Humans and Landscapes of Çatalhöyük

Reports from the 2000–2008 Seasons

Humans and Landscapes of Çatalhöyük

Reports from the 2000–2008 Seasons

Çatalhöyük Research Project Series Volume 8

Edited by

Ian Hodder

BRITISH INSTITUTE AT ANKARA
BIAA Monograph No. 47

Monumenta Archaeologica 29
Cotsen Institute of Archaeology Press

Published by the British Institute at Ankara
c/o The British Academy, 10 Carlton House Terrace, London SW1Y 5AH
and the Cotsen Institute of Archaeology at UCLA
308 Charles E. Young Dr. N, A163 Fowler, Los Angeles, CA 90095

UK distributor: Oxbow Books, Park End Place, Oxford OX1 1HN
USA distributor: University of New Mexico Press, 1717 Roma Ave. NE, Albuquerque, NM 87106

Library of Congress Cataloging-in-Publication Data

ISBN 978 1 898249 30 6

BIAA Monograph no. 47 ISSN 0969-9007 (British Institute at Ankara)
Monumenta Archaeologica 29 (Cotsen Institute of Archaeology at UCLA)

Copyright ©2013 British Institute of Archaeology at Ankara; Regents of the University of California
All rights reserved.

The British Institute at Ankara (BIAA), one of the British Academy's overseas institutes, has promoted world-class research in Turkey and the Black Sea region in the fields of history, archaeology and related social sciences since its foundation in 1947. The BIAA publishes scholarly monographs relating to the archaeology and history of Turkey, with a particular emphasis on publishing the results of Institute-funded research.

The British Institute at Ankara Publications Editorial Board

Dr Gülnur Aybet
Ms Gina Coulthard
Dr Shahina Farid
Dr Tamar Hodos
Professor Roger Matthews
Professor Stephen Mitchell
Dr Claire Norton
Dr Lutgarde Vandeput

Typeset by Campbell Archaeological Services, Lymm Cheshire
Printed by . . . .

Chapter 16

Mollusc Exploitation at Çatalhöyük

Daniella E. Bar-Yosef Mayer

Mollusc shells contribute to our understanding of the Çatalhöyük economy, the social and spiritual practices of its inhabitants, and their interactions with local and regional environments. The site is rich in molluscan remains of three classes: gastropods (snails) that naturally inhabit marine, freshwater or land environments; bivalves that naturally inhabit marine and freshwater environments; and scaphopods (tusk shells) that inhabit only marine environments. Shells were brought to the site from different regions and sources: the Mediterranean shore, fossil beds in the Taurus Mountains, as well as various freshwater sources in the vicinity of the site; additionally, several land snails may have been collected at or near the site. The shells found at Çatalhöyük reflect a variety of human activities: shells of gastropods, bivalves and scaphopods used as personal ornaments, usually beads, originate in all the above-mentioned environments; bivalves collected as food were gathered in a nearby river. Mud containing thousands of tiny freshwater snails was collected for construction and pottery production from the Çarşamba River, as well as other freshwater sources (lakes and marshes). Some of these could also have been brought along with certain plants. The South and 4040 Areas contained 734 shell artifacts. In this chapter, I will focus on the shells considered as artifacts and as food sources, or in other words, those that were deliberately collected.

Methods

Shells were collected by hand, or by sieving, but the smallest shell beads, namely, scaphopod segments, were collected from floatation samples. Shells were identified to species level in the field when possible, based on comparison to various publications and to a local reference collection. The following specialists contributed to species identification: Burçin A. Gümüş, Gazi University, Ankara; Henk K. Mienis, Israel's National Collections of Natural History, Tel Aviv University; Yeşim İslamoğlu of the Geological Research Department, Turkish Institute for Mineral Research and Exploration (MTA), Ankara; Aldona Kurzawska, Adam Mitskiewicz University, Poznan, Poland.

Following species identification, the shells were described taphonomically. This was done with the help of a typelist that distinguishes between complete shells, broken shells (where more than half the shell is present or it contains the umbo or apex), shell fragments (where less than half the shell is present or the umbo or apex are absent), worked shells, and specific products of worked shell that are species-specific. Whenever possible, we noted other parameters such as working methods of perforated shells and whether they were colored or burned; complete artifacts were measured with a digital caliper.

In the case of freshwater bivalves of the genus *Unio*, which are assumed to have served as food and are very fragmented, it is critical to be able to calculate MNI (minimum number of individuals), as opposed to NISP (number of identified specimens), which is a sufficient calculation for the rest of the molluscan fauna. Thus, we distinguished between right and left valves in the remains that include the umbo (whether fragments, broken valves or complete ones; Fig. 16.1). The larger number of valves (right or left) determines the MNI. *Unio* fragments are common in very large numbers throughout the site and each bag containing such fragments was recorded as having one fragment, as it is impossible to count the fragments due to breakage, and because we cannot assess MNI from these fragments. They do, however, provide an indication of the prevalence of this species throughout the sequence.

Results

The results, presented and discussed below, are divided according to the shells' presumed function at the site.

