EARLY UPPER PALEOLITHIC ORNAMENTS FROM ÜÇA IZLI CAVE, TURKEY

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*Beads and similar ornaments appear early in the archaeological record associated with modern humans (*Homo sapiens*), first in Africa and somewhat later in Eurasia. They are thought to be among the first indicators of human use of symbols. This paper discusses criteria used to distinguish early mollusk-shell beads from other kinds of shells in archaeological deposits, focusing on evidence from the site of Üça izli Cave in Turkey. Upper Paleolithic beadmakers at this and other sites clearly preferred certain forms of shell for ornamental purposes, although the reasons for that selectivity remain obscure.*

INTRODUCTION

It will come as no surprise to readers of this journal that virtually every known human society makes or uses beads and similar ornaments. As it turns out, this is a comparatively old habit of humans. Beads and bead-like objects are found in archaeological layers dating to more than 70,000 years ago in Africa, and more than 40,000 years or more in Eurasia. Seemingly, wherever one finds archaeological evidence of *Homo sapiens* (i.e., anatomically modern humans), one also finds beads. The beads may not be numerous or prepossessing, but they are extremely widespread in time and space nonetheless.

The earliest beads and ornaments are often minimally altered objects taken from nature. This raises some challenges for archaeologists who seek to distinguish artifacts from other naturally occurring materials. Not all things that look like beads are anything of the sort. For example, there are scattered reports of possible ornamental objects from much earlier archaeological deposits in Eurasia associated with Neandertals and other human forms predating *Homo sapiens*. In almost all of these earlier cases, however, evidence of human manufacture is dubious (d'Errico and Villa 1997).

Early ornaments made of mollusk shells present particular analytical challenges. Shells may wind up in archaeological sites for any number of reasons. People may carry shells to their campsites because they contain edible meat, or the shells may be carried along by accident, clinging to materials such as driftwood and seaweed. Damage to shells by predatory mollusks and wave action can superficially resemble that produced by humans during ornament making. In this paper we describe some of the criteria that archaeologists use to identify early shell beads, using as illustration data from our own research at Üçağizli Cave in Turkey. These observations help us determine what was collected for ornamental purposes and what was collected for food. They also help to reveal just how raw material was obtained, the techniques used for manufacturing ornaments, as well as providing clues as to the criteria for selecting certain shells for use as beads.

A VERY BRIEF HISTORY OF EARLY BEADS

One should always be cautious about discussing the "first" example of anything, as new discoveries inevitably push the earliest known dates back in time. The oldest beads currently known come from Middle Stone Age (MSA) layers at Blombos Cave on the coast of South Africa, and date to around 70,000 years before present. These objects are shells of small marine gastropods *(Nassarius kraussianus)* with natural and artificially enhanced perforations (Henshilwood et al. 2004). There are no diagnostic human fossils from the layers yielding the beads, but it is thought that the Blombos beads were produced by an early population of anatomically modern humans, *Homo sapiens*. Similarly, early ostrich eggshell beads have been reported from eastern Africa (e.g., McBrearty and Brooks 2000) but the dating is less certain. The widespread tradition of making beads from ostrich eggshell had certainly begun in East Africa by around 40,000 years ago (Ambrose 1998).

Ornaments appeared in Eurasia somewhat later than in Africa, sometime between 45,000 and 40,000 years ago. The precise ages of the very earliest specimens are not well understood because they lie at the practical limits of the radiocarbon dating technique, the most widely applied method for obtaining absolute dates. The first indisputable beads in Eurasia are associated with early Upper Paleolithic cultural remains which, like the South African material, are

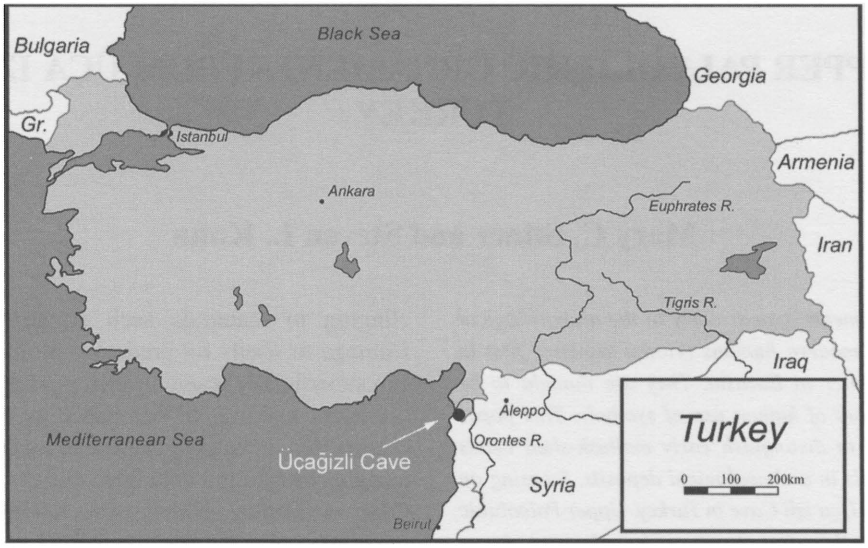

Figure 1. Location of Üçağizli Cave in the Hatay region of south-central Turkey (all photos by the authors).

thought to have been produced by anatomically modern *Homo sapiens.* Interestingly, the forms of these early beads vary from place to place. For example, in the Mediterranean basin, early Upper Paleolithic ornaments are almost exclusively made of marine gastropod shells, whereas in central and eastern Europe they are usually made of pierced animal teeth (Kuhn et al. 2001; Stiner 2003; White 2003).

