteration might alter the novaculite, giving it

TABLE 6.5. Massard points measurement summary (n = 12).

Measurement	Mean	Extremes	Standard deviation
Length (cm)	2.38	1.87 / 2.68	0.28
Width (cm)	1.18	0.84 / 1.51	0.17
Thickness (cm)	0.39	0.3 / 0.52	0.07
Proximal stem width (cm)	0.88	0.59 / 1.21	0.16
Distal stem width (cm)	0.6	0.45 / 0.72	0.07
Stem length (cm)	0.7	0.54 / 0.85	0.1
Thickness/width ratio	0.34	0.21 / 0.47	0.8
Width/proximal stem width	1.36	0.95 / 1.78	0.22

the waxiness and translucence usually characteristic of chalcedony. Two novaculite tools would be fewer than expected on the basis of Brown's (1976, 1996) study, which indicates Massard (especially the variety designated "B") points are produced predominantly from novaculite. This can be explained partially in terms of the small sample size of Massard points in the Smithsonian collection and partially in terms of the subjectivity involved in doing point typologies. Three of the cherts could not be identified with any confidence. One may be Keokuk, Prior Aggregate variety, and another has the characteristic banding of the Ordovician Cotter or Jefferson City Formations. Another may be from the Reed Springs Formation, also in the southern Ozark Highlands.

Scallorn

Scallorn points are summarized in Table 6.6. The 12 Scallorn points are distinguished by corner notching and are usually barbed. Blade outline is predominantly triangular (62%), although there are ovate outlines (23%) and one each of incurvate and asymmetrical triangular outlines. One-half of the bases are straight, five are convex, and one is concave. Serration does occur on the point edges. Workmanship is good, with fine bifacial retouch being typical, although there is one unifacially worked point that falls into this class. Justice (1987:220–222) places this cluster in the Late Woodland to Mississippian transition, about AD 700–1000 or the Fourche Maline, Evans, and Harlan phases. Brown (1996:442) reports on Scallorn points from Spiro II and III grave lots, implying that Scallorn points were being made later, from AD 1100 to 1300.

USE. Shear fractures on the barbs is the most frequent damage recorded. Three may be altered by heat. Point 423192s04 is serrated, with a retouched base and snap or shear fractures on the shoulders. The tip is blunted by a hinge fracture that could also have been caused during manufacture. Artifact 448651s15 exhibits a bending fracture at the tip that could easily be from use.

RESIDUES. Two points have some form of residue that may be prehistoric. Point 423192s63 has orange residue near the tip on the numbered face.

RAW MATERIAL. Nine of the 12 are chert, and three are of Arkansas novaculite. The chert points all appear to be of Keota, Burlington, or Reed Springs Formations. One may be of the Pierson Formation.

TABLE 6.6. Scallorn points measurement summary (n = 12).

Measurement	Mean	Extremes	Standard deviation
Length (cm)	2.67	1.74 / 3.82	0.63
Width (cm)	1.38	1.06 / 1.69	0.2
Thickness (cm)	0.47	0.27 / 1.44	0.3
Proximal stem width (cm)	0.96	0.61 / 1.49	0.26
Distal stem width (cm)	0.62	0.53 / 0.78	0.9
Stem length (cm)	0.62	0.39 / 0.77	0.12
Thickness/width ratio	0.34	0.21 / 0.93	0.18
Width/proximal stem width	1.51	0.94 / 0.33	0.39

Side-Notched Points

Side-notched points include Reed, Morris, Keota, Haskell, and Washita and its variations. The side-notched group as a whole usually exhibits fine thinning and secondary retouch, but points are unbarbed.

Reed

This straight-based point style is listed by Brown (1996:444) in grave lots as early as Spiro IA but is present in larger numbers in caches in Spiro II/III and Spiro III grave lots. The 12 Reed points reported here are characterized by good to fine bifacial thinning and basal retouch (Figure 6.12). None of the Reed points are broken. By and large, they are thin and finely worked, although several are steeply retouched. Eight are triangular, and four are ovate in outline. Two of the Reed points are serrated.

USE. Fine edge damage is present on one point, but otherwise, characteristics of use are lacking.

RAW MATERIAL. All are chert except for two, which are novaculite.

Keota

Ten projectile points have the convex bases and relatively narrow side notches characteristic of the Keota style. Three bear traces of heat alteration. Eighty percent have a triangular blade outline; 20% are ovate. The base may or may not be retouched. Tools having a lower T/W ratio also tend to have retouched bases. There is a varying degree of fineness displayed in finishing knapping. Keota points are found in a variety of grave lot styles, occasionally in Spiro IB and II and cached in Spiro III and IV grave lots (Brown, 1996:444).

USE. Point 448651s53 (Figure 6.12p) has steep unifacial retouch to form a thick tip. A steep intersection at the tip would make a useful graver or incising tool and

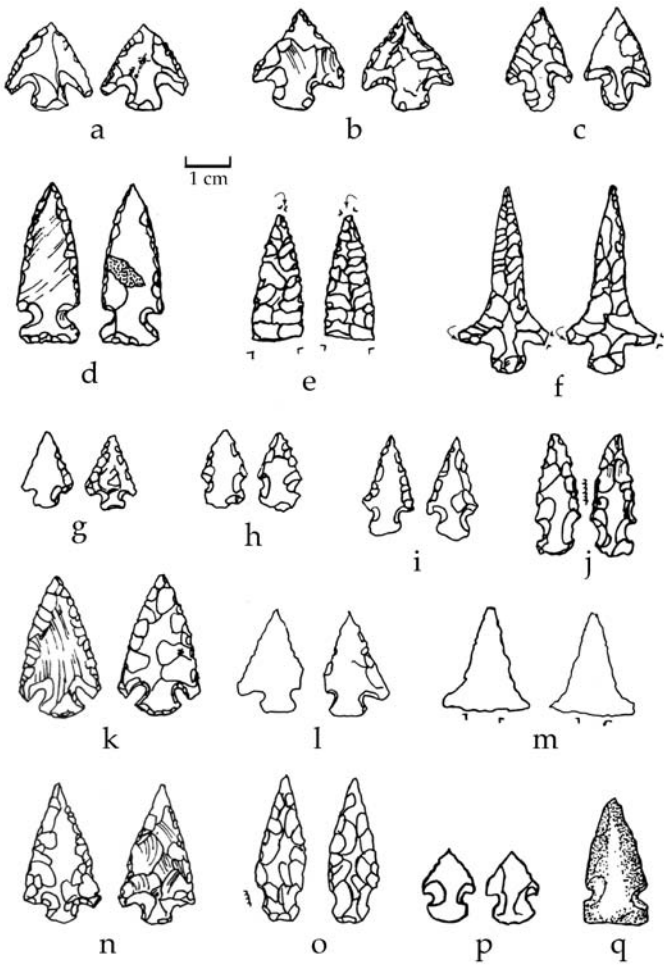


FIGURE 6.12. Small projectile points (448651): a–b, s36–s37; c, s39 Alba; d, s40 Reed; e, s41; f, s43 Alba; g–h, s44–s45; i, s48 Massard; j, s46; k, s47 Coryell; l, s45 Agee; m, s54; n, s50 Hayes; o, s51; p, s53 Keota; q, s52 ground Washita point.

would be unusual for projectile points. The tip edge resembles scraper retouch but is pointed very sharply. Also, the wide blade would strengthen a tool that would be used for gouging, although there are no obvious direct traces of use.

Residues. Yellowish sediment on one, black resinous residue on another.

Raw Material. Of 10 Keota points, nine are chert and only one is a highly lustrous novaculite. Artifact 448651s53 is a small Keota point made of pink semitranslucent, nonwaxy novaculite that is homogeneous and nongrainy. Of the chert points, one appears to be the deeply blue-black waxy Pitkin chert, one is unclassified, and the remainder appear to be of the Burlington, Keota, Elsley cluster (Boone). Of the Boone group, one has tiny dark gray flecks in the matrix. Another is a very distinctive mottled and variegated highly lustrous chert in grays with some brown swirls. It resembles samples of Keota Formation, Prior Aggregate variety. Another is probably Reed Springs. All raw materials with the exception of the novaculite are regionally available, and therefore, the Keota points do not present much in the way of exotic material.

Reed/Keota Variation

There are side-notched points made using a slightly different design from either Reed or Keota. These nonbarbed points are asymmetrical in cross section and are not nearly as finely thinned as are others in the Reed, Keota, and Washita macrogroup. They have long stems and wide side notches. Bifacial retouch does not always reach the axis of the piece, showing clearly the ventral surface of a flake blank on which these were almost invariably made. The retouch is in most cases steep and shallow. Blade outlines are primarily triangular but include incurvate shapes

TABLE 6.7. Reed points measurement summary (n = 12).

Measurement	Mean	Extremes	Standard deviation
Length (cm)	2.27	1.59 / 3.88	0.63
Width (cm)	1.12	0.75 / 1.94	0.35
Thickness (cm)	0.38	0.26 / 0.97	0.2
Proximal stem width (cm)	1.11	1.89 / 1.52	0.2
Distal stem width (cm)	0.63	0.49 / 0.86	0.13
Stem length (cm)	0.64	0.55 / 0.86	0.1
Thickness/width ratio	0.37	0.14 / 1.29	0.3
Width/proximal stem width	1.0	0.77 / 1.69	0.24

TABLE 6.8. Keota points measurement summary (n = 10).

Measurement	Mean	Extremes	Standard deviation
Length (cm)	2.53	1.52 / 3.49	0.65
Width (cm)	1.19	0.97 / 1.43	0.13
Thickness (cm)	0.39	0.28 / 0.57	0.03
Proximal stem width (cm)	1.1	0.98 / 1.25	0.1
Distal stem width (cm)	0.7	0.52 / 0.89	0.11
Stem length (cm)	0.76	0.64 / 0.98	0.09
Thickness/width ratio	0.33	0.24 / 0.45	0.7
Width/proximal stem width	1.08	0.9 / 1.37	0.16

as well. Three have a tip that tapers to a nearly needlelike point. Four of 11 are serrated, one of which shows pronounced serration. Identical points are shown for the Harlan site (Bell, 1984:234). There are two varieties, straight based and convex based.

The straight-based variation is clearly side notched, but the notches are very wide, giving the piece a long stem. The base is unretouched. Included are 423192s40, 423192s44, and 423192s67. All are very finely serrated. These are all novaculite.

The convex-based variation has exactly the same notching and blade form as the straight-based examples, but the base is retouched convex (though the basal retouch may be unifacial or minimal). Included are 423192s45, 423192s64, 423192s65, and 423192s66. The two raw materials used to make them are novaculite and dark blue-gray Pitkin chert. Five of 11 points in this combined classification are Pitkin chert.

Both varieties can easily be combined into one type that overlaps the Reed and Keota types, hence the grouping here. The tools listed as both above, combined with 423192s69 and 423192s71, all seem to go together. One could also add 423192s51 and 423192s55, which are essentially Reed points but are very like 423192s65 both in workmanship and raw material. Although singled out here as a variation on the Mississippian styles of Reed and Keota points, which share some characteristics with Cahokia (Washita) points in style, Justice (1987) would probably place these points into the same group as Sequoyah.

USE. None of these points are broken, nor are there any other indicators that would suggest they had actually been used.

RESIDUES. None.

TABLE 6.9. Reed/Keota variety points measurement summary (n = 11).

Measurement	Mean	Extremes	Standard deviation
Length (cm)	2.49	1.89 / 3.27	0.42
Width (cm)	1.12	0.91 / 1.29	0.11
Thickness (cm)	0.37	0.3 / 0.5	0.06
Proximal stem width (cm)	1.09	0.92 / 1.24	0.1
Distal stem width (cm)	0.59	0.42 / 0.75	0.1
Stem length (cm)	0.8	0.6 / 0.99	0.1
Thickness/width ratio	0.33	0.25 / 0.42	0.05
Width/proximal stem width	1.04	0.89 / 1.24	0.12

Morris

There are four Morris points that have the characteristic deeply concave basal morphology. Brown (1996:444) places these points between AD 1000 and 1200. The mean length is 2.36 cm, with a minimum of 1.47 cm and a maximum of 3.13 cm. Mean width is 1.26 cm, minimum width is 1.05 cm, and maximum width is 1.48 cm. Three of the points are finely serrated. All appear to have been altered by heat. Workmanship is very good.

USE. One exhibits a shear fracture on the base.

RESIDUES. Point 423185s02 has a band of dark material that may be a residue.

RAW MATERIAL. Three of these points are from chert, and one is an unidentified material. Brown (1996:444) found high levels of heat treating for the Morris points in the WPA collections.

Haskell

Two concave-based Haskell points are finely flaked using well-controlled pressure flaking techniques. One (423192s37) resembles a Reed point (423192s46) in both raw material and flaking style and could have been produced by the same flintknapper. This would support the contention that some of these pieces do derive from cached materials. The third Haskell point is steeply retouched on the edges only. A fourth was surface collected at the site after the WPA excavations. Haskell points from the WPA work were found cached in Spiro II and III grave lots (Brown, 1996:444).

USE. The two finely flaked Haskell points each have damaged tips.

RESIDUES. One has a deposit of sediment.

RAW MATERIAL. All are chert. Brown (1996:444) reports that Haskell points he analyzed were primarily made of a dark gray, red-banded chert.

Washita

There are five Washita points in the varieties Washita garvin, Washita peno, and Washita chaffee. Washita-style projectiles are characterized by fine flaking, thin cross section, and relatively highly placed narrow side notches. These are typical of the Cahokia site in Illinois. Two more Washita points were not classified into subtypes. According to Brown (1996:445), the Washita garvin style was found cached in Spiro III grave lots and is also found in some Spiro II contexts.

Use. The Washita peno points both show signs of use in the form of a blunt tip on one (423192s38) and a burination from impact on the other (448651s03).

Raw Material. The two Washita garvin points are made from gray Reed Springs chert and Boone chert. The Washita peno points are both of Reed Springs chert. One unspecified Washita point of novaculite is heavily ground on both faces (Figure 6.12q, 448651s52). One thick novaculite point is unusual in that the edges have been ground on both faces (Figure 6.12q). The grinding nearly, but not quite, eliminates the flake scars from knapping. This type of grinding is rare for projectile points from North America. The other unspecified Washita example is chert of unknown source. The Washita chaffee point is possibly made from a high-quality chert of the Devonian Woodford Formation from the Ouachita Hills.

Unclassified Side-Notched Points

One side-notched point (448650s16) was left unclassified because it exhibits characteristics of more than one type. The small tool has a typical Reed base but is coarsely serrated and more ovate in form than most Reed points are. It may be a variety of Reed point or a resharpened tool, giving it the shorter overall aspect and more rounded form. The small point of light olive-gray Reed Springs chert measures 2.32 cm in length, 1.29 cm in width, and 0.24 cm in thickness.

Unshouldered Points

Unshouldered points are rare and include Fresno (straight based), Young and Nodena (convex based), and a single Maud point with serrations part of the way down the edges along with a concave base.

Maud

There is one Maud point of a very fine grained black chert with a matte luster. Although rare from the Spiro Craig Mound collection, Maud points are reported elsewhere at Spiro phase localities nearby. For example, Rohrbaugh (1985a:70) records the incidence of four Maud points at the Geren site (34Lf36).

Fresno

Small projectiles with a straight base and triangular blade outline are classified as Fresno points. There are two such in the Spiro collection (378271s03 and 448651s26), measuring 1.48 and 1.88 cm in length, 1.26 and 1.07 cm in width, and 0.28 and 0.26 cm in thickness, respectively. They are both chert. One appears to be consistent with Boone chert varieties, and the other is unidentifiable. Brown (1996:446) finds Fresno points in relatively late contexts (Spiro IV) based on his grave lot seriation.

Young and Nodena

There are three unshouldered, convex-based points with ovate blade outlines. The two Nodena points, 448651s22 and 448652s06, average 1.98 cm in length and 0.95 cm in width. The T/W ratio is 0.24. The Young style (448650s18) is characterized by a wider blade (1.27 cm). It is longer overall than the Nodena points at 2.58 cm.

Unclassified Points

Eight points were unclassified. In some cases diagnostic features are broken, hampering classification. Two of these (448651s51 and 448651s46) are similar arrow points with wide shallow side notches. They are made from Reed Springs chert. Another narrow, thick point (378271s01) was manufactured from a reddish yellow chert, possibly a variety of Boone or Keokuk chert.

Small Projectile Point Summary

Heat Alteration

Heat treatment was almost certainly done to improve flaking quality of some of the raw materials. However, intentional heat treatment may produce only subtle effects in some materials and may be confused with nonintentional heat alteration in others. Conversely, it is important not to assume intentional heat treatment every time an artifact displays signs of having been heated because there are many other factors that can bring tools into contact with heat, including hearth proximity, prairie fire, or cremation.

Postmanufacture heating is suggested by eight projectile points that have a pink or reddish tip consistent with heat alteration (Table 6.10). If the reddening is from heat, it must be postmanufacture because otherwise it would not affect just the tip unless mostly finished preforms were being heated. This alteration could be some form of purposeful treatment as part of the mortuary procedure or simply a characteristic of chance contact with heat.

The characteristic of postutilization heat alteration needs to be examined for contexts with better provenience, especially in nonburial situations. All in all, few points appear to have burned after use. Burning after use might be

TABLE 6.10. Presence of postmanufacturing heat alteration in small projectile points.

Catalog number	Style	Notes
423192s05	Agee	Already red; tip and barbs slightly darker
423192s14	Unclassified corner notch	
423192s24	Perdiz	Grayish red tip on a light brown tool
423192s47	Reed	Slightly pinker at tip
423192s49	Keota	Red tip
448651s50	Hayes	More pink at tip
448651s24	Alba	Although entire piece is red, tip is darkest area on tool
448650s08	Morris	Redder tip

expected (1) as a function of random disposal in domestic contexts or (2) as a function of mortuary ritual in which some materials might be burned. Postutilization heat alteration is usually uncontrolled (as opposed to controlled heat treatment to improve flaking quality) and often results in crazing, thermal fracturing, potlid scarring, and resinous or sooty residues. None of the specimens from Spiro exhibit any of these dramatic damage indicators.

Caches

Some similarities among points suggest cached deposits with points having been made of similar material by a single manufacturer. There are definite similarities among points in the Trowbridge and Meyer collections. Caching was studied by Brown (1976, 1996). Several points in the Trowbridge collection are of an unusual olive brown lusterless opaque jasper, which probably comes from the Red River area (Brown, personal communication, 1992). These are similar morphologically as well and fit into the Hayes and Alba groups. They could easily represent a group made by a single manufacturer and perhaps were cached in a single burial context or feature.

Likely candidates for cache composition among the small points include (1) group A, 423192s51, s55, s65; (2) group B, 423192s66, s67; and (3) group C, 423192s17, s18, s19, s20, s21, s22, maybe 423192s08 with s33.

Use

There are some indicators of use. In most cases they consist of damage to shoulder, barb, or base, characteristic of damage from projection when the force of impact is loaded onto the haft. However, such damage may also be produced by mechanical, excavation, and curation (keeping a tool) processes. There are few broken pieces. The propensity for tools to be complete might result from the preference among both diggers and dealers to collect complete pieces to which they accord a higher value. Shear fractures on barbs would be unlikely to affect the overall value greatly or might not even be noticed by a collector.

The possibility for arrows to have been held together in a quiver might account for the relatively high amount of shoulder damage. If arrows are held together in a tight cluster, the portions of the tools that will come in contact with one another are the barbs or shoulders, and these will be more likely to become damaged. This is an example of damage that may occur as a result of curation: keeping and perhaps transporting objects together.

Small projectile points recovered from nonmortuary contexts at Spiro appear to have incurred a greater degree of damage. Most of the points illustrated from the 1979 excavations at Spiro (Rogers, 1980:172) exhibit some form of breakage consistent with wastage during use. Small points in the NMNH collection from the Craig Mound are remarkably whole, given the total number of small points. Although the projectiles may not have been in a pristine state when they were deposited, as a group they were definitely utilized only to a slight degree.

Large Projectile Points

Larger bifaces that display a haft element but are too large to have functioned as arrow points are present in the collection and were classified as large points. Most are stemmed as opposed to notched, although there are exceptions. These may have been utilized as knives or projectiles for use with atlatls or spears. Among the large points, the most common styles are Gary and Lange. There are also others that do not fit well into known types, and those were listed as unclassified.

Gary

Gary points are distinguished by ovate blade outlines and stems with well-rounded convex bases. They range from Late Archaic to Woodland contexts and are associated with Fourche Maline phase sites in Arkansas (Justice, 1987:189). Since these tools are generally earlier than the Spiro phase Great Mortuary deposit, they were possibly redeposited in the Craig Mound as fill taken from older habitation areas during mound construction. There

TABLE 6.11. Large projectile point styles and raw materials.

Style	Catalog number	Raw material
Gary	417939s02	Jefferson City–Cotter chert
	448652s01	Keokuk/Boone chert
	448652s03	Chert
	448929	Chert
Lange	423175s01	Keokuk chert
	423176	Jefferson City–Cotter chert
	448652s02	Keokuk/Boone chert
Johnson	423189	Boone or Reed Springs chert
Graham Cave	423190s01	Chert
	423177	Chert
Expanding stem B	423190s02	Chert
Eccentric	448653	Keokuk/Boone chert

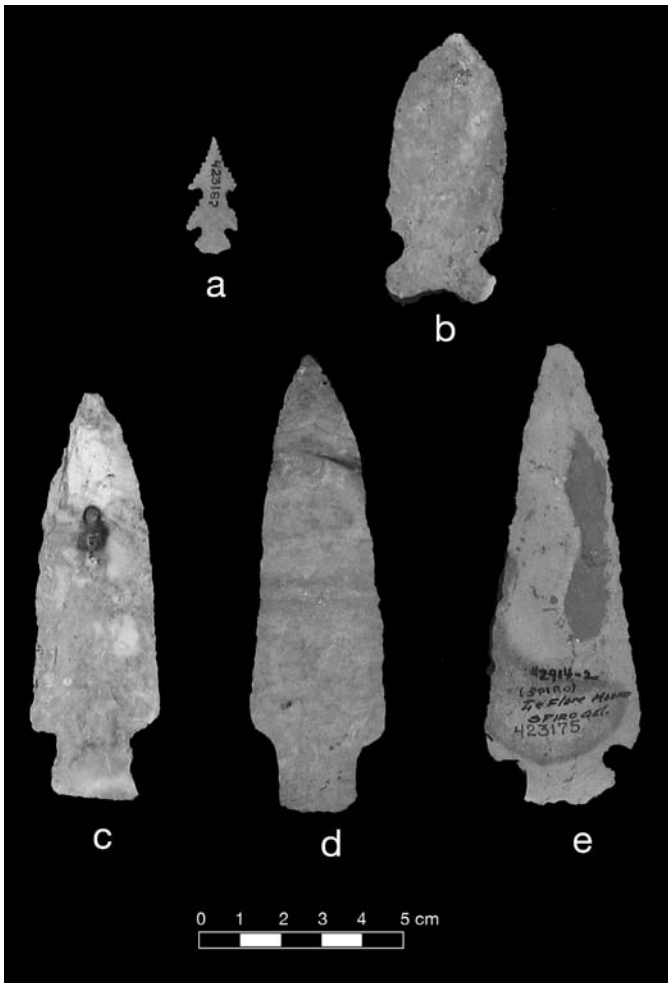


FIGURE 6.13. Large and unusual points: a, Ashley Chocoville point (423187); b, very early point, Graham Cave (423177); c, d, Lange points (423175s01, 423176); e, Kay point (423175).

are four Gary points, one of which has a midblade snap fracture. The other three range from 5.74 to 9.02 cm in length and 2.7 to 3.87 cm in width. Thickness ranges from 0.88 to 1.76 cm. Stem length ranges from 0.87 to 2.17 cm. Stem width at the distal juncture with the blade ranges from 1.72 to 1.99 cm. Bifacial thinning is deep, and in three cases secondary edge retouch is minimal, although stepped terminations are common.

Use. The Gary points do appear to have been utilized. One (448652s01) has a medial break that could have been incurred in any number of ways, including use. Another (448652s03) has burination originating at the shoulder and continuing more than one-half of the distance up one lateral edge. It also shows edge rounding especially at the tip. Artifact 448929 exhibits clear damage and blunting to the tip. The fourth tool has a flake taken out of one shoulder, which may be from either manufacture or use. All of these damage types are consistent with the action of projection (Sievert, 1992), and none would typify utilization along a lateral edge in cutting or sawing.

Residues. No residues were present.

Raw Material. All are chert; however, in most cases the type of chert is unknown. One may be chert from the Jefferson City Formation. Two are of a material that has apparently been heated.

Lange

Lange-style lithic artifacts are characterized by straight or slightly expanding stems (Figure 6.13c,d.). The blade is usually narrow relative to length. There are four such tools in the Spiro collection. Three are large and range from 9.48 to 11.42 cm in length, 3.23 to 3.69 cm in width, and 0.8 to 1.15 cm in thickness. The fourth (448652s02) is considerably smaller at 5.4 cm long, 2.65 cm wide, and 0.57 cm thick. Lintz (1978:141) discusses similar Lange points recovered on survey in Haskell County, Oklahoma.

Use. Point 378372 exhibits highly polished ridges and a green stain that is probably copper. Two others have damage consistent with impact; 423175s01 exhibits burination on the stem and a corresponding shear fracture on the shoulder of the same edge. Point 448652s02 has distal damage typical of impact.

Raw Material. All are chert. However, in one case (423175) the biface is of an unusual purple color, which possibly resulted from heating. Another (423176) is

a distinctive banded chert not inconsistent with the cherts of the Cotter Formation in the Southern Ozarks.

Johnson

One haftable point exhibits a pattern of inverse retouch that creates a bevel and is tentatively assigned to the Johnson category. It has shallow serration and stepped termination on the secondary retouch flake scars. It is unbarbed, with a minimally retouched base. It resembles Ellis points (Bell, 1958) with beveling along the sides of the blade, but the stem does not expand significantly. Johnson points are usually dated to the Late Archaic or Early Woodland periods (Perino, 1968). Raw material is a typical Boone chert.

Graham Cave

One biface has an ovate blade outline, a definite side notch and a slightly concave base (423190s01). It is made from a dull brown chert and measures 5.87 × 2.07 cm. Another (423177, Figure 6.13b) resembles 423190s01 except that the blade is excurvate, the base is markedly concave, and the ears are more rounded. These both appear to be Archaic period point styles, with resemblance to the Early to Middle Archaic Graham Cave styles found in the region (Justice, 1987). Along with the Johnson point, these two early points may have been deposited in the Craig Mound through the mound building process, or they may have been intentionally collected from earlier sites by the Spiro people and redeposited in the secondary burials placed into the Great Mortuary.

Expanding Stem Points

Artifact 423190s02 is a medium-sized haftable point having an excurvate outline and wide expanding stem. It is 4.98 cm long, 2.59 cm wide, and fairly thick at 0.98 cm. Raw material is a fine-quality waxy-lustered translucent brown chert.

Eccentric Points

There is one truly eccentric haftable biface produced from a good quality white chert not unlike Burlington (448653, Figure 6.14e). It is a complete tool 7.45 cm long, 4.02 cm wide, and 0.65 cm thick. Distal stem width is 2.2 cm, which contracts to a proximal stem width of 1.21 cm. The stem is 1.41 cm long and notched in the center of the base. There are three sets of notches along the triangular blade edges. The distal notch is shallow, the medial notch is wide and deep, and the proximal notch is shallower and narrower than the medial notch. The shoulders are barbed.

Large Bifaces

There are various types of larger bifaces ranging from ovoid bifaces to sword-form knives and maces. Clements et al. (1935–1938:263) noted that

> finely shaped, very thin stone blades are typical of this culture. These blades range from eight inches to twenty-eight inches in length and seem to have been manufactured for ceremonial use as they are far too fragile to have served any utilitarian purpose, although the larger ones may have been used as knives. The only large points that were found were "V" shaped with small tangs at the apices of the "V" and average about five inches in length.

Raw materials used in producing large bifaces vary (see Table 6.12). Banks (1984) mentions argillite, which was used for some celts and reputedly comes from a "siltstone" ledge in the Atoka Formation, which abuts the Arkansas River. Smoky Hills jasper, also called Niobrara jasper, comes from Kansas but was utilized at Spiro, primarily for large bifaces. Novaculite, quartzite, and varieties of chert complete the inventory of materials used for large bifaces. In most cases, these large bifaces probably served a social or ceremonial function.

Haftable Bifaces

Ovoid Bifaces

There are two examples of the type that Brown (1976:127–131; 1996:464) refers to as "ovoid bifaces," type A (Figure 6.14f, h). They are made from Kay County chert of the Flint Hills region of northern Oklahoma. This chert has the characteristic banding, and the bifaces have lopsided blade outlines, with one edge convex and the other straight. One is broken, such that only the proximal end is present. They are notched a short distance from the base. The complete biface has thick brown sediment adhering to one face near the tip and is well polished on dorsal ridges. Near the tip, along both lateral edges the residue is abruptly truncated about 1 mm from the edge, leaving a narrow residue-free band. Function of these tools is uncertain.

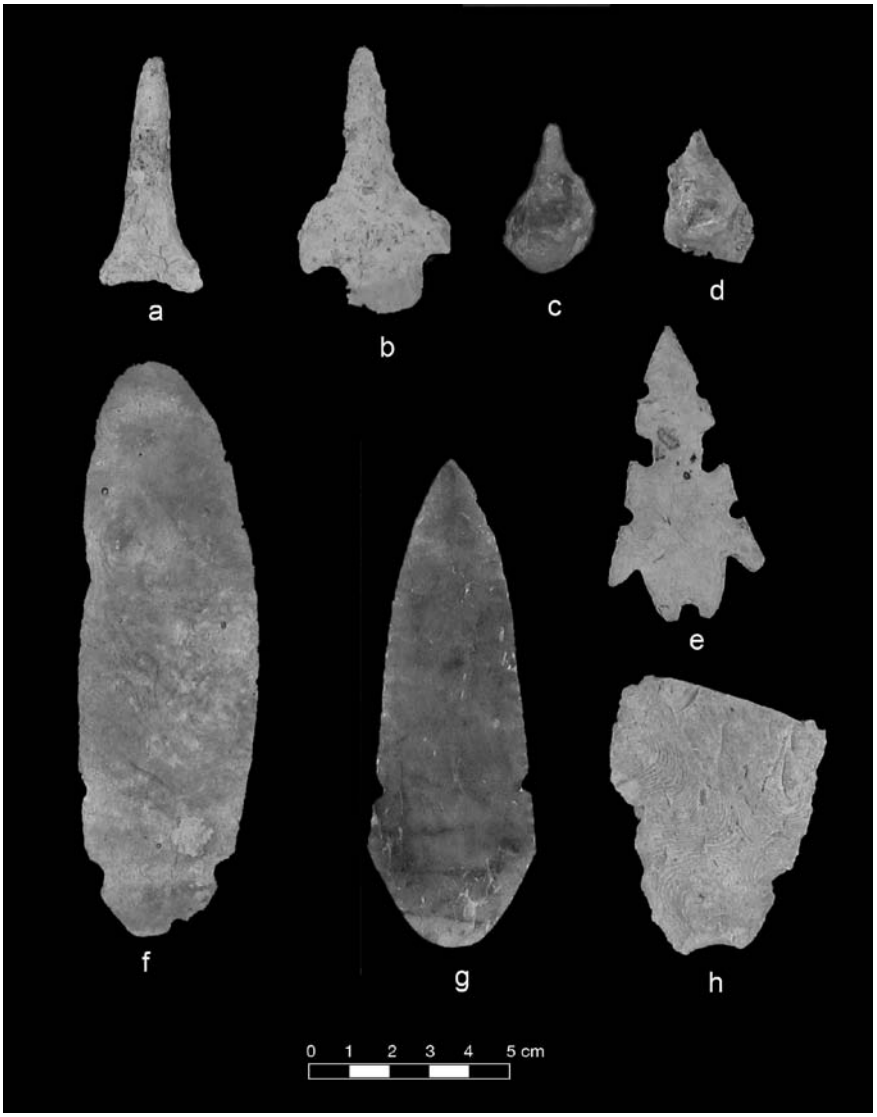


FIGURE 6.14. Large bifaces and drills: a, expanding stemmed drill (423193s01); b, barbed drill (423193s02); c, drill made on a pebble (448655); d, quartz graver (423191s04); e, eccentric point (448653); f, h, ovoid bifaces of Kay County chert (423178, 417939); g, novaculite biface (423179).

An unusually shaped ovoid biface is present (423179, Figure 6.14g.). This is a fine, thin blade made from what is probably heat-altered novaculite. It has a clear red color and waxy luster. The tool has a well-defined shoulder and shallow notches in the lateral edges set high on the blade distal to the shoulder. Some edge damage is visible on one lateral edge near the tip. The tool measures 12.19 cm in length and 3.81 cm in width. Another biface fragment is made from a dense grainy material that appears to be siltstone (423191s03). It is broken and tapers near the tip of the wide, thin blade.

Kay

One biface corresponds to the morphology reported for Kay points (Brown, 1976); however, it is crudely made of an unidentified yellowish brown grainy chert instead of the more usual Kay County chert (Figure 6.13e). This point (423175s02) has rounded corner notches and a burination extending up the stem from the base. There is an odd whitish residue on one face of this artifact that could be adhesive. It is 11.53 cm long and 3.95 cm wide.

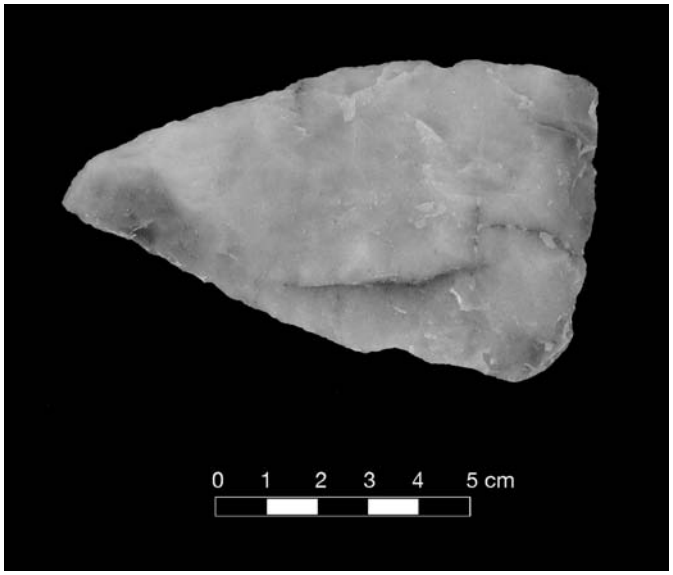


FIGURE 6.15. Large triangular preform or celt-form biface (423170s01).

Preforms

There are nine pieces that may be preforms. Of these, three are large bifacially worked tools (423170) of novaculite or chert with triangular outlines and broad flat bases. It is conceivable that such tools could have been utilized as celts; however, it is also possible that since they are of nonlocal raw material, they may have been imported in this form, to be used or finished by local knappers. One is of a high-quality grayish novaculite (Figure 6.15), similar in raw material to that used to manufacture biface number 423180 (a long, thick lanceolate biface which likewise could be a preform but is more likely a resharpened knife form). Ovoid and lanceolate bifaces of catalog number 448654 consist of four chert forms and one novaculite form, all of which appear unfinished.

SPECIAL CHIPPED-STONE WEAPONRY

Brown (1996:470) divides special weaponry clubs into three types: maces, axes, and sword forms. Both chipped-stone and ground-stone manufacturing methods are used for celts and maces. Sword-form tools are chipped stone. Ceremonial weapons were perhaps designed to resemble more utilitarian weapons; however, they were embellished or altered to reflect a symbolic component. Contexts of use will involve display or demonstration.

TABLE 6.12. Large biface types and raw material summary.

Type	Catalog number	Raw material
Ovoid biface A	417939s01	Kay County chert
	423178	Kay County chert
Ovoid (irregular)	423179	Novaculite
Kay	423175s02	Chert
Celt form	423170s01	Novaculite
	423170s02	Novaculite
	423170s03	Chert
	423173	Chert
Preform	423180	Novaculite
	448654s02	Chert
	448654s03	Novaculite
	448654s04	Chert
	448654s05	Chert
General sword form	423174s01	Chert
	423174s03	Chert
	423191s03	Siltstone
Duck River sword form	423172s01	Boone chert
	423174s04	Mill Creek chert
	423174s05	Mill Creek chert
	423174s06	Mill Creek chert
	423174s07	Dover chert
	423174s08	Dover chert
Fusi-elliptical sword form	423171	Quartzite
Hoe	423174s02	Chert
Unclassified	448654s01	Chert
	448690s01	Unknown

Sword-Form Bifaces

Sword-form bifaces are large bifacially worked tools that fit into several morphological classes, including general bifaces, Duck River bifaces, and fusi-elliptical form bifaces. These forms may have served as batons or clubs rather than as knives or other cutting tools. They are listed in Table 6.12.

Duck River

Spiro is known to have yielded fragments of very long narrow blades, often pointed at both ends. A reconstructed biface and five fragments (Figure 6.16) are present. These artifacts are similar in morphology and raw material to the Duck River cache of bifaces found in Tennessee (Brown, 1996:474) and have been given the name "Duck River" for that reason. Brown (1976:159) notes that all of the ones in the WPA collection were broken and writes that they can be expected to occur in highly fragmented form, suggesting intentional breakage or ceremonial "killing." Pronounced hinge fractures as well as

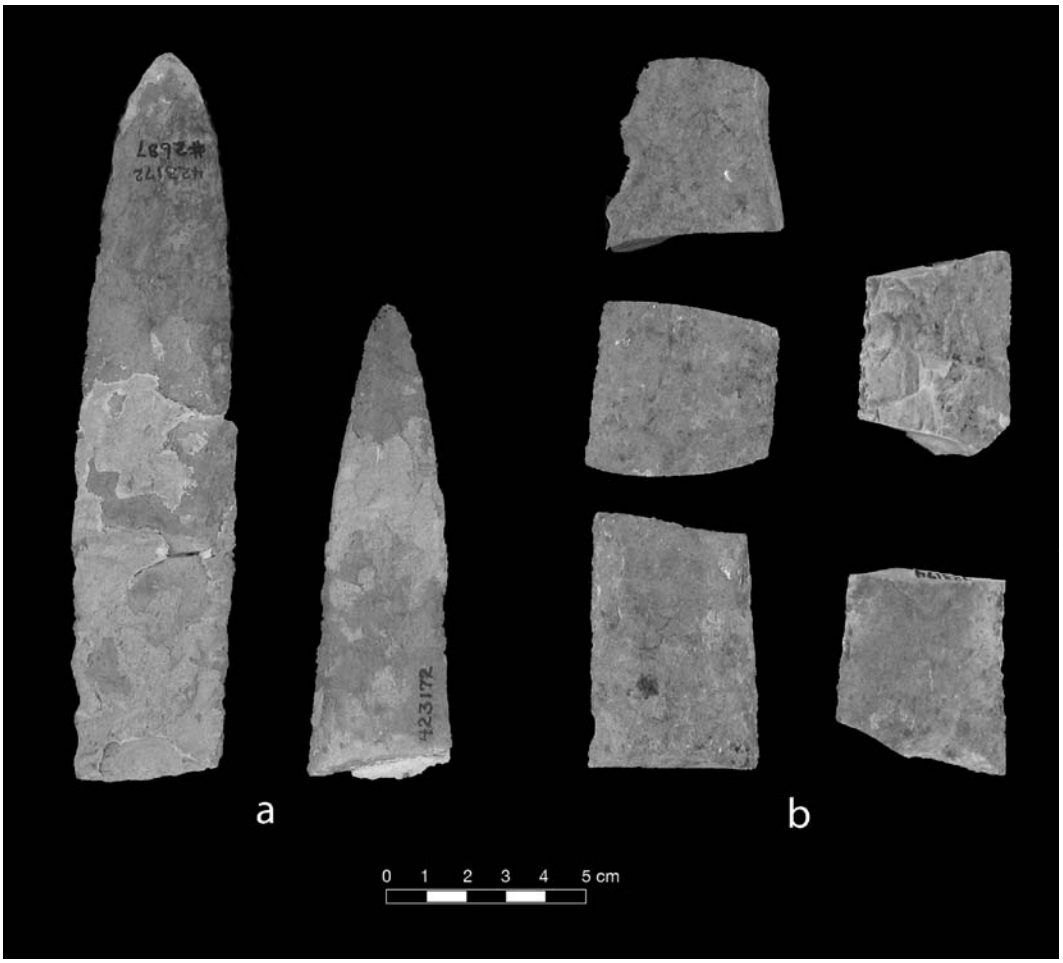


FIGURE 6.16. Duck River bifaces: a, reconstructed biface (423172); b, fragments (423174).

battering and retouch on the edges of medial breaks support the idea that the blades were deliberately broken. The pieces in the Smithsonian collection are all smeared with green pigment, and the five nonreconstructed pieces bear ocher stains as well. This residue is truncated by hinge fractures; in one case (423174s05) the hinge fracture extends for 2.81 cm onto the face. Therefore, the pieces must have been smeared with pigments and then ceremonially broken and strewn about. The fragments range from 4.39 to 8.43 cm in length and 3.86 to 2.53 cm in width.

The reconstructed biface is composed of at least four other fragments clumsily fit together to make a 30 cm blade (423172). Trowbridge acquired the piece and recorded in his catalog that this blade was constructed from similar but nonrefitting fragments by J. W. Balloun, from whom he purchased it. One join has given way so that the tool is now in two pieces. An outstanding feature of the reconstructed biface is the retouch on the edges of one of the breaks. It appears to be recent and occurs on an edge that is broken at an oblique angle. It does not seem possible that this edge could be the base of the fragment but perhaps was nicked away at the edges by Mr. Balloun in order to produce fragments that would fit together in a straight line, thereby reducing the true edge of the break and creating a false "fit." Residues on the tool are plentiful and include traces of glauconite, copper, and ocher. Modern residues include plaster or wood filler, green pigment, and adhesive. The entire surface is smeared with reconstructive material. Beneath the material, relatively fresh flake scars can be seen along the broken edges, which indicates that the dealer who reconstructed the blade battered away at the broken edges in order to create a smooth fit. The chert is homogeneous and peppered with very small dark speckles. The same raw material has been used in

each piece. Hamilton (1952: pl. 46) shows several bifaces that may have been similarly reconstructed.

There are two types of chert represented (Table 6.12). One is a grainy brownish chert that is probably material from Mill Creek in Illinois. The other form is a finer-grained, lighter gray, slightly mottled chert typical of materials from Dover, Tennessee (Brown, personal communication, 1992). The reconstructed biface appears to be of the Dover variety, although the raw material of some of its component fragments is obscured by applied reconstruction material.

General Sword-Form Bifaces

In the collection is a complete but broken biface of a white chert (423174s01, Figure 6.17b). It consists of four large fragments and one small fragment that refit to a length of 25.5 cm. The maximum width is 6 cm. The blade is pointed distally and rounded proximally. The pointed end is refitted from a fragment from lot 423191, and this break occurred before excavation. There are at least two breaks that occurred after cataloguing at the NMNH. A brown residue adheres to one face only and is present on the oldest break surface. The point of impact for the earliest break is on the face of the piece, leaving a cone of percussion on the break surface. This is a typical result of hitting a biface with a stone hammer to break it intentionally (Sievert, 1992). The white chert has a homogeneous texture and sparse darker elliptical spots with very light halos suggestive of the Reed Springs Formation.

Biface fragment 423174s03 has an asymmetrical outline with one edge being more convex. The straighter edge is clearly beveled, with the opposite edge retouched. The retouched convex edge is polished, and the distribution of wear suggests use as a side scraper. It is of a pinkish gray chert of unknown origin. Brown (1996:472) reported this type of biface from Spiro II and Spiro IV grave lots. He found the raw materials to include Smoky Hills jasper, Kay County chert, and other unidentified cherts.

Fusi-elliptical Bifaces

These long bifaces are wider near the distal end. Artifact 423171 has a distinct shoulder occurring 3.96 cm from one end. Bifacial thinning with secondary edge retouch has produced a sinuous cross section. There is polish on either end and on dorsal ridges. It is hard to say which end is distal and which is proximal. Generally, there is more polish on the shorter, wider end, which could be from hafting or from use, such as digging. Polish

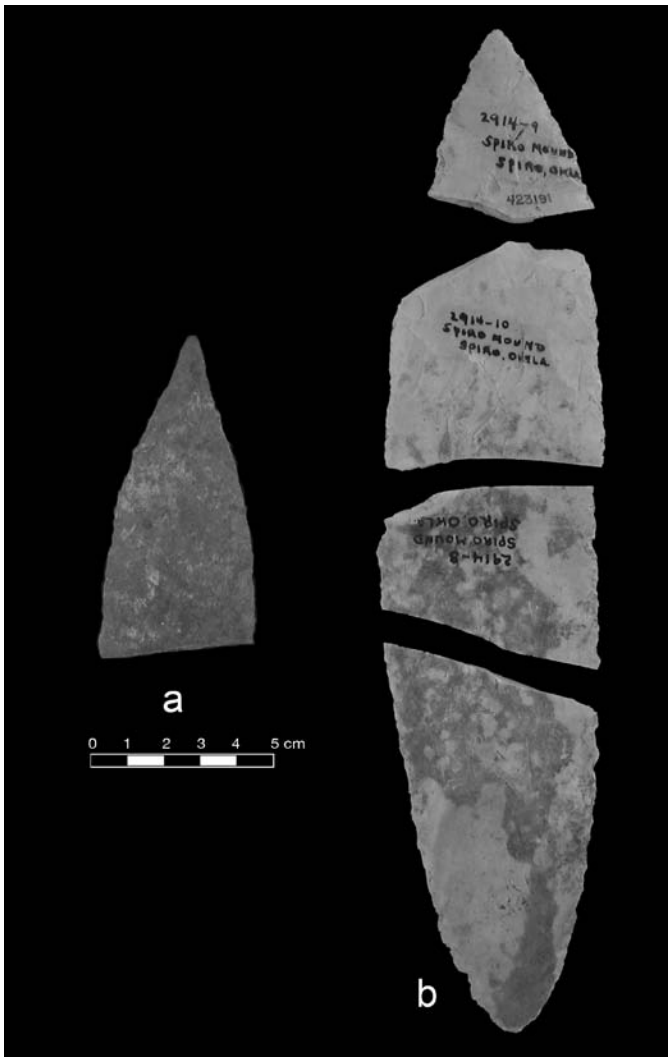


FIGURE 6.17. General sword-form bifaces: a, 423191; b, 423174.

extends well up toward midblade on some ridges. It is clearly fusi-elliptical in outline but broader and thicker than other similar bifaces described by Brown (1976:161, 1996:474), which could put it into a class more similar to the Ramey knife described by Perino (1963). The raw material is a dark quartzite with sparse darker gray to black mottles and streaks surrounded by halos of a rusty hue. It is unlike any other lithic material encountered in this collection.

Maces

There are four large, ornate, and impressive crown-form bifaces of varied morphology. These bifaces have been referred to as crown maces and fall into a number of

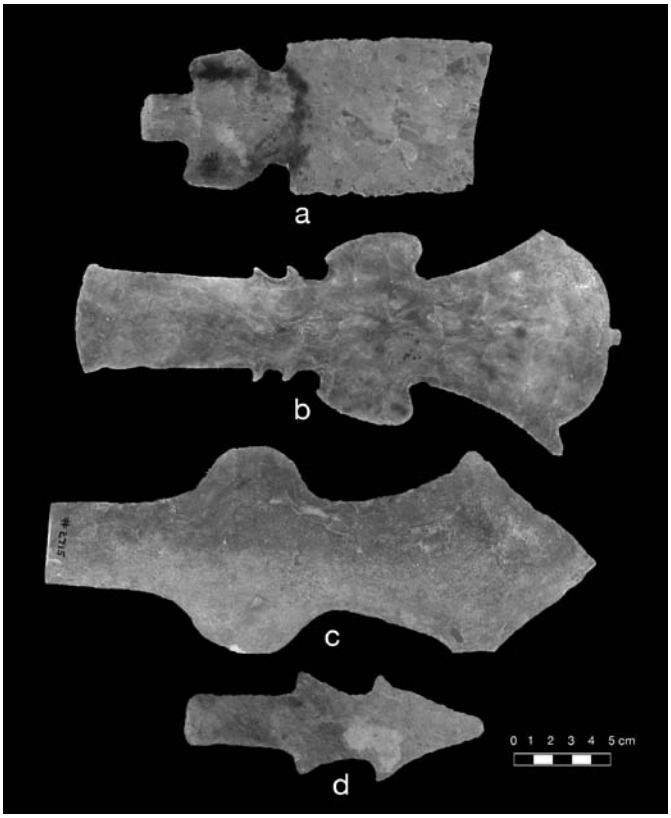


FIGURE 6.18. Maces: a, 423196; b, 423198; c, 423197; d, 423195.

documented morphological types (Brown, 1976:166–173; 1996:474–476).

The first is represented only by the elaborate haft element consisting of a stem and wide flanges proximal to deep notches (423196, Figure 6.18a). The margins of the haft element are discolored to a very dark grayish brown, possibly related to the way it was hafted. The discoloration may be due to mastic or bindings. This discoloration follows the edges, where bindings would be expected, not in the center, where mastic might be expected. None of the tools in this collection exhibit any trace of mastic, which implies that mastic was simply not used. The mace has been shown in Hamilton (1952: pl. 44A).

During the 1970s, A. Segovia (University of Maryland, Department of Geology) identified the raw material as novaculite (Joan S. Gardner, unpublished notes on conservation measures taken for the Spiro collections at the National Museum of Natural History, Smithsonian Institution, 1970–1971). However, the texture, color, and inclusions are unlike that of any of the novaculites in the reference collection. Rather, this tool appears to be a dark grayish brown fine-quality chert, resembling those of the Woodford Formation. There are at least two kinds of residue on the piece, a greenish clay that resembles glauconite and a brown sediment that overlays the glauconite and probably represents sediment from the mound fill.

A second large crown-type mace made of what was at first thought to be jasper was loaned to the NMNH in 1936 by Braecklein for casting (Figure 6.18b). Several casts were made, and there are two in the collection (377378, 377379). The original was later turned over to Trowbridge and entered the NMNH collection more than two decades later (423198). Braecklein (1936), in a letter to the Smithsonian, indicates that the artifact was "found in hematitie [sic] bed, one end next to a cremation." This mace is an impressive piece of lithic workmanship of the shape that Brown (1996:475) refers to as type 1. This crown mace has two projections on the convex expanding distal end, one in the middle, and one at the side. Presumably, there was a third on the opposite corner, but this corner has been fractured. There is a pair of large "ears" on either side in the medial section of the artifact, and below these ears are two short, downward-pointing barbs. This artifact is pictured in Hamilton (1952: pl. 41), Fundaburk and Foreman (1957: pl. 92), and Merriam and Merriam (2004: fig. 15). The mace is quite similar to 18/9334 of the National Museum of the American Indian (Burnett, 1952: pl. xvi). The mace pictured by Burnett lacks the thorny barbs and is painted. The upper projections or ears may have served as anchors for tassels that are shown dangling from such maces in the iconography of the incised shells (Phillips and Brown, 1978: pl. 62)

The tool is made from a large block of high-quality cryptocrystalline material with a waxy luster. Brown (1996:475) reports that all known examples are made of a semitransparent flint known as Kaolin chert, which derives from Illinois. There is red ocher smeared over the piece (fortunately, it was never washed). The raw material is characterized by subtly shaded concentric bands in gray, yellowish brown, and red. One red vein runs along the axis of much of the blade. This is possibly coincidental; however, in light of the treatment of the third blade described below, such an intentional design element cannot be put beyond the skills of the lithic craftspeople who made these implements.

A third mace is pointed and has a pair of lateral projections (423197). One longitudinal half of the artifact is deeply stained with red ocher (Figure 6.18c). This tool was either painted or rubbed with ocher. Furthermore, tiny bits of yellow residue overlay the red pigment. The line formed by putting ocher on the blade follows the axis of the piece. In shell depictions, crown maces are

FIGURE 6.19. Depiction of mace on Braden B shell cup (423266).

sometimes shown crossed with lines (see Figure 6.19). This mace is broken at the proximal end, so the original length is unknown. The proximal portions, or handles, of these maces are extremely narrow given the overall massiveness of the blades (Table 6.13). This artifact is pictured in both Hamilton (1952: pl. 44A) and Fundaburk and Foreman (1957: pl. 92). Brown has labeled this shape "type 2."

The fourth mace (423195) is considerably smaller and corresponds to a type described by Brown (1976, 1996:476) and labeled "type 5," which Brown believes derives from Tennessee. It has two sets of lateral projections above the shoulder (Figure 6.18d). Flaking consists of moderately well controlled bifacial thinning and secondary retouch. The dorsal ridges are smooth and appear polished, perhaps from some sort of scabbard. This mace carries no residue. It was pictured in Hamilton (1952: pl. 42). There are no ground-stone maces in the NMNH collection.

Celts

These tools fall into two major categories, those for utilitarian or extractive tasks and those for special or ceremonial use. They may be utilized to accomplish everyday tasks, or they may be reserved for very special occasions. Some probably served as part of composite weapons. For celts, indicators of use include chips and crushing along the working edge; asymmetry of the working edge, which may indicate resharpening; and, sometimes, striations. Although in some cases it may be unclear whether or not the axes or celts served utilitarian purposes, all celts, utilitarian or symbolic, will be treated in this section.

For celts several attributes were recorded in addition to those noted for chipped-stone implements: width of the working edge, width of the poll, and shape of the working edge. Celts vary in morphology, but they all have a working edge and some form of haft device (although it may be undifferentiated from the bit, i.e., unshouldered). Some celts resemble chisels, some resemble axes, and some are without analogy. Celt nomenclature and measurement are shown in Figure 6.20.

TABLE 6.13. Mace types, characteristics, and raw materials.

Catalog number	Type	Length (cm)	Width (cm)	Thickness (cm)	Stem length (cm)	Proximal stem width (cm)	Weight (g)	Raw material
423195	Type 5	15.5	5.56	1.33	5.46	2.73	74.0	Chert
423196*	Unclassified	18.25	8.18	0.95	7.58	7.3	187.6	Chert
423197*	Type 2	28.9	10.47	2.25	6.5	4.25	540.8	Chert
423198	Type 1	27.6	11.58	1.52	12.38	5.47	424.8	Alibates

* Incomplete.

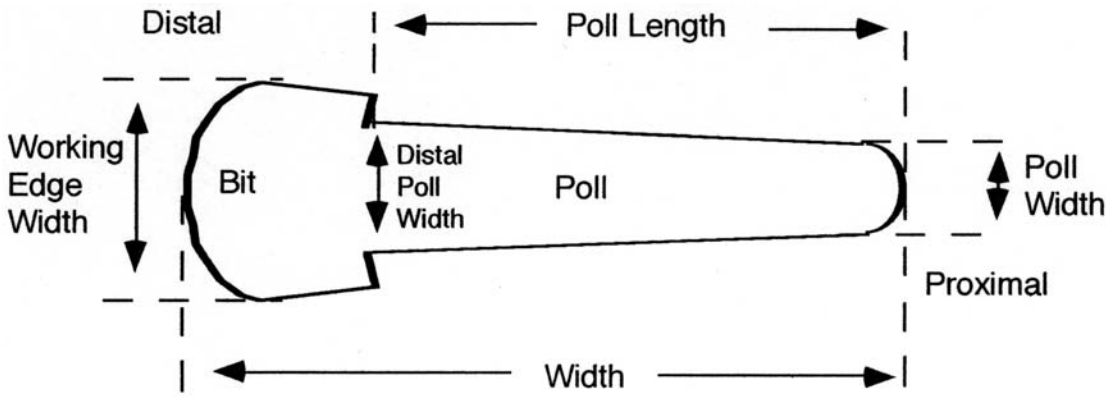


FIGURE 6.20. Celts: nomenclature and measurement.

Elongate Celts

Elongate celts are, by definition, long and narrow and often have a flared or splayed bit. In cross section they are rectangular to subelliptical. There are six elongate celts in the collection, ranging in size and shape. Most resemble the celts in the collections of the National Museum of the American Indian illustrated by Burnett (1945: pl. xxii h,i.). Elongate celts from the NMNH collection are listed in Table 6.14.

Only one is flared out into a rounded bit (448670). This celt has been broken and glued back together (Figure 6.21a). The pieces were likely in different depositional contexts, judging by the difference in appearance of the readhered sections. The center section is more deteriorated than the two end fragments. This long limestone celt is illustrated in Hamilton (1952: pl. 24A), where it is incorrectly referred to as a bone spatula. Celt 448670 closely resembles a celt pictured in Brown (1976: fig. 33n).

The smallest of the elongate celts is a small complete artifact of jasper (448676) and was made from a pebble. The poll end retains considerable cortex (Figure 6.21d).

Celt 448671 has been reconstructed (Figure 6.21b). The proximal end of the blade has been rebuilt using a compound resembling plaster. The reconstructive material is smeared over the original stone surface in some areas. The additive contains grit and also some form of very fine white fibrous material that resembles fiberglass or synthetic fiber, such as nylon. (Bits of filler material that were removed were retained in a small vial now kept with the artifact.)

TABLE 6.14. Elongate celt characteristics and raw materials.

Catalog number	Length (cm)	Working edge width (cm)	Thickness (cm)	Poll width (cm)	Raw material
448676	14.68	6.30	4.36	4.58	Unknown
448670	30.20	4.74	2.12	2.60	Limestone
423201	15.54	2.75	1.93	n/a	Sedimentary
448672	10.66	3.20	1.75	1.98	Greenstone
448671	23.50	2.17	2.02	1.91	Sedimentary
448676	9.05	2.90	2.70	3.00	Jasper

Spatulate Celts

Spatulate celts are wide and flat, usually with convex working edges. Notable is the collection of cannel coal celts (Figure 6.22a,b). There is one complete celt and bit portions of two others as well as a few small fragments. These are wide and relatively thin. The condition is poor to fair because of the softness of the material and its tendency to flake and disintegrate over time. Such celts could only have served a special function because the bits could stand no percussive forces, lest they split and fracture. One cannel coal celt has a pronounced shoulder and deeply convex bit. Two others have convex bits that flare to the sides and a simple juncture with the poll. Sizes of all spatulate celts are shown in Table 6.15.

There are two large stone spatulate celts. One has wide parallel sides and a biplano cross section and is manufactured of a high-quality, dense, dark greenstone or serpentine from an unknown source (448673, Figure

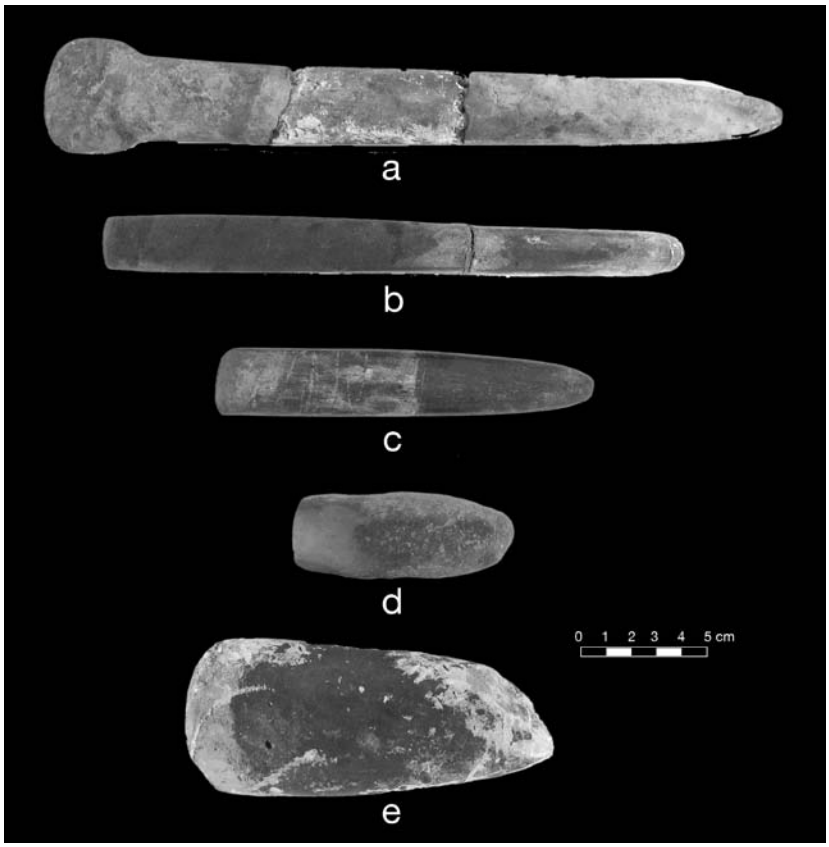


FIGURE 6.21. Elongate celts: a, flared bit (448670); b, reconstructed celt (448671); c, elongate celt (423201); d, small jasper pebble celt (448676s01); e, wide celt (448676s02).

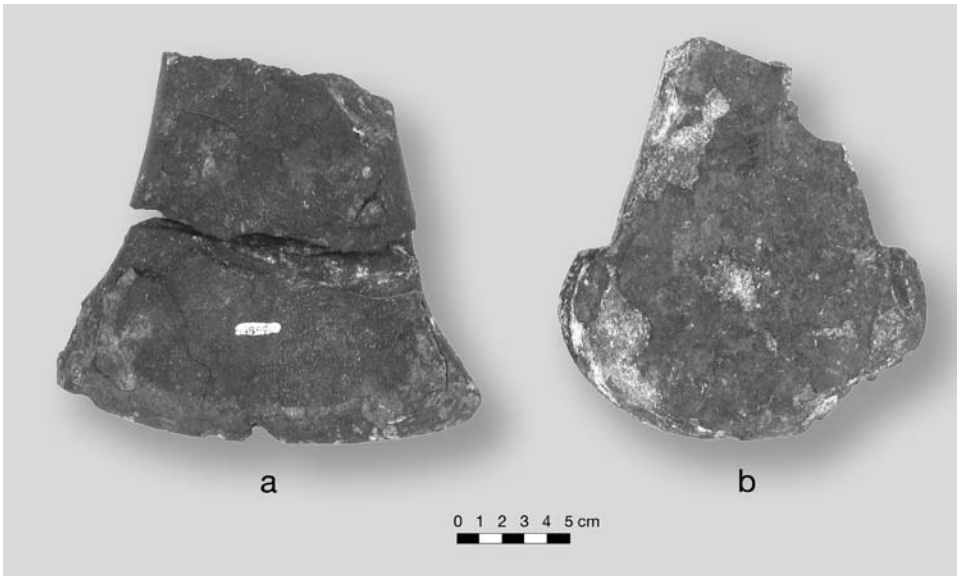


FIGURE 6.22. Cannel coal spatulate celts: a, expanding bit (448690); b, shouldered (448675).

TABLE 6.15. Spatulate celt characteristics and raw materials.

Catalog number	Length (cm)	Working edge width (cm)	Thickness (cm)	Poll width[a] (cm)	Raw material
448690s06	16.0	18.8	1.84	n/a	Cannel coal
448690s05	9.68	13.79	1.48	n/a	Cannel coal
448673 [b]	23.3	15.7	1.83	12.76	Greenstone
448675	18.0	16.4	2.14	n/a	Cannel coal
448674 [b]	24.9	18	1.57	6.36	Marble

[a] "n/a" indicates data are not applicable.

[b] Complete artifact.

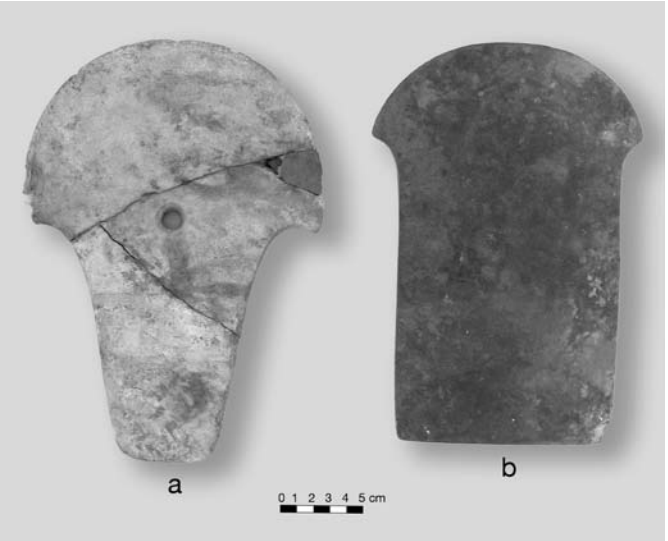


FIGURE 6.23. Spatulate celts: a, perforated marble celt (448674); b, large greenstone celt (448673).

6.23b). The other is a large tool, perforated in the center (448674, Figure 6.23a). It was made from high-quality white marble and was broken but has been repaired. A small missing triangular section was reconstructed by the dealer or collector. The center perforation was drilled from both sides. This celt is a morphological twin to a celt reported from the WPA excavations (Brown, 1976: fig. 179f; 1996: fig. 2-178f); however, the tool at the NMNH is larger. Both large stone spatulate celts were shown in Hamilton (1952: pl. 52).