Shells as food

Most prominent among the edible shellfish recovered at Çatalhöyük are the *Unio mancus* bivalves, which live in freshwater river systems, floodplain lakes and ponds. Some large freshwater gastropods might also have been consumed, especially *Viviparus viviparus,* which inhabit similar environments to *Unio* bivalves. These gastropods appear in relatively small numbers, however, and are scattered throughout the site in low concentrations; as such, they are not treated in this study as food remains.

The long sequence in the South Area permits a preliminary view of how *Unio* shells were exploited. The shells were

Figure 16.1. Unio *valve fragments with intact umbones, separated between right and left valves for MNI counts.*

most prominent in Level South G where they account for 72 per cent of shells. Moreover, Sp.181 exhibits a large MNI (*n*=693) of *Unio* bivalves which were mixed with a variety of other artifacts including obsidian tools, stone beads, etc. While *Unio* shells are present in all levels, they were often found as fragments, and over 12,000 fragments have been recorded in our database (see methods, above). MNI counts amount to only 898 in the entire South sequence, however (Figs. 16.1, 16.2). It is therefore highly likely that *Unio* shells in Level South G represent the remains of a shell midden. It is worth noting the proportion between supposedly edible *Unio* shells and artifacts made from them; in Level South G, out of an MNI of *c*.700 shells, only six (under 1 per cent) are artifacts.

Shellfishing was probably a seasonal occupation. Human consumption of bivalves typically occurs outside of the reproductive period when gametes can make the meat distasteful. Aldridge (1999) reports that for *Unio* spp. in the UK, eggs move into the gill demibranchs from April to May and glochidia are released from June to July. This would suggest that *Unio* are best eaten in late summer and autumn when gametes and glochidia are absent and its tissues would have the greatest nutritional value before reserves become depleted. Three of the valve samples tested for oxygen isotopes to date suggest that shellfish were collected in autumn (Chapter 6). This makes sense, as it is likely that following hot and dry summers some food sources (especially plants) were scarce and supplements to diet were sought.

In many non-western societies, shellfish are considered a low-ranking food which is often a last resort in the absence of better and more nutritious foods. The seasonality of shellfish gathering could and should be checked in relation to other seasonal food resources (fruits, cereals). The Level South G shell midden complements other information on the initial settlement of the site such as faunal and botanical remains as well as wood procurement; all of these indicate a more variable exploitation of the site's environment and available resources.

What is not clear is why the shell midden ceases to exist in subsequent levels of the site. There are several possible explanations: a) the shell midden always existed at the perimeter of the site, but because the edge of the site was only visible in Level South G, other shell middens were not discovered; b) shellfish consumption did continue, but the shells were not preserved. This could either be a result of changing preservation conditions, or, that the shells were used secondarily and did not survive. Reese (2005, 123) proposes that they were used in lime burning. We suspect that shells became a necessary ingredient in the production of plaster for covering floors, walls, bins and other installations; c) with the establishment of the site as a permanent occupation, the inhabitants learned to rely on other food sources and were no longer dependent on shellfish for subsistence; d) a taboo developed against shellfish consumption. This last explanation contradicts the previous options, but at this point there is no way of testing either hypothesis.

Shells as ornaments

Ornaments made of shell are presented and discussed here according to their origin. Tables 16.1 and 16.2 (on CD) list the shell artifacts from the South and 4040 Areas, respectively, presenting them by level, as well as by their function and origin. Most of the shells were found in various midden depositions, but a few were found as clusters or in special contexts as detailed in Tables 16.5 and 16.6 (on CD).

Beads and pendants

Marine shells

All marine shells present at the site originate from the shores of the Mediterranean and are composed of gastropods, bivalves and scaphopods. The species brought from the Mediterranean probably served as simple beads, as most of them are naturally or artificially perforated. Artificial perforations in gastropods were made by grinding and possibly gouging (Fig. 16.3; Francis 1982), while perforations in scaphopods were made by slicing. The most common species, *Columbella rustica* and *Nassarius gibbosulus,* as well as *Conus mediterraneus*, usually have a hole that could serve for suspension (Fig. 16.4).

In some of the *Columbella* shells there seems to be a notch inside the naturally perforated apex, indicating the bead was worn sidewise from apex to base. Many of the burned shells are completely black and sometimes shiny, suggesting that these shells may have been intentionally burned to give them a black color, as known from other sites (e.g. Franchthi cave, Perlès & Vanhaeren 2010).

Columbella rustica, Nassarius gibbosulus, Conus mediterraneus and *Antalis* spp. form 90 per cent of all marine shells found at the site. *Columbella* and *Antalis* form over half of these. This seems to reflect a continuation of a Palaeolithic tradition, as these are the species dominant in the Levant and the Eastern Mediterranean during Upper Palaeolithic and Epi-Palaeolithc periods (Bar-Yosef Mayer 2005; Colonese *et al.* 2011). In the Levant we see a gradual change during PPNA and especially PPNB towards other species, with *Glycymeris, Cerastoderma* and *Cypraea* becoming much more prominent. The only marine bivalves recovered are from the family Cardiidae (possibly fragments of *Cerastoderma glaucum*), and they were represented by one speciemen from Level South R and another from Level South L. This is curious in light of the dominance of such shells in PPNB Levantine sites. Interestingly, one of the *Cerastoderma* fragments came from (11306), a woman's burial in B.42. A similar situation is encountered with *Cypraea* (cowrie), which is represented by only two specimens from Level South G. Cowries that appear to have been set in the eye sockets of a red ochre burial below Shrine VII were also encountered in Mellaart's excavation (Mellaart 1966, 183, Pl. L*b*).

