

CRAFTING BONE – SKELETAL TECHNOLOGIES THROUGH TIME AND SPACE

Proceedings of the 2nd meeting of the (ICAZ) Worked Bone Research Group

Editors

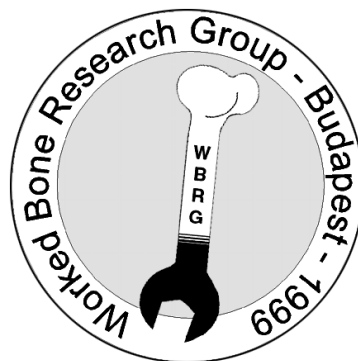
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Table of Contents

Introduction	III-IV
 General Theory	
Genevieve LeMoine – <i>Skeletal Technology in Context: An Optimistic Overview</i>	1
 Raw Material Exploitation	
Lyuba Smirnova – <i>Utilization of Rare Bone Materials in Medieval Novgorod</i>	9
Liina Maldre – <i>Bone and Antler Artefacts from Otepää Hill-fort</i>	19
Sabine Deschler-Erb – <i>Do-it-yourself Manufacturing of Bone and Antler in Two Villas in Roman Switzerland</i>	31
Rosalia Christidou – <i>Study of Bone Tools at Three Late/Final Neolithic Sites from Northern Greece</i>	41
 Manufacturing Technology	
Jörg Schibler – <i>Experimental Production of Neolithic Bone and Antler Tools</i>	49
Daniella Ciugudean – <i>Workshops and Manufacturing Techniques at Apulum (AD 2nd-3rd Century)</i>	61
Kitty F. Emery – <i>The Economics of Bone Artifact Production in the Ancient Maya Lowlands</i>	73
Karlheinz Steppan – <i>Worked Shoulder Blades: Technotypological Analysis of Neolithic Bone Tools From Southwest Germany</i>	85
Noëlle Provenzano – <i>Worked Bone Assemblages from Northern Italian Terramare: A Technological Approach</i>	93
Aline Averbouh – <i>Methodological Specifics of the Techno-Economic Analysis of Worked Bone and Antler: Mental Refitting and Methods of Application</i>	111
 Function	
Mária Bíró – <i>A Round Bone Box Lid with a Mythological Representation</i>	123
Cornelia Becker – <i>Bone Points - No Longer a Mystery? Evidence from the Slavic Urban Fortification of Berlin-Spandau</i>	129
Mickle G. Zhilin – <i>Technology of the Manufacture of Mesolithic Bone and Antler Daggers on Upper Volga</i>	149
Tina Tuohy – <i>Bone and Antler Working on the Iron Age Sites of Glastonbury and Meare in Britain</i>	157
Gitte Jensen – <i>Macro Wear Patterns on Danish Late Mesolithic Antler Axes</i>	165
Yekaterina Antipina – <i>Bone Tools and Wares from the Site of Gornyy (1690 - 1410 BC) in the Kargaly Mining Complex in the South Ural Part of the East European Steppe</i>	171
Andreas Northe – <i>Notched Implements made of Scapulae - Still a Problem</i>	179
Janet Griffiths – <i>Bone Tools from Los Pozos</i>	185
Sandra L. Olsen – <i>The Importance of Thong-Smoothers at Botai, Kazakhstan</i>	197
Janet Griffiths and Clive Bonsall – <i>Experimental Determination of the Function of Antler and Bone 'Bevel-Ended Tools' from Prehistoric Shell Middens in Western Scotland</i>	207
 Social Context	
Isabelle Sidéra – <i>Domestic and Funerary Bone, Antler and Tooth Objects in the Neolithic of Western Europe: a Comparison</i>	221
George Nash – <i>Altered States of Consciousness and the Afterlife: A Reappraisal on a Decorated Bone Piece from Ryemarksgaard, Central Zealand, Denmark</i>	231
Nerissa Russell – <i>The Social Life of Bone: A Preliminary Assessment of Bone Tool Manufacture and Discard at Çatalhöyük</i>	241
Alice M. Choyke – <i>Late Neolithic Red Deer Canine Beads and Their Imitations</i>	251
Colleen Batey – <i>Viking and Late Norse Combs in Scotland: An Update</i>	267
Nerissa Russell – <i>Neolithic Relations of Production: Insights from the Bone Tool Industry</i>	271

Special Assemblages

Péter Gróf and Dániel Gróh – <i>The Remains of Medieval Bone Carvings from Visegrád</i>	281
László Bartosiewicz – <i>Roman Period Equid Ilium Implement from Pannonia Superior (NW Hungary)</i>	287
E.E. Bulten and Anneke Clason – <i>The antler, bone and tooth tools of Swifterbant, The Netherlands (c. 5500 – 4000 cal. BC) compared with those from other Neolithic sites in the western Netherlands</i>	297
Heidi Luik – <i>Bone Combs from Medieval Tallinn, from the Excavations in Sauna Street</i>	321
Steven R. James – <i>Prehistoric Hohocam Bone Artifacts from Southern Arizona: Craft Specialization, Status and Gender</i>	331
Arthur MacGregor and Ailsa Mainman – <i>The Bone and Antler Industry in Anglo-Scandinavian York: the Evidence from Coppergate</i>	343
Ernestine Elster – <i>Middle Neolithic to Early Bronze Age Bone Tools from Sitagroi, Greece</i>	355
Ülle Tamla and Liina Maldre – <i>Artefacts of Bone, Antler and Canine Teeth among the Archaeological Finds from the Hill-Fort of Varbola</i>	371
Kordula Gostenčnik – <i>Pre- and Early Roman Bone and Antler Manufacturing in Kärnten, Austria</i>	383
<i>Index of Authors</i>	399