Other Celts

There are four other celt fragments that either fell outside the above two categories or were too fragmentary for certain identification. Of these, three are cannel coal and probably represent parts of larger spatulate celts. The fourth (423200) is a small flat celt of a sedimentary stone 8.04 cm long, 4.45 cm wide, and 1.0 cm thick. It exhibits some damage to the bit (Figure 6.25a). There are no monolithic axes in the NMNH collection.

OTHER WEAPONRY COMPONENTS

Other components of composite weapons are present. These include ground-stone artifacts, such as atlatl weights, and decorations. Pieces of wood that may or may not derive from weapons are included with other wooden objects in chapter 8. There are also some ceremonial copper covered wooden blades that are also treated in chapter 8.

Four artifacts are classified as atlatl weights (448677). They are all boatstones, that is, hollowed out crescent-shaped devices (Figure 6.24). All are manufactured from what appears to be greenstone, described as porphyritic igneous material and as being altered (J. Gardner, unpublished notes on conservation measures taken for the Spiro collections at National Museum of Natural History, Smithsonian Institution, 1970–1971). The color is a dark olive gray. All four sit on flattened keels. The ends of the boatstones are notched with grooves ranging from 0.35 to 0.71 cm in length. They are highly polished, and surface cavities appear to contain residues that in two cases appear to be ocher. Toolmarks are visible on the inner surfaces of the cavity. These boatstones are shown by Hamilton (1952: pl. 59), who reports that six such boatstones were recovered from one of the smaller southern mounds in the Craig Mound group. Two keeled boatstones were recorded by Brown (1976:115; 1996:465–466) for the WPA excavations from pre-Harlan phase contexts at Spiro. The WPA boatstones were not of greenstone as the four specimens from the relic-hunting excavations are. Boatstones are usually associated with earlier Woodland occupations when atlatls were in greater use. However, Brown (1996:465) reports that they were still in use in the Caddoan area until AD 1000 and may have been used for symbolic purposes after they ceased to be used directly for weaponry.

FIGURE 6.24. Atlatl weights or boatstones (448677).

TABLE 6.16. Atlatl weight characteristics. Raw material is greenstone for each specimen.

Catalog number	Length (cm)	Width (cm)	Depth (cm)	Cavity depth (cm)
448677s01	15.02	2.66	4.07	2.22
448677s02	16.00	2.78	3.49	2.90
448677s03	19.10	2.70	4.00	3.42
448677s04	19.80	2.57	3.97	3.16

There may also be segments of wooden weapons, possibly bow or atlatl (see chapter 8 for discussion of wooden objects.). The wooden segments present are too fragmented to be clearly linked with a particular artifact form (see Table 8.7).

TABLE 6.17. Frequency of utilitarian tools by type.

Tool type	Count
Engravers	1
Abraders	2
Manos	3
Polishers	2
Drills	4
Hoes	2
Hammerstones	3
Flakes	4
Worked pebbles	5
Total tools	**26**

UTILITARIAN ARTIFACTS

Although there are utilitarian implements, they are definitely in the minority in this collection. Such artifacts most likely served needs for resource procurement and processing, or needs associated with the manufacturing of other artifacts. Both chipped-stone and ground-stone extractive tools are in the NMNH collection. The collection of utilitarian tools is summarized in Table 6.17.

Chipped Stone

Hoes and Spades

There are two hoe-like implements chipped from chert. These are relatively thin and finely made. One is a broken hoe from a heat-altered, good quality chert (423174s02). The other is a large, thin biface from a brown and white mottled chert (423173) that shows clear evidence for grinding or insertion into an abrasive substrate. The ridges and edges of the piece are quite smooth. It is 13.34 cm long and 6.79 cm wide.

There are three massive, thick, crude spade-like implements that have definite shoulders and stem elements. One is made from a fossiliferous chert and is quite crude in manufacture (a large brachiopod mold is evident in one face). The source of this chert is indeterminate. It is heavily patinated to a deep brown surface color. Two more shouldered spades are made from a dense siltstone or argillite (Brown, 1976), which Banks (1984) sees as deriving from the Atoka Formation. These siltstone tools (448656) measure 15.12 and 12.65 cm in length, 6.94 and 7.35 cm

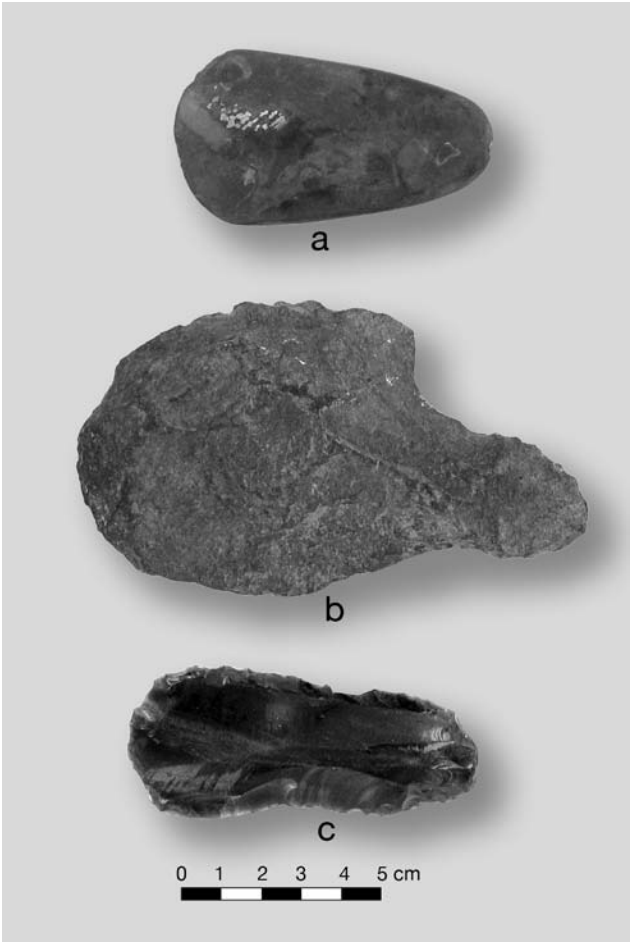


FIGURE 6.25. Other stone tools: a, celt (423200); b, shouldered spade (448656); c, obsidian scraper originating from the Pachuca source in central Mexico (378273).

in width, and 1.83 and 2.48 cm in thickness, respectively. The smaller of the two is shown in Figure 6.25b.

Drills

There are four drills, each having a unique morphology. There are two large drills made from whitish cherts (423193s01, s02, Figure 6.14 a,c.). One is stemmed and has long barbed shoulders (6.96 cm long). The bit is thick, wide, and damaged. Its companion in the same catalog context has a simple expanding base and a thick, wide bit (6.08 cm long). Its lateral edges are heavily rounded. The third drill (423191s01) is a unifacial tool made from novaculite and has a widely expanding base. All three of these were probably hafted. The fourth is a small tool manufactured on a pebble that has been retouched to a short fine point (448655). The base of the tool retains cortex. Only the latter tool could have been used for doing delicate work, and it would have to have been held in the fingers.

Unifacial Graver

One tool would have served well as a graver or incising tool. This a unifacial piece with a projection (423191s04, Figure 6.14d.). It is made of quartz crystal and so would be hard enough to use effectively on hard materials such as shell or bone.

Scrapers

There are three small end scrapers made from local chert. They have straight to convex working edges of approximately 2 cm in width. They are all from surface collection done by R. King Harris and are not necessarily from Craig Mound contexts at Spiro. The only other scraper is a unifacial obsidian scraper donated by J. G. Braecklein (378273, Figure 6.25c). Obsidian tools would be unusual for Spiro (no other obsidian tools are present in collections from controlled excavations), and therefore, this tool is highly interesting. The tool has shallow engraving on the ventral side reading "Le Flore Mound Okla." Other scratches also occur on ventral surface. It is not impossible that obsidian trade goods could have entered the site from far away, especially later in the sequence. Records indicate that Braecklein personally collected the obsidian artifact from the east tunnel of the Craig Mound in December of 1935 (National Museum of Natural History, 1937), so the provenience is more or less assured. Braecklein was a careful and knowledgeable collector. Barker et al. (2002) used energy dispersive X-ray fluorescence to obtain the trace element signature of the obsidian. Results indicate that the obsidian derived from the well-studied Pachuca source in the state of Hidalgo, north of Mexico City. This obsidian artifact is therefore the only certifiably Mesoamerican artifact to be found in a Mississippian context.

Flakes

There are only four small flakes and one clearly bipolar flake. The flakes (488688) appear to be of a grayish to reddish local chert, perhaps from river pebbles, judging from the cortex on two of the flakes.

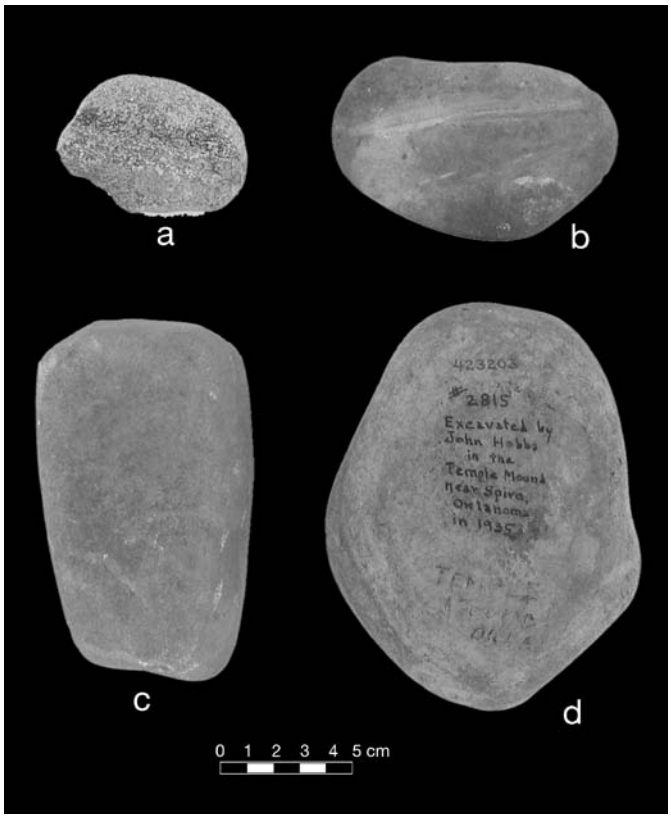


FIGURE 6.26. Abrading tools: a, grooved abrader (423206); b, grooved abrader (423205); c, mano (448681); d, polishing stone (423203).

Ground Stone

Abrading Tools

Abrading tools fall into three categories. The first includes tools for polishing narrow objects and would include shaft abraders and similar forms. These would be manufacturing tools. Two tools fall into this category. One is a piece of unidentified stone with one wide groove and one smaller groove in its surface (423206, Figure 6.26a). The grooves are of even width and run the length of the stone, which would be expected for shaft polishers. The other abrader has been referred to in the NMNH catalog as a sharpener (423205). It has four grooves, two on either face (Figure 6.26b). The grooves are deepest in the center and are confined to the central area of the faces.

The second type includes manos, which would have been ground against other stone surfaces, presumably in food preparation. Grinding clay or pigments with manos would be distinct possibilities as well. Manos often have a pit in the center of one surface (448681, as shown in Figure 6.26c). Manos in this collection are similar to those reported from the excavation of domestic areas at Spiro (Rogers, 1989: fig. 73).

The third type comprises those stones that are polished to a high sheen on one or more faces. These were either used in fine sanding activities and became polished through use or were intentionally polished to produce a mirror-like surface. They are classified as polishing stones and could have been employed in burnishing ceramics. There are two such stones in the collection. One is a large piece of quartzite polished to a high gloss on one face (423203, Figure 6.26d). It is biplano in cross section. The other face is smoothed but not glossy. The second such stone is a black stone, which is plano-convex in cross section. The flat face is glossy. The opposite face is faceted into a roughly five-sided pyramid. These faces are not equivalent in size. The outline of the piece is circular. In the Smithsonian records, the raw material has been alternately referred to as hematite (possible) or chalcedony (unlikely). It is a dense, black material.

Hammerstones

There are three quartz cobbles with extreme damage from battering. They are roughly equivalent in size. The damage is consistent with hammerstone use, and the overall shape and size place them in a similar class to hammerstones recovered from nonmound excavations at Spiro (Rogers, 1980:166). Hammerstones from the 1979 excavations were recovered in two areas, north and east of Craig Mound.

Worked Pebbles

Four worked pebbles are present and differ in shape and material: a long, slender, broken sandstone pebble; a smoothly polished triangular pebble and a thin ovoid pebble, both of fine, dense, dark gray or black stone; and a broken plano-convex stone that appears to have been burned. The function for these pebbles is unclear.

7

Ornaments and Decorations

April K. Sievert

Ornaments are decorative objects used or worn primarily for personal adornment or as components of clothing and headgear. Such decorations include beads, earspools, plaques, pins, and pendants made from a wide variety of materials, including bone, shell, wood, and leather.

EARSPOOLS

One ubiquitous Mississippian ornament is the earspool. These are large earrings worn through extended holes in the earlobe. They are known from various Mississippian contexts, including several other sites in Oklahoma, Arkansas, and northern Texas, with variation in style, size, and composition. Raw materials desired for making earspools include stone, copper, wood, ceramic, and shell. Some spools are composed of two or more materials in combination, such as stone with copper foil wrapping or wood with a shell disc in the center. Both Baerreis (1957) and Brown (1976, 1996) described elements of earspools. Most are shaped like pulleys (hence the name) and have an outward facing flange that is often decorated and an inner flange that faces the neck of the wearer. They may or may not be perforated by a central bore. Earspools from the Smithsonian collections fit into the style typology developed by Brown (1976, 1996). There are 53 whole or partial earspools and over 200 fragments. Table 7.1 shows the distribution of earspools and fragments by style. The whole or partial count column reflects complete earspools or pieces large enough to be measured in at least one dimension.

Pulley-Shaped Earspools

Pulley-shaped earspools are by far the most common. They are characterized by an outer flange, an inner flange, and a central core and are primarily constructed of stone. In many cases, vestiges of a copper flashing remain visible on the spool surfaces. Often the core is perforated with a central bore. Spools can be classified by the morphology of the flanges and the presence or absence of central bores.

TABLE 7.1. Counts of ear ornaments (whole and fragments) by style.

Style	Whole or partial ornaments	Ornament fragments	Total
Pulley shaped			
Perforated	31	7	38
Unperforated	7	58	65
Divided flange	6	13	19
Nesting	1	0	1
Central boss	2	0	2
Flanged ring	1	0	1
Composite	2	0	2
Other			
Effigy	2	0	2
Wooden disc	1	1	2
Unclassified	0	132	132
Total ornaments or pieces	53	211	264
Total weight (g)	2,137	452	2,589

Perforated Pulley-Shaped Earspools

Perforated earspools are common, comprising 47% of the total measurable earspool collection. In most cases the perforation is small (~1.5 cm in diameter), leaving ample surface space for decoration. Figure 7.1 shows several fragments of differently styled pulley earspools. The earspools are heavy, averaging 55.2 g per earspool for the whole and nearly whole ornaments. Table 7.2 gives the dimensions for perforated earspools (see Appendix A for measurement procedures).

Manufacture

The earspool central bore is parallel-sided and may be either smooth or ridged. A ridged bore has narrow incised grooves resembling threads within the bore. The threads are fairly even and were mechanically produced by the techniques used to drill out the stone. Both decorated

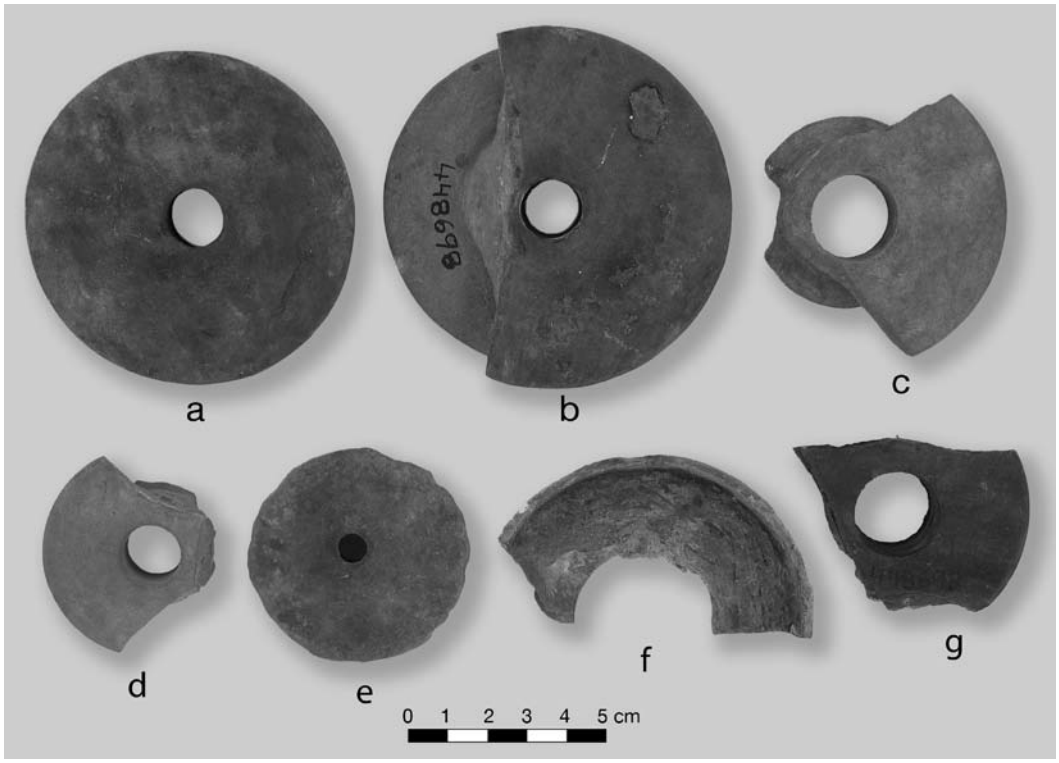


FIGURE 7.1. A variety of perforated pulley-shaped stone earspools: a, complete example carved from argillaceous siltstone (448698s01); b, large earspool carved from argillaceous siltstone (448698s02); c, fragment with narrow pulley groove (448698s03); d, fragment made of soft claystone (448698s04); e, unfinished specimen with central hole only partially drilled (448698s05); f, flanged example carved from sandstone (448698s06); g, fragment carved from siltstone (448698s07).

TABLE 7.2. Characteristics of perforated pulley-shaped earspools. All measurements are in centimeters.

Measurement (count) [a]	Mean	Extremes	Standard deviation
Thickness (31)	1.67	1.18 / 2.32	0.25
Outer flange diameter (29)	6.63	3.27 / 9.06	1.61
Inner flange diameter (23)	5.58	2.43 / 7.95	1.6
Pulley diameter (27)	3.36	1.43 / 4.2	0.7
Hole diameter (28)	1.67	0.53 / 3.39	0.52
Wall thickness (29)	0.48	0.3 / 0.68	0.1

[a] Numbers in parentheses are the number of artifacts having this measurable component.

(448691) and undecorated (448699) earspools exhibit this feature to varying degrees. If drilling was accomplished using a hollow cylinder, such as a reed (perhaps with an abrasive), such a pattern might develop. Similar ridges occur on the surface of other stone objects with wide drilled bores (e.g., pipes). The central bore may have a partially utilitarian function. By drilling out the inner pulley, the earspool becomes considerably lighter, thus lessening the pull on the earlobe. In addition, the central bore might also facilitate removing the material between the two flanges. Placing a shaft through the bore would allow the spool to spin as if on a lathe.

Another manufacturing characteristic appears on the inner faces of the flanges where fine striae radiate out from the center of the pulley. This must be a result of grinding out the pulley. Pulling a cord or thick thong around the pulley could result in similar marks, especially if abrasives were used. The interior surfaces of the pulley shank are smooth, without obvious toolmarks.

Raw Material

The complete and nearly complete earspools are manufactured from either limestone or a fine-grained siltstone or sandstone. Baerreis (1957) and Brown (1976) refer to the latter as sandstone, and indeed, there is a fine crystalline graininess visible in the surface of this stone. However, the grain size is very small. Conservator Joan Gardner noted that this raw material may be argillaceous siltstone on the basis of examination by geologist A. Segovia from the University of Maryland in 1974. It is brown, usually in the 10YR hue range using the Munsell Soil Color Chart (Munsell Color Co., 1973). In some areas the surface has become exfoliated as layers of the raw material flaked away. Exfoliation might be expected if the stone is, indeed, a siltstone. The stone is tough, and surfaces in general exhibit very little weathering, also typical of siltstones. This stone accounts for 13% of the total number of earspool fragments. This percentage may seem insignificant except that this material makes up 44% of the earspool collection by weight because the stone is durable and so many of the spools made from it are unbroken (Table 7.3).

The other commonly used stone is limestone, a white or light gray soft and fine-grained variety. In general, the limestone has fared poorly, and many fragments show weathering and leaching of the surface. Several limestone spools are undecorated and without the residue that would indicate that they once had a copper foil covering. Limestone has a much greater tendency to be broken than does the siltstone. It is softer, more friable, and highly affected by acid.

Associations

Copper foil is a common decoration for earspools. It occurs on both decorated and undecorated spools. Bell (1984:234) notes that the perforated stone earspools found at the Harlan site are not decorated but are covered with copper foil. He notes also that they become larger in diameter through time. Brown writes also that the nonincised stone earspools are associated with Harlan phase contexts and suggests that through time the inner flange becomes larger in proportion to the outer flange (Brown, 1976:279). Decorated earspools are found throughout the Spiro phase. Similar styles of decoration are shown among the earspools depicted in Burnett (1945: pls. XI–XII).

Most of the earspools from the NMNH collection will be from Spiro or late Spiro phase burials, as suggested by the patterns recorded for earspools from the WPA excavations (Brown, 1976:303, 1996). The distribution of perforated pulley-shaped earspools is wide, and they are found across the Caddoan area (Brown, 1996:566). These earspools cease to be used in later Caddoan sites, and at Spiro they were in use primarily during the Spiro II and Spiro III periods (Brown, 1996:566).

Decoration

The majority of earspools are smooth. However, some are decorated with incised designs. Designs registered on perforated pulley-shaped earspools include both geometric and figural representations. Brown (1996:563) links the geometric designs with Spiro II burials and figural designs with Spiro III. Decoration occurs on the outer face only.

TABLE 7.3. Summary of earspool styles by raw material. A dash (-) indicates that no earspools occur in this raw material category.

Style	Limestone	Siltstone/ Sandstone	Wood	Copper	Other	Style total
Pulley shaped						
Perforated	17	15	6	-	1	39
Unperforated	59	-	6	-	-	65
Divided flange	16	3	-	-	-	19
Nesting	1	-	-	-	-	1
Central boss	-	-	2	-	-	2
Flanged ring	-	-	-	-	1	1
Composite	-	-	2	-	-	2
Other						
Effigy	-	-	2	-	-	2
Disc	-	-	2	-	-	2
Unclassified	50	8	-	74	-	132
Raw material total	143	26	20	74	2	265
Total weight (g)	1,131	1,209	187	24	38	2,589

Perforated spools are often covered with copper foil and decorated with an incised pattern of geometric forms. The copper foil would be carefully pressed into the relief designs carved on the surface of the flange. Concentric circles occur on four examples of whole or partial rings (Figure 7.2). There are two earspools that are nearly identical in form and decoration. These could easily represent a pair.

FIGURE 7.2. Perforated pulley-shaped earspool with concentric circle decoration (448693).

Only one pattern occurs with any regularity. A chevron pattern repeated in four quadrants of the spool is present on four of the specimens from NMNH and was common in the WPA collections (Brown, 1976: fig. 58p; 1996: fig. 2-119p). In three cases the chevrons are narrowly incised lines that radiate out from the central bore. There are four repetitions of the chevron pattern. In one case, the space between the lines in the chevrons is greater, thus effectively dividing the field into quarters. Artifacts 448691s01 and 448691s02 represent a pair, with narrow incised lines forming the chevrons. The surface is without copper (Figure 7.3a,b). Artifact 448692 is a similar earspool with wider incised lines and remnants of the original copper foil intact (Figure 7.3c).

In most cases the decoration is incised into the surface, but in a few cases, it is excised. The single earspool from Spiro known to depict a human figure (423162) is from the Trowbridge collection, and it is excised (Figure 7.4a). The figure appears in low relief, with detail added by incising the sandstone surface. The lower body of the figure is depicted in unusual form in that legs are not shown. Rather, the body terminates in what resembles a flared skirt. This might represent a desire to impart avian characteristics to the figure (a bird's tail feathers), or the artist may simply have run out of room for legs. The head is shown in profile with the nose transformed into a hawklike beak. The eye is a simple diamond shape. Elbows are bent with hands upraised. In this particular case, the central bore seems not to be incorporated into the overall design. Instead, it

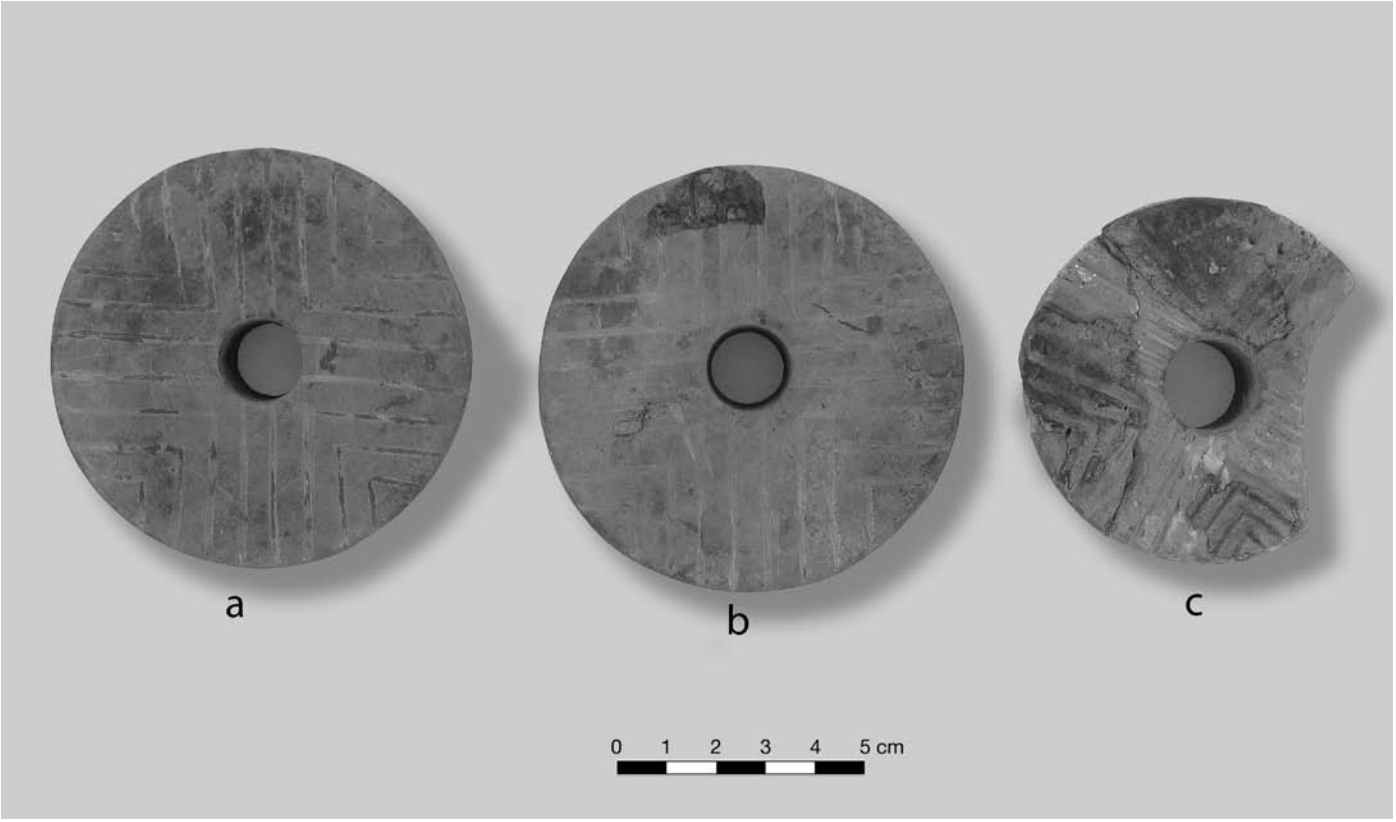


FIGURE 7.3. Earspools with chevron decoration: a, b, pair of earspools without copper foil (448691s01, 448691s02); c, earspool with chevron design and copper foil (448692).

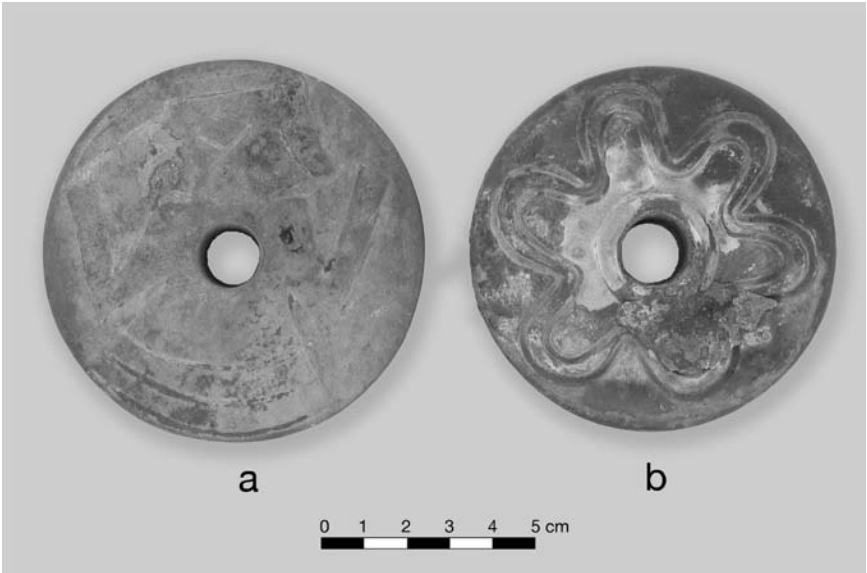


FIGURE 7.4. Perforated pulley-shaped earspool: a, human warrior figure design (423162); b, petaloid design (423163).

perforates the figure. This spool is illustrated in Hamilton (1952: pl. 81). Brown (1996:566) refers to the figure as a standing warrior. Human figures are rare on earspools and have been noted for only the Norman and Wilbanks sites (Brown, 1996:567).

There is one complete earspool bearing a six-lobed double petaloid line around the central bore (423163) (Figure 7.4b). This sandstone earspool also has one ring incised close to the perforation and is pictured in Hamilton (1952: pl. 81). It has no exact match in the other collections known to be from Spiro. Brown (1996:566) refers to a similar motif as a double-line meander. Traces of the copper facing remain.

There is excellent information as to how earspools were worn. Perforated earspools are illustrated as adorning the ears of people depicted on engraved shells from Spiro and on shell gorgets from across the Southeast. Usually, the motif is executed by incising a circle and then starting a drill hole in the center of the circle, resulting in a perfectly round dot. This motif appears frequently elsewhere in Spiro art, for example, as decoration on the bodies of serpentine forms or as the eyes of zoomorphs. Whether the earspool design reflects an iconographic formula or the iconography reflects a style of dress is debatable.

Alteration

Several earspools also show evidence for having been reconstructed after excavation. Artifact 448698s16 appears to have been reconstructed with plaster or a similar filler. Two sections of the outer face were rebuilt and smeared with a green pigment to mimic copper staining.

Unperforated Pulley Earspools

Unperforated earspools are similar to the perforated form, except that they do not have holes drilled through the center. As shown in Table 7.1, there are seven unperforated pulley-shaped earspools. However, six of these are of wood, leaving only one unperforated earspool made of limestone. This earspool is incomplete and consists of the flanges of a limestone earspool that have been cemented together with copper. The unperforated stone earspool in this collection is not decorated. This contrasts with the unperforated stone earspools recovered by the WPA excavations, which generally have decoration excised in shallow relief.

Many of the fragments of stone earspools recorded as being from unperforated earspools may actually be from the perforated or divided flange types, but without a trace of the inner flange, this is difficult to ascertain. There is a fairly large number of such fragments recorded (n = 58), and they are all limestone. It is possible that they may be from the outer flanges of the broken earspools recorded as having divided flanges or from perforated earspool flanges.

There are four matching pulley-shaped wooden spools with flanges of unequal widths (448902, 448903, 448904, 448905s01). They could represent two matching pairs. In each of these four spools one flange is wide, markedly concave, and extremely thin. It carries a narrow lip. This surface is not finely finished, and toolmarks are visible on this face in every case. The opposite flange is narrower in diameter, thicker, and excised to form a dish-shaped indentation. With the exception of 448904, which may have once held a shell disc, there is no evidence that another component was set into the shallow hollow space. If 448904 ever held a shell disc, it is not there now, and the earspool is otherwise so similar to the other unperforated wooden spools that it seems justifiable to classify it with them. The earspools are relatively plain and do not appear to have been covered with copper. A third pair of plain wooden spools differs from the other two pairs only in that the flanges are quite narrow (448905s02, 448905s05). Although these are fairly thick, the absence of a noticeable flange makes them appear more like wide plugs. This pair is marked by flattening and deformation, so the stylistic characteristics may simply be harder to discern. The unperforated wooden earspools have a mean weight of 7.98 g. They average 1.6 cm in thickness, 4.15 cm in outer flange width, 3.56 cm in inner flange width, and 3.4 cm in pulley width. Two of the unperforated wooden earspools have traces of fiber wrapping around the pulley (448903 and 448904).

Divided Flange Earspools

Earspools with divided inner flanges are common (Figure 7.5). The divided flange is characterized by two equally sized, semicircular halves that are separated by a sharply defined channel (see Baerreis, 1957:32). This type may be prototypical to the later Foster type earspool in which the inner flange is reduced to two lugs. Surfaces of the divided flange earspools are usually concave. There were no earspool fragments of the Foster type from the NMNH collection.

The divided flange earspools are badly fragmented, with none being complete. The 11 limestone fragments in 448699s03 represent a minimum number of six earspools. Residues are plentiful, and nearly every fragment is stained with copper. One earspool has a well-adhered fragment

FIGURE 7.5. Divided flange earspools: a, 448695s01; b, 448695s02.

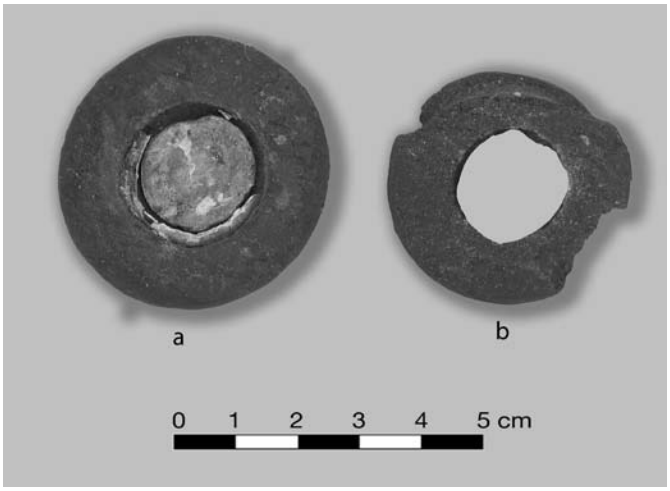


FIGURE 7.6. Composite wood and shell earspools: a, 448900s01; b, 448905s03.

of mica on the outer surface (448695s02), suggesting that mica may have been an alternative to copper for decorating earspool surfaces. In addition, there are three flange sections having twilled basketry impressions on the surface. The impressions appear to be similar, and it is likely that they were from similar depositional contexts.

Average dimensions for divided flanges are as follows: thickness, 1.67 cm (n = 4); outer flange, 5.77 cm (n = 1); inner flange, 5.45 cm (n = 3); and pulley width, 3.41 cm (n = 5).

Central Boss Earspools

One pair of wooden spools with a central boss is present (448900s02 and 448905s04). These have the inset inner flange and a raised mound on the outer flange and were clearly covered with copper foil. Faint toolmarks around the outer flange of 448900s02 suggest that a tool with a working edge width of about 0.45 cm was used in shaping these. Its probable mate is slightly damaged around the perimeter. The mean dimensions of these earspools are as follows: thickness, 1.89 cm; outer flange width, 4.66 cm; inner flange width, 3.6 cm; pulley width, 3.46 cm; and weight, 12.45 g.

Composite Earspools

Composite earspools are manufactured from more than one element (Figure 7.6). For example, a wooden or stone spool may possess an inlaid disc of shell or stone. The two examples of complete composite earspools are wooden with inlaid shell, but they do not constitute a matching pair.

The first is a wooden pulley with both flanges intact (448900s01). The inset size of the outer flange is 1.8 cm in diameter; the inner flange inset size is 2.1 cm. The shell disc in the outer flange is present. There is nothing in the shallow depression on the inner flange; however, there is a perforation on the perimeter of the inner flange as well as slight breakage. There are traces of fiber wrapped around the pulley.

Wooden earspool 448905s03 was also inlaid on the outer flange with shell, and it is stained with copper. It is embellished with small bumps that have been excised from the outer surface. There are six extant bumps, and there is room for two more in the missing, broken portion of the outer flange. This earspool carries only a faint impression that the inner flange was excised. This is a thin earspool pulley compared to other wooden forms.

Nesting Earspools

One small limestone earspool appears to be the male portion of a nesting ring earspool (448699s02). Nesting spools consist of two parts that fit together, one flange nesting inside the other. This fragment is 1.03 cm thick and has a pulley width of 1.4 cm. Brown (1976:278) reports that this variety was also found in the burial mound at the Harlan site.

FIGURE 7.7. Ceramic flanged ring earspool, both sides (448696).

FIGURE 7.8. Canine wooden effigy earspools, side and frontal views (448895).

Flanged Ring Earspools

The single earspool that could be called a flanged ring is ceramic, not stone (448696). It displays a wide central opening and very narrow flanges. The paste is tempered with shell. It is complete and in good condition (Figure 7.7).

Other Earspools

Earspools not shaped like pulleys are much less common. Furthermore, most of these are manufactured from something other than stone.

Wood Disc Earspools

One complete wooden disc is present (448901). It is flat except for a raised portion in the center of the disc. Copper and a trace of matting or woven surface are visible. The width of the fiber is not clear but seems fairly wide (0.5 cm) and indicates contact with basketry or matting. There is a perforation in the flat posterior face that is centered, approximately 0.2 cm deep, and appears to be drilled. There is also a fragment of a wooden disc (448909). Exactly how they were worn or used is unclear.

Effigy Earspools

The only effigy earspools are a pair of carved cedar canine heads (448895s01, 448895s02). Tongues hang out as if the animals were panting (Figure 7.8, 7.42a). The figures have exaggerated snouts and excised eye patches (which might have held an insert, although there is no residue in the depression to attest to this) and display small, rounded upright ears. Two pairs of small holes flank each ear and may have formed a means of attachment. Residue clogs these holes. This pair was shown by Hamilton (1952: fig. 30a). The only other effigy earspool reported to be from Spiro is known only from a photograph published by Brown (1996: fig. 2-121d). It depicts the head of a bird of prey with shell inset eyes.

Shell Rings and Discs

Shell rings or discs may have been utilized for purposes other than to decorate ears or earspools. However, given that inlays for earspools are often of shell and that shell earspools are a known type, any shell discs and rings are discussed here in the context of earspools. Shell discs may either be planar or concave. Whether these may have served as parts of composite earspools, figures or other artifacts, or as independent objects is unclear.

There are 14 shell discs. All are well smoothed. Together they weigh 153.1 g. Five are perforated in the center, drilled straight through from one face to the other. Diameters range from 2.88 to 6.0 cm and average 4.34 cm (standard deviation, 1.03 cm). Sizes do seem to cluster, with one size measuring close to 4 cm in diameter and a larger size measuring nearly 6 cm. Most are concave, exhibiting the natural curvature of the shell wall from which they were cut. Signs of manufacture include scouring marks, especially on the inner surfaces.

One is incised with a star design reminiscent of a seven-point Moundville star (448908). Around the inside of the perimeter is brown prehistoric adhesive. Copper foil remains in some of the scallops around the star. The star would have been manufactured of shell and glued into the center of another object, probably a wooden earspool (now gone). The outer surface would then be covered in copper foil carefully cut to fit the scalloped pattern engraved into the shell disc. The result would be a flashy copper ornament with a lustrous central star.

BEADS

Beads are numerically the largest component of the Spiro collection, and shell is by far the most common material used to make them. Shell beads are present strung on the original prehistoric cordage, piled into lots (and sometimes restrung on modern string), or as a component of other composite artifacts. Most of the beads are combined into lots. At the time of original cataloguing some beads were apparently sorted by type, while other lots were not. Trowbridge had his beads strung in many cases, perhaps to display them better. Most of these were not resorted when they were accessioned, and Trowbridge's original groupings tended to stay together. The combinations of beads in Trowbridge's lots probably depended primarily on the circumstances of his acquisition—what he received together, he kept together. In some cases, several kinds of beads (primarily the small varieties) were mixed into large groupings that included other artifact types as well, especially quartz and galena.

Shell Beads

Manufacture

Shell beads can be manufactured in three ways. (1) The columella of univalves (which in some cases can be extremely thick) can be used as raw material. Shell thickness is greatest in the columella and is ideal for making large beads. Beads manufactured this way often display the groove of the mollusk's anal canal. (2) Beads can be worked from the outer surfaces of either univalve or bivalve mollusks. In these cases, original curvature of the shell may be visible. (3) Finally, whole shells can be used. For small shells such as the miniature species of *Olivella*, the apex may be ground down, leaving a circular hole. The bead can then be strung using this hole and the natural opening at the distal end.

There seems to be no simple rule regarding which bead types are drilled from both ends and which are drilled straight through. The smallest disc beads are nearly always drilled from both sides. This may prevent breakage as the rim gets progressively thinner with deeper drilling. Beads with a round cross section are always drilled from both ends. Some elliptical and convexo-cylindrical beads are drilled from one side only. Some beads have relatively equal bore holes on each end and a straight bore, suggesting that the drill used was a reed or other similar material. Overall, most beads have a biconical or contracting bore, suggesting the use of a stone drill.

Some beads were altered by heat. Brown (1996:576) believes that burned beads were not typical of the litter burials in the Great Mortuary because few other objects found with the large quantities of beads were burned. Burned beads would be more characteristic of the earlier burials that were redeposited for the construction of the Great Mortuary.

Beads had a wide use in personal decoration. Necklaces, hair ornaments, ear ornaments, bracelets, and anklets were prevalent and are identified on the shell iconography that depicts human figures.

Styles

Beads come in a wide variety of styles, as illustrated in Hamilton (1952: pl. 66). A number of bead shapes are represented in the NMNH collection, as shown in Figure 7.9. Beads from the NMNH collection are not split into quite so many types as done by Brown (1976). For example, for purposes of this report, beads made from the columella are included with other beads of the type. Frequency and size range for beads are shown in Table 7.4.

Disc Beads

The overall shape is round and flat, with relatively straight sides. There are four substyles.

1. For very small beads with flat or slightly convex sides, the diameter of the hole occupies a substantial proportion of the total diameter. These are included in the "small" category in Table 7.4.

2. Very thin discs (~1 mm) are distinguished by a low thickness-to-diameter (T/D) ratio. They are listed as "thin discs" in Table 7.4. These discs were noted in only two catalog contexts (423331 and 448721) and were always mixed in with small disc beads and small convexo-cylindrical beads. The bore is relatively small, and the size is uniform at approximately 1 cm in diameter. One such bead was sculptured along the edges.

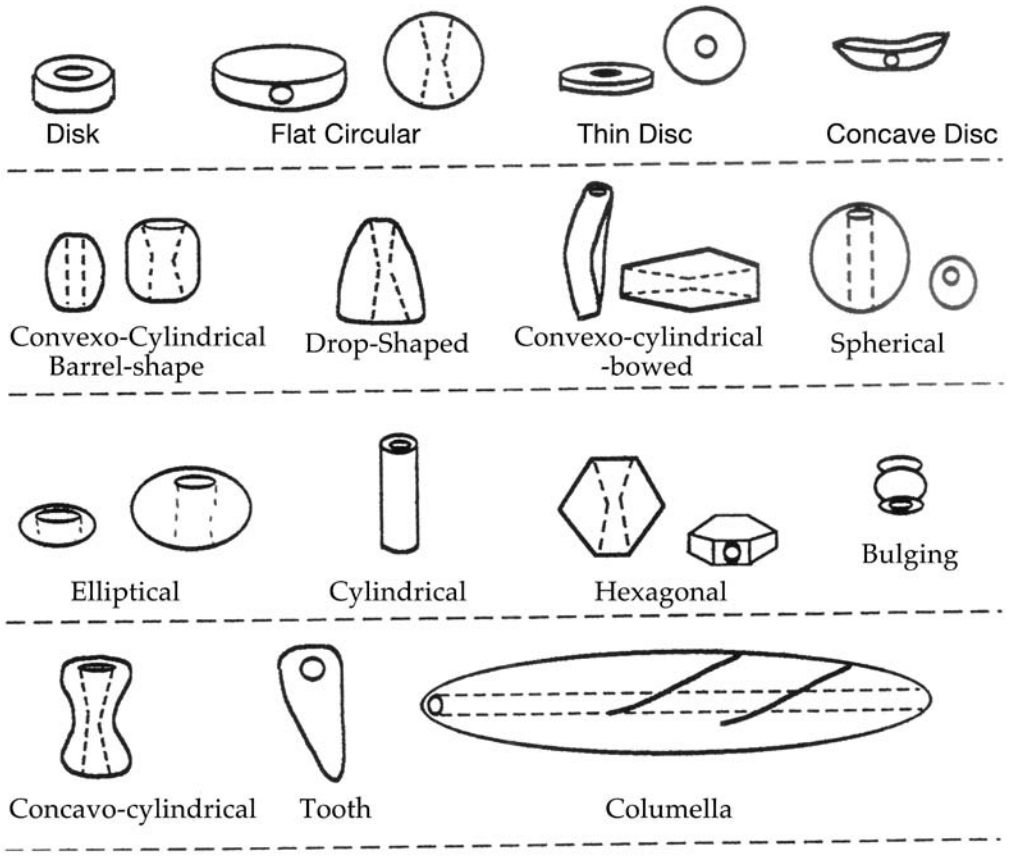


FIGURE 7.9. Manufactured shell bead types in the National Museum of Natural History collection (after Brown, 1976:345).

3. Larger discs are similar to small disc beads except that the diameter is relatively greater, especially as related to the diameter of the hole. These correspond to the "medium" and "large" categories in Table 7.4.

4. Concave disc beads, although disc-shaped, do not lie flat (Figure 7.10).

Disc beads number over 10,000, making them the most common bead type present in the collection. Furthermore, this number does not include beads in the composite artifact 448934, a basket containing leather, beads, and copper. It was not feasible to count the beads nestled among the other artifacts in that basket.

Flat Circular Beads

These are also disc shaped; however, the bore enters the bead from the side rather than the face. Of these, there are only two (448735), and they are large (see Table 7.4). Thickness averages at 1.5 cm. The center bore is 0.82 cm in diameter at the surface and is biconical. The surfaces are well smoothed but have weathered.

Elliptical Beads

Elliptical beads are much less common. Beads are classified as elliptical if their diameter exceeds their length and if the outline forms a fairly smooth curve. Elliptical beads in small, medium, and large categories are present. They are similar to disc beads in style, but the rounded outline implies greater investment in finishing.

Convexo-Cylindrical Beads

These are the common "barrel-shaped" beads mentioned often in the literature. They are less numerous than disc beads at a total of over 2,300. Length exceeds diameter. There is variation in the sizes here as well, but they do seem to cluster into three major categories.

TABLE 7.4. Frequency and characteristics of shell beads. A dash (-) indicates data are not available or not applicable.

Style	Size	Count	Weight (g)	Length (cm)		Width (cm)	
				Maximum	Minimum	Maximum	Minimum
Disc	Small	10,377	1,423.1	0.67	0.11	0.78	0.31
	Medium	135	284	0.92	0.29	2.85	0.67
	Large	79	209.4	1.00	0.42	2.62	1.87
	Thin	162	10.4	0.18	0.07	0.83	0.68
Flat circular	-	2	76.2	4.33	4.2	4.64	4.27
Convexo-cylindrical	Small	2,130	651.7	1.22	0.24	0.94	0.25
	Medium	237	299.7	2.50	0.71	1.54	0.52
	Large	45	410.1	13.73	1.72	2.67	0.94
Bowed	-	196	1,123.3	10.06	2.39	0.94	1.57
Drop-shaped	-	3	3.69	2.07	1.80	1.62	1.33
Sculptured	Pearl	2	-	0.93	0.69	0.54	0.53
	Columella	2	39.0	8.25	4.65	2.10	1.82
Spherical	Small	107	51.8	1.35	0.25	1.27	0.33
	Medium	9	45.0	1.75	1.18	1.96	1.23
	Large	180	2,121.8	3.58	1.90	4.22	1.15
Elliptical	Small	47	15.4	0.92	0.35	0.79	0.28
	Medium	28	27.3	1.04	0.32	1.95	0.40
	Large	2	14.9	1.10	0.90	2.24	2.17
Bulging	-	124	176.6	3.44	1.02	2.27	0.62
Concave disc	-	64	421.6	1.20	0.43	3.10	1.75
Concavo-cylindrical	-	143	168.1	2.60	0.82	1.24	0.48
Cylindrical	Medium	5	15.9	3.65	2.30	1.26	0.54
	Small	584	201.0	1.25	0.40	0.69	0.37
Tooth	-	10	28.9	2.62	0.22	1.42	0.62
Hexagonal	-	2	9.9	2.90	-	2.80	-
Mask	-	1	96.3	5.46	-	5.50	-
Pearl							
Spherical	-	238	43.3	0.74	0.31	0.80	0.32
Natural (baroque)	-	186	-	2.87	0.24	2.78	0.39
Mixed	-	321	46.9	1.10	-	0.90	-
Olivella	-	6,592	486.3	1.8	0.65	0.85	0.22
Oliva?	-	1	21.4	6.07	2.70	-	-
Marginella	-	15	2.6	0.98	0.82	0.68	0.50

1. Small beads are <1 cm long. Mean bead length in this group is 0.79 cm, and mean bead diameter is 0.55 cm.

2. Medium beads generally fall between 1 cm and 2 cm in length.

3. The largest beads are made from the columella of *Busycon* shells. Usually quite long (>3 cm) they almost always display the anal canal from the mollusk. This category includes all of the large columella beads and some other large convexo-cylindrical beads that may or may not be from columellas.

Sculpted Beads

This style is another variation on the convex-sided beads and includes any beads that were modified further by incising extra detail on the surface. Making these would involve added time expenditure. Sculpted beads come in two sizes: small (<~1.5 cm) and larger (>2 cm). There are very few. The small ones comprise two pearl beads that were treated with extra incisions around the circumference (423337s02). The large beads are columella beads in which either the canal spiraling down the length of the columella is embellished or extra grooves are added. There are two large beads of this type (423323s01 and 448768s02).

Asymmetrical Convex (Bowed) Beads

These beads are convex in outline (or somewhat hexagonal) but are bowed when viewed from the side and display natural shell surface sometimes on both faces. They appear to have been made from either distal portions of

FIGURE 7.10. Concave disc beads (423313).

FIGURE 7.11. Spherical columella beads (423314).

columellas or from the thickest parts of the body of shells (usually distal). This style is perhaps what Brown (1976) refers to as "large elongate" beads. Convexo-cylindrical and large elongate beads might represent a similar conception of bead morphology. The difference lies in the constraints of the raw material. The convex outline sometimes resembles a lengthened hexagon (Figure 7.15). These have also been referred to as "spindle-shaped" beads.

Convexo-Cylindrical Drop-Shaped Beads

These beads are flattened at each end and are significantly narrower at one end so that the bead assumes a drop shape (448723s04 and 448728s01). There are three such beads, and all of them are broken along the axis.

Spherical Beads

Length equals diameter for spherical beads (Figure 7.11). They can be somewhat irregular and not precisely round when viewed from the end. This irregularity stems somewhat from the difficulty of working with shell. Larger spherical beads are almost always made from the columella (thickest part) of large univalves, primarily *Busycon*. Smaller spherical beads can be made from other parts of shells, including thick wall sections sometimes found in distal areas of the whelk shells. Beads cluster into three general size categories, as shown in Table 7.4.

Cylindrical Beads

Cylindrical beads are nearly straight sided and are longer than they are wide (Figure 7.12). This grouping posed a problem in that in many cases within lots of similar beads, the beads graded from being clearly convex in outline to being cylindrical. In such cases the beads are not separated into smaller groups because it seems that the variation is due more to variation in manufacturing than to a different "mental template" used by the craftsperson to manufacture the beads.

Concavo-Cylindrical Beads

These beads are concave in outline, constricted in the center, and flared outward at the ends of the bead (Figure 7.13). Spool shaped, they resemble human phalanges, and en masse they look very much like small bones. This resemblance to bone may not be an accident. The shape is similar to that of bones as presented in the iconography of shell engraving (see Phillips and Brown, 1978:151). Brain and Phillips (1996:361) believe this spool-type shell bead may prove to be a useful chronological marker, as it appears to be linked to late prehistoric and protohistoric contexts.

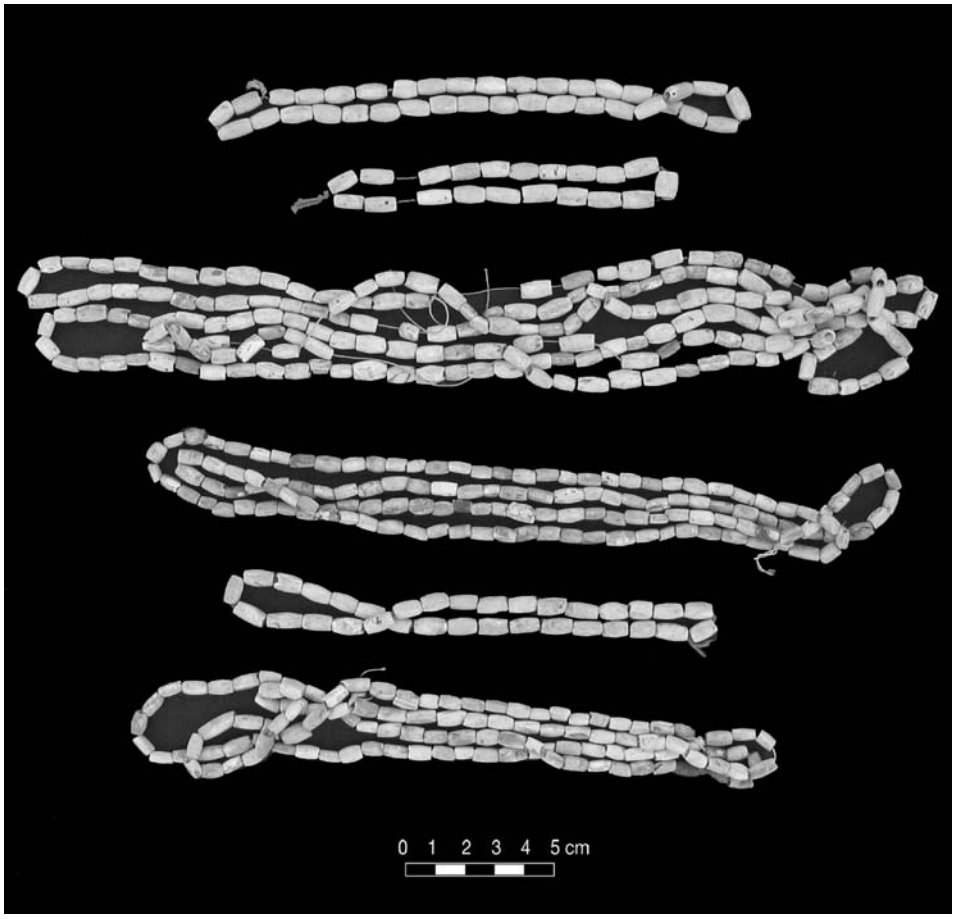


FIGURE 7.12. Cylindrical beads (423316).

FIGURE 7.13. Concavo-cylindrical "phalange" beads (378259).

Bulging (Compound Cylindrical) Beads

These interesting beads are a variation on a convexo-cylindrical theme in that they have constrictions near each end, giving the impression that they are composed of three distinct sections (e.g., 378258s01). Usually, the wider center section bulges distinctly outward. They are recorded as "bulging" beads (Figure 7.14).The 124 beads of this type range between approximately 1 and 3.4 cm in length.

Flattened Hexagonal Beads

A low T/D ratio distinguishes flattened hexagonal beads from the asymmetrical bowed beads of hexagonal shape discussed above. One such bead (378253s01) is shown in the left center of Figure 7.15. There are only two in the collection. They measure 2.9 cm in length by 2.8 cm in width.

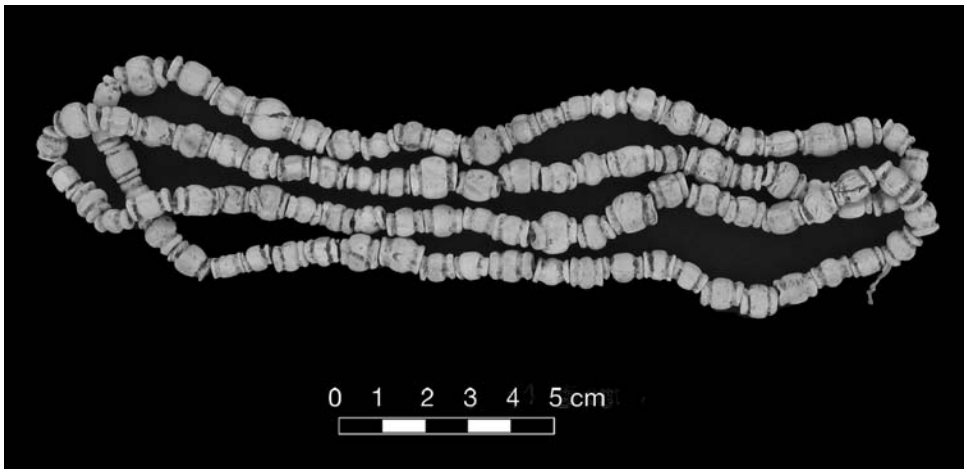


FIGURE 7.14. Bulging beads (423327).

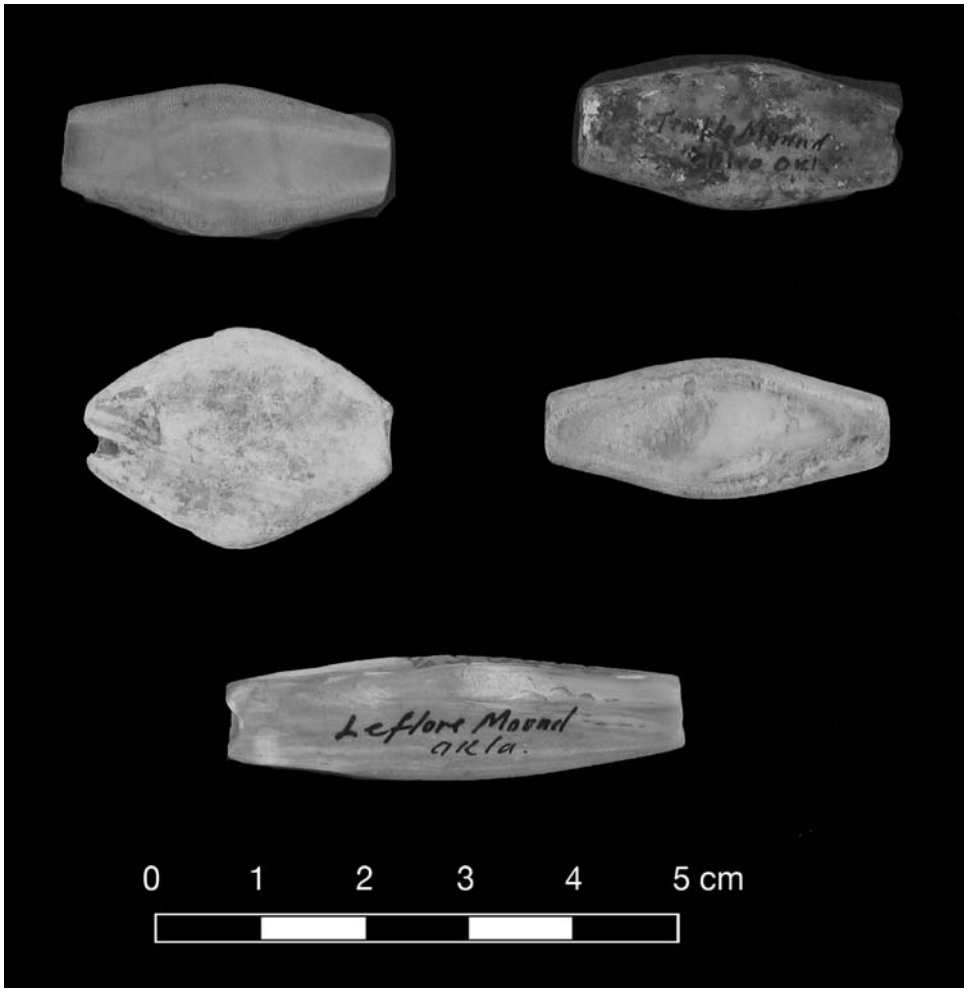


FIGURE 7.15. Hexagonal and asymmetrical convex beads (378253).

Convex Disc Beads

There are only three of these beads (423169s05, 423329s02, 423311). The curvature indicates that the bead blank was cut from a shell wall. One exhibits red ocher on the surface.

Mask Beads

Only one mask bead is present, but it is well crafted (Figure 7.16). Bead number 448773 is realistically modeled and incised with deep V-shaped lines. The head wears no forelock. The view is frontal, with the eye treated as an oval within a forked-eye pattern. The pupil was created using a drill. Teeth are raised, and the center of the mouth is missing from the surface. The person wears a band around the forehead that has three parallel lines in the center, with sets of two lines on each side. Features appear to be rendered in Craig style. The human face wears a perforated pulley earspool. The bead measures 5.46 cm long by 5.5 cm wide. A 0.66 cm diameter hole has been bored from either end. The channel has considerable sediment remaining inside it. This large bead weighs 96.3 g.

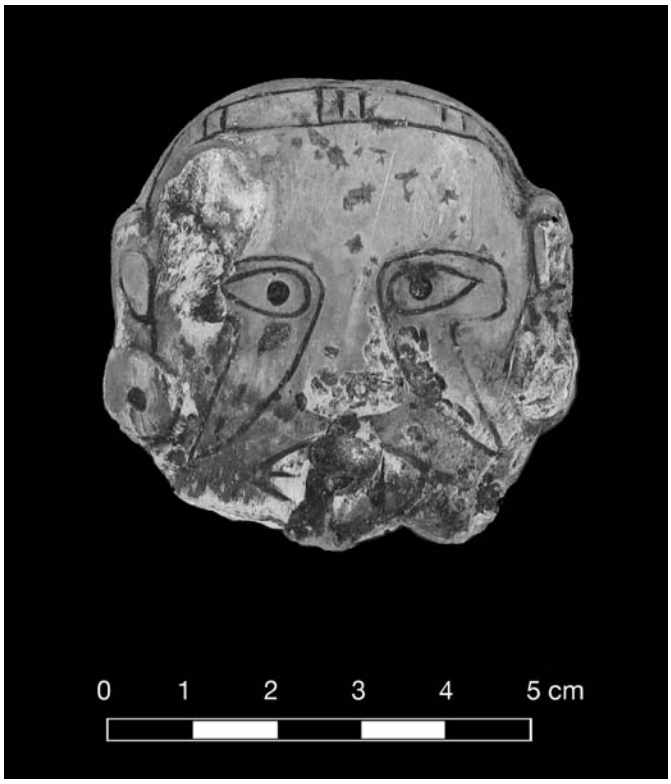


FIGURE 7.16. Shell mask bead (448773).

Shell Tooth Beads

These beads are shaped like teeth. They have a pyramidal shape, with the hole drilled through the wider portion of the piece. They are not numerous (n = 10), but they do vary in size. Included in this category is one tiny pyramidal pearl drilled through the apex. The shell beads in this group are all fairly large, with dimensions of greater than 1 cm in diameter and 2 cm in length.

Gastropod and Bivalve Beads

A variety of small freshwater snails are present, but in small numbers. Table 7.5 lists these varieties along with their ranges, when known (Figure 7.17a). These designations are based on identifications made prior to my study and recorded on the catalog cards for 378250. For 448889, identifications had been elicited from Dr. Rosewater of NMNH's Department of Invertebrate Zoology, Division of Mollusks, in the mid-1970s. The small snails *Campeloma, Angitrema,* and *Anculosa* were undoubtedly used for beads.

Bivalves include one specimen identified by Rosewater as *Laevicardium elatum* Sowerby. This is a cockle that derives from the Pacific, and its presence is interesting because it suggests elaborate economic integration. Cockles of the same genus are also found off the coast of Florida. Another Pacific shell is a specimen of genus *Haliotis*, which includes abalones. This shell has well-preserved nacreous luster and appears to be unmodified.

MARGINELLA. *Marginella* sp. is a small marine univalve (Figure 7.17b). Used for beads across North America, they are present but not plentiful in the collection from Spiro at the NMNH. Whole *Marginella* shells are worked by grinding down the apex on the side of the shell obliquely to create a hole. The beads can then be strung using this hole and the natural aperture at the distal shell.