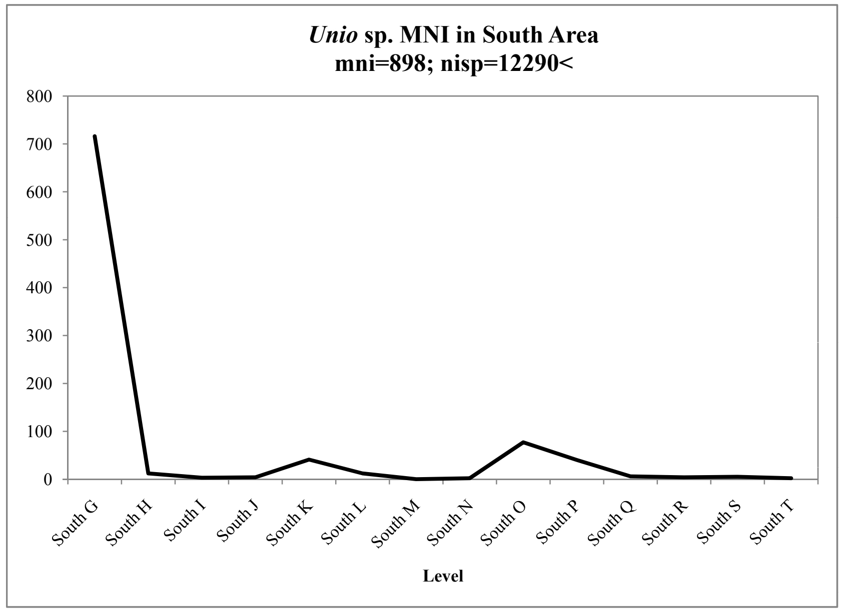

Figure 16.2. *Graph showing the frequency of unworked* Unio *shells in the South area, by level.*

Despite their negligible numbers at Çatalhöyük, these specimens might reflect connections with the Levant. To some extent, this may be related to symbolic values attributed to these shells by the Çatalhöyük society, as may have been the case during the Upper Palaeolithic. What this symbolism entails is partially understood by recent psychological research indicating connections to birth, death and creative renewal (Steinhardt 2010). The 'Palaeolithic' nature of this assemblage may be a further indication of the degree of mobility in this society, as seen in the dominance of scaphopod shells and in the presence of *Antalis,* which is found in all levels where other marine gastropods and bivalves are recovered. The use of scaphopods and other shell beads in conjunction with stone beads should be explored further.

Scaphopods, or tusk shells, are known to most archaeologists as *Dentalium* (Bar-Yosef Mayer 2008). Scaphopods are a major component of the ornaments and originate in both the Mediterranean (where the most common genus is *Antalis*) and fossil beds of the Hatay region in Southeast Turkey (where the common genus is *Dentalium*; see below). Scaphopods usually live in depths of 30m or more, both in the Mediterranean and in other seas. In the Near East they are known in archaeological sites to be collected from the Red Sea and from fossil exposures (Avnimelech 1937; Stiner & Kuhn 2003).

Our attempts to identify *Antalis* at species level were only partially successful. One of the species present is *Anta-*

Figure 16.3. *Ground hole on a* Columbella *shell bead (Photograph by Jason Quinlan).*

Figure 16.4. *Mediterranean gastropods used as beads (*Columbella rustica*) with natural and artificial perforations (Photograph by Jason Quinlan).*

Figure 16.5. *Fossil* Dentalium *sp with cut marks (Photograph by Jason Quinlan).*

lis dentalis, a finely ribbed and small shell, but it should be noted that it is hard to differentiate between *Antalis dentalis* and *Antalis inaequicostata*; these Mediterranean species are now referred to as *Antalis dentalis* group (Kurzawska *et al.* in press). *Fustiaria rubsecens*, the species currently common on the beaches of the Levant, seems to also be present at the site.

Overall, *Antalis* forms 45 per cent of the Mediterranean shells both in the South and 4040 Areas. If all Mediterrnean and fossil shell beads are counted, however, scaphopods form 57 per cent in the South Area and 80 per cent in the 4040 Area. Not all scaphopods were measured, but a random sample of 29 scaphopods ranged in size from 0.9–24.2mm in length, with an average size of 4.7mm. Ten of the shells are heavily abraded. One shell (10039), the largest scaphopod recovered to date, is of special interest as it has several incisions around its perimeter indicating an attempt to cut it in order to make shorter beads. It might also indicate that they served as raw material and that shell bead production may have taken place on site (Fig. 16.5) (Bains *et al.* in preparation; Volume 9, Chapter 12).