Participants in the WBRG 1999 Budapest conference (left to right): Ülle Tamla, Elisabeth Brynja, Tina Tuohy, Liina Maldre, Karlheinz Steppan, Heidi Luik, Gitte Jensen, John Chapman, Alice Choyke, Janet Griffiths, Andreas Northe, Noëlle Provenzano, Jörg Schibler, Nerissa Russell, Colleen Batey, Lyuba Smirnova, László Daróczy-Szabó, Daniella Ciugudean, Mária Bíró, Kordula Gostenčnik, Eszter Kovács, Christopher Morris, Sabine Deschler-Erb, Ans Nieuwenberg-Bron, Katalin Simán, Isabelle Sidéra, Mickle Zhilin

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Budapest, September 1999

Introduction

Archaeologists and Archeozoologists, both study worked osseous materials (bone, antler and tooth, including ivory, in short all referred to as “bone”). Such reports, however, are often buried at the very back of faunal analyses appended to site reports. Furthermore, the two groups of specialists have had little chance to interact, even within Europe since they tend to attend different conferences and write for different fora.

At the root of this problem lay the arbitrary, largely institutional division between pre- and proto-historians, often imposed on bone manufacturing experts by nothing but formalism in research tradition. The most exemplary series of studies in this field is entitled: “*Industrie de l’os neolithique et de l’age de metaux*” (Bone industry from the Neolithic and Metal Ages). Another classic, a book, is sub-titled “The Technology of Skeletal Materials since the Roman Period”. In very early prehistoric assemblages, attention is often focused on the question of whether a particular piece of bone was worked or not. In later assemblages, it is the intensity of manufacturing that often renders objects zoologically non-identifiable, so that important aspects of raw material procurement, including long distance trade, remain intangible.

The history of raw material use, however, is continuous and many of the constraints and possibilities inherent in skeletal materials are the same whether one is dealing with Paleolithic or Medieval artifacts. Indubitably, the organization of manufacture, the function and value of bone artifacts (as well as some technological innovations such as the regular use of metal tools or lathes), differ substantially between simple and complex societies through time. On the other hand, fundamental questions of tensile characteristics, procurement strategies, style and certain technological requirements are not only similar diachronically, but also open up new vistas when apparently unrelated periods are compared. The function of these objects as social markers, for example, remains remarkably constant through time, even if details vary. The papers in this volume reflect these conceptual similarities and differences as did the papers delivered at the conference itself.

The first meeting of what was to become the Worked Bone Research Group (WBRG) was organized by Dr. Ian Riddler in the **British Museum, London, in January 1997**. The commitment and enthusiasm of that first workshop has greatly inspired subsequent efforts in recruiting a wide range of bone specialists, capable of contributing to discussions concerning bone manufacturing.

In keeping with the aims of the Worked Bone Research Group, since 2000 an official working group of the International Council for Archaeozoology (ICAZ), an effort was made to present these papers on the basis of what *connects* them rather than segregating them by archaeological period or region. Contributions mostly include articles based on papers delivered in September 1999 at the second Worked Bone Research Group meeting in Budapest, organized by the editors with the unfailing support of the Aquincum Museum (Budapest) and its staff. Several people who were unable to be present at this conference were also asked to contribute papers. Finally, five of the studies in this volume, originally delivered at a symposium on bone tools organized by Dr. Kitty Emery and Dr. Tom Wake, entitled “*Technology of Skeletal Materials: Considerations of Production, Method and Scale*”, at the 64th Annual Meeting of the Society for American Archaeology (Chicago 1999), were added thereby expanding the academic spectrum both in terms of research tradition and geographic scope.

There are a total of 36 papers in this volume. Research was carried out on materials from Central and North America to various regions of Europe and Southwest Asia. The authors represent scientific traditions from Estonia, Hungary, Romania, and Russia, European countries in which, until recently, ideas developed in relative isolation. Other European countries represented include Austria, Denmark, France, Germany, Great Britain, Greece, and Switzerland. Last but not least, the North American scholarly approach is also represented here.

Schools of thought may be said to be exemplified by what used to be Soviet research, well known for pioneering works on taphonomy, experimentation and traceology. Bone manufacturing was first brought to the attention of Western scholars by the publication in 1964 of the translation of S. A. Semenov’s *Prehistoric Technology*, published originally in 1957. Scholars in France have also carried out decades of co-ordinated work on operational chains in the manufacturing process from the selection

of raw materials to finished products, with special emphasis on prehistoric modified bone. An entire working group, “Unspecialized Bone Industries/Bone Modification”, is directed by Marylene Patou-Mathis. This working group itself is part of a larger research program on bone industry “*La Commission de Nomenclature sur l’Industrie de l’Os Préhistorique*” headed by Mme. H. Camps-Fabrer. Several specialists such as Jörg Schibler in Switzerland, have created laboratories where ground laying work has been carried out for years on worked osseous materials, especially from Swiss Neolithic Lake Dwellings and Roman Period sites. Language barriers have often prevented these important bodies of work from being as widely disseminated as they deserve. Arthur MacGregor in England, writing in English, has had a decisive influence on specialists working on more recent Roman and Medieval worked bone assemblages in Europe.

The work of all of these groups as well as certain individual scholars is well known within limited circles. Otherwise, however, the overwhelming experience of most researchers on worked bone have been feelings of isolation and alienation from most archaeological or archaeozoological work related, most importantly, to the absence of an international forum where their often specialized work can be presented and problems discussed.

In spite of the fact that there have been many practical obstacles to information flow between specialists in this field, there are really remarkable similarities of approach which should ultimately lead to the development of more compatible paradigms in research. Agreement on methodologies will have a positive feedback on communications, helping the field to grow and develop properly.

