Opportunities and continuities of shellfish gathering and their relationship to major steps in human evolution: A response to Jerardino

DANIELLA E. BAR-YOSEF MAYER

The Leon Recanati Institute for Maritime Studies & Department of Maritime Civilizations. University of Haifa
Departament of Zoology, Tel Aviv University, and Mount Carmel
31905 Haifa, Israel
baryosef@research.haifa.ac.il

Jerardino (2010) presents an overview of shellfish exploitation in the South African archaeological record, which is based on case studies of her own previous analyses as well as others'. The two periods mostly represented are the Middle Stone Age (Upper Pleistocene), corresponding to some of the earliest evidence of modern humans, and the Late Stone Age (Holocene), and especially its latest part and the onset of farming and pastoralism in South Africa. Unfortunately the periods that correspond to the Eurasian Upper Palaeolithic are not represented in this retrospective, seemingly because shell middens of this period were not discovered. This is due to a hiatus of these phases in South African archaeology (Phillipson, 2005: 96-107), but could also be a result of coastal sites, if they existed, being submerged today (Bailey & Flemming, 2008).

What I found most fascinating in this paper is the fact that unintentionally (?) it focuses on two major "revolutions": the emergence of modern humans and their modern behavior (admittedly some call it a revolution and others do not, but all agree this is a major step that differs from the previous two million years; Bar-Yosef, 1998a; MacBrearty & Brooks, 2000; Klein, 2008), and the transition to agriculture (the Neolithic revolution; Childe, 1942: 43).

Jerardino emphasizes two main processes related to each of these major changes in human lifeways: First is the exploitation of sand dwelling species, particularly *Donax serra*. Its collection requires entering the ocean waters, as opposed to the exploitation of rock dwelling species, such as *Patella* spp., *Choromytilus meridionalis* and others that can be picked off rocks in the tidal zone during low tide. The collection of sand dwellers requires both "confronting" the water, and advance preparation of suitable containers for collection. She sees this as a significant shift in human behavior, which enabled, among others, the coastal move out of Africa (e.g., Walter *et al.*, 2000). While the onset of shellfish exploitation in their respective environments is seen as an opportunity, their long-term use is seen as con-

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tinuity, and therefore should not be viewed as a marginal resource, as is often the case among archaeologists who emphasize vertebrate remains.

The second significant change is expressed in the intensification of marine resources in the mid-Holocene. This is expressed, for example, in the presence of seaweeds that were found in sites in South Africa but are rarely found in the archaeological record worldwide, although their collection is sometimes implicit from the presence of molluscs that live among them (e.g., Colonese & Wilkens, 2005). Importantly shellfish exploitation resulted in size decrease of the molluscs, and later in the Holocene, mega middens are observed in South Africa. This is viewed as an adaptation that results from the large increase in human population size. It is accompanied by evidence for violence, rituals, exchange systems, and so on, and expressed in material culture that includes personal ornaments, hearths, ochre, etc.

Looking at these processes from the Near East, I am intrigued by what occurred to humankind in the periods that are less well represented in South Africa: The periods of the Upper Palaeolithic, Epi-Palaeolithic and the Neolithic periods of the Levant. These periods are well represented in the Near East by hundreds of sites (e.g., Gilead, 1998; Goring-Morris, 1998; Bar-Yosef, 1998b) and it is not possible to characterize them in the framework of this discussion, but shellfishing is not a preferred activity of these populations. Limited evidence for shellfishing exists in a few sites, primarily Ksar Akil in Lebanon and Üçağızlı Cave in Turkey (Kuhn *et al.*, 2001, 2009) but it does not seem to be a leading economic strategy (Colonese *et al.*, in press). There might be several different reasons for this: The oligotrophic nature of the eastern Mediterranean was probably the principle reason (or in other words: lack of opportunity). But it is also possible that due to sea level rise following the last glacial maximum, here too shell middens are not visible because they are submerged. However, it is doubtful that shellfishing was ever a major component in the Near Eastern diet, because usually it was unnecessary. The richness of the terrestrial faunal remains testified to plenty of other opportunities (Stiner & Munro, 2002). Indeed, Kuhn *et al.* (2009: 108) note that "shellfish may have represented a supplementary protein source when meat was in low supply (Epi-Paleolithic) or the littoral was particularly close". Just as shellfish seem to be added to the diet of modern humans in the Middle Stone Age of South Africa (where it did not exist before), they appear in moderate quantities in the Middle Palaeolithic of Mediterranean Europe where they were possibly consumed, by both Neanderthals in Europe and presumably by modern humans in North Africa in various sites including Gibraltar and Haua Fteah. Significantly, mostly rocky shore species were collected. This is also the case during the Upper Palaeolithic for the few sites around the Mediterranean where shellfishing was practiced. In light of Jerardino's explanations of the relative difficulties of collecting molluscs on sandy shores, the scarcity of shellfish exploitation by eastern Mediterranean populations might be related to the proportions between sandy and rocky shores but this remains to be investigated.