Scaphopods from both the South and 4040 Areas are scattered throughout the sequence, but they are completely absent from the Chalcolithic West Mound. This accords with what is known from the Levant, namely that these shells are no longer used in sedentary post-Neolithic societies, and in the Chalcolithic and Early Bronze Age they were only used by pastoralists (Bar-Yosef Mayer 2008). If scaphopods are indeed indicators of high mobility and were used primarily by hunter-gatherers and herders, this may serve as an indicator of decreased mobility during the Chalcolithic at Çatalhöyük.

Fossil shells

Fossil gastropod and bivalve shells recovered at the site are part of a Miocene fauna of different geological formations representing different ages. The habitat and ecological environment of the species represented by this fauna is one of shallow waters, and sandy and muddy bottoms of the Tethys Sea. The most likely source for these fossils could be the shallow marine units of the Karaman-Mut Basin of the Taurus Mountains (Bar-Yosef Mayer *et al.* 2010 and references therein).

Most of the shells of fossil origin, including *Strombus*, Cassidae, *Turitella*, and Fasciolariidae, are complete or broken (Fig. 16.6) and assumed to have been collected as 'souvenirs'. Two fossil gastropods, however, were perforated (*Terebralia bidentata* and *Clavatula calcarata*) and three shells were painted (*Athleta ficulina, Terbralia bidentata* and *Persistrombus coronatus*). The latter, 13127.x3, was an unusually large fossil measuring 67mm long and the spire was painted red (Fig. 16.7). In total, we can refer to five of the fossil gastropods as having been artificially manipulated, possibly on-site, and appear mostly in the later levels, especially in the 4040 Area. In these levels, they appear to derive from middens associated with feasting activities.

Another group of fossils were scaphopods, also referred to as *Dentalium* shells. They were cut into short, annular segments, and all can be considered as beads which likely complement the *Antalis* shell beads from the Mediterranean. It should be noted that the average segment length is *c*.4mm for both fossil and subfossil (Mediterranean) shells (Volume 10). In the eastern Mediterranean region, fossil scaphopods are only known in Pliocene units in the Syrian Basin and Lower Pliocene marine deposits of the Hatay-Samandağ and İskenderun sub-basins (Bar-Yosef Mayer *et al*. 2010). These were exploited throughout the sequence from Level South I onwards. A total of 24 fossil scaphopods were found in the South Area and over 200 in the 4040 Area, suggesting that ties to the Hatay region may have intensified with time (this may also be a bias related to excavated volume and sample size between the two excavation areas).

Freshwater		
Gastropods	*Theodoxus* cf. *heldreichi heldreichi*	
	Viviparus viviparus	
	Bythinella cf. *turca*	
	Bithynia leachi	
	Valvata piscinalis	
	Fagotia esperi	
	Lymnaea stagnalis	
	Stagnicola palustris	
	Radix auricularia	
	Planorbis carinatus	
	Gyraulus crista	
	Planorbarius corneus	
Bivalves	*Unio mancus eucirrus*	
	Pisidium amnicum	
	Dreissena sp.	
Landsnails		
Gastropods	*Vallonia pulchella*	
	Borlumastus yildirimi	
	Cecilioides sp.	
	Monacha (Parathba) rothii	
	Xeropicta derbentina *	

Table 16.4. *Inadvertently or naturally introduced species from the site's immediate vicinity.*

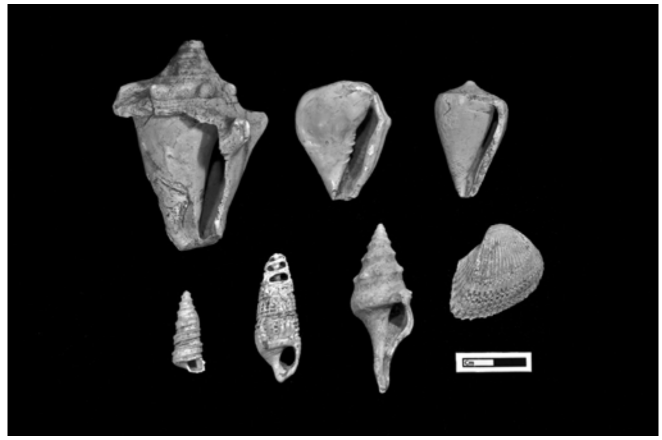

Figure 16.6. *Selection of fossil shells (Photograph by Jason Quinlan).*

An interesting cluster of *Dentalium* comes from B.49, F.4023, which contained the crouched skeleton of an infant (17457) with 48 *Dentalium* cf. *sexangulum* beads which were very worn from use.

While the scaphopods are found in most levels, the majority of fossil gastropods and bivalves were recovered in the 4040 and TP Areas, i.e. in the latest levels of the site. This implies, however, that contacts with the Hatay region, which is over 300km from the site, existed throughout most of the sequence, while 'expeditions' to the closer Karaman area, about 50km away, developed only in later periods of the site's occupation.