It seems that, at last, archaeologists and archaeozoologists and other specialists are talking to each other and sharing methodological points of view. One striking example of this can be seen in the the emphasis on raw materials studied in parallel to types found in the majority of papers in this volume. Previously studies often concentrated on typo-chronological questions, ignoring the questions of raw material morphology and availability. The series published by the *Centre National de la Recherche Scientifique*, edited by Mme. Henriette Camps-Fabrer in France is largely to be credited for beginning this new trend. It contains many papers concentrating on understanding manufacturing sequences and, indeed, from Europe to North America there are papers which explicitly deal with manufacturing sequences in individual assemblages.

There is also a consistent emphasis on experiment and manufacturing techniques present in much of the work in this volume. The related but fraught question of function continues to tantalize and frustrate most specialists. A number of articles attempt to apply techniques of hard science, such as scanning electron microscopy or light microscopy, together with experiment to get objective, “processual” answers to this important group of questions. Other researchers rely deductively on analogy, archaeological context, gross morphology, and textual sources as they try understanding how these objects were used.

When editing the volume, we tried to concentrate on the underlying main concepts represented by each paper rather than grouping them diachronically or by geographical region. As a result, contributions follow a line from the theoretical through the problems of raw material selection, manufacturing techniques, experimental work, technical function and socio-cultural interpretations. Obviously many of these papers deal with several of these aspects simultaneously. Finally, analyses of assemblages are grouped to show the current state of general application of these principles as illustrated in papers in the rest of the volume. Reports on bone tool types will ultimately benefit from more unified typologies and also provide researchers with comparative databases from regions beyond their own.

Finally, a word on the organization of papers in this volume. Although the editors have tried to group these papers by what they see as the main theoretical and methodological thrust of the authors it should be understood that most papers, to a greater or lesser extent, overlap between these artificial sub-titles. Happily, almost all these works include considerations of raw material exploitation, manufacturing and functional analyses and all make some attempt to consider the social context from which these artifacts emerged. It is exactly this cross-cutting of boundaries which allows us to hope that the study of worked osseous materials is well on the way to developing into a discipline in its own right.

In addition to the generous support given by our sponsors and technical editors for this volume, organizing the conference would not have been possible without the active help of numerous colleagues. Special thanks are due to Paula Zsidy, Director of the Aquincum Museum, Katalin Simán, archaeologist and two students from the Institute of Archaeological Sciences (ELTE, Budapest): László Daróczi-Szabó and András Markó. The Hotel Wien, Budapest and its efficient manager provided a comfortable setting for our discussions at a reasonable price. Last but not least, help with abstract translations by Cornelia Becker, Noelle Provenzano as well as Marjan Mashkour and Turit Wilroy should also be acknowledged here.

PREHISTORIC HOHOKAM BONE ARTIFACTS FROM SOUTHERN ARIZONA: CRAFT SPECIALIZATION, STATUS, AND GENDER

Steven R. James

Abstract: Excavations at the large Classic period (AD 1150-1450) platform mound village of Pueblo Grande in Phoenix recovered nearly 300 bone artifacts, the single largest collection obtained to date from a prehistoric Hohokam site in southern Arizona. Eighteen artifact categories are represented. The data are examined with regard to manufacturing techniques, function, context, craft specialization, status, and gender differentiation. Comparisons are made with bone artifact assemblages recovered from other Hohokam sites in the region and elsewhere in the Southwest.

Keywords: Bone artifacts (awls and hairpins), prehistoric Hohokam, American Southwest, craft specialization, status, gender

Résumé: Les fouilles de la plate-forme du grand village de la période Classique (1150-1450 A.D.) de Pueblo Grande à Phoenix ont livré près de 300 objets en os, ce qui représente la plus grande collection obtenue jusqu'ici dans un site préhistorique Hohokam en Arizona méridional. Dix-huit catégories d'objets sont représentées. Les données sont examinées du point de vue des techniques de fabrication, de la fonction, du contexte, de la spécialisation artisanale, du statut, et de la division sexuelle du travail. Des comparaisons sont faites avec des assemblages d'objets en os provenant d'autres sites Hohokams de la région et du Sud-Ouest.

Mots-clés : Objets en os (alènes et épingles à cheveux), Hohokam préhistorique, Sud-Ouest américain, spécialisation artisanale, statut, division sexuelle du travail

Zusammenfassung: Ausgrabungen in dem großen Flachhügeldorf Pueblo Grande/Phönix aus der Klassischen Periode (1150-1450 n.Chr.) erbrachten annähernd 300 Knochenartefakte, die größte Ansammlung, welche bisher von einem prähistorischen Hohokam-Fundplatz aus dem südlichen Arizona geborgen wurde. Man kann achtzehn Artefaktgruppen voneinander differenzieren. Die Daten wurden hinsichtlich der Herstellungstechnik, der Funktionen, des Fundkontextes, der handwerklichen Spezialisierung, des sozialen Status und einer geschlechtspezifischen Differenzierung hinterfragt und mit anderen Daten aus Artefaktassemblagen weiterer Hohokam-Fundplätze aus der Region und im Südwesten des Landes verglichen.

Schlüsselworte: Knochenartefakte (Ahlen und Haarnadeln), prähistorisches Hohokam, Südwesten der USA, handwerkliche Spezialisierung, Status, Geschlecht

Introduction

Between about the time of Christ and AD 1450, the prehistoric Hohokam culture developed an extensive agricultural society in the arid Sonoran Desert of southwestern North America. With little more than wooden digging sticks and stone hoes, these desert farmers constructed a massive network of irrigation canals supplied by water from the Salt and Gila rivers and their tributaries. In fact, the primary canals in this system are estimated to have totaled over 500 km in length. Residential structures in the Pre-Classic periods (prior to AD 1150) consisted of pithouses, but about AD 1150 at the beginning of the Classic period, there was a rapid shift to above-ground adobe rooms within compounds.