OLIVELLA. There are several species of *Olivella.* The smallest, also referred to as "rice shells," resemble small grains of rice (Figure 7.17a). *Olivella* are small marine univalves. Multiple species have been identified in the materials recovered from the WPA excavations (Brown, 1983:149). There are two primary sizes present, representing a minimum of two different species. The tiny "rice" shells rarely exceed 10 mm in length. A larger variety varies around a length of 1.5 cm. There is

TABLE 7.5. Variety and range of gastropod and bivalve shells.

Mollusk	Count	Range	Type	Catalog number(s)
		Gastropods		
Campeloma sp.	5	Widespread	Freshwater snail	378250, 448889
Angitrema salebrosa Conrad	4	Tennessee River	Freshwater mollusk	378250
Anculosa tintinnabulum Lea.	45	Tropical America	Freshwater mollusk	378250, 448733
Angitrema verrucosa Raf.	1	Tennessee River	Freshwater mollusk	378250
Angitrema sp.	18	Tennessee River	Freshwater mollusk	448733
Prunum sp.	1	Caribbean?	Marine snail	448889
Total gastropod count	**74**			
		Bivalves		
Donax sp.	3	Widespread	Marine clam	448889
Scallop?	1	Variable	Unknown	448885
Haliotis fulgens Philippi	1	Pacific: Oregon to Baja	Abalone	448776
Laevicardium elatum Sowerby	1	Southern California to Panama	Cockle	448775
Pecten sp.	2	Widespread	Freshwater bivalve	448889
Unio sp.	1	Widespread	Freshwater mussel	448889
Total bivalve count	**9**			

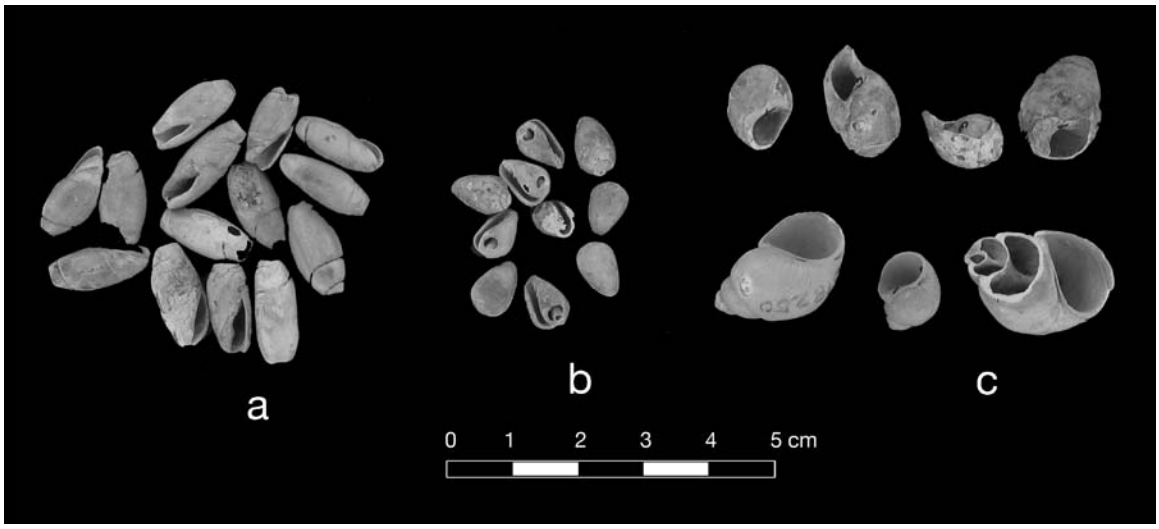


FIGURE 7.17. Whole shell beads: a, *Olivella* beads (378252); b, *Marginella* beads (378251); c, gastropods (378250).

one example of a larger shell (6 cm in length) that may be a different genus, perhaps *Oliva*. Species designations for the smaller shells in the collection from NMNH are given as *Olivella dama*, a Gulf of California species. Reanalysis of other *Olivella* beads in the collections from the Sam Noble Oklahoma Museum of Natural History have also turned up *O. dama* (Kozuch, 2002:697). This finding supports the probability that materials reached Spiro from considerably farther west.

Pearls

Pearls are numerous (Figure 7.18), as indicated in Table 7.4. In nearly all cases, pearls were not modified

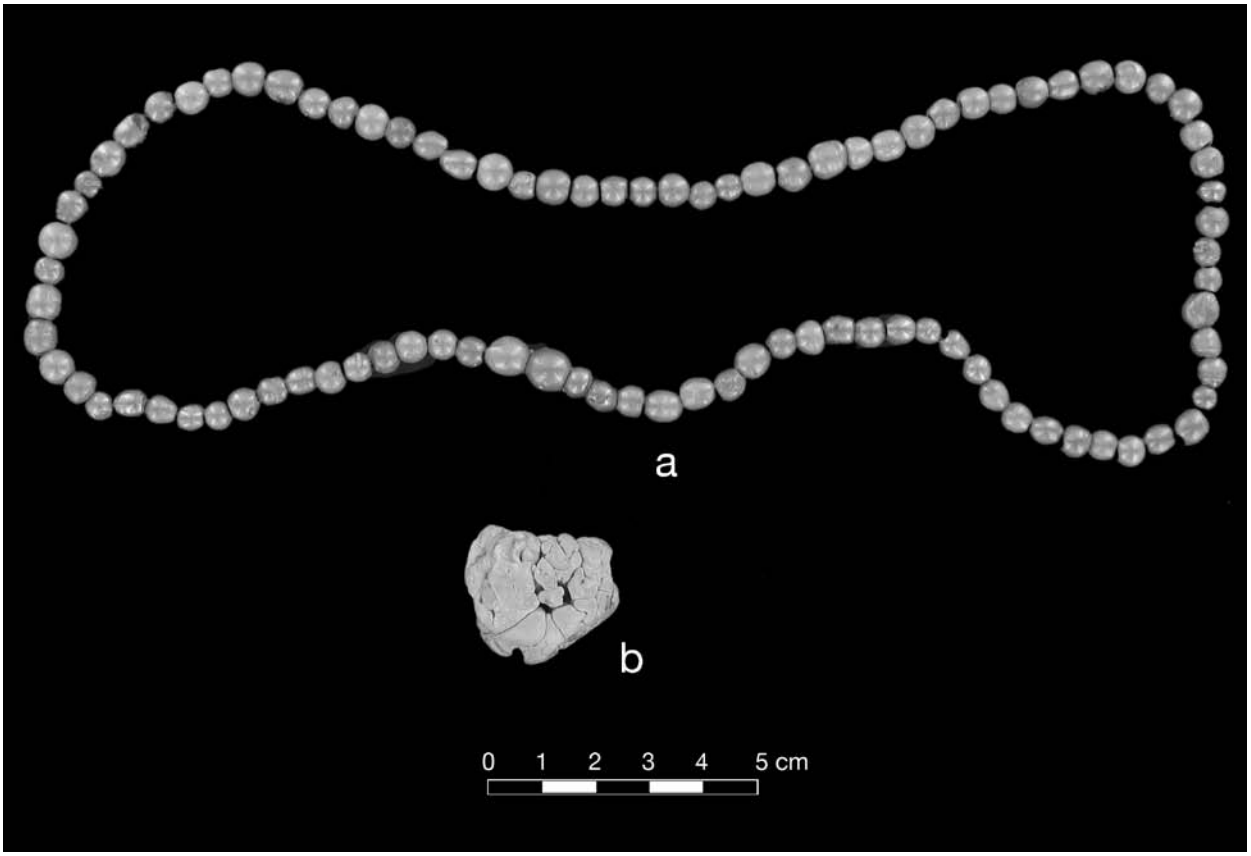


FIGURE 7.18. Pearl beads: a, small round pearls, strung (423332); b, large baroque pearl (423340).

beyond drilling them for suspension. Freshwater pearls derive from bivalves from the Unionidae family. They are subdivided according to shape, with oddly shaped or baroque pearls grouped separately from spherical pearls. In some cases, this division was reflected when catalog numbers had been originally assigned. The largest single pearl is a baroque pearl 2.87 cm by 2.78 cm. Others are extremely small, approximately 3 mm in diameter.

Composite Bead Artifacts

Artifact 423331 consists of a modern glass jar containing galena in small chunks (<20 mm maximum), the small variety of *Olivella* shell beads, very small disc beads, quartz fragments, small cylindrical beads, and larger thin disc beads. Bits of dried clay, dirt, organic matter and bone were also present. This mass was sorted into its constituents for study. Lot 448734 contained similar combinations of beads. In another case a single glass jar (423330) contained the small disc beads mixed with convexo-cylindrical beads. Groupings or mixtures of beads are relevant to reconstructing original context. It is certainly possible that beads so grouped were actually recovered together, especially in the case of 423331, which contained dirt, clay, and bone fragments along with the beads.

In several cases beads still adhere to the original prehistoric string. One set consists of seven small (0.25 cm thick and 0.7 in diameter) elliptical shell beads on an S-twist, two-ply string measuring approximately 5 cm in length (423307). A number of beads nestle among textile fragments (423378). Trowbridge stated in his catalog that these became detached during his unrolling of textile bundles.

Stone Beads

Stone beads are made either from a black carbonate fluorapatite (phosphate), a black or dark gray sedimentary stone (possibly slate), or a dark brown finely grained claystone or siltstone. A few appear to be hematite, judging from the red ocher deposit on the surface. These, however,

are manufactured as pendants rather than beads. The stone beads assume the form of thick discs, convex-sided cylinders, or spheres. Apparently, the phosphate nodules are naturally spherical, occurring as nodules within shale (Brown, 1996:643), and require little modification beyond drilling. The stone is lustrous, shiny, and black. In all cases the bores drilled through stone beads are biconical.

Banks (1984:78) refers to the phosphate nodules that are found in the Seminole Formation along Flat Rock Creek in Tulsa, Oklahoma, which is likely the source for the phosphate for beads at Spiro. Sources for the other stone raw materials are unknown. Stone beads are not common (n = 27). Types represented in the NMNH collection are listed in Table 7.6, and several phosphate beads are shown in Figure 7.19. The elliptical, spherical, and cylindrical beads are all manufactured from phosphate nodules. The disc beads are primarily of sedimentary stone, either siltstone or, in one case, sandstone. Only one disc bead appears to be phosphate. An interesting feature is the inclusion of bead blanks. Three unfinished convexo-cylindrical bead blanks are of an unclassified lithic material. Undrilled beads were certainly not strung, so they were unlikely to have been "worn" into a mortuary deposit by the deceased. They must have been placed into the graves as a discrete offering. The half-finished beads imply that bead manufacture was carried out either at Spiro or nearby.

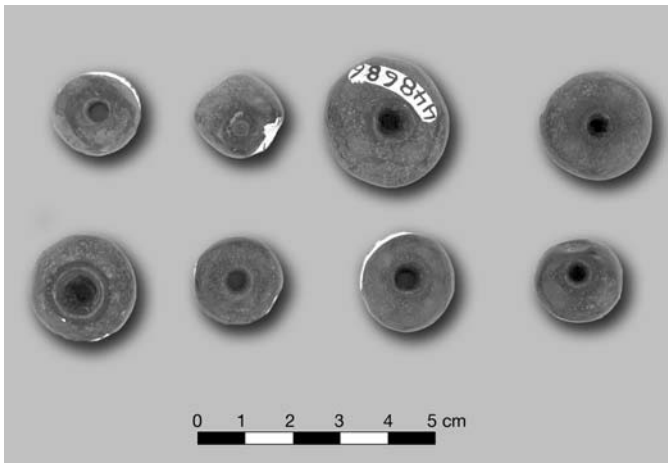


FIGURE 7.19. Phosphate beads (448686).

FIGURE 7.20. Copper disc beads—apparently fraudulent (448713).

Copper Beads

Copper beads are rare. There are two types present in this collection, disc and tubular, and the disc type is probably fraudulent.

Disc Type

The copper disc beads present in the collection of NMNH and shown in Figure 7.20 do not appear to be

TABLE 7.6. Frequency and characteristics of stone beads. A dash (-) indicates data nonexistent or not available; Max., maximum; Min., minimum.

Style	Count	Combined weight (g)	Length (cm)			Diameter (cm)		
			Mean	Max.	Min.	Mean	Max.	Min.
Convexo-cylindrical	7	35.4	1.84	0.75	2.96	1.32	1.09	1.66
Elliptical	3	26.5	1.30	1.69	1.04	1.95	2.66	1.32
Spherical	6	68.3	1.65	2.03	1.16	2.11	2.47	1.72
Cylindrical	3	13.2	1.59	2.20	1.21	1.04	1.23	1.57
Irregular disc	1	1.6	0.34	-	-	0.2	-	-
Disc	7	18.6	0.62	1.12	0.30	1.58	2.35	0.89
Total count and weight	**27**	**163.6**						

prehistoric artifacts because they were manufactured of smelted copper.[4]

Brown (1976, 1996) writes that beads of this style are not known to occur in Mississippian contexts. There are 35 disc beads from catalog numbers 378266, 423216, and 448713, representing donations from Braecklein, Trowbridge, and Meyer. All three collectors could easily have received beads from the same individual. Combined weight is 225.5 g. Bead length ranges from 0.40 to 0.75 cm, with diameters between 1.90 and 1.45 cm.

Tubular Type

There are some clearly prehistoric copper beads in the collection, and these are long and tubular in form, manufactured from rolled copper sheeting (Figure 7.21). They seem to divide naturally into four sizes. Sizes and frequencies of beads are shown in Table 7.7. They are all from lot 448714.

The string may even remain inside the copper tube thanks to the preservative properties of copper. In two cases, the string is well preserved, testifying to how these beads may have been worn. Lot 448714 includes a thick cord on which three tubular copper beads and one very small shell disc bead have been preserved. Another artifact in the same lot contains a long bead broken into two fragments that cling to the original string.

FIGURE 7.21. Small and medium copper beads: a, three beads strung on original cordage (448714); b, loose beads, several with original cordage remaining inside (448714).

TABLE 7.7. Frequency and characteristics of tubular copper beads.

Size	Length (cm)	Count	Weight (g)
Small	1.5–2.0	5	4.4
Medium	2.5–3.5	7	6.8
Medium large	3.5–4.5	14	17.0
Large	4.5–6.0	6	11.9
Total count, weight		**32**	**40.1**

PENDANTS

There are pendants of stone, shell, and bone. All contain some element by which the piece may have been suspended, usually consisting of holes or grooves. Pendants may have been placed with the body or included as part of composite ornaments.

Shell Pendants

Shell is by far the most common material for making pendants, as it is for making beads. Most of these are columella pendants, a type made by removing the outer shell wall of large *Busycon*. A few other types of shell pendant are present as well.

Columella

These pendants are pictured in the iconography of shell and copper artifacts. They were suspended from necklaces and rested on the wearer's chest such that the apex of the shell is pointed downward (Figure 7.22). Columella pendants may be drilled through distally, or they may be left undrilled.

Trowbridge's pendants have all been combined into lot 423305. He numbered his specimens individually, and for this reason, each columella from his collection was analyzed separately. Objects in Meyer's collection do not benefit from separate numbering, and because the pendants were numerous, these were grouped into smaller lots for which measurements were averaged. Width of the columella and length of the whole columellas are useful for estimating the size of the parent univalve. The people of Spiro favored large shells for cups and for making gorgets (see gorgets in this chapter). Cutting the columella away from the shell results in a large hole being left in the fabric of the shell.

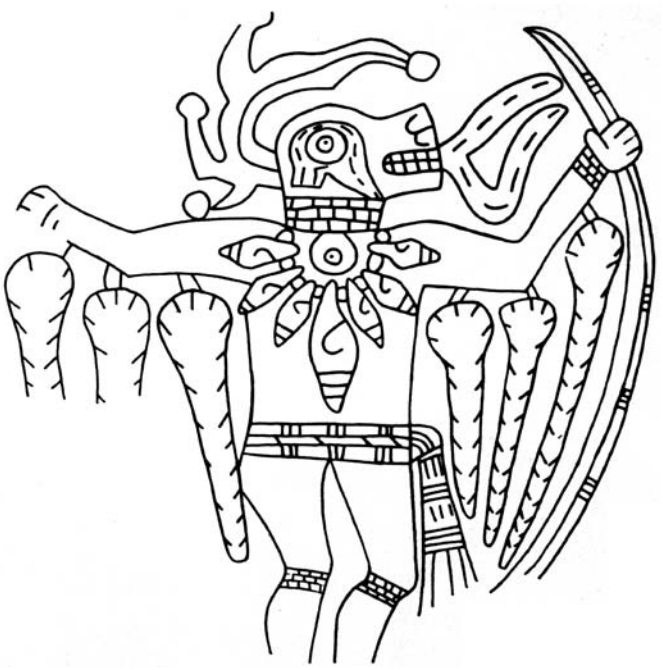


FIGURE 7.22. Cat-man warrior wearing necklace of columella pendants and displaying scalps (423245).

Columellas in Trowbridge's collection all appear white and chalky. There is little prehistoric residue present, implying that he may have cleaned them. Meyer appears not to have cleaned his specimens because they do appear to be stable and well caked with residue. Also, Meyer may have treated his with something to halt deterioration. At any rate, there is a distinct difference between the two collections in terms of amount of residue present and condition of the shell.

Large lots were subdivided on the basis of the location and extent of damage. This division reflects variation in taphonomic process more than style or use. Stylistically, these pendants are all similar. In most cases the distal tip is absent, and therefore, presence or absence of a drilled hole (the only stylistic difference noted by Brown, 1976) is unknown. Table 7.8 summarizes dimensions and descriptions of the columella pendants.

Several types of residue occur on the columella beads. One columella (448778) accompanies two fragments of well-preserved twill-weave basketry. Other columellas have faint traces of matting or mat impressions, and these combined impressions suggest that such pendants were disposed of in proximity to basketry (or matting) in the mound. Very little copper stains the pendants, so they were not placed in proximity to copper.

TABLE 7.8. Frequency and characteristics of columella pendants. Dash (-) indicates data are nonexistent or not available.

Portion present	Mean count	Total length (cm)	Width (cm)	Weight (g)
Whole pendants with distal tip	16	18.7	5.4	1,659.0
Apical fragments	28	12.5	5.4	2,538.4
Distal fragments	1	4.0	-	7.4
Nearly complete pendants	34	19.3	6.5	4,635.6
Lateral fragments	5	18.5	6.1	485.0
Spines only	9	12.0	3.3	471.5
Total count, weight	**93**			**9,796.9**

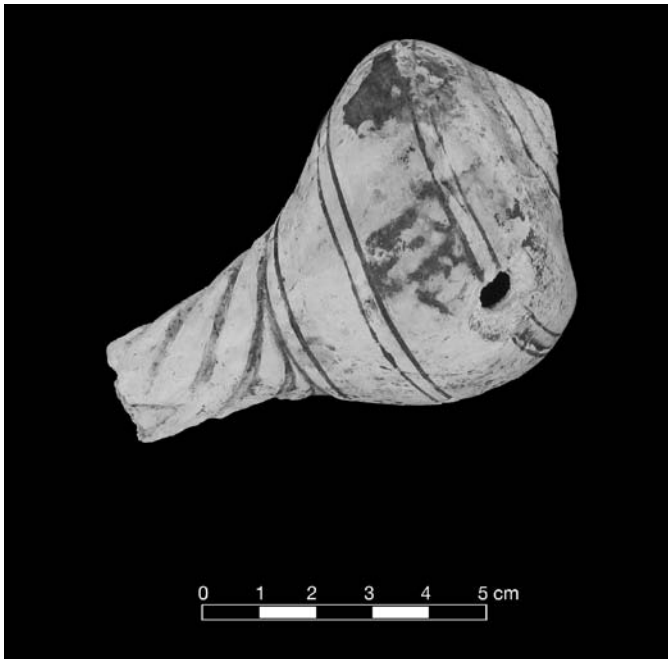


FIGURE 7.23. Sculpted columella pendant (448780s01).

Sculpted Columella

Only one of the over 90 columella pendants has been modified beyond drilling a hole in the distal end for suspension (Figure 7.23). Pendant 448780s01 has a design consisting of two parallel lines extending down from the apex, following the natural whorls around to the opening, and then following the shoulder to the opposite side of the opening. Two more sets of these double lines extend

around the apex. The artifact has a brown crusty residue on the apex. One spot of brown residue is quite thick. In addition, a fragment of mica adheres to the apex.

Other Shell Pendants

Several other forms of shell pendants were fabricated. One variety is made from a long, cylindrical piece of columella that has been perforated at one end. It differs from columella pendants in that the apex is not present. There are six of these in the collection (Figure 7.24b). Mean dimensions are length 7.02 cm, diameter 2.7 cm, and hole diameter 0.28 cm. The longest is 9.35 cm long; the shortest is 4.92 cm. Total weight amounts to 94.2 g. Holes are usually biconical; however, one such pendant has a contracting hole, indicating that it was drilled all the way through from one side.

The second variety is a shell bauble with a groove carved around one end and no hole. This variety resembles weights or sinkers. The two present in the collection (448886 and 448727) measure 6.72 and 6.78 cm long and 0.96 and 1.18 cm in diameter, respectively. A larger type (Figure 7.25) has three incised proximal grooves (448738) and resembles an artifact shown by Brown (1996: fig. 2-129a).

The third type is a pendant cut from shell and incised (448769). It is shaped like a tassel and, if inverted, resembles the shape of a crown mace (Figure 7.26). It is possible that this type was meant to be worn from the ear or earspool because an identical artifact is pictured on engraved shell number 423234 (Phillips and Brown, 1984: pl. 282). A nearly identical artifact from the WPA excavations is pictured in Brown (1976: fig. 77e; 1996: fig. 2-129).

Unusual Shell Forms

There are also some other unusual forms of shell artifact. One is a small, irregularly shaped piece of bivalve wall that has two small perforations along one side. Presumably, it was meant to be strung and worn as an ornament, in the same manner as some gorgets are worn.

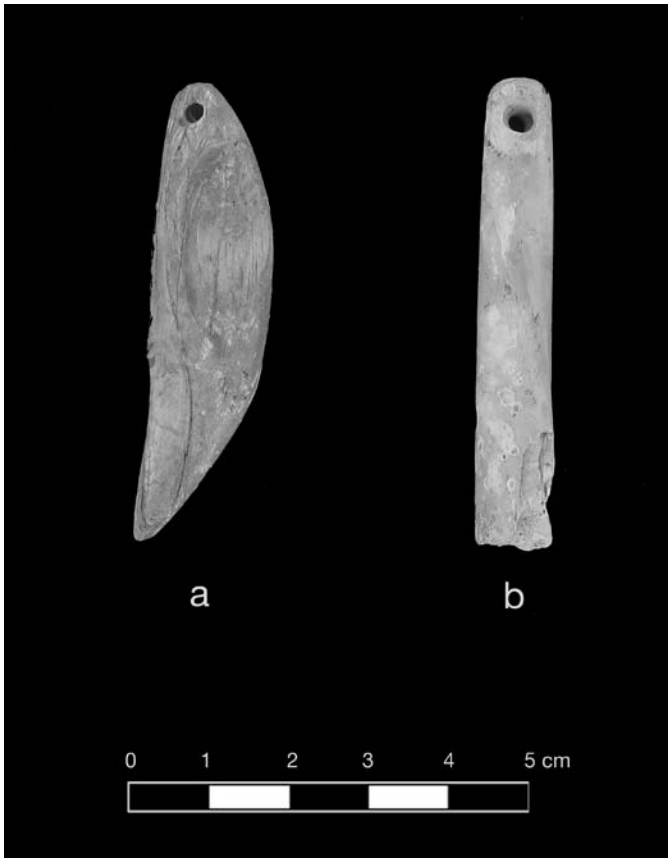


FIGURE 7.24. Pendants: a, bone pendant carved to resemble bear tooth (378264); b, cylindrical columella shell pendant (378263).

FIGURE 7.25. Sculpted shell pendant (448738).

Two shell hooks are present in the collection (Figure 7.27). The flat hooks are grooved around one end for tying. Another similar artifact is less curved. A similar pendant from another collection is shown in Hamilton (1952: pl. 83A). In another artifact, the opening edges of shells were perforated (423302s02). The use of this artifact is unknown.

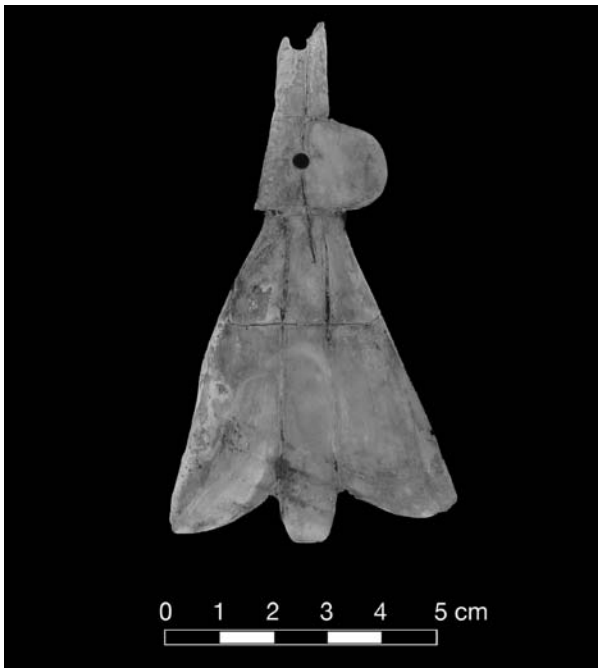


FIGURE 7.26. Shell pendant (448769).

FIGURE 7.27. Shell hooks (447770).

Stone Pendants

Other pendants can be classified according to where the hole is placed. The most common form is that of a worked stone having a hole in one end for stringing or tying.

Cannel Coal

Two pendants are made from this soft material. In both cases the pendant is oval (423167) or elliptical in shape (448683s04) and perforated with a single hole at one end (Figure 7.28). The perforation is incomplete on one of the pendants, with a drill start on one face only.

Hematite

These small pendants are made of dense, heavy stones that exhibit a powdery reddish residue on the surface. The shape is cylindrical. There are two finished pendants of this type and one that is roughed out but unperforated. These are grouped along with beads of phosphate nodules in catalog number 448686.

Other Stone

An odd pendant of greenstone is incised on one face (448684). This is an unusual design in that the stone is not simply drilled through the top to provide a point of

FIGURE 7.28. Cannel coal pendant, both sides (423167).

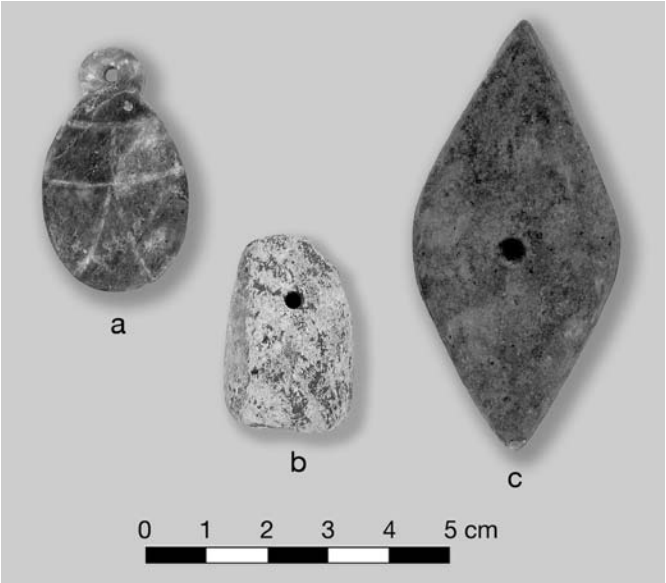


FIGURE 7.29. Stone pendants: a, beetle-shaped greenstone pendant (448684); b, broken stone pendant (423168); c, diamond-shaped pendant (423166).

attachment; rather it has a carved loop (Figure 7.29). The surface is well polished and exhibits a design of crossed lines. Overall, it resembles the back of a beetle, with the wings outlined and the loop serving as the head. Another stone pendant is perforated in the center (423166). It has an overall diamond shape and is made of sandstone. This object resembles Woodland period gorgets and may be an older object that was interred as part of a reburial. Finally, an unfinished pendant is merely a pebble with the hole for suspension only partially drilled.

Bone Pendants

There is one broken pendant of bone (see Table 8.6). It is drilled through on one end (423341). Another pendant (Figure 7.24a) is composed of what appears to be antler (378264). This artifact represents a bear tooth and is identical with other bear tooth pendants shown in Hamilton (1952: pl. 60) and in Fundaburk and Foreman (1957). It is 5.6 cm long and well polished. This artifact is in excellent condition.

Ceramic Pendant

The only ceramic pendant is 448931. It is very heavy and stonelike but friable, and magnification shows a gritty paste. The pendant is broken in half medially. A deep groove extends around the top of the pendant.

GORGETS

Gorgets are ornaments that were suspended from the neck to hang upon the wearer's chest. Such ornaments are analogous to the pectorals worn throughout Mesoamerica and manufactured of jade and bone. Gorgets are made primarily from shell, usually *Busycon,* although there is also a bone gorget fragment in the collection.

Shell Gorgets

Brown (1976) classified shell gorgets into morphological types on the basis of attributes of manufacture and design. The custom was to decorate gorgets on the inside surface of the shell wall, which would afford a concave surface for decoration. Gorgets were less frequently incised with the design on the outer surface, which is quite interesting in light of the tradition of engraved shell cups, all of which were decorated on the outside wall only. The inner surface is of a somewhat different luster and smoothness. Perhaps the decoration itself could be more easily executed on inner surfaces. The inner surface is naturally smooth and, for fresh shells, is softer and easier to engrave. (As indicated in my experiments done to simulate engraving shell using stone tools, fresh shell is not as hard as seasoned shell, and the inner surface is softer than the outer.) There are 56 gorget fragments, representing at least 31 gorgets.

The gorgets can be classified according to either manufacturing style or iconographic style. Brown (1976, 1996) devised a scheme for classifying gorgets according to manufacturing style. The portion of the shell used (inner or outer surface), the areas decorated, shape (circular or otherwise), and the medium of decoration (e.g., incising) are all indicators of manufacturing style.

An adaptation of this method is used in discussing the gorgets in the NMNH collection. A summary of gorgets and masks is given in Table 7.9.

When Phillips and Brown worked with the shell cup designs, they were able to extrapolate the design styles to include gorgets as well as cups. Phillips and Brown (1978, 1984) refer to two major design schools, Braden and Craig. Gorgets correspond only to the Craig school. The number of fragments in each catalog context represents the total number of fragments, including those that have been refitted and readhered.

TABLE 7.9. Frequency and characteristics of shell gorgets by style.

Style	Iconographic style	Symbols	Count	MNI [a]	Weight (g)
Fenestrated					
Circular	Craig A	Raccoon, concentric rings	8	6	214.4
	Craig B	Bird, cross, dotted circle	7	2	133.6
	Craig unclassified	Humans, Greek cross	19	6 [b]	267.7
	Unclassified	Sun disc	3	3	26.9
Other shape	Craig A and unclassified	Concentric half circles and rings, forked eye, Akron grid	4	3	223.8
Solid					
Engraved inner surface	Craig A and unclassified	Dots, birdman	2	2	123.9
Engraved outer surface, mask	Craig B	Forked eye	3	1	37.0
Perforated circular	Unclassified	None	1	1	9.2
Unmodified wall section	Unclassified	None	2	2	175.7
Unclassified	Craig unclassified	None	4	3	147.3
Mask	Craig B and unclassified	Human face	3	2	189.9
Total counts, weight			**56**	**31**	**1,549.4**

[a] MNI = minimum number of individuals.

[b] Includes 448742, a gorget not located for this analysis.

Brain and Phillips (1996) published a separate study of gorgets and plotted design distribution across the southeast. They refer to styles based on subject matter, orientation, and other characteristics. They connect several styles to Spiro: Pearce, which has a single bird, interpreted as a turkey; Jackson, which displays birds in swastika orientation; Hull, which has human hand motifs; and Philbrook, a birdman theme. They refer to one style that is found only at Spiro as Hamilton (Brain and Phillips, 1996:55–59). In the Hamilton style, two human figures are arranged symmetrically on either side of a pole and are executed within the parameters associated with Craig A styling.

Fenestrated Gorgets

The best represented style was the fenestrated gorget. These artifacts are usually round (type 1 in Brown, 1976, 1996) but may be other shapes as well (type 3 in Brown, 1976, 1996). Portions of the design have been cut out, resulting in an overall lacy effect. Cutting shell in this way is difficult and time-consuming; however, the resulting gorgets are quite impressive. The contrast between the shell and the background would make them show up vividly on the wearer. Brown's type 1 refers to artifacts with a circular outline. Type 3 refers to gorgets cut to conform to the outline of the design on the gorget. In other words, they are often not round.

The 17 examples of circular gorgets comprise 37 separate fragments. Most of these represent the Craig A style; only two examples are Craig B. Four of these circular gorgets are decorated with a modified star with concentric circles (Figure 7.30). (See Brown, 1976: fig. 81g for an identical type in the University of Arkansas collection.) The style resembles a motif associated with Moundville (Fundaburk and Foreman, 1957).

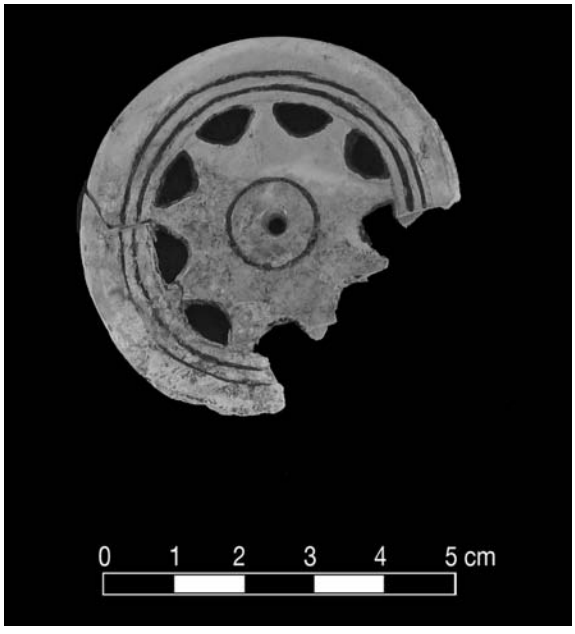


FIGURE 7.30. Circular fenestrated gorget depicting a sun symbol (448740).

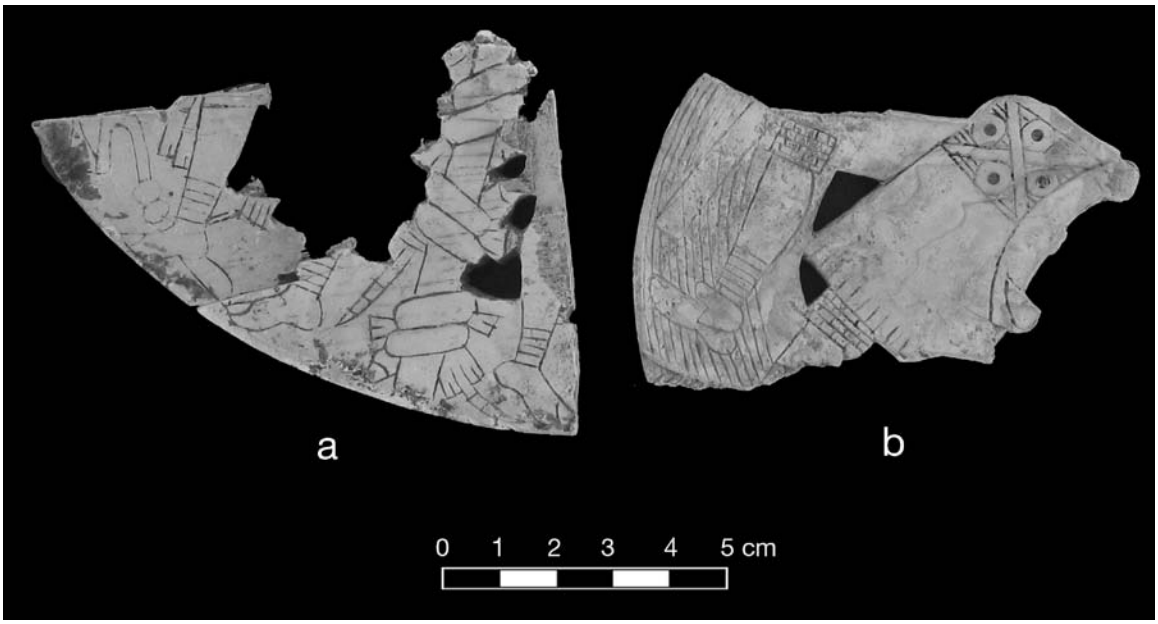


FIGURE 7.31. Craig A gorget fragments: a, depicts raccoon pole (448750); b, depicts warrior (448747).

The Pearce style (Brain and Philips, 1996) is represented by artifacts 423292 and 448765, two fragments that refit. The birdman Philbrook style shows up on artifact 423293. Brain and Phillips (1996:61) point out the sophistication of this design in which the wings hanging down from the birdman's arms cross in front of the body.

Examples of the bilaterally symmetrical Hamilton style are 448747, 448748, 448749, 448755, and fragments from 448765 (see Figure 7.31). Gorget 448742 depicts a man facing a forked pole, a Craig C motif (see Figure 7.32). Brain and Phillips classify this as the Houston style. They distinguish this style, one that has a similar design to Hamilton, for the simple reason that Hamilton depictions are Craig A, whereas this is Craig C. Another circular fenestrated gorget depicts a birdlike creature rendered in Craig B style (Figure 7.33).

Two of the gorgets in this group were made on the reverse face of engraved shell cup fragments. One is large and highly concave and has a large hole in the center (448761s02.1). The other (448761s01.1) is made on the inner surface of a shell fragment and depicts a human holding tightly to a raccoon staff (a whole raccoon dangles from the top of the staff).

The noncircular gorgets include a variety of forms. One artifact is a long, narrow object with a pattern of brickwork (448763) (Figure 7.34a). Another is an unusual gorget made on a *Pleuroploca* shell (Figure 7.34b).

FIGURE 7.32. Gorget showing man facing forked pole (448742).

FIGURE 7.33. Craig B style gorget depicting avian subject (423292).

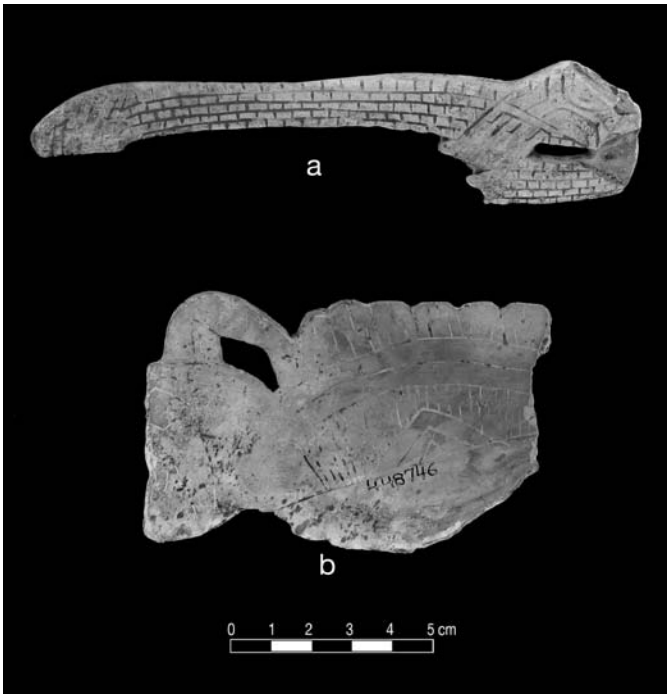


FIGURE 7.34. Noncircular fenestrated gorgets: a, pattern of brickwork (448763); b, Craig B bird motif on inner surface of *Pleuroploca* shell (448746).

On the outer face is an amphisbaena-type tongue, probably a remnant of an engraved shell cup design. On the inner surface motifs depict a forked eye and bird's tail. The cutout area appears to be a part of the inner surface design. Although this could be a case of reuse, Phillips and Brown (1978:vi, 1984: pl. 274) discuss the possibility that this was intended as a two sided design. A third artifact appears to be a cutout of a woodpecker's head and tail (Figure 7.35a). It has a thick copper incrustation on one face (448762). The precise mode of wearing or using such an object is unknown (but see Phillips and Brown, 1984: pl. 338D). Another gorget of this type is a reused engraved shell cup (448762s02). A large circle has been removed from the center, probably for making another gorget.

MOTIFS. Motifs seen on these gorgets include raccoon bindings, eye-in-hand motifs, concentric rings, Greek cross, forked eye, concentric half circles, chevrons, and bird and human motifs.

RESIDUES. Among the residues present are brown resinous patches, brown stains, copper stains, and basket impressions.

Solid Gorgets

Solid gorgets are much less common. There are only three, and one of these is more appropriately classified as a mask or maskette (423295). Two others are solid pieces decorated on the inner surface (type 2 in Brown, 1976). One is a round object (448757) decorated on the inner surface with lines of dots. The dots were executed through a series of drill starts that are not very deep and are arranged in two rows spaced 2.6 cm apart.

The other (423293) shows a serpentine arm with claw and bead brickwork at the wrist, elbow, and shoulder. This is a fragment of a birdman with outstretched arm, feathers, and petaloid decoration (Phillips and Brown, 1984: pl. 148).

Perforated Gorgets

Perforated gorgets are decorated with numerous circular perforations drilled through the piece. There is only one gorget of this type in the collection. Brown (1976) referred to this variation as type 5. Artifact 423294 has two perforations on a circular gorget. The fragment represents only a small portion of the whole. It is possible since this is a small piece that the perforations present were for suspending the object. Therefore, it is impossible to tell if this came from a gorget with lots of holes or if these holes would have been the only two.

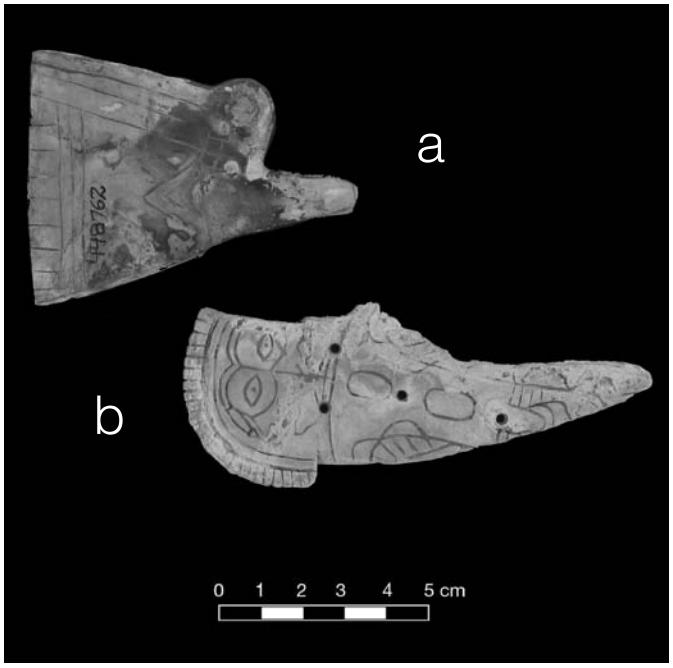


FIGURE 7.35. Gorgets: a, Woodpecker head gorget (448762); b, Janus-faced figure (448759).

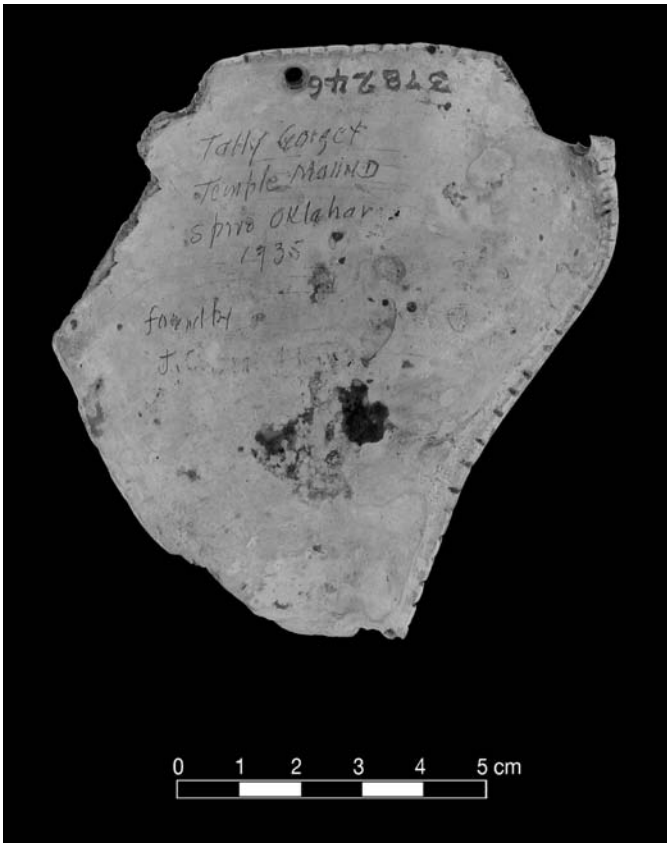


FIGURE 7.36. Gorget made from *Cassis* shell (378246).

Unclassified Gorget

One unclassified gorget is engraved on an irregularly shaped piece and depicts a Janus-faced figure whose head is surrounded by a sort of semicircular frame (448759) (Figure 7.35b).

Shell Sidewall Gorgets

There are two gorgets of this type (referred to as type 9 in Brown, 1976). They are manufactured by taking a section of the outer wall of a univalve and polishing off the edges. The shape is that of the shell wall, with upper and distal body areas retained. One is made from a *Cassis* shell and bears an inscription that reads "Tally Gorget." It is signed by Braecklein (Figure 7.36). The perimeter of this gorget has been incised with short hatched lines running perpendicular to the edge (378246). On the outside are two impressions or stains that are reminiscent of cordage. The other gorget of this type is from a small *Busycon* (423308s01). It exhibits some hatching on the top lip, but that is the only decoration.

Mask Gorgets

There are three masks. Such masks may have been worn over the face, perhaps after death (Phillips and Brown, 1984: pl. 273). As such, they are not gorgets proper but are included here because they are similar in terms of analysis. One is made from the apex of a shell (448743) and might have been worn as a gorget, judging from the holes for suspension (Figure 7.37a). The impression is that of a human face. Taking out the tip of the apex formed the gaping mouth. Two eyes are drilled all the way through, and an incised circle surrounds these. A long raised nose extends down between the eyes. The surface is very well polished. The mouth has five incised lines extending down from the lower edge. Three parallel lines zigzag out and down from each eye. Odd random lines also seem to emanate from below the eye. Beneath the mouth on the left is a recently incised scribble. This gorget is complete. Total measurements are 11.36 × 9.08 cm. The holes at the top for suspension are 0.45 cm in diameter and biconical in

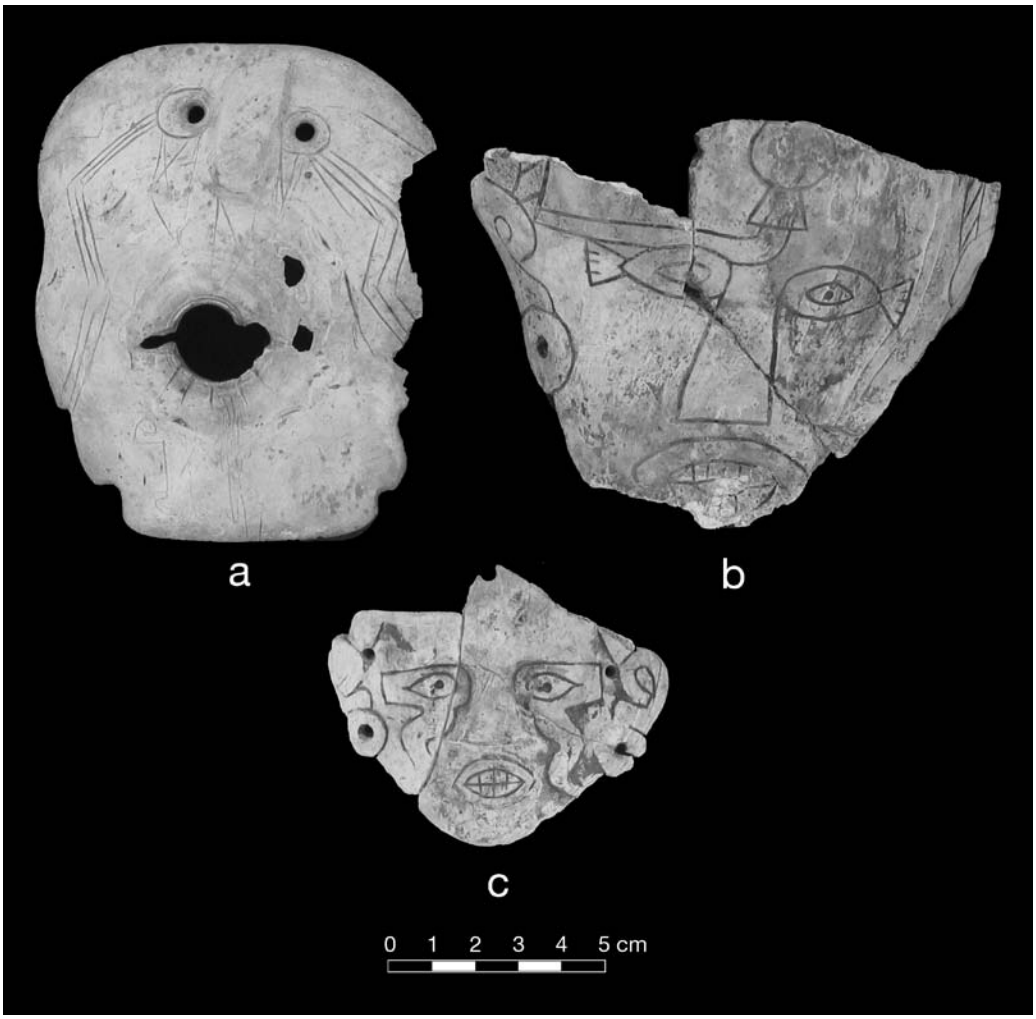


FIGURE 7.37. Masks: a, whimsical face cut from shell apex (448743); b, Craig B style face (448861s07); c, Craig B style gorget (423295).

shape. This is a very interesting and unique artifact, unlike anything from the WPA excavations.

The second mask is a fairly large artifact manufactured from the distal part of a *Busycon* shell (448861s07). A human face is shown, done in the Craig B style (Figure 7.37b). The mouth is open and shows teeth that are separated (Phillips and Brown, 1984: pl. 273A). A beaded forelock is shown pulled to the left (when viewing). The nose is a long trapezoid, and the eyes resemble fish. The width of the artifact is 11.45 cm.

The third is a smaller mask (width is 7.72 cm), also done in the Craig B style (423295). Faint toolmarks are visible around the relief-carved features (Figure 7.37c). The piece consists of three refitted fragments. The eyes are sunken, making the nose stand out. Lips and teeth protrude, and large forked eyes frame the nose. The figure's teeth, eye decoration, and ear detail are incised. Two holes on each side and at least one at the top are present. The smaller size and plentiful holes imply use on a headdress or other composite artifact (Phillips and Brown, 1984: pl. 273). Traces of red ocher are present.

Bone Gorget

A single bone gorget fragment is present (423343). This disc was cut from bone and then perforated in the center (Figure 7.38). Two circles are inscribed around the perforation. What appears to be a circular arrangement of perforations encloses the central design. Parts of at least five perforations are visible. Three more lines are inscribed

FIGURE 7.38. Bone gorget (423343).

around the ring of perforations. The outer edge is scalloped. The artifact has an overall finish in a dark, rich reddish brown, as though it has a patina or was affected by pigment. The finished size of the gorget can be estimated at 7 cm in diameter (see Table 8.6). The bone appears to be the scapula of a large mammal, e.g., bison, deer, bear, or elk.[5]

HEADDRESSES

Headdresses were composite artifacts that consisted of plumes, pins, headbands, plaques, fastenings, and beads or pendants. They often contained parts using a wide variety of raw materials, including copper, wood, bone, leather, shell, and textiles.

Pins

Pins were used in fastening portions of headdresses and especially in attaching copper plumes. Pins are known to have been made from copper and from bone, and both of these material types are represented.

Copper Pins

Prehistoric copper pins have square cross sections and taper gradually from the center to the tips. There are only six fragments of authentic pins (448714). These are broken into segments approximately 5 cm long. The set includes two tips. The lot containing these pin fragments consisted primarily of tubular copper beads, and the pin segments had gone unnoticed among the beads. These copper pins are heavily corroded and highly fragmented (Figure 7.39b).

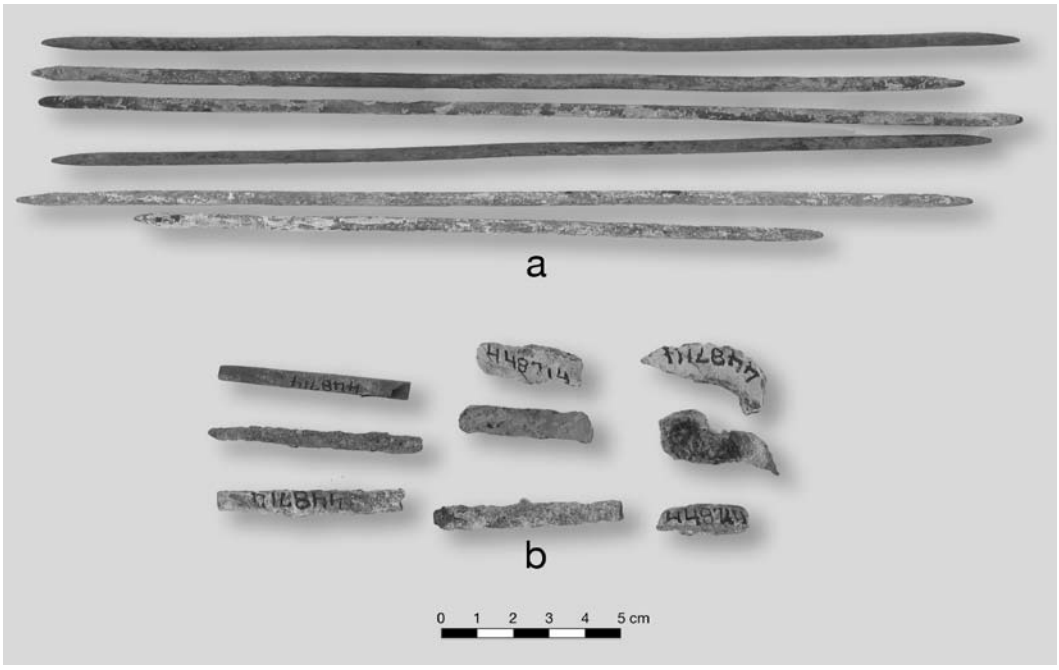


FIGURE 7.39. Copper pins: a, fraudulent pins manufactured from copper wire (448712); b, authentic copper pins and S-shaped pieces (448714s10, s11).

Six other small curved fragments were also identified from the same lot. These are S-shaped, approximately 1.0 cm wide, and 0.65 cm thick. These are also fragmented, with an average length of about 2.6 cm. The function of the curved segments is unknown, but they could also be segments of pins or other fasteners. The curved pieces are all covered on one side with fragments of a coarse, straight, pale brown fibrous material that J. Gardner (unpublished notes on conservation measures taken for Spiro collections at National Museum of Natural History, Smithsonian Institution, 1970–1971) apparently interpreted as leather, although it also resembles vegetable fiber. It is highly likely that the curved segments were recovered together from the same archaeological context. Perhaps they were used to hold a garment together.

Most of the artifacts listed as copper pins are fraudulent, a fact mentioned in the inventory of materials accessioned from J. G. Braecklein (National Museum of Natural History, 1937). Both Mohrman (1939) and Hamilton (1952:51) address the concern over authenticity of copper pins. Analysis performed on one of the pins showed the artifact to be of smelted copper (CAL report on artifact number T1421; Smithsonian Institution, Museum Conservation Institute, unpublished). These pins are cigar shaped, with consistent diameter and round cross section. None are broken or bent, a condition suspicious in itself because most of the copper artifacts are quite fragmentary. They were probably made of copper wire (Figure 7.39a). Apparently fraudulent copper pins in the collection include the artifacts listed in Table 7.10.

These pins were apparently widespread, as they appeared in several different accessions. Trowbridge's catalog does not indicate from whom he received the pins, but they are listed among other materials that he received in 1936. Therefore, the perpetrator of the fraud is unknown, but the pins entered the artifact market not long after the commercial excavation of Craig Mound (see also Mohrman, 1939). In an accession inventory of materials received from Braecklein in 1937, there is a notation that copper pins were received from the property owners at the mound.

TABLE 7.10. Apparently fraudulent copper pins in the collection.

Catalog number	Count
378268	2
397719	2
423217	4
448712	15
542527 to 542531	5
Total pins	**28**

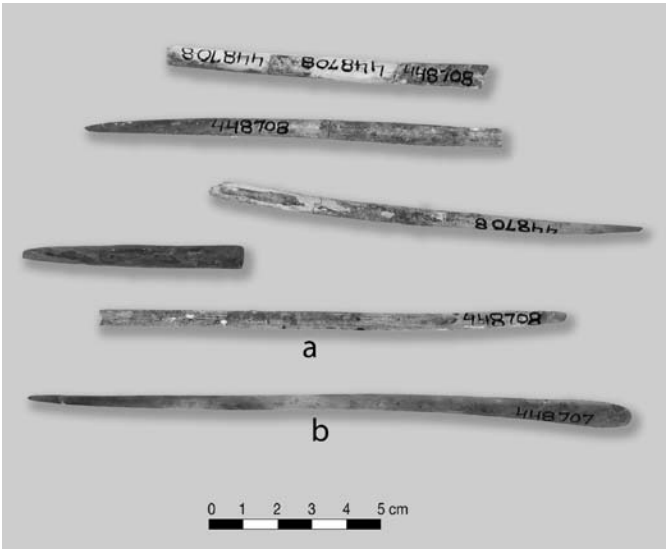


FIGURE 7.40. Bone pins: a, fragments (448708); b, complete pin with spatulate end (448707).

Bone Pins

Bone pins are present as well (see Table 8.6). These are distinguished from awls or other bone tools by a lack of wear on the pointed tips (Figure 7.40a). The copper and bone pins in the collection are nearly all broken, and this may have been part of the ritual process in depositing them in the mortuary feature. Artifact 448707 is a complete pin 17.3 cm long that tapers to the distal tip and features a spatulate end. It is heavily copper stained (Figure 7.40b). Lot number 448408s01 consists of 15 fragments of bone that refit into nine pin fragments. Seven distal pieces are included. Eight more fragments of tapering pins are present in 423324 and 379214. These are narrow, straight, and round to elliptical in cross section. Several are heavily stained with copper. The most massive of the tapering type is 1.05 cm in diameter (379214).

The other type of bone pin or implement is grooved on one or both surfaces (448708s02). These are noticeably wider and have a concavo-convex cross section. Six fragments refit into five sections. Their use is not clear because of the grooves and greater width of the implements. In the NMNH catalog, all of these are referred to as awls.

FIGURE 7.41. Bone awls, pins, or piercers: a, sharpened *os penis* from a raccoon (379212); b, mammal bone tool (379213).

Two artifacts may, indeed, be awls or some kind of piercing implement (Figure 7.41). They have very sharp oblique tips. One has been made from the *os penis* of a raccoon, *Procyon lotor*, and the other is a tibia, probably also from a raccoon. The tibia tool has two worn patches along the body of the piece.

Headdress Plaques and Plates

Copper

Sheet copper is known to have been used for making copper plumes, which were attached to headdresses, and plaques, which comprised the frontal portion of some headdresses. Headdress plaques are thin plates with numerous perforations for the attachment of bindings or other ornaments. Some of the copper foil materials in the NMNH collection could easily be from headdresses. One set of fragments consists of two pieces with an outline done in a reverse scallop. Several other fragments appear to match these, although they do not refit (423221). Copper sheet artifact fragments, which usually cannot be differentiated between headdress parts and free-standing plates, are discussed and shown in chapter 8.

Brown lists four types of headdress plumes from copper that are all designed to mimic feathers. These would have been either lashed to a pin with cordage or other fiber threaded through pairs of holes along a pin track or fastened by the pin using a riveted copper piece (Brown, 1976:311). Plumes often exhibit a dorsal offset near the base. They are often but not always decorated in repousse patterns of parallel lines representing feather markings. In this collection, no pieces can be called plumes unambiguously, although there is one fragment that may possibly have come from a plume. Catalog number 448716s02 contains a sheet copper artifact with one pair of perforations flanking a groove, presumably for attachment of the pin. The fragment has a repousse design.

Bone

There is also a small plaque of turtle carapace with several small perforations (448898). It has a parabolic shape and is decorated with parallel incised lines (see Table 8.6). Although it is by no means certain that this is indeed a fragment from a headdress plaque, it is similar enough to be included in this section (Figure 7.42c).

Another bone plate consists of two fragments (423221s03). In the collection, this is included in a lot containing copper fragments. It is a thin circular disc of bone with a hole in the center. The diameter when complete would have been at least 12 cm. The doughnut-shaped item has small holes around the periphery and around the center hole. On one side it has been reverse painted in a design of concentric circles (see Figure 7.42d). This artifact resembles a bone plaque shown and discussed by Brown (1966:553, fig. 2-112b) from collections of the Gilcrease Institute. That plaque has a cross and circle motif painted on the center and concentric rings. It has only a small perforation in the center, not the large hole implied by the artifact in the Smithsonian collection.

CONE ORNAMENTS

The final artifacts considered in this chapter are five cone-shaped wooden ornaments (448889). These have a raised rim around the outer wide edge and are hollowed for about one-half of their length. They have become warped and squashed (Figure 7.42b). In all cases a hole has been drilled through the apex of the cone, out through the hollow in the back of the cone. The raised rim is perforated in four spots equidistant around the perimeter. In all but one of these ornaments there are two depressions, one on either side, about halfway between apex and rim. These are not exactly opposite, but fall in one hemisphere

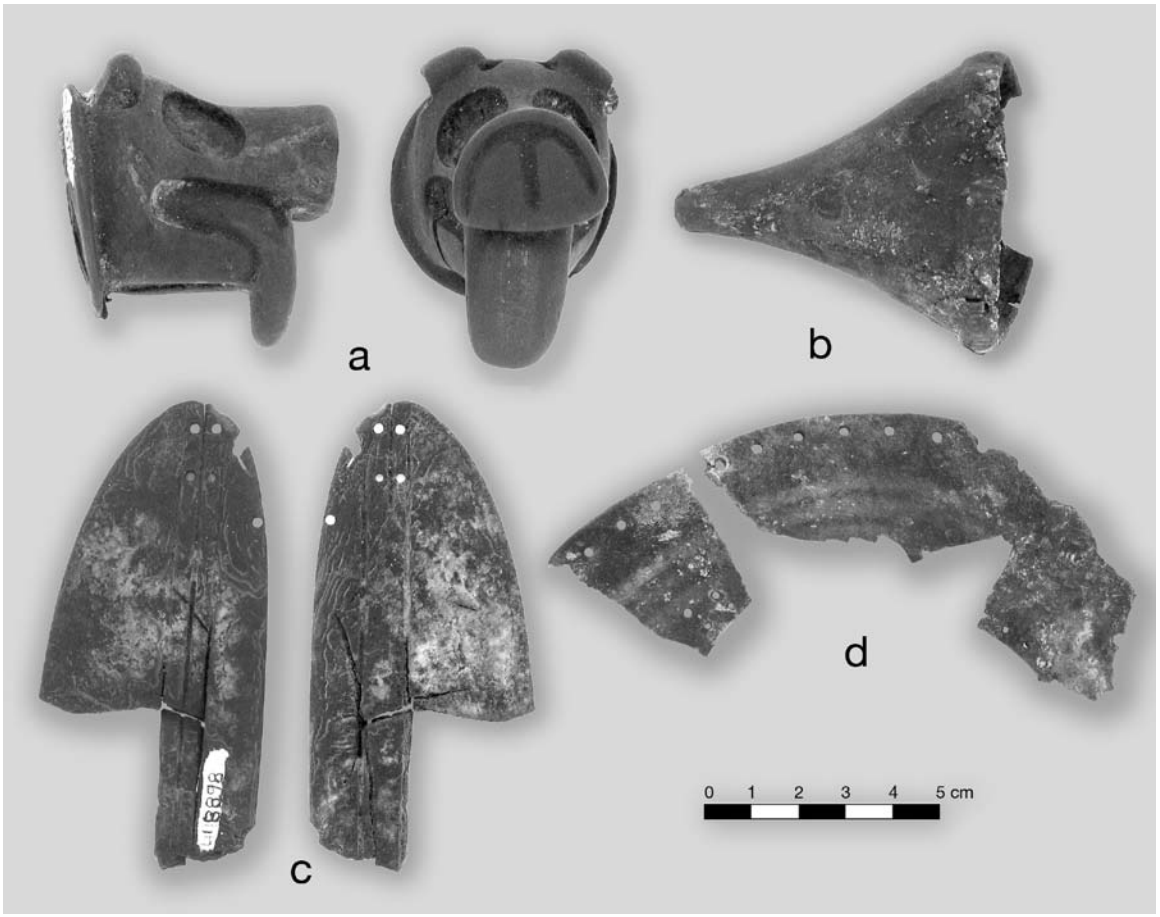


FIGURE 7.42. Other ornamental objects: a, effigy earspools (448895); b, zoomorphic wooden cones (448899); c, turtle carapace plaque (448898); d, bone plate plaque.

of the piece. Although there is no residue in these spots, they could represent eyespots in some sort of stylized zoomorphic form. Dimensions for the cones are summarized as follows: length from the apex to the rim ranges from 6.97 to 7.4 cm, and diameter ranges from 5.5 to 6.43 cm. Mean weight is 29.3 g. The use of these cone artifacts is unclear. Because they have holes in the perimeter, they could have been sewn or tied to some other object.