Freshwater shells

Freshwater shells were used for the production of various artifacts, including beads and pendants. Most prominent are *Unio* artifacts (missing in Levels South I, M, and O), which served both as ornaments and utilitarian objects (see below). They begin to appear in Level South G with six artifacts, while 47 *Unio* artifacts were discovered in the 4040 Area. *Unio* artifact form 5–15 per cent of shell beads when present, but in Level South Q, where 13 pendants were found in the context of a baby burial (B.53), they form a third of shell beads. In Level South L they are also relatively abundant due to a concentration of five specimens in bin fill ((4796) in B.6). The concentration of 13 pendants (10400) from Level South Q (Fig. 16.8) is different from most other perforated *Unio* artifacts in that they have two perforations each; their shape is that of a rounded square, and they are especially thin (*c.*1mm in thickness). A microscopic examination of the holes indicates no wear. In other words, they were not used and were probably produced to serve as grave goods. In one case, a pendant with three holes (1868) was recovered from Level South K, but because it was broken we cannot elaborate on it.

Technologically, both ornamental and non-ornamental *Unio* shells were perforated from the inside (the nacre) of the valve outwards. This is probably due both to the concave shape of the shell's interior, and to the mechanics of the relatively soft nature of the nacre, as opposed to the exterior calcite. The striation marks inside the holes suggest mechanic drilling, possibly with a pump or bow drill.

In at least one case we are aware of, an *Unio* valve placed in a grave (F.2910, F.1630), there is no evidence for its use as an ochre container or as any other artifact. This item is not listed in Table 16.6 (on CD) as we are undecided as to whether it should be viewed as an artifact. Since several *Unio* valves were placed in graves, however, it reinforces our notion of the symbolic value of this shell in the lives of the Çatalhöyük population.

Freshwater gastropods were also perforated, probably to serve as 'beads'. A few specimens of *Viviparus viviparus* had holes ground in the body whorl and a few of those also had red paint following their suture lines (Fig. 16.9). Two shells of the genus *Stagnicola* were also painted and perforated.

Many mature *Theodoxus* cf. *heldereichi* had perforations in the body whorl, although these are probably natural, as there are no obvious manufacturing traces and many of the holes are irregular. While these holes were previously considered deliberate and the shells seen as beads (Reese 2005), we be-

Figure 16.7. *Red painted fossil shell (Photograph by Jason Quinlan).*

Figure 16.8. Unio *pendants from baby burial, unit 10400 (Photograph by Jason Quinlan).*

lieve they are natural (Fig. 16.10). Many of these shells were collected inadvertently along with many other shells from waters surrounding the site (Chapter 5). A few specimens of *T.* cf. *heldereichi* are fairly large (Schütt & Şeşen 1992) and were previously confused with *Nerita* sp. The latter, of the same molluscan family, is a marine species inhabiting the Indo-Pacific, but because we have now re-identified the *Theodoxus* as probably belonging to the species *heldereichi*, we know it can be large and when missing a part of its body whorl it resembles the *Nerita*. Thus, no Red Sea shells have been discovered at Çatalhöyük. It is still possible, however, that some of the perforated *Theodoxus* did serve as ready-to-use beads, and at this point it is difficult to differentiate between these and the ones that were brought to the site along with mud for brick construction (Tables 16.2 (on CD), 16.4). We counted 168 naturally perforated *Theodoxus* (out of a total of 551, 30 per cent) in the South and 4040 Areas; many come from midden, fill, plaster and mortar contexts, and none are from contexts that suggest decorative use. A single example, 15924.x3, comes from Sp.1006 in the 4040 Area.

Landsnails

Sixty-nine specimens of *Xeropicta derbentina* were found as a cluster (11691) in B.56, Level South R (Fig. 16.11). Thirty-four of them have a perforation in their body whorl and the rest are broken, but seem to have also been perforated, perhaps forming a necklace or another type of decoration. These holes, mostly in the last whorl opposite the aperture, do not seem consistent with perforations made by rodents often seen in other land snails (Mienis, pers. comm.). They are also inconsistent with perforations made by insect larvae (Örstan 1999). The consistent position of the perforation, and their deposition in a niche, reinforces the notion that they are anthropogenic in nature. On the other hand, a *Borlumastus yildirimi* shell, 13167.x13, which has a perforation in the body whorl, displays scratches on the inside of the hole which are

Figure 16.9. *Painted and perforated* Viviparus *shell (Photograph by Jason Quinlan).*

Figure 16.10. *Naturally perforated* Theodoxus *sp (Photograph by Jason Quinlan).*

possibly consistent with the emergene of insect larvae from within the shell. It is impossible to determine whether or not it was used as a bead.

Painted shells and shells as paint containers

Some shells, in particular *Unio* valves, have traces or lumps of pigments on their interior, and sometimes also on their exterior surface. In a few cases they were discovered in burials (F.4023, F.4028 in Level 4040 G). Both red and yellow ochre are present and they are associated especially with infants and juveniles.

Several types of large freshwater gastropods (mostly *Viviparus,* as well as *Stagnicola*) are perforated through the body whorl and in a few cases red stripes were painted on them. The presence of pigment reinforces their use as personal ornaments (Fig. 16.9). Three fossil gastropods were also covered with pigment, but not with stripes (mentioned above).

While the pigment found on *Unio* valves usually contains ochre, it is possible that pigments found on snails were produced from other sources such as cinnabar; this material has not yet been tested, however.