Hohokam socio-political organization has been the subject of debate for the past few decades. Some researchers view the Hohokam as an egalitarian tribal society, whereas others argue that they were a hierarchical chiefdom. With regard to the latter, one form of public works that required both mobilization of labor and managerial skills by the Hohokam was

the construction of their extensive irrigation system. Other forms of public architecture included ball courts in the Pre-Classic followed by multi-storied big houses and large platform mounds inside of extensive walled compounds during the Classic period. Given the size and complexity of their irrigation system and other public structures, my own view is that Hohokam society was more advanced than tribal organization but not as complex as a chiefdom (for similar views, see Fish 1999; Fish and Fish 1991; Neitzel 1999; for additional information on the Hohokam, see Crown and Judge 1991; Doyel 1987; Gumerman 1991; James 1994c, 1997, 2000a; Noble 1991).

Although some aspects of Hohokam material culture, particularly their ceramics, have been the focus of considerable research over the years, their bone artifact technology has not received as much attention. An opportunity to examine Hohokam bone artifacts in detail was provided during excavations at Pueblo Grande. The extensive prehistoric Hohokam platform mound site of Pueblo Grande (AZ U:9:7 ASM) on the Salt River in Phoenix, Arizona, U.S.A., was occupied for

about a thousand years from around AD 400 to 1450. A portion of the site was excavated between 1988 and 1990 by Soil Systems, Inc., with funding provided by the Arizona Department of Transportation (Foster et al. 1994). The excavations produced an extremely large artifact assemblage which included over 26,000 archaeofaunal specimens (James 1994a, 1994b, 1997, 2000a, 2000b).

Bone artifacts in the Pueblo Grande archaeofaunal assemblage represent the *single largest collection* of such material recovered to date from a Hohokam site in southern Arizona. The total count amounts to nearly 300 individual bone artifacts, the majority of which are from Classic period deposits (AD 1150-1450). Specimens in the collection consist of 18 individual categories that are divided into three major groups: awls/hairpins, tubes/whistles, and other artifacts. In this paper, the bone artifacts, particularly awls and hairpins, are examined with regard to function, context, craft specialization, as well as status and gender differentiation.

Awls and Hairpins

Awls, awl fragments, and long awls/hairpins are by far the dominant group of artifacts representing 92 percent of the assemblage (258 specimens). In general, awls and hairpins were manufactured from the metapodials of artiodactyls that included deer (*Odocoileus* sp.) and bighorn sheep (*Ovis canadensis*). With regard to function, awls usually taper to a sharp point and were used in making baskets, sleeping mats, sandals, bags, and other objects woven from wild plant fibers. They also may have been used in weaving cotton fiber into cloth. In contrast, long awls are generally inferred to be hairpins since they have usually been recovered in cremations or inhumations at various sites in Arizona, often adjacent to the skull in the case of the latter, and hence their inference as hairpins (DiPeso 1956: 76-77, Plate 11; Fewkes 1926: 6, 13, 1927: 214; Haury 1937: 154, 1976: 303; see discussions in James 1988: 324-327, 1989: 598, 606-603). Examples of awls and hairpins recovered from Pueblo Grande are depicted in Figures 1 and 2.

Although hairpins mainly have been found associated with burials, they should also occur in houses and other archaeological features, especially if hairpins were manufactured in residential structures and were used as hair ornaments in everyday life. However, hairpins may have served primarily as symbols of status or clan membership and may even have been restricted in their use as a part of Hohokam mortuary customs for status-related individuals. There is a growing body of data from Hohokam sites that tends to support the latter inference, including the present evidence from Pueblo Grande. In contrast, most awls should be recovered in houses and trash features where they were manufactured, used, and discarded. Yet awls owned by individuals, particularly women, might accompany the deceased as one of the burial items. Some men in villages may also have been the persons who manufactured hairpins and awls and could have been buried with their craft items.

Distinctions Between Awls and Hairpins

Based on differences in their function, it would seem that awls and hairpins could be separated fairly easily. Such is not the case, for the two types are not always mutually exclusive. Distinctions between awls and hairpins are generally based on their archaeological context, total length, and tip morphology. Each of these aspects of the data are discussed here.

Context

Archaeological context provides one method for distinguishing between hairpins and awls at Pueblo Grande and many other prehistoric Hohokam sites. Ten Classic period specimens in the Pueblo Grande collection are examined here, consisting of seven long awls and hairpins and three probable hairpin fragments (tab. 1). Feature types indicated that the specimens were recovered from 8 inhumations, 1 cremation, and 1 pithouse. Those from the burials indicated that nearly all of the bone artifacts considered here were from adult males. One was from a child of undetermined sex between the ages of 3 to 10 years.

Seven of the eight bone artifacts from these inhumations were directly in association with the head, including the child inhumation. These data strongly suggest that they served as hairpins. In their use, long hair was probably wrapped into a knot and secured by a hairpin (for examples, see DiPeso 1956: Figure 60; Jernigan 1978: Figure 30). An exception to these findings was that of one burial (F3324). This inhumation contained a male between 18 to 30 years of age who had either a long awl or hairpin that was placed across the right lower leg (tibia).

The data from these Pueblo Grande Classic period burials indicate that six adult males and one child of undetermined sex were interred with hairpins, as shown by their placement on and next to the head. The absence of any females with hairpins suggests that hairpins at Pueblo Grande were most likely a male-related artifact.

Measurements

Most long awls or hairpins in archaeological assemblages are over 150 mm in length, whereas awls are generally below this threshold. For complete or relatively intact specimens, separation of the two types by length can be used in many cases to distinguish them apart. However, tip and medial fragments of awls and hairpins are much more numerous at archaeological sites, and for these fragments, the two types cannot be separated on the basis of specimen length.

