This PDF file of your paper in Archaeomalacology has been created from the Oxbow publication and is therefore their copyright.

We are happy to allow you to make up to 50 offprints from it, but beyond that we ask you not to publish it on the World Wide Web or in any other form without prior permission.
Archaeomalacology

Molluscs in former environments of human behaviour

Edited by
Daniella E. Bar-Yosef Mayer
## Contents

Preface .............................................................................................................................................................................. vii  
*Keith Dobney, Peter Rowley-Conwy and Umberto Albarella*

1. An Introduction to Archaeomalacology ...................................................................................................................... 1  
*Daniella E. Bar-Yosef Mayer*

### America

2. Land snails, artifacts and faunal remains: understanding site formation processes at Prehistoric/Protohistoric sites in the Southeastern United States ........................................................................................................... 6  
*Evan Peacock, Janet Rafferty and S. Homes Hogue*

3. Seasonal collection of coquina clams (*Donax variabilis* Say, 1822) during the Archaic and St. Johns Periods in coastal Northeast Florida ........................................................................................................... 18  
*Irvy R. Quitmyer, Dougals S. Jones and C. Fred T. Andrus*

4. Pre-Columbian Preceramic shellfish consumption and shell tool production: shell remains from Orient Bay, Saint-Martin, Northern Lesser Antilles ........................................................................................................... 29  
*Nathalie Serrand and Dominique Bonnissent*

5. Shell middens on the Caribbean coast of Nicaragua: Prehistoric patterns of mollusc collection and consumption ........................................................................................................................................................ 40  
*Ermengol Gassiot Ballibè*

### Europe

6. Marine mussel shells – wear is the evidence ........................................................................................................... 56  
*Jan Light*

7. The malacofauna of the Upper Paleolithic levels at Grotta della Serratura (Salerno, southern Italy). preliminary data ........................................................................................................................................................ 63  
*André Carlo Colone and Barbara Wilkens*

8. Shells at the Bronze Age settlement of Coppa Nevigata (Apulia, Italy) ........................................................................................................................................................................................................................................... 71  
*Claudia Minniti*

9. The evidence of *Spondylus* ornamental objects in the central Mediterranean Sea. two case studies: Sicily and Malta ........................................................................................................................................................ 82  
*Salvatore Chilardi, Lorenzo Guzzardi, Maria Rosa Iovino and Annalisa Rivoli*

10. Shells from Prehistoric sites in northern Greece ...................................................................................................... 91  
*Lilian Karali*

11. Reconstructing murex Royal Purple and Biblical Blue in the Aegean ........................................................................................................................................................................................................................................... 99  
*Deborah Ruscillo*

12. Molluscs from a Middle Bronze Age site and two Hellenistic sites in Thessaly, Greece ..................................... 107  
*Wietske Prummel*
13. Early preceramic Neolithic marine shells from Shillourokambos, Cyprus (late 9th-8th mill. cal BC): a mainly-ornamental set with similarities to mainland PPNB .......................................................... 122
    Nathalie Serrand, Jean-Denis Vigne and Jean Guilaine

Asia

14. The mollusc fauna from the Late Bronze and Iron Age strata of Tell Abu Hawam ........................................ 132
    Inbar Baruch, Michal Artzy, Joseph Heller, Jacqueline Balensi and Maria D. Herrera

15. Shifts in Epipaleolithic marine shell exploitation at Wadi Mataha, southern Jordan .................................. 148
    Joel C. Janetski

16. The use of marine shells at Sumhuram, Oman ......................................................................................... 159
    Barbara Wilkens

17. The shell material from Suwayh I (Oman, Neolithic) .............................................................................. 166
    Chloé Martin

18. Marine shell utilisation by the Chalcolithic cultures of the Western Deccan region of India ..................... 174
    Arati Deshpande-Mukherjee
15. Shifts in Epipaleolithic marine shell exploitation at Wadi Mataha, southern Jordan

Joel C. Janetski

Introduction
Several scholars (including Bar-Yosef 1991, Bar-Yosef Mayer 1997, and Reese 1991) have focused on the implications of the increasing numbers of marine shell in Epipaleolithic sites of the Near East. Typically these discussions have focused on socio-economic issues such as trade. I suggest that beyond trade, the presence of increasing quantities of marine shells implies changes in social structure during the Epipaleolithic. It may be one hallmark of an emerging social differentiation or complexity.