The Middle Stone Age beads from southern Africa and early Upper Paleolithic ornaments from Eurasia are numerous and they are unquestionably artifactual. Moreover, they take standardized forms that persist across time and space. Small, flat, circular beads of ostrich eggshell have been used in Africa continuously from 40,000 years ago up to the present day. Some of the basic forms of mollusk shell beads from Mediterranean Europe continued to be made and used for tens of thousands of years, into the Neolithic and Bronze Ages. Thus, the early beads from Eurasia and Africa therefore represent not only ornaments, but canons of ornamentation, cultural rules about what was appropriate (and inappropriate) to use as decoration.

The ubiquity of beads in the material culture of *Homo sapiens,* both in the present and in the archaeological past, tells us that personal ornaments play a very fundamental role in human life. We are not suggesting that there is a stretch of DNA in the human genome that codes for beadmaking. Whether or not to make beads, what kinds of beads to make, and how to use them are cultural choices. Yet they are choices that most every community of human beings has chosen to make at some point. In the most general sense, beads are components in languages of personal ornamentation, material means for expressing the identity of the wearer to a variety of audiences.

There are three main hypotheses for the first appearance of ornaments in the Paleolithic, all of which relate to their role in communication. One hypothesis holds that beads are simply one symptom of sudden cognitive changes associated with the appearance of *Homo sapiens* (Klein and Edgar 2002): the first examples of beads and other elements of material culture such as art and decoration would thus coincide with an expansion of humans' biologically based abilities to communicate through symbols. Other explanations focus more on the conditions of life than on the abilities of past humans. We have argued that the first appearance of beads coincides with certain thresholds in human population sizes and densities, marking a point in time when it became necessary for people to broadcast aspects of their identities to individuals from beyond their immediate social group (Kuhn et al. 2001). A related hypothesis is that early beads are the first material expressions of social inequality and status competition in human groups.

ORNAMENTS FROM ÜÇA IZLI CAVE

We are fortunate to have been able to conduct collaborative archaeological studies with Turkish colleagues at Üçağizli Cave, a site that dates to the early Upper Paleolithic period. It was during this period that anatomically modern *Homo sapiens* dispersed into Eurasia, replacing or swamping other human forms such as Neandertals. Üçağizli Cave has also yielded some of the largest collections of Upper Paleolithic beads in Eurasia.

Table 1. Relative Abundances (MNI) of Taxa in the Ornamental Shell Assemblages in the Northern Part of the Main Trench in Üça izli Cave, by Layer or Layer Group.

Shell types	EPI %	B %	B1-4 %	C-D %	E %	F-Fc %	G-H %	H1-3 %	I %
Columbella rustica	22	32	46	51	52	37	3	1	0
Nassarius gibbosula	22	55	42	31	23	49	95	98	83
Dentalium spp.	20	0	0	0	0	0	0	0	0
Gibbula spp.	24	4	3	0	0	0	0	0	0
Rift/brackish types*	0	3	3	10	23	4	1	0	8
Marine bivalves	9	4	4	3	0	0	0	0	8
Other species	4	2	3	4	2	10	1	1	0
Total assemblage MNI	46	328	705	94	52	214	96	151	12

(*) Fresh- and brackish-water taxa, dominated by *Theodoxus jordani* but may include the genera *Cobicula*, *Melanopsis*, and *Potomida*. The nearest sources would be the Orontes River drainage. Material from the Epipaleolithic layer in the south end of the site is also included for comparison.

Üçağizli ("three mouths") Cave is situated on a rugged stretch of the Mediterranean coast in Hatay province in south-central Turkey (Fig. 1). The terrain around the site is characterized by dramatic relief. As the coastal topography is so steep, the site would always have been within a few kilometers of the sea, even during periods of very low sea level associated with full glacial conditions during the Pleistocene.

The main archaeological sequence at Üçağizli Cave is more than three meters deep, and almost all of the deposits excavated so far date to the early Upper Paleolithic period; more recent Epipaleolithic-aged deposits are preserved in another part of the cave. Given the ambiguities that currently plague radiocarbon dating for age ranges in excess of 35,000 years, we will not attempt to assign precise dates to individual layers at Üçağizli Cave. At this point, however, we are reasonably confident that the early Upper Paleolithic sequence spans the period between approximately 29,000 through 41,000 (uncalibrated) radiocarbon years before present. In fact, the radiocarbon determinations for the earlier layers represent minimum age estimates that likely underestimate the true age by several thousand years. The Epipaleolithic deposit dates to around 17,000 years ago.