An attempt to define a pattern in the presence of shell beads and ornaments within specific buildings was unsuccessful (Table 16.3 on CD); moreover, it seems that most shell beads were found in middens rather than in buildings (compare to Tables 16.1 and 16.2 on CD).

Non-ornamental shell artifacts

Perforated objects

Unio shells were used to produce perforated artifacts (*n*=108). Some are double-holed pendants (discussed above), but most have a single perforation in the center of the artifact; I refer to these as 'disks', in order to distinguish them from pendants.

Many of these disks are cut from the thicker part of the shell near its margin, and the pallial line is clearly visible on them. Most holes are perforated on or slightly above the pallial line (Fig. 16.12), usually from the inside nacreous surface of the shell outwards. The diameter of the hole ranges between 1.58–6.4mm, with an average of 3mm; this is in contrast to the perforation of the (10400) pendant's holes, which range between 1–2mm in diameter. The overall shape of the artifact varies from an oval to a square and many did not have their margins worked or smoothed. We also found a number of 'blanks' that have the same general squarish contour and dimensions but were not perforated, as well as two partially perforated items. A cluster of 22 such *Unio* perforated items are from B.58, mostly from (11985), from the 4040 Area. B.6 in Level South L yielded six artifacts, five of which come from the same unit (4796), which is a very rich unit associated with many phytoliths, among other finds.

I note that at least one of these artifacts from Level South G was perforated by pecking, and not by drilling (5290), and at least one artifact (4587) was drilled biconically, i.e. from both sides. Most are drilled, however, and the striations inside the

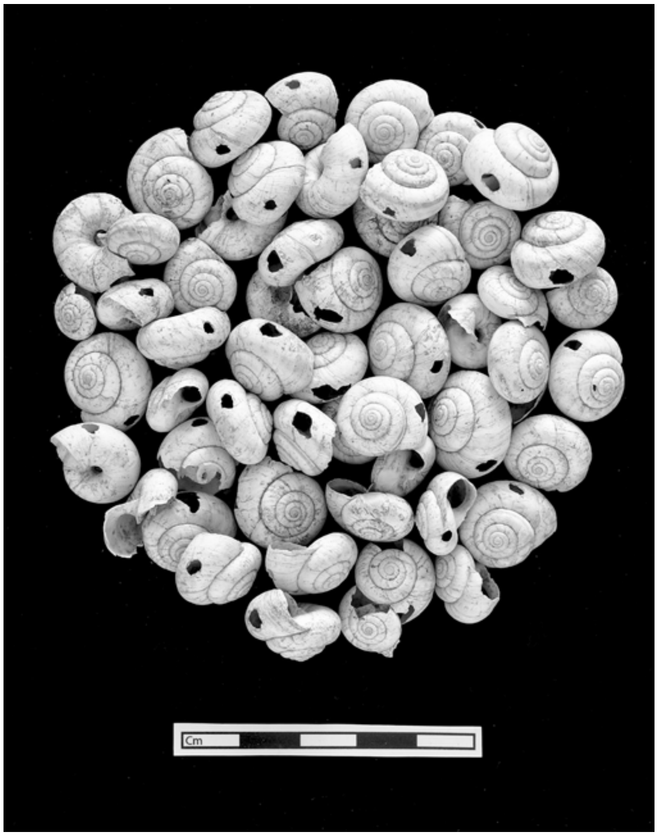

Figure 16.11. *Perforated* Xeropicta *landsnails (Photograph by Jason Quinlan).*

holes indicate they were mechanically drilled, i.e. with the help of a pump or a bow drill (We thank Rose Bains for making an SEM photo of these artifacts that enabled this determination).

These characteristics convey an impression of an expedient artifact used for mundane purposes. I propose that it may have served as a spindle whorl. The presence of a few flax remains (*Linum* sp.; Fairbairn *et al.* 2005b) lends further support to this interpretation.

Serrated objects

Shells with serrated edges have also been recovered. These are rectangular in shape, typically measuring 9.6–15mm in height, and 16.7–33.3mm in length. These artifacts (*n*=7) are usually cut from the margin of the bivalve, and the serrations are incised about 1–2mm apart (Fig. 16.13). Some are worn as a result of use, and one is also perforated. Those could have been used for pottery decoration, but similar artifacts, it has been suggested, could have served as 'fish scalers' (MacDonald 1932). The finding of one such item in B.77, where fish remains were found, may lend support to this interpretation. The fish themselves are small species, however, which may not require scaling (We thank the faunal team for providing this information). For the function of these artifacts

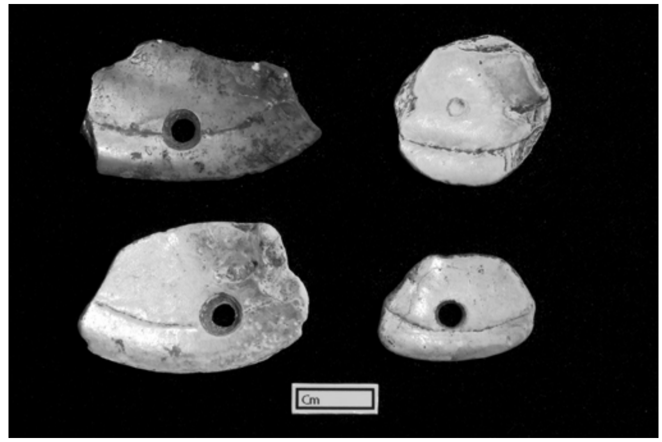

Figure 16.12. *Drilled holes in* Unio *'disks' (Photograph by Jason Quinlan).*

to be better assessed, microwear and/or experimental studies should take place.