NOTES

4. These were analyzed at the Smithsonian's Museum Conservation Institute, according to notes on the conservations cards, but the report number is unknown.
5. Identification by R. Purdy, Department of Vertebrate Paleontology, Smithsonian Institution, 1975.

Plates

The 11 plates that follow show photographs of selected engraved shells to illustrate a range of engraving styles. Many fragments not previously published are included.

In the images, numbers following the letter "A" are the assigned catalog numbers for the artifacts shown; number labels beginning "ANT" no longer have relevance and should be disregarded.

In the captions, an asterisk (*) indicates an object not in Phillips and Brown (1978, 1984). Codes within square brackets (e.g., "[s07]") are the catalog identifier subnumbers used to identify fragments in Table A.1 and Appendix B; numbers in parentheses refer to the plate number(s) in Phillips and Brown (1978, 1984).

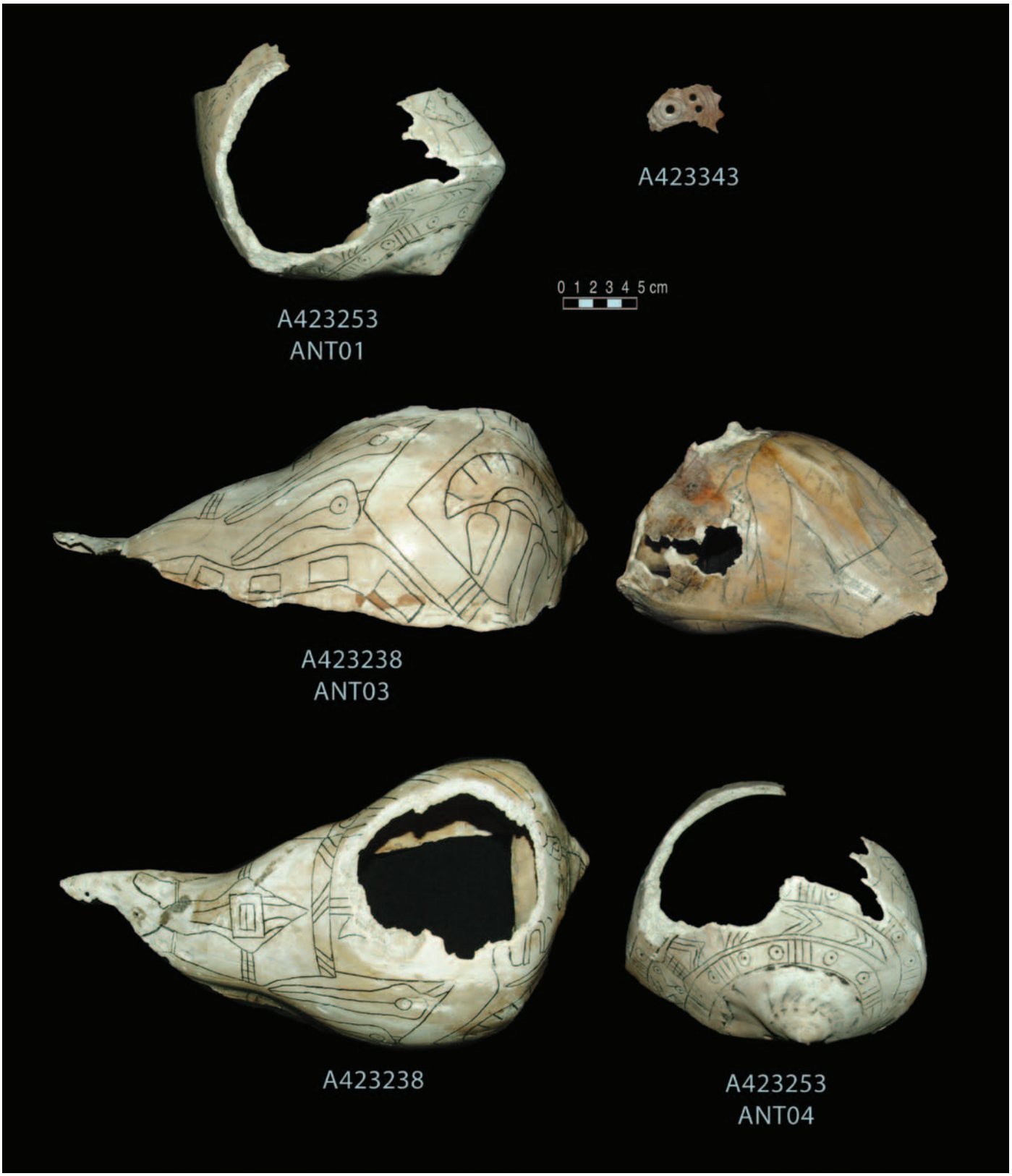


PLATE 1. Row 1: 423253, Craig C cup with snake and talon motifs*; 423343, bone gorget. Row 2: 423238, Craig C cup with man holding serpent staff, lateral view*; 423252 (on right), Braden C cup with bird in flight and possible armadillo*. Row 3: 423238, dorsal view; 423253, apical view.

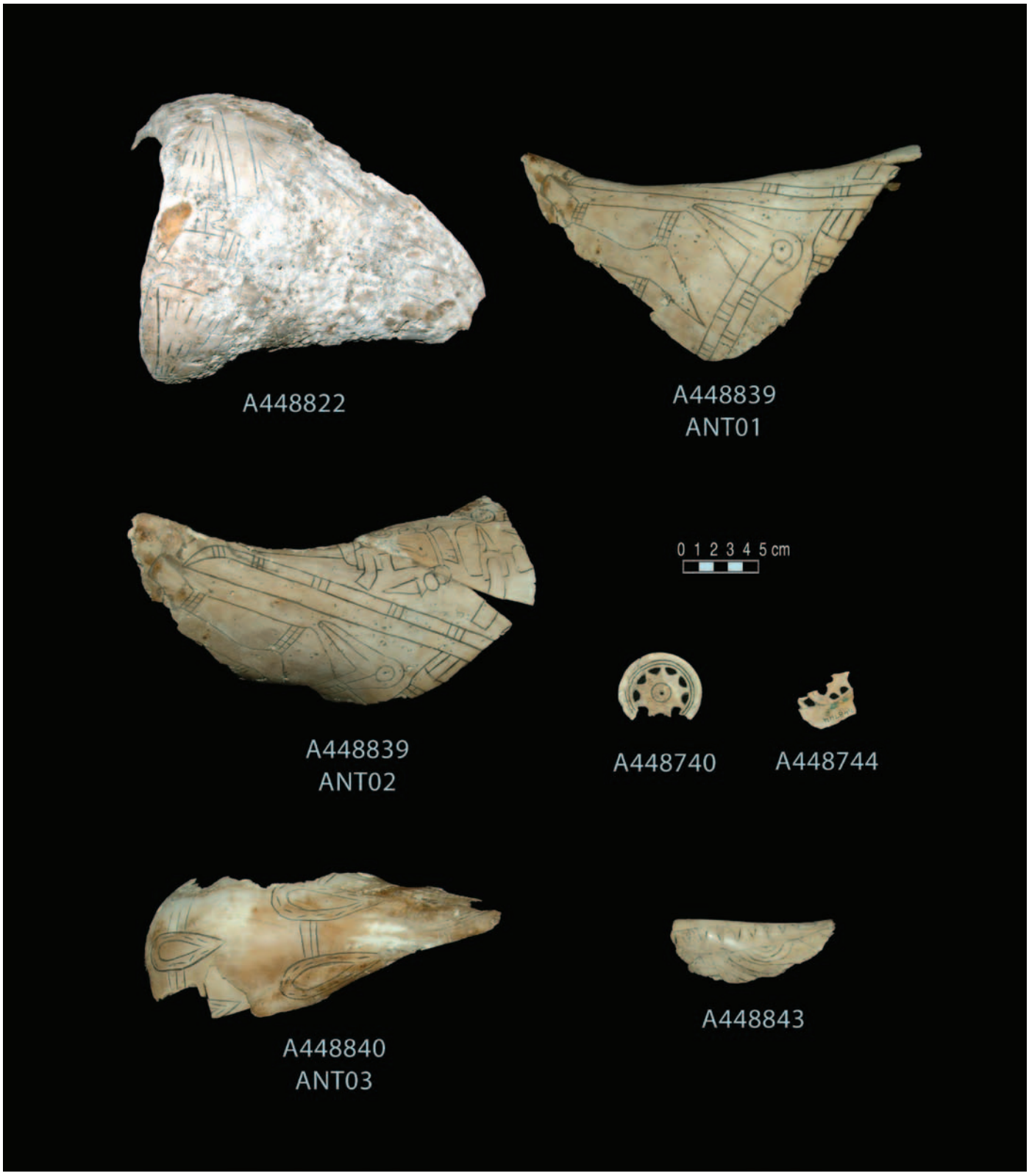


PLATE 2. Row 1: 448822, Craig C cup with forked pole theme*; 448839, Craig C cup with human figure, disembodied heads, and bow, lateral view. Row 2: 448839, dorsal view; 448740, type 1 gorget with sun circle; 448744, type 1 unclassified gorget. Row 3: 448840, Craig C cup with pear-shape motif and bands; 448843, Braden A cup lip fragment with serrated border*.

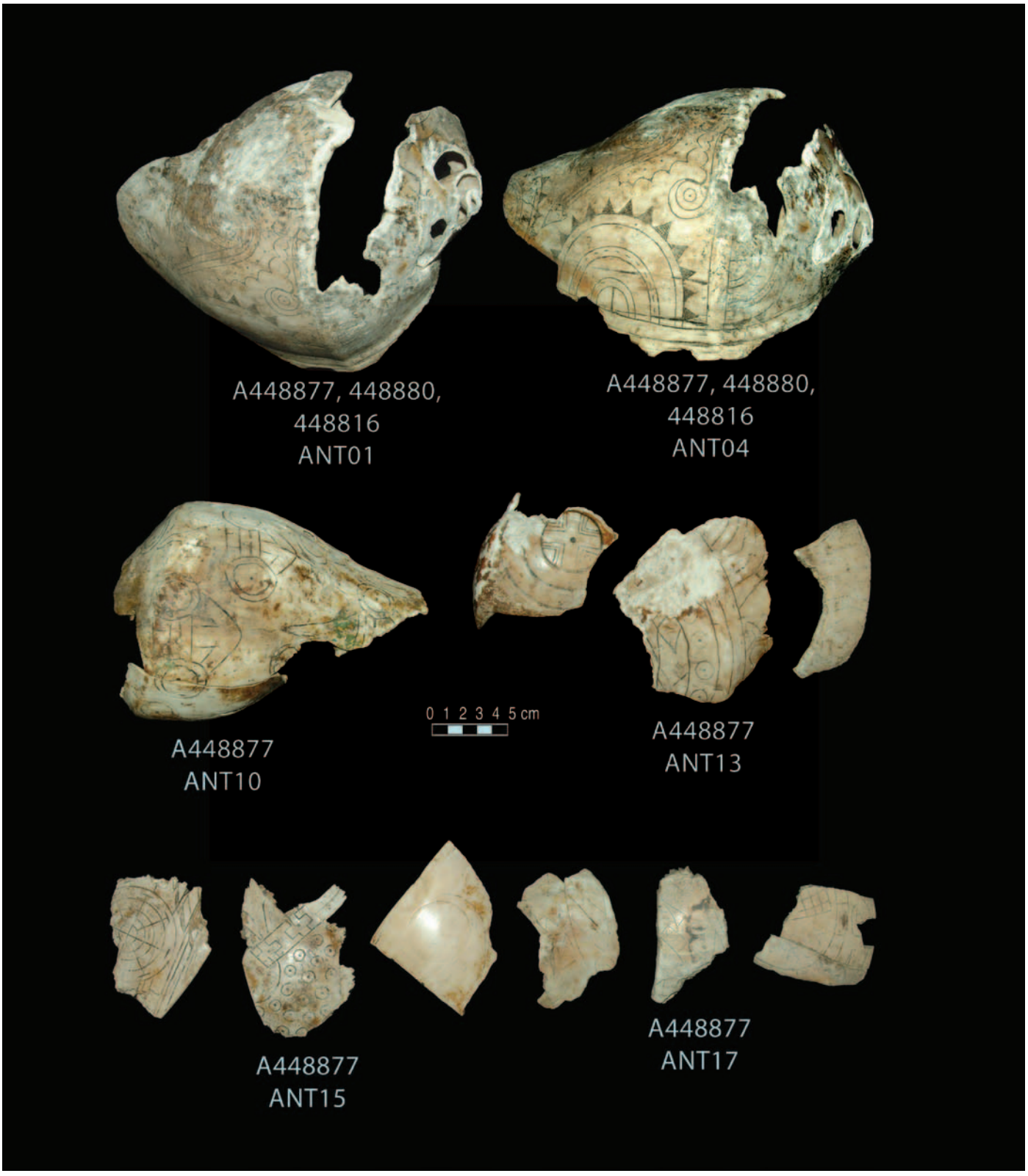


PLATE 3. Row 1: 448877, 448880, and 448816, fragments in two views. Row 2: 448877, left, [s07], Craig B cup with bilobed arrows motif; right (cluster of three), [s11], [s05], and [s03], sun circles and snake motifs. Row 3: 448877, from left, [s04] Braden A cup with concentric circles (34.5); [s05] Craig B with snake man theme (222Da); [s02] unclassified (A2); [s03] Braden (B2C); and two snake fragments.

PLATE 4. Row 1: 448860 with refits from 448880, Braden A with human heads and bilobed arrows (12); 448867[s03], unclassified cup with snake, forked eye, and circles motifs. Row 2: 448867 (4 fragments), Craig B and unclassified snake and bird themes; 448869 (5 fragments), Craig style wing motifs. Row 3: 448869, left (2 fragments), [s03], Craig B wing motifs; center (3 fragments), Craig feather and plume motifs; far right, [s02], Craig A feathers and barred oval. Row 4: 448869, far left, [s01]; 7 fragments to right, Craig feather and plume motifs.

PLATE 5. 448866. Row 1: left, 2 fragments; center, apical view of Craig B fragment with snake (241A); right, 3 fragments, center of which is [s05] Craig (218Aa). Row 2: left, fragment; center, [s01], apex; right, [s06], Braden A (8Aa). Row 3: left, 5 fragments with cross-hatching; center, feather motif; right (2 fragments), [s10], Braden A. Row 4: left, [s11], Craig B cup (242); right, [s12], Braden A Amphisbaena (28A).

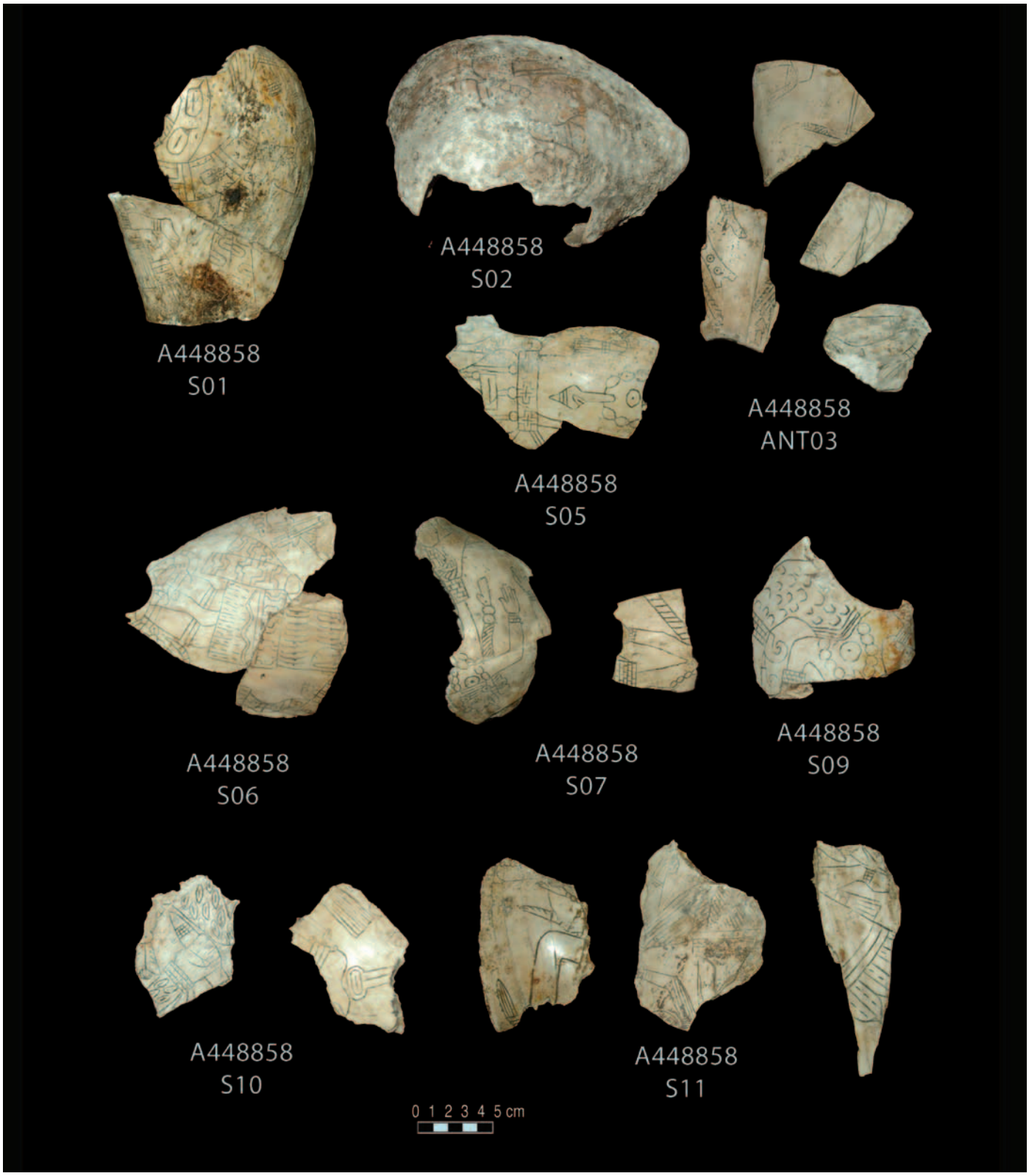


PLATE 6. 448858. Row 1: left, [s01], Craig B; center upper, [s02]; center lower, [s05], human figure wearing columella pendant; right, 4 fragments. Row 2: [s06]; [s07] (2 fragments), Craig A; [s09]; birdman theme. Row 3: left, [s10] (2 fragments), Craig B; [s11] (3 fragments); birdmen in various styles.

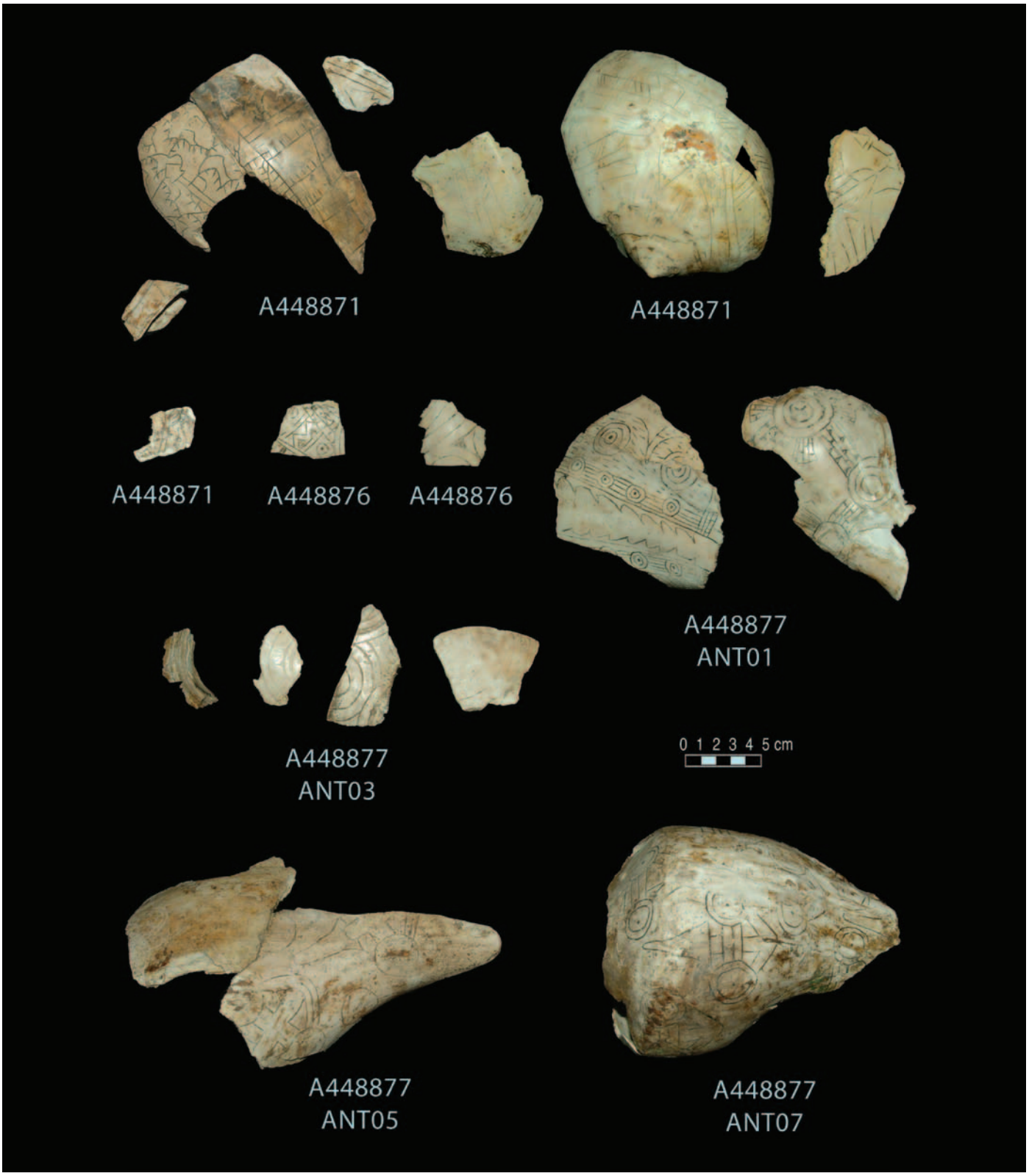


PLATE 7. Row 1: 448871, left, [s01] (4 fragments), Craig cup with bison; center, [s03] (2 fragments), Braden A*; right, [s02] (2 fragments), Braden B. Row 2: 448871; 448876 (2 fragments); 448877 (2 fragments). Row 3: 448877[s04] (4 fragments), concentric circle motif. Row 4: 448877, left, [s08], Craig B cup with bilobed arrows; right, [s07], Craig B cup.

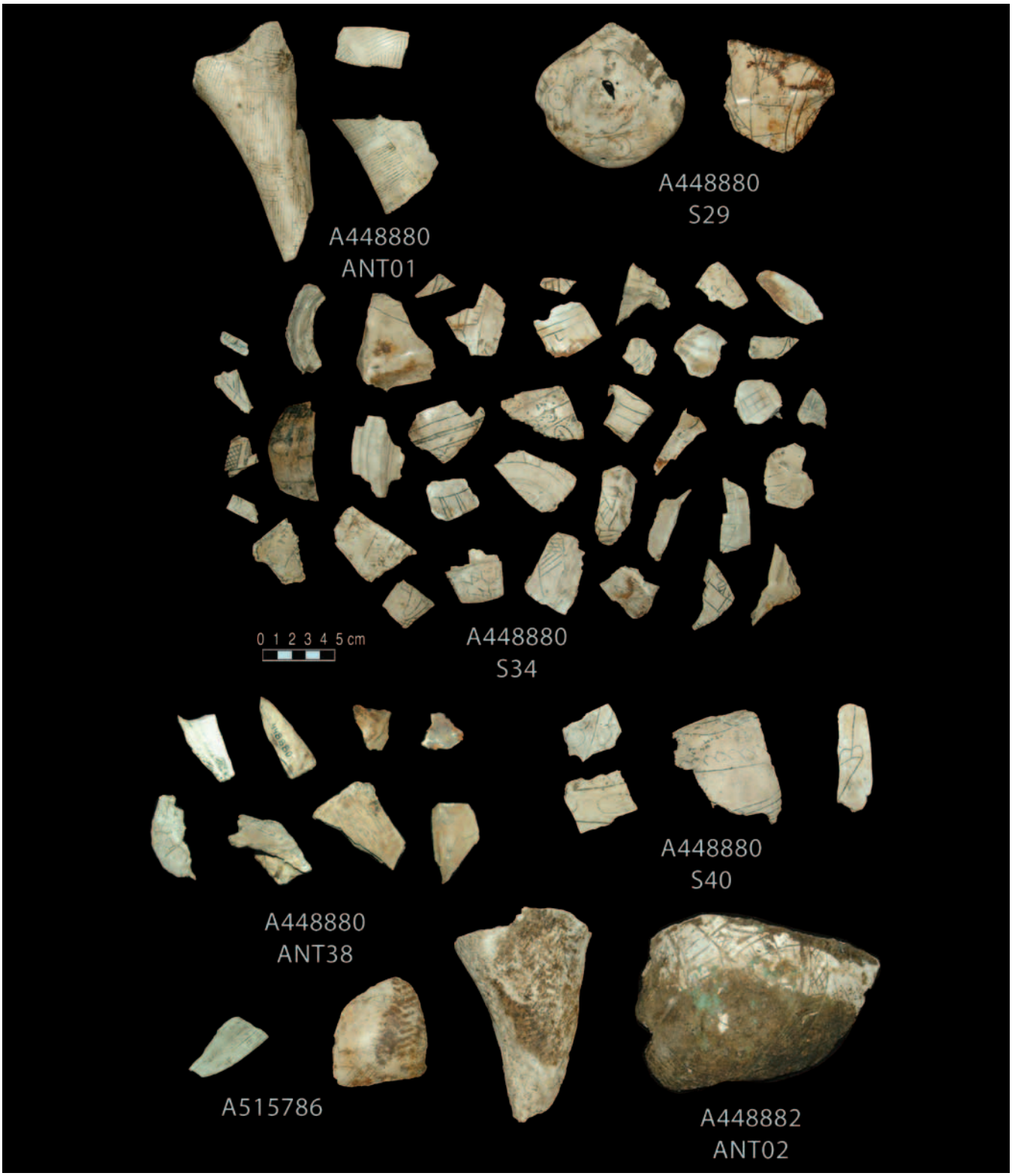


PLATE 8. Row 1: 448880, left, Craig A, 3 distal and body fragments (168B, -C); right, [s29], Braden B, 2 fragments (96A, B-7). Row 2: 448880[s34], 38 fragments, including (B-3J, -H, B4Bb) mostly Braden (most not in Phillips and Brown, 1978, 1984). Row 3: 448880: left, 8 fragments; center, [s40] (2 fragments), Braden A-B miscellaneous (B-4G, -E); right, [s40] (2 fragments including A-Sk). Row 4: left, 515786; center, 448881 (not labeled), 2 fragments with basketry impression*; right, 448882, Amphisbaena cup with basketry impression*.

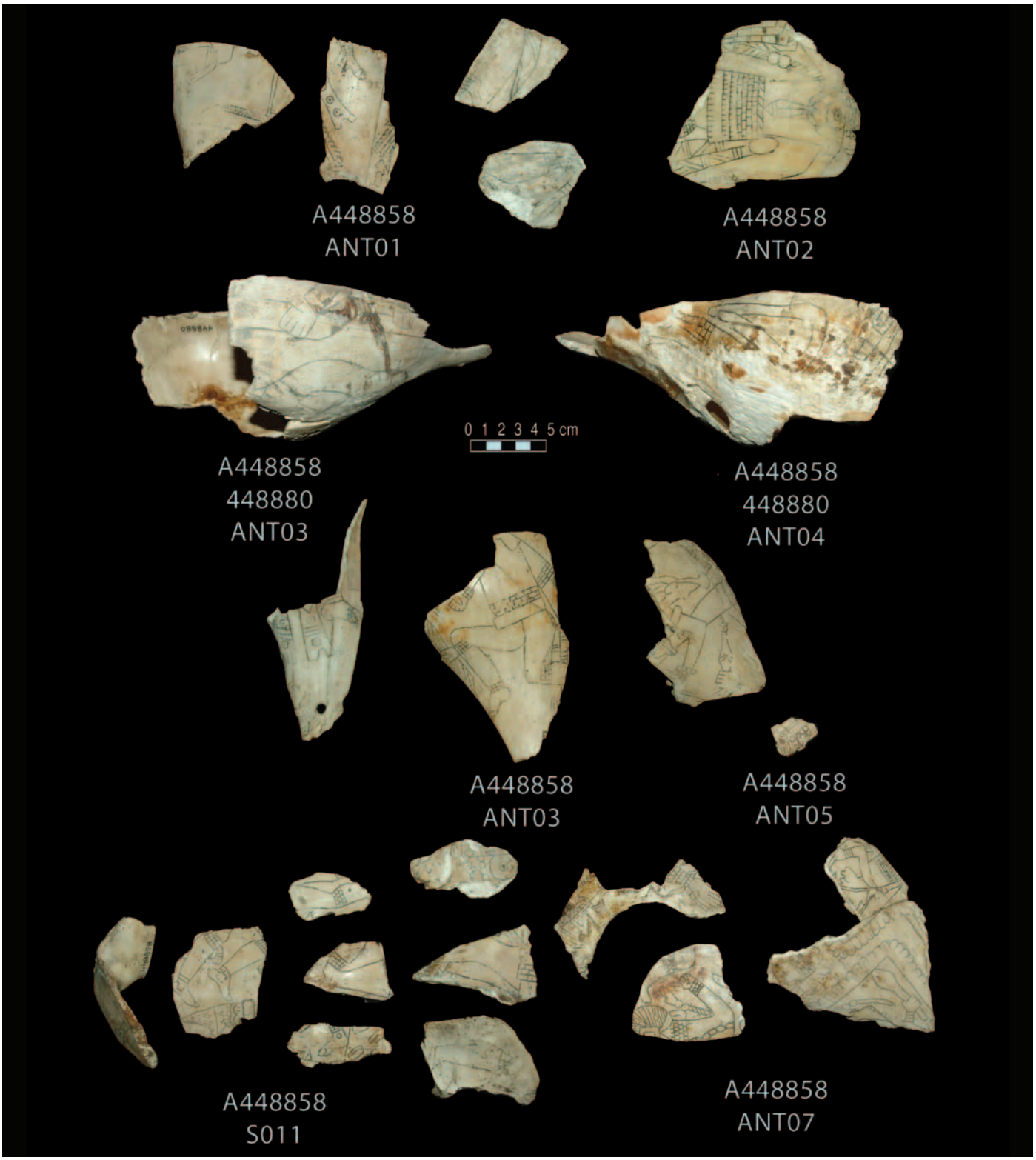


PLATE 9. 448858. Row 1: left cluster, same as Plate 6, top right; right, [s03], human male figure*. Row 2: with 448880, 2 refitted fragments shown in two views. Row 3: left, distal fragment (278b); center, Craig B (195a); right, [s04], Braden A atlatl; far right, small fragment. Row 4: left, [s11], 8 fragments showing human legs (163E Craig A is second from left); right, 4 fragments (2 refitted) including human figures and framed figures.

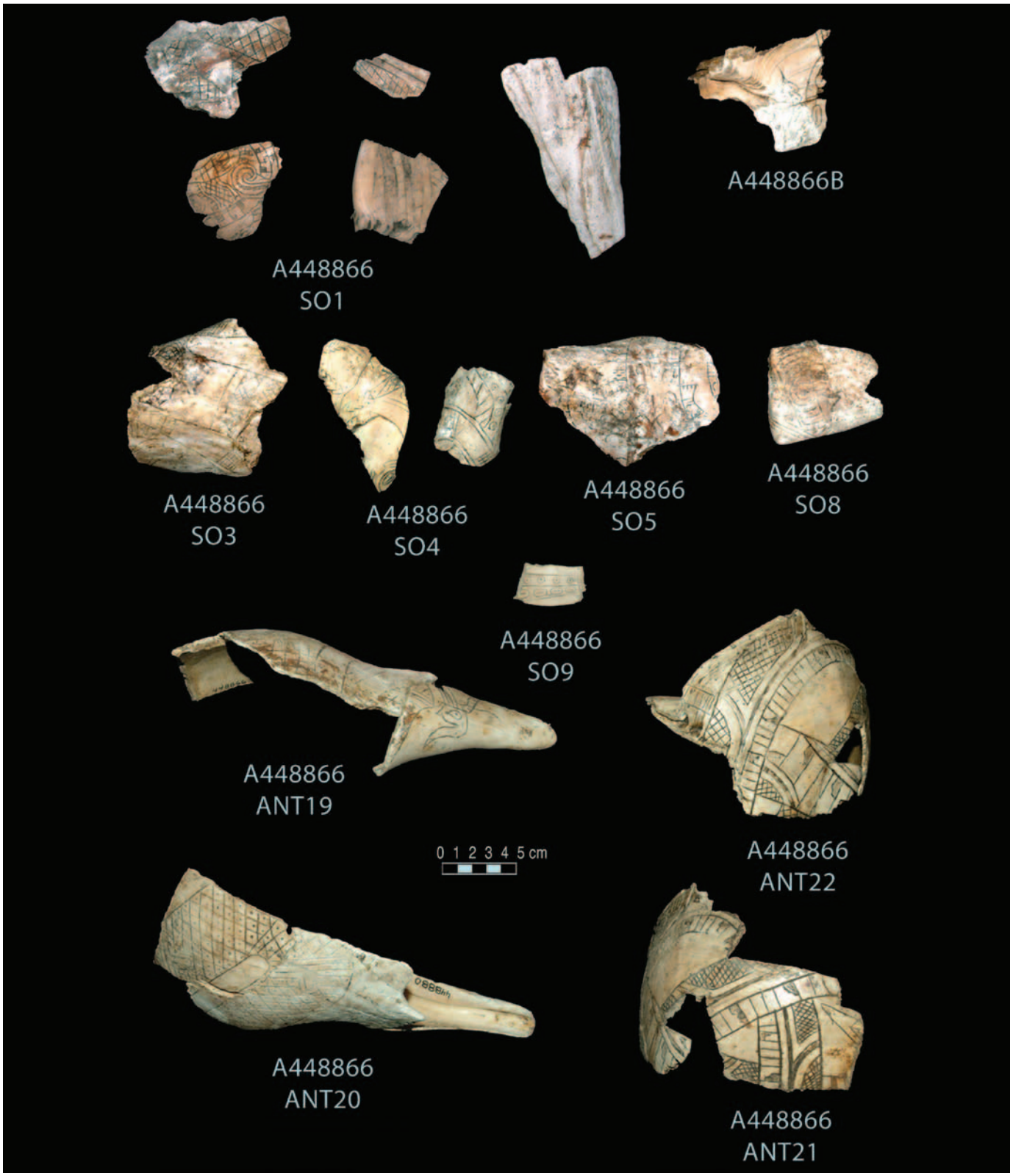


PLATE 10. 448866. Row 1: left, [s01], 4 fragments (lower left is 96.13); right, [s09], 2 fragments, Craig (198Hb). Row 2: from left, [s03]; [s04], 2 fragments; [s05], Craig (224b); [s08], Braden (52A). Row 3: center, [s09], small fragment Craig piasa. Rows 4, 5: upper and lower left, [s19], cup with spider and rattlesnake, Craig B (242); upper and lower right, [s12], Braden A cup (28A).

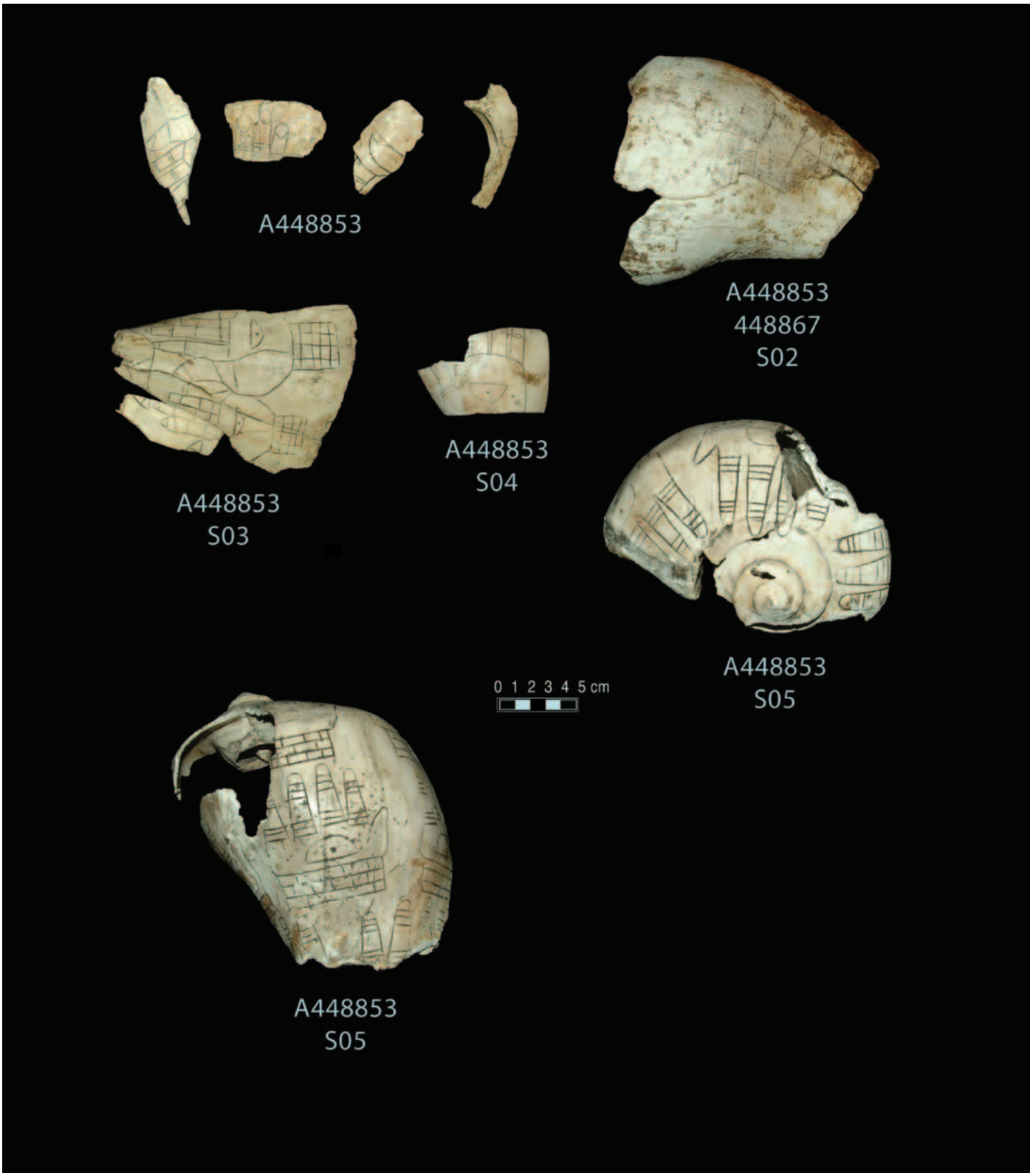


PLATE 11. 448853. Row 1: left, 4 fragments; right, with 448867[s02]. Row 2: from left, [s03], [s04], and [s05], human hands on apical view. Row 3: [s05], dorsal view of human hands.

8

Ritual Equipment and Ceremonial Materials

April K. Sievert

Ritual equipment encompasses objects thought to be associated with ceremonial or special circumstances. Activities surrounding the use of these materials may be social, religious, or both. Such equipment would include pipes, figurines, copper plates, and discoidals. In addition, other objects—raw materials, crystals, pigments, or minerals—might also connote ritual or special activity. This chapter is organized into three sections, the first being devoted to clearly manufactured artifacts such as pipes and figurines. The second part deals primarily with worked materials of uncertain function. The third covers unworked materials, including pigments, minerals, and other miscellaneous but interesting items.

Some of the materials discussed in this chapter might fit more easily into the sections on decoration and ornamentation in chapter 7. However, without clear linkage to parts of costumes or headwear, fragments of copper, wood, bone, and leather can just as reasonably be considered here.

MANUFACTURED OBJECTS

Pipes

Pipes are considered to be among the most special objects used in North America. Pipe making is a recognized art, with skilled pipe makers working with carefully selected materials. Some of the pipes represented are self-stemmed pipes, meaning they lack a separate stem. This type includes the numerous T-shaped pipes. Other pipes are composite artifacts in which the user inserts a smoking tube into the pipe to act as a stem. All of the effigy forms fall into this category. Pipes having shapes other than effigy are listed by style in Table 8.1. Effigy pipes are treated separately in Table 8.2.

T-Shaped Pipes

These pipes resemble an upside-down letter T, with the base forming the crossbar and the bowl forming the upright. Complete pipes have a bowl that

TABLE 8.1. Characteristics of stone and ceramic pipes by type (except effigy). All measurements are in centimeters. The abbreviation "T" indicates T-shaped; a dash (-) indicates that data are nonexistent or not available.

Catalog number	Type	Element	Length	Width	Height	Diameter	Bowl diameter	Bore depth	Bowl length	Material
423156	Elbow	Complete	5.81	2.92	4.22	2.32	0.71	2.15	2.37	Siltstone
379215	Red River	Stem	6.84	0.76	-	-	0.35	-	-	Clay
423154	T cylindrical or Chandler	Bowl	8.76	4.61	8.7	3.22	1	5.6	-	Siltstone/ sandstone
448657	T Chandler	Complete	15.28	3.32	8.29	2.38	0.85	5.44	6.75	Sandstone
448658	T contracting	Complete	32.2	3.89	7.57	2.66	0.54	5.35	14.8	Siltstone or pipestone
448660s02	T contracting	Bowl and base fragments	8.68	4	6.32	2.82	0.58	4.05	-	Siltstone
423157	T cylindrical	Complete	25.2	3.5	7.95	2.72	0.84	5.25	10.73	Siltstone
448659	T cylindrical	Complete	20.1	3.6	7.5	3.27	1	4.82	8.78	Siltstone
448660s01	T cylindrical	Bowl and base fragments	20.7	4.28	9.46	3.48	1.05	6	-	Siltstone
448660s03	T cylindrical	Bowl and base fragments	16.6	4.23	7.82	3.45	0.91	5.95	-	Siltstone
423158	T cylindrical	Complete	40.8	3.95	10.1	2.99	1.44	6.41	19.5	Siltstone
423159	T cylindrical or contracting	Complete	29.4	4.06	9.49	5.2	-	5.8	11.7	Siltstone (siliceous shale)
423155s01	T unclassified	Tail	10.68	2.47	1.83	-	-	-	-	Siltstone
423155s03	T unclassified	Stem	7.31	1.66	1.67	-	0.68	-	7.31	Siltstone
423155s04	T unclassified	Tail fragment	4.72	3.74	2.16	-	-	-	-	Siltstone
448661s02	T unclassified	Bowl and tail	4.65	2.58	5.35	1.98	0.45	3.99	-	Clay
448661s03	T unclassified	Bowl base and tail	7	3.12	3.33	2.28	0.15	-	-	Clay
448661s04	T unclassified	Bowl, half	-	-	-	-	-	3.89	-	Clay
448661s05	Unclassified	Bowl fragments	-	-	-	-	-	-	-	Siltstone
448662s01	T unclassified	Tail fragment	4.95	3.25	2.31	-	-	-	-	Limestone
448662s02	T unclassified	Tail	7.9	2.51	2.34	-	-	-	-	Steatite
423155s02	Unclassified	Stem	6.59	2.28	2.1	-	0.58	-	5.33	Clay
448661s01	Unclassified	Bowl only	-	3.58	-	2.18	-	3.9	-	Clay
417938s05	Unclassified	Bowl fragment	3.73	3.66	1.22	-	-	-	-	Sandstone

rests on or near the center of a long, cigar-shaped stone base. One side will be drilled for use as the pipestem. The opposite end remains solid (in most cases). The NMNH collection contains complete pipes, pipe fragments, and an unfinished pipe of this type.

The pipes are usually made of relatively soft stone, including the siltstone, sandstone, and steatite found in the NMNH collection. Brown (1996:507) also lists hematite, shale, and limestone among the locally available hard stone materials used for T-shaped pipes. It is possible that siltstone, as identified here, is a material that Brown would refer to as either a sandstone or possibly shale. The "siltstone" is a very finely grained homogeneous material (based on small grain size, rather than on petrographic analysis).

T-shaped pipes are divided here into the three categories employed by Brown (1976, 1996:505): contracting bowl, cylindrical bowl, and Chandler. They constitute typical Mississippian artifact types and can be described using three fragment categories: bowl, stem, and tail (stem projection). Differences in the types of pipe usually reflect differences in the morphologies of these three pipe sections.

Chandler T-Shaped Pipes

These pipes have stems and projections that are unequal in both cross section and length. They are probably the earliest form (Brown, 1996:505). There is one complete Chandler pipe in the collection (448657), shown in Figure 8.1. It is made from fine-grained sandstone. In cross section the stem is round and the tail is a flattened ellipse. The surface is polished. Brown residue is caked onto the sides of the bowl, which exhibit shallow ridges

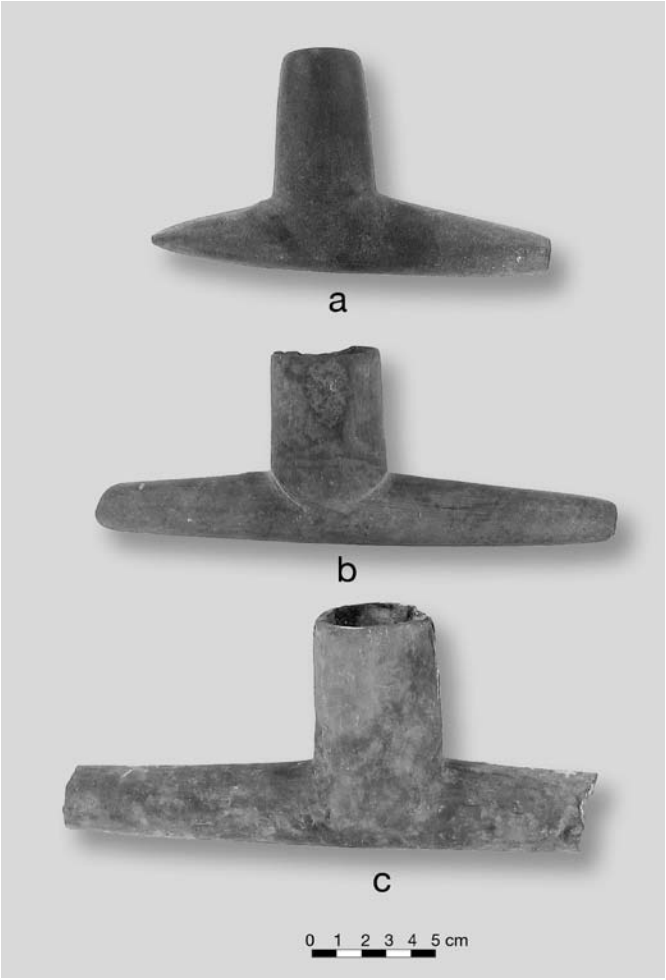


FIGURE 8.1. T-shaped pipes: a, Chandler pipe (448657); b, cylindrical bowl pipe (448659); c, cylindrical bowl pipe (448660).

from the drilling process. There is also a bowl of another pipe that could come from either a Chandler or cylindrical bowl pipe (423154). The fragment consists of the entire bowl and a short piece of the tail. Material is a very finely grained siltstone or sandstone. The tail is plano-convex in cross section. The bore extends across the bowl and indents into the tail, suggesting the possibility that the bore was drilled before the bowl. There are toolmarks on the base, and the interior of the bowl is ridged, in a manner similar to the central perforation on pulley-type earspools. There is brown sediment in the bowl, a brown patchy hard and thin residue on the outer surface near the tail, and copper stains in two locations on the outer surface. The flat bottom of this pipe would allow it to sit upright.

Cylindrical Bowl T-Shaped Pipes

These pipes have been found in Harlan and Spiro phase contexts (Brown, 1976:227; 1996: fig. 2-90h). This style of pipe has a cylindrical bowl along with stems and stem projections that are roughly equal in length and cross section (Figure 8.1b,c). The cylindrical bowl types are often found broken. The breakage may be either from intentional "killing," from excavation, or from damage incurred during use. Most of the collection of T-shaped pipes in the NMNH falls into this category. Four cylindrical bowl pipes are complete.

One such pipe is an unfinished blank (423159). The pipe shape is roughed out, and a depression has been created in the top for the bowl (Figure 8.2a). From the rough, nicked surface of the unfinished pipe, it is clear that the method for creating the blank is pecking. Furthermore, the base shows that a narrow tool was applied using an adzing motion in shaping the base. This artifact correlates with a similar unfinished pipe in Brown (1996: fig. 2-90h).

The largest artifact of this type is a pipe measuring over 40 cm in total length (423158). It has incurred a break near the bowl, but both parts refit exactly, without loss of material at the point of the break (Figure 8.2b). An unusual characteristic of this pipe is that it has yellow ocher smeared all over the surface. An ashy residue remains in the bottom of the bowl.

One of the pipes in this group is incised with a design on either side of the bowl. On pipe 423157 is a motif similar to that present on a pipe from the WPA excavations (Brown, 1976:240, fig. 45a; 1996: figs. 2-89e, 2-91a). This motif appears to be a circle with two legs or streamers, housed under a parabolic motif (Figures 8.2c, 8.3a, b). The motif is then repeated below, only reversed vertically. The motif may be a stylized hawk eye or "weeping eye" representation (Brown, 1996:508). The design is present on both the right and left sides of the bowl. The bore contains a reddish brown residue. In the bowl the residue is thick, caked, and dark. The bore enters the bowl just slightly off center. Polishing and grinding marks are visible on the surface. The incised design displays a neat V-shaped groove, suggesting it was carved using a chipped-stone tool. The stem is round in cross section.

The last complete pipe of this style (448659) has a slightly damaged bowl that sits just slightly toward the tail (Figure 8.1b). The stem and tail are the same shape in cross section. The bowl displays ridges from the boring process, but they are uneven, unlike the bowls of other cylindrical bowl pipes. The material appears to be siltstone, and there is sediment remaining in the bowl.

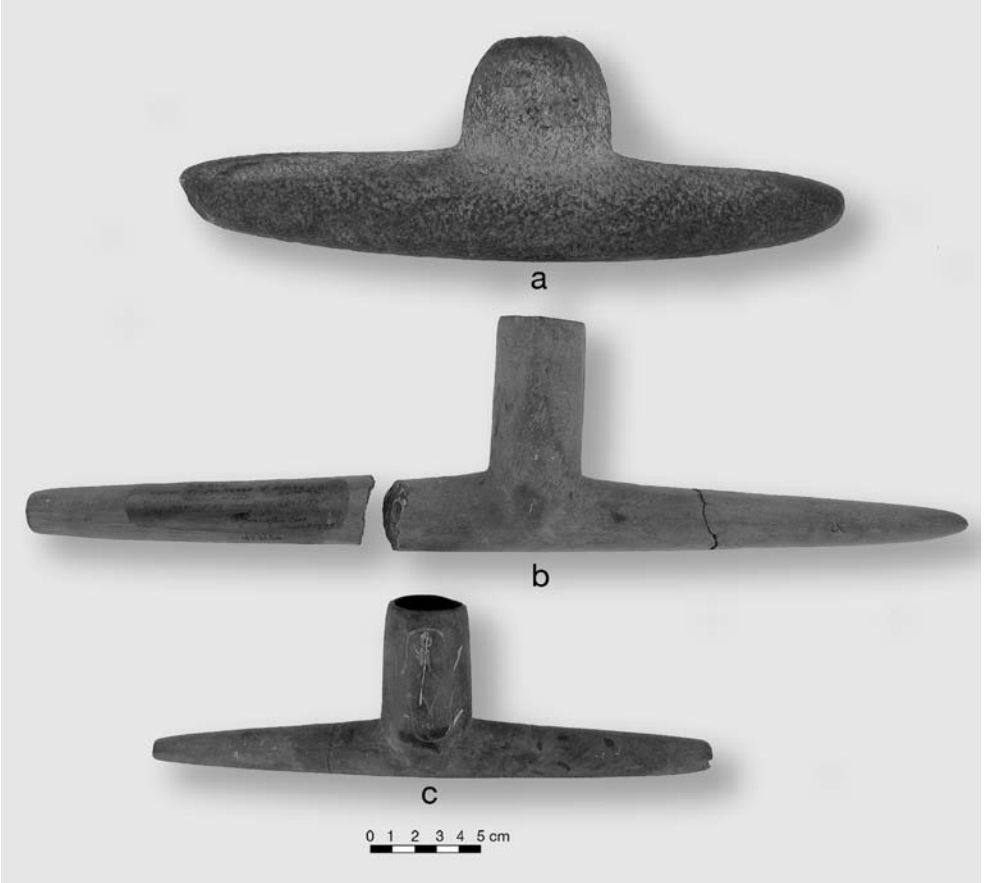


FIGURE 8.2. Cylindrical bowl T-shaped pipes: a, unfinished pipe blank (423159); b, very long pipe (423158); c, pipe with incised bowl (423157).

Two other pipes of this type are broken (448660s01 and 448660s03). In each case, the bowl and portions of both stem and tail are present, but the tips are missing. These both have thick, unanalyzed residues on the inner surfaces of the bowl.

Contracting Bowl T-Shaped Pipes

With these pipes, the bowl contracts as it moves up from the base. Only two such pipes are present in the NMNH collection. One (448658) is incised and was probably painted as well (see Figures 8.3a, 8.4a). The decorated pipe has lines incised in a spiral around both the stem and tail and incised chevrons on the bowl. This chevron pattern on the bowl is reminiscent of the decoration along the rims of Sanders Engraved ceramics. The surface of the pipe appears to have been painted with a reddish pigment. In spots the pigment has flaked off to show plain gray stone beneath. The inner surface of the bore is gray. There are traces of soot in the bowl.

The other pipe with a contracting bowl (448660s02) is not decorated. It exhibits copper stains on the outer surface and thick brown residue on the inside of the bowl. A shiny film on the outer surface may be a preservative. The cross section on the tail is round; on the stem it is a slightly flattened ellipse. The bore enters the bowl off center. Unlike the other T-shaped pipes, this one appears to be made from steatite.

T-Shaped Unclassified Pipes

There are also fragments of tails, stems, and bowls that cannot be classified into types. Overall, the cross section of such pipe stems and tails is round to plano-convex, with the majority being round. One tail fragment is limestone (448662s01). Some residue is present in the bowls

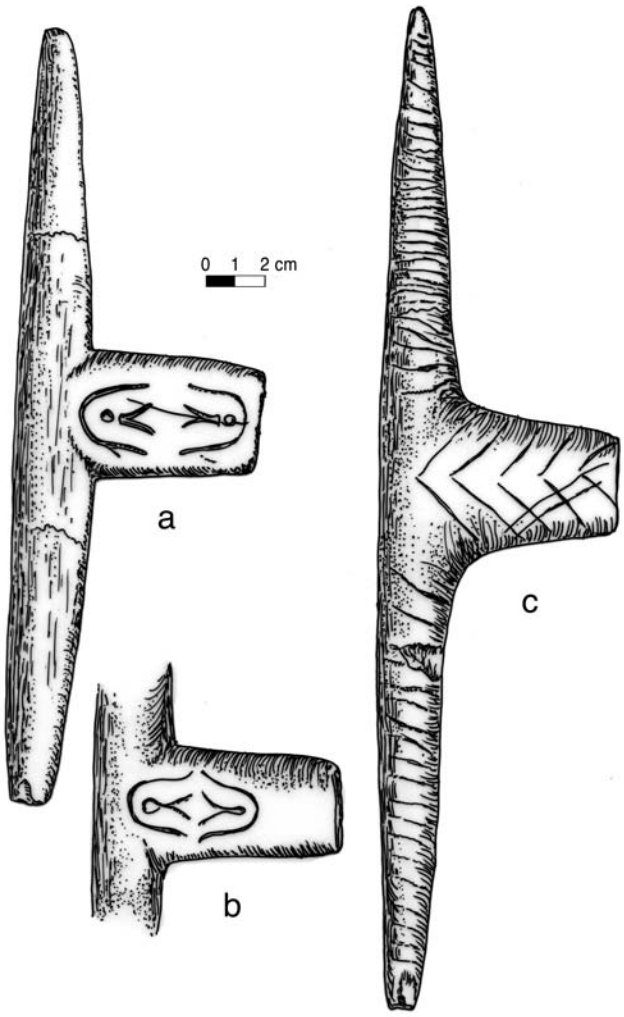


FIGURE 8.3. Decorated T-shaped pipes; a, painted and incised contracting bowl pipe (448658); b, incised cylindrical bowl pipe (423157); c, incised pipe.

and bores of nearly all fragments. Although in some cases this residue appears to be depositional sediment, in others it appears charred and probably represents the remains of the material smoked. Two pipes having short tails are ceramic (448661s02, 448661s03). One exhibits a patch of red hair stuck to a broken edge (423155s04).

Elbow Pipe

One elbow pipe is present (423156). It appears to be made of a fine-grained siltstone and is complete and undamaged (Figure 8.4b). Inside the bore is a reddish residue. The bore enters the bowl off center. Grinding marks are visible around the bowl. Faint red lettering reads "C26 13°°," interpreted as a price of $13.00.

Red River Pipe

Artifact 379215 is the stem from a single Red River pipe. These pipes are ceramic, with a narrow, straight, polished stem and a bowl that sits squarely on one end. There are two sections that refit for a total 6.84 cm in length. The diameter is 0.76 cm. Bore diameter is 0.35 cm. The paste is a grog-tempered clay that registers 2.5YR 4/4 reddish brown on the Munsell Color Chart. There are no bowl fragments. Presumably, the stems are manufactured by rolling clay around a narrow reed.

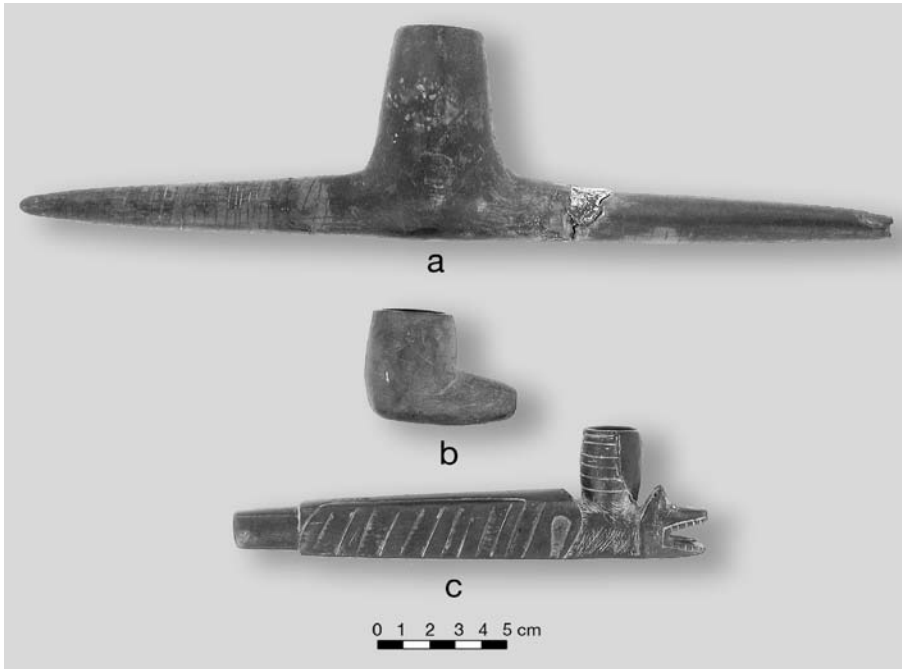


FIGURE 8.4. Stone pipes: a, contracting bowl pipe (448658); b, elbow pipe (423156); c, catlinite effigy pipe (423152).

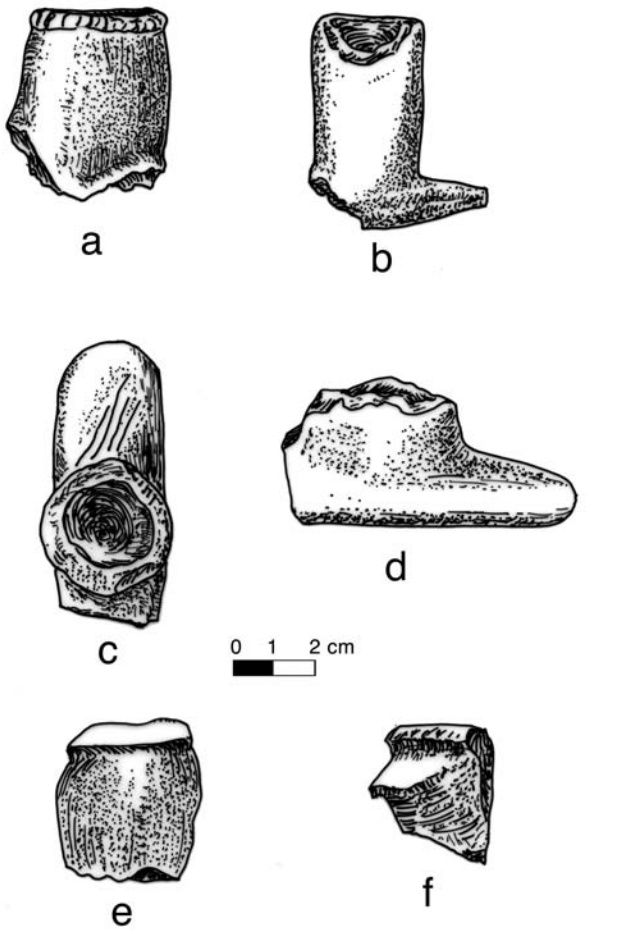


FIGURE 8.5. Ceramic and stone pipe fragments: a, ceramic (448661s01); b, stone (448661s02); c, ceramic pipe, top view (448661s03); d, ceramic pipe, side view (448661s02); e, ceramic pipe bowl fragment (448661s03); f, stone pipe bowl fragment (448661s05).

Unclassified Pipes

Various portions of other ceramic and lithic pipes, including bowl fragments and stem tips, are present as well (Figure 8.5). One bowl fragment appears to have a projection, resembling a lug, on the side (448661s05). The rim of the bowl is incised with hatch marks (Figure 8.5f). A shell-tempered ceramic bowl fragment (448661s01) also exhibits hatching around the rim (Figure 8.5a).

Two stone cone-like fragments included in an artifact lot containing various pipe fragments appear at first glance to be pieces of pipe bores (448662s03). However, closer examination reveals that they have an internal structure consisting of rays extending out from a center. They are broken longitudinally along the center axis. These are more likely fossil corals or perhaps some crystalline mineral. The outer surfaces do appear to have been intentionally smoothed.

Effigy Pipes

There are effigy pipes manufactured to represent both people and animals (and one that crosses this distinction). Dimensions for effigy pipes are shown in Table 8.2.

All of the effigy pipes are carved of stone, which is ground and polished to a smooth outer finish. In several cases, the bottoms of the pipes are decorated. Because every side of the piece may be visible during use, it comes as no surprise that they often have decorations on all faces, including the bottom.

Zoomorphic Effigy Pipes

There are three pipes made in the form of animals. Two resemble a feline (possibly puma), and the third

TABLE 8.2. Characteristics of effigy pipes by style. All measurements are in centimeters; a dash (-) indicates that data are nonexistent or not available.

Catalog number	Style	Length	Width	Bowl height	Bore diameter	Bowl diameter	Depth
423152	Canine	17.70	2.32	4.92	1.76	0.98	2.92
423160	Crouching man	8.70	5.05	8.87	-	2.47	-
448663	Pipe holder	10.72	6.66	13.49	2.75	2.37	3.10
448664	Pipe holder	10.20	8.24	14.1	2.99	2.35	2.95
448665	Two-headed figure	9.42	8.27	10.00	3.30	3.00	3.80
448666	Feline	14.70	5.82	7.00	3.30	2.47	3.40
448667	Feline	10.40	7.80	8.40	8.90	3.05	4.20
448668	Human–bird	18.50	15.00	16.00	4.20	3.30	3.60
448669	Crouching woman	18.50	14.00	24.00	4.45	4.00	4.85

FIGURE 8.6. Feline effigy pipe (448667).