Site description
Wadi Mataha is a multi-component, Epipaleolithic site in the northern portion of the Petra Basin (Figs 1 and 2). Evidence for human occupation was found at the top of and down a steep talus slope at the south edge of Maghur al Mataha, a large sandstone monolith, c. 950 m asl. The landscape is rough, broken terrain intermediate between the city of Petra and gentler, hilly uplands that still contain vestiges of oak–pistachio woodlands. The slope is littered with sandstone rubble, chipped stone debris and tools, and occasional bone fragments. From here, water flows into a secondary drainage of the site’s namesake, Wadi Mataha and from there into Petra, 1.2 km to the south. Initial estimates of site size were modest given the possibility that cultural material may have simply eroded down slope; however, excavations have demonstrated that features and buried deposits are present along both the upper and the lower slopes (Fig. 3).

Site chronology
Absolute dates have been elusive at Wadi Mataha as charcoal has not been found and bone collagen is present in only very minute quantities. However, two AMS dates on humic acids from burned animal bone from the Upper Slope place a Geometric Kebaran occupation at 14.1 ± 130 14C kyr BP (calibrated to BC 15,579–14,457 @ 2 sigma using calib 4.4) and the Late Natufian at 11.2 ± 50 14C kyr BP (calibrated to BC 11760–11042 @ 2 sigma using calib 4.4) (Thomas Stafford, personal communication 1999). The later date places the Late Natufian occupation at the onset of the Younger Dryas (Hughen et al. 2000).

Geometric Kebaran
Geometric Kebaran (GK) deposits are restricted to the upper slope directly below Late Natufian occupation. Although the earlier sediments were distinctive, it is clear
that some mixing occurred as diagnostics of both periods occurred in the narrow, intermediate zone. Burials of a male with breached stone bowl and an infant just above the male were found in the GK layer, but no architectural features have been discovered to date. The male burial was lying face down with the lower legs tightly flexed over the upper legs. A circular trephinated hole in the skull frontal may be evidence of funerary practices. Long bone robusticity and bilateral asymmetry represent a rigorous life style.

Diagnostic tools consist of obliquely truncated, abrupt-backed bladelets, while lunates typical of the Natufian were absent. The diversity of toolstone in the GK level is in striking contrast with the Natufian materials, which consist primarily of local cherts. The variability in the raw material along with the physical characteristics of
the male adult burial supports the notion that site occupants during the GK period were highly mobile.

**Early Natufian**

Early Natufian diagnostics dominate the mid and lower slopes and are present but sparse in the upper slope. Excavations in the mid-slope revealed a sinuous masonry wall that angles up and across the slope for ~4 m eventually connecting with a sandstone cliff (Fig. 4). The poorly defined floor associated with the wall yielded a carved stone and a fragmented basalt shaft straightener decorated with a meander pattern similar to those found on Early Natufian artifacts from sites such as Mallaha, Nahal Oren, Shukba Cave, and Upper Besor 6 in the Negev (O. Bar-Yosef and Belfer-Cohen 1998, Noy 1991, Goring-Morris 1998).

An additional masonry alignment was discovered slightly downslope, but remains to be fully explored (see Fig. 3) and a pit feature is present on the lower slope. Milling equipment and culturally stained sediments are so far absent in the mid and lower slopes, although the deposits are rich with bone, chipped stone tools, and tool manufacturing detritus. The lithic assemblage contains numerous lunates with Helwan retouch and is consistent with Early Natufian lithic material found in the Levant.