Inlays

Two lunate-shaped worked artifacts (4838) found in Level South G, about 15–17mm long by 6mm wide, may have served as inlays, possibly in the shape of an eye. A similar artifact was recently discovered at Kefar HaHoresh and other similar artifacts are documented ethnographically, for example, on wooden masks from New Guinea (on display in the Quai Branley ethnographic museum, Paris).

The above-mentioned 'disks' may have also been used as pegged inlays for decoration, but there is no evidence for this interpretation, and their imprecise and inconsistent contour negates this proposal.

Burnishers

Two *Unio* valves were discovered with a distinct polish on their exterior face and are assumed to have been used as burnishers. A similar artifact, also made of *Unio*, was discovered in an Early Bronze Age site in Jordan (Bar-Yosef Mayer 2008) and the use of shell for burnishing is documented ethnographically in Palestine (Crowfoot *et al.* 1942). The use of this artifact at Çatalhöyük may have been either for pottery production or for the application of plaster, or both.

Shells collected unintentionally

Shells in pottery

Several shells were identified as inclusions in pottery. Those include the landsnail *Vallonia* sp., several specimens of which were found embedded in ceramic sherds from the TP Area (15279), in addition to freshwater specimens of possibly *Valvata* sp. which have been identified elsewhere ((5512), (12980); Fig. 16.14)). It is as yet unclear whether they were

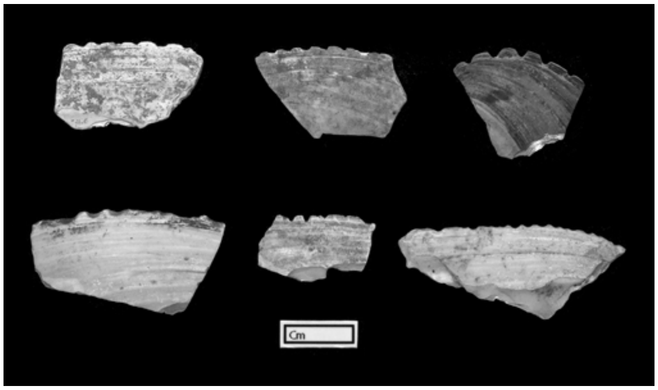

Figure 16.13. *Serrated artifacts made of* Unio *(Photograph by Jason Quinlan)***.**

used intentionally as temper or were part of the natural make-up of the clay.

Freshwater shells in construction

Gastropod microshells in bricks and mortar

The largest numbers of shells at the site are those that were included in brick and mortar and are composed mostly of micro-gastropods, as well as a few micro-bivalves. Micro shells refer to complete shells that are less than 10mm in size, many of them in the range of 2–3mm. These include the juveniles of larger shells, including juvenile *Viviparus*, *Valvata, Theodoxus* and even *Unio* shells. This means that the adults of these species were collected deliberately and juveniles were collected inadventently with the sediments in which they were embedded. Occasionally, larger *Unio* shells were also collected inadvertently (Fig. 16.15). Table 16.4 presents the full range of species present in brick and mortar debris, as well as other species that are suspected of being self-introduced, namely, landsnails (see below). We attempted to reconstruct the past site environment by analyzing micro-gastropods and bivalves as representing lotic vs. lentic environments (Chapter 5), and by analyzing stable isotope records in *Unio* valves (Chapter 6).

Bivalves in plaster

Some of the complete or slightly broken *Unio* valves come from plaster contexts. Furthermore, thin sections of plaster show the presence of shell (Shillito *et al.* 2011b; Camurcuoğlu, pers. comm.). While the role of shell in plaster is under investigation and experiments are carried out to determine the presence and role of shell in different types of plaster (Volume 9, Chapter 18) this raises the question of whether or not shells were collected especially for this purpose. Because *Unio* valves were specifically identified in several plaster units, I assume that the tiny shell flakes identified in thin sections of plaster are probably those of *Unio*. One should add to that the 12,000 or so shell fragments that we