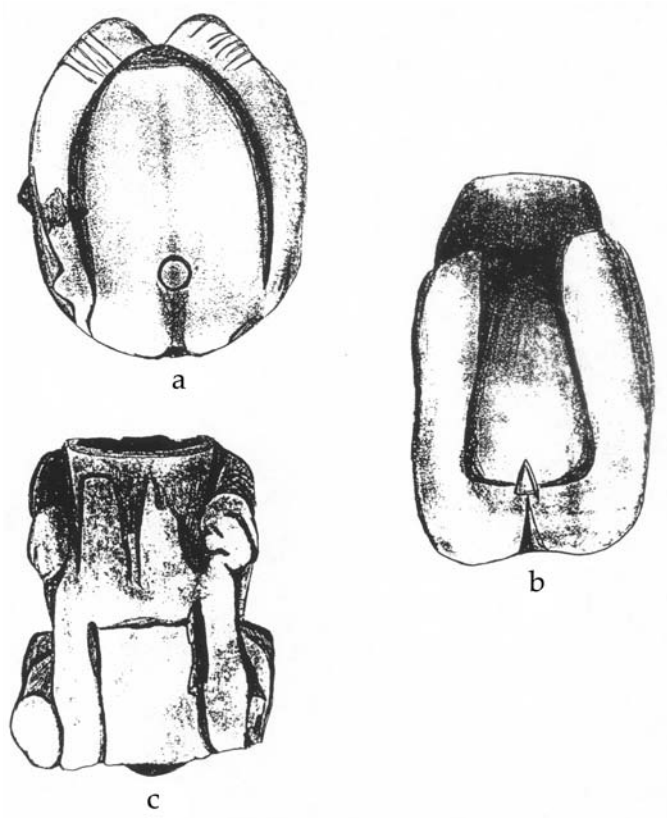


FIGURE 8.7. Effigy pipe bases showing design detail: a, 448665; b, 448663; c, 448667.

represents a canine. The tail of the feline on pipe 448667 (Figure 8.6) curves up and around the bowl, terminating near the head, in a pattern similar to that described by Brown (1976:247; 1996:513) for two puma pipes from the WPA excavations. It appears that the feline crouches over or straddles a human form. The piece is carved on all surfaces, including the bottom (Figure 8.7c). The view of the bottom clearly shows a headless human form in outline. The person's head appears to wrap around the front of the pipe to face out below the head of the cat. The bowl is in the form of a round, lipped pot similar to the bowl of 448663, and it sits squarely in the center of the animal's back. The stem extends out from behind the animal, so the effigy would not face the smoker. Spirals are incised onto shoulders and knees. Lines are also incised at elbow and ankle joints. Horizontal incised lines decorate each side of the body. The animal clearly has rounded paws with incised claws and was illustrated in Hamilton (1952: pl. 17D). This pipe is manufactured from a highly crystalline stone of uncertain composition, perhaps bauxite or sphalerite, as suggested by notes accompanying the artifact. Sediment remains in the crevice around the bowl.

The second limestone zoomorphic pipe (448666) is in poorer condition than 448667. Featured is a deteriorated rendition of a quadruped (Figure 8.8). The animal seems

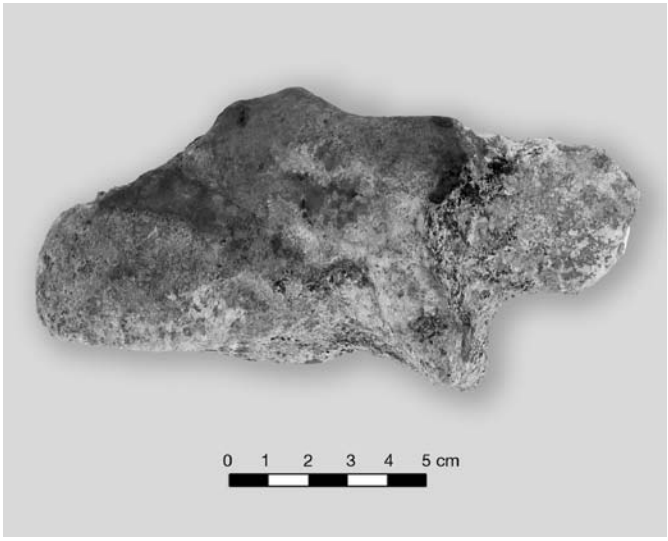


FIGURE 8.8. Feline effigy pipe (448666).

to be seated on its haunches but raised up slightly on forelegs. It could represent either a feline or canine stance. The head faces forward but is not raised. The overall slinky pose suggests cat. The stem exits from the animal's hindquarters, and the bowl rises from the animal's back. The surface is badly eroded from chemical decomposition of the limestone. It is very friable, unlike other raw materials used for pipes. Although it is possible to discern that the surface was once ground smooth, most of the original surface is gone. Dark sooty residue is present in the bowl.

Pipe 423152 is of an effigy style that would be irregular for Caddoan pipes (Figure 8.4c; Hamilton, 1952: pl. 22B). It has the red color and soft texture typically expected from catlinite (most notably deriving from Minnesota sources). The bowl sits well forward, right behind the head of a canine animal with an open mouth and well-carved tongue. Teeth are shown along the mouth opening. The canine head has drilled eyes and is also drilled through the ears. The body of the pipe has alternating excised diagonal bands and constricts at the butt. A rattlesnake is incised on the bottom. The surface is coated with a patina, and on the smoking end a lighter shade of red shows through. The style is more often associated with later contexts (Griffin, 1952:91), and although there is no reason to doubt J. G. Braecklein's report concerning its provenience as the Craig Mound, it very likely represents a depositional episode much later than that which created the Great Mortuary. Trowbridge (1958) records that John Hobbs excavated the pipe in November 1935. Hobb's wife sold it to Braecklein, who in turn sold it to Trowbridge on 11 December 1935.

The bowl was incised with concentric rings. It was originally broken and repaired. The reconstructed portion has been painted to resemble the original surface but is not incised. The patched area appears to have been filed with a metal file, leaving toolmarks on the catlinite near the joins. These file marks are also found in spots on the bowl. They appear as minute, perfectly parallel sets of shallow incised lines. This was the first pipe from Spiro to find its way to the Smithsonian Institution. In 1936, Braecklein loaned the piece to the Smithsonian for casting, and there are three casts of this pipe in the collection. The pipe was returned to Braecklein and was later acquired by Trowbridge. The original was accessioned along with the remainder of the Trowbridge collection. This pipe has no prehistoric residue; however, paint and some form of filler were used in reconstructing the bowl. The repaired surface is outlined with a thin yellow line. Trowbridge (1958) records that the repair was done by the Smithsonian Institution at the time they made casts of it in 1936.

Human Effigy Pipes

Six finely worked limestone pipes are present. These include some styles that duplicate those in the collections from the WPA excavations and others that do not.

Crouching Man. The first (423160) is a rather small pipe that depicts a man holding his arms crossed in front, with his hands resting on opposite shoulders (Figure 8.9). Feet are modeled in two different ways on the two sides. On one side, the foot is tucked underneath the leg, and just the toes and distal ball of the foot show. On the other side the foot is twisted up on the outside of the body and is shown in profile. The individual's facial features are distorted in a grimace. Features are modeled in low relief. The pipe is broken, and part of the top of the pipe is missing. This pipe was shown in Hamilton (1952: pl. 17A). No culturally deposited residue appears to remain.

Crouching Woman. Pipe number 448669 is a very large limestone artifact (Figure 8.10). It depicts a human wearing beaded side locks and a double back hair bun. The figure is squatting. The stem exits at the rear, and the bowl opens at the top, behind the head. The mouths of both the bowl and stem bores are flush with the surface. This large pipe stands over 24 cm high. The head is 8.8 cm wide, 8.0 cm high, and 9.5 cm deep. The figure has two small breasts at the front and probably represents a woman. Her hands rest on her knees. The back hair bun is tied around the middle and modeled by a raised band with two horizontal incised lines. The forehead shows a clear case of frontal flattening and deformation. At the ear is an oddly shaped motif done in bas-relief. It resembles

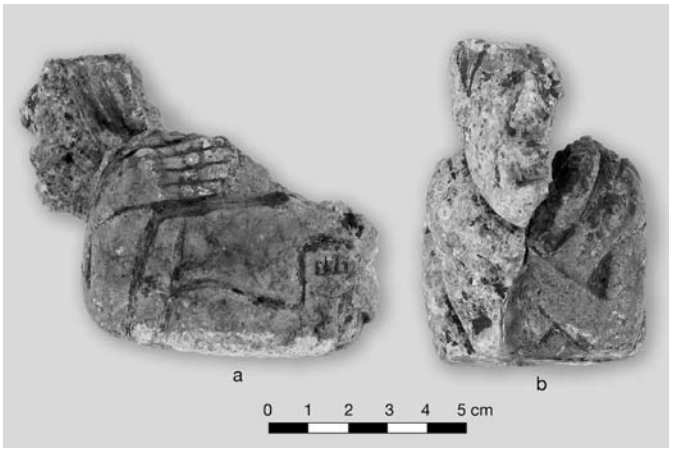


FIGURE 8.9. Crouching human effigy pipe: a, side view; b, front view (423160).

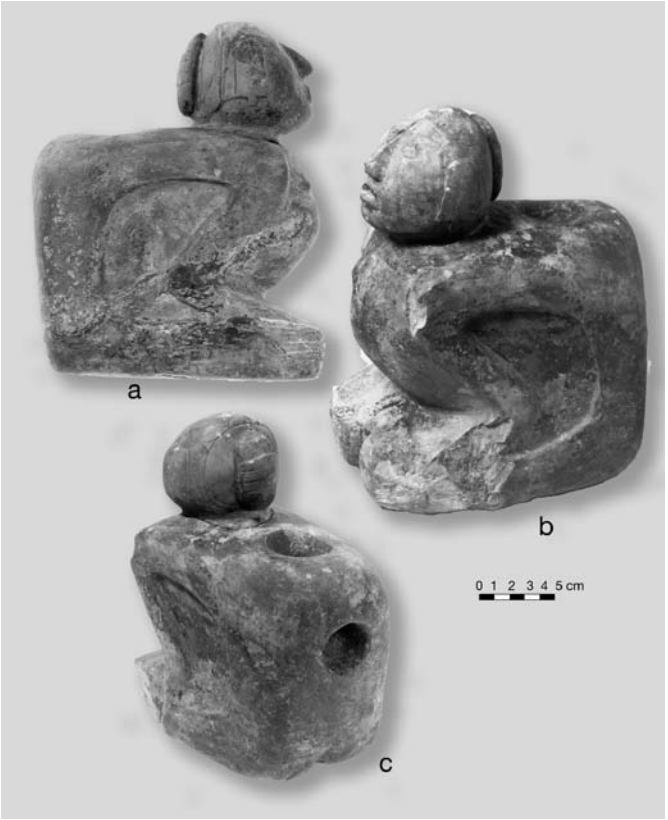


FIGURE 8.10. Human effigy pipe (448669): a, side view; b, oblique view front; c, oblique view rear.

FIGURE 8.11. Human effigy pipe, pipe holder style (448663): a, oblique view front; b, side view.

a round-tipped stemmed projectile point with a square notch on the right lateral edge of the motif. Beaded side locks are done in relief down either side of the head. The body is blocky and spare, with the exception of rounded buttocks on the figure's back.

There is some crusty residue in the bowl. Copper is present on the base, and ocher can be seen inside a depression on one side. Perhaps this was originally painted. A large black stain on the base suggests that someone set this down on a dark fluid that seeped into the stone. Some striae from grinding are visible, and the stone was incised using a sharp fine tool that left V-shaped grooves. Abrasion from use or excavation is visible on the front left lower side.

Pipe Holder. Two pipe holder effigies are present. One human effigy pipe (448663) of limestone portrays a kneeling figure with the legs folded underneath the body (Figure 8.11). Arms are outstretched and hold up a pipe with a large round pipe bowl. The stem issues from the abdomen, so that the pipe faces the smoker. The head is slightly turned to the right side. The modeled bowl is held slightly to the left side so that the bowl is not precisely above the stem. The round bowl has an indented, standing flat rim. A large nose and open mouth are visible on the pipe holder. Ears are shaped realistically. Long hair or a headdress flows down the back of the head and extends to the waist. The original surface is visible on the posterior base, where the buttocks are clearly modeled. The original surface is visible on the outer posterior bowl, an area that may have been protected. Between the buttocks on the base is an incised triangular form that might represent genitalia (Figure 8.7b). Manufacturing traces are mostly obliterated by weathering, and the limestone is badly leached. Sediment and sooty residue line the bowl. The bore is clogged with residue. Some brown residue is also present on the posterior face. This pipe was pictured by Hamilton (1952: pl. 13) and resembles one from the collection of the Gilcrease Institute and shown in Brown (1996: fig. 2-101c). The only difference between the pipe in the NMNH collection and that at the Gilcrease is the position of the pipe holder's legs, which in the case of the latter, are extended.

Another pipe, 448664, is similar stylistically to 448663, except that the arms encircle an elbow pipe with hands clasped in front (Figure 8.12). As with 448663, the stem extends out from the abdomen such that the smoker faces the figure. The figure is raised up on his lower legs so that there is a space between the legs on the base. Feet

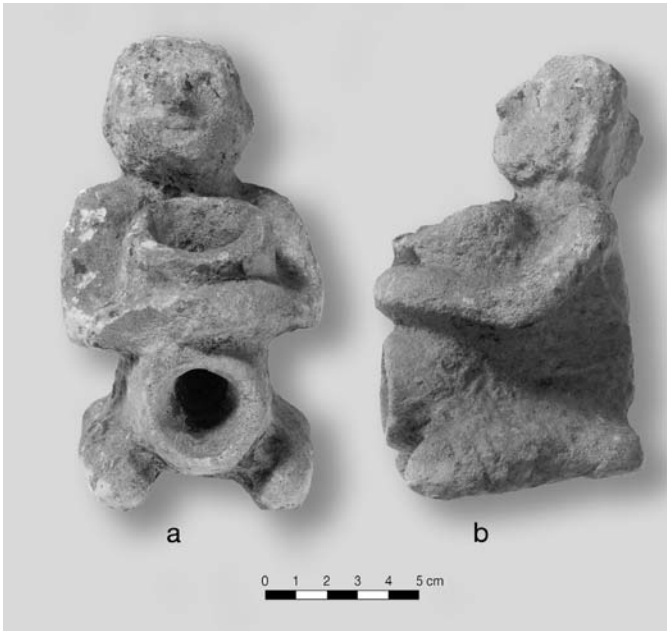


FIGURE 8.12. Human effigy pipe, pipe holder style (448664): a, front view; b, side view.

FIGURE 8.13. Two-headed human effigy pipe (448665): a, oblique view front; b, front view.

are turned inward with the toes pointing toward the spine. The figure wears its hair pulled back into a bun. The head is tilted backward so that it extends beyond the line formed by the spine. Body length is 8 cm. This artifact is weathered, and no trace of the original surface remains. Any traces of manufacturing have been obliterated. The only residue on the pipe is soot in the very base of the bore.

Two-Headed Figure. Pipe number 448665 is a two-headed human limestone figure (Figure 8.13). The heads are positioned side by side rather than back to back as they are in a pipe from the WPA excavations described by Brown (1996:526, fig. 2-101a,b). The two-headed effigy from the WPA excavation has double torsos, whereas the one from Meyer's collection at the Smithsonian has a single body only. The stem extends out 1 cm from the posterior surface. The bore perforates the figure from the anterior to posterior surface. Toolmarks extend down into the bowl. Eyes and mouths are simple slits and are not rendered with much detail. The right head has crude features incised with the eye, extending into the nose. The ears are crudely defined with an incised curvilinear line. In each case the right ear is clearer. Knobs on the backs of the head are probably hair buns. The left head has been broken off but readhered. The figure kneels with knees together. There is one hand on either side of the bowl, and these are broken away. The right wrist has two parallel lines incised as bracelets. Below the knees there are incised lines running parallel around the leg. Five lines encircle the right leg, and six deep and two shallow lines can be seen on the left leg. The widest point is at the heads. The user of this pipe would face the back of the figure. On the base, the feet are shown by extending the leg carving using an incised line. The heels point up. The buttocks are clearly shaped, and a groove extends onto the base, where it terminates in an incised circle (Figure 8.7a). The right buttock has two incised concentric ring motifs. The left buttock has an incised foot but no other decoration. Hamilton (1952: pl. 16A) illustrates this piece sans the left head. There is some smoke residue on upper surface of inner pipe bowl.

Human–Bird. Artifact 448668 is a large pipe that is part bird and part human (Figure 8.14). The right side shows a crouching eagle with wing and incised tail. Its leg rests on its foot, and the talons are clearly incised. The bird leg wears an incised bracelet. The head is a rounded knob incised with an oval design that terminates at the chin. The left side depicts a kneeling, crouching human wearing bracelets. The hand rests on the knee, and five digits are clearly incised on the hand. The foot is tucked under the body. One buttock is incised around onto the posterior surface and flanks the stem opening. The opening is flush with the surface on both stem and

FIGURE 8.14. Oblique views of human-bird effigy pipe (448668): a, left side, the human; b, right side, the bird.

bowl. An incised line connects the oval on the head to the bowl. Another incised line rings the neck. A human shoulder is clearly modeled. The base has two diagonal incised lines extending from front right to posterior left. The effigy does not face the smoker. The bird wing and leg extend farther forward than the human shoulder and knee. The juxtaposition of bird and human reflects the birdman theme often seen on engraved shells. The bird is clearly a raptorial type.

Both V-shaped and U-shaped grooves are visible. Horizontal toolmarks are present in the bowl. The limestone is similar to that used for 448665. This is a large, heavy pipe and would be somewhat unwieldy to use. Copper extends onto the human side of the piece, on the dorsal surface and on the posterior rim of the bowl. Very little residue is visible in the bowl. Red residue (ocher) is present only on the base and is quite faint. The pipe was shown in Hamilton (1952: pl. 8). No pipes of this type were recovered in the WPA excavations (Brown, 1996:514). Griffin (1952:90) wrote that he did not believe the composite human-eagle effigy pipe shown by Hamilton to be authentically made by Spiro's inhabitants. It is unclear if Griffin is referring to this pipe or to the pipe showing an eagle crouching over a human (Hamilton, 1952: pl. 6). The crouching eagle representation is not an uncommon one for Spiro and is recorded for the WPA excavations, assuming that Griffin did refer to the human-bird composite pipe in this collection, which shares overall characteristics of manufacture with the large crouching woman pipe, 448669. Also, given the frequency of human-bird representations in Spiro's artistic representations, a human-bird transformation such as this one seems reasonable from an iconographic perspective. In addition, the copper and other residues are consistent with other stone pieces from the Craig Mound.

Discoidals

Gaming stones and related paraphernalia are expected for Caddoan sites. The most obvious indicators of games or competitions are "chunkee" stones, large discoidal artifacts used in the prehistoric game that involved hurling or bowling a stone disc. Four such stones are present (Figure 8.15). Of these, two are miniature and would likely have been too small for use in actual games. One is a large, smooth, biconcave artifact of a red metamorphic stone, possibly quartzite. Another is of a smooth, fine-grained black sedimentary stone. One of the miniatures is made of marble, and the other is made of a dark gray sedimentary stone. Sizes are shown in Table 8.3. Three of the four are biconcave in cross section, whereas the remaining one is biplano (448676). The depths of the concavities on each side are variable. None exhibit clear traces of utilization.

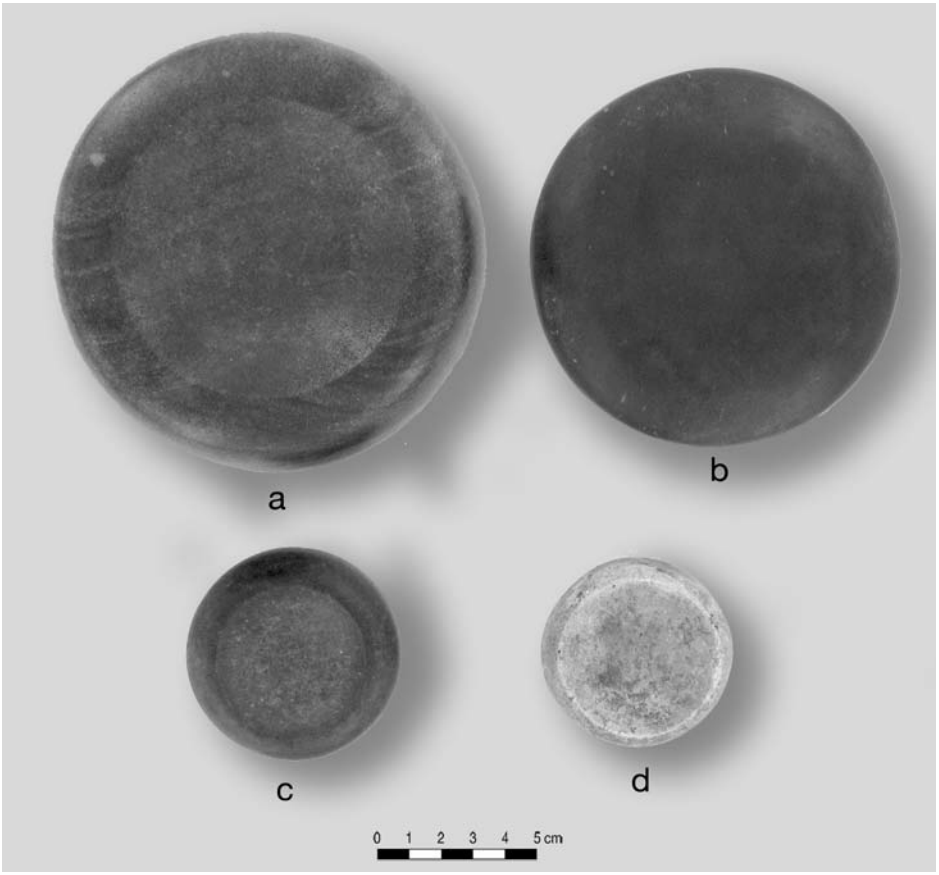


FIGURE 8.15. Discoidals; a, 448678; b, 448679; c, 448680s01; d, 448680s02.

TABLE 8.3. Discoidal characteristics and raw materials.

Catalog number	Diameter (cm)	Length (cm)	Raw material	Notes
448676	12.89	6.3	Quartzite	Large but unused
448679	11.3	3.18	Sedimentary	No depression
448680s01	5.88	2.18	Marble	Thin in center (0.4 cm)
448860s02	6.58	2.98	Sedimentary	Has a lip

Chunkee stones are, if utilized, expected to exhibit some damage to the outer perimeter.

Copper

Copper has been discussed to some extent in chapter 7 under the topic of headdress parts. The discussion is continued here to include certain other lots of copper and composite copper artifacts. The NMNH collection contains some 1,582 g of copper (excluding pins and beads). In most cases, the copper is highly fragmentary or folded several times. Fragments total 382, and many are quite small (<1 cm maximum dimension). Because copper was folded and corroded into masses, it was generally not possible to distinguish among what might have been copper plumes, headdress plaques, and falcon plates that have been reported for Spiro elsewhere (Hamilton, 1952; Brown, 1996). However, other characteristics, such as presence of perforations or rivets, were noted and may enable some gross interpretations along these lines. A summary of sheet copper artifacts is shown in Table 8.4.

For sheets, it is difficult at best to ascertain the character of the parent artifact from squashed and folded fragments. Simple style designations such as perforated, embossed, or unclassified are used to refer to types among the sheet artifacts. In subdividing lots having numerous fragments for analysis, size, thickness, and degree of folding and crumpling are also used as criteria.

TABLE 8.4. Sheet copper artifact fragments.

Style	Size (cm)	Count	Weight (g)	Comments
Embossed square plate	10.4 × 6.5	1	16.5	448715s07; partial square
Embossed fragment	<2.0 × 3.0	176	166.2	448715s01, s02; 448718 423221s04; 423222
	<3.0 × 10.0	30	332.5	448715s03, s04, s06, s09, s10; 448737s01.1
Embossed bird motif	12.0 × 9.25	6	161.1	423227s01.1; woodpecker
	8.0 × 5.0	14	244.3	448715s04; badly folded and corroded
Embossed motif	5.0 × 5.10	1	4.2	423218s01
Nonembossed	16.0 × 15.0	8	81.4	448716s01
Riveted	10.0 × 5.6	5	82.3	448715s08
Perforated	14.0 × 7.3	5	22.5	423221s02
Riveted	6.15 × 5.9	1	8.1	423221s01
Unclassified	<2.0 × 3.0	118	193.3	423225s01; 378267; 448715s05, s11; 448737s13; 448934s06; 423218s02; 42319
	>2.0 × 3.0	3	29.6	423223; 448717; 423220
Composites	12.0 × 9.25	6	161.1	Sheet with pendants, basketry 423227s01.1
	3.9 × 2.57	1	7.6	Fragment with disc shell bead; 423226s01.1
	11.1 × 4.55	1	61.4	Distal end *Busycon* on sheet; 448737s02
	10.0 × 7.0	6	112	Fragments with fiber and shell beads; 423224s01.1
Total count and weight		**382**	**1,684.1**	

Brown (1976:413) and Hamilton (1952) discuss copper plates and copper-covered wooden plaques. Here Brown observes that copper artifacts are made in two different ways. Plates are stiff, self-supporting sheets, whereas plaques are made of a carved wooden backing covered with a thinner copper foil. It seems likely that copper plumes would also be made to be thicker and self-supporting. The plates can be either figural or geometric.

From the WPA excavations, well-preserved copper plates were found with twilled basketry, implying that the copper was buried in baskets (Brown, 1996:546). The copper from commercial excavation in the Great Mortuary was recovered broken, crumpled, and folded (Figure 8.16). This copper was demolished prior to burial. The highly fragmentary and crumpled condition of the copper pieces in the Trowbridge and Meyer collections is consistent with their recovery in the Great Mortuary by the relic hunters. Despite being damaged, the copper still retains basket impression, suggesting it was also deposited in baskets or on mats.

Artifact 423227s01.1 could represent a portion of a hawk plate, although the head present on the plate resembles a woodpecker more than a raptorial bird. This artifact has been X-rayed in an attempt to reconstruct more of the design. This attempt was largely unsuccessful.

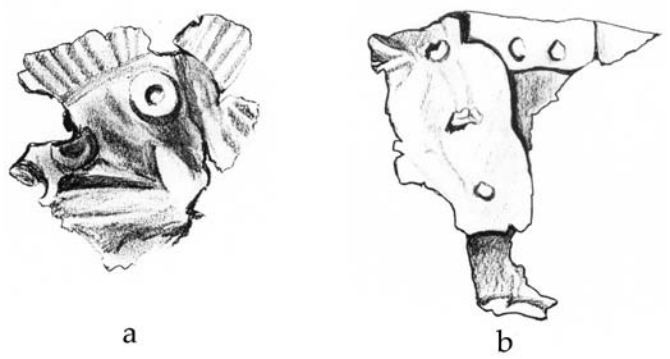


FIGURE 8.16. Copper sheet artifacts: a, crumpled embossed fragment (423218); b, fragment with numerous rivets (423221s01).

Hamilton (1974) records significant patching to plates done with rivets; therefore, rivets should be present among the copper pieces from the NMNH collection. Figure 8.16b shows a piece that has numerous rivets. Rivets would also be useful in providing ways to attach the components of

copper artifacts. Brown (1996:547) remarks that rivets would be expected more for objects that would undergo stress, perhaps as a function of being worn during ceremonial or dance contexts. Therefore, rivets will be expected more for costume components than for discrete plates that were not parts of other artifacts.

Copper has been instrumental in preserving organic materials. Copper artifact 378267 is a lot containing bits of copper plating. One fragment adheres to a fragment of leather 2.1 × 4.2 cm in size. The leather is thin and brown and very soft. Lot 423224 contains a group of copper fragments, one with a very long frayed bit of basketry fiber adhering to it. There is also copper with basketry covered in two colors of clay, green and brown. The basketry fiber is very friable and splits easily, so the entire piece appears brushy. Many of the other copper fragments display bits of basketry or even cloth that have been preserved by the action of copper salts in reducing bacterial and fungal growth. Some copper pieces are undergoing decomposition. In one case, 423220, a residue that resembles soap is present and may be cuprous chloride, but this residue has not been analyzed.

Shell beads are stuck to the copper in some cases. Artifact group 448737 contains copper plates with beads attached. Convexo-cylindrical, disc, bowed, and columella beads are present.

Figurines

Figurines are functionally somewhat different from other decorated objects. Their function is for display and representation. They cannot be smoked, worn, or filled. There are five figurines representing humans, and these are listed in Table 8.5. Raw materials vary, as do sizes and styles of representation.

Wood

Brown (1996:531) reports that several wooden human effigies were recovered, and these came primarily from the relic-hunting episode that struck the Great Mortuary deposit. Wooden statuary is thought to have been a standard feature in mortuary contexts. There are three wooden sculptures depicting human males in the collections that Richard Meyer donated to the Smithsonian. The figures are seated. One figure (448891) is attached to a tenon (Figure 8.17a), which probably served to anchor the sculpture (Hamilton, 1952: pl. 25). The eye spots are excised and probably had inlays at one time. Total length including the tenon is 50.5 cm. The buttocks are defined. The head has two slots in the center and right of center (the left side is damaged). A deep incision runs around the head behind the ears. The right ear is realistically rendered. A dent in the abdomen could signify the navel. The hairline is clearly carved as well. The right arm has separated at the shoulder. Residues include glauconite, copper, and a basket fragment that adheres to the face (cheek). Although the right side is well preserved, the left side shows evidence of fire damage. Perhaps it was burned prior to or as a part of a mortuary ritual. The piece was burned enough to damage the head and destroy the left arm and leg.

Another figure is represented by a body (448890) and a separate but refitting head (448896). The head (Figure 8.17b) became detached and is a slightly different color than its body; however, even with warping, these clearly refit (and are shown together in Hamilton, 1952: pl. 26B).

TABLE 8.5. Characteristics of human effigy figurines and maskettes. A dash (-) indicates data are nonexistent or not available.

Catalog number	Length (cm)	Width/ diameter (cm)	Height (cm)	Raw material	Notes
448890, 448896	11.40	9.97	28.60	Red cedar	Seated man
448891	9.20	21.50	38.70	Red cedar	Seated man with tenon
448892	13.00	16.00	30.50	Red cedar	"Spiro Man"; painted
448706	7.00	7.35	9.70	Galena	Small seated male
448772	-	10.82	21.00	Shell	Standing male; Craig C
423298	4.15	-	-	Shell	Maskette
423299	3.95	-	-	Shell	Maskette
423300	4.05	-	-	Shell	Maskette
423301	3.90	-	-	Shell	Maskette

FIGURE 8.17. Wooden figurines: a, seated man with tenon (448891); b, head only (448896).

FIGURE 8.18. Wooden figurine, seated "Spiro Man" (448892).

The figure is sitting on one knee with the other leg flexed in front and the foot flat on the basal plane. An occipital hair knot is worn. Very vague toolmarks can still be seen. The buttocks are defined by a groove. The head is narrow and somewhat flattened longitudinally. The left side of the face is clearly defined, especially the left ear and eye, as well as the nose. The eye spot is deep and could have held an inset. The right eye is flattened toward the side of the face. The right side is featureless except for part of the eye. In this case it was the right side that became damaged by burning. Workmanship and style are quite similar to that of 448891. Although it is speculation that they were made by the same artist, it is clear they were engendered by a single genre in human depiction.

The third wooden figure (448892) is a well-preserved seated male (Figure 8.18). This is a well-known figurine that has been illustrated (Hamilton, 1952: pl. 26A; Brown, 1984b:247; Brose et al., 1985:138). The man is modeled realistically. Deeply sunken eyes once held insets that are now missing (they may have been copper or shell). The forehead is high and not flattened (i.e., without cranial deformation). The nose is aquiline, and nostrils are shown. The lips protrude around an open mouth. The head is 10.77 cm long and 8.9 cm wide. A long neck extends above a clearly defined clavicle. The width at the shoulder is 13.44 cm. Pectorals are modeled on the chest. The man is nude and devoid of ornament except for an ear decoration. Male genitalia are realistically sculpted. The man sits cross-legged, with his feet tucked underneath his knees and his hands resting on his knees. He wears no footwear, but the toes are visible. The area between his crotch and legs is carved out, leaving a space. The back

shows no detail and is without the buttock definition present on pipes.

The sculpture exhibits remnants of adhesive and traces of copper in the eyes. There is red paint residue in the mouth and white paint around the mouth and on the cheeks. Traces of copper occur elsewhere on the body. The right ear has a bit of cordage drawn through a drilled hole in the lobe. The only decoration on the base is the excision of the feet. The left earlobe is damaged. The right arm is broken in two places but has been repaired and filled with some sort of filler that has been colored brown to match the object. The front part of the legs has also cracked, and these cracks are filled with an unidentified residue. The left hand is damaged. The most interesting damage is present on the back, where the man was stabbed four times. The perforations run in a line extending from the man's upper left to the lower right. The holes are square in outline, and depths of the holes are 0.3, 0.75, 0.3, and 0.98 cm. These stab holes could have been used to mount the figure. The square outline of these holes suggests that the damage was done prehistorically with a copper pin, which is customarily square in cross section. If done after excavation, the implement used would have to have been a square nail, either cut or hand wrought. The latter seems unlikely.

Stone

One human figurine was carved from a single lump of galena (Figure 8.19). The figure is seated, with arms resting on legs in a posture similar to that assumed by the wooden figurines. Details are absent. The galena (lead sulfide) has undergone some chemical alteration, and some features originally present may now be obscured. The base of the figure is coated with a thick layer of copper and malachite. Perhaps it rested on a copper deposit while buried. This galena figure is interesting in that galena is a less than tractable material for doing lapidary art. Crude modeling is typical of the piece, but the arms are realistically shaped. Ears are depicted as bumps. The lack of detail may be as much a function of the difficulty in working galena as it is of style, intent, or the skill of the artisan. The buttocks are modeled, and the head is flattened at the forehead. Some of this flattening may be from erosion of the original surface, or it may represent cranial deformation. This object has not been reported elsewhere, and similar figures have not (to my knowledge) been reported. It is significant that Hamilton (1952) did not report this effigy figure among the stone effigies that he listed. It is from the Meyer collection, which Hamilton did inventory. Perhaps the figure was included with the 500 pounds of worked galena reported by Hamilton (1952:87). Galena is known to assume the shape of balls and other geometric shapes, probably as a result of grinding it to obtain white lustrous pigment. The figurine is a rare form. In fact, Brown (1996:643) indicates that galena was not used in making other artifacts. This artifact appears to be an exception.

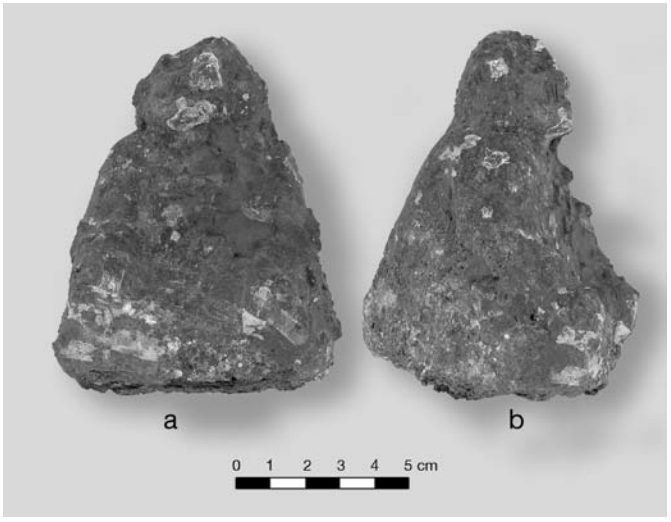


FIGURE 8.19. Galena figurine (448706): a, front view; b, side view.

The figure has basketry impression and residue on the anterior side, especially on the figure's face, knees, and chest. There is little to no basketry on the figure's back. This lack, along with the heavy layer of copper on the base, suggests that the figure sat upright on copper, facing and touching basketry.

Shell

One figural shell effigy is present in the collection (Figure 8.20). It differs from other effigies in that the raw material limits the object to two dimensions. This object consists of a human form cut out from shell and incised with decorations depicting accessories. The total height of 21 cm excludes the head, which is not with the collection.[6]

The front of the figure is the inner shell surface; however, the simple bead grid designs are carried around to the back (outer shell) surface at wrists, knees and feet. The man is shown wearing a belt decorated with a repeated motif of dotted circles in diamonds. A triangular bib extends down onto the chest from the neck. The Craig C styling is bold and simple.

A striking feature of this object is that it was made using material from a previously engraved cup. The outer

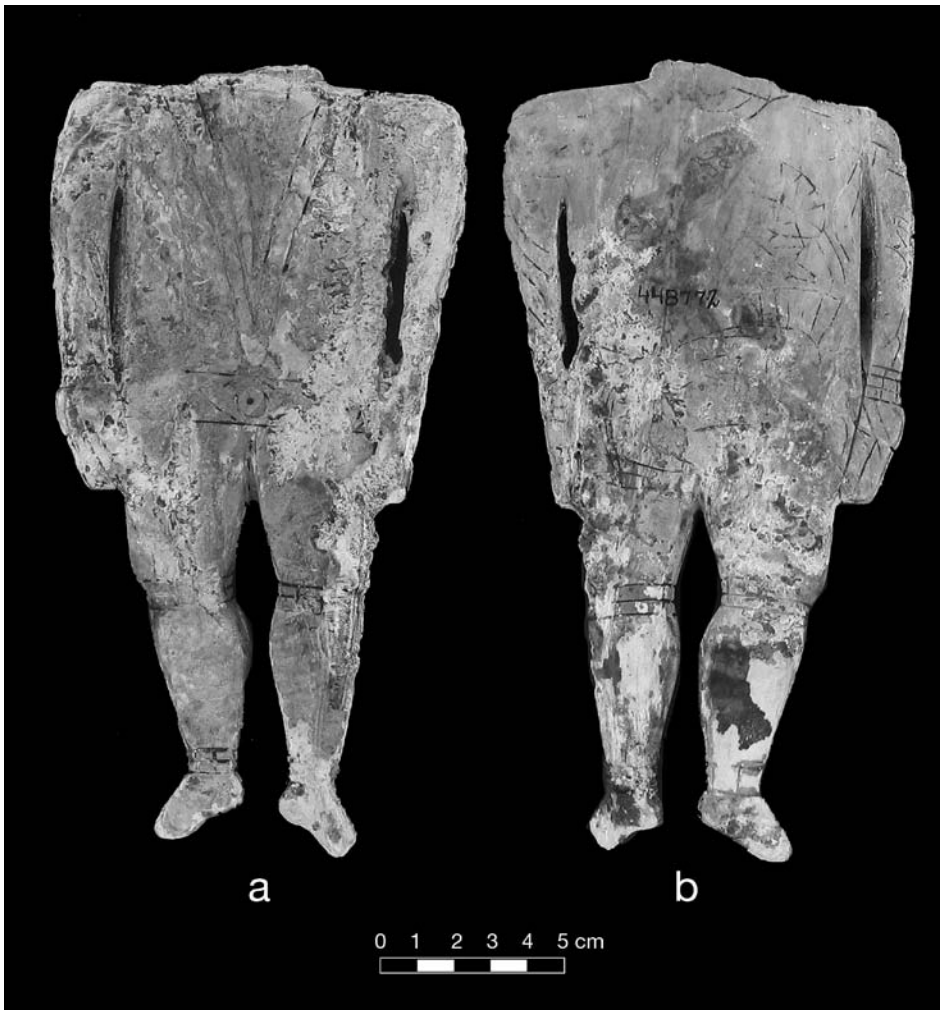


FIGURE 8.20. Shell figurine (448872): a, front view; b, back view showing previous engraving.

surface presents a palimpsest of designs. The original Braden B design on the outer surface depicts large faces with bilobed arrow headdresses and was used by Phillips and Brown in refitting the head from the collection of the National Museum of the American Indian. The overall large size suggests that the original *Busycon* from which it was cut was a very large specimen.

Maskettes

There are four small shell maskettes carved in low relief on shell discs (Figure 8.21). They were almost certainly made by the same craftsperson because they are very similar in workmanship and style. Human faces are depicted in frontal view, and each person has a beaded forelock. In two cases the forelocks are pulled to the right side of the face, and in the other two they are pulled to the left. Two have facial decoration (one each of the right-sided and left-sided forelock wearers). The ones with facial decoration have larger round faces, and the hair on top is detailed using hatched lines. The two smaller-faced people have no decoration and less overall detail on their faces. Original notes suggest that these represent women, whereas the larger faces represent men. All four have pendants hanging from the ear or earspools. The smaller-faced people have smaller ear pendants too. These artifacts are referred to as cameos in the NMNH catalog. It is possible that when new, the differential luster of layers of shell may have been visible. At this time, all surfaces are equally weathered and dulled. All four maskettes have a yellow residue, perhaps ocher, on the face.

These are the medallions originally reported by Hamilton (1952:57–58, pl. 85) as having been found inside a

FIGURE 8.21. Shell cameo maskettes: a, 423298; b, 423299; c, 423300; d, 423301.

cedar box that the commercial excavators destroyed. The box reputedly had a lid of mica. Brown (1996:531) argues that the maskettes placed in a mica-topped box represent a symbolic burial. Hamilton (1952:57) also reported that these came from one of the southern mounds of the Craig Mound complex.

Animal Effigies

Animal effigy forms in this collection are rare. One wooden effigy (448910) represents a small bird head. Insets have been excised for eyes and a crest. A large glob of melted resin rests in the posterior inset. There is no sign that this artifact was attached to anything. That is, there is no body, but the object does not appear to have been broken. Overall, the head closely resembles the figure on the wooden effigy bowl handle (448894) except that it is much smaller (see Figure 4.38). Brown (1996:531–532) describes bird effigies that were probably designed to sit atop staffs. The birds he describes are whole birds, not just the head.

Bone Objects

Objects of bone are not plentiful. It is possible that as the relic hunters discarded human bone, they also discarded artifacts of modified bone. One artifact (448939) comprises four beaver bones, including innominate, femur, tibia, and fibula (Figure 8.22). The bones are tied together with cordage and may represent a ritual bundle. The presence of beaver bones is interesting because beavers do not otherwise occur in the iconography.

Several other bone artifacts or implements are present. They consist of awls, spatulas, and tubes (Table 8.6). Two artifacts appear to be spatulate scrapers: 448710, which is made from an elk metapodial, and 448709, which is made from an ungulate long bone. Artifact 448709 is a long object made from a long bone that has been split (Figure 8.23a). The handle retains the shape of the condyle. All edges are well rounded, and the surface is covered with striations from grinding. The working edge or tip is worn to an asymmetrical shape and well rounded from use.

FIGURE 8.22. Beaver leg bone bundle tied with cordage (448939).

TABLE 8.6. Frequency and characteristics of bone artifacts. A dash (-) indicates data are nonexistent or not available.

Catalog number	Object	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Count	Comments
448939	Bundle	13.0	5.0	4.5	54	4	Beaver bones
423341	Pendant	0.71	1.93	-	0.8	1	Unmodified bone
378264	Pendant	5.60	1.51	1.19	13.2	1	Antler tooth
423343	Gorget	5.00	3.40	0.42	5.8	1	Mammal scapula
448708s02	Awl	17.50	2.13	0.89	46.4	6	Troughed fragments
379212	Awl	8.1	3.53	0.46	2.4	1	Os penis
379213	Awl	8.53	1.21	1.10	2.3	1	Long bone
423342	Pin	8.87	0.67	-	3.8	1	Distal fragment
448707	Pin	17.13	0.97	0.51	5.9	1	Spatulate
379214	Pin	7.50	0.74	-	37.1	7	Fragments, 1 distal
448708s01	Pin	13.43	0.65	0.60	28.3	15	Fragments, 7 distal
448710	Scraper	26.70	4.67	5.1	214.6	1	Metapodia, elk
448709	Scraper	33.5	5.10	-	81.5	1	Long bone, ungulate
448711	Tube	17.3	2.5	2.1	73.7	1	Hollow long bone
448898	Perforated plate	10.06	4.78	0.26	6.5	1	Turtle
423221s03	Perforated plate	9.50	3.38	0.1	5.9	2	Round, thin

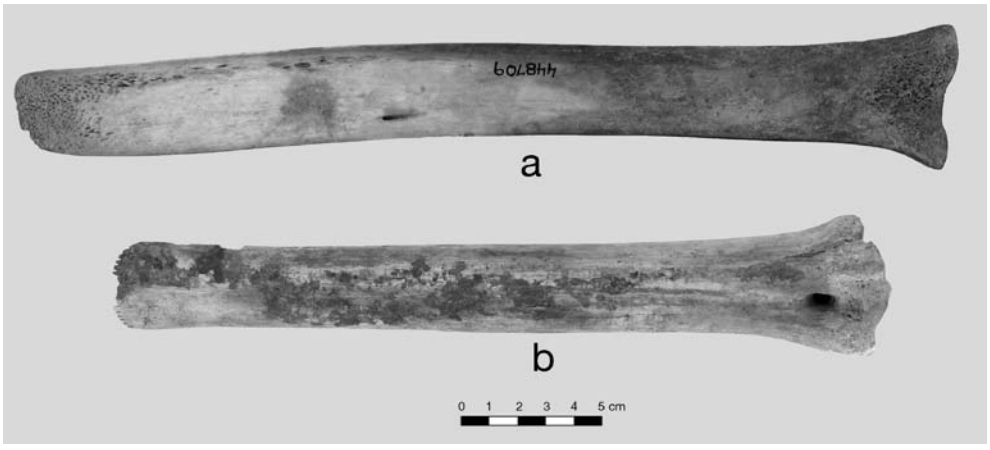


FIGURE 8.23. Bone spatulas: a, ungulate long bone (448709); b, elk bone metapodia spatula with toothed tip (448710).

The other spatulate scraper, 448710, is a long bone that has been split to open up half the length (Figure 8.23b). The working edge is 3.4 cm wide, and along this edge are fine teeth cut in with a very narrow tool, perhaps cord and grit. The teeth are precisely parallel, so they could not have been cut using a stone tool. There is a red patchy residue on the outer surface, and the working edge is damaged.

The one tube, 448711, is manufactured from a hollowed long bone. The exterior is well polished, and it appears to have sediment inside.

Wooden Objects

Wood preservation is excellent, and there are numerous fragments of worked wood. Some items are complete, others appear to be the wooden portions of composite artifacts, and still others are fragmentary. Wooden artifacts in the NMNH collection are listed in Table 8.7, and some are shown in Figure 8.24.

One artifact type known from Spiro is a large, lanceolate, wooden blade form that was encased in copper foil. The objects in the NMNH include two small wooden fragments and one larger distal fragment that are all deeply carved on one face (Figure 8.24a). These fragments could be portions of similar wooden blades. Piece 423391 exhibits very faint toolmarks and copper residue. The depressions carved onto one face mimic flake scars. Although only the distal tip is extant, the size of the tip suggests an overall artifact size consistent with the examples from the Ohio Historical Society (Brown, 1976:194). Brown (1996) refers to these artifacts as ceremonial weaponry, carved and copper covered to form large symbolic blades. The NMNH also retains three plaster casts of artifacts that are in the collection of the Ohio Historical Society.

There is a large blade-form artifact of wood (448897) that is asymmetrical in shape (Figure 8.24d). It is perforated in several locations, and one face is carved with shallow, smooth-sided depressions, perhaps representing flake scars (Figure 8.24 Hamilton, 1952: pl. 24B). The proximal end of this tool has a rectangle excised into it on each face (offset, not back-to-back). This recessed and perforated area could have served as a location for setting in and

TABLE 8.7. Frequency and characteristics of wooden objects in the collection. A dash (-) indicates that data are nonexistent or not available.

Catalog number	Object	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Count	Comments
448897	Blade	26.00	5.61	0.83	28.1	1	Distal fragment
423396	Charcoal	8.50	2.64	1.45	7.4	7	Three are charred wood
423397	Fragment	-	-	-	4.1	20	Splinters
448910	Effigy object	5.85	2.65	3.25	15.6	1	Bird head effigy
423392	Ornament	6.79	4.16	0.96	4.6	1	Blade
423393	Ornament	10.07	2.06	0.50	1.3	1	Fragment of blade
423391	Blade	14.34	4.63	0.83	9	1	Distal fragment of ovate blade; plano-convex cross section
423398	Pole	11.12	10.00	-	456.2	1	Log segment
423400	Pole	279.00	10.00	-	-	1	Tapering
423399	Pole	309.00	10.00	-	-	1	Straight
423401	Pole	414.00	10.00	-	-	1	Tapering
423395	Stick	35.00	1.76	0.91	11.4	1	Splinter
448893	Vessel	12.40	9.84	12.80	220.9	1	Vessel ornament, puma
448894	Vessel	13.58	8.47	11.24	162.8	1	Bird effigy and bowl rim
448911s02	Worked fragment	3.57	2.00	1.13	4.4	17	Fragments
448911s01	Worked fragment	6.62	5.18	2.30	55.1	8	Various
448911s05	Worked fragment	13.45	6.04	1.55	58.6	1	Spatulate artifact
448911s04	Worked fragment	18.80	4.00	2.00	229.1	24	Stick fragments
423394	Cedar	4.00	2.20	1.25	3.4	3	Fragments

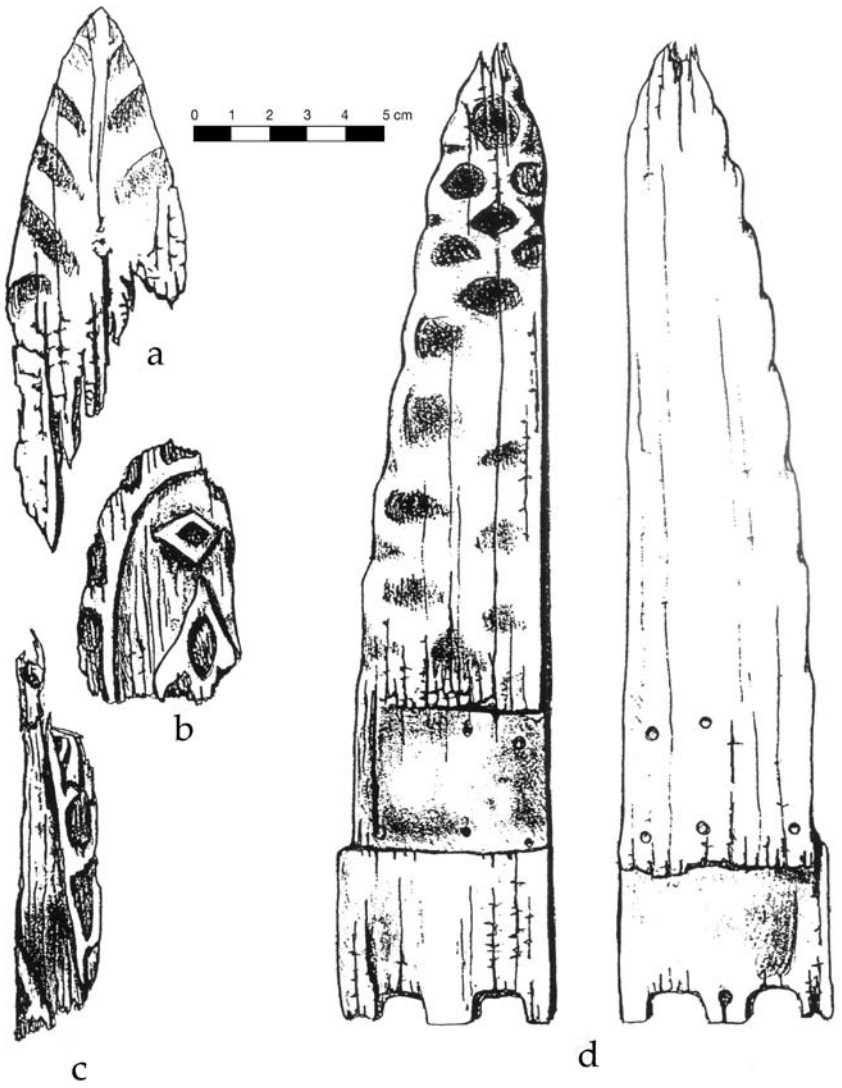


FIGURE 8.24. Wooden artifacts, blade-like forms: a, blade-form fragment (423391); b, (423392); c, 423393; d, asymmetrical blade-form artifact (448897).

affixing another facet (now missing) of a composite artifact. There is no residue to belie the character of this missing component. The proximal edge has three projections.

Artifact 448911s05 is a complete spatulate artifact (Figure 8.25). It is thinner at the wider end. Perhaps it once belonged to a macelike form, although the morphology is not consistent with known wooden maces.

Some of the most interesting wooden objects are also among the plainest. Lot 448911s04 includes fragments of wood that at first glance seem simply to be narrow thin sticks. There is regularity in form, however, and on closer examination, it is apparent that many of these fragments refit. Two fragments are shaped at one end, one exhibits a mat impression, and others are stained with copper. Dimensions given in Table 8.7 are the maximum. Eleven of the fragments are 5–7 cm in length and 1.5–2.5 cm in width. They are regular and do not exhibit branching. It is suspected that several pieces represent parts of similar artifacts or the same artifact and may represent portions of a bow. One flat, wide fragment differs from the others and may be a portion of atlatl or wooden mace or blade. Some are slightly charred. Smaller, chunky fragments within this lot are less suggestive, although they also appear to have been worked.

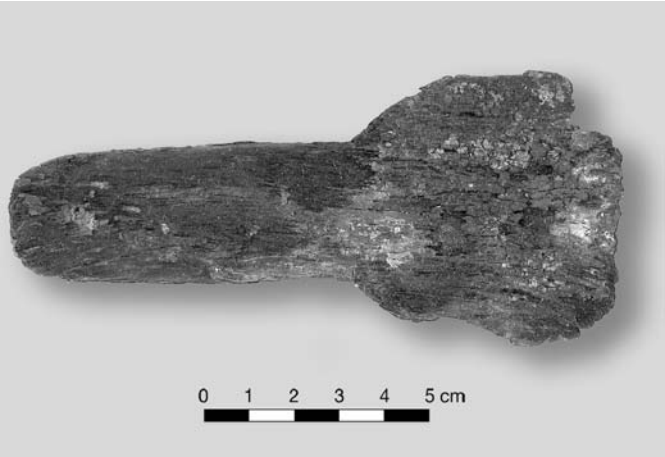


FIGURE 8.25. Wooden spatulate artifact (448911s05).

There are also three long cedar poles. These are all 10 cm in diameter and between 2.5 and 4 m long (Table 8.6). They are either from litters or from internal mound supports. Two taper to one end, and one is of consistent diameter throughout. A small section of a cut log is also present in the collection.

Leather

Very few pieces of leather are present in the collection. Leather is a highly perishable material that normally would not preserve. The leather present either adheres to copper or is heavily copper stained, suggesting that the copper and copper salts acted as a preservative.

Artifact 448934s08 is a tanned leather rectangle. Copper stains one side. The piece is perforated along the edges, presumably for stitching. It exhibits a well-preserved mold of a loosely meshed basket or mat. The leather sat flat on the mat and worked its way down to conform to the structure of the matting. It is possible that the leather was actually sewn to the mat structure. It was originally part of the large twill basket, but their association is unclear. It may be that the basket had a covering of leather.

Artifact 423378s01 consists of leather fragments adhering to corroded copper sheets. Perhaps these represent some sort of composite artifact, such as a headdress plaque with leather facing.

Pieces of leather along with fragments of basketry adhere to copper sheet fragments (378267). One piece of leather is 2.1 × 4.2 cm in size. The leather is thin and brown and soft, unlike rawhide.

Another fragment (423376s02) is a thin piece of hide from an unidentified animal. Yet another fragment (448920) is a tanned leather rectangle similar to that recorded for 448934s08. Copper fragments adhere to one face. At one time it had been square—at least, there is a perfectly square corner present. It had been sewn. Small perforations are present close to the remaining edges at approximately 1.2 cm intervals. Edges are slightly scalloped in appearance, as they would be if the piece had been sewn and stretched in the process. There are two larger round perforations in the left central area. This piece is partially decomposed.

There is also a soft reddish brown leather fragment (448916s01) that is 4.0 cm by 3.5 cm in size.

OTHER WORKED OBJECTS

Other materials, including several kinds of minerals, show modification. One intriguing object is a lump of ocher (448924) that has been shaped into a rounded mound. There are wide, shallow grooves running vertically along the face, and these appear to be finger trails. There is a pit nearly 1.0 cm deep in the top, suggesting that something was embedded into the apex of the object.

A few of the galena pieces show signs of working as well. One is a smoothed cube with a depression in one face (448704). The artifact is 5.42 cm long by 5.01 cm wide by 3.75 cm high. It is a nodule with incised or cut crosshatching on four faces. One corner has the surface shaved off in strips 0.33 cm wide and as much as 3.0 cm long. One face is smooth and ground out, leaving an indentation with wide, shallow walls and circular toolmarks. The different surface treatments are interesting. This could be a piece used in producing pigment, or it could be a ritual object.

Another is a pyramidal galena object, approximately 2.0 cm in length, with six well-smoothed faces (448705s01). Perhaps this object was worked as a preform for a pendant or was used in gaming or another unknown purpose.

In addition, a baked clay biconical object is also present. This object (448928) is a typical representative of a class of objects associated with the Late Archaic site of Poverty Point in Louisiana. It suggests some interesting alternatives. The object in question could have been traded for, kept, and handed down through successive generations; it could have been recycled from an earlier context; or it may not derive from Spiro at all.

UNWORKED RITUAL MATERIALS

Unworked materials include items which may be of ritual importance or the result of ritual behavior but which are essentially unmodified. This category includes paint or pigments and chunks of minerals, such as quartz, galena, or mica. Also, any materials that are not manufactured artifacts but are, rather, by-products of the activities at Spiro are included.

Pigment

Brown (1996:536) lists numerous minerals that were used as pigment, including minerals that could be used to create hues of the colors red, yellow, brown, green, white, and black.

Ocher

Both the Trowbridge and Meyer collections contained ocher. Most of it is fragmentary, yet there are some large lumps present. The combined weight of ocher is 2,682.5 g, including the weight of worked ocher lumps. The weight excludes highly fragmentary and friable ocher contained in two 1-pint jars. The ocher ranges from a dark, almost maroon, color to yellow; however, most of it is a strong red.

Ocher is present as a residue on many artifacts, including lithic tools and shell cups. Furthermore, the red slip found on Sanders ceramics was apparently produced using red ocher. Red paint produced from ocher remains on one of the large stone maces.

Glauconite

There are 171 fragments of glauconite in one lot in the collection of R. K. Meyer (448923). Combined weight is 755.9 g. Glauconite, which Brown (1996:644) describes as a hydrous silicate of iron, aluminum, and potash, is a claylike mineral ranging in color from green to bluish green. Glauconite was apparently used in painting or for smearing on artifacts. Maces such as 423196 and figures such as 448891 exhibit traces of glauconite on the surfaces. Glauconite is of such a distinctive color that it is unlikely to be mistaken for naturally occurring clay sediment. Where it occurs, it is usually overlaid by pale brown clay, interpreted as vestiges of mound sediment. The glauconite must have been applied to the surface before the artifacts were deposited in the mound. Glauconite has been associated with Crockett Curvilinear Incised ceramics. Several vessel bases of this type are present and contain thick deposits of this mineral on the interior of the vessels. Sources for glauconite include marls located in Arkansas as well as gulf coastal areas.

Minerals

Mineral Lumps

There are 10 odd pieces of heavily burned stone. A report on analysis done by the Conservation Analytical Laboratory (Smithsonian Institution, Museum Conservation Institute, 1975, unpublished CAL report 2018) indicates that these are of micaceous sandstone that has been coated with a vegetable gum. Brown (personal communication, 1992) suggested that they may contain manganese. The gum is very likely flammable and would probably burn brightly. These pieces may represent the remains of torchlike objects whose function was to provide light. Subsequent reanalysis in 2010 of fragments from lump 448689 (Smithsonian Institution, Museum Conservation Institute, unpublished MCI report 2018.2) did not confirm the original interpretation. Additional analyses will be necessary to determine the possible function of the mineral lumps. Descriptive statistics are shown in Table 8.8.

These stones appear to be artificially shaped. Several exhibit long, wide grooves that do not appear altogether natural. They all have irregular but smoothly curved surfaces along with the grooves. Use beyond burning is not indicated. They are heavily burned and thickly coated with a layer of charcoal. The stone matrix is friable from heat damage.

Galena

Raw galena (lead sulfide) is conspicuous. A large number of small fragments (n = 140, weight = 1,762.1 g) were recovered from a quart jar of mixed *Olivella* beads

TABLE 8.8. Statistical summary of burned mineral lump measurements (n = 10).

Measurement	Mean	Extremes	Standard deviation
Length (cm)	11.11	7.60 / 13.02	1.90
Width (cm)	5.19	4.10 / 6.95	0.90
Thickness (cm)	3.54	2.42 / 4.46	0.63
Weight [a] (g)	186.14	101.8 / 251.1	55.26

[a] Total weight is 1,861.4 g.

TABLE 8.9. Unmodified galena nodule measurement summary (n = 140). All measurements are in cm. Total weight is 1,762.1 g.

Measurement	Mean	Extremes	Standard deviation
Length	5.1	2.4 / 11.0	2.96
Width	4.17	2.4 / 7.3	1.84
Thickness	3.28	1.5 / 6.69	1.69

and small shell beads (presumably found in the same provenience). There are other nodules and cubes of various sizes as well, as shown in Table 8.9.

Some of the pieces exhibit signs of working, possibly as a part of the production of pigment because the modification appears random, not directed toward the creation of finished galena artifacts. Piece 448703 has red pigment and thickly applied brown clay in crevices. Although the catalog card stipulates that there are no signs of use, the object appears to have been reduced in a couple of areas. This is the largest nodule and is naturally shaped roughly like a crouching animal. Perhaps this natural shape led to this nodule being used as a ritual object. Otherwise, it could have been raw material for obtaining powdered galena. Another object, 448702, is worked slightly, with both ends ground using a circular, pestle-type motion.

Quartz

Brown (1996:644–645) writes that quartz crystals are not uncommon from Craig Mound contexts and records at least 17 unmodified crystals from the WPA excavations. Trowbridge collected two large quartz crystals (423208, 423211). One is milky and measures 9.92 cm long, 5.18 cm wide, and 4.29 cm high. It weighs 267.4 g. A milk quartz crystal was also recovered during the WPA project (Brown, 1996:536). That crystal is battered or ground along its sides. Brown (1996:537) writes that quartz occasionally shows battering.

The other quartz from the Trowbridge collection is a long, transparent crystal of fine quality that measures 12.54 cm by 4.22 cm by 3.16 cm and weighs 222.3 g. The larger crystal is a single rock crystal with sparse red residue on its surface. The base has been shaped, and there are fairly even conchoidal fractures around the perimeter of the angled base.

Still other fragments of quartz are present, but they are miniscule. Thirty-two tiny fragments of quartz were mixed with galena, small shell disc and convexo-cylindrical beads, and a large quantity of *Olivella* shell beads that were separated from lot number 423331.

Mica

Mica is not plentiful. There is a single vial containing three small fragments, each approximately 1 cm long. These fragments are all elliptical in shape. A few tiny flakes (n = 3) were recovered from the conglomeration of beads and galena that compose 423331. Another large piece of mica (448921) is more than 4 cm in diameter. It exhibits one clearly cut edge whereas the other edges are ragged. Brown (1996:543–544) reports on mica recovered from the Craig and Brown mound contexts at Spiro. One use for mica was in covering cedar boxes reported to have been excavated by the relic hunters but then destroyed.

Other Materials

The following materials are not assumed to have ceremonial or ritual function, although the slag suggests a mortuary event if it resulted from cremation. These materials do, however, provide information regarding the original archaeological context.

Glass Slag

There is a piece of frothy vitrified silica with a large glass bubble present in the surface (423210). The glass bubble measures 0.88 × 1.02 cm in diameter, and the slag is 8.48 cm long, 4.57 cm wide, and 1.65 cm high. Weight is 47.7 g. There appears to be bone within this slag as well. Rogers (1980) mentions the recovery of silica froth from another part of the site. According to Brown (personal communication, 1992), crematory remains—vitrified bones—are not uncommon. Silica froth also occurs from the intense burning of grassy materials (Brown, 1996:645).

Three other fragments of burned bone and shell are present as well. These are small and exhibit no vitrification (423303).

Coprolites

There are three pieces of fecal matter that weigh 5 g total. Maximum dimensions are approximately 6 cm

long by 0.8 cm in diameter. Organic material is clearly preserved in these artifacts.

Sediment

In some cases, vials of sediment have been removed from some objects at some point during their curation, and these vials can be considered as remnants or residues relating to the original archaeological context. Of the six artifacts that fit into this category, one derived from a stone pipe (448669s02), one from a shell gorget (423308s04), one from a copper sheet (448715s05), one from a textile (4233378s05), and two, which contain clay and bits of vegetable matter, from mixtures of beads, mica, and metal fragments (423330s06, 4233301s02).

Seed

A single large seedpod is present among the wooden fragments of 448911. The plant represented has not been identified.