Excavations at Üçağizli Cave between 1997 and 2002 have yielded more than 1,900 ornamental objects. Almost all of these are beads or small pendants manufactured from marine and brackish-water mollusk shells. Frequencies of the most important ornamental mollusk species in assemblages from the northern sector of the excavation are shown in Table 1. The only definite non-shell ornament recovered to date is the talon of a very large raptor (probably *Gyps;* e.g., *G. fulvus*). The talon has a small notch cut in the anterior proximal end (Fig. 2), presumably to facilitate suspension. One other non-shell item of note is the large tusk of a wild boar *(Sus scrofa)* that was separated from the skull at its base by a relatively clean transverse fracture. Though this object was clearly collected for some reason, there is no evidence that it was suspended or worn.

The sheer quantities of beads from Üçağizli Cave are especially remarkable in light of the small size of the excavated area. We do not believe that the abundance of beads implies that Üçağizli Cave occupied a special social or symbolic role in the cultural landscapes of the early Upper Paleolithic groups that used it, however. Due to its location close to the sea, the cave may simply have been an especially convenient place to make shell beads. Moreover, foragers' use of ornaments is not necessarily confined to ritual or socially important situations. Beads, and more importantly, beaded products (clothing, headgear, and "accessories") serve in part to inform people outside the wearer's immediate group about that individual's age, marital status, role in society, and other factors. Foragers may carry ornaments and display them in almost any situation where they are likely to encounter strangers or other people who might need visual clues about their identities. The large collections of beads from Üçağizli Cave could reflect nothing more than normal use and refurbishment of beaded ornaments and clothing over long periods of time.

The Upper Paleolithic hunter-gatherers who occupied Üçağizli Cave introduced mollusk shells into the site for a

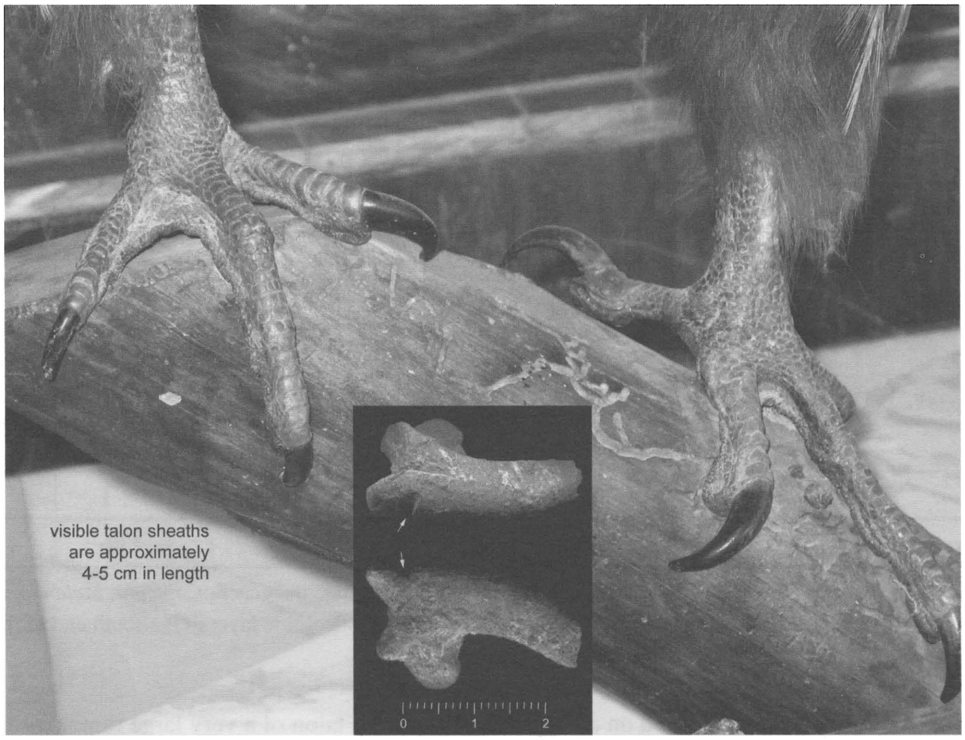

Figure 2. Incised bony core of a large raptor talon from Üçağizli Cave (inset, probably *Gyps fulvus*), and an example of modern talons complete with horny sheaths of the similarly sized Eurasian black vulture (*Aegypius monachus*).

variety of reasons. Some shell-bearing mollusks also found their way into the cave by themselves. We have distinguished "ornamental" shells from other types of mollusk shells in the archaeological deposits—food species and land snails—using an aggregate of damage characteristics. The most important characteristics for distinguishing ornaments are: a, high frequencies of particular types of perforation; b, consistent placement of perforations; c, moderate incidence of wave-induced abrasion, which indicates that shells were collected from beaches well after the death of the animals; d, consistently small shell size; and e, a tendency toward completeness (Table 2) (Stiner 1999).

Table 2. Summary of Damage Frequencies (Percentages) for Various Shell Categories from Üça izli Cave.