One method for distinguishing between awls and hairpin fragments has been proposed that involves slight differences in tip morphology (Olsen 1979, 1980, 1981; Glass 1984: 900-908; Szuter 1983: 593-594, 1988: 404-405). Awl tips generally appear to be about equal in their width and thickness when measurements are taken at a point 5 mm from the end

Feature Type	Feature No.	Site Local	Sex	Age (year)	Time Period	Artifact Type	Specimen No.	Artifact Length (mm)	Position in Burial	Location
IN	434	BG13	Male	18+	Early Classic	Hairpin Fragment	15747	n.d.	At Head	
IN	438	BG13	Male	30+	Early Classic	Hairpin Fragment	15404	44.7	At Head	
IN	3183	BG11	?	3-10	Early Classic	Hairpin Fragment	40092	n.d.	At Head	
IN	927	BG4	Male	30+	Early Classic	Hairpin	4892	237.0	At Head	
IN	1048	BG5	Male	18-30	Early Classic	Hairpin	29104	245.0	At Head	
IN	1581	BG1	Male	30+	Early Classic	Hairpin	14844	84.3	At Head	
IN	2847	BG14	Male	30+	Early Classic	Hairpin	21900	241.0	At Head	
IN	3324	BG11	Male	18-30	?	Long Awl or Hairpin	24520	254.0	In Feature Fill	
C.R.	3373	BG17	?	18+	?	Long Awl or Hairpin	24990	171.0	Across Leg	
PH	2014	HA5	N/A	N/A	Late Classic	Long Awl or Hairpin	20243	139.0	N/A	

Note: BG = Burial Group, C.R. = Cremation, HA = Habitation Area, IN = Information, PH = Pit house
 N/A = not applicable, n.d. = no data

Tab. 1 Position of long awls and hairpins recovered from human burials at Pueblo Grande

Artifact Type	Specimen No.	Area	Feature No.	Feature Type	Time Period	Type of Modification
Long Awl/Hairpin	4892	BG4	927	IN	Early Classic	Drilled hole top of handle
Awl: Complete	40013	BG1	1578	IN	Early Classic	Drilled hole side of handle
Awl: Incomplete	15404	BG13	438	IN	Early Classic	Drilled hole side of handle
Hairpin: Handle	40100	BG15	44902	IN	Late Classic	Carved line on handle
Hairpin: Handle	40104	HA5	474	R.M.	Late Classic	Carved line on handle
Awl: Handle	8319	BG5	1402	IN	Late Classic	Carved handle
Awl: Handle	40035	HA2	900	R.M.	Late Classic	Drilled hole top & side of handle
Awl: Handle	40040	HA2	938	PH	Early Classic	Drilled hole top of handle
Awl: Handle	10401	HA2	1417	B/TP	Early Classic	Drilled hole side of handle
Awl: Medial	14407	BG5	1032	C.R.	Early Classic	2 diagonal incised lines
Awl: Medial	8724	HA7	141	IN	Late Classic	2 incised lines & drilled hole
Awl: Medial	27214	BG14	3307	C.R.	?	Incised metilinear design

Note: BG = Burial Group, B/TP = Bone-wash Pit, C.R. = Cremation, HA = Habitation Area
 IN = Information, PH = Pit house, R.M. = Compound Room

Tab. 2 Drilled, shaped, and incised awl/hairpin fragments from Pueblo Grande

of the tip. The tips of hairpins, on the other hand, are about twice as wide as they are thick. In other words, awls are usually sharper than hairpins. These differences were undoubtedly related to function; awls were used in piercing and opening stitches in weaving and basketry for insertion of plant fibers, whereas hairpins were for placement in the hair and perhaps served as male status items.

In order to determine the strength of the association of tip and width measurements as a means for distinguishing between awls and hairpins, measurements taken 5 mm from the end of the tip were obtained on the complete and nearly complete hairpin and awl specimens in the Pueblo Grande bone artifact assemblage. Bivariate plots of tip width and thickness measurements for these specimens indicate that most of the awls and hairpins exhibited a linear relationship in which tip width and length were about equal in proportion and any increase in one dimension increased the other at about the same rate (fig. 3).

Two of the six hairpins had tip widths that were greater than their thickness. These two specimens were more than likely hairpins based on tip morphology. Both specimens came from early Classic inhumations (F1048 and F1581), and they were found across the top of the skull and were probably wrapped in the hair of the deceased adult males. Based on tip measurement plots, one awl also had the same pattern as the two hairpins and should probably be classified as a hairpin.

The measurement data on tip morphology used for separating awls and hairpins, however, were not conclusive because four of the hairpin tip measurements were indistinguishable from the complete awls in the collection. On the other hand, when total specimen length was compared with tip width, the differences between hairpins and awls were more apparent. As shown in Figure 4, five of the artifacts classified as hairpins were over 150 mm and clearly separated from nearly all the awls with one exception, a specimen recovered from a male inhumation (F1581).

In summary, comparisons of tip morphology and total length for distinguishing between complete awls and hairpins can be used for most specimens. Direct archaeological context provided the best indication for identifying hairpins when they are recovered from inhumations adjacent to the head. Use of multi-dimensional scaling would probably more clearly show the relationship between tip width and thickness and total length, and the three variables should be examined further in future analyses.

Drilled and Incised Awls and Hairpins

A dozen fragmentary awls and hairpins in the Pueblo Grande bone artifact assemblage had been modified by drilling, carving, and incising (tab. 2; fig. 1a, 2b, 5). These artifacts formed a subset of awls and hairpins but were treated as part of the overall analysis. In this section, they will be discussed in more detail since these types of artifacts sometimes have been considered by archaeologists as chronological markers and status objects.