SUMMARY

The magnitude of the collection of ceremonial, special, or prestige materials present in the collection from NMNH cannot be underestimated. The ritual items described in this chapter do not constitute the entire ceremonial assemblage from the mound deposit by any means. Shell cups in particular were undoubtedly used in special or ceremonial contexts but were more easily discussed as containers. Of all the materials included in this chapter, pipes, many of which are figural, and the other effigy figures clearly indicate that a life rich in social interaction and spiritual import typified the individuals buried in the Great Mortuary.

In some ways, the presence of raw materials having ritual significance, such as pigments and minerals, is surprising. The artifact miners apparently collected materials that were not made into obvious finished artifacts. Although it is impossible to say that these raw materials themselves were used in a ritual context, they certainly were deposited in a special context, having been interred in the Craig Mound. In addition, the prestige value of materials such as copper, hematite, and galena has a long history in eastern North America, having been included as a major component of grave goods during Middle Woodland Copena contexts in the Southeast.

NOTE

6. Phillips and Brown (1984: pl. 285) remarked that the head was acquired from the Museum of the American Indian, Heye Foundation, by the Smithsonian and that the two pieces are now together. No record of such a transaction could be located, and there is no head present in the collection at the National Museum of Natural History.

9

Human Remains

Javier Urcid

This chapter deals with the skeletal remains from the Craig Mound at Spiro and discusses only those catalog numbers that contain human bone. The set of remains with number 448937 includes 109 loose teeth that were sorted into the groupings shown in Table 9.1.[7]

These teeth have not yet been studied and documented. Given their condition—not only fragmentary but also outside of anatomical context—it is considered that their future study will not greatly affect the conclusions reached here regarding minimum and maximum number of individuals. Some of these teeth might actually form part of maxillary and mandibular fragments listed under number 448935.

CATALOG NUMBER 423344

This catalog number includes two right and one left parietal. Two of them are antimeric. All the sutures (sagittal, occipital, and a portion of the coronal in the partially assembled cranium) are open both endo- and ectocranially, suggesting that both crania were from young adults. Although warped and deformed, the incomplete cranium seems small and thus might belong to a female. The isolated parietal is larger and might belong to a male. Both skulls had ossicles in the lambdoid suture. Their color and texture are very similar, suggesting that the two came from the same underground burial context. The isolated left parietal has a green stain in the ectocranium, in the area of asterion. There is no evidence of pathology.

CATALOG NUMBER 423345

This catalog number includes the left half of an adult mandible. On the basis of slight to moderate dental wear the individual could have been between 35 and 45 years of age. The mental shape and eminence suggest a male. Although the mandibular is eroded, the entire left lower dental arch is present. There are some moderate alveolar tori. Traces of soil, especially along the broken edge,

***Javier Urcid**, Department of Anthropology, Brandeis University, P.O. Box 549110, MS 006, Waltham, Massachusetts 02454, USA (formerly with the Department of Anthropology Repatriation Office, National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA).*

TABLE 9.1. Types and counts of human teeth present in catalog number 448937.

Type	Count
Incisors	10
Canines and premolars	20
Third molars	16
Upper molars	14
Unerupted or partially erupted teeth	2
Teeth with cavities	1
Unsorted teeth	18
Undifferentiated molars	22
Unrecognizable tooth fragments	6
Total	**109**

indicate that the bone was found in an underground burial context.

CATALOG NUMBER 423346

This catalog number includes the complete left humerus of an adult individual. Specific age is undeterminable. The occurrence of slight marginal osteophytes in the distal epiphysis suggests an age range between 35 and 45 years. The shaft of the bone looks robust, but the diameter of the head is only 39 mm, well below the mean for females, which is 43 mm. Near the distal end of the shaft there is a bony excrescence that is not surrounded by active remodelling. It seems to be a very localized and healed osteitis.

CATALOG NUMBER 423347

Included in this catalog number is the complete right tibia of an adult individual. Specific age cannot be determined. However, the lack of degenerative lesions on the surfaces of articulation suggests a young adult. The bone is gracile and might correspond to a female. Some erosion on the epiphyses and cracks on the surface of the bone indicate an underground burial context. There is no evidence of pathology.

CATALOG NUMBER 423348

This catalog number includes the complete left innominate of a male between 30 and 40 years old. The sexual determination is based on the angle of aperture in the sciatic notch, the lack of a preauricular sulcus, the lack of medial projection of the auricular surface, absence of a ventral arch, and broad medial aspect of the ischiopubic ramus. The age assessment is based on the morphological changes of the pubic symphysis. The acetabulum has slight marginal osteophytes and slight localized porosis in the articulatory surface. There is postmortem damage, caused apparently by the tip of a nail, in the ventral surface of the ilium, very close to the superior border.

CATALOG NUMBER 423349

This catalog number includes two incomplete innominates. Only one is human. It is from the left side. It belongs to an adult perhaps between 40 and 50 years of age, as suggested by the morphological changes of the auricular articulation. The criterion of changes of the pubic symphysis cannot be used since this portion is missing. Female sex can be determined on the basis of an open sciatic notch, marked preauricular sulcus, and medial projection of the sacroiliac articulation. The bone is eroded and incomplete, with cracks in the surfaces, some exfoliation, warping, and bleaching, mainly on the ventral surface. These traits indicate partial exposure weathering. The yellow color on the dorsal surface indicates a previous underground burial context.

CATALOG NUMBER 423350

This catalog number includes a very eroded fragment of a right femur. It belongs to an adult individual, but specific age and sex are undeterminable. Erosion, exfoliation, and cracks indicate that the fragment was exposed to weathering. Because of its advanced erosion, its previous taphonomic history has been obliterated. The fragment includes portion of the distal shaft and parts (amorphous) of the distal epiphysis. There is no evidence of pathology in what remains of the original surface of the bone.

CATALOG NUMBER 423351

This catalog number includes three vertebrae, two of which are nonhuman. The human vertebra is incomplete, represented only by the right half of the centrum and a portion of the right arch. It is probably a C4 and belongs to an adult. Because of color and texture it cannot be from

individual B in number 448936. Specific age and sex are undeterminable.

CATALOG NUMBER 448935

This catalog number includes several different sets of bones. Two are fragments of human skull. On the basis of differences in color and texture they do not belong to the same individual, but both were undoubtedly in an underground burial context. One is an incomplete right parietal from a young adult. The sagittal and lambdoid sutures were both endo- and ectocranially open, except for the endocranial area of obelion. The coronal suture was already endocranially fused but open in the ectocranium. Sex is undeterminable. There is a fine osteoporosis over much of the ectocranial surface. The other fragment corresponds to a right temporal and might belong to a young adult since there are no degenerative lesions on the temporomandibular joint. Also, both the superior and inferior sphenotemporal sutures are open endo- and ectocranially. The medium size of the mastoid process does not allow a reliable determination of sex. There is a postmortem perforation just anterior to the origin of the zygomatic bridge, and the hole was produced from the inside to the outside. Thus, the temporal bone was already isolated from the skull when the perforation occurred. This might have been produced by an excavating tool, perhaps a small pick. There is no evidence of pathology in this fragment.

Also included are two incomplete maxillae that match. From the surviving sutures, the person was an adult between 25 and 30 years of age. The dental wear in the surviving teeth is slight. The left fragment corresponds to the anterior portion and includes alveoli of the incisors, the canine, the two premolars, and the medial surface of the first molar. No teeth remain. The central incisor was lost antemortem. The other teeth fell out after death, and the dental pieces might be among the set of loose teeth numbered 448937. The right maxilla includes the canine, first premolar, and the second molar. The first molar was lost antemortem but shortly before death. The sockets for the tooth's roots are in an initial stage of resorption. The incisors and the third molar were lost postmortem.

Additionally, there are two incomplete mandibles. The permanent dentition, the slight degree of attrition, and the dental pathology (caries) suggest that both mandibles pertain to young or middle-aged adults. On the basis of color differences, none of the mandibles match with the paired maxillae. Using the same criteria, however, one of the mandibles might correspond with the right parietal described above. Thus, there could be as many as four different adult individuals in this set.

CATALOG NUMBER 448936

This catalog number includes the miscellaneous remains of various individuals. In the discussion of each anatomical set, these individuals are distinguished with letters.

1. Four cervical vertebrae (C1 to C4) of an adult individual (A). The color and anatomical fit between them clearly indicates that they belong to the same individual. The lack of degenerative lesions suggests a young adult less than 40 years of age. Sex is undeterminable. Traces of soil adhered by shellac evinces an underground burial context.

2. Cervical vertebra (C3) of an adult individual (B). Color and texture are different from the previous set. No pathology is evident. This is apparently a young adult; sex is undeterminable. Traces of soil and a crack in the centrum indicate an underground burial context.

3. Two fragments of ribs. Both are from adult individual(s). Judging from the color and texture, it is feasible that one fragment belongs to individual A and the other to individual B. Cracks and erosion on both fragments indicate an underground burial context.

4. Hand bones, including five metacarpals and three phalanges. The metacarpals include one right third (proximal epiphysis unfused), one right fourth, one left fourth, one left fifth that lacks portion of the distal epiphysis, and one metacarpal without distal epiphysis. Thus, its position and side are undeterminable. Because the right and left fourth metacarpals do not match, the incomplete left fifth and the left fourth listed above cannot belong to the same individual, and since the right third metacarpal had its proximal epiphysis unfused, then this set of bones represents at least three individuals. Two were adults and the third was less than 15 years of age. There are also three proximal hand phalanges. Two are complete and could belong to the same individual. The third is incomplete and seems to belong to another person.

5. Five long bones, including four femora and an ulna. Three of the femora are left and another is right. The latter matches one of the left ones. The paired bones are almost complete but eroded in some parts. They have pronounced exfoliation on the anterior surface and gouges that seem to be the result of postmortem damage. Portions of the epiphyses are missing. The head diameter (44 mm) suggests a male. There is no evidence of degenerative lesions

in what remains of the articulatory surfaces, so presumably, the pair belonged to a young adult. The right femur had traces of a red powder adhering to the surface around the lesser trochanter and tiny spots on the femoral head. This substance might be cinnabar. The evidence of the red paint is less conspicuous on the left femur, but a few traces are discernible on the femoral head and in two spots along the posterior surface of the shaft. There is a cut 216 mm long in the head of the right femur. Because of its location the cut is either a peri- or postmortem cut. The other two left femora show similar surface changes as the pair discussed above, suggesting that all come from the same burial context. The proximal epiphyses of both bones are incomplete, but enough remains to derive the head diameters. According to these, which are 42 and 43 mm, the femora could belong to two females, yet in other features of the shafts, they seem to be slightly more robust than the pair described above. Only one of these left femora has traces of red powder adhered to the femoral head. The fifth long bone in this set is a left ulna from an adult individual. Its relative robusticity and the lack of degenerative lesions in the articulations suggest a young adult male. Traces of soil are adhered by a layer of shellac, evincing an underground burial context. However, the color of the bone and the lack of surface changes indicate that the ulna probably does not come from the same burial context as the femora, although the differences could be the result of the bone having been found at a deeper level.

6. Nine foot bones, all from adult individuals. One is an incomplete left navicular. There are also six metatarsals, including two complete left first, one complete right first, one complete left third, one complete right fourth, and a fragment that includes only the proximal epiphysis and portion of the shaft of an unidentified metatarsal. The latter might be from a right foot. The right first metatarsal does not match with either of the two left ones, and thus, the set of bones has remains of at least three adult individuals. On the basis of color similarities, the right first metatarsal, the right fourth, and the left third might belong to the same individual. Other foot bones in this set include two first proximal phalanges. On the basis of color and size, one seems to correspond to one of the left first metatarsals, and the other seems to articulate with the right first metatarsal.

7. Fragment of a parietal bone and the shaft of a left fibula. Both are from an immature individual and probably from the same skeleton (C). Age and sex are undeterminable. The shaft fragment is 13 cm long. It is estimated that the complete bone would have been at least 16 cm in length, giving a possible age of 4 to 7 years. A tag on the fibula says that its weight is 6.2 g.

SUMMARY REMARKS

Considering groups of anatomical elements, the following are independent counts of minimum number of individuals.

Skulls	At least four adult individuals and one immature person (4–7) years old
Mandibles	At least three adult individuals
Vertebrae	At least three adult individuals
Humerus	At least one adult individual
Ulna	At least one adult individual
Hand bones	At least three adults and one immature individual less than 15 years old but older than the immature person counted in the skulls set
Innominates	At least two adult individuals
Femora	At least four individuals: three under number 448936 and one under number 423350
Tibia	At least one adult individual

The figures generated by the skulls and the hand bones provide a composite picture of at least six individuals: four adult, a child between 4 and 7 years old, and an adolescent less than 15 years old. If no relationship is assumed between all the remains, then a maximum count of 24 individuals results. The archaeological context should allow determining a more accurate number of individuals. This determination would also permit a more accurate sorting of the age and sex assessments that were provided in the descriptions.

NOTE

7. Osteologist Beverly Byrd, formerly of NMNH's Department of Anthropology Repatriation Office, assisted in collecting and organizing the information on human teeth.

10

Conclusion

April K. Sievert

The NMNH collection from the Craig Mound contains general artifact types similar to those found during controlled excavations by the WPA. Shell vessels, pipes, and wooden statuary are well represented in collections made by relic hunters. Looters, however, miss things. The Pocola Mining Company undoubtedly went for large, obvious, and well-preserved materials. They discarded human bone, ignored small lithic materials, probably missed thousands of shell beads, and hastened the destruction of organic or fragile materials, such as textiles, leather, ceramics, or copper sheet artifacts. This concluding chapter assesses the significance of the NMNH collection in light of the problems with provenience and explores its potential both as a research tool and as a major piece of North American cultural heritage.

REPRESENTATIVENESS OF THE COLLECTION

The NMNH collection of materials from Spiro represents a large portion of the materials known from the site, aside from the collections made during the WPA operations. The NMNH collection includes some of the first pieces brought to the attention of professional archaeologists; collector J. G. Braecklein sent materials to the Smithsonian for perusal and casting as early as 1936. In the NMNH collection from the site are just fewer than 5,000 artifacts (not including beads). Of these, 2,072 are lithic artifacts, including implements, beads, earspools, pipes, and pieces of minerals. Ceramic artifacts, including sherds, account for 327 pieces. Shell artifacts number 1,160, excluding the over 20,000 shell beads.

But just how representative is this sample of artifacts from Craig Mound? The relic hunters collected a little bit of every type of material present, but there are notable differences between the WPA assemblages and those in the NMNH. For example, the WPA excavation has relatively more ceramic material, more small lithic material, and proportionately fewer complete shell vessels.

Reasons that account for these differences should reflect something about the nature of commercial excavation and collecting.

The first possibility addresses the selective nature of artifact collection in which hunters collected only what they saw and what they thought they could

sell. Small projectile points probably escaped notice, as may have other small items. There are very few copper plate pieces in the NMNH collection. The fragility of copper plates may have contributed to them being destroyed by the relic hunters but salvaged by the more careful WPA crews.

Second, collectors purchase what they personally desire. We can expect that the large collections amassed by Meyer and Trowbridge reflect the men's personal tastes. Whereas Trowbridge may have recognized the value of bundled textiles that may have looked mucky and fragile to others, Meyer apparently had an eye for showy sculptural pieces. Differences between the collections from Trowbridge and Meyer are remarkable and highlight the serendipitous nature of artifact collecting. For example, of the nine whole or nearly whole pots in the collection, Trowbridge had possessed five, which he sold along with only a handful of other sherds. Meyer donated primarily sherds, including many of the slipped sherds from ovaloid bowls, some of which have been refitted to form nearly whole pots. This is interesting in light of the conception (discussed below) that only whole artifacts are of interest to collectors. Trowbridge collected 199 pieces of cloth to Meyer's 29. Among wooden artifacts, it was Trowbridge who collected four cedar poles and no effigies figures and Meyer, on the other hand, who possessed three human figural effigies, two vessel handles, and 19 wooden earspools. Meyer also donated seven stone effigy pipes, and Trowbridge sold two to the museum.

Third, collectors and relic hunters are interested in complete artifacts, rather than broken pieces. Shell cup fragments number 908, including 84 whole or nearly whole decorated and undecorated cups. This compares with 85 complete vessels plus 3,695 fragments reported by Brown (1996: table 2-81) for the WPA material. Although several of the complete cups in the NMNH collection have been refitted from multiple fragments, the presence of the same number of whole cups to four times the fragments is remarkable.

Finally, there could easily also have been real differences in the nature of the deposits removed by the Pocola Mining Company compared to nearby contexts in the mound. The artifact hunters did strike at and remove much of the central portion of the large feature that Brown (1996) refers to as the Great Mortuary. There may have been more intact shell in this area, which is thought to have been a protected hollow cavity.

SIGNIFICANCE OF THE COLLECTION

Many of the materials from the Great Mortuary feature in the Craig Mound are unique. Wooden mortuary figures, well-preserved stone effigy pipes, textiles, and galena figurines are rare. For these reasons, the Craig Mound burials offer a rare glimpse into late prehistoric lifeways. Preservation of materials interred in the Craig Mound was extraordinary, due in part to the large amount of copper artifacts placed in the mound and to the rather impermeable sediments capping the mortuary features. Although not a tomb in the sense evoked by some of the newspaper writing of the 1930s, the possibility of a protected cavity has been supported by Brown (1996). These conditions are in part responsible for the overall character of the collection as rare and unique. Spiro yielded one of the largest collections of Mississippian textiles known, and the textiles at the NMNH form a large component of this material. Collector Harry Trowbridge's work at conserving the textiles that he rescued, in part by controlling temperatures, undoubtedly contributed to the fact that so many textile pieces have survived. Of course, we have no way of knowing how much material was destroyed during the commercial excavations.

The artifact hunters were none too careful as they tunneled into the center of the Great Mortuary. Therefore, the material in the collection comes from a context that did not entail the collection of provenience data, and what there is, is anecdotal. Therefore, the materials from commercial excavations at Spiro present two problems. The first is an ethical one in that the materials derive from commercial excavation (looting). Wylie (1995) has discussed the issue of looting and the fact that publication of looted materials adds commercial value to the artifacts, something that archaeologists wish to avoid. Second, the lack of contextual information makes these materials less than useful for many types of analyses—those dealing with mound structure or burial associations, for example. This problem may actually be less critical for material from Craig Mound than for other Mississippian burial contexts. Brown (1996:98–102) points out that the assemblages of materials within burial units at Spiro were in some cases probably already mixed, as a result of a mortuary practice that involved collecting and reburying earlier remains with later ones.

Even so, the materials in the NMNH collection are not without scientific utility (Sievert, 2003). The artifacts themselves can provide technological information concerning raw materials, manufacturing, and use. The extensive iconography displayed on the artifacts can be used to interpret social and ceremonial life. These data, in turn, can be used in researching questions of subsistence, technology, social interaction, regional integration, and religion. Although problematic on a site structural scale, when put into the larger framework of what happened

during the Late Mississippian period, the materials have a lot to say.

THE SPIRO COLLECTION AND MISSISSIPPIAN RESEARCH

Throughout the decade of the 1990s, foci for Mississippian research changed, with more emphasis on political economy, the structure of prestige systems, social interaction and integration, and religion. Research on the edges of the Mississippian world, from the perspectives of both geography and time (King and Meyers, 2002), has shown that manifestations of Mississippian society were far-reaching and influential, despite individual polities not always enjoying far-reaching regional influence. Although it is not the intent of this work to fully review late prehistoric research in the Caddoan area or the Southeast, it does seem appropriate to point out the relevance of a collection like this one to ongoing research into Mississippian society.

Part of what characterizes the late prehistoric period in eastern North America is far-reaching intercultural social interaction. Similarities in mound form and iconography indicate the spread of ideas over a wide area, from Wisconsin in the north to Florida in the south and from Oklahoma in the west to Virginia in the east. There is ample evidence for interaction in the form of trade, and this becomes apparent when looking at the artifact distribution maps developed by Brain and Phillips (1996). Some information on trade comes from style; other data can be gathered on the basis of source analyses. Because scientific methods for the analysis of materials are constantly improving, the Spiro collection will be useful continually. The source analysis done for the obsidian end scraper (catalog number 378273) collected by J. G. Braecklein in 1935 is a case in point. Energy dispersive X-ray fluorescence revealed a trace element signature that indicates the material came from the Pachuca obsidian source in Mexico (Barker et al., 2002). This result supports the notion that trade relations extended across a wide expanse, in this case to Mesoamerica. Petrographic analyses of lithic materials and chemical analyses of lithic, clay, and other minerals could prove invaluable for interpreting social interaction and integration on a wide scale. Furthermore, Spiro is itself a mound center located on the edge of the Mississippian world (Payne and Scarry, 1998:47). It retains connections to sites in the east but is poised on the edge of the Great Plains, perhaps brokering trade to and from the west (Rogers, 1991a, 1991b; Schambach, 1993). For this reason, an understanding of Spiro is critical to an understanding of trade relations throughout the western half of the Mississippian world.

The collection from Spiro can inform not only on matters of distant trade but also on social interaction at the site itself. Objects that were social in usage, such as pipes and cups (relatively common artifacts in the Craig Mound), were used not in solitary situations but in contexts involving more than one person. Pipe ceremonies such as the calumet of the historic period were ceremonies that extended social relations (Hall, 1997).

The materials from the Craig Mound—the wealth—indicate individuals of importance, perhaps a hereditary chiefly elite. Much of the research about the structure of political influence during the Mississippian (Barker and Pauketat, 1992) has been focused on Cahokia (Pauketat, 1993, 1994; Pauketat and Emerson, 1997; Milner, 1998). Spiro, a much smaller site with a smaller population yet possessing a remarkably appointed mortuary feature, makes an excellent counterpoint to the Middle Mississippian manifestation farther north.

Finally, archaeologists can expect more focus on the study of iconography and its meaning. As research becomes increasingly emic, the iconography found at Spiro and other sites throughout the southeast is taking on added dimension. It is likely that we are only beginning to appreciate the magnitude of the knowledge coded in the symbols and motifs of the Mississippian world.

Appendix A: Catalog Summary of Artifacts in the National Museum of Natural History Spiro Collection

ANALYTICAL PROCEDURE AND DATA LIST

The artifacts in the Spiro collection fit into one or more of seven raw material categories: lithic, ceramic, shell, metal, textile, bone, and wood. Listed below are some of the variables used for recording different kinds of objects and the methods employed for taking measurements.

Ceramics

Color. Paste colors were recorded using the Munsell Color system for the outer surface, the inner surface, and the core. In cases where the colors ranged among adjacent levels in tone or value, the hue was recorded along with the name of general color family. For black, it is difficult to assign a hue, so black was often referred to simply as black.

Wall Thickness. For rim sherds, wall thickness was measured consistently approximately 1 cm below the rim. For body sherds, which can vary widely, one measurement was taken at what appeared to be an average thickness. For base sherds, thickness was measured near the center of the base.

Size. For whole vessels, diameter and height were taken. For nonspherical vessels (i.e., elliptical bowls), length and width were noted. In the database, diameter and width occupy the same data field. In some cases single sherds were measured to indicate size, especially if it represented a large part of a vessel. In cases of partial pots, those dimensions that could be measured or estimated were recorded.

A separate subnumber was given to each separate grouping created to record multiple styles or elements within each catalog number.

Shell Cups

A separate data form was created for each fragment. In cases where fragments adhered to other fragments, the single fragment comprising the largest portion of the vessel was chosen, and the data form was made on the basis of that catalog number. In cases where the largest fragment derived from a lot with many artifacts and there was another fragment of the same cup that was assigned a unique catalog number, the data form was based on the unique fragment, thereby reducing the number of separate data forms created.

As with other artifact categories, information from catalog cards was recorded along with information taken directly from the artifacts themselves. Conservation cards kept with the collection included a compendium of ideas about and interpretations of motifs recognized in the shell engravings. Joan S. Gardner's notes (unpublished) on motifs represented were recorded, along with personal interpretations.

Basic measurements that were taken include length, width, and height of shells that were complete enough to suggest overall dimensions for the complete vessel or shell. Length was measured as the distance from apex to distal tip, width was the maximum distance across the opening, and height was recorded as the maximum height of the piece when resting on the shell opening. Dimensions for smaller fragments were also taken, but these were recorded as maximum or minimum dimensions, especially for lots containing more than one fragment. Weights of fragments and vessels were recorded.

In general, shell fragments were treated similarly to potsherds. Refitting is an aid to analysis in that it allows for the interpretation of more complete, discrete artifacts. In cases for which there is more than one fragment of a shell but they do not refit exactly, fragments will still be counted together under one data entry. For example, parent fragment 448816 has been refit to a small fragment of 448880 and an apical fragment from 448877. In addition, two other fragments, one each from 448877 and 448880, refit each other but do not exactly refit to 488816. Because they are considered by Phillips and Brown (1978, 1984) to have derived from the same shell, they will be counted as one shell. Unless fragments are treated in this way, the redundancy of design among segments of the same vessel will inflate the counting of the incidence of motif occurrence. Here Phillips and Brown (1978, 1984) were consulted in order to match portions of single shells. The term "parent" is used to refer to the largest portion of shell or the one having a unique catalog number, and it will be this parent fragment that will be given a data form. Other fragments included under the parent were listed in the section devoted to my comments.

Descriptions of design use an orientation with the distal end down, the apex up, and the shell lying on the aperture. Right and left designations used in descriptions refer to this orientation. What Phillips and Brown (1978) refer to as spire is referred to in the present study as apex. Inner always refers to the inner surface of the shell.

For incomplete vessels, width refers to minimum width in order to give a width measurement that would identify the piece but would not be presumed to constitute the actual width of the vessel. For fragments, maximum width is the maximum width of the largest fragment within a lot. Maximum length is the length of the longest fragment in a lot. Fragments were measured along the axis of the original shell, with length always referring to the shell axial length. Therefore, a piece might be wider than it is long. Measurements could not be taken for all fragments. However, maximum or minimum widths are sometimes given to indicate the general size of the artifacts. These maximum and minimum dimensions give an idea of the range of fragment sizes represented. These are not to be interpreted as vessel dimensions because such fragments rarely are complete enough to allow for estimating vessel length or width. Fragment counts are the total number of fragments including components of pieces which have been glued together (necessary because objects often comprise several NMNH catalog numbers). Weights were always taken, but in the case of combined fragment groupings, weights were added together.

All engraved shell cups and gorgets were examined and, if needed, conserved by Joan Gardner between 1974 and 1976. In 1992 the shells were in stable condition for the most part. Gardner described and recorded the condition of the shells in 1992. Shell condition can be ranked as follows.

- *Poor* condition implies a badly eroded, pitted, and porous surface. Chalking and flaking occur over 75% of the surface area.
- *Fair* condition implies eroded surfaces of flaky, chalking, and porous areas accounting for 50% of the surface.
- *Adequate* condition implies some fairly deteriorated spots affecting between 25% and 50% of the surface area.
- *Good* condition presents very solid surfaces overall, with few chalking or flaky areas.

- *Excellent* condition requires no flaking or chalky areas.

The history of the engraved shells prior to Gardner's treatment remains largely unknown. Gardner noted excess polyvinyl acetate (PVA), which had in many cases yellowed on the specimens. She removed excess PVA with acetone and reapplied a thinner coat. This thick coat of PVA may have been applied by the collectors. When Meyer's collection reached the Smithsonian in the late 1960s, Elizabeth Gibson was the conservator who examined and treated the collection. Given how yellowed Gardner found the shells, it seems unlikely that the PVA applied at the time of accession would have altered that drastically in the 6- to 15-year interval between Trowbridge's and Meyer's donations and 1974 when Gardner examined the collection. The collectors could easily have treated objects themselves, leaving 20 to 30 years for the PVA to become yellowed. Furthermore, we have no way of knowing exactly what type of conservative the collectors might have used, and therefore, they may have applied other sealants such as shellac or varnish, which would be expected to become yellow.

Joan Gardner reported treating three unengraved shells from the Trowbridge accession but stipulates only a specific two that she treated.

Textiles

Measurements are not exact, but are approximations. Rather than risk damaging fragments, textile fragments were measured on top of the glass or Plexiglas that covers them. In cases where there are several fragments, the largest in the group was measured. The dimensions therefore represent maximum dimensions. Weights were not taken for textiles because of the fragility of the artifacts. In most cases thickness was not measured. Width of the primary yarns or fibers used in both textiles and basketry was sampled. In the case of basket fragments, the length of the longest single strip present was measured.

The textile materials have undergone two major conservation efforts during the past 20 years. Joan Gardner worked with the collection in the mid-1970s. At that time she unfurled several of the bundles, cleaned and applied preservatives to fragments that had already been unfolded, and prepared new mounts for others. At the time she finished, there were still objects stored in Trowbridge's original boxes. In the early 1990s, Lynn Arden, contract conservator, prepared new box mounts: sturdy acid-free paperboard boxes with glass insets in the lids. The objects were placed in the mounts on foam that was covered with a smooth synthetic fabric. The artifacts are held in place by the lid, which places gentle pressure on the artifact, keeping it from shifting within the mount.

Condition of the textiles varies. Some are in excellent condition, meaning that they retain the integrity of the original textile and that color and weave are clearly visible. Others are highly fragmentary. Still others remain as bundles.

There has been some difficulty in maintaining the discrete nature of many of these textiles. For example, catalog numbers 423373 and 423372 contain many different fragments of twined tapestry done in multiple colors. Number 423373 represents pieces in Trowbridge's box labeled 2719. Unfortunately, over the years the integrity of his designations has been compromised, and in some cases, the linkage between Trowbridge's number and the correct fragment is unclear. Some bundles were unfolded during the 1970s, and the resulting fragments were sometimes placed in Plexiglas and sometimes not.

Baskets

Discrete fragments were counted within groupings when possible. Small fragments were grouped into lots.

Projectile Points

In his study of the artifacts from the Craig Mound, Brown (1976, 1996) used a variety of attributes to characterize the small projectile points and then created a key for point identification based on these attributes. Many of the same measurements were used in the present study.

Earspools

The following measurements were taken for pulley-shaped earspools.

1. Inner flange diameter is the diameter of the flange that forms the back of the spool. This is usually smaller than the front or outer flange.
2. Outer flange diameter is the diameter of the outer flange, the one meant to be seen. It is the outer flange that is often decorated.
3. Thickness is the maximum thickness of the entire spool.
4. Diameter of perforation can be used to separate the pulley ring forms from the pulleys having a narrow central bore.
5. Wall thickness is average flange thickness, measured 1 cm from the edge of the outer flange.

6. Pulley width is the core diameter measured between the flanges.

Beads

Shells that were cemented together were counted separately, so in some cases, the number in the lot will be higher than the total number of discrete pieces. Lot count is a minimum number of beads rather than a piece count.

Beads were so numerous that measurements on individual shell beads were in most cases not taken. In many cases, individual lots of beads number into the thousands. Rather than take individual measurements, groups within each morphological bead class were sorted by size, and representative measurements were then taken to arrive at an approximate mean for the group. For large lots, count was estimated by dividing the total weight by the weight of 100 beads, then multiplying by 100. It is estimated that the total count will be off by no more than 10% by using this method. For beads of generally rounded shape, the width measurement was consistently taken at the widest point. Beads that were rounded but not truly round in cross section were also measured at the widest point.

Pipes

Bore diameters were measured approximately 1 cm into the bore. Bowl diameter is the inside diameter of the bowl. In the case of unfinished pipe 423159, the bowl diameter represents the outer diameter. The width of the bowl is measured approximately 4 cm up from the base. This is generally the widest portion of the T-shaped pipe.

NOTE ON CATALOG SUPPLEMENT

There are 1464 separate analytical forms covering over 630 catalog numbers listed in the NMNH catalog. These forms, along with history forms for each catalog number, are contained in an extended catalog supplement kept in the Department of Anthropology collections management records. The catalog is the primary data source for this collection and can be utilized as a collection guide and analytical tool for studying the collection. There is one history form for each NMNH catalog number, along with one or more data forms. A single template was used to record historical information. Alternate data collection templates were used in order to accommodate different material types and manufactured goods. The history form contains historical information about the pieces, including extra conservation notes and descriptions made by Joan Gardner. The data forms present information collected by the author of the present study.

Inventory of Data Forms

Table A.1 presents a summary of the collection listed by catalog number. This summary serves as a quick reference source and as an inventory of data forms. Data forms generated in the database are listed by catalog number followed by subnumbers and abbreviations indicating material types. Also included are object name (which may differ from the object name recorded in the NMNH electronic database), style (usually abbreviated), count, raw material, and template code.

TABLE A.1. Summary of artifacts in the Spiro collection. Material type codes are as follows: T, textile; S, shell; L, lithic; C, ceramic; M, metal; B, bone; W, wood; O, other. Other abbreviations are S Point, small projectile point; L Point, large projectile point; Lg Biface, large biface; frag, fragment; Convexo-cylin, convexo-cylindrical; Concavo-cylin, concavo-cylindrical; Undesig., undesignated; Micac., micaceous.

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
378240	s01	T	Cordage	Braid	1	
378240	s02	T	Cloth	Spaced weft twining	1	
378240	s03	T	Cordage	Wrapped warp	1	
378240	s04	T	Cordage	Wrapped warp barrel-shaped	2	
378240	s05	T	Cordage	Braid	2	
378240	s06	T	Sample	Slide	2	
378240	s07	T	Sample	Slide	8	

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
378242		S	Cup	Unengraved	1	Shell
378243	s01	S	Cup	Unengraved	1	Shell
378243	s02	S	Cup	Unengraved	1	Shell
378243	s03	S	Cup	Unengraved	2	Shell
378243	s04	S	Cup	Unengraved	1	Shell
378244		S	Pendant	Columella	2	Shell
378245		S	Worked shell	Unengraved	1	Shell
378246		S	Gorget	Type 9	1	Univalve
378247	s01	S	Cup	Unengraved	1	Cassis
378247	s02	S	Cup	Unengraved	1	Cassis
378248		S	Cup	Unengraved	1	Univalve
378249		S	Pendant	Unengraved	1	Shell
378250	s01	S	Bead	Gastropod	3	Snail
378250	s02	S	Bead	Gastropod	1	Freshwater snail
378250	s03	S	Bead	Gastropod	2	Freshwater snail
378250	s04	S	Bead	Gastropod	1	Freshwater Snail
378251		S	Bead	Marginella	10	Univalve
378252		S	Bead	*Olivella*	45	Shell
378253	s01	S	Bead	Hexagonal	2	Shell
378253	s02	S	Bead	Convexo-bowed	4	
378253	s03	S	Bead	Convexo-bowed	1	
378254	s01	S	Bead	Cylindrical	1	Shell
378254	s02	S	Bead	Cylindrical	1	Shell
378254	s03	S	Bead	Convexo-cylin	6	Shell
378254	s04	S	Bead	Spherical	1	Shell
378254	s05	S	Bead	Convexo-cylin-columella	1	Shell
378254	s06	S	Bead	Convexo-cylin-columella	1	Shell
378255	s01	S	Bead	Disc	1	
378255	s02	S	Bead	Disc	1	
378255	s03	S	Bead	Elliptical	2	
378255	s04	S	Bead	Elliptical	1	Pearl
378255	s05	S	Bead	Elliptical	1	Shell
378256	s01	S	Bead	Cylindrical	15	Shell
378256	s02	S	Bead	Elliptical	16	Shell
378256	s03	S	Bead	Disc	440	Shell
378256	s04	S	Bead	Disc	278	Shell
378256	s05	S	Bead	Disc	23	Shell
378256	s06	S	Bead	Disc	92	Shell
378256	s07	S	Bead	Elliptical	30	Shell
378256	s08	S	Bead	Spherical	20	Shell
378257	s01	S	Bead	Convexo-cylin	61	Shell
378257	s02	S	Bead	Convexo-cylin	398	Shell
378257	s03	S	Bead	Convexo-cylin	10	Shell
378257	s04	S	Bead	Convexo-cylin	5	Shell
378257	s05	S	Bead	Convexo-cylin	1	Shell
378257	s06	S	Bead	Spherical	5	Shell
378258	s01	S	Bead	Bulging	1	Shell
378258	s02	S	Bead	Bulging	4	Shell
378259		S	Bead	Concavo-cylin	4	Shell
378260		S	Bead	Spherical pearl	104	Pearl
378261		L	Bead	Cylindrical	1	Phosphate
378262		S	Gorget	Type 1	1	Shell
378263		S	Pendant	Carved	1	
378264		B	Pendant	Tooth	1	Antler
378265		S	Worked frag	Inset	1	
378266		M	Bead	Fraudulent-disc	4	Copper
378267		M, T, O	Sheet	Unclassified	11	Copper
378268		M	Pin	Fraudulent	2	Copper
378269		L	Earspool	Unperforated	2	Limestone
378270		L	Cube	Unmodified	1	Galena
378271	s01	L	S Point	Unclassified	1	Chert

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
378271	s02	L	S Point	Ashley	1	Chert
378271	s03	L	S Point	Fresno	1	Chert
378271	s04	L	S Point	Massard	1	Chert
378271	s05	L	S Point	Unclassified	1	Chert
378272		L	L Point	Lange	1	Chert
378273		L	Scraper	Uniface	1	Obsidian
379212		B	Awl		1	Os penis
379213		B	Awl		1	Long bone
379214		B	Pin	Tapering	7	Bone
379215		C	Pipe	Red River	2	Clay
379216		S	Bead	Concavo-cylin	1	
379217	s01	S	Bead	Disc	5	Shell
379217	s02	S	Bead	Convexo-cylin	4	Shell
379217	s03	S	Bead	Concavo-cylin	1	Shell
379218	s01	S	Bead	Disc	1	Siltstone
379218	s02	L	Bead	Disc	1	Phosphate
379218	s03	L	Bead	Disc	1	Sandstone
379218	s04	L	Bead	Disc	1	Sedimentary
379218	s05	L	Bead	Disc	1	Sedimentary
379218	s06	L	Bead	Convexo-cylin	1	Phosphate sphericalate
379218	s07	L	Bead	Disc	1	Sedimentary
379218	s08	L	Bead	Disc	1	Sedimentary
386185	s01	T, M	Basket	Twill	1	Wicker
386186		T	Basketry	Twill	1	
386187	s01	T	Cloth	Tapestry	1	
386188	s01	T, O	Cordage	Strand	2	Hair
386188	s02	T, O	Cloth	Wrapped warp	3	Feather
386188	s03	T, O	Cordage	Tapestry	1	Hair
386188	s04	T, O	Sample	Slide	1	Feather
397718	s01	S	Bead	Convexo-cylin	106	
397718	s02	S	Bead	Disc	105	
397719		M	Pin	Fraudulent	2	Copper
407190		S	Shell cast		1	Plaster
417938	s01	C	Sherd	Williams Plain	10	Clay
417938	s02	C	Sherd	Leflore Plain	5	Clay
417938	s03	C	Sherd	Sanders Plain	1	Clay
417938	s04	C	Sherd	Woodward Plain	3	Clay
417938	s05	L	Pipe	Unclassified	1	Sandstone
417939	s01	L	Lg Biface	Ovoid A	1	Chert
417939	s02	L	L Point	Gary	1	Chert
417940		L	Mano	Pitted	1	Sandstone
417941		S	Bead	Disc	1	Shell
423144		C	Vessel	Smithport Plain	1	Clay
423145		C	Vessel	Redware-Coles Creek variation	1	Clay
423146		C	Vessel	Sanders Plain	1	Clay
423147		C	Vessel	Crockett Curvilinear Incised	1	Clay
423148		C	Vessel	White Engraved	1	Clay
423149		L	Vessel	Effigy	1	Marble
423150		L	Vessel	Effigy	1	Marble
423151	s01	C	Sherd	Sanders Plain	1	Clay
423151	s02	C	Sherd	Sanders Plain	1	Clay
423151	s03	C	Sherd	Williams Plain	1	Clay
423151	s04	C	Sherd	Sanders Plain	1	Clay
423151	s05	C	Sherd	Undesig. Plain Grog	1	Clay
423151	s06	C	Sherd	Williams Plain	1	Clay
423151	s07	C	Sherd	Southwestern	6	Clay
423151	s08	C	Sherd	Unclassified	3	Clay
423151	s09	C	Sherd	Polychrome	1	Clay
423151	s10	C	Sherd	Glazed	1	Clay
423152		L	Pipe	Effigy-Irregular	1	Catlinite

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
423154		L	Pipe	T-shaped, cylindrical bowl or Chandler	1	Siltstone/ sandstone
423155	s01	L	Pipe	T unclassified	1	Siltstone
423155	s02	C	Pipe	Unclassified	1	Clay
423155	s03	L	Pipe	T-shaped, unclassified	1	Siltstone
423155	s04	L	Pipe	T-shaped, unclassified	1	Siltstone
423156		L	Pipe	Elbow	1	Siltstone
423157		L	Pipe	T-shaped, cylindrical bowl	1	Siltstone
423158		L	Pipe	T-shaped, cylindrical bowl	3	Siltstone
423159		L	Pipe	T-shaped, cylindrical/contracting	1	Siltstone
423160		L	Pipe	Effigy	1	Limestone
423161		L	Earspool	Perforated	1	Sandstone
423162		L	Earspool	Perforated	1	Sandstone
423163		L	Earspool	Perforated	1	Sandstone
423164		L	Earspool	Perforated	1	Limestone
423165		L	Earspool	Divided flange	1	Limestone
423166		L	Pendant	Center perforated	1	Siltstone
423167		L	Pendant	Perforated at end	1	Coal
423168		L	Pendant	Perforated at end	1	Chert
423169	s01	L	Bead	Cylindrical	1	Phosphate
423169	s02	S	Bead	Convexo-cylin	1	Shell
423169	s03	S	Bead	Convexo-cylin	1	Shell
423169	s04	S	Bead	Convexo-cylin	1	Shell
423169	s05	L	Bead	Convexo Disc	1	Phosphate
423170	s01	L	Lg Biface	Celt form	1	Novaculite
423170	s02	L	Lg Biface	Celt form	1	Novaculite
423170	s03	L	Lg Biface	Celt form	1	Chert
423171		L	Lg Biface	Fusi-elliptical or Ramey	1	Quartzite
423172	s01	L	Lg Biface	Sword form, Duck River	1	Chert
423173		L	Lg Biface	Celt	1	Chert
423174	s01	L	Lg Biface	Sword form, general	1	Chert
423174	s02	L	Lg Biface	Hoe	1	Chert
423174	s03	L	Lg Biface	Sword form, general	1	Chert
423174	s04	L	Lg Biface	Sword form, Duck River	1	Chert
423174	s05	L	Lg Biface	Sword form, Duck River	1	Chert
423174	s06	L	Lg Biface	Unclassified	1	Chert
423174	s07	L	Lg Biface	Sword form, Duck River	1	Chert
423174	s08	L	Lg Biface	Sword form, Duck River	1	Chert
423175	s01	L	L Point	Lange	1	Chert
423175	s02	L	Lg Biface	Kay (like)	1	Chert
423176		L	L Point	Lange	1	Chert
423177		L	Lg Biface	Unclassified	1	Chert
423178		L	Lg Biface	Ovoid A	1	Chert
423179		L	Lg Biface	Ovoid irregular	1	Novaculite
423180		L	Lg Biface	Preform	1	Novaculite
423181	s01	L	S Point	Agee	1	Novaculite
423181	s02	L	S Point	Massard	1	Novaculite
423182	s01	L	S Point	Agee	1	Novaculite
423182	s02	L	S Point	Agee	1	Novaculite
423182	s03	L	S Point	Agee	1	Novaculite
423183	s01	L	S Point	Massard	1	Chert
423183	s02	L	S Point	Reed	1	Chert
423183	s03	L	S Point	Massard	1	Calcedony
423184		L	S Point	Sequoyah	1	Novaculite
423185	s01	L	S Point	Agee	1	Chert
423185	s02	L	S Point	Morris	1	Chert
423186		L	S Point	Agee	1	Novaculite
423187		L	S Point	Ashley Chocoville	1	Chert
423188		L	S Point	Agee	1	Quartz crystal
423189		L	L Point	Johnson	1	Chert
423190	s01	L	L Point	Unclassified side notch	1	Chert

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
423190	s02	L	L Point	Expanding B	1	Chert
423191	s01	L	Drill	Expanding	1	Novaculite
423191	s02	L	S Point	Uniface	1	Chert
423191	s03	L	Lg Biface	Sword form	1	Siltstone
423191	s04	L	Uniface	Projection	1	Quartz crystal
423192	s01	L	S Point	Agee	1	Novaculite
423192	s02	L	S Point	Agee	1	Novaculite
423192	s03	L	S Point	Agee	1	Chert
423192	s04	L	S Point	Agee	1	Chert
423192	s05	L	S Point	Agee	1	Unknown
423192	s06	L	S Point	Agee	1	Chert
423192	s07	L	S Point	Agee	1	Chert
423192	s08	L	S Point	Agee	1	Jasper
423192	s09	L	S Point	Agee	1	Chert
423192	s10	L	S Point	Scallorn	1	Chert
423192	s11	L	S Point	Scallorn	1	Novaculite
423192	s12	L	S Point	Scallorn	1	Chert
423192	s13	L	S Point	Unclassified corner notch	1	Chert
423192	s14	L	S Point	Unclassified corner notch	1	Chert
423192	s15	L	S Point	Unclassified corner notch	1	Chert
423192	s16	L	S Point	Maud	1	Chert
423192	s17	L	S Point	Ashley	1	Chert
423192	s18	L	S Point	Ashley	1	Jasper
423192	s19	L	S Point	Hayes	1	Jasper
423192	s20	L	S Point	Hayes	1	Jasper (banded)
423192	s21	L	S Point	Hayes	1	Chert
423192	s22	L	S Point	Hayes	1	Jasper
423192	s23	L	S Point	Alba	1	Chert
423192	s24	L	S Point	Perdiz	1	Chert
423192	s25	L	S Point	Perdiz	1	Chert
423192	s26	L	S Point	Perdiz	1	Chert
423192	s27	L	S Point	Perdiz	1	Chert
423192	s28	L	S Point	Perdiz	1	Chert
423192	s29	L	S Point	Perdiz	1	Chert
423192	s30	L	S Point	Bonham Tahlequah	1	Chert
423192	s31	L	S Point	Alba	1	Chert
423192	s32	L	S Point	Hayes	1	Chert
423192	s33	L	S Point	Hayes	1	Jasper
423192	s34	L	S Point	Ashley	1	Novaculite
423192	s35	L	S Point	Hayes	1	Chert
423192	s36	L	S Point	Martindale	1	Chert
423192	s37	L	S Point	Haskell	1	Chert
423192	s38	L	S Point	Washita Peno	1	Chert
423192	s39	L	S Point	Scallorn	1	Novaculite
423192	s40	L	S Point	Reed/Keota variety	1	Novaculite/ chert
423192	s41	L	S Point	Massard	1	Chert
423192	s42	L	S Point	Massard	1	Chert
423192	s43	L	S Point	Scallorn	1	Chert
423192	s44	L	S Point	Reed/Keota variety	1	Novaculite
423192	s45	L	S Point	Reed/Keota variety	1	Chert
423192	s46	L	S Point	Reed	1	Chert
423192	s47	L	S Point	Reed	1	Chert
423192	s48	L	S Point	Reed	1	Chert
423192	s49	L	S Point	Keota	1	Chert
423192	s50	L	S Point	Reed	1	Chert
423192	s51	L	S Point	Reed/Keota variety	1	Chert
423192	s52	L	S Point	Reed	1	Novaculite
423192	s53	L	S Point	Reed	1	Novaculite
423192	s54	L	S Point	Scallorn	1	Chert
423192	s55	L	S Point	Reed/Keota variety	1	Chert

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
423192	s56	L	S Point	Keota	1	Chert
423192	s57	L	S Point	Reed	1	Chert
423192	s58	L	S Point	Reed	1	Chert
423192	s59	L	S Point	Scallorn	1	Chert
423192	s60	L	S Point	Scallorn	1	Chert
423192	s61	L	S Point	Collier	1	Novaculite
423192	s62	L	S Point	Keota	1	Chert
423192	s63	L	S Point	Scallorn	1	Chert
423192	s64	L	S Point	Reed/Keota variety	1	Novaculite
423192	s65	L	S Point	Reed/Keota variety	1	Chert
423192	s66	L	S Point	Reed/Keota variety	1	Novaculite
423192	s67	L	S Point	Reed/Keota variety	1	Novaculite
423192	s68	L	S Point	Keota	1	Chert
423192	s69	L	S Point	Reed/Keota variety	1	Chert
423192	s70	L	S Point	Alba	1	Chert
423192	s71	L	S Point	Reed/Keota variety	1	Chert
423193	s01	L	Drill	Unclassified	1	Chert
423193	s02	L	Drill	Expanding	1	Chert
423194		L	Celt	Shouldered spade	1	Chert
423195		L	Mace	Type 5	1	Chert
423196		L	Mace	Unclassified	1	Chert
423197		L	Mace	Type 2	1	Chert
423198		L	Mace	Type 1	1	Chert
423200		L	Celt	Unclassified	1	Sedimentary
423201		L	Celt	Elongate	1	Sedimentary
423202		L	Abrader	Polishing stone	1	Hematite
423203		L	Abrader	Polishing stone	1	Quartzite
423204		L	Mano	Pitted	1	Quartzite
423205		L	Abrader	Sharpener	1	Sandstone
423206		L	Abrader	Shaft abrader	1	Igneous?
423207	s01	L	Galena	Nodule	1	Galena
423207	s02	L	Galena	Nodule	1	Galena
423207	s03	L	Galena	Nodule	1	Galena
423207	s04	L	Galena	Worked	1	Galena
423208		L	Quartz	Unmodified	1	Quartz crystal
423209	s01	O	Pigment	Worked	[a]	Ocher
423209	s02	O	Pigment	Chunk	1	Ocher
423210		L	Slag	Unmodified	1	Ash/bone/glass
423211		L	Quartz	Crystal	1	Quartz crystal
423212		L	Mineral lump		1	Micac. sandstone
423213		L	Pigment	Powder	1	Ocher
423214		L	Pigment	Unmodified	15	Glauconite
423215		L	Mica	Worked	3	Mica
423216		M	Bead	Fraudulent-disc	20	Copper
423217		M	Pin	Fraudulent	4	Copper
423218	s01	M	Sheet	Plume?	1	Copper
423218	s02	M	Sheet	Unclassified	9	Copper
423219		M, T	Sheet	Unclassified	3	Copper
423220		M	Sheet	Unclassified	1	Copper
423221	s01	M	Sheet	Perforated	1	Copper
423221	s02	M	Sheet	Perforated	5	Copper
423221	s03	B	Sheet	Perforated	2	Bone
423221	s04	M	Sheet	Embossed	12	Copper
423222		M	Sheet	Embossed	70	Copper
423223		M, T	Sheet		1	Copper
423224	s01.1	M, T, S	Sheet	Composites	6	Copper
423224	s01.2	M, T, S	Basket	Twill	5	Wicker
423225	s01	M, T	Sheet	Unclassified	10	Copper
423225	s02	M, T	Sheet	Unclassified	4	Copper
423226	s01.1	M	Composite	Disc	1	Copper
423226	s01.2	S	Bead	Disc	1	Shell

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
423227	s01.1	M, T, S, W	Composite	Unclassified	6	Copper
423227	s01.2	S	Bead	Columella	3	Shell
423227	s01.3	T	Mat	Twill	1	Wicker
423227	s01.4	T	Cordage	2 ply Z-twist	1	Fiber
423228	s01	S	Cup	Unengraved	1	Univalve
423228	s02	S	Cup	Unengraved	1	Univalve
423228	s03	S	Cup	Unengraved	1	Univalve
423228	s04	S	Cup	Unengraved	1	Univalve
423228	s05	S	Cup	Unengraved	1	Univalve
423228	s06	S	Cup	Unengraved	1	Univalve
423228	s07	S	Cup	Unengraved	1	Univalve
423228	s08	S	Cup	Unengraved	1	Univalve
423228	s09	S	Cup	Unengraved	1	Univalve
423228	s10	S	Cup	Unengraved	1	Univalve
423228	s11	S	Cup	Unengraved	1	Univalve
423228	s12	S	Cup	Unengraved	1	Univalve
423228	s13	S	Cup	Unengraved	1	Univalve
423228	s14	S	Cup	Unengraved	1	Univalve
423228	s15	S	Cup	Unengraved	1	Univalve
423228	s16	S	Cup	Unengraved	1	Univalve
423228	s17	S	Cup	Unengraved	1	Univalve
423228	s18	S	Cup	Unengraved	1	Univalve
423228	s19	S	Cup	Unengraved	1	Univalve
423228	s20	S	Cup	Unengraved	1	Univalve
423228	s21	S	Cup	Unengraved	1	Univalve
423228	s22	S	Cup	Unengraved	1	Univalve
423228	s23	S	Cup	Unengraved	1	Univalve
423228	s24	S	Cup	Unengraved	1	Univalve
423228	s25	S	Cup	Unengraved	1	Univalve
423228	s26	S	Cup	Unengraved	1	Univalve
423228	s27	S	Cup	Unengraved	1	Univalve
423228	s28	S	Cup	Unengraved	1	Univalve
423228	s29	S	Cup	Unengraved	1	Univalve
423228	s30	S	Cup	Unengraved	1	Univalve
423228	s31	S	Cup	Unengraved	1	Univalve
423229	s01	S	Cup	Unengraved	4	Univalve
423229	s02	S	Cup	Unengraved	1	Shell
423230	s01	S	Cup	Unengraved	1	Shell
423230	s02	S	Cup	Unengraved	1	Shell
423231		S	Pendant	Drop	1	Shell
423232	s01	S, T	Cup	Unengraved	1	Univalve
423232	s02	S, T	Cup	Unengraved	1	Univalve
423232	s03	S	Cup	Unengraved-sculptured	1	Univalve
423232	s04	S, T	Cup	Unengraved	1	Univalve
423233	s01.1	S, T	Cup	Unengraved	1	Univalve
423233	s01.2	S, T	Cordage	2-ply Z-twist	1	
423234		S	Cup	Craig C	1	Univalve
423235		S	Cup	Braden B	1	Univalve
423236		S	Cup	Craig B	1	Univalve
423237		S	Cup	Braden C	1	Univalve
423238		S	Cup	Craig C	1	Univalve
423239		S	Cup	Craig C	1	Univalve
423240		S	Cup	Braden C	1	Univalve
423241		S	Cup	Craig C	1	Univalve
423242		S	Cup	Braden C	1	Univalve
423243		S	Cup	Craig C	1	Univalve
423244		S	Cup	Braden C	1	Univalve
423245		S	Cup	Craig C	1	Univalve
423246		S	Cup	Craig C	1	Univalve
423247		S	Cup	Craig C	1	Univalve
423248		S	Cup	Craig B	1	Univalve

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
423249		S	Cup	Braden B	1	Univalve
423250		S	Cup	Braden C	1	Univalve
423251		S	Cup	Craig B	2	Univalve
423252		S	Cup	Braden C	1	Univalve
423253		S	Cup	Craig C	1	Univalve
423254		S	Cup	Craig B	1	Univalve
423255	s01	S	Cup	Craig B	1	Univalve
423256		S	Cup	Craig C	1	Univalve
423257		S	Cup	Braden B	2	Univalve
423258		S	Cup	Craig B	2	Univalve
423259		S	Cup	Braden C	2	Univalve
423260		S	Cup	Braden B	1	Univalve
423261		S	Cup	Craig B	1	Univalve
423262		S	Cup	Craig C	1	Univalve
423263		S	Cup	Braden B	1	Univalve
423264		S	Cup	Craig B	2	Univalve
423266		S	Cup	Braden B	1	Shell
423267		S	Cup	Craig C	1	Univalve
423268		S	Cup	Unclassified	1	Univalve
423269		S	Cup	Braden C	1	Univalve
423270		S	Cup	Craig B	1	Univalve
423271		S	Cup	Craig B	1	Univalve
423273		S	Cup	Craig C	1	Univalve
423274		S	Cup	Braden A	1	Univalve
423276		S	Cup	Craig B	1	Univalve
423277		S	Cup	Braden B	1	Univalve
423279		S	Cup	Craig A	5	Univalve
423281		S	Cup	Braden B	2	Univalve
423282		S	Cup	Craig C	1	Univalve
423283		S	Cup	Craig C	1	Univalve
423284		S	Cup	Craig B	1	Univalve
423285		S	Cup	Unclassified	1	Univalve
423287		S	Cup	Craig B	2	Univalve
423288		S	Cup	Craig A	1	Univalve
423289		S	Cup	Craig B	1	Univalve
423290		S	Cup	Craig B	2	Univalve
423291		S	Cup	Braden B	2	Univalve
423292		S	Gorget	Craig B, type 1	2	Univalve
423293		S	Gorget	Craig A, type 2	1	Univalve
423294		S	Gorget	Type 5	1	Univalve
423295		S	Gorget-mask	Type 7	3	Shell
423296		S	Cup	Craig A	3	Univalve
423298	s01	S	Cameo	Maskette	1	Shell
423299		S	Cameo	Maskette	1	Shell
423300		S	Cameo	Maskette	1	Shell
423301		S	Cameo	Maskette	1	Shell
423302	s01	S	Worked shell	Unengraved	1	Univalve
423302	s02	S	Object	Unmodified	1	Shell
423303		S, B	Bead	Disc	3	Shell
423304		S	Barnacle	Unmodified	1	Shell
423305	s01	S	Pendant	Columella	1	Shell
423305	s02	S	Pendant	Columella	1	Shell
423305	s03	S	Pendant	Columella	1	Shell
423305	s04	S	Pendant	Columella	1	Shell
423305	s05	S	Pendant	Columella	1	Shell
423305	s06	S	Pendant	Columella	1	Shell
423305	s07	S	Pendant	Columella	1	Shell
423305	s08	S	Bead	Disc	6	Shell
423305	s09	S	Pendant	Columella	1	Shell
423305	s10	S	Pendant	Columella	1	Shell
423305	s11	S	Pendant	Columella	1	Shell

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
423305	s12	S	Pendant	Columella	1	Shell
423305	s13	S	Pendant	Columella	1	Shell
423305	s14	S	Pendant	Columella	1	Shell
423305	s15	S	Pendant	Columella	1	Shell
423305	s16	S	Pendant	Columella	1	Shell
423305	s17	S	Pendant	Columella	1	Shell
423305	s18	S	Pendant	Columella	1	Shell
423305	s19	S	Pendant	Columella	1	Shell
423305	s20	S	Pendant	Columella	1	Shell
423305	s21	S	Pendant	Columella	1	Shell
423305	s22	S	Pendant	Columella	1	Shell
423306	s01	S, M	Bead	Spherical	1	Shell
423306	s02	S	Bead	Disc	1	Shell
423307	s01.1	S, T	Bead	Elliptical	7	Shell
423307	s01.2	T	Cordage	2-ply S-twist	1	Fiber
423308	s01	S	Gorget	Type 9	1	Univalve
423308	s02	S	Bead	Disc	31	Shell
423308	s03	S	Bead	Baroque	1	Pearl
423308	s04	S	Sediment		1	Unknown
423309	s01	S	Bead	Disc	31	Shell
423309	s02	S	Bead	Disc	1,020	Shell
423310		S	Bead	Disc	2	Shell
423311		S	Bead	Convexo disc	2	Shell
423312		S	Disk	Disc	1	Shell
423313		S	Bead	Concavo disc	64	Shell
423314	s01	S	Bead	Spherical-columella	23	Shell
423314	s02	S	Bead	Spherical-columella	48	Shell
423315		S	Bead	Spherical	1	Shell
423316	s01	S	Bead	Cylindrical	478	Shell
423316	s02	S	Bead	Cylindrical	36	Shell
423317	s01	S	Bead	Convexo-cylin	81	Shell
423317	s02	S	Bead	Disc	13	Shell
423318	s01	S	Bead	Concavo	117	Shell
423318	s02	S	Bead	Convexo-cylin	5	Shell
423319		S	Bead	Concavo	6	Shell
423320		S	Bead	Convexo-cylin	16	Shell
423321		S	Bead	Convexo-cowed	53	Shell
423322		S	Bead	Convexo-cylin-columella	8	Shell
423323	s01	S	Bead	Convexo-cylin-sculptured	1	Univalve
423323	s02	S	Bead	Convexo-cylin-columella	2	Shell
423324	s01	S	Bead	Convexo-cylin	42	Shell
423324	s02	S	Bead	Disc	42	Shell
423324	s03	S	Bead	Olivella	1	Shell
423325	s01	S	Bead	Disc	52	Shell
423325	s02	S	Bead	Convexo-bowed	2	Shell
423325	s03	S	Bead	Convexo-cylin-columella	1	Univalve
423325	s04	S	Bead	Convexo-cylin	17	Shell
423325	s05	S	Bead	Concavo	1	Shell
423325	s06	S	Bead	Spherical-columella	2	Univalve
423325	s07	S	Bead	Disc	6	Shell
423325	s08	S	Bead	Spherical	12	Shell
423325	s09	S	Bead	*Olivella*	2	Shell
423326	s01	S	Bead	Concavo	4	Shell
423326	s02	S	Bead	Convexo-bowed	6	Shell
423326	s03	S	Bead	Convexo-cylin-columella	1	Univalve
423326	s04	S	Bead	Spherical-columella	2	Univalve
423326	s05	S	Bead	Spherical	7	Shell
423326	s06	S	Bead	Convexo-cylin-columella	9	Univalve
423326	s07	S	Bead	Convexo-cylin-columella	55	Univalve
423327		S	Bead	Bulging	108	Shell
423328		S	Bead	Bulging-columella	1	Univalve

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
423329	s01	S	Bead	Tooth	3	Shell
423329	s02	S	Bead	Convexo disc	1	Shell
423329	s03	S	Bead	Elliptical	3	Shell
423329	s04	S	Bead	Spherical	1	Shell
423330	s01	S	Bead	Disc	5,715	Shell
423330	s02	S	Bead	Convexo-cylin	1,545	Shell
423330	s03	S	Bead	Spherical	28	Shell
423330	s04	S	Bead	Spherical pearl	2	Pearl
423330	s05	S	Bead	*Olivella*	4	Shell
423330	s06	B, W, O	Sediment		30	Bone
423330	s07	S	Bead	Marginella	1	Shell
423330	s08	S	Bead	Elliptical	5	Shell
423331	s01	S	Bead	Olivella	2,750	Shell
423331	s02	O	Sediment		1	Soil/bone/ wood
423331	s03	L	Galena	Nodule	1,400	Galena
423331	s04	S	Bead	Disc	980	Shell
423331	s05	S	Bead	Disc-thin	96	Shell
423331	s06	S	Bead	Convexo-cylin	4	Shell
423331	s07	S	Bead	Cylindrical	55	Shell
423331	s08	L	Mica	Unmodified	3	Mica
423331	s09	L	Quartz	Unmodified	32	Quartz
423332		S	Bead	Spherical pearl	94	Pearl
423333		S	Bead	Spherical pearl	8	Pearl
423334		S	Bead	Spherical pearl	99	Pearl
423335		S	Bead	Baroque	10	Pearl
423336		S	Bead	Spherical pearl	5	Pearl
423337	s01	S	Bead	Spherical pearl	18	Pearl
423337	s02	S	Bead	Convexo-cylin-sculptured	2	Pearl
423337	s03	S	Bead	Tooth	1	Pearl
423338		S	Bead	Baroque	63	Pearl
423339		S	Bead	Baroque	118	Pearl
423340		S	Bead	Baroque	1	Pearl
423341		B	Pendant	Drop	1	Bird
423342		B	Pin	Tapering	1	Bone
423343		B	Gorget	Irregular	1	Scapula
423344–423351 [b]						
423352	s01	T	Cloth	Spaced weft twining	1	Hair
423352	s02	T	Cordage	Fiber	1	Hair
423352	s03	T	Cordage	Braid-tassel	1	Hair
423352	s04	T	Cordage	Strand	1	
423353	s01	T	Cloth mantle	Spaced weft twining	1	Hair
423353	s02	T	Sample	Slide	1	
423354	s01	T	Cloth mantle	Spaced weft twining	1	Hair
423354	s02	T	Cordage	Strand	1	Hair
423354	s03	T	Sample	Slide	1	
423355		T	Cloth mantle	Spaced weft twining	1	Hair
423356	s01	T	Cloth	Spaced weft twining	1	Hair
423356	s02	T	Cloth	Spaced weft twining	1	Hair
423356	s03	T	Cordage	Strand	1	Hair
423357	s01	T	Cloth	Spaced weft twining	1	Hair
423357	s02	T	Cordage	Strand	1	Hair
423358	s01	T	Cloth	Simple weave	1	Hair
423358	s02	T	Cordage	Strand	1	Hair
423358	s03	T	Cordage	Strand	1	Hair
423358	s04	T	Sample		2	
423359		T	Cloth	Spaced weft twining	1	Hair
423360		T	Cloth bundle	Spaced weft twining	1	Hair
423360	s02	T	Sample	Slide	1	
423361		T	Cloth bundle	Spaced weft twining	1	Hair