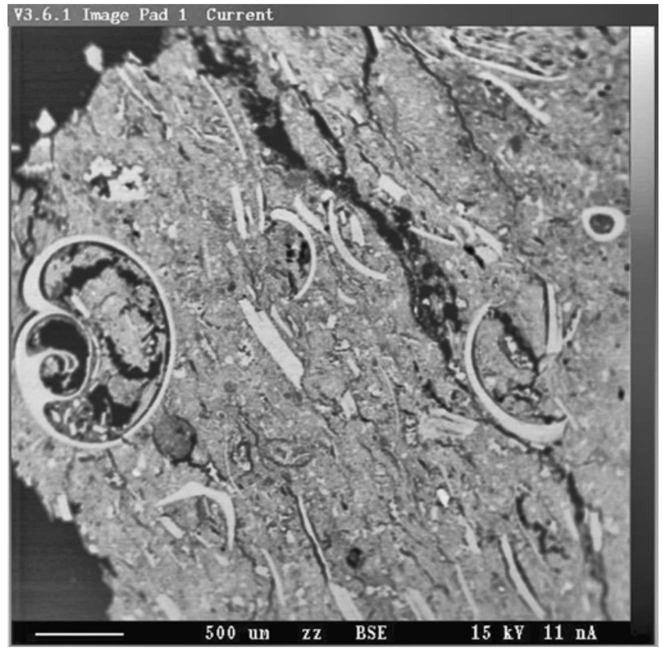

Figure 16.14. *SEM image of shells as inclusions in pottery (Photograph by Duygu Tarkan).*

recorded as a minimum number of fragments throughout the record (see Methods). In light of the dominance of *Unio* fragments throughout the sequence, we should explore several possibilities: a) that *Unio* were collected for the production of ornaments and that the waste was crushed and mixed with other components to produce plaster; b) that *Unio* from the earliest levels of the site where they served as food were collected as a readily available resource for plaster production; and c) that *Unio* valves were collected as food and the debris was crushed to produce plaster, (and also possibly to discard of the bad smell that follows food debris), or, that a few were made into ornaments and the rest were crushed.

Landsnails

Land snails can serve as environmental indicators, but very few land snail species were discovered at the site (*n*=5), and their numbers were low. Most of them were discovered near the surface and could post-date the deposits in which they were found. This raises the question of why so few land snails were present at Çatalhöyük. One possible interpretation could be that the houses made of mudbricks did not allow humidity to penetrate, thus making them an unattractive habitat for the landsnails. This information is based on our interview with Veli, a builder from the nearby village of Kücükkoy, who specifically mentioned the lack of humidity in the houses as being an advantage for using mudbricks in house construction. Alternatively, landsnails were moved out of the site by the inhabitants of Çatalhöyük in order to keep their houses clean (in which case we might expect to find remains in the

Figure 16.15. *Complete* Unio *shell (conjoining valves) embedded in a brick (Photograph by Jason Quinlan).*

middens, but we did not). Another option for the absence of landsnails on-site could be that the site's surroundings were swampy or wet; such an environment deters snails.

Conclusions

Shells were exploited at Çatalhöyük in every possible way. The most common finds are snails and *Unio* bivalves from the nearby Çarşamba River and its tributaries. The latter were used primarily as a food source, and probably secondarily as a source for mother of pearl ornaments as well as other shell artifacts. Some of the crushed remains formed part of the plaster used at the site. A few river shells, both *Unio* and gastropods were painted red. Since some of these are not perforated, it is not possible to determine if they were personal ornaments, but they most likely played a role in the spiritual lives of the inhabitants of Çatalhöyük.

Personal ornaments and jewelry were made not only of local material (*Unio*, *Viviparus*, *Stagnicola* and *Xeropicta*), but also from imported shells. These consist of marine and fossil shells that were either used in their natural state (as in the case of scaphopods and naturally holed gastropods), or were perforated and/or painted.

Most marine and fossil shells are found in middens and fills, similarly to figurines (Meskell, pers. comm.); very few are found in graves. This is indicative of their value, as it shows that people were not prepared to dispose of their valued ornaments and figurines within burials, but kept them for use by the living.

In contrast to their relative abundance in Levantine sites, for example, in the PPNB sites of Yiftah'el, Kefar HaHoresh, Nahal Hemar Cave (Bar-Yosef Mayer 2005), it is worth noting that relatively few marine or fossil bivalves were brought into Çatalhöyük. The paucity of marine and fossil bivalves may have to do with the wealth of freshwater bivalves such as *Unio* shells. Since the latter were used mostly for mundane artifacts, however, the shell ornaments should be further considered within the realm of other personal ornaments, especially stone beads and pendants.

Acknowledgments

I am deeply thankful to Ian Hodder for inviting me to join the Çatalhöyük Research Project, and to Shahina Farid and Sarah Jones for enabling my work there. I thank Burçin A. Gümüş, Gazi University, Ankara; Henk K. Mienis, Israel's National Collection of Natural History, Tel Aviv University; Yeşim İslamoğlu of the Geological Research Department, Turkish Institute for Mineral Research and Exploration (MTA), Ankara and Aldona Kurzawska, Adam Mitskiewicz University, Poznan, Poland for their assistance in shell identification, and David Aldridge (Cambridge University) and Aydin Örstan (Pennsylvania Natural History Museum) for consultations. Serena Love provided information on shells in brick and mortar; Arlene Rosen and Philippa Ryan provided information on macrophytes; Nurcan Yalman and Duygu Tarkan provided information on shells in pottery; Duygu Çamurcuoğlu provided information on pigments. I am grateful to them all. Nigel Goring-Morris (Hebrew University of Jerusalem) kindly allowed me to cite as yet unpublished information from the excavations of Kefar HaHoresh. I thank the Israeli ministry of Science, Culture and Sport for supporting the National Collections of Natural History at Tel Aviv University as a biodiversity, environment, and agriculture research knowledge center.