Variable	(Orn) Small gastropods	(Orn) Tusk shells	(Orn) Most bivalves	(Food) Various turbans	(Food) Various limpets
Beach polish (% of NISP)	46	10	12	0	0
Index of completeness (MNI/NISP)	98	53	64	42	63
Perforation (round hole or slit, % of MNI)	67	30	34	0	0
Burned (% of NISP)	10	5	10	14	4
Punched-out spire (% of MNI)	24	n/a	4	95	1
Predated by naticid mollusk (% of MNI)	5	0	7	0	0

Notes: (Orn) Ornamental shell group; (Food) Edible marine mollusks. Perforation count refers to sectioning in the case of tusk shells. Data are for all layers combined. Punched out spires can be the result of intentional damage during processing of food shells by humans, or from wave-induced collisions with shoreline rocks; association or the lack of it with wave abrasion is required to infer cause; (n/a) not applicable to tusk shells (*Dentalium*, Scaphopoda).

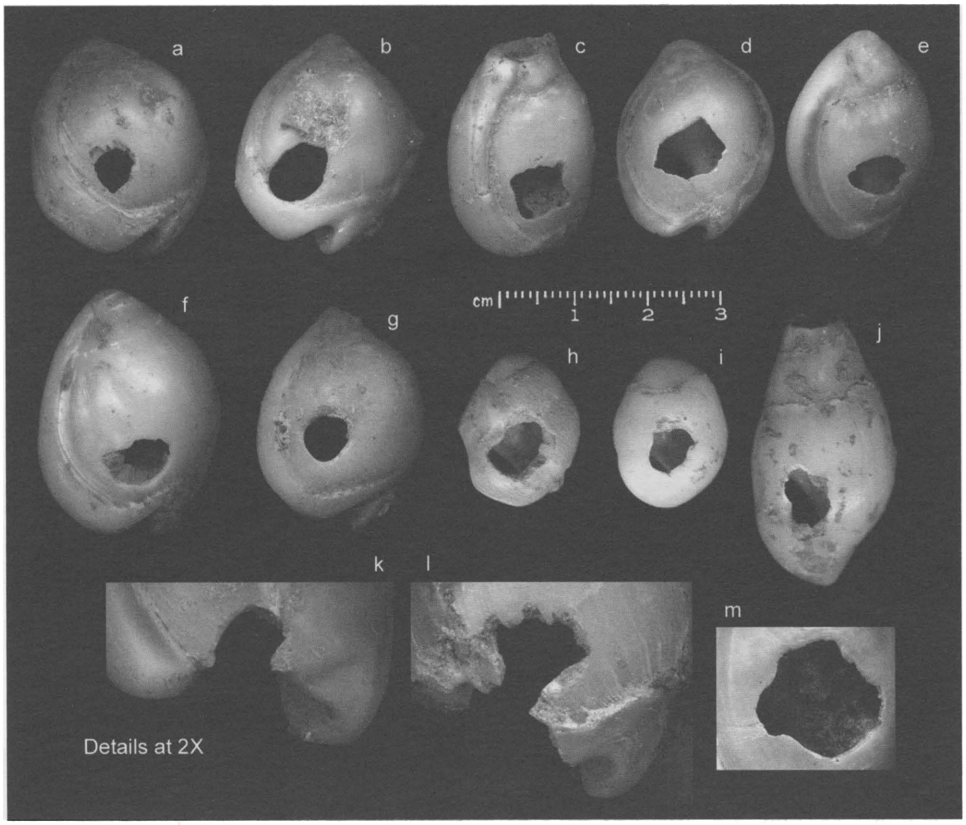

Figure 3. Typical perforations in small marine gastropod shells (*Nassarius* [a-g, k-m], *Theodoxus* [h-i], and *Melanopsis* [j]) made by humans using a simple punching technique. Some shell flanges were broken through the perforation point at the time of manufacture or, in other cases, from use. Abrasion damage on some specimens is confined to the edges of these holes (absent from the rest of the shell), sometimes asymmetrically, and is indicative of cord-wear.

Wave-induced abrasion is quite common on the shells of ornamental species. This kind of damage is never present on the types of shells interpreted as food species. Edible taxa—mainly turbans and limpets—also tend to be much larger than the ornamental types. In addition, the degree of shell completeness is very high for all ornamental shells other than *Dentalium,* which was regularly sectioned into tube beads. By contrast, species used as food tend to be highly fragmented. Not surprisingly, the shells of species interpreted as food were never perforated. Interestingly, evidence for burning is about equally frequent on shells used for ornaments and food. While there was no reason to burn ornaments, it appears that mollusks used for food were not often cooked either. Much or all of the burning damage appears to have occurred incidentally, probably from the accidental burning of debris.

These observations imply distinct histories of modification and acquisition for ornament and food shell types. Ornamental shells were frequently obtained as beach-cast material, whereas—predictably—food mollusks invariably were always taken while alive. Some of the ornament shells show small, neatly beveled perforations typically produced by predatory naticid and muricid mollusks, consistent with deaths from nonhuman causes (Table 2). Food species at the site never exhibit this kind of damage.