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
423362		T	Cloth bundle	Spaced weft twining	1	
423363	s01	T	Cloth bundle	Spaced weft twining	1	
423363	s02	T	Sample	Slide	1	
423364		T	Cloth bundle	Spaced weft twining	2	Hair
423365		T	Cloth bundle	Wrapped warp	6	Feather
423366		T	Bundle	Spaced weft twining	5	
423367	s01	T	Cloth bundle	Wrapped warp	1	Feather
423367	s02	T	Cloth bundle	Wrapped warp	1	Feather
423367	s03	T	Cloth bundle	Spaced weft twining	1	Hair
423367	s04	T	Cloth bundle	Wrapped warp	1	Feather
423367	s05	T	Sample	Strand	1	
423367	s06	T	Cloth	Unclassified	2	
423367	s07	T	Cloth	Spaced weft twining	1	
423368	s01	T	Cloth	Spaced weft/wrapped warp	6	
423368	s02	T	Cloth	Wrapped warp	6	Feather
423369	s01	T	Cloth	Wrapped warp	8	Feather
423369	s02	T	Cloth	Spaced weft twining	6	
423369	s03	T	Cloth	Spaced weft twining	7	Vegetal
423369	s04	T	Cloth	Spaced weft twining	2	Hair
423369	s05	T	Cordage	Braid-tassel	2	Hair?
423369	s06	T	Cloth	Wrapped warp	2	Feather
423370	s01	T	Cloth	Wrapped warp	2	Feather
423370	s02	T, O	Cordage, cloth	Wrapped warp, braid	8	Feather
423371	s01	T	Cloth	Wrapped warp	8	Feather
423371	s02	T	Cloth	Wrapped warp	9	Feather
423371	s03	T	Cloth	Wrapped warp	8	Feather
423372	s01	T	Cloth	Tapestry	1	Hair
423372	s02	T	Cloth	Tapestry	2	Feather
423372	s03	T	Cordage	Wrapped basketry	1	Hair
423372	s04	T	Cloth	Tapestry	2	
423372	s05	T	Cloth	Tapestry, wrapped warp	9	Hair
423372	s06	T	Cordage	Wrapped basketry	3	Hair
423372	s07	T	Cloth	Wrapped warp	1	Feather
423372	s08	T	Cloth	Tapestry	2	Hair
423372	s09	T	Cloth	Spaced weft twining	1	Hair
423372	s10	T	Cloth	Wrapped warp	1	Feather
423372	s11	T	Cloth	Tapestry	2	Hair
423372	s12	T	Cloth	Tapestry	1	Hair
423372	s13	T	Cloth	Tapestry	1	Hair
423372	s14	T	Sample		1	Hair
423373	s01	T	Cloth	Tapestry	1	Hair
423373	s02	T	Cloth	Tapestry	1	
423373	s03	T	Cloth	Tapestry	5	Hair
423373	s04	T	Cloth	Tapestry	3	Hair
423373	s05	T	Cloth	Tapestry	2	Hair
423373	s06	T	Cordage	Tapestry, wrapped warp	1	
423373	s07	T	Cloth	Tapestry	4	Hair
423373	s08	T	Cloth	Tapestry	3	Hair
423373	s09	T	Sample	Slide	1	
423373	s10	T	Cloth	Tapestry	4	Hair
423373	s11	T	Cloth, cordage	Tapestry, braid	5	Hair
423373	s12	T	Cloth	Tapestry	2	Hair
423373	s13	T	Cloth	Tapestry	1	Hair
423373	s14	T	Cloth	Tapestry	1	Hair
423373	s15	T	Cloth	Tapestry	1	Hair
423373	s16	T	Cloth	Tapestry	1	Hair
423373	s17	T	Cloth	Tapestry	2	Hair
423373	s18	T	Cloth	Tapestry	2	Hair
423373	s19	T	Cloth	Braid, tapestry	1	Hair
423373	s20	T	Sample	Slide	1	
423373	s21	T	Cloth	Tapestry	1	Hair

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
423373	s22	T	Textile	Wrapped warp barrel-shaped	1	Hair
423373	s23	T	Cloth	Wrapped warp	3	Feather
423373	s24	T	Cloth	Tapestry	1	Hair
423373	s25	T	Cloth	Tapestry	2	Hair
423373	s26	T	Cloth	Tapestry	1	Hair
423373	s27	T	Cloth	Tapestry	1	Hair
423374	s01	T	Cloth	Wrapped warp	10	Feather
423374	s02	T	Cordage	Braid	3	Hair?
423375		T	Cordage	Strand	2	
423376	s01	T	Cordage	2-ply Z-twist	5	
423376	s02	O	Hide		1	
423377	s01	T	Cordage	Strand	12	
423377	s02	T	Sample	Slide	2	
423378	s01	T, S	Cloth	Wrapped warp, tapestry	9	Hair
423378	s02	T	Cloth	Wrapped warp, braid	3	Hair
423378	s03	T	Cordage	Strand	1	
423378	s04	S	Bead	Spherical pearl	4	Pearl
423378	s05	S	Powder	Unmodified	1	Lime
423378	s06	S	Cup	Unclassified	1	Shell
423378	s07	S	Bead	Convexo-cylin	13	Shell
423378	s08	S	Bead	Disc	[a]	Shell
423378	s09	S	Bead	Convexo-cylin	[a]	
423378	s10	S	Bead	Convexo-bowed	10	
423378	s11	M, O	Hide	Leather	3	Copper
423379		T	Cloth	Tapestry	1	Vegetal
423380		T	Cloth	Spaced weft twining	6	Hair?
423381		T, W	Cordage	2-ply Z–twist	1	
423382		T	Cordage-rope	Braid	14	Possibly hair
423383		T	Cordage	Loose fibers	1	
423384		T, M	Cordage	Braid	2	Hair
423385		T, M	Basketry	Matting	3	
423386		T	Basketry	Twill	1	
423387		T	Basketry	Twill	1	
423388		T	Basketry	Twill	3	
423389		T	Basketry	Coil	1	
423390		T	Basketry	Coil	1	
423391		W	Point	Ceremonial	1	
423392		W	Ornament	Worked	1	Cedar
423393		W	Ornament	Worked	1	
423394		W, M	Stick	Variety	3	Cedar
423395		W	Stick	Unmodified	1	Cedar
423396		W	Charcoal	Unmodified	7	Cedar
423397		W	Stick	Unmodified	20	Cedar
423398		W	Pole	Unmodified	1	Cedar
423399		W	Pole	ST	1	Cedar
423400		W	Pole	Taper	1	Cedar
423401		W	Pole	Taper	1	Cedar
448641	s01	C	Vessel	Sanders Plain–Old Town Red	6	Clay
448641	s02	C	Vessel	Sanders Plain–Old Town Red	11	Clay
448641	s03	C	Vessel	Sanders Plain–Old Town Red	3	Clay
448641	s04	C	Vessel	Sanders Plain–Old Town Red	4	Clay
448641	s05	C	Sherd	Sanders Plain–Old Town Red	2	Clay
448641	s06	C	Sherd	Sanders Plain–Old Town Red	6	Clay
448641	s07	C	Sherd	Sanders Plain	9	Clay
448641	s08	C	Sherd	Sanders Plain	8	Clay
448641	s09	C	Sherd	Sanders Plain	39	Clay
448641	s10	C	Sherd	Sanders Plain	28	Clay
448641	s11	C	Sherd	Sanders Plain	1	Clay
448641	s12	C	Sherd	Sanders Engraved	1	Clay
448641	s13	C	Sherd	Sanders Engraved	1	Clay
448641	s14	C	Sherd	Sanders Engraved	1	Clay

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448641	s15	C	Sherd	Sanders Engraved	2	Clay
448641	s16	C	Sherd	Clement Redware/Sanders	2	
448641	s17	C	Sherd	Sanders Plain	2	Clay
448641	s18	C	Sherd	Sanders Plain	1	Clay
448641	s19	C	Sherd	Sanders Plain	1	Clay
448641	s20	C	Sherd	Sanders Plain	3	Clay
448641	s21	C	Sherd	Poteau Plain	2	Clay
448641	s22	C	Sherd	Undesig. grog tempered	2	Clay
448641	s23	C	Sherd	Poteau Plain	7	Clay
448641	s24	C	Sherd	Poteau Plain	1	Clay
448641	s25	C	Sherd	Poteau Plain	4	Clay
448641	s26	C	Sherd	Poteau Plain	1	Clay
448641	s27	C	Sherd	Poteau Plain	1	Clay
448641	s28	C	Sherd	Sanders Plain-Old Town Red	4	Clay
448642	s01	C	Sherd	Leflore Plain	8	Clay
448642	s02	C	Sherd	Undesignated grit	1	Clay
448642	s03	C	Sherd	Undesig. plain	2	Clay
448642	s04	C	Sherd	Leflore Plain	2	Clay
448642	s05	C	Sherd	Undesig. grog	3	Clay
448642	s06	C	Sherd	Leflore Plain	1	Clay
448642	s07	C	Sherd	Leflore Plain	2	Clay
448642	s08	C	Sherd	Williams (?)	5	Clay
448642	s09	C	Sherd	Undesig. plain grog	1	Clay
448642	s10	C	Sherd	Williams Plain	1	Clay
448642	s11	C	Sherd	Undesig. grog plain	2	Clay
448642	s12	C	Sherd	Undesig. shell tempered	2	Clay
448642	s13	C	Sherd	Undesig. shell tempered	2	Clay
448642	s14	C	Sherd	Poteau Plain	3	Clay
448642	s15	C	Sherd	Hatchel Engraved	1	Clay
448642	s16	C	Sherd	Haley Engraved	1	Clay
448642	s17	C	Sherd	Pennington Punctate	2	Clay
448642	s18	C	Sherd	Crockett Curvilinear Incised	1	Clay
448642	s19	C	Sherd	Friendship Engraved	1	Clay
448642	s20	C	Sherd	Undesig. engraved	1	Clay
448642	s21	C	Sherd	Undesig. incised shell	1	Clay
448642	s22	C	Sherd	Undesig. plain	5	Clay
448643	s01	C	Sherd	Poteau Plain	10	Clay
448643	s02	C	Sherd	Poteau Plain	2	Clay
448643	s03	C	Sherd	Poteau Plain	1	Clay
448643	s04	C	Sherd	Undesig. grog tempered	5	Clay
448643	s05	C	Sherd	Woodward Plain	10	Clay
448643	s06	C	Sherd	Woodward Plain	2	Clay
448643	s07	C	Sherd	Woodward Plain	1	Clay
448643	s08	C	Sherd	Effigy	1	Clay
448644	s01	C	Sherd	Crockett Curvilinear Incised	1	Clay
448644	s02	C	Sherd	Crockett Curvilinear Incised	1	Clay
448644	s03	C	Sherd	Unclassified	1	Clay
448645	s01	C	Sherd	Sanders Plain	2	Clay
448645	s02	C	Sherd	Crockett Curvilinear Incised	2	Clay
448645	s03	C	Sherd	Leflore Plain	1	Clay
448645	s04	C	Sherd	Sanders Engraved	1	Clay
448645	s05	C	Sherd	Unclassified	1	Clay
448645	s06	C	Sherd	Williams Plain	1	Clay
448645	s07	C	Sherd	Undesig. slipped incised	1	Clay
448645	s08	C	Sherd	Williams Plain	1	Clay
448646	s01	C	Sherd	Undesig. grit tempered	11	
448646	s02	C	Sherd	Undesig. slipped grog	3	
448646	s03	C	Sherd	Undesig. incised grog	2	
448646	s04	C	Sherd	Poteau Plain	1	
448646	s05	C	Sherd	Undesig. shell tempered	2	
448647		C	Sherd	Red on polished	2	Clay

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448648		C	Vessel	Williams Plain?	2	
448649		C	Sherd	Effigy	1	Clay
448650	s01	L	S Point	Agee	1	Novaculite
448650	s02	L	S Point	Rockwall	1	Chert
448650	s03	L	S Point	Keota	1	Chert
448650	s04	L	S Point	Sequoyah	1	Chert
448650	s05	L	S Point	Sequoyah	1	Chert
448650	s06	L	S Point	Sequoyah	1	Chert
448650	s07	L	S Point	Haskell	1	Chert
448650	s08	L	S Point	Morris	1	Chert
448650	s09	L	S Point	Morris	1	Unclassified
448650	s10	L	S Point	Agee	1	Chert
448650	s11	L	S Point	Agee	1	Chert
448650	s12	L	S Point	Agee	1	Novaculite
448650	s13	L	S Point	Agee	1	Novaculite
448650	s14	L	S Point	Hayes Short	1	Novaculite
448650	s15	L	S Point	Keota	1	Chert
448650	s16	L	S Point	Unclassified side notch	1	Chert
448650	s17	L	S Point	Unclassified	1	Chert
448650	s18	L	S Point	Young	1	Chert
448651	s01	L	S Point	Edwards	1	Chert
448651	s02	L	S Point	Massard	1	Chert
448651	s03	L	S Point	Washita Peno	1	Chert
448651	s04	L	S Point	Keota	1	Chert
448651	s05	L	S Point	Collier	1	Chert
448651	s06	L	S Point	Ashley	1	Novaculite
448651	s07	L	S Point	Massard	1	Chert
448651	s08	L	S Point	Alba	1	Novaculite
448651	s09	L	S Point	Bonham Tahlequah?	1	Chert
448651	s10	L	S Point	Massard	1	Chert
448651	s11	L	S Point	Washita Chaffee	1	Chert
448651	s12	L	S Point	Haskell	1	Chert
448651	s13	L	S Point	Reed	1	Chert
448651	s14	L	S Point	Washita Garvin	1	Chert
448651	s15	L	S Point	Scallorn	1	Chert
448651	s16	L	S Point	Agee	1	Chert
448651	s17	L	S Point	Massard	1	Chert
448651	s18	L	S Point	Haskell	1	Chert
448651	s19	L	S Point	Hayes	1	Chert
448651	s20	L	S Point	Coryell	1	Chert
448651	s21	L	S Point	Massard	1	Chert
448651	s22	L	S Point	Nodena	1	Chert
448651	s23	L	S Point	Keota	1	Chert
448651	s24	L	S Point	Alba	1	Chert
448651	s25	L	S Point	Alba	1	Jasper
448651	s26	L	S Point	Fresno	1	Chert
448651	s27	L	S Point	Reed	1	Chert
448651	s28	L	S Point	Agee	1	Novaculite
448651	s29	L	S Point	Collier	1	Chert
448651	s30	L	S Point	Scallorn	1	Novaculite
448651	s31	L	S Point	Unclassified	1	Chert
448651	s32	L	S Point	Alba	1	Novaculite
448651	s33	L	S Point	Bonham	1	Chert
448651	s34	L	S Point	Washita Garvin	1	Chert
448651	s35	L	S Point	Hayes Short	1	Chert
448651	s36	L	S Point	Agee	1	Chert
448651	s37	L	S Point	Hayes	1	Chert
448651	s38	L	S Point	Homan	1	Novaculite
448651	s39	L	S Point	Alba	1	Novaculite
448651	s40	L	S Point	Reed	1	Chert
448651	s41	L	S Point	Unclassified	1	Chert

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448651	s42	L	S Point	Rockwall	1	Chert
448651	s43	L	S Point	Alba	1	Chert
448651	s44	L	S Point	Scallorn	1	Chert
448651	s45	L	S Point	Keota	1	Chert
448651	s46	L	S Point	Unclassified	1	Chert
448651	s47	L	S Point	Coryell	1	Chert
448651	s48	L	S Point	Massard	1	Chert
448651	s49	L	S Point	Agee	1	Novaculite
448651	s50	L	S Point	Unclassified corner notch	1	Chert
448651	s51	L	S Point	Unclassified	1	Chert
448651	s52	L	S Point	Washita	1	Novaculite
448651	s53	L	S Point	Keota	1	Novaculite
448651	s54	L	S Point	Unclassified	1	Chert
448652	s01	L	L Point	Gary	1	Chert
448652	s02	L	L Point	Lange	1	Chert
448652	s03	L	L Point	Gary	1	Chert
448653		L	L Point	Eccentric	1	Chert
448654	s01	L	Lg Biface	Unclassified	1	Chert
448654	s02	L	Lg Biface	Preform	1	Chert
448654	s03	L	Lg Biface	Preform	1	Novaculite
448654	s04	L	Lg Biface	Preform	1	Chert
448654	s05	L	Lg Biface	Preform	1	Chert
448654	s06	L	S Point	Nodena	1	Chert
448655		L	Drill	Nonhaft	1	Chert
448656	s01	L	Celt	Shouldered spade	1	Siltstone
448656	s02	L	Celt	Shouldered spade	1	Siltstone
448657		L	Pipe	T-shaped, Chandler	1	Sandstone
448658		L	Pipe	T-shaped, contracting	1	Siltstone/pipest
448659		L	Pipe	T-shaped, cylindrical bowl	1	Siltstone
448660	s01	L	Pipe	T-shaped, cylindrical bowl	1	Siltstone
448660	s02	L	Pipe	T-shaped, contracting	1	Siltstone
448660	s03	L	Pipe	T-shaped, cylindrical bowl	1	Siltstone
448661	s01	C	Pipe	Unclassified	1	Clay
448661	s02	C	Pipe	T-shaped, unclassified	1	Clay
448661	s03	C	Pipe	T-shaped, unclassified	1	Clay
448661	s04	C	Pipe	T-shaped, unclassified	1	Clay
448661	s05	L	Pipe	T-shaped, unclassified	2	Siltstone
448661	s06	L	Sherd	Poteau Plain	1	Clay
448662	s01	L	Pipe	T-shaped, unclassified	1	Limestone
448662	s02	L	Pipe	T-shaped, unclassified	1	Steatite
448662	s03	L	Cone object	Unclassified	2	Quartz
448663		L	Pipe	Effigy	1	Limestone
448664		L	Pipe	Effigy	1	Limestone
448665		L	Pipe	Effigy	1	Limestone
448666		L	Pipe	Effigy	1	Limestone
448667		L	Pipe	Effigy	1	Sphalerite
448668		L	Pipe	Effigy	1	Limestone
448669	s01	L	Pipe	Effigy	1	Limestone
448669	s02	L	Sediment	None	1	Clay-silt
448670		L	Celt	Elongate	1	Sedimentary
448671		L	Celt	Elongate	1	Sedimentary
448672		L	Celt	Elongate	1	Greenstone
448673		L	Celt	Spatulate	1	Greenstone
448674		L	Celt	Perforated spatulate	1	Marble
448675		L	Celt	Spatulate	1	Coal
448676	s01	L	Celt	Elongate, small	1	Jasper
448676	s02	L	Celt	Elongate	1	Igneous
448677	s01	L	Atlatl weight	Boatstone	1	Greenstone
448677	s02	L	Atlatl weight	Boatstone	1	Greenstone
448677	s03	L	Atlatl weight	Boatstone	1	Greenstone
448677	s04	L	Atlatl weight	Boatstone	1	Greenstone

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448678		L	Discoidal	Chunky	1	Quartzite
448679		L	Discoidal	Chunky	1	Sedimentary
448680	s01	L	Discoidal	Chunky	1	Marble
448680	s02	L	Discoidal	Chunky	1	Sedimentary
448681		L	Mano	Pitted	1	Sandstone
448682		L	Hammerstone		3	Quartz
448683	s01	L	Pebble	Worked	1	Quartz
448683	s02	L	Pebble	Worked	1	Unknown
448683	s03	L	Pebble	Worked	1	Unknown
448683	s04	L	Pendant	Perforated end	1	Coal
448683	s05	L	Pebble	Worked	1	Stone
448684		L	Pendant	Perforated end	1	Greenstone
448685		L	Pendant	Perforated end	1	Sandstone
448686	s01	L	Pendant	Perforated end	1	Phosphate
448686	s02	L	Pendant	Perforated end	1	Phosphate
448686	s03	S	Bead	Convexo-cylin	1	Shell
448686	s04	L	Bead	Convexo-cylin blank	1	Unclassified
448686	s05	L	Bead	Convexo-cylin blank	1	Unclassified
448686	s06	L	Bead	Convexo-cylin blank	1	Unclassified
448686	s07	L	Bead	Elliptical	1	Phosphate
448686	s08	L	Bead	Cylindrical	1	Phosphate
448686	s09	L	Bead	Elliptical	1	Phosphate
448686	s10	L	Bead	Convexo-cylin	1	Phosphate
448686	s11	L	Bead	Spherical	1	Phosphate
448686	s12	L	Bead	Elliptical	1	Phosphate
448686	s13	L	Bead	Spherical	1	Phosphate
448686	s14	L	Bead	Spherical	1	Phosphate
448686	s15	L	Bead	Spherical	1	Phosphate
448686	s16	L	Bead	Spherical	1	Phosphate
448686	s17	L	Bead	Spherical	1	Phosphate
448686	s18	L	Bead	Convexo-cylin	1	Phosphate
448687		L	Bead	Disc	1	Sedimentary
448688	s01	L	Flake	Secondary	1	Chert
448688	s02	L	Flake	Blank	1	Chert
448688	s03	L	Flake	Secondary	1	Chert
448688	s04	L	Flake	Blank	1	Chert
448689	s01	L	Mineral lump		1	Micac. sandstone
448689	s02	L	Mineral lump		1	Micac. sandstone
448689	s03	L	Mineral lump		1	Micac. sandstone
448689	s04	L	Mineral lump		1	Micac. sandstone
448689	s05	L	Mineral lump		1	Micac. sandstone
448689	s06	L	Mineral lump		1	Micac. sandstone
448689	s07	L	Mineral lump		1	Micac. sandstone
448689	s08	L	Mineral lump		1	Micac. sandstone
448689	s09	L	Mineral lump		1	Micac. sandstone
448690	s01	L	Lg Biface	Unclassified	1	Unknown
448690	s02	L	Celt	Unclassified	1	Coal
448690	s03	L	Celt	Unclassified	1	Coal
448690	s04	L	Celt	Unclassified	1	Coal
448690	s05	L	Celt	Spatulate	3	Coal
448690	s06	L	Celt	Spatulate	2	Coal
448691	s02	L	Earspool	Perforated	1	Sandstone
448692		L	Earspool	Perforated	1	Sandstone
448693		L	Earspool	Perforated	1	Sandstone
448694		L	Earspool	Perforated	1	Limestone
448695	s01	L	Earspool	Divided flange	1	Limestone
448695	s02	L	Earspool	Divided flange	1	Sandstone
448696		C	Earspool	Perforated	1	Clay
448697		L	Earspool	Perforated	1	Limestone
448698	s01	L	Earspool	Perforated	1	Silt/sandstone
448698	s02	L	Earspool	Perforated	1	Silt/sandstone

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448698	s03	L	Earspool	Perforated	1	Silt/sandstone
448698	s04	L	Earspool	Perforated	1	Limestone
448698	s05	L	Earspool	Perforated	1	Siltstone
448698	s06	L	Earspool	Perforated	1	Sandstone
448698	s07	L	Earspool	Perforated	1	Siltstone
448698	s08	L, M	Earspool	Perforated	1	Limestone
448698	s09	L	Earspool	Perforated	1	Limestone
448698	s10	L	Earspool	Perforated	1	Limestone
448698	s11	L	Earspool	Perforated	1	Limestone
448698	s12	L	Earspool	Perforated	1	Limestone
448698	s13	L	Earspool	Perforated	1	Limestone
448698	s14	L	Earspool	Perforated	1	Limestone
448698	s15	L	Earspool	Perforated	1	Limestone
448698	s16	L	Earspool	Perforated	1	Limestone
448698	s17	L	Earspool	Perforated	1	Limestone
448698	s18	L	Earspool	Perforated	1	Limestone
448698	s19	L	Earspool	Perforated	1	Limestone
448699	s01	L	Earspool	Perforated	1	Limestone
448699	s02	L	Earspool	Nesting	1	Limestone
448699	s03	L	Earspool	Divided flange	11	Limestone
448699	s04	L, M	Earspool	Unperforated	1	Limestone
448699	s05	L, M	Earspool	Unperforated	56	Limestone
448699	s06	L	Earspool	Perforated	2	Sandstone
448699	s07	L	Earspool	Unclassified	8	Siltstone
448699	s08	M	Earspool	Unclassified	5	Copper
448699	s09	L	Earspool	Divided flange	1	Limestone
448699	s10	L	Earspool	Divided flange	1	Limestone
448699	s11	L	Earspool	Divided flange	1	Limestone
448699	s12	L	Earspool	Unclassified	50	Limestone
448699	s13	L	Earspool	Divided flange	2	Siltstone
448699	s14	C	Sherd	Woodward	1	Ceramic
448700		L, M	Earspool	Unclassified	69	Copper
448702		L	Galena	Worked	1	Galena
448703		L	Galena	Worked	1	Galena
448704		L	Galena	Worked cube	1	Galena
448705		L	Galena	Worked	1	Galena
448705	s02	L	Galena	Nodule	8	Galena
448706	s01.1	L	Figure	Effigy	1	Galena
448706	s01.2	T	Basket impression	Unclassified	1	Reed or cane
448707		B	Pin	Spatulate	1	Bone
448708	s01	B	Pin	Tapering	15	Bone
448708	s02	B	Awl	Troughed	6	Bone
448709		B	Scraper	Unclassified	1	Long bone
448710		B	Scraper	Unclassified	1	Metapodial
448711		B	Tube	Hollow	1	Long bone
448712		M	Pin	Fraudulent	15	Copper
448713		M	Bead	Fraudulent-disc	11	Copper
448714	s01	M	Bead	Tubular small	5	Copper
448714	s02	M, T	Bead	Tubular medium	4	Copper
448714	s03	M, T	Bead	Tubular medium large	12	Copper
448714	s04	M	Bead	Tubular large	4	Copper
448714	s05	M, T	Bead	Tubular large	2	Copper
448714	s06	M, T	Bead	Tubular medium large	2	Copper
448714	s06.2	T	Cordage	2-ply S-twist	1	Fiber
448714	s07.1	M, T, S	Bead	Tubular medium	3	Copper
448714	s07.2	T	Cordage	2-strand 3–ply Z-twist	1	Fiber
448714	s08	T	Cordage	3-ply S-twist	1	Fiber
448714	s09	T	Cordage	2-ply Z-twist	1	Fiber
448714	s10	M	Pin	Tapering	6	Copper
448714	s11	M	Pin	Curved	11	Copper
448715	s01	M	Sheet	Embossed	5	Copper

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448715	s02	M	Sheet	Embossed	12	Copper
448715	s03	M	Sheets	Embossed	16	Copper
448715	s04	M	Sheets	Embossed	14	Copper
448715	s05	M, W	Sheets	Unclassified	1	Copper
448715	s06	M	Sheet	Embossed	7	Copper
448715	s07	M, W	Sheet	Embossed	1	Copper
448715	s08	M	Sheet	Nonembossed	5	Copper
448715	s09	M, W	Sheet	Embossed	1	Copper
448715	s10	M	Sheet	Embossed	3	Copper
448715	s11	M, W	Sheet	Unclassified	10	Copper
448716	s01	M	Sheet	Nonembossed	8	Copper
448716	s02	M	Sheet	Plume?	2	Copper
448717		M	Sheet		1	Copper
448718		M	Sheet	Embossed	77	Copper
448719	s01	S	Bead	Disc	119	Shell
448719	s02	S	Bead	Elliptical	3	Shell
448720		S	Bead	Disc	76	Shell
448721	s01	S	Bead	Disc	1,400	Shell
448721	s02	S	Bead	Disc-thin	65	Shell
448721	s03	S	Bead	Disc-thin-sculptured	1	Shell
448721	s04	L, O	Bead	Crinoid and seed	2	Fossil
448722	s01	S	Bead	Variety pearl	321	Pearl
448722	s02	S	Bead	Baroque	1	Pearl
448723	s01	S	Bead	Convexo-bowed	85	Shell
448723	s02	S	Bead	Cylindrical	3	Shell
448723	s03	S	Bead	Convexo-cylin	5	Shell
448723	s04	S	Bead	Convexo-cylin	1	Shell
448724	s01	S	Bead	Convexo-cylin-columella	17	Shell
448724	s02	S	Bead	Convexo-bowed-large	2	Shell
448724	s03	S	Bead	Convexo-bowed	1	Shell
448724	s04	S	Bead	Columella	3	Shell
448725	s01	S	Bead	Spherical-columella	80	Shell
448725	s02	S	Bead	Baroque	1	Pearl
448725	s03	S	Bead	Elliptical	2	Shell
448726		S, M	Bead	Spherical	3	Shell
448727		S	Pendant	Grooved drop	1	Shell
448728	s01	S	Bead	Convexo-cylin	2	Shell
448728	s02	S	Bead	Convexo-cylin	50	Shell
448728	s03	S	Bead	Disc	7	Shell
448728	s04	S	Bead	Baroque	1	Pearl
448728	s05	S	Bead	Elliptical	7	Shell
448728	s06	S	Bead	Spherical	17	Shell
448729		S	Bead	Convexo-cylin	154	Shell
448730	s01	S	Bead	Bulging-columella	1	Shell
448730	s02	S	Bead	Bulging	9	Shell
448731		S	Bead	Concavo	9	Shell
448732		S	Bead	Tooth	6	Shell
448733	s01	S	Bead	Gastropod	44	Univalve
448733	s02	S	Bead	*Marginella*	3	Univalve
448733	s04	S	Bead	Gastropod	18	Univalve
448734		S	Bead	*Olivella*	2,790	Shell
448735		S	Bead	Flat circular	2	Shell
448736		S	Pendant	Gorget-like	1	Shell
448737	s01.1	M, S, T	Sheet	Embossed	3	Copper
448737	s01.2	S	Bead	Convexo-cylin-columella	2	Shell
448737	s02	M, S, T	Worked shell	Unclassified	1	Shell
448737	s03.1	M, S, T	Bead	Convexo-cylin-columella	1	Shell
448737	s03.2	T	Cordage	2-ply S-Twist	1	Fiber
448737	s04	M, S	Bead	Convexo-cylin-columella	1	Shell
448737	s05	M, S	Bead	Spherical columella	2	Shell
448737	s06	M, S	Bead	Convexo-cylin	1	Shell

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448737	s07	M, S	Bead	Convexo-cylin-columella	1	Shell
448737	s08	M, S, T	Bead	Convexo-cylin	1	Shell
448737	s09	M S	Bead	Convexo-cylin	3	Shell
448737	s10	M S	Bead	Convexo-cylin	1	Shell
448737	s11	M S	Bead	Convexo-cylin-columella	1	Shell
448737	s12	M, S, T	Bead	Spherical columella	1	Shell
448737	s13	M, T	Sheet	Unclassified	14	Copper
448738		S	Pendant	Drop	1	Shell
448739		S	Pendant	Disc	1	Shell
448740		S	Gorget	Type 1	1	Shell
448741		S	Gorget	Type 1, Craig A	1	Shell
448743		S	Gorget	Mask	1	Shell
448744		S	Gorget	Type 1, Unclassified	1	Shell
448745		S	Worked shell	Unclassified	1	Shell
448746		S	Gorget	Craig B	1	Shell
448747		S	Gorget	Type 1, Craig A	1	Shell
448748		S	Gorget	Type 1	1	Shell
448749		S	Gorget	Type 1, Craig A	2	Shell
448750		S	Gorget	Type 1, Craig A	2	Shell
448752		S	Gorget	Type 1, Craig A	1	Shell
448753		S	Gorget	Type 1, Craig	1	Shell
448755		S	Gorget	Type 1, Craig	2	Shell
448757		S	Gorget	Type 2, Unclassified	1	Shell
448758		S	Gorget	Style 1, Craig A	1	Shell
448759		S	Gorget	Type ?, Craig	1	Shell
448760		S	Gorget	Type 1, Craig B	5	Shell
448761	s01.1	S	Gorget	Type 1, Craig	2	Shell
448761	s01.2	S	CUP	Braden A	2	Shell
448761	s02.1	S	Gorget	Type 3, Craig A	2	Shell
448761	s02.2	S	Cup	Craig A	2	Shell
448762		S, T, M	Gorget	Type 3, Craig	1	Shell
448763		S	Gorget	Type 3, Craig	1	Shell
448764		S	Worked Shell	Plain	2	Shell
448765		S	Gorget	Type 1, Craig	12	Shell
448766		S	Pendant	Irregular	1	Shell
448768	s01	S	Bead	Olivella	1	Shell
448768	s02	S	Bead	Convexo-cylin-sculptured	1	Univalve
448769		S	Pendant	Irregular	1	Shell
448770		S	Worked shell	Hook	2	Shell
448771	s01	S	Disk	Plain	1	Shell
448771	s02	S	Disk	Plain	1	Shell
448772		S	Figurine	Craig C	1	Shell
448773		S	Bead	Mask	1	Shell
448774		S	Cup	Unengraved	1	Univalve
448775		S	Worked shell	Worked	1	Shell
448776		S	Worked shell		1	Bivalve
448777		S	Pendant	Drop-columella	4	Univalve
448778	s01.1	S, T	Pendant	Columella	1	Univalve
448778	s01.2	T, S	Basketry	Twill	2	Wicker, cane
448779	s01	S	Pendant	Columella	4	Univalve
448779	s02	S	Pendant	Columella	4	Univalve
448780	s01	S, L	Pendant	Columella-sculptured	1	Univalve
448780	s02	S	Bead	Spherical pearl	1	Pearl
448781	s01	S	Pendant	Columella	5	Shell
448781	s02	S	Pendant	Columella	5	Shell
448781	s03	S	Pendant	Columella	13	Shell
448781	s04	S	Pendant	Columella	5	Shell
448781	s05	S	Pendant	Columella	6	Shell
448781	s06	S	Pendant	Columella	1	Shell
448781	s07	S	Pendant	Columella	5	Shell
448781	s08	S	Pendant	Columella	10	Shell

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448781	s09	S	Pendant	Columella	6	Shell
448781	s10	S	Pendant	Columella	1	Shell
448782	s00	S	Cup	Unengraved	1	Univalve
448782	s01	S	Cup	Unengraved	1	Shell
448782	s02	S	Cup	Unengraved	8	Shell
448782	s03	S	Cup	Unengraved	14	Shell
448782	s04	S	Cup	Unengraved	5	Shell
448782	s05	S	Cup	Unengraved	26	Shell
448782	s06	S	Cup	Unengraved	1	Shell
448782	s07	S	Cup	Unengraved	1	Shell
448782	s08	S	Cup	Unengraved	1	Shell
448782	s09	S	Cup	Unengraved	1	Shell
448782	s10	S	Cup	Unengraved	1	Shell
448782	s11	S	Cup	Unengraved	1	Shell
448782	s12	S	Cup	Unengraved	1	Shell
448782	s13	S	Cup	Unengraved	1	Shell
448782	s14	S	Cup	Unengraved	1	Shell
448782	s15	S	Cup	Unengraved	1	Shell
448782	s16	S	Cup	Unengraved	1	Shell
448782	s17	S	Cup	Unclassified	1	Shell
448782	s18	S	Cup	Unengraved	1	Shell
448783		S	Cup	Braden B	1	Univalve
448784		S	Cup	Craig C	1	Univalve
448785		S	Cup	Braden B	2	Univalve
448786		S	Cup	Braden C	1	Univalve
448787		S	Cup	Craig B	1	Univalve
448788		S	Cup	Braden B	1	Univalve
448789		S	Cup	Braden B	1	Univalve
448790		S	Cup	Braden B	1	Univalve
448791		S	Cup	Braden A	3	Univalve
448792		S	Cup	Braden C	1	Univalve
448793		S	Cup	Braden C	1	Univalve
448794		S	Cup	Craig C	1	Univalve
448795		S	Cup	Craig C	1	Univalve
448796		S	Cup	Craig C	1	Univalve
448797		S	Cup	Craig C	1	Univalve
448798		S	Cup	Craig A	1	Univalve
448799		S	Cup	Craig C	1	Univalve
448800		S	Cup	Craig C	1	Univalve
448801		S	Cup	Craig B	1	Univalve
448802		S	Cup	Craig C	1	Univalve
448803		S	Cup	Braden B	2	Univalve
448804		S	Cup	Craig C	1	Univalve
448805		S	Cup	Braden B	1	Univalve
448806		S	Cup	Craig B	6	Univalve
448807		S	Cup	Braden B	8	Univalve
448808		S	Cup	Craig B	1	Univalve
448809		S	Cup	Braden C	1	Univalve
448810		S	Cup	Braden B	1	Univalve
448811		S	Cup	Braden B	1	Univalve
448812		S	Cup	Craig C	2	Univalve
448813		S	Cup	Craig C	1	Univalve
448814		S	Cup	Craig B	2	Univalve
448815		S	Cup	Craig A	2	Univalve
448816		S	Cup	Braden C	5	Univalve
448817		S	Cup	Craig B	3	Univalve
448818		S	Cup	Craig B	3	Univalve
448819		S	Cup	Braden A	2	Univalve
448820		S	Cup	Braden B	2	Univalve
448821		S	Cup	Craig B	5	Shell
448822		S	Cup	Craig C	1	Univalve

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448823		S	Cup	Unclassified	1	Univalve
448824		S	Cup	Unclassified	1	Univalve
448825		S	Cup	Craig A	3	Univalve
448826		S	Cup	Craig B	3	Univalve
448827		S	Cup	Braden A	3	Univalve
448828		S	Cup	Braden C	3	Univalve
448829		S	Cup	Braden A	2	Univalve
448830		S	Cup	Braden C	2	Univalve
448831		S	Cup	Craig B	5	Univalve
448832		S	Cup	Craig C	4	Univalve
448833		S	Cup	Braden A	2	Univalve
448834		S	Cup	Craig C	3	Univalve
448835		S	Cup	Craig C	4	Univalve
448836		S	Cup	Craig	4	Univalve
448838		S	Cup	Braden A	2	Univalve
448839		S	Cup	Craig C	2	Univalve
448840		S	Cup	Craig B	4	Univalve
448843		S	Cup	Braden A	1	Univalve
448844		S	Cup	Braden A	1	Univalve
448845		S	Cup	Craig B	1	Univalve
448847		S	Cup	Braden A	2	Univalve
448848		S	Cup	Craig B	6	Univalve
448849		S	Cup	Braden A	4	Univalve
448850	s01	S	Cup	Braden B	2	Univalve
448850	s02	S	Cup	Craig	1	Univalve
448851		S	Cup	Craig A	5	Univalve
448852		S	Cup	Craig B	4	Univalve
448853	s01	S	Cup	Craig B	3	Univalve
448853	s02	S	Cup	Craig B	2	Univalve
448853	s03	S	Cup	Craig B	2	Univalve
448853	s04	S	Cup	Craig B	3	Univalve
448853	s05	S	Cup	Craig C	2	Univalve
448854		S	Cup	Braden C	3	Univalve
448855		S	Cup	Braden B	1	Univalve
448856		S	Cup	Braden B	2	Univalve
448857		S	Cup	Braden B	1	Univalve
448858	s01	S	Cup	Craig B	3	Univalve
448858	s02	S	Cup	Craig C	1	Univalve
448858	s03	S	Cup	Craig C	1	Univalve
448858	s04	S	Cup	Braden A	2	Univalve
448858	s05	S	Cup	Craig B	1	Univalve
448858	s06	S	Cup	Craig A	2	Univalve
448858	s07	S	Cup	Craig A	2	Univalve
448858	s08	S	Cup	Craig B	1	Univalve
448858	s09	S	Cup	Craig B	1	Univalve
448858	s10	S	Cup	Craig B	3	Univalve
448858	s11	S	Cup	Various	16	Univalve
448858	s12	S	Cup	Craig A	3	Univalve
448859		S	Cup	Craig A	1	Univalve
448860		S	Cup	Braden A	4	Univalve
448861	s01	S	Cup	Craig B	4	Univalve
448861	s02	S	Cup	Braden C	1	Univalve
448861	s03	S	Cup	Craig B	2	Univalve
448861	s04	S	Cup	Craig B	1	Univalve
448861	s05	S	Cup	Braden A	1	Univalve
448861	s06	S	Cup	Craig A	2	Univalve
448861	s07	S	Gorget-mask	Craig B	2	Univalve
448862		S	Cup	Craig A	6	Univalve
448863		S	Cup	Braden A	1	Univalve
448864		S	Cup	Braden C	1	Univalve
448865		S	Cup	Braden A	6	Univalve

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448866	s01	S	Cup	Braden	6	Univalve
448866	s02	S	Cup	Braden A	3	Univalve
448866	s03	S	Cup	Craig B	2	Univalve
448866	s04	S	Cup	Braden A	2	Univalve
448866	s05	S	Cup	Craig B	4	Univalve
448866	s06	S	Cup	Braden A	3	Univalve
448866	s07	S	Cup	Craig B	3	Univalve
448866	s08	S	Cup	Braden A	1	Univalve
448866	s09	S	Cup	Craig B	2	Univalve
448866	s10	S	Cup	Braden A	2	Univalve
448866	s11	S	Cup	Craig B	7	Univalve
448866	s12	S	Cup	Braden A	4	Univalve
448867	s01	S	Cup	Craig B	2	Univalve
448867	s02	S	Cup	Unclassified	4	Univalve
448867	s03	S	Cup	Unclassified	5	Univalve
448868		S	Cup	Braden B	5	Univalve
448869	s01	S	Cup	Craig various	16	Univalve
448869	s02	S	Cup	Craig A	2	Univalve
448869	s03	S	Cup	Craig B	2	Univalve
448870		S	Cup	Braden B	2	Univalve
448871	s01	S	Cup	Craig A	5	Univalve
448871	s02	S	Cup	Braden B	2	Univalve
448871	s03	S	Cup	Braden A	2	Univalve
448872		S	Cup	Craig B	4	Univalve
448873		S	Cup	Craig B	1	Univalve
448874	s01	S	Cup	Craig B	2	Univalve
448874	s02	S	Cup	Unclassified	1	Univalve
448874	s03	S	Cup	Craig A	3	Univalve
448875	s01	S	Cup	Craig A	2	Univalve
448875	s02	S	Cup	Craig A	2	Univalve
448875	s03	S	Cup	Braden B	3	Univalve
448875	s04	S	Cup	Craig C	2	Univalve
448876	s01	S	Cup	Braden A	2	Univalve
448876	s02	S	Cup	Braden A	16	Univalve
448876	s03	S	Cup	Craig A	1	Univalve
448876	s04	S	Cup	Braden A	10	Univalve
448877	s01	S	Cup	Craig C	3	Univalve
448877	s02	S	Cup	Unclassified	2	Univalve
448877	s03	S	Cup	Braden	3	Univalve
448877	s04	S	Cup	Braden A	2	Univalve
448877	s05	S	Cup	Craig B	2	Univalve
448877	s06	S	Cup	Braden A	11	Univalve
448877	s07	S	Cup	Craig B	2	Univalve
448877	s08	S	Cup	Craig B	2	Univalve
448878	s01	S	Cup	Craig A	6	Univalve
448878	s02	S	Cup	Craig A	4	Univalve
448878	s03	S	Cup	Braden B	3	Univalve
448879	s01	S	Cup	Craig B	2	Univalve
448879	s02	S	Cup	Craig B	6	Univalve
448880	s00	S	Cup	Craig C	2	Univalve
448880	s01	S	Cup	Braden A	1	Univalve
448880	s02	S	Cup	Braden A	1	Univalve
448880	s03	S	Cup	Braden A	2	Univalve
448880	s04	S	Cup	Craig B	2	Univalve
448880	s05	S	Cup	Craig A	7	Univalve
448880	s06	S	Cup	Braden A	1	Univalve
448880	s07	S	Cup	Craig A	2	Univalve
448880	s08	S	Cup	Braden A	9	Univalve
448880	s09	S	Cup	Braden A	1	Univalve
448880	s10	S	Cup	Braden A	1	Univalve
448880	s11	S	Cup	Unclassified	2	Univalve

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448880	s12	S	Cup	Braden C	1	Univalve
448880	s13	S	Cup	Braden B	3	Univalve
448880	s14	S	Cup	Craig B	2	Univalve
448880	s15	S	Cup	Braden B	2	Univalve
448880	s16	S	Cup	Craig C	1	Univalve
448880	s17	S	Cup	Craig C	1	Univalve
448880	s18	S	Cup	Craig C	1	Univalve
448880	s19	S	Cup	Craig C	3	Univalve
448880	s20	S	Cup	Craig A	4	Univalve
448880	s21	S	Cup	Craig A	2	Univalve
448880	s22	S	Cup	Craig B	4	Univalve
448880	s23	S	Cup	Craig B	6	Univalve
448880	s24	S	Cup	Craig B	2	Univalve
448880	s25	S	Cup	Craig A	3	Univalve
448880	s26	S	Cup	Craig A	6	Univalve
448880	s27	S	Cup	Braden C	1	Univalve
448880	s28	S	Cup	Braden B	1	Univalve
448880	s29	S	Cup	Braden A and B	3	Univalve
448880	s30	S	Cup	Craig A	4	Univalve
448880	s31	S	Cup	Braden A	1	Univalve
448880	s32	S	Cup	Braden B	2	Univalve
448880	s33	S	Cup	Braden B	1	Univalve
448880	s34	S	Cup	Unclassified	39	Univalve
448880	s35	S	Cup	Unclassified	11	Univalve
448880	s36	S	Cup	Unclassified	14	Univalve
448880	s37	S	Cup	Craig B	2	Univalve
448880	s38	S	Cup	Unclassified	9	Univalve
448880	s39	S	Cup	Craig A	1	Univalve
448880	s40	S	Cup	Unclassified	4	Univalve
448880	s41	S	Cup	Craig B	4	Univalve
448880	s42	S	Cup	Unclassified	10	Univalve
448880	s43	S	Cup	Unclassified	7	Univalve
448880	s44	S	Worked shell	Scales	3	Scales
448881		S	Cup	Unclassified	3	Univalve
448882		S	Cup	Braden A	1	Univalve
448883	s01	S	Cup	Unengraved	4	Univalve
448883	s02	S	Cup	Unengraved	2	Univalve
448883	s03	S	Cup	Unengraved	15	Univalve
448883	s04	S	Cup	Unengraved	20	Univalve
448883	s05	S	Cup	Unengraved	10	Univalve
448883	s06	S	Cup	Unengraved	12	Univalve
448883	s07	S	Cup	Unengraved	1	Univalve
448884		S	Worked shell	Unengraved	1	Univalve
448885	s01	S	Worked shell	Unengraved	5	
448885	s02	S	Worked shell	Unengraved	1	
448885	s03	S	Pendant	Unengraved	2	Univalve
448885	s04	S	Worked shell	Unclassified	6	
448885	s05	S	Worked shell	Unmodified	1	Bivalve
448886		S	Pendant	Grooved drop	1	
448887	s01	S	Worked shell	Columella	7	Shell
448887	s02	S	Pendant	Columella	3	Shell
448887	s03	S	Worked shell	Unclassified	1	Univalve
448888		S	Worked shell	Unengraved	1	Univalve
448889	s01	S	Worked shell	Unmodified	3	Univalve
448889	s02	S	Bead	Marginella	1	Univalve
448889	s03	S	Shell	Unmodified	1	Univalve
448889	s04	S	Worked shell	Unmodified	1	Univalve
448889	s05	S	Worked shell	Unmodified	2	Univalve
448889	s06	S	Shell	Unmodified	2	Univalve
448890		W	Figure	Effigy	1	Red cedar
448891		W	Figure	Effigy	1	Red cedar

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448892		W	Figure	Effigy	1	Cedar
448893		W	Vessel	Effigy	1	Cedar
448894		W, S	Vessel	Effigy	1	Cedar
448895	s01	W	Earspool	Effigy	1	Cedar
448895	s02	W	Earspool	Effigy	1	Cedar
448897		W	Blade	Ceremonial	1	Cedar
448898		B	Ornament	Perforated plate	1	Turtle
448899	s01	W	Earspool	Cone	1	Cedar
448899	s02	W	Earspool	Cone	1	Cedar
448899	s03	W	Earspool	Cone	1	Cedar
448899	s04	W	Earspool	Cone	1	Cedar
448899	s05	W	Earspool	Cone	1	Cedar
448900	s01	W, S	Earspool	Composite	1	Cedar
448900	s02	W	Earspool	Central boss	1	
448901		W, M	Earspool	Worked	1	Cedar
448902		W	Earspool	Unperforated	1	
448903		W	Earspool	Unperforated	1	
448904		W	Earspool	Unperforated	1	
448905	s01	W, S	Earspool	Unperforated	1	
448905	s02	W	Earspool	Unperforated	1	
448905	s03	W, S	Earspool	Composite	1	Cedar
448905	s04	W, S	Earspool	Central boss	1	Cedar
448905	s05	W, S	Earspool	Unperforated	1	Cedar
448906	s01	S	Disk	Plain	4	Shell
448906	s02	S	Disk	Perforated disc	2	
448906	s03	S	Disk	Plain large	2	Shell
448907		S	Disk	Perforated disc	2	
448908		S	Disk	Engraved	1	Shell
448909		W	Earspool	Perforated	6	Cedar
448910		W	Object	Effigy	1	
448911	s01	W	Worked frag	Unknown	8	
448911	s02	W	Worked frag	Unknown	17	
448911	s03	O	Pod	Unmodified	1	
448911	s04	W	Worked frag	Stick	24	Cedar
448911	s05	W	Worked frag	Mace or atlatl	1	
448912		T	Basketry	Twill matting	1	Cane
448913	s01	T	Basketry	Spaced weft twining	1	Vegetal
448913	s02	T	Sample	Slide	1	
448914		T	Basketry	Loose fibers	1	
448915		T	Cloth	Tapestry	4	Hair?
448916	s01	T	Cloth	Tapestry	3	Hair?
448916	s02	T	Cloth	Spaced weft twining, wrapped warp	4	Hair
448916	s03	T	Cloth	Spaced weft twining	17	Hair
448916	s04	T	Hide	Leather	1	
448917	s01	T	Cordage	Braid, wrapped warp barrel-shaped wrapped warp	10	Vegetal
448917	s02	S	Bead	Convexo-cylin	7	Shell
448918		T	Cordage	Loose fibers	1	
448919		T	Cordage, fur	2-ply S-twist	1	Vegetal
448920		O	Hide	Leather	1	Hide
448921		L	Mica	Flake	1	Mica
448922		T	Basketry	Twill	2	Cane
448923		O	Clay	Worked	171	Glauconite
448924		O	Pigment	Worked	1	Ocher
448925		O	Pigment	Raw	2	Ocher
448926	s01	O	Clay	Chert unknown	1	Clay
448926	s02	O	Clay	Worked	1	Clay
448927	s01.1	O	Pigment	Unmodified	1	Ocher
448927	s01.2	T	Basket	Twill	1	Reed/cane
448927	s02	O	Pigment		1	Ocher

(*continued*)

Catalog number	Subnumber (if any)	Material type	Object	Style	Count	Raw material (if known)
448927	s03	O	Pigment	Worked	1	Ocher
448927	s04	O	Pigment		1	Ocher
448927	s05	O	Pigment	Raw	1	Ocher
448928		C	Object	Poverty point object	1	Clay
448929		L	L Point	Gary	1	Chert
448930		C	Sherd	Undesig.	1	Clay
448931		C	Pendant	Grooved	1	Clay
448932	s01	L	Tube		1	Stone
448932	s02	L	Bead	Irregular disc	1	Unknown
448933		O	Coprolite		3	Organic
448934	s01.1	T	Basketry	Twill	1	Cane
448934	s01.2	T	Cloth	Braid	1	Hair
448934	s01.3	S	Bead	Disc	500	Shell
448934	s02	S	Bead	Disc	1,650	Shell
448934	s03	S	Bead	Spherical	3	Shell
448934	s04	S	Cup	Unengraved	4	Shell
448934	s05	T	Basketry	Unclassified	1	Cane
448934	s06	M	Sheet	Unclassified	60	Copper
448934	s07	T	Basketry	Unmodified	12	Cane
448934	s08	T	Leather	Tanned	1	Hide
448935–448937 [b]						
448939	s01.1	B, T	Bone object	Unclassified	4	Beaver
448939	s01.2	T	Cordage	2-ply Z-twist	1	Vegetal
515780	s01	C	Sherd	Woodward Plain	3	Clay
515780	s02	C	Sherd	Williams Plain	1	Clay
515780	s03	C	Sherd	Poteau Plain	1	Clay
515781		L	S Point	Morris	1	Chert
515782	s01	L	Flake	Bipolar	1	Chert
515782	s02	L	Scraper	End	1	Chert
515782	s03	L	Scraper	End	1	Chert
515782	s04	L	Scraper	End	1	Chert
515783		L	S Point	Washita	1	Chert
515784	s01	S	Bead	Spherical	9	Shell
515784	s02	S	Bead	Convexo-cylin	99	Shell
515785	s01	S	Bead	Olivella	7	Shell
515785	s02	S	Bead	Disc	142	Shell
515786		S	Cup	Craig	1	Shell
515787		S	Cup	Unengraved	37	
542527		M	Pin	Fraudulent	1	Copper
542528		M	Pin	Fraudulent	1	Copper
542529		M	Pin	Fraudulent	1	Copper
542530		M	Pin	Fraudulent	1	Copper
542531		M	Pin	Fraudulent	1	Copper
542532		L	Earspool	Perforated	1	Limestone
542533		S	Bead	Spherical-columella	21	Shell
542534		S	Bead	Convexo-bowed	32	Shell
542535		S	Bead	Spherical	14	Shell
542536		S	Bead	*Olivella*	990	Shell
542537	s01	S	Bead	Convexo-cylin	42	Shell
542537	s02	S	Bead	Spherical pearl	2	Pearl
542537	s03	S	Bead	*Olivella*	2	Shell
542538		S	Cup	Unengraved	1	Univalve

[a] No number available.

[b] Human remains—see chapter 9.

Appendix B: Concordance of References

Many of the artifacts in the Spiro collection have been illustrated and discussed in other publications. Table B.1 provides a list of artifact catalog numbers along with notes and references to the other major published sources.

TABLE B.1. Reference summary of the National Museum of Natural History's Spiro collection by catalog number. (NAA = National Anthropological Archives.)

Catalog number	Subnumber (if any)	Object	References and notes
377378		Mace	Crowned maces discussed by Brown (1976:166–172), designated as type 1 (figs. 30a, 31a,b) Hamilton's (1952) pl. 41 is the same artifact
378240		Fragment	Rogers et al. (2002)
378244		Pendant	Fundaburk and Foreman (1957) depict whelk picks, but these are not made solely of the columella
378261		Bead	Brown (1976:377) gives types for similar beads
378264		Pendant	See Burnett (1945: pls. LXXXI, LXXXII, LXXXV) for similar pendants and use on headband; see Brown (1976)
378273		End scraper	Barker et al. (2002)
386187		Cloth	Rogers et al. (2002)
386188		Cloth	Rogers et al. (2002)
411901		Worked shell	Fundaburk and Foreman (1957: pl. 25)
411904		Worked shell	Illustrated (Duffield, 1964: pl. VII2)
411905		Worked shell	Fundaburk and Foreman (1957: pl. 27?)
423145		Vessel	Hamilton (1952: pl. 32A)
423147		Vessel	Hamilton (1952: pls. 32A, 33C)
423148		Vessel	Hamilton (1952: pls. 32A, 33B)
423149		Vessel	Hamilton (1952: pl. 31), partially restored
423150		Vessel	Hamilton (1952: pl. 31B); Fundaburk and Foreman (1957: pl. 89)
423152		Pipe	Hamilton (1952: pl. 22B), restored
423160		Pipe	Hamilton (1952: pl. 17A)
423161		Earspool	Hamilton (1952: pl. 80, upper left?)
423162		Earspool	Hamilton (1952, pl. 81)
423163		Earspool	Hamilton (1952: pl. 81)
423195		Mace	Hamilton (1952: pl. 42); Griffin (1952:93–94) notes resemblance to Duck River focus, Tennessee
423196		Mace	Hamilton (1952: pl. 44A)
423197		Mace	Hamilton (1952: pl. 44A); Fundaburk and Foreman (1957: pl. 92)
423198		Mace	Hamilton (1952: pl. 41); Fundaburk and Foreman (1957: pl. 92)
423227		Pendant	Compare with Hopewell bird in Moorehead (1897:259, fig. XLII)
423234		Cup	Hamilton (1952: pl. 106); Phillips and Brown (1984: pl. 282)
423235		Cup	Hamilton (1952: pl. 117A); Phillips and Brown (1978: pl. 81), Braden Style
423236		Cup	Hamilton (1952: pl. 108A); Phillips and Brown (1984: pl. 232)
423237		Cup	Hamilton (1952: pl. 131B); Phillips and Brown (1978:pl. 116), style Braden C
423238		Cup	Hamilton (1952: pls. 92B, 105); not in Phillips and Brown (1978, 1984)
423239		Cup	Hamilton (1952: pl. 115B); Phillips and Brown (1984: pl. 329)
423240		Cup	Duffield (1964: pl. XXXIII); Phillips and Brown (1978: pl. 114), Braden C; Hamilton (1952: pl. 129B)
423241		Cup	Hamilton (1952: pl. 94A); Phillips and Brown (1984: pl. 318)
423242		Cup	Hamilton (1952: pl. 129A); Phillips and Brown (1978: pl. 113), Braden C
423243		Cup	Hamilton (1952: pl. 94B); Phillips and Brown (1984: pl. 320)
423244		Cup	Hamilton (1952: pl. 128B); Fundaburk and Foreman (1957: pl. 28); Phillips and Brown (1978: pl. 121)
423245		Cup	Hamilton (1952: pl. 118); Fundaburk and Foreman (1957: pl. 25); also see Clements (1945: pl. XLIII) for similar depiction; Phillips and Brown (1984: pl. 305)
423246		Cup	Hamilton (1952: pl. 119A); Fundaburk and Foreman (1957: pl. 25); Phillips and Brown (1984: pl. 278a)
423247		Cup	Hamilton (1952: pl. 92A); Fundaburk and Foreman (1957: pls. 24, 27); Phillips and Brown (1984: pl. 315)
423248		Cup	Hamilton (1952: pl. 122A); Phillips and Brown (1984: pl. 214a)
423249		Cup	Phillips and Brown (1984: pl. 79); Hamilton (1952: 115A); Phillips and Brown (1978: pl. 79)
423250		Cup	Hamilton (1952: pl. 136A); Phillips and Brown (1978, pl. 1222)
423251		Cup	Hamilton (1952: pl. 134D); Phillips and Brown (1984: pl. 246)
423252		Cup	Bird in flight, chevron, and an animal that may be an armadillo; not in Phillips and Brown (1978, 1984); assigned Braden C based on execution

Catalog number	Subnumber (if any)	Object	References and notes
423253		Cup	Nearly identical to Phillips and Brown (1984: pl. 327); not in Phillips and Brown (1978, 1984) but might fit center portion shown in their (1984) pl. 333C
423254		Cup	Hamilton (1952: pl. 136B); Phillips and Brown (1984: pl. 264)
423255		Cup	Hamilton (1952: pl. 108B); Phillips and Brown (1984: pl. 230)
423256		Cup	Hamilton (1952: pl. 95A); Phillips and Brown (1984: pl. 312)
423257		Cup	Duffield (1964) plate XXII5 could be a piece of this or similar shell; Hamilton (1952: pl. 103C); Phillips and Brown (1978: pl. 89b)
423258		Cup	Hamilton (1952: pl. 122B); Phillips and Brown (1984: pl. 213a)
423259		Cup	Hamilton (1952: pl. 120B); Phillips and Brown (1978: pl. 101)
423260		Cup	Hamilton (1952: pl. 114B); Phillips and Brown (1978: pl. 76), Braden style
423261		Cup	Hamilton (1952: pl. 132C); Phillips and Brown (1984: pl. 234.1)
423262		Cup	Phillips and Brown (1984: pl. 308.1)
423263		Cup	Phillips and Brown (1984: pl. B-7L)
423264		Cup	Hamilton (1952: pl. 125A); Phillips and Brown (1984: pl. 233)
423265		Cup	Hamilton (1952: pl. 103B); Phillips and Brown (1978: pl. 86a); see also 448870
423266		Cup	Hamilton (1952: pl. 128A); Fundaburk and Foreman (1957: pl. 28); Phillips and Brown (1978: pl. 64)
423267		Cup	Phillips and Brown (1984: pl. 316A)
423268		Cup	Hamilton (1952: pl. 130C); Phillips and Brown (1984: pl. A-1Cb)
423269		Cup	Hamilton (1952: pl. 117B); Phillips and Brown (1978: pl. 108)
423270		Cup	Hamilton (1952: pl. 116A); Phillips and Brown (1984: pl. 240a)
423271		Cup	Burnett (1945: pls. LI and LII); Phillips and Brown (1984: pl. 234a); Hamilton (1952: pl. 132B)
423272		Cup	Phillips and Brown (1978: pl. 89a)
423273		Cup	Hamilton (1952: pl. 122C); Phillips and Brown (1984: pl. 295a), Craig style
423274		Cup	Phillips and Brown (1978: pl. 45a)
423275		Cup	Phillips and Brown (1984: pl. 225c)
423276		Cup	Hamilton (1952: 134C); Phillips and Brown (1984: pl. 247a)
423277		Cup	Hamilton (1952: 138E); Duffield (1964: pl. XXIX4), probably same shell; similar to fragment shown in Phillips and Brown (1984: pl. A-1F)
423278		Cup	Phillips and Brown (1984: pl. 187c); Duffield (1964: pl. XXXII1); Hamilton (1952:75, pl. 124A);
423279		Cup	Hamilton (1952: 116B); Phillips and Brown (1984: pl. 167c)
423280		Cup	Hamilton (1952: 138C); Phillips and Brown (1984: pl. 257a); see also 448852
423281		Cup	Hamilton (1952: 125D); Phillips and Brown (1978: pl. 53a), Braden B style; Phillips and Brown (1978) show 448880F as being from same shell
423282		Cup	Hamilton (1952: pl. 125C); Phillips and Brown (1984: pl. 304C)
423283		Cup	Phillips and Brown (1984: pl. 287Gb); Hamilton (1952: pl. 126A)
423284		Cup	Hamilton (1952: pl. 125B); Phillips and Brown (1984: pl. 215A); Duffield (1964: pl. XII) has pictured a fragment that might fit this one
423285		Cup	Phillips and Brown (1984: pl. A-2B)
423286		Cup	Phillips and Brown (1984: pl. 174a)
423287		Cup	Phillips and Brown (1984: pl. 263c); Hamilton (1952: pl. 138A)
423288		Conch	Phillips and Brown (1984: pl. 178.1B)
423289		Cup	Hamilton (1952: pl. 134B); Phillips and Brown (1984: pl. 237b)
423290		Cup	Phillips and Brown (1984: pl. 252b); Hamilton (1952: pl. 138D)
423291		Cup	Phillips and Brown (1984: pl. B-80)
423292		Gorget	Hamilton (1952: pl. 91D); Phillips and Brown (1984: pl. 275Ba); Brain and Phillips (1996:446)
423293		Gorget	Phillips and Brown (1984: pl. 148Ab); Brain and Phillips (1996:445)
423295		Gorget	Hamilton (1952: pl. 91B); Phillips and Brown (1984: pl. 273C)
423296		Cup	Hamilton (1952: pl. 139A); Phillips and Brown (1984: pls. 159h, 163D)
423297		Cup	Hamilton (1952: pl. 139B); Phillips and Brown (1984: pl. 159e); see also 423296
423298		Cameo	Hamilton (1952: pl. 85); Fundaburk and Foreman (1957: pl. 158); Phillips and Brown (1984: pl. 152Ba)
423299		Cameo	Hamilton (1952: pl. 85); Fundaburk and Foreman (1958); Phillips and Brown (1984: pl. 152B)
423300		Cameo	Hamilton (1952: pl. 85)
423301		Cameo	Hamilton (1952: pl. 85)
423305		Pendant	Hamilton (1952: pl. 83B)
423309		Bead	Type illustration Hamilton (1952: pl. 66)

(*continued*)

Catalog number	Subnumber (if any)	Object	References and notes
423310		Bead	Hamilton (1952: pl. 66)
423312		Disc	Hamilton (1952: pl. 66)
423313		Bead	Hamilton (1952: pl. 66)
423314		Bead	Hamilton (1952: pl. 66)
423315		Bead	Hamilton (1952: pl. 66)
423317		Bead	Hamilton (1952: pl. 66)
423318		Bead	Hamilton (1952: pl. 66)
423324		Bead	Hamilton (1952: pl. 66)
423329		Bead	Hamilton (1952: pl. 66)
423352		Mantle	Pictured in Hamilton (1952: pl. 146); lower also shown in Trowbridge notebook in NAA (Wedel correspondence file)
423353		Mantle	Hamilton (1952: pl. 145); also shown in Trowbridge notebook in NAA (Wedel correspondence file)
423354		Mantle	Hamilton (1952: pl. 146); also shown in Trowbridge notebook in NAA (Wedel correspondence file)
423355		Mantle	Hamilton (1952: pl. 147); Fundaburk and Foreman (1957: pl. 133); also shown in Trowbridge notebook in NAA (Wedel correspondence file)
423356		Mantle	Hamilton (1952: pl. 145); also shown in Trowbridge notebook in NAA (Wedel correspondence file); Rogers et al. (2002)
423357		Mantle	Hamilton (1952: pl. 148, lower); also shown in Trowbridge notebook in NAA (Wedel correspondence file)
423358		Mantle	Hamilton (1952: pl. 148); also shown in Trowbridge notebook in NAA (Wedel correspondence file)
423359		Bundle	Hamilton (1952: pl. 149, lower); also shown in Trowbridge notebook in NAA (Wedel correspondence file)
423360		Bundle	Hamilton (1952: pl. 149); also in Trowbridge notebook in NAA (Wedel correspondence file)
423361		Bundle	Hamilton (1952: pl. 149); Rogers et al. (2002)
423362		Bundle	Hamilton (1952: pl. 149); Rogers et al. (2002)
423365		Bundle	Whitford (1941); Rogers et al. (2002)
423366		Bundle	Rogers et al. (2002)
423367		Fragments	Rogers et al. (2002)
423368		Fragments	Whitford (1941); Rogers et al. (2002)
423369		Fragments	Whitford (1941); Rogers et al. (2002)
423370		Fragments	Hamilton (1952: pl. 143); Rogers et al. (2002)
423371		Fragments	Rogers et al. (2002)
423372		Fragments	Rogers et al. (2002)
423373		Fragments	Rogers et al. (2002)
423374		Fragments	Rogers et al. (2002)
423375		Cord	Rogers et al. (2002)
423377		Cord	Rogers et al. (2002)
423378	s02	Cloth	Rogers et al. (2002)
423378	s06	Cup	incised pattern too fragmentary to infer style, has curvilinear pattern, perhaps of the ceramic mimicry styles of Braden
423379		Cloth	Hamilton (1952: pl. 152)
423380		Cloth	Rogers et al. (2002)
423386		Matting	Whitford (1941)
423388		Matting	Hamilton (1952: pl. 62)
423389		Basketry	Hamilton (1952: pl. 62); Whitford (1941)
423390		Basketry	Hamilton (1952: pl. 62)
448663		Pipe	Hamilton (1952: pl. 13, left); Griffin (1952) states this pipe is Middle Mississippian and associates it with pipes from Gahagan (Coles Creek and Gibson aspects); Spiro is the western margin of the pipe's distribution (Griffin, 1952:92)
448664		Pipe	Hamilton (1952: pl. 13, right); Griffin (1952) states this pipe is Middle Mississippian and associates it with pipes from Gahagan (Coles Creek and Gibson aspects); Spiro is the western margin of the pipe's distribution (Griffin, 1952:92)
448665		Pipe	Hamilton (1952: pl. 16A)
448667		Pipe	Hamilton (1952: pl. 17D); discussed by Griffin (1952:91–92)
448668		Pipe	Hamilton (1952:34, pl. 8)
448670		Celt	Hamilton (1952: pl. 24A); described therein as bone spatula
448673		Celt	Hamilton (1952: pl. 52, bottom)