**Late Natufian**

The Late Natufian occupation seems limited to Test Area 2. The darkly stained sediments here are in decided contrast with the Early Natufian deposits, although both are artfactually rich. Stone tools from this area are characterized by small, steeply backed lunates with bipolar retouch and denticulates, and, as with the Early Natufian chipped stone assemblage, these collections are similar to chipped stone assemblages from sites in the Levant of similar age and affiliation. Late Natufian features include a roasting area containing very dark sediments and small sandstone cobbles (Fig. 5). Strati-

---

*Fig. 2. Petra Basin showing relationship of Wadi Mataha to Petra.*
graphically below (but still Late Natufian) and slightly downslope from the roasting feature was a patchy surface of flat stones. Several *C. ibex* horn cores and domestic items, including pestles and chipped stone tools lay on this surface, which seemed circumscribed by fingers of bedrock sandstone and portable boulders.

Several bedrock mortars are present on a sandstone ledge abutting Test Area 2 on the east. The deepest mortars (up to 72 cm) are grooved from heavy use. The shape of the grooves matches that of pestles found in situ on the patchy stone surface, which argues for a Late Natufian age for the mortars. A hearth containing ashy sediments and broken pestles and a pit feature intruded into the underlying GK deposits. Such facilities argue for nut processing (*e.g.*, Goring-Morris 1991, 184), although direct evidence of what was processed in the mortars has not been found to date.

**Faunal remains**

Faunal remains are abundant and have been well described for the first two seasons of excavation by Baadsgaard et al. (2002) and will not be covered here in any detail. Suffice it to say that the assemblage closely resembles those from Epipaleolithic sites located in the semi-arid, steppic strip east of the Dead Sea (for example, Beidha and Wadi Judayid 2; Byrd 1990). Caprines, including both wild goat (*Capra aegagrus*) and Nubian ibex (*Capra ibex*), dominate the assemblages from all occupations, with gazelle (*Gazella gazella*), cattle (*Bos primigenius*), equids (*Equus hemionus* and *Equus africanus*), and possibly wild sheep (*Ovis orientalis*) also represented. The large mammal component from the Early Natufian sample closely resembles that found at Beidha, although cattle are slightly more abundant at Beidha (Hecker 1989).
Marine shell

Marine shell is common in all areas and in all components with a total of 488 specimens recovered to date with 471 assignable to a specific time period (Fig. 6). Shell was more abundant in the Natufian period generally but was present in the GK as well (Fig. 7).

Dentalium spp. (Fig. 8, a-f) is by far the most abundant shell, but Nerita spp. (Fig. 8, i-k), both holed and unmodified, Nassarius (Fig. 8, g-h), Cypraea sp., Pecten, Serpulidae (‘worm tube’), and others (Fig. 8, l-p) are also present. Disk beads (several of which may be stone) of varying sizes occur in both Early and Late Natufian deposits but increase somewhat in the Late Natufian (Fig. 9). The presence of Nerita and large, ribbed Dentalium, probably D. elephantinum, suggest the Red Sea (about 100 km from Wadi Mataha) was a primary source for this shell (Reese 1991, 613). However, the Nassarius shell beads are evidence of contact to the more distant Mediterranean Sea.

As noted Dentalium dominates as a percentage of assemblage in all periods, although it tends to be a bit more abundant in the Early Natufian as compared to GK and Late Natufian. The percent of Dentalium shifts from 60 percent in the GK to 70 percent in the Early Natufian and drops back to 63 percent in the Late Natufian (Table 1). Taxonomic richness tends to increase modestly through time with seven shell taxa identified in the Kebaran, 11 in the Early Natufian, and 10 in the Late Natufian. Geometric Kebaran is under represented, however, due to a smaller excavated sample. Shell density adjusted for volume excavated, however, is very similar for Early (29/cu m) and Late Natufian (29/cu m) but considerably lower for GK (10.8/cu m) (Table 1).
Fig. 5. Plan of upper area showing roasting area as well as Late Natufian hearth areas and bedrock mortars.