Between 63% and 77% of all shells from species commonly used as ornaments have holes in them, some made by humans and others from surf damage. Figure 3 shows typical human-made perforations in gastropod shells from Üçağizli Cave. Most of the perforated shells are small (1-2 cm), but a few larger shells were also modified in this way (Fig. 4). The typical perforation is a rough circle, usually located in the shell's flange. The walls of the perforation are perpendicular to the outer face of the shell. In some cases the holes seem to have been started by pecking or scratching (*see* Fig. 3,k-m), but a simple punching motion or pressure applied by a pointed object was the most common perforation technique. There is no evidence that people drilled holes in shells using a radial motion. In fact, human

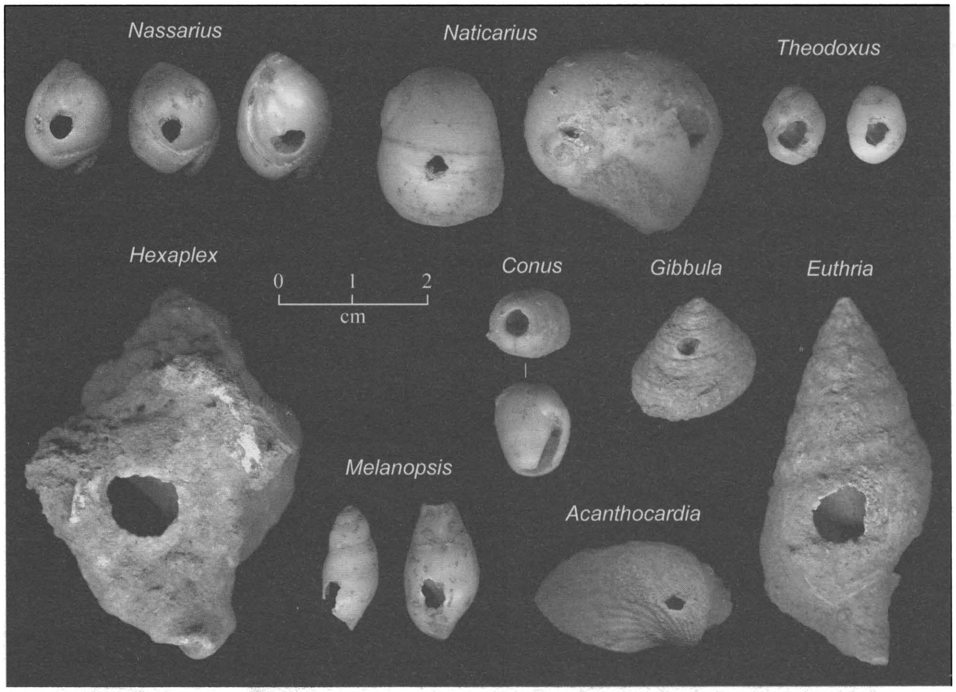

Figure 4. Variation in shell types used as ornaments at Üçağizli Cave (*Dentalium* not shown).

made perforations are very different from the symmetrical beveled openings that naticid and muricid predators drill into the shells of live mollusks (Figs. 4-5) (*see* also d'Errico et al. 1993). A less common method of perforation involved sawing the lips of moon snails *(Naticarius* and *Neverita)* to create a slit-shaped aperture (Fig. 6). *Dentalium* (tusk) shell beads, common only in the Epipaleolithic at Üçağizli Cave, were sectioned by sawing or snapping, followed in some cases by grinding. The Paleolithic occupants of the cave also took advantage of natural perforations in beach-cast shells, particularly those on the dorsal face of *Nassarius* shells, as well as voids left by broken spires on *Columbella* and *Conus* shells (*see* Fig. 4).

Some shells in the collections from Üçağizli Cave

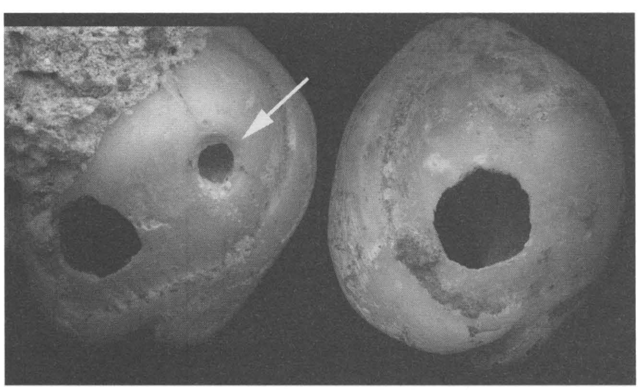

Figure 5. Close-up of *Nassarius* specimens showing the difference between large irregular holes produced by humans and small symmetrical holes produced by predatory mollusks or "drills" (indicated by arrow).

