

Refuse disposal in the Early Epipalaeolithic? Preliminary zooarchaeological evidence from Kharaneh IV, Eastern Jordan

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In an influential 2004 paper by T. Hardy-Smith and P. Edwards, entitled 'The Garbage Crisis in Prehistory' (*Journal of Anthropological Archaeology* 23), the origin of systematic refuse disposal in the Near East is attributed to the Pre-Pottery Neolithic B period when sedentary villagers devised novel ways of reducing the burden of accumulating trash. They argue that waste management practice before the Neolithic was indifferent and they offer the material assemblages of the Early Natufian site of Wadi Hammeh 27 as a case in point.

In this brief preliminary report, we present evidence that challenges a Neolithic origin for refuse disposal practices. The evidence from the large Early Epipalaeolithic aggregation site of Kharaneh IV in the Azraq drainage basin predates the Early Natufian by at least 3000 years and the Pre-Pottery Neolithic B by more than 7000 years. We present preliminary results of zooarchaeological analysis showing that hunter-gatherers made modest efforts to remove refuse from an Early Epipalaeolithic dwelling structure at a site in the eastern steppe of Jordan.

Renewed excavations at Kharaneh IV by the Epipalaeolithic Foragers in Azraq Project (EFAP) are focused on issues of mobility, subsistence, long-term settlement, and environment in eastern Jordan. Kharaneh IV is divided into two principal excavation areas. Area A comprises Middle Epipalaeolithic deposits that overlay Early Epipalaeolithic occupations. Faunal samples from this area are currently under

investigation by A. Spyrou (*CBRL Bulletin 7*). Excavations in Area B have revealed a stratified succession of Early Epipalaeolithic midden and exterior occupation deposits, in addition to three dwelling structures and several hearths, pits and caches (Fig. 1). Middle Epipalaeolithic deposits have not been detected in Area B. Structure 1, the only dwelling that is completely excavated to date and the focus of this brief report, is among the earliest and best preserved brush hut structures known from the Late Pleistocene Near East. Structure 1 is comprised of five stratified layers: a succession of three compacted floors, a burnt superstructure, and a capping deposit. Structure 1 was destroyed by a fire set after its abandonment, then capped with a large, flat rock surrounded by large pieces of red ochre and hundreds of pierced marine shells, and finally covered with layer of sterile orange sand.

The Area B faunal assemblage comprises an array of steppic fauna typical of eastern Jordan during the late Pleistocene. Ongoing analysis of the Area B faunal material has produced 1,969 identified mammal, bird and reptile remains and a little over 7,000 unidentified animal remains. Gazelle are the dominant taxon and other animals such as equid, aurochs, wolf or dog, cat, fox, hare, tortoise, hedgehog, and ostrich, comprise minor components of the assemblage. All regions of the gazelle carcass are well represented, but horn cores are the most abundant skeletal part observed in the Area B sample.

In order to illustrate the spatial variability of faunal abundance within Structure 1, we converted the piece-plotted data into kernel density maps. The darkest shading in the colour gradient denotes the highest concentration of faunal remains. Gazelle, which comprise over 80% of NISP in most contexts, are not as common within Structure 1 as it

is outside of Structure 1. Rather, small game animals (fox, hare and tortoise) are collectively equal to gazelle in Structure 1 (Fig. 2A-B).

The deposits of Structure 1 yielded several notable anatomically articulated specimens that could have been hanging inside the structure, such as a wolf or dog skull, fox paw, hare paw, and three tortoise shells. The high incidence of articulated bone elements of fur-bearing animals and tortoises in Structure 1 is not found in exterior contexts. Articulating gazelle elements, particularly conjoining left and right horn cores, are prominent in external features such as the hearth, cache and pit, but are rare in Structure 1 (Fig. 2C).

A broadly contrasting pattern is found between Structure 1 and the middens in terms of element completeness, which describes the preserved fraction relative to the original skeletal element. Here, Structure 1 is characterized by high relative frequencies of complete and nearly complete elements, with the exception of the uppermost (capping) layer, which is mainly comprised of specimens between one-quarter and half of their original size. The more fragmented nature of fauna from the capping superstructure is consistent with a deposit that was exposed to the elements much like the exterior deposits. The element completeness data from Structure 1 suggest that the taphonomic agents and mechanisms responsible for the higher rates of fragmentation in the exterior contexts were not a factor inside the structure. The contrasting pattern is most clearly seen in the middens. Here, specimens 10% of their original size or smaller are the most frequent size class. This relatively high rate of fragmentation in the middens may have been produced from greater surface exposure, trampling or food processing.

These preliminary findings persuade us to consider the case of Early Epipalaeolithic Kharaneh IV as a counterpoint to the assertion that systematic refuse disposal practices originate no earlier than the Pre-Pottery Neolithic B. The intra-site spatial analysis shows that refuse disposal practices relied on principles of taxonomic and anatomical selectivity, which resulted in distinct faunal deposits. This patterning suggests that refuse discard behaviours of seasonally aggregating hunter-gatherers were highly structured. We present this conclusion with caution and restraint, however, as our results are liable to change with additional data, particularly those from the heavy fraction flotation residues that we have only begun to examine. Finally, although our findings may not prove resistant to additional data, we hope in the very least to have raised the possibility of Epipalaeolithic refuse disposal practices.

Figure captions

Figure 1. Overview plan of the principal features in Area B at Kharaneh IV.

Figure 2. Kernel density plots of piece-plotted fauna from Area B at Kharaneh IV. (A) small game (fox, hare and tortoise); (B) gazelle; and (C) gazelle horn cores.