Table 1. Summary characteristics of shell occurrence at Wadi Mataha by cultural period.

<table>
<thead>
<tr>
<th>Period</th>
<th>NISP</th>
<th>% Dentalium</th>
<th>Taxa Richness</th>
<th>shell/m3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Natufian</td>
<td>187</td>
<td>63</td>
<td>10</td>
<td>29</td>
</tr>
<tr>
<td>Early Natufian</td>
<td>242</td>
<td>70</td>
<td>11</td>
<td>29</td>
</tr>
<tr>
<td>Geometric Kebaran</td>
<td>42</td>
<td>60</td>
<td>7</td>
<td>10.8</td>
</tr>
<tr>
<td>Total provenienced</td>
<td>471</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>marine shells</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The marine shell assemblage from Wadi Mataha fits comfortably into existing regional data sets. The closest Natufian assemblage comes from Beidha only a few kilometres to the north. Here *Dentalium* amounted to 87 percent of the assemblage with *Nerita* (nerite), *Cerithium* (ceriths), *Pecten* (scallop), and Serpulidae also present (Reese 1989, 1991), a composition not unlike Wadi Mataha. When compared to assemblages from core zone Natufian sites, however, percentages of *Dentalium* from Wadi Mataha are lower than most (Bar-Yosef 1991).

Bar-Yosef (1991, 629) has noted that Epipaleolithic
Fig. 6. Frequency of marine shell found in all contexts at Wadi Maitaha.

Fig. 7. Frequency of marine shell by cultural period.
Shifts in Epipaleolithic marine shell exploitation at Wadi Mataha assemblages increase in richness and quantity with the Natufian, a trend supported modestly here. When comparing shell percentages from GK to Early Natufian (Fig. 10), there does not appear to be a “dramatic” shift to higher percentages of *Dentalium* as D. Bar Yosef (1991) has reported for more northerly sites. Clearly the percentages of *Dentalium* from GK levels are quite similar to the Late Natufian percentages. This tends to support Reese’s (1991) point that trade or procurement patterns do not shift much through time; however, there is a significant increase in shell quantity in the Natufian with shell density in the GK levels one-third of that recovered from Natufian occupations (see Table 1 and shell per cubic meter excavated). Goring-Morris (1989, 184) has noted that marine shell occurrence declines in the Middle Epipaleolithic, particularly in the GK of the southern Levant, a pattern also reported by Reese (1982, 83). In a later paper Reese (1991) reports on shell from GK (as well as other time periods) sites throughout the Levant and demonstrates the considerable variability in percentage of *Dentalium* from the Upper Paleolithic through the Natufian, but percent of *Dentalium* clearly increases in the Natufian. The increase presented by Reese (1991, 614) tends to be greater than that seen at Wadi Mataha, although the percentage of *Dentalium* from GK to Early Natufian does jump from 60 percent to 70 percent. An interesting question concerns the meaning of that increase.

Explanation of the increase could relate to mobility. Earle (1994), for example, has argued that increased exchange of goods is often associated with diminished mobility. A reduction in mobility could lead to the kinds

Fig. 8. Selected marine shell from Wadi Matha: a-f) Dentalium, g-h) Nassarius, i-k) Nerita, l) Turret, m) Serpulidae, n) Cypraea, o) Cerithium, p) Pecten
Fig. 9. Late Natufian disc beads: a-b, d) possible stone or burned shell, c, e-f) shell.