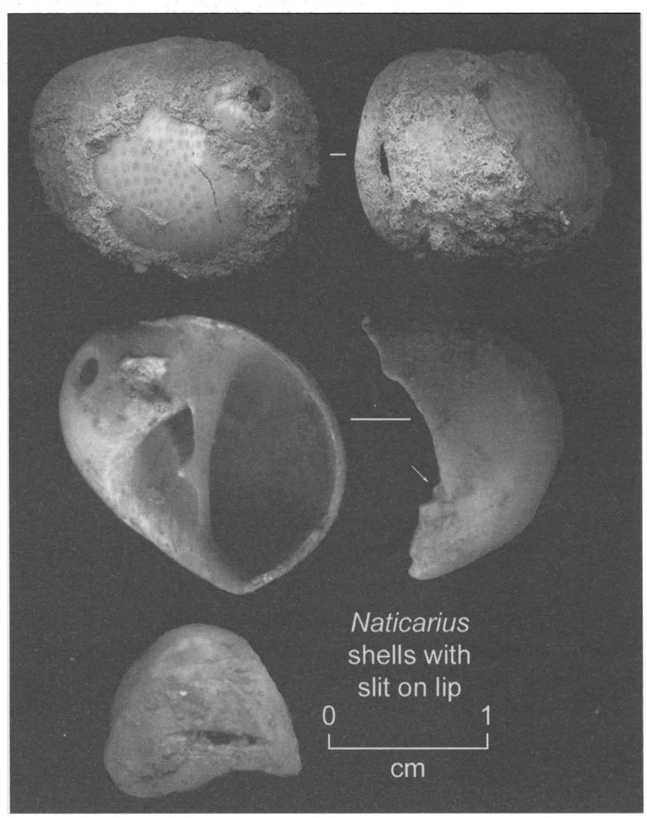

Figure 6. Slit-shaped holes incised into the lips of moon shells (*Naticarius* and *Neverita*). The middle specimen has broken through the hole. The additional round hole in the specimen at the top is human-made, whereas that on the middle specimen is from a molluskan predator or "drill."

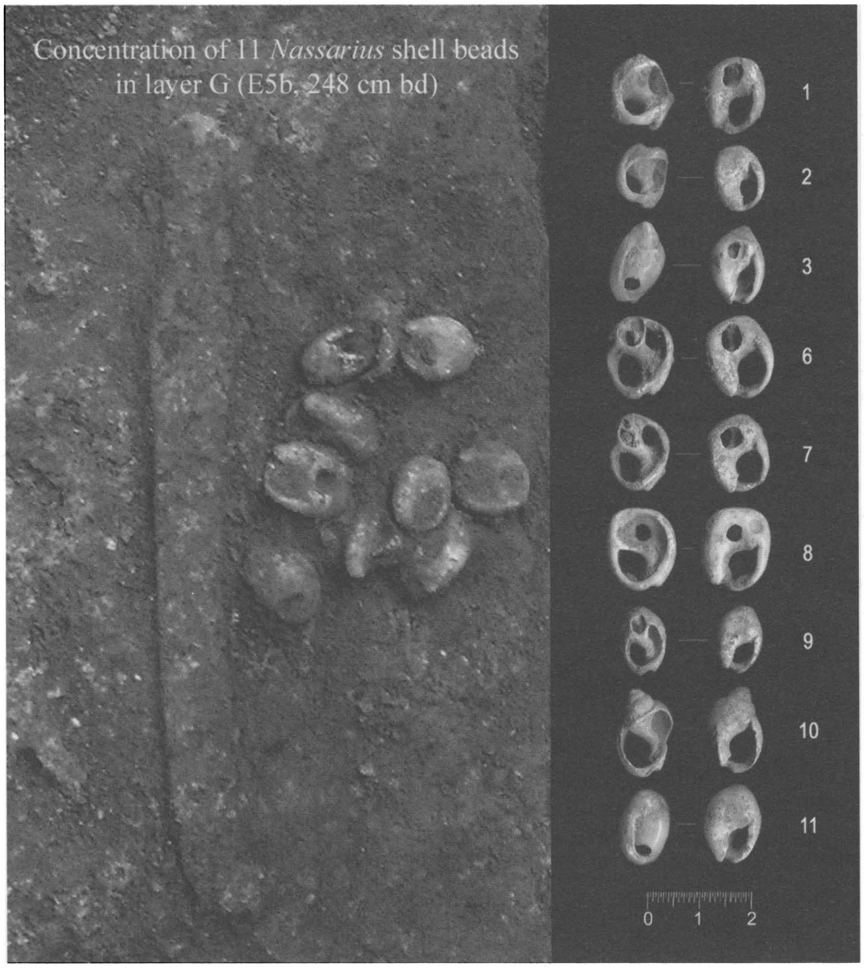

Figure 7. *In situ* concentration of 11 *Nassarius* and *Sphaeronassa* shell beads from layer G, with multiple views of most specimens. Note that only some of the shells are perforated and that their conditions vary.

appear to have been broken during attempts at perforation while others seem to have broken as a result of use (*see* Fig. 3). A minority of the holes in shell beads display fine abrasion, sometimes in an asymmetrical pattern, apparently from prolonged contact with fiber. This kind of abrasion contrasts with the fresh condition of the specimens and is not due to wave-induced abrasion. It is also interesting that not all specimens of typical ornament shells have holes in them (*see* Table 2; Fig. 7). Apparently some shells appropriate for beadmaking were collected but never used, probably indicating that beads were manufactured on site.