If shellfishing were to reflect increase in human population, we would expect an intensification of shellfish use during the Holocene, but this is not visible on the eastern Mediterranean coast. What is evident from that region is the onset of agriculture (e.g.,

Bar-Yosef & Meadow, 1995). This change, according to current thought and evidence must have started in the area that is nowadays Northern Syria/southeastern Turkey (Abbo *et al.*, 2005). Unlike South Africa, where shellfish exploitation becomes a major food source at about the time when farming and herding arrive, during the Neolithic periods of the Levant we have very little evidence for such endeavors. Again, the reasons for this deficiency that were mentioned above in relation to the Upper Palaeolithic are plausible, primarily the possibility that middens are submerged. The submerged Neolithic (PPNC) site of Atlit Yam (Galili *et al.*, 1993), however, did not exhibit a shell midden. Unlike early Holocene structures that seem to be underwater middens discovered in the Red Sea (Bailey *et al.*, 2007), at Atlit Yam large numbers of shells collected seem all to be recent or subrecent molluscs of the Mediterranean (including Lesepsian migrants) with no evidence for human intervention (Mienis, personal communication). The one possible exception is a midden, or rather, a relatively large concentration of oysters discovered in Late Neolithic Ashkelon (Bar-Yosef Mayer, 2007). Interestingly this site is associated with cattle herding (Garfinkel *et al.*, 2005; Garfinkel & Dag, 2008), however, it is the only one of its kind discovered to date on the eastern Mediterranean coast. Thus, during the Neolithic of the Near East agriculture and domestication of plants and animals was a major strategy, which resulted both from the need to control food supplies (and see Marshall & Hildebrand, 2002), and from the opportunity to do so with the availability of highly nutritious wild crops of cereals and legumes. Interestingly, there is occasional evidence for marine fishing (as opposed to freshwater fishing that started long before marine fishing; Zohar, 2002; Alperson-Afil *et al.*, 2009) during the Late Upper Palaeolithic in the Mediterranean. The earliest evidence for marine fishing in Israel, to date, is from the Early Natufian, ca. 14,500 cal BP. In a similar process to that of shellfishing, first near shore species are fished, and deep water species are only found later, in the Neolithic (Bar-Yosef Mayer & Zohar, 2010).

The ripple effect of agricultural expansion from the Levant to Europe (Ammerman & Cavalli-Sforza, 1984), but probably also to Africa, and herding as an accompanying or following process, is the continuity in human activities that culminated in the arrival of herders in the Cape area around 2000 years ago.

To conclude, the situation of South Africa at the convergence area of the Benguela and Agulhas currents makes this area particularly rich in molluscan fauna. In this way it is significantly different from the oligotrophic eastern Mediterranean, and hence an appropriate area for humans to first explore the various opportunities that the cape area provides. Humans in southwest Asia, however, never had the same opportunities for shellfishing. However, once modern humans occupied the Near East, they continued to explore their environment and find innovative strategies of subsistence: Rich terrestrial fauna and flora formed the base for the eventual transition to agriculture, many millennia before this innovation reached Southern Africa. The opportunities available to modern humans in Africa enabled them to expand beyond their original habitat. Continuity in human behavior, and especially the continued exploration of their environment enabled making a full circle when farmers and herders arrived in South Africa.

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