CHAPTER THIRTEEN

ANIMAL BONES AND ARCHAEZOZOLOGICAL ANALYSIS

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13.1 Introduction

This chapter reports on the mammal, bird and reptile remains recovered from Wadi Hammeh 27. Molluscs and other invertebrates are considered elsewhere (Chapter 11. 8-9). Material was collected from sealed occupation deposits in the Phase 1 levels, together with loci from earlier Phases 2, 3 and 4 in the Plot XX F sondage (Chapter 3. 9-13). All specimens were recorded by plot location, locus and level. In total, more than 14,000 complete and fragmentary animal bones were retrieved weighing 10.97 kilograms (cf. Chapter 5.10). Material recovered from ‘Topsoil’ and ‘Subsoil’ layers above the Phase 1 occupation deposits were omitted from these analyses.

With the completion of this analysis, Wadi Hammeh 27 now joins the handful of Early Natufian sites in the southern Levant with reliably retrieved and published fauna. Amongst these are Hayonim Cave (Bar-Yosef 1991) and El Wad, Chamber III (Weinstein-Evron 1998; Munro 2004), situated in the Mediterranean hill zone; ‘Ain Mallaha (Bouchud 1987) in the Jordan Valley; and Upper Besor 6 in the Negev (Kolska-Horwitz and Goring-Morris 2000).

The main objectives of this report are to provide a detailed study of the faunal remains from Wadi Hammeh 27, in which four main issues are considered:

i) Identification and quantification of proportions of taxa found at Wadi Hammeh 27.

ii) Subsistence economy and procurement strategies, and how this assemblage compares with those recovered from other settlements of the same period.

iii) Site formation processes which were active during occupation of the site and post-dating the period of occupation. In particular, we have attempted to add to observations made concerning waste disposal at Wadi Hammeh 27 (Chapter 5; Hardy-Smith and Edwards 2004) and have also investigated whether post-abandonment change in environmental conditions impacted bone survival.

iv) How environmental and demographic factors influenced the range of species utilised by people at Wadi Hammeh 27 and where this assemblage fits into current foraging theory and dietary breadth models (Binford 1968b; Flannery 1969; Surovell 1999; Stiner and Munro 2002).

Some of these questions will be answered more fully by spatial analyses of subsets of the assemblage. No spatial analyses data are presented here but it is planned that these will appear in forthcoming studies.

13.2 Recovery and Sampling Strategies

During excavation, animal bones were either collected by hand, or more usually, after dry and wet sieving through 3-millimetre mesh (and through 5-millimetre mesh in the first season, Chapter 1.5). High levels of fragmentation meant that it was not possible to assign the majority of fragments to taxonomic order or family. These non-diagnostic specimens were separated from the identifiable specimens and recorded separately.

A sample of the heavy residues collected from the archaeobotanical flotation program (Chapter 14) was also retained (collected with a 0.3 mm mesh). We processed some of these for bone retrieval, and although we do not consider these in our report, a brief summary of the preliminary processing follows. The heavy residues were passed through stacked sieves of 4 mm, 2 mm and 1 mm meshes to facilitate sorting. Samples from 61 different contexts were treated in this way. A preliminary assessment of the bone fraction retrieved was made on two of these samples, which were drawn randomly (Plot XX F Sondage extension, Locus 5.4, and Plot XX E/H Locus 4.1, Square 4). In total, they yielded 260 bone fragments. Eighteen per cent of these comprised
long-bone and skull fragments from microfauna, none of which were unidentifiable to class or family, apart from two micro-mammal teeth (molars from *Meriones* sp. and *Spalax* sp.) and a small lizard mandible fragment. All other specimens in these two samples appeared to be highly fragmented bone from larger taxa. Notably, no fish bone was observed, and this general picture was supported by a broader scan of the other bone samples from heavy residue sorting. Further analysis of sorted fractions was not undertaken for this report but such a project may have potential for future study.

### 13.3 Archaeozoological Methodology

Animal bones were identified using reference collections housed at the Institute of Archaeology, University College London (including the personal collection of Dr A. Garrard), the Natural History Museum London, the Bird Reference Collection at Tring Museum and the Harrison Institute, Sevenoaks. This report includes those bones examined in a preliminary study carried out by Garrard and West (Garrard n.d.). Specimens sorted as diagnostic, that is those that were identifiable to element and taxa, were separated from non-diagnostic bones for processing and recording. For diagnostic specimens, the skeletal parts recorded were skull fragments, mandibles, maxillae, loose teeth, atlas and axis vertebrae, and articular surfaces and epiphyses of girdle, limb and foot bones. All these specimens were measured (to the nearest mm), weighed (to the nearest 0.01g) and information about fusion status and degree of intactness recorded. Attributes resulting from taphonomic processes including weathering, surface condition, gnawing and burning were also recorded. Morphometric data were assembled (following von den Driesch 1976) for some species including gazelle (*Gazella* sp.), sheep/goat (*Ovis* sp. and *Capra* sp.), fallow deer (*Dama* sp.), fox (*Vulpes* sp.) and hare (*Lepus* sp.). These data are presented in Tables 13.10-17.

The recording of non-diagnostic specimens was included in a general scheme for assessing the condition of bone material from each context (which necessarily included all material, diagnostic and non-diagnostic). This system used for Wadi Hammeh 27 is a modified version of the protocol devised by O’Connor (2003: 126-29). Fragmentation was recorded by counting the number of bone fragments in pre-set size categories (0-1 cm; 1-3 cm; 3-5 cm; 5-7 cm; 7-10 cm and more than 10 cm); surface condition and edge damage was assessed, and colour of fragments noted, in order to assess degree and type of burning. Quantification of these attributes allows consideration of contextual variation, and the results are discussed below (Chapter 13.7).

Three quantification methods were employed, the first two being Number of Identified Specimens (NISP) and Minimum Number of Individuals (MNI). The recommendation of Grayson (1984) to use NISP rather than MNI as a basic measure of abundance was followed, particularly since the ‘identified to species’ assemblage size was only moderate in size. In the summary tables, NISP includes only specimens identified at least to order or family. Thirdly, NS (number of specimens) was used to summarise data for specimens identified only to size class, or size class plus element, and is also used where NS and NISP data are combined.

There are three cases where variations in the determination of NS or NISP values were made. There is a problem with simply counting tortoise shell fragments (scutes) which are outgrowths of the rib/vertebra axial skeleton, when vertebrae and rib fragments are generally not counted for most species. In order to avoid overestimating tortoise quantities, scute numbers were divided by 50 (approximately the number of scutes in the carapace and plastron combined) before being added to the number of tortoise long bones, in order to derive a more rigorous ‘Number of Specimens’ (NS) value. Only Table 13.1 shows the full number of shell fragments. Squamata (snakes and lizards) are largely recognisable by vertebrae and mandibles. At Wadi Hammeh 27 no snake or lizard mandibles were recovered but their characteristic vertebrae were often intact and were recorded separately during analysis. These account for the NS values shown in Table 13.1.

Bearing in mind the relatively high fragility of bird bones, moderately intact long bone fragments from medium and large birds were counted, even without identification to taxa and element, so that the relative size of the contribution of this class to the economy of Wadi Hammeh 27 could be assessed (NS in Table 13.1). The relative evenness of prey procurement methods was assessed using the formula, \(1/\Sigma(p_i)^2\), the reciprocal of Simpson’s index where \(p_i\) represents the proportion of each prey procurement type (Grayson 1984; Stiner and Munro 2002).