All ornamental mollusk species identified in the Upper Paleolithic and Epipaleolithic layers of Üçağizli Cave could have been collected within 20 km of the site and most could have been found even closer. Most of the taxa used as beads, such as *Nassarius* and *Columbella,* occur in near-shore saltwater environments and could easily have been picked up on beaches in the immediate vicinity of the cave, although they are not especially common in beach-cast material in the area today. Some ornament shells come from mollusks that live in fresh or brackish water of the nearby Asi River and its tributaries and in the inland lakes of the northern Rift Valley (e.g., *Theodoxus* and *Melanopsis*). Today some of these inland types are washed downstream to where the Asi River empties into the sea a few kilometers north of Üçağizli Cave, and they could have been obtained locally by Paleolithic foragers from time to time. *Dentalium,* which is common only in the Epipaleolithic deposit, is seldom if ever found on beaches in the area now. Fossil dentalium shells, however, occur in abundance in exposures of Pliocene deposits a few kilometers from the site (Fig. 8). We suspect these fossil deposits are the source of the archaeological tusk shells as well. Use of fossil shells for ornaments is known from other early Upper Paleolithic sites (e.g., *see* Taborin 1993).

The absence of clearly "exotic" species at Üçağizli does not necessarily mean that long-distance exchange never took place, though it does show that such shells were not a particularly valued object for trade. On the other hand, it is also clear that people did not just pick up the most common shells found around the cave, but instead exercised considerable selectivity in the things they used to make ornaments. A high proportion of the mollusk shells used for making ornaments (such as *Nassarius*) are from ecologically uncommon carnivores or scavengers. Others (e.g., *Thedoxus*) probably came from inland aquatic sources. In other words, certain kinds of shells were considered appropriate for producing beads, but most were not. This selectivity suggests that certain types of shells were invested with a certain amount of cultural "value."

Although relatively uncommon species were apparently valued more, the absence of evidence for long distance exchange indicates the value of ornamental shells did not derive exclusively from scarcity or "exoticness." Instead, the criteria determining what was an "appropriate" ornament shell at Üçağizli Cave and other early Upper Paleolithic sites in the Mediterranean seem to have centered on shape, size, and probably also color (*see* Stiner 1999, 2003; Taborin 1993). Asymmetrical rounded, basket-shaped, or pearl-shaped forms 1-2 cm in length are especially common in the ornament assemblages of Üçağizli and other European Upper Paleolithic sites. Interestingly, Upper Paleolithic people made use of distinct molluskan families apparently to meet a common aesthetic (Fig. 9). At Üçağizli Cave, the demand for small, oval "basket-shaped" beads was met using *Nassarius gibbosula* and *Theodoxus jordani. Columbella rustica,* another important ornamental shell type, possesses similar proportions. The same species were used at Ksar 'Akil in Lebanon (Kuhn et al. 2001). On Mediterranean shores farther west different species were utilized but these were similar in form and size (Stiner 2003). The sizes and shapes of shell beads also overlap to a remarkable degree with the same characteristics in non-shell beads (made from ivory, bone, soft stone, or the canine teeth of red deer (*Cervus elaphus*) in the European Paleolithic (e.g., White 2003). Remarkably, the earliest beads known to date from South Africa display these same characteristics (Henshilwood et al. 2004).

This widely shared esthetic and tendency to emphasize certain bead forms is intriguing but difficult to interpret. It is, however, important to distinguish commonality in form from commonality in meaning. The fact that the same shapes were selected time and time again by people living in widely scattered areas may even speak to some very basic shared characteristics of the human perceptual apparatus. At the same time, beads and other ornaments would have been

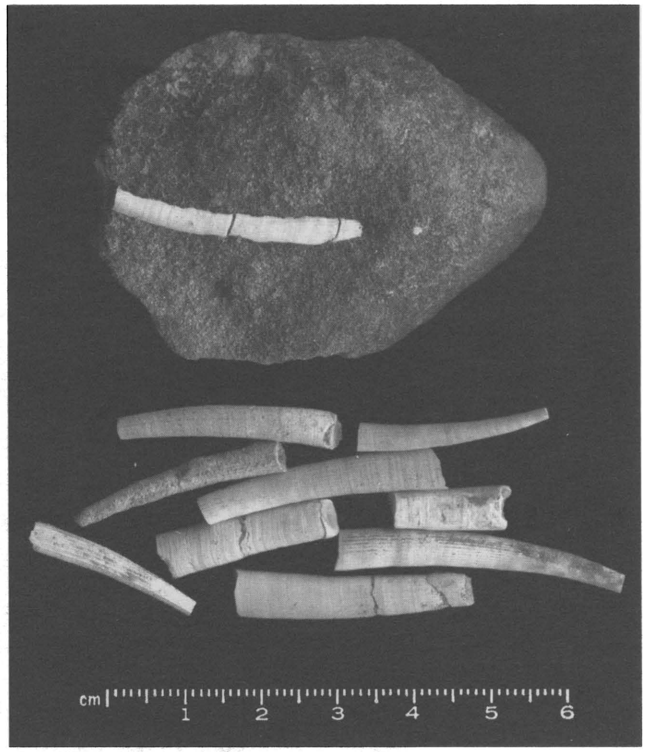

Figure 8. Fossil dentalia (tusk) shells from Pliocene mudstones near Üçağizli Cave.

invested with symbolic meaning or value. By definition, however, the meaning or value of a symbol is arbitrary. Thus, very similar kinds of ornaments may have meant very different things to different people.