Fig. 10. Percentages of shell by taxa and by time period.

of economic changes discussed by Bar-Yosef (1991) and perhaps an increasing sense of territory or identity with a specific group (see the discussion in Belfer-Cohen, 1991). Another possibility is that status differentiation became increasingly common during the Natufian. As pointed out by Bar-Yosef (1991, 630), the occurrence of shell in burials is not random but is associated more with adult males. The Natufian is, of course, known for the proliferation of items considered evidence of symbolic behavior (various, but see Bar-Yosef and Belfer-Cohen
1998, Bar-Yosef and Valla 1991 and the many references therein) and are at the heart of why the Natufian is often referred to as complex. But what do these items symbolize? Clark and Perry (1990) have suggested that information-rich, labor-rich craft items, such as beads and pendants become important early in the process of emerging social complexity. In other words, individuals adorn themselves or others in life or death as a way of proclaiming identity and status. The accumulation or concentration, in the case of burials, of such “valuables” or other goods suggests emerging personal wealth. In a similar vein, Bettinger (1999) suggests that the emergence of storage facilities in the early farming villages of western North America (Fremont and Anasazi) are evidence for the important transition from public (i.e., shared) to private (hoarded) goods.

Natuftian burials rich in marine shell decoration are well known. Among the most impressive are several burials from Hayonim Cave Layer B, which contained Dentalium shell necklaces with numbers of shells reaching well over one hundred (Belfer-Cohen 1991, 580) in some cases. Also well known are the finds at El-Wad (Garrod and Batte 1937, but see Belfer-Cohen and Hovers 1992 for more recent discussion) where excavators found Dentalium necklaces and head decorations as well as strings of shells decorating the arm of one burial. Other notable sites with decorated burials include Eynan (Perrot 1966) and Wadi Hammeh 27 where a probable necklace associated with Burial Pit XXI consisted of 27 Dentalium shells (Edwards 1991, 146). Belfer-Cohen and Hovers (1992, 469) suggest that elaborated burials and the presence of communal burials and burial grounds in the Natufian are evidence of “a society undergoing major social change,” a conclusion also expressed by Cauvin (2000, 20).

I suggest that parallel processes of social change were operating in the Near East and the American Southwest and Eastern Great Basin of North America, an area with which I am more familiar. Evidence of increasing interest in the production of information-rich craft items can be seen at the Steinhaker Gap site in northeastern Utah. Here excavators discovered several infant burials dating to the early agricultural period (~AD 300) that were swathed in hundreds of bone beads as well as some marine shell beads from the Pacific. These burials were placed in bell-shaped pits that had likely been originally used for storage of corn or other plant goods (Talbot and Richens 1996). Additional social change included the reduction of residential mobility, increased reliance on plant foods, and eventually commit to food production. Bettinger (1999), for example, refers specifically to plants as the kind of goods most likely to be stored.

The result of this trajectory of accumulating exotics that served as symbols of personal identity was status differentiation and the loss of cultural prescriptions against private goods or personal property. Of course, the process occurred about 10,000 years earlier in the Near East as it did in the American Southwest. Such a topic deserves in-depth discussions and comparisons, an effort beyond that appropriate for this paper. Such a discussion could prove enlightening as we continue to explore the reasons for these dramatic changes.

Conclusion

In summary, the Wadi Mataha shell assemblage is dominated by Dentalium from the Geometric Kebaran period through the Early and Late Natufian, although the array of shells becomes more diverse and considerably more abundant through time. Disc beads are more common during the Late Natufian and marine shell continues to be important in the Late Natufian despite what appears to be a shift to a more residentially mobile strategy (Munro 2001). I concur with Bar-Yosef and Belfer-Cohen (1998, 259) and others that the increasing importance of marine shell and other information-rich items during the Natufian not only signals economic connections but important social changes as well.

Acknowledgments

Thanks are due to Daniella Bar-Yosef for organizing the Archaeo-Malacology symposium at the 2002 ICAC conference in Durham and for shouldering the burden of putting this volume together. I thank the reviewer for useful and insightful comments that improved the paper considerably, although the final form of the paper is my responsibility.

Bibliography


Belfer-Cohen, A. and Hovers, E. (1992) In the Eye of the Beholder:


Joel C. Janetski, Department of Anthropology, 946 SWKT Brigham Young University, Provo, Utah 84602 U.S.A. E-mail: joel_janetski@byu.edu