The 12 modified awls and hairpins represent a very small portion of the assemblage, constituting only 5 percent of the total 258 awls and hairpins. Modification of the specimens are separated into four groups: (1) drilled through the top of the handle, (2) drilled through the side, (3) carved handles, and (4) incised specimens. With regard to provenience, 8 of the artifacts are from burials (2 cremations, 6 inhumations), 3 from compound rooms and pithouses, and 1 from a borrow/trash pit. All the medial incised specimens are from burials (tab. 2).

Of particular interest, two probable hairpin handle fragments had been carved around the epicondyle on the distal metapodial to form a knob. One of these (fig. 5c) was associated with a late Classic inhumation (F449.02); the other was recovered in a late Classic compound room (F674; tab. 2).

Both these carved hairpin handles were remarkably similar to hairpins reported from the Tonto Basin at a Salado site (Jernigan 1978: fig. 63) and farther east at the late Mogollon Western Pueblo sites of Grasshopper (Olsen 1979: 367, fig. 12A,C) and Kinishba (Olsen 1980: 51, fig. 6a) in eastern Arizona. The close similarities of the Pueblo Grande carved knob hairpin handles to the specimens from the Tonto Ruins, Grasshopper, and Kinishba, raises questions as to whether the artifacts were crafted independently, or whether they represent trade items, widespread stylistic designs, or exogamous marriage patterns and clan affiliations for males from these areas. These artifacts date from about the same time period between AD 1300-1400 and such connections are within the realm of possibility. The mechanisms by which these similar hairpins circulated, however, still need to be identified.

Craft Specialization and Status

Although various burials excavated at Pueblo Grande had one or two bone artifacts, especially awls and hairpins, that accompanied the deceased individuals, only a small number of the burials contained three or more bone artifacts. The quantity of artifacts associated with these half dozen burials might be an indication that they had higher status than other members of the Pueblo Grande community. Concomitantly, individuals buried with a number of awls and other worked bone items may represent craftspersons specialized in bone artifact, basketry, or weaving. For this reason, a detailed consideration of these burials and their associated bone artifacts are presented.

Burials with three or more bone artifacts were represented by three cremations and three inhumations (tab. 3). One of the inhumations (F1402) was that of a fetus or infant. The six burials together comprised 35 artifacts, representing 12.5 percent of the total assemblage. In some instances, the bone artifacts associated with these burials accounted for high percentages of several artifact categories in the assemblage. That is, these types occurred more commonly in the six burials than elsewhere at the site. For example, awl manufacturing stock or batons were found only in the two burials considered

Artifact Type	Cremation (BC6, F1006), Adult, Unknown Period	Cremation (BC6, F1032) Males, 18-30 yrs, Early Classic	Cremation (BC6, F2938) Males, 18-30 yrs, Early Classic	Inhumation (BC6, F1048) Males, 18-30 yrs, Early Classic	Inhumation (BC6, F1402) Female, Late Classic	Inhumation (BC6, F1578) Males, 30+ yrs, Early Classic	Total	% of 86 Total by Type
Long Awd or Hairpin				1			1	14.3
Awd, Complete		2	3			10	15	40.5
Awd, Incomplete	1	1					2	5.0
Awd: Medial	1	4		1			6	6.5
Awd: Iro	1						1	1.8
Awd: Stock or Baton		2		2			4	100.0
Tube: Bird					1		1	50.0
Whistle					1		1	33.3
Turtle Shell Artifact		1					1	33.3
Indet. Worked	2				1		3	60.0
Total	5	10	3	4	3	10	35	12.5
Note: BC = Burial Group								

Table 3. Distribution of bone artifacts from several burials at Pueblo Grande

here. Other artifact categories represented in the burials with relatively high percentages included complete awls (40.5%), bird bone tubes (50%), whistles (33.3%), turtle shell artifacts (33.3%), and indeterminate worked pieces (60%).

One of the cremations (F1032) and one inhumation (F1578) each had 10 bone artifacts (figs. 2 and 6); both were early Classic period burials. Of these two, the cremation (F1032) had the most diverse bone artifact types consisting of two complete awls, an incomplete awl, four medial awl fragments, two awl stocks or batons, and a fragmentary turtle shell artifact (fig. 6). All the artifacts along with the cremated remains were contained in a jar. One inhumation (F1578) was much less diverse in terms of bone artifacts but contained 10 complete awls. These awls were found on both sides of the body near the upper arms and shoulders along with a bowl and projectile points, the latter presumably from arrows whose shafts had decomposed.

Given the quantity of bone artifacts found with these two individuals in the same burial group (BG5), they may have been craftsmen in the village and had a higher status than other residents. A similar situation was noted at the nearby site of Grand Canal Ruin where an early Classic period adult male inhumation (F48-14), which had a number of bone artifact types and other material remains, showed evidence of higher status than other individuals in the cemetery (James 1989, 1990). At this juncture, it is still unclear whether the males in these communities acquired their status during their lifetime or inherited it from birth. The former would indicate the presence of a tribal level society, and the latter would be a chiefdom.

Conclusions

Most of the complete hairpins were found at the heads of extended male inhumations from the early Classic period and thus confirmed the function of these items as hairpins, a matter which is problematic with regard to fragmentary awls and hairpins. No hairpins were recovered with females at Pueblo Grande, indicating that these artifacts were primarily a male item. Several stylized carved hairpin handle fragments from the late Classic period were quite similar to intact specimens described from sites to the east, that of Tonto Ruins, Grasshopper Pueblo, and Kinishba. At this point, it is not clear whether the similarity between these artifacts represents independent development of a widespread style, trade relations, status burials, or symbols of clan affiliation and exogamous marriages.