Catalog number	Subnumber (if any)	Object	References and notes
448674		Celt	Hamilton (1952: pl. 52); Brain and Phillips (1996:378)
448677		Boatstone	Hamilton (1952:47, pl. 59)
448678		Discoidal	Hamilton (1952:47, pl. 58)
448679		Discoidal	Hamilton (1952:47)
448689		Mineral lumps	CAL Report 2018; MCI Report 2018.2 (Smithsonian Institution, Museum Conservation Institute, unpublished reports, 1975 and 2010)
448711		Tube	See Fundaburk and Foreman (1957)
448713		Bead	Hamilton (1952: pl. 69)
448740		Pendant	Same type as 448741
448741		Pendant	Phillips and Brown (1984: pl. 152Ib); also see Brown (1976: fig. 81g) for identical type in University of Arkansas collection
448742		Pendant	Hamilton (1952: pl. 88D); Phillips and Brown (1984: pl. 336a)
448743		Gorget	Not pictured elsewhere
448744		Gorget	Not in Phillips and Brown (1978, 1984); fenestrated
448746		Gorget	Phillips and Brown (1984: pl. 274a)
448747		Gorget	Phillips and Brown (1984: pl. 138a)
448748		Gorget	Phillips and Brown (1978: pl. 23Cb); Brain and Phillips (1996:447)
448749		Gorget	Phillips and Brown (1984: pl. 134A); Brain and Phillips (1996:453)
448750		Gorget	Phillips and Brown (1984: pl. 131D); Brain and Phillips (1996:454)
448751		Gorget	Phillips and Brown (1984: pl. 131D); Brain and Phillips (1996:454); see also 448750
448752		Gorget	Phillips and Brown (1984: pl. 144A); Brain and Phillips (1996:453)
448753		Gorget	Phillips and Brown (1978: pl. 23A)
448754		Gorget	Phillips and Brown (1984: pl. 128d); see also 448761s011 and s012
448755		Gorget	Phillips and Brown (1984: pl. 131B); Brain and Phillips (1996:453)
448756		Gorget	Not located
448758		Gorget	Phillips and Brown (1984: pl. 125); Brain and Phillips (1996:453)
448759		Gorget	See Watson (1950); Phillips and Brown (1984: pl. 152E)
448760		Gorget	Phillips and Brown (1984: pl. 275a,b); Brain and Phillips (1996:453)
448761	s011	Gorget	Phillips and Brown (1984: pl. 128c); Brain and Phillips (1996:452)
448761	s012	Cup	See Phillips and Brown (1984: pl. 128)
448761	s021	Gorget	Phillips and Brown (1984: pl. 146); Brain and Phillips (1996:455)
448761	s022	Cup	Phillips and Brown (1984: pl. 146)
448762		Gorget	Phillips and Brown (1984: pl. 338D)
448763		Gorget	Phillips and Brown (1984: pl. 152K)
448765		Gorget	Phillips and Brown (1984: pls. 131B,C, 134B [see also 448749], 148, 151E, 151N, 273F, 275Ab [see also 448760], 275Bb, 277Ca–b); see Brain and Phillips (1996:451) for hand and eye fragments; Brain and Phillips (1996:453–454)
448769		Pendant	See Duffield (1964: pl. XIII1–3) for ear pendants; Burnett (1945); Clements (1945: pl. LVIII d); Hamilton (1952: pl. 106) (423234) shows man wearing one; Phillips and Brown (1984: pl. 338E)
448770		Hook pendant	Hamilton (1952: pl. 83)
448772		Effigy	Phillips and Brown (1984: pl. 285b)
448773		Effigy	Hamilton (1952: pl. 66, top right)
448782		Cup	Phillips and Brown (1978:30, fig. 11)
448783		Cup	Phillips and Brown (1978: pl. 83)
448784		Cup	Hamilton (1952: pl. 115B); Burnett (1945: pl. LVIII); Phillips and Brown (1984: pl. 331) (incorrectly numbered as 448819 in Phillips and Brown)
448785		Cup	Phillips and Brown (1978: pl. 62), where it is referred to as 448880, not 448785
448786		Cup	Phillips and Brown (1978: pl. 115)
448787		Cup	Phillips and Brown (1984: pl. 200)
448788		Cup	Phillips and Brown (1978: pl. 80)
448789		Cup	Phillips and Brown (1978: pl. 77)
448790		Cup	Hamilton (1952: pl. 114A); Phillips and Brown (1978: pl. 57)
448791		Cup	Phillips and Brown (1978: pl. 24)
448792		Cup	Phillips and Brown (1978: pl. 122)
448793		Cup	Phillips and Brown (1978: pl. 119)
448794		Cup	Similar to Hamilton (1952: pl. 95A); Phillips and Brown (1984: pl. 317)
448795		Cup	Phillips and Brown (1984: pl. 322)
448796		Cup	Phillips and Brown (1984: pl. 296)
448797		Cup	Phillips and Brown (1984: pl. 330)
448798		Cup	Phillips and Brown (1984: pl. 165.1)

(*continued*)

Catalog number	Subnumber (if any)	Object	References and notes
448799		Cup	Phillips and Brown (1984: pl. 321)
448800		Cup	Phillips and Brown (1984: pl. 299)
448801		Cup	Phillips and Brown (1984: pl. 238a)
448802		Cup	See 448812 similar design; Phillips and Brown (1984: pl. 300)
448803		Cup	Phillips and Brown (1978: pl. 99a)
448804		Cup	Phillips and Brown (1984: pl. 259)
448805		Cup	Phillips and Brown (1978: pl. 100)
448806		Cup	Phillips and Brown (1984: pl. 260a)
448807		Cup	Phillips and Brown (1978: pl. 47), Braden style
448808		Cup	Phillips and Brown (1984: pl. 235)
448809		Cup	Phillips and Brown (1978: pl. 106)
448810		Cup	Duffield (1964, pl. XXXIII6); similar to Phillips and Brown (1978: pl. 67)
448811		Cup	Hamilton (1952: pl. 121B); Phillips and Brown (1978: pl. 58)
448812		Cup	Phillips and Brown (1984: pl. 301)
448813		Cup	Phillips and Brown (1984: pl. 328)
448814		Cup	Phillips and Brown (1984: pl. 188)
448815		Cup	Phillips and Brown (1984: pl. 266A,B)
448816		Cup	Phillips and Brown (1984: pl. 122.1b)
448817		Cup	Hamilton (1952: 116A); see 423270 for other horned snakes; Phillips and Brown (1984: pl. 241B)
448818		Cup	Duffield (1964, pl. XXXIII); Phillips and Brown (1984: pl. 269a,b)
448819		Cup	Phillips and Brown (1978: pl. 11a)
448820		Cup	Phillips and Brown (1978: pl. 55c), Braden B style, joins to 448871 (Phillips and Brown, 1978: pl. 55b)
448821		Cup	Phillips and Brown (1984: pl. 225a)
448822		Cup	Not believed to be in Phillips and Brown (1978, 1984); paired figures facing a pole similar to Phillips and Brown (1984: pl. 317)
448823		Cup	Not believed to be in Phillips and Brown (1984), compare with their pl. 283.1
448824		Cup	Not believed to be in Phillips and Brown (1984)
448825		Cup	Pictured in Duffield (1964)?; Phillips and Brown (1984: pl. 169a)
448826		Cup	Phillips and Brown (1984: pl. 205a)
448827		Cup	Hamilton (1952: pl. 137A); Phillips and Brown (1978: pl. 46)
448828		Cup	Phillips and Brown (1978: pl. 122.3a)
448829		Cup	Phillips and Brown (1978: pl. 2b)
448830		Cup	Phillips and Brown (1978: pl. 110a,c)
448831		Cup	Hamilton (1952:75, pl. 124A) Phillips and Brown (1984: pl. 187a); Duffield (1964: pl. XXXII)
448832		Cup	Phillips and Brown (1984: pl. 310.1)
448833		Cup	Phillips and Brown (1984: pl. B-3Ra,b)
448834		Cup	Phillips and Brown (1984: pl. 297a)
448835		Cup	Similar figures on 423234; see Clements (1945: pl. XXXVI); Hamilton (1952: pl. 119B); Phillips and Brown (1984: pl. 283a)
448836		Cup	Phillips and Brown (1984: pl. 207Ba)
448837		Cup	Phillips and Brown (1978: pl. 2a); see also 449929
448838		Cup	Phillips and Brown (1978: pl. 25a,c)
448839		Cup	Phillips and Brown (1984: pl. 286b); compare with Hamilton (1952: pl. 126A); Heye (catalog number 18/9118); and see Burnett (1945: pls. XXXIV and XL)
448840		Cup	Phillips and Brown (1984: pl. 267)
448841		Cup	Phillips and Brown (1984: pl. 263a); compare to Hamilton (1952: pl. 138A); see 423287
448842		Cup	Hamilton (1952: pl. 116B); Phillips and Brown (1984: pl. 167a,b,d)
448843		Cup	Hamilton (1952: pl. 137A,B); not in Phillips and Brown (1984)
448844		Cup	Phillips and Brown (1984: pl. B-1G); see Phillips and Brown (1978: pl. 51) for rest of vessel
448845		Cup	Hamilton (1952: pl. 104B); Burnett (1945: pls. XVII, XVIII); Phillips and Brown (1984: pl. 219G)
448846		Worked shell	Hamilton (1952: 138B); Phillips and Brown (1984: pl. 159a)
448847		Cup	Hamilton (1952: pl. 123); Phillips and Brown (1978: pl. 1)
448848		Cup	Phillips and Brown (1984: pls. 226Db, 227a)
448849		Cup	Phillips and Brown (1984: pl. 31B), Braden A
448850	s01	Cup	Phillips and Brown's (1978) pl. 59Aa,Ac along with fragment from 448874 is part of same shell and shown again in Phillips and Brown (1984: pl. B-2Bd; these were given subnumber 448850s01

Catalog number	Subnumber (if any)	Object	References and notes
448850	s02	Cup	Phillips and Brown (1984: pl. B-12H)
448851		Cup	Phillips and Brown (1984: pl. 153a,b); Hamilton (1952: pl. 127B) shows refitting piece of same shell
448852		Cup	Hamilton (1952: pl. 138C); Phillips and Brown (1984: pl. 257b,c)
448853	s01	Cup	Phillips and Brown (1984: pl. 251a,b)
448853	s02	Cup	Phillips and Brown (1984: pl. 2571b)
448853	s03	Cup	Phillips and Brown (1984: pl. 258b)
448853	s04	Cup	One could be from vessel in Phillips and Brown (1984: pl. 252)
448853	s05	Cup	Phillips and Brown (1984: pl. 324)
448854		Cup	Phillips and Brown (1978: pl. 104); Phillips and Brown (1984: pl. B-8G)
448855		Cup	Phillips and Brown (1978: pl. 95)
448856		Cup	Duffield (1964, pl. XVIII1–3); Phillips and Brown (1978, 1984)
448857		Cup	Hamilton (1952: pl. 109) for comparable figure; Phillips and Brown (1978: pl. 70)
448858	s01–33	Cup	Phillips and Brown's plates (1978: pl. 3a; 1984: pls. 168d, 195a) show bridge between 448880 and 1 fragment 448858A similar to pl. XXVII of Clements (1945); also see Fundaburk and Foreman (1957: pl. 54)
448858	s01	Cup	Phillips and Brown (1984: pl. 197a), 2 refitted fragments 448858; 1 matching fragment from 448861 (Phillips and Brown, 1984: pl. 197b)
448858	s02	Cup	Phillips and Brown (1984: pl. 311); 2 men facing each other and holding snake staffs
448858	s03	Cup	Not in Phillips and Brown (1978, 1984); birdman
448858	s04	Cup	Called the Atlatl Cup in Phillips and Brown (1978: pl. 9a)
448858	s05	Cup	Possibly Phillips and Brown (1984: pl. 190)
448858	s06	Cup	Possibly Phillips and Brown (1984: pl. 158)
448858	s07	Cup	Possibly Phillips and Brown (1984: pl. 155a), fragment 2, one facing right, arms out in Bilbao stance
448858	s08	Cup	Intertwined snake men theme, Phillips and Brown (1984: pl. 195a)
448858	s09	Cup	Phillips and Brown (1984: pl. 217b) man with long snake head and neck
448858	s10	Cup	Phillips and Brown (1984: pl. 210Ac,Ca,Cb)
448858	s11	Cup	16 fragments; shown in Phillips and Brown (1984: pls. 163E,F, 198B, 278b)
448858	s12	Cup	Phillips and Brown (1984: pl. 168.1a); see their note
448859		Cup	Phillips and Brown (1984: pl. 163A)
448860		Cup	Hamilton (1952: pl. 123B); Phillips and Brown (1978: pl. 12a)
448861	s01–04	Cup	Phillips and Brown (1978: pl. 21); see also 448865-2 fragments in Phillips and Brown (1984: pls. 155B, 169c, 210D, 273A, 297b, B-8G; B-8K)
448861	s01	Cup	Phillips and Brown (1984: pl. 220b)
448861	s02	Cup	Phillips and Brown (1984: pl. 8-K), rows of heads facing left
448861	s03	Cup	Possible serpent man; has hair on end and lidded eye as on 448852
448861	s04	Cup	Shows snout with teeth; small fragment, Phillips and Brown (1984: pl. 226A)
448861	s05	Cup	Phillips and Brown (1978: pl. 22G)
448861	s06	Cup	Phillips and Brown (1984: pl. 156); includes fragment of 448858
448862		Cup	Hamilton (1952: pl. 126B); Phillips and Brown (1984: pl. 161b,c); see also 448858
448863		Cup	Phillips and Brown (1978: pl. 22D), Braden A
448864		Cup	Phillips and Brown (1978: pl. 103), Braden C
448865		Cup	Hamilton (1952: pl. 127A); Phillips and Brown (1978: pl. 21a,h [448861], 21d,e [448865, 448880])
448866	s01–12	Cup	Phillips and Brown (1978: pls. 25, 110c); Phillips and Brown (1984: pls. 171Cb, 198Hb, 241A, B-3A, B-3L); Hamilton (1952: pl. 111); University of Arkansas collection shell with snake-jaguar-wing combination is probable match; see Phillips and Brown (1984: pls. B8, B22, B52) for further matches; see also 448838
448866	s01	Cup	Various serpent motifs, mostly in Braden B style, cross-hatching; on one apical fragment the snake wraps around the apex and has excised bits and an underbelly of trapezoid with center rectangles; not pictured in Phillips and Brown (1984); twined snakes mostly; one is Phillips and Brown (1978: pl. 96.1)
448866	s02	Cup	Phillips and Brown (1984: pl. 26) include 2 fragments, 448880 and 448866
448866	s03	Cup	Phillips and Brown (1984: pl. 204C)
448866	s04	Cup	Phillips and Brown (1978: pl. 22H)
448866	s05	Cup	Three fragments from one vessel; Phillips and Brown (1984: pl. 224b); largest fragment (448866) shows anus of animal surrounded by a nimbus with hair marks; 2 more smaller fragments of 448880 go with this vessel; 1 edge fragment is from another vessel in Phillips and Brown (1984: pl. 218Aa)

(*continued*)

Catalog number	Subnumber (if any)	Object	References and notes
448866	s06	Cup	Snake with dotted circle, modified trilobite on snake body; Phillips and Brown (1978: pl. 8Aa,B), 1 large fragment 448866, 1 small fragment 448848, another small fragment 448876 included under parent 448866s06
448866	s07	Cup	Phillips and Brown (1984); smaller 4 body fragments are 448878
448866	s08	Cup	Phillips and Brown (1978: pl. 52a)
448866	s09	Cup	Larger apical fragment, Phillips and Brown (1978, 1984: pl. 198Hb), small fragments numbered; 448866-B resembles exactly the representation in Phillips and Brown (1984: pl. 229); serpentine piasa in swastika arrangement, grouped because of motif similarity
448866	s10	Cup	Phillips and Brown (1978: pls. 30D [small], 35Aa [larger])
448866	s11	Cup	Phillips and Brown (1984: pls. 242, B-7I); 6 fragments are 448866 and 448880
448866	s12	Cup	Two large fragments 488866, 2 small fragments 448880; Phillips and Brown (1978: pl. 28A,B), Braden A (1 fragment)
448867	s01–04	Cup	Hamilton (1952: pls. 99C, 108, 110–117); Phillips and Brown (1984: pls. 241A, 257.1a, B-6Ad)
448867	s01	Cup	Phillips and Brown (1984: pl. 243A,B)
448867	s02	Cup	One fragment is 448866 and 1 is 448880; 2 are 448867A; Phillips and Brown (1984: pl. 182B,C,G) and apical fragment not shown in Phillips and Brown (1984)
448867	s03	Cup	One large fragment is 448867, 4 others are 448880; Phillips and Brown (1984: pls. B6Aa–Ac, B6Ad)
448868		Cup	Phillips and Brown (1978: pl. 91a,b,c); Braden, also 1 fragment 448880; Phillips and Brown (1984: pl. 186B)
448869	s01–03	Cup	Phillips and Brown (1984: pls. 183b, 186H, 208Ha, 208.1Ad, 209.1)
448869	s01	Cup	Phillips and Brown (1984: pls. 171Cc,Cb, 186H, 186B) (448868); Phillips and Brown (1984: pl. 209.1), woodpecker head with dotted beak; Phillips and Brown (1984: pl. 183b); several may not be pictured in Phillips and Brown
448869	s02	Cup	Barred oval, feathers, beaded forelock, divided arcs; similar to Phillips and Brown (1984: pl. 204.1) but does not match
448869	s03	Cup	Phillips and Brown (1984: pl. 208Ha,b)
448870		Cup	Phillips and Brown (1978: pl. 86b)
448871	s01	Cup	Phillips and Brown (1984: pl.176), of a shot bison; pl. 176b is 448871
448871	s02	Cup	Maces and broken arrows; Phillips and Brown (1978: pl. 66a)
448871	s03	Cup	Two fragments, neither of which is in Phillips and Brown (1978, 1984); show arrow fletching, arrowheads
448872		Cup	Hamilton (1952: pl. 130A); Phillips and Brown (1984: pl. 270b,e,f,g); 2 large fragments 448872; 2 small fragments 448871
448873		Cup	Phillips and Brown (1984: pl. 201a)
448874	s01	Cup	Hamilton (1952: pls. 134C,D, 135); Phillips and Brown (1978: pls. 59C [see 448850s01], 183, 174c [s03], 248a,b [s01])
448874	s02	Cup	Very rare to see double outlining; see Phillips and Brown (1984: pl. A-5M)
448874	s03	Cup	Consists of large fragments 423286, distal fragment 448874, small fragment 448880; single animal face with horns and snout on background of concentric scallop design; Phillips and Brown (1984: pl. 174)
448875	s01	Cup	Phillips and Brown (1984: pl. 170F)
448875	s02	Cup	Phillips and Brown (1984: pl. 172)
448875	s03	Cup	Phillips and Brown (1978: pl. 90)
448875	s04	Cup	Phillips and Brown (1984: pl. 333E)
448876		Cup	448876–448876A is subsumed in s02; Phillips and Brown (1978: pls. 36a,b; 38b)
448876	s01	Cup	Phillips and Brown (1978: pl. 18)
448876	s02	Cup	One placed to Phillips and Brown (1978: pl. 37A), but the others are not in Phillips and Brown (1978, 1984)
448876	s03	Cup	Phillips and Brown (1984: pl. 179D)
448876	s04	Cup	Not in Phillips and Brown (1978, 1984); spirals, dotted half circles, and sawtooth border
448877		Cup	Phillips and Brown (1978: pls. 34b, 122.1a, 122.3b; 1984: pl. 225); 448877A, Phillips and Brown (1984: pl. 333F)
448877	s01	Cup	Phillips and Brown (1984: pl. 338H)
448877	s02	Cup	Phillips and Brown (1984: pl. A-2 A,P)
448877	s03	Cup	Phillips and Brown (1984: pl. B-2C)
448877	s04	Cup	Phillips and Brown (1978: pl. 34B)
448877	s05	Cup	Phillips and Brown (1984: pl. 222Da)

Catalog number	Subnumber (if any)	Object	References and notes
448877	s06	Cup	Not in Phillips and Brown (1978, 1984); Davis rectangle and concentric rayed, barred ovals
448877	s07	Cup	Phillips and Brown (1984: pl. 271); designated as 448877A by Phillips and Brown (1984)
448877	s08	Cup	Phillips and Brown (1984: pl. 272B)
448878		Cup	Phillips and Brown (1984: pls. 199K, B-3Rb, B-4Ba); 448878B, Phillips and Brown (1984: pl. 185f)
448878	s01	Cup	Phillips and Brown (1984: pl. 184)
448878	s02	Cup	Phillips and Brown (1984: pl. 185)
448878	s03	Cup	Phillips and Brown (1978: pl. 97a,b) (448880)
448879		Cup	See Duffield (1964: pl. XXXV2) for similar design; Phillips and Brown (1984: pl. 183.1a,c)
448879	s01	Cup	Phillips and Brown (1984: pl. 261)
448879	s02	Cup	Phillips and Brown (1984: pl. 260)
448880	s00	Cup	Phillips and Brown (1984: pl. 280.1)
448880	Various	Cup	See Duffield (1964: pls. XXIX3, X1 [on pendant]); Phillips and Brown (1978: pls. 4c, 9b [with 448858], 13B, 14b, 15a, 20c, 21 [2 fragments, see 448865], 22E, 24 [with 448791], 26d [with 448866s02], 28B [with 448866s12])
448880	Various	Cup	Phillips and Brown (1978: pls. 30A, 31A, 33B, 43b, 53bc, 59F, 91a [with 448868], 92, 94A, 96A, 97B [with 448878s03], 99B [with 448803], 111A, 112a; 1984: pls. 161a,d [with 448862], 162f, 163Ba,c, 166.1, 168b,c, 168.1b [with 448858s12])
448880	Various	Cup	Phillips and Brown (1984: pls. 170A,D, 171A, 173Aa,B, 174d [with 448874s03], 175d,e, 176a,e,f [with 448871s01], 177b, 179Ba,C, 179Da, 181F, 182d, 183c,d,e, 183.1d, 183.1b,e,f [with 448879s02]; 184d, 186D; 204Ab,B)
448880	Various	Cup	Phillips and Brown (1984: pls. 204.1c, 204.1a,b, 207A,Bb [with 448836], 208Cb, 208.1Aa, 208.1Ab, 209.1E,F,G, 210Ca [with 448858s10], 210Bb,E, 220a [with 448861s01], 222H, 224a,f [with 448866s05], 225e [with 448821], 227b,c [with 448848], 229b, 239h, 244a)
448880	Various	Cup	Phillips and Brown (1984: pls. 262D, 266b [with 448815], 271.1e, 273G, 280.1b, 283.1 [mislabeled as 448823], 302.1, 310.1 [with 448832], 333A [with 448875], 334, 338Ha,b [with 448877], A-4G,P, A-5I,K,R, B-1C,J,N, B-1H, B-2Cb,c [with 448877], B-2H [with 448816])
448880	Various	Cup	Phillips and Brown (1984: pls. B-2I [with 448828], B-3E,G,N,Pa, B-3B,H,J,K,O, B-4Bb,E,G,L, B-6Aa-c [with 448867], B-7A,D,H, B-7J,K, B-8F,H, B-8I, B-12Ga, B-12Q)
448880	s01	Cup	Phillips and Brown (1978: pl. 43)
448880	s02	Cup	Phillips and Brown (1978: pl. 13B)
448880	s03	Cup	Phillips and Brown (1978: pls. 4C, 22E)
448880	s04	Cup	Phillips and Brown (1984: pl. 244A)
448880	s05	Cup	Phillips and Brown (1984: pls. 171A, 173A,B, 177B, 179Ba,C, 182D)
448880	s06	Cup	Phillips and Brown (1978: pl. 14B)
448880	s07	Cup	Phillips and Brown (1984: pl. 170A,D)
448880	s08	Cup	Phillips and Brown (1978: pls. 30A, 31A); Phillips and Brown (1984: pl. B-3K,O)
448880	s09	Cup	Phillips and Brown (1978: pl. 15) and Phillips and Brown (1984: pl. 197), fragment pictured twice
448880	s10	Cup	Phillips and Brown (1978: pl. 33B)
448880	s11	Cup	Phillips and Brown (1984: pl. A-4G)
448880	s12	Cup	Phillips and Brown (1978: pl. 111A)
448880	s13	Cup	Not in Phillips and Brown (1978, 1984); bitriangular arrows
448880	s14	Cup	Not in Phillips and Brown (1978, 1984); barred oval, snake, feathers
448880	s15	Cup	Phillips and Brown (1978: pl. 53B,C)
448880	s16	Cup	Not in Phillips and Brown (1978, 1984); Bird Man
448880	s17	Cup	Not in Phillips and Brown (1978, 1984); bird head on belt, pear-shaped object, pole with protuberance
448880	s18	Cup	Phillips and Brown (1984: pl. 302.1)
448880	s19	Cup	Phillips and Brown (1984: pl. 334)
448880	s20	Cup	Phillips and Brown (1984: pl. 183)
448880	s21	Cup	Phillips and Brown (1984: pls. 163Bb, 186D)
448880	s22	Cup	Phillips and Brown (1984: pl. 209.1E,F)
448880	s23	Cup	Phillips and Brown (1984: pls. 204.1C, 208.1Ab, 209.1G); Phillips and Brown's (1984) pls. 204Ab,B and 204.1A,B may be included with these fragments, but there is no photographic evidence

(*continued*)

Catalog number	Subnumber (if any)	Object	References and notes
448880	s24	Cup	Phillips and Brown (1984: pl. 210Bb; 222H)
448880	s25	Cup	Phillips and Brown (1984: pl. 175D,E)
448880	s26	Cup	Phillips and Brown (1984: pl. 168B,C,D)
448880	s27	Cup	Phillips and Brown (1978: pl. 112A)
448880	s28	Cup	Phillips and Brown (1978: pl. 94A)
448880	s29	Cup	Phillips and Brown (1978: pl. 96A); Phillips and Brown (1984: pl. B-7Jb)
448880	s30	Cup	Phillips and Brown (1984: pl. 166.1A,B,C,D)
448880	s31	Cup	Phillips and Brown (1978: pl. 20C)
448880	s32	Cup	Phillips and Brown (1984: pl. B-1Ha,Hb)
448880	s33	Cup	Phillips and Brown (1978: pl. 92A)
448880	s34	Cup	Phillips and Brown (1984: pls. 208Cc, B-3H,J, B-4Bb); 35 other pieces that are unintelligible
448880	s35	Cup	Phillips and Brown (1984: pls. 273G, A-5I, B-3B, B-4Ba,L); other pieces not in Phillips and Brown (1978, 1984)
448880	s36	Cup	Phillips and Brown (1984: pls. 210E, A-5R); other pieces not in Phillips and Brown (1978, 1984)
448880	s37	Cup	Phillips and Brown (1984: pls. 262D, 271.1E)
448880	s38	Cup	Either too little of design present to matter or unengraved
448880	s39	Cup	Phillips and Brown (1984: pl. 162F)
448880	s40	Cup	Phillips and Brown (1984: pls. A-5K, B-4E,G); one other fragment not found in Phillips and Brown
448880	s41	Cup	Phillips and Brown (1984: pls. 229B, 239H, B-12Ga,Q)
448880	s42	Cup	Phillips and Brown (1978: pl. 59F); Phillips and Brown (1984: pls. A-4P, B-7K, B-8I); other pieces not in Phillips and Brown (1978, 1984)
448880	s43	Cup	All badly deteriorated; not in Phillips and Brown (1978, 1984)
448880	s44	Cup	Worked shell; not in Phillips and Brown (1978, 1984)
448880	s45	Cup	Phillips and Brown (1978: pl. 62)
448881		Cup	Not in Phillips and Brown (1978, 1984); unclear designs due to a heavy mat impression
448882		Cup	Not in Phillips and Brown (1978, 1984)
448885	s04	Worked shell	Not in Phillips and Brown (1978, 1984)
448890		Figure	Hamilton (1952: pl. 26) (shown with head)
448891		Effigy	Hamilton (1952: pl. 25)
448892		Effigy	Hamilton (1952: pl. 26); Brose (1985: pls. 96, 138); identified by Brose as seated male figure, Caddoan culture Spiro phase, Mississippian period ad 1200–1350
448893		Effigy bowl	Hamilton (1952: pl. 29B)
448894		Effigy bowl	Hamilton (1952: pl. 29A); see Griffin (1952:92) for relation to Middle Mississippi area effigy bowls
448895		Effigy	Hamilton (1952: pl. 30A); Griffin (1952:92); these "dog heads" resemble shell specimens from the Huasteca, Mexico
448896		Effigy	Hamilton (1952: pl. 26)
448897		Worked wood	Hamilton (1952: pl. 24B) (wooden blade)
448899		Worked wood	Hamilton (1952: pl. 24C); Burnett (1945, pl. LXXXV)
448915		Cloth fragment	Rogers et al. (2002)
448916		Cord	Rogers et al. (2002)
448917		Cordage, cloth	Rogers et al. (2002)
448919		Cloth	Rogers et al. (2002)
448934		Basketry	Hamilton (1952: pl. 67)

References

Anderson, D. G., and K. E. Sassaman, eds. 1996. *The Paleoindian and Early Archaic Southeast*. Tuscaloosa: University of Alabama Press.

Baerreis, D. A. 1947. Spiro Focus Basketry. *The Museum of the University of Oklahoma, Information Series*, Circular 2:1–12.

———. 1957. The Southern Cult and the Spiro Ceremonial Complex. *Bulletin of the Oklahoma Anthropological Society*, 5:23–28.

Banks, L. D. 1984. "Lithic Resources and Quarries." In *Prehistory of Oklahoma*, ed. R. E. Bell, pp. 65–95. New York: Academic Press.

———. 1990. *From Mountain Peaks to Alligator Stomachs: A Review of Lithic Sources in the Trans-Mississippi South, the Southern Plains, and Adjacent Southwest*. Oklahoma Anthropological Society Memoir, No. 4. Oklahoma City: Oklahoma Anthropological Society.

Barker, A. W., and T. R. Pauketat, eds. 1992. *Lords of the Southeast: Social Inequality and the Native Elites of Southeastern North America*. Archeological Papers of the American Anthropological Association, No. 3. Washington, D.C.: American Anthropological Association.

Barker, A. W., C. E. Skinner, M. S. Shackley, M. D. Glascock, and J. D. Rogers. 2002. Mesoamerican Origin for an Obsidian Scraper from the Precolumbian Southeastern United States. *American Antiquity,* 67(1):103–108.

Bauxar, J. J. 1953. Evidence of a Substructure Chamber under the Brown Mound at Spiro. *American Antiquity,* 19(2):169–170.

Beck, R. A. 2003. Consolidation and Hierarchy: Chiefdom Variability in the Mississippian Southeast. *American Antiquity,* 68(4):641–661.

Bell, R. E. 1947. Trade Materials at Spiro Mound as Indicated by Artifacts. *American Antiquity*, 12(3):181–184.

———. 1953. Pottery Vessels from the Spiro Mound, Cr-1, Le Flore County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society,* 1:25–38.

———. 1958. *Guide to the Identification of Certain American Indian Projectile Points*. Special Bulletin of the Oklahoma Anthropological Society, No. 1. Oklahoma City: Oklahoma Anthropological Society.

———. 1960. *Guide to the Identification of Certain American Indian Projectile Points*. Special Bulletin of the Oklahoma Anthropological Society, No. 2. Oklahoma City: Oklahoma Anthropological Society.

———. 1972. *The Harlan Site, Ck-6, a Prehistoric Mound Center in Cherokee County, Eastern Oklahoma*. Oklahoma Anthropological Society Memoir, No. 2. Oklahoma City: Oklahoma Anthropological Society.

———. 1980. "Fourche Maline: An Archaeological Manifestation in Eastern Oklahoma." In *Caddoan and Poverty Point Archaeology: Essays in Honor of Clarence Hungerford Webb*, ed. J. L. Gibson. *Louisiana Archaeology,* 6:83–125.

———. 1984. "Arkansas Valley Caddoan: The Harlan Phase." In *Prehistory of Oklahoma,* ed. R. E. Bell, pp. 221–240. New York: Academic Press.

Bennett, C., and J. Weymouth. 1982. "A Magnetic Survey in the Plaza Area of the Spiro Mounds Site." In *Spiro Archaeology: 1980 Research*, by J. D. Rogers, pp. 215–226. Norman, Okla.: Oklahoma Archaeological Survey.

Bense, J. A. 1994. *Archaeology of the Southeastern United States: Paleoindian to World War* I. San Diego, Calif.: Academic Press.

Berthoud, G., and F. Savelli. 1979. Our Obsolete Production Mentality: The Heresy of the Communal Formation. *Current Anthropology,* 20:745–760.

Braecklein, J. G. 1936. "Letter to Smithsonian Institution." Accession File 137937. National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Brain, J. P., and P. Phillips. 1996. *Shell Gorgets: Styles of the Late Prehistoric and Protohistoric Southeast*. Cambridge, Mass.: Peabody Museum Press.

Brose, D. S., J. A. Brown, and D. W. Penney. 1985. *Ancient Art of the American Woodland Indians*. New York: Harry Abrams, in association with the Detroit Institute of Arts.

Brown, J. A. 1966a. *Description of the Mound Group*. First Part of the Second Annual Report of Caddoan Archaeology—Spiro Focus Research. Norman, Okla.: University of Oklahoma Research Institute.

———. 1966b. *The Graves and Their Contents*. Second Part of the Second Annual Report of Caddoan Archaeology—Spiro Focus Research. Norman, Okla.: University of Oklahoma Research Institute.

———. 1971a. "The Dimensions of Status in the Burials at Spiro." In *Approaches to the Social Dimensions of Mortuary Practices,* ed. J. A. Brown, pp. 92–112. Washington, D.C.: Society for American Archaeology.

———. 1971b. *Pottery Vessels*. First Part of the Third Annual Report of Caddoan Archaeology—Spiro Focus Research. Norman, Okla.: University of Oklahoma Research Institute.

———. 1976. *The Artifacts*. Second Part of the Third Annual Report of Caddoan Archaeology—Spiro Focus Research. Norman, Okla.: University of Oklahoma Research Institute.

———. 1983. "Spiro Exchange Connections Revealed by Sources of Imported Raw Materials." In *Southeastern Natives and Their Pasts: A Collection of Papers Honoring Dr. Robert E. Bell,* ed. D. G. Wyckoff and J. L. Hofman, pp. 129–162. Norman, Okla.: Oklahoma Archeological Survey.

———. 1984a. *Prehistoric Southern Ozark Marginality: A Myth Exposed*. Missouri Archaeological Society Special Publication, No. 6. Columbia, Missouri: Missouri Archaeological Society.

———. 1984b. "Arkansas Valley Caddoan: The Spiro Phase." In *Prehistory of Oklahoma*, ed. R. E. Bell, pp. 241–263. New York: Academic Press.

———. 1996. *The Spiro Ceremonial Center: The Archaeology of Arkansas Valley Caddoan Culture in Eastern Oklahoma*. Volumes 1–2. Memoirs of the Museum of Anthropology, No. 29. Ann Arbor: University of Michigan.

———. 2010. "Cosmological Layouts of Secondary Burials as Political Instruments." In *Mississippian Mortuary Practices: Beyond Hierarchy and the Representationist Perspective*, ed. L. P. Sullivan and R. C. Mainfort, Jr., pp. 30–53. Gainesville: University of Florida Press.

Brown, J. A., and R. E. Bell. 1964. *The First Annual Report of Caddoan Archaeology—Spiro Focus Research*. Norman, Okla.: University of Oklahoma Research Institute.

Brown, J. A., R. E. Bell, and D. G. Wyckoff. 1978. "Caddoan Settlement Patterns in the Arkansas River Drainage." In *Mississippi Settlement Patterns,* ed. B. D. Smith, pp. 169–200. New York: Academic Press.

Brown, J. A., and J. Kelly. 2000. "Cahokia and the Southeastern Ceremonial Complex." In *Mounds, Modoc and Mesoamerica*, ed. S. R. Ahler, pp. 469–510. Illinois State Museum Scientific Papers, Vol. 28. Springfield: Illinois State Museum.

Brown, J. A., and J. D. Rogers. 1989. Linking Spiro's Artistic Styles: The Copper Connection. *Southeastern Archaeology,* 8:1–8.

———. 1999. AMS Dates on Artifacts of the Southeastern Ceremonial Complex from Spiro. *Southeastern Archaeology,* 18:11–18.

Burnett, E. K. 1945. *The Spiro Mound Collection in the Museum*. New York: Museum of the American Indian, Heye Foundation.

Clements, F. E. 1945. *Historical Sketch of the Spiro Mound*. Contributions to the Museum of the American Indian, Heye Foundation, No. 14:48–68. New York: Museum of the American Indian, Heye Foundation.

Clements, F. E., and Associates. 1935–1938. *Preliminary General Report on Archaeological Work in Oklahoma Sponsored by the University of Oklahoma as a Works Progress Administration Project*. WPA Progress Report 4844. Washington, D.C.: National Anthropological Archives, Smithsonian Institution.

Dickson, D. 1989. Lithic Raw Materials in the Southern Ozark Highlands. Unpublished manuscript. Department of Anthropology, National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Duffield, L. F. 1964. *Engraved Shells from the Craig Mound at Spiro, Le Flore County, Oklahoma*. Memoir 1. Oklahoma City: Oklahoma Anthropological Society.

———. 1973. The Oklahoma Craig Mound: Another Look at an Old Problem. *Bulletin of the Oklahoma Anthropological Society,* 22:1–10.

Fischbeck, H. J., J. D. Rogers, S. R. Ryan, and F. E. Swenson. 1989. Sourcing Ceramics in the Spiro Region: A Preliminary Study Using Proton-Induced X-ray Emission (PIXE) analysis. *Midcontinental Journal of Archaeology,* 14(1):3–18.

Fowler, M. L. 1989. *The Cahokia Atlas: A Historical Atlas of Cahokia Archaeology.* Studies in Illinois Archaeology, No. 6. Springfield: Illinois Historic Preservation Agency.

Fundaburk, E. L., and M. D. Foreman, eds. 1957. *Sun Circles and Human Hands: The Southeastern Indians Art and Industries*. Luverne, Ala.: Authors, self-published.

Galloway, P. 1989. *The Southeastern Ceremonial Complex: Artifacts and Analysis*. Lincoln: University of Nebraska Press.

Galm, J. R. 1978. *Archaeological Investigations at Wister Lake, Le Flore County, Oklahoma*. Archaeological Research and Management Center, Research Series, No. 1. Norman, Okla.: Archaeological Research and Management Center.

———. 1981. Prehistoric Cultural Adaptations in the Wister Valley, Eastern Oklahoma. Ph.D. diss., Washington State University, Pullman. Ann Arbor, Mich.: University Microfilms.

———. 1984. "Arkansas Valley Caddoan Formative: The Wister and Fourche Maline Phases." In *Prehistory of Oklahoma,* ed. R. E. Bell, pp. 199–219. New York: Academic Press.

Galm, J. R., and P. Flynn. 1978. *The Cultural Sequences at the Scott (34Lf-11) and Wann (34Lf-27) Sites and Prehistory of the Wister Valley*. Archaeological Research and Management Center, Research Series, No. 3. Norman, Okla.: Archaeological Research and Management Center.

Goodman, D., Y. Nishimura, and J. D. Rogers. 1995. GPR (Ground Penetrating Radar) Time Slices in Archaeological Prospection. *Archaeological Prospection,* 2:85–89.

Griffin, J. B. 1952. An Interpretation of the Place of Spiro in Southeastern Archaeology. *The Missouri Archaeologist,* 14:89–106.

Hall, R. L. 1997. *An Archaeology of the Soul: North American Indian Belief and Ritual.* Urbana: University of Illinois Press.

Hamilton, H. W. 1952. The Spiro Mound. *The Missouri Archaeologist*, 14:17–88.

Hamilton, H. W., J. T. Hamilton, and E. F. Chapman. 1974. *Spiro Mound Copper*. Memoir, Missouri Archaeological Society, No. 11. Columbia, Mo.: Missouri Archaeological Society.

Henry, D. O. 1978. Big Hawk Shelter in Northeastern Oklahoma: Environmental, Economic, and Cultural Changes. *Journal of Field Archaeology, 5*:269–287.

Henry, D. O., B. H. Butler, and S. A. Hall. 1979. The Late Prehistoric Human Ecology of Birch Creek Valley, Northeastern Oklahoma. *Plains Anthropologist,* 24(85):207–238.

Hilgeman, S. L. 1985. Lower Ohio Valley Negative Painted Ceramics. *Midcontinental Journal of Archaeology,* 10(2):195–214.

Hitchcock, R. K. 1982. "Patterns of Sedentism Among the Bosarwa of Eastern Botswana." In *Politics and History in Band Societies*, ed. E. Leacock and R. B. Lee, pp. 223–268. Cambridge: Cambridge University Press.

Hoffman, M. J. 1978. Conservation Systems for the Spiro Textiles. Master's thesis, University of Arkansas, Fayetteville.

Horton, E., and G. Sabo III. 2011. Spiro Perishable Project Makes Exciting New Discovery. *Field Notes*, 358:9–13.

Johnson, G. A. 1982. "Organizational Structure and Scalar Stress." In *Theory and Explanation in Archaeology: The Southampton Conference*, ed. C. Renfrew, M. J. Rowlands, and B. A. Segraves, pp. 389–421. New York: Academic Press.

Justice, N. D. 1987. *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States.* Bloomington: Indiana University Press.

Kay, M., G. Sabo III, and R. J. Merletti. 1989. "Late Prehistoric Settlement Patterning: A View from Three Caddoan Civic-Ceremonial Centers in Northwest Arkansas." In *Contributions to Spiro Archaeology: Mound Excavations and Regional Perspectives*, ed. J. D. Rogers, D. G. Wyckoff, and D. A. Peterson, pp. 129–157. Studies in Oklahoma's Past, No. 16. Norman, Okla.: Oklahoma Archaeological Survey.

King, A. 2007. *Southeastern Ceremonial Complex: Chronology, Content, Context*. Tuscaloosa: University of Alabama Press.

King, A., and M. S. Meyers, eds. 2002. Frontiers, Backwaters, and Peripheries: Exploring the Edges of the Mississippian World. *Southeastern Archaeology,* 21(2):113–116.

King, M. E., and J. Gardner 1981. "The Analysis of Textiles from Spiro Mound, Oklahoma." In *The Research Potential of Anthropological Museum Collections*, ed. A. E. Cantwell, J. B. Griffin, and N. A. Rothschild. *Annals of the New York Academy of Science,* 376:123–139.

Kozuch, L. 2002. *Olivella* beads from Spiro and the Plains. *American Antiquity,* 67(4):697–709.

Kuttruff, J. 1988. Textile Attributes and Production Complexity as Indicators of Caddoan Status Differentiation in the Arkansas Valley and Southern Ozark Regions. Ph.D. diss., Department of Anthropology, Ohio State University, Columbus.

La Vere, D. 2007. *Looting Spiro Mounds: An American King Tut's Tomb*. Norman: University of Oklahoma Press.

Leonhardy, F. 1989. "The Physical Stratigraphy of Copple Mound." In *Contributions to Spiro Archaeology: Mound Excavations and Regional Perspectives,* ed. J. D. Rogers, D. G. Wyckoff, and D. A. Peterson, pp. 15–26. Norman, Okla.: Oklahoma Archaeological Survey.

Lintz, C. 1978. *An Archaeological Survey of the Kerr–McGee Choctaw Coal Mine Facility, Haskell County, Oklahoma.* Project Report Series No. 2. Norman, Okla: Archaeological Research and Management Center, University of Oklahoma.

MacDonald, A. B. 1935. "A 'King Tut' Tomb in the Arkansas Valley." *Kansas City Star,* 14 December 1935.

Meillassoux, C. 1960. Essai d'interprétation du phénomene économique daus les sociétiés traditionnelles d'anto-subsistence. *Cahiers d'Etudes Africains,* 4:36–67.

Merriam, L. G., and C. J. Merriam. 2004. *The Spiro Mound: A Photo Essay.* Oklahoma City, Okla.: Merriam Station Books.

Milner, G. R. 1998. *The Cahokia Chiefdom: Archaeology of a Mississippian Society.* Washington, D.C.: Smithsonian Institution Press.

Mohrman, D. 1939. The Detection of Fraudulent Copper Needles. *Transactions of the Illinois Academy of Sciences,* 32:60–61.

Moorehead, W. G. 1897. The Hopewell Group. *The Antiquarian* 1(10):254–264.

———. 2000. *The Cahokia Mounds*. Tuscaloosa: University of Alabama Press.

Munsell Color Co. 1973. Munsell Soil Color Charts. Baltimore, Md.: Munsell Color Co.

Muto, G. 1978. *The Habiukut of Eastern Oklahoma: Parris Mound, Part 1, Phase 1, an Archaeological Report*. Series in Anthropology, No. 3. Oklahoma City: Oklahoma Historical Society.

National Museum of Natural History. 1936. "J. G. Braecklein loan." Accession File 137937. Smithsonian Institution, Washington, D.C.

———. 1937. "Inventory list of J. G. Braecklein gift." Accession File 145540. Smithsonian Institution, Washington, D.C.

———. 1960. "Harry M. Trowbridge purchase." Accession File 228126. Smithsonian Institution, Washington, D.C.

Orr, K. G. 1946. The Archaeological Situation at Spiro, Oklahoma: A Preliminary Report. *American Antiquity,* 11(4):228–256.

Pauketat, T. R. 1993. *Temples for Cahokia Lords*. Memoirs of the Museum of Anthropology, No. 26. Ann Arbor: University of Michigan.

———. 1994. *The Ascent of Chiefs: Cahokia and Mississippian Politics in Native North America*. Tuscaloosa: University of Alabama Press.

———. 2007. *Chiefdoms and Other Archaeological Delusions*. Lanham, Md.: Altamira Press.

———. 2009. *Cahokia: Ancient America's Great City on the Mississippi*. New York: Viking.

Pauketat, T. R., and T. E. Emerson, eds. 1997. *Cahokia: Domination and Ideology in the Mississippian World*. Lincoln: University of Nebraska Press.

Payne, C., and J. F. Scarry. 1998. "Town Structure at the Edge of the Mississippian World." In *Mississippian Towns and Sacred Spaces: Searching for an Architectural Grammar,* ed. R. B. Lewis and C. Stout, pp. 22–48. Tuscaloosa: University of Alabama Press.

Pendergast, J. F. 1989. "The Significance of Some Shell Excavated on Iroquoian Archaeological Sites in Ontario." In *Proceedings of the 1986 Shell Bead Conference, Selected Papers*, ed. L. Ceci, pp. 97–112. Research Records, No. 20. Rochester, New York: Rochester Museum and Science Center.

Perino, G. 1968. *A Guide to Certain Projectile Points*. Special Bulletin of the Oklahoma Anthropological Society, No. 3. Oklahoma City: Oklahoma Anthropological Society.

———. 1970. *A Guide to Certain Projectile Points*. Special Bulletin of the Oklahoma Anthropological Society, No. 4. Oklahoma City: Oklahoma Anthropological Society.

Perttula, T. K. 1989. "The Late Prehistoric Period in the Western Ozarks of Southwest Missouri." In *Contributions to Spiro Archaeology: Mound Excavations and Regional Perspectives*, ed. J. D. Rogers, D. G. Wyckoff, and D. A. Peterson, pp. 117–128, Studies in Oklahoma's Past, No. 16. Norman, Okla.: Oklahoma Archaeological Survey.

Peterson, D. 1989. "Copple Mound Excavations." In *Contributions to Spiro Archaeology: Regional Perspectives and Mound Excavations,* ed. J. D. Rogers, D. G. Wyckoff, and D. A. Peterson, pp. 27–41. Studies in Oklahoma's Past, No. 16. Norman, Okla.: Oklahoma Archaeological Survey.

Phillips, P., and J. A. Brown. 1978. *Pre-Columbian Shell Engravings from the Craig Mound at Spiro, Oklahoma, Part 1*. Cambridge, Mass.: Peabody Museum of Archaeology and Ethnology.

———. 1984. *Pre-Columbian Shell Engravings from Craig Mound at Spiro, Oklahoma, Part 2*. Cambridge, Mass.: Peabody Museum of Archaeology and Ethnology.

Phillips, P., J. A. Ford, and J. B. Griffin. 1951. *Archaeological Survey on the Lower Mississippi Alluvial Valley, 1940–1947*. Papers of the Peabody Museum of Archaeology and Ethnology, No. 25. Cambridge, Mass.: Peabody Museum Press.

Plog, F. T. 1974. *The Study of Prehistoric Change*. New York: Academic Press.

Potter County Historical Survey Committee. 1964. *Alibates Flint Quarries: A National Monument, 2 Volumes*. Amarillo, Texas: Panhandle Geological Society.

Powell, S. 1983. *Mobility and Adaptation: The Anasazi of Black Mesa, Arizona*. Southern Carbondale: Illinois University Press.

Rafferty, J. E. 1985. The Archaeological Record on Sedentariness: Recognition, Development, and Implications. *Advances in Archaeological Method and Theory*, No. 8, ed. M. B. Schiffer, pp. 113–156. New York: Academic Press.

Rogers, J. D. 1980. *Spiro Archaeology: 1979 Excavations*. Studies in Oklahoma's Past, No. 6. Norman, Okla.: Oklahoma Archeological Survey.

———. 1982. *Spiro Archaeology: 1980 Research*. Studies in Oklahoma's Past, No. 9. Norman, Okla.: Oklahoma Archaeological Survey.

———. 1983. "Social Ranking and Change in the Harlan and Spiro Phases of Eastern Oklahoma." In *Southeastern Natives and Their Pasts: Papers in Honoring Robert E. Bell,* ed. D. F. Wyckoff and J. Hofman, pp. 17–128. Studies in Oklahoma's Past, No. 11. Norman, Okla: Oklahoma Archeological Survey.

———. 1989. "Settlement Contexts for Shifting Authority in the Arkansas Basin." In *Contributions to Spiro Archaeology: Mound Excavations and Regional Perspectives*, ed. J. D. Rogers, D. G. Wyckoff, and D. A. Peterson, pp. 159–176. Studies in Oklahoma's Past, No. 16. Norman, Okla.: Oklahoma Archeological Survey.

———. 1991a. "Patterns of Change on the Western Margin of the Southeast, A.D. 600–900." In *Stability, Transformation, and Variation: The Late Woodland Southeast,* ed. M. S. Nassaney and C. R. Cobb, pp. 221–248. New York: Plenum.

———. 1991b. Regional Prehistory and the Spiro Site. *Southeastern Archaeology*, 10:63–69.

———. 1995. "Dispersed Communities and Integrated Households: A Perspective from Spiro and the Arkansas Basin." In *Mississippian Communities and Households,* ed. J. D. Rogers and B. D. Smith, pp. 81–98. Tuscaloosa: University of Alabama Press.

———. 1996. Markers of Social Integration: The Development of Centralized Authority in the Spiro Region. In *Political Structure and Change in the Prehistoric Southeastern United States*, ed. J. F. Scarry, pp. 53–68. Gainesville, Florida: University Press of Florida.

———. 2006. Chronology and the Demise of Chiefdoms: Eastern Oklahoma in the Sixteenth and Seventeenth Centuries. *Southeastern Archaeology,* 25:20–28.

———. 2009a. "The Spiro Site." In *Archaeology in America: An Encyclopedia*, ed. F. P. McManamon, pp. 324–329. Westport, Connecticut: Greenwood Press.

———. 2009b. "The Harlan Site." In *Archaeology in America: An Encyclopedia*, ed. F. P. McManamon, pp. 322–323. Westport, Connecticut: Greenwood Press.

———. 2011. Stable Isotope Analysis and Diet in Eastern Oklahoma. *Southeastern Archaeology*, 30.

Rogers, J. D., L. E. Albert, and F. Winchell. 2000. Chronometrics at the Norman Site. *Caddoan Archaeology,* 11:11–18.

Rogers, J. D., C. J. Dove, M. Heacker, and G. R. Graves. 2002. Identification of Feathers in Textiles from the Craig Mound at Spiro, Oklahoma. *Southeastern Archaeology,* 21:245–251.

Rogers, J. D., M. Moore, and R. Greaves. 1982. *Spiro Archaeology—The Plaza.* Studies in Oklahoma's Past, No. 10. Norman, Okla.: Oklahoma Archaeological Survey.

Rogers, J. D., and G. Sabo III. 2004. "The Caddos." In *Handbook of North American Indians,* ed. W. C. Sturtevant. Volume 14: *Southeast,* ed. R. D. Fogelson, pp. 616–631. Washington, D.C.: Smithsonian Institution Press.

Rogers, J. D., and B. D. Smith, eds. 1995. *Mississippian Communities and Households.* Tuscaloosa: University of Alabama Press.

Rogers, J. D., D. G. Wyckoff, and D. Peterson, eds. 1989. *Contributions to Spiro Archaeology: Regional Perspectives and Mound Excavations*. Studies in Oklahoma's Past, No. 16. Norman, Okla.: Oklahoma Archaeological Survey.

Rohrbaugh, C. L. 1982. Spiro and Fort Coffee Phases: Changing Cultural Complexes of the Caddoan Area. Ph.D. diss., University of Wisconsin, Madison. Ann Arbor, Mich.: University Microfilms.

———. 1985a. LfGeI, The Geren Site, 34LF36, of the Spiro Phase. *Bulletin of the Oklahoma Anthropological Society,* 34:9–81.

———. 1985b. The Subdivision of Spiro Phase. *Midcontinental Journal of Archaeology*, 10(2):155–170.

Rolingson, M. A. 1987. "An Assessment of the Significance of Clay-Tempered Ceramics and Platform Mounds at the Toltec Mounds Site." In *The Emergent Mississippian: Proceedings of the Sixth Mid-South Archaeological Conference*, ed. R. A. Marshall, pp. 107–116. Occasional Papers 87-01. Mississippi State: Cobb Institute of Archaeology, Mississippi State University.

Scarry, J. F., ed. 1996. *Political Structure and Change in the Prehistoric Southeastern United States*. Gainesville: University Press of Florida.

Schambach, F. F. 1982. "An Outline of Fourche Maline Culture in Southwest Arkansas." In *Arkansas Archeology in Review*, ed. N. L. Trubowitz and M. D. Jeter, 132–197. Research Series, No. 15. Fayetteville: Arkansas Archeological Survey.

———. 1993. "Some New Interpretations of Spiroan Culture History." In *Archaeology of Eastern North America: Papers in Honor of Stephen Williams,* ed. J. B. Stoltman, pp. 187–230. Archaeological Report, No. 25. Jackson: Mississippi Department of Archives and History.

———. 1998. *Pre-Caddoan Cultures in the Trans-Mississippi South: A Beginning Sequence*. Research Series, No. 53. Fayetteville: Arkansas Archeological Survey.

Schroeder, S. 2004. Power and Place: Agency, Ecology, and History in the American Bottom, Illinois. *Antiquity*, 78:812–827.

Sievert, A. K. 1992. *Maya Ceremonial Specialization: Lithic Tools from the Sacred Cenote at Chichen Itza, Yucatan.* Madison, Wis.: Prehistory Press.

———. 2003. "Spiro Painted Maces and Shell Cups: The Scientific Use of Artifacts without Context." In *Theory, Method, and Practice in Modern Archaeology*, ed. R. J. Jeske and D. K. Charles, pp. 182–194. Westport, Conn.: Praeger.

Smith, B. D. 1984. Mississippian Expansion: Tracing the Historical Development of an Explanatory Model. *Southeastern Archaeology,* 3:13–32.

———. 1986. The Archaeology of the Southeastern United States: From Dalton to de Soto, 10,500–500 B.P. *Advances in World Archaeology,* 5:1–95.

———, ed. 1990. *The Mississippian Emergence.* Washington, D.C.: Smithsonian Institution Press.

Story, D. A., ed. 1981. *Archaeological Investigations at the George C. Davis Site, Cherokee County, Texas: Summers of 1979 and 1980*. Occasional Papers, No. 1. Austin: Texas Archaeological Research Laboratory.

Suhm, D. A., A. D. Krieger, and E. B. Jelks. 1954. *An Introductory Handbook of Texas Archaeology*. Bulletin of the Texas Archeological Society, No. 25. Austin: Texas Archeological Society.

Thoburn, J. B. 1930. The Northern Caddoan Peoples of Prehistoric Times and the Human Origin of the Natural Mounds, So Called, of Oklahoma and Neighboring States. Thoburn Collection, Oklahoma Historical Society, Oklahoma City.

———. 1931. "The Prehistoric Cultures of Oklahoma." In *Archaeology of the Arkansas River Valley*, ed. W. K. Moorehead, pp. 53–82. Andover, Mass.: Phillips Academy.

Thorne, R. M., and B. J. Broyles, eds. 1968. Handbook of Pottery Types Found in Mississippi. *SEAC Bulletin,* 7.

Thurmond, J. P. 1991. Archeology of the Dempsey Divide: A Late Archaic/Woodland Hotspot on the Southern Plains. *Bulletin of the Oklahoma Anthropological Society,* 39:103–157.

Trowbridge, H. M. 1938. Analysis of Spiro Mound Textiles. *American Antiquity,* 4(1):51–53.

———. 1944. The Trowbridge Collection of Spiro Mound Artifacts. *Journal of the Illinois Archaeological Society,* July:21–23.

———. 1958. "Catalog of Artifacts from Spiro Mound." National Anthropological Archives, W. Wedel Collection, Correspondence file: "Trowbridge." Smithsonian Institution, Washington, D.C.

Turgeon, D. D., H. E. Bogan, E. V. Coan, W. K. Emerson, W. G. Lyons, W. L. Pratt, C. F. E. Roper, A. Scheltema, F. G. Thompson, and J. D. Williams. 1988. *Common and Scientific Names of Aquatic Invertebrates from the United States and Canada: Mollusks*. Special Publication No. 16. Bethesda, Md.: American Fisheries Society.

Watson, V. D. 1950. *The Wulfing Plates: Products of Prehistoric Americans*. St. Louis, Mo.: Washington University Press.

White, D. R., G. P. Murdock, and R. Scaglion. 1971. Natchez Class and Rank Reconsidered. *Ethnology,* 10:369–388.

White, S. 1940. Human Effigy Pipes from Spiro Mound, Le Flore County, Oklahoma. *The Oklahoma Prehistorian,* 3(1): 10–11.

Whitford, A. C. 1941. *Textile Fibers Used in Eastern Aboriginal North America*. Anthropological Papers of the American Museum of Natural History, No. 38. New York: American Museum of Natural History.

Willoughby, C. C. 1952. Textile Fabrics from the Spiro Mound. *The Missouri Archaeologist*, 14:107–118.

Wilson, G. D. 2010. Community, Identity, and Social Memory at Moundville. *American Antiquity*, 75:3–18.

Wyckoff, D. G. 1970. *A Preliminary Report on 1970 Field Research at the Spiro Site, Le Flore County, Oklahoma*. Norman, Okla.: Oklahoma Archaeological Survey.

———. 1980. Caddoan Adaptive Strategies in the Arkansas Basin, Eastern Oklahoma. Ph.D. diss., Washington State University. Ann Arbor, Mich.: University Microfilms.

Wylie, A. A. 1995. "Archaeology and the Antiquities Market: The Use of 'Looted' Data." In *Ethics in American Archaeology: Challenges for the 1990s*, ed. M. J. Lynott and A. A. Wylie, pp. 17–21. Washington, D.C.: Society for American Archaeology.

Zirkan, C. 1956. "Record Unit 305: Letter to Clifford Evans." Accession 210052. National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Index

Page numbers for tables are in *italics* and for figures are in **bold.**

REQUIREMENTS FOR SMITHSONIAN SERIES PUBLICATION

ALL MANUSCRIPTS ARE REVIEWED FOR ADHERENCE TO THE SISP MANUSCRIPT PREPARATION AND STYLE GUIDE FOR AUTHORS (available on the "Submissions" page at www.scholarlypress.si.edu). Manuscripts not in compliance will be returned to the author. Manuscripts intended for publication in the Contributions Series are evaluated by a content review board and undergo substantive peer review. Accepted manuscripts are submitted for funding approval and scheduling to the Publications Oversight Board.

MINIMUM MANUSCRIPT LENGTH is thirty manuscript pages. If a manuscript is longer than average, an appropriate length will be determined during peer review and evaluation by the Content Review Board. Authors may be asked to edit manuscripts that are determined to be too long.

TEXT must be prepared in a recent version of Microsoft Word; use a Times font in 12 point for regular text; be double spaced; and have 1" margins. Each chapter/section must be saved in a separate file.

REQUIRED ELEMENTS are title page, abstract page, table of contents, main text, and reference section. See the SISP Manuscript Preparation and Style Guide for Authors for the order of all elements.

HEADINGS should be styled so different levels of headings are distinct from each other and so the organization of the manuscript is clear. Insert one line space above and one line space below all headings.

FRONT MATTER should include title page, abstract page, and table of contents. All other sections are optional. Abstracts must not exceed 300 words. Table of contents should include A-, B-, and C-level headings.

TABLES (numbered, with captions, stubs, rules) should be submitted in separate MS Word files; should include footnotes, if appropriate; should have rules only at top, bottom, and beneath column heads. Printouts of each table should accompany the manuscript to ensure correct layout of data. Tabulations within running text should not be numbered or formatted like formal tables, and should be included in the text of the manuscript.

FIGURE CAPTIONS should be provided in a separate MS Word file.

FIGURES (e.g., photographs, line art, maps) should be numbered sequentially (1, 2, 3, etc.) in the order called out; be placed throughout text, not at end of manuscript; have all components of composites lettered with lowercase letters and described in the caption; include a scale bar or scale description, if appropriate; include any legends in or on the figure rather than in a caption.

ART must not be embedded in the main text.

Figures must be original and submitted as individual TIFF or EPS files. Resolution for art files must be at least 300 dpi for grayscale and color images and at least 1200 dpi for line art. Electronic images should measure no more than 100% and no less than 75% of final size when published. JPG files will not be accepted. Color images significantly increase costs so should be included only if required. Funding for color art is subject to approval by SISP and the Publications Oversight Board.

IN-TEXT REFERENCES should be used rather than bibliographic notes and should follow the author-date system in the following format: "(author last name, year)" or ". . . author (year)"; "(author, year:page used within the text)" or ". . . author (year:page)." A full citation should be included in a "References" section.

ENDNOTES are to be used in lieu of footnotes and should be keyed manually into a separate MS Word file, in a section titled "Notes." Notes should not contain bibliographic information. Manually type superscript numerals in text and use full-sized numerals at the beginning of each note in the "Notes" section. SISP will determine the best placement of the notes section, either at the end of each chapter or at the end of the main text.

REFERENCES should be in alphabetical order, and in chronological order for same-author entries. Each reference should be cited at least once in main text. Complete bibliographic information must be included in all citations (e.g., author/editor, title, subtitle, edition, volume, issue, pages, figures). For books, place of publication and publisher are required. For journals, use the parentheses system for volume(number):pagination [e.g., "10(2):5–9"]. Do not use "et al."; all authors/editors should be included in reference citations. In titles, capitalize first word, last word, first word after colon, and all other words except articles, conjunctions, and prepositions. Examples of the most common types of citations are provided in the SISP Manuscript Preparation and Author Style Guide.

For questions regarding the guidelines, please email SISP at schol.press@si.edu.