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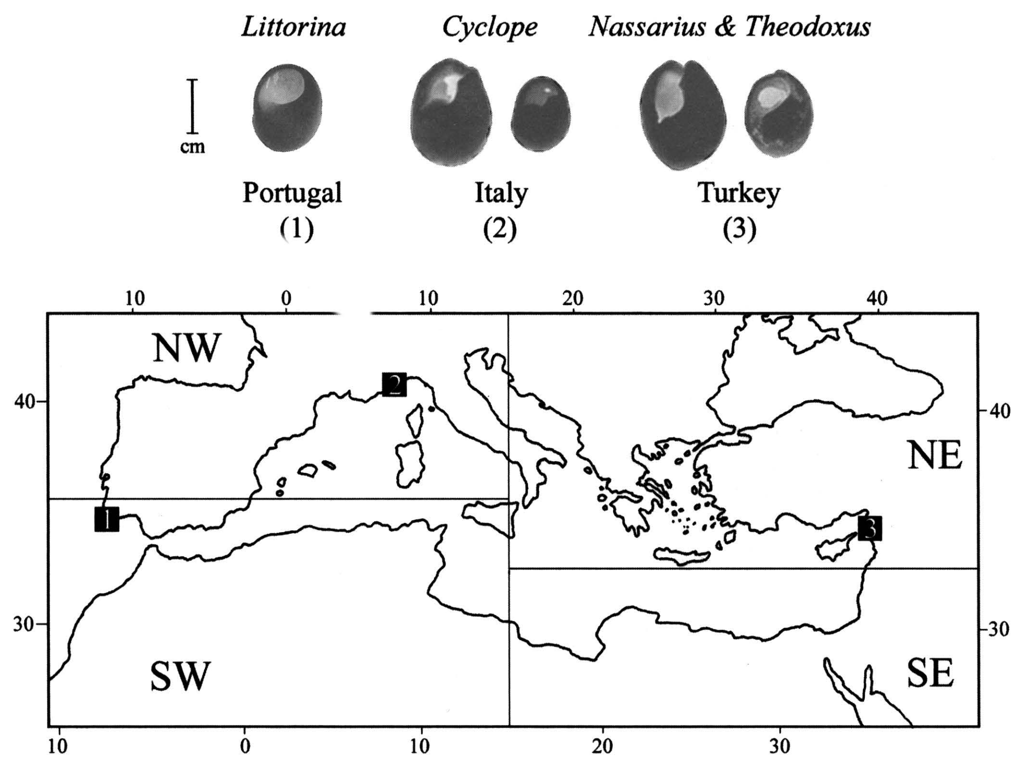

Figure 9. Similarities in shell size and form were preferred by early Upper Paleolithic peoples for ornament-making across the Mediterranean rim: 1, Algarve region of Portugal; 2, Liguria region of Italy; 3, Hatay coast of Turkey. Note that four different genera are represented.

REFERENCES CITED

Ambrose, S. H.

1998 Chronology of the Later Stone Age and Food Production in East Africa. *Journal of Archaeological Science* 25: 377-392.

d'Errico, F., P. Jardón-Giner, and B. Soler-Mayor

1993 Critères à base experimentale pour l'étude des perforations naturelles et intentionelles sur coquillages. In *Traces et Fonction. Les Gestes Retrouvés*, edited by P. Anderson, S. Beyries, M. Otte, and H. Plisson, pp. 243-254. ERAUL 50. Université de Liège.

d'Errico, F. and P. Villa

1997 Holes and Grooves: The Contribution of Microscopy and Taphonomy to the Problem of Art Origins. *Journal of Human Evolution* 33:1-31.

Henshilwood, C., F. d'Errico, M. Vanhaeren, K. van Niekerk, and Z. Jacobs

2004 Middle Stone Age Shell Beads from South Africa. *Science* 304(5669):404.

Kuhn, S., M.C. Stiner, D. Reese, E. Güleç

2001 Ornaments in the Earliest Upper Paleolithic: New Perspectives from the Levant. *Proceedings of the National Academy of Sciences* 98(13):7641-7646.

Klein, R. and B. Edgar

2002 *The Dawn of Human Culture*. John Wiley, New York.

McBrearty, S. and A. Brooks

2000 The Revolution that wasn't: A New Interpretation of the Origin of Modern Human Behavior. *Journal of Human Evolution* 39:453-563.

Stiner, M. C.

1999 Trends in Paleolithic Mollusk Exploitation at Riparo Mochi (Balzi Rossi, Italy): Food and Ornaments from the Aurignacian through Epigravettian. *Antiquity* 73(282): 735-754.

2003 "Standardization" in Upper Paleolithic Ornaments at the Coastal Sites of Riparo Mochi and Üçağizli Cave. In *The Chronology of the Aurignacian and of the Transitional Technocomplexes: Dating, Stratigraphies, Cultural Implications*, edited by 1. Zilhão and F. d'Errico, pp. 49-59. Trabalhos de Arqueologia 33. Instituto Português de Arqueologia, Lisbon.

Taborin, Y.

1993 Shells of the French Aurignacian and Perigordian. In *Before Lascaux: The Complex Record of the Early Upper Paleolithic*, edited by H. Knecht, A. Pike-Tay, and R. White, pp. 211-229. CRC Press, Boca Raton.

White, R.

2003 *Prehistoric Art: The Symbolic Journey of Humankind.* Harry N. Abrams, New York.

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