One male inhumation was buried with 10 nearly complete awls (F1578; see fig. 2). The occurrence of awls with a deceased male individual was contrary to the view that awls should always be considered female-associated artifacts. Ethnographically, however, awls were generally used by women in weaving baskets and mats. The awl specimens associated with this male inhumation may, instead, represent weaving tools in the production of cotton cloth, that is, if late

19th century ethnographic observations that Western Pueblo men did most of the weaving can serve as an appropriate analogy for comparative purposes. Such an inference might correlate with the relatively high number of spindle whorls from Pueblo Grande and the presence of cotton in the macrobotanical remains. An alternative explanation may relate to the technology involved in the production of fishing equipment that may have been used by the inhabitants of Pueblo Grande (see James 1994a, 1995, 1997, 2000a, 2000b for details on fish and fishing technology among the Hohokam). Thus, the high number of awls at the site in general and those with this male inhumation could also have been involved in making nets, which may have been used to catch the large quantities of fish represented in the unmodified archaeofaunal remains from the site.

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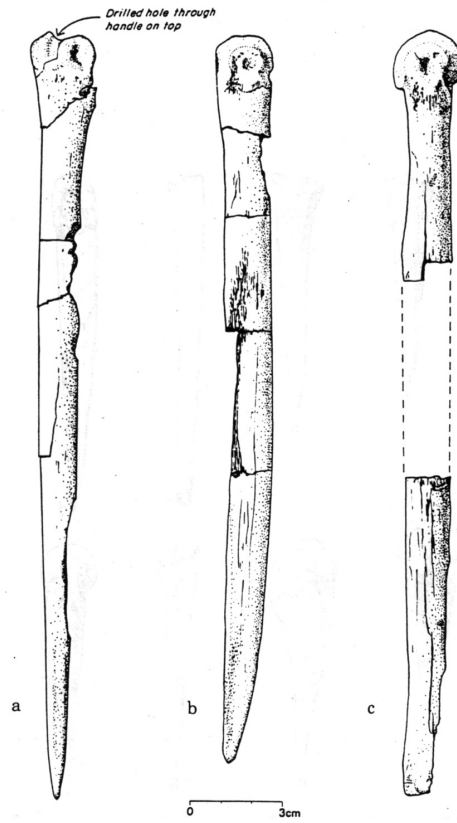


Fig. 1 Early Classic period hairpins and awl stock or baton: a - hairpin (FS 4892) from inhumation Feature 927; b - hairpin (FS 29106) from inhumation Feature 1048; and c - awl stock or baton (FS 60080) from inhumation Feature 1048

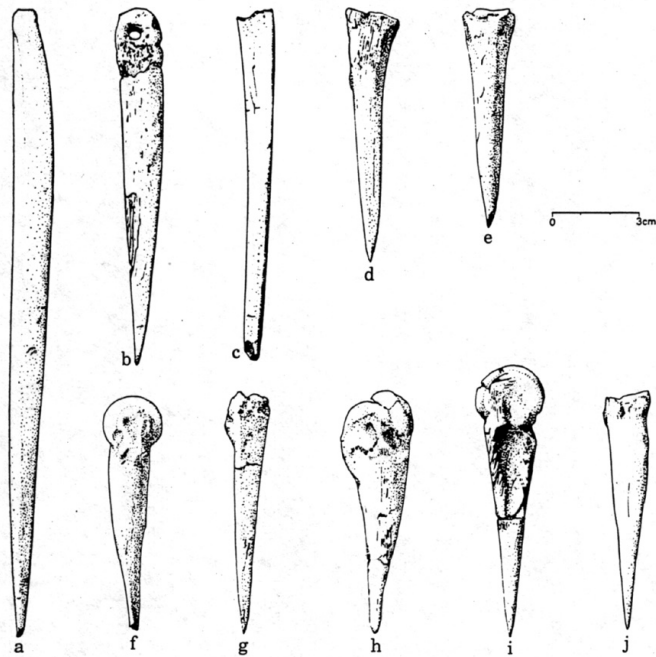


Fig. 2 Bone awls from an early Classic period inhumation (F1579): a - FS60016; b - 60013 (note drill hole); c - FS 60017; d - FS 60014; e - FS 16398; g - FS 60012; h - FS 60015; i - FS 16394; j - FS 16397

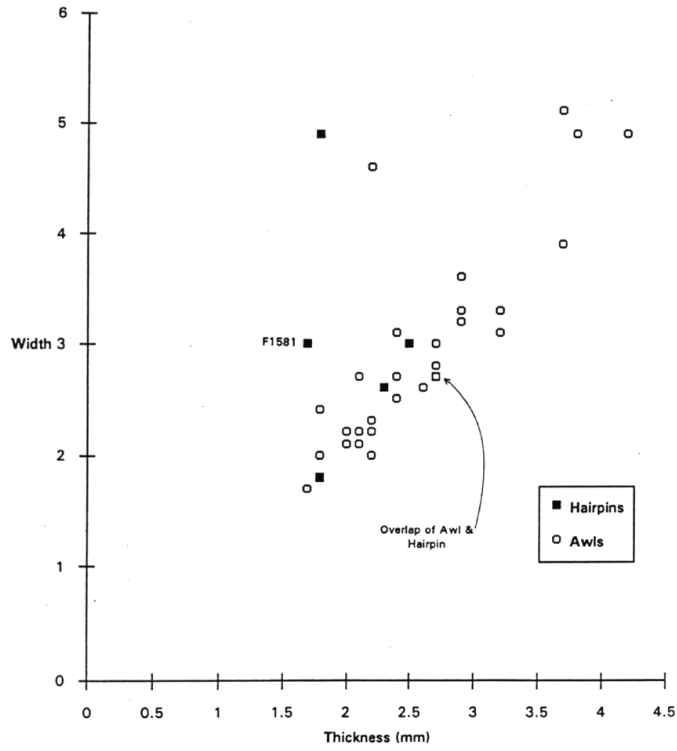
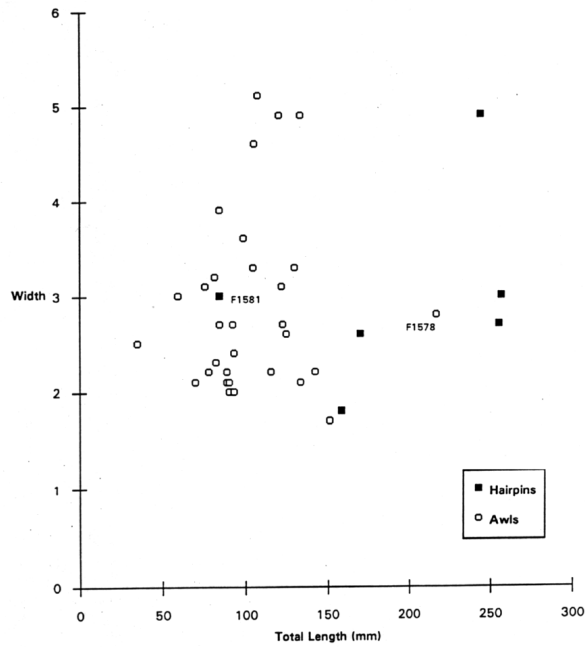


Fig. 3 Bivariate plot showing comparisons of awl and hairpin measurements taken 5mm from the tip for specimens from Pueblo Grande



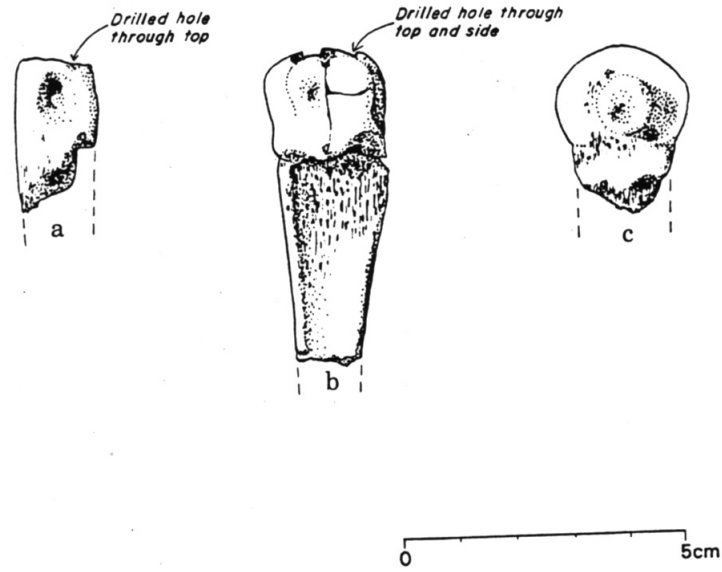


Fig. 5 Drilled and carved awl and hairpin handles from the Classic period: a - smoothed and drilled awl handle from a compound room (Feature 900); b - awl handle drilled through the top, from a narrow-walled adobe pithouse (Feature 958); c - carved hairpin handle from an inhumation (Feature 449.02)

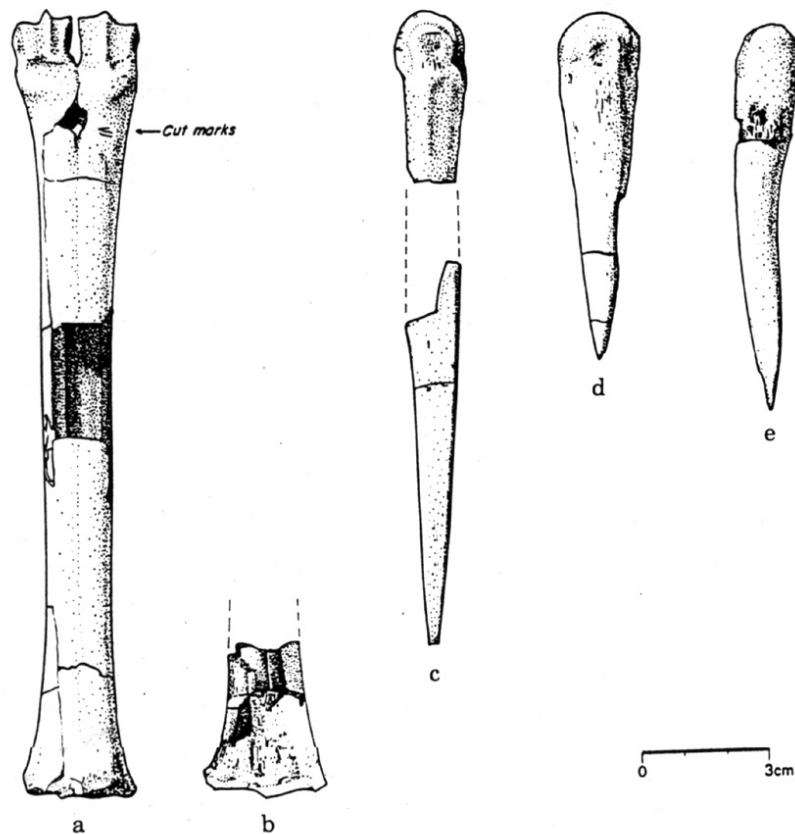


Fig. 6 Bone awls and awl stock or batons from an early Classic period cremation (F1032): a, b - awl manufacturing stock or batons (FS 60079, FS 60078); c - incomplete awl (potential refit - FS 60031); and d, e - complete short awls (FS 1978, FS 60030)