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Preface

When I participated in the IVth International Conference of ASWA, held in the summer of 1998 in Paris, I was gratified to learn that the Scientific committee had unanimously agreed to hold the next meeting in Jordan. Thus, on 2 April 2000, the Vth International Conference of the Archaeozoology of Southwest Asia and Adjacent Areas was held for the first time within the region at Yarmouk University in Irbid, Jordan after being held on the past four occasions in Europe.

The themes of this conference were divided into five areas including:

- Paleo-environment and biogeography
- Domestication and animal management
- Ancient subsistence economies
- Man/animal interactions in the past
- Ongoing research projects in the field and related areas

I wish to thank all those who helped make this conference such a success. In particular, I would like to express my appreciation to the Director of the Institute of Archaeology and anthropology at Yarmouk University Special thanks are due to his excellency, the President of Yarmouk University, Professor Khasawneh, who gave his full support and encouragement to the convening of this conference at Yarmouk University and to all those who contributed the working papers which made the conference possible.

I also wish to thank members of the organizing committee who worked very hard for many months in preparing the venue for this conference.

Abdel Halim Al-Shiyab
Yarmouk University
Irbid, Jordan

Note from the editors:
The editors wish to thank Dr. László Bartosiewicz for his excellent assistance in preparing and checking the contributions to this volume.

Participants at the 5th ASWA Conference, held at theYarmouk University in Irbid, Jordan, 2000

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BIRD REMAINS FROM JERF EL AHMAR A PPNA SITE IN NORTHERN SYRIA WITH SPECIAL REFERENCE TO THE GRIFFON VULTURE (*GYPS FULVUS*)

Lionel Gourichon[1]

Abstract

This paper presents preliminary results from the analysis of 1554 bird remains which were recovered from excavations at Jerf el Ahmar, a PPNA site in the Euphrates valley in northern Syria. With about fifty taxa identified, the avifauna is highly diversified although the hunting focused on geese (*Anser albifrons, A. anser*), cranes (*Grus grus, Anthropoides virgo*), black francolin (*Francolinus francolinus*) and diurnal birds of prey. Among the latter, the presence of the griffon vulture (*Gyps fulvus*) suggests that the Neolithic community had a special interest in this scavenger. Comparisons of the skeletal distribution of the major species indicate that vultures were not exploited for food but for other resources such as skin, feathers, claws and raw bone material, and perhaps had a ritual use. These observations reinforce existing archaeological evidence concerning the cultural importance of the vulture in certain Epipalaeolithic and Neolithic societies in the Near East.

Résumé

Cet article présente les résultats préliminaires de l'analyse de 1554 restes d'oiseaux qu'ont livré les fouilles de Jerf el Ahmar, un site PPNA de la haute vallée de l'Euphrate (Syrie du Nord). Avec près de cinquante taxons identifiés, l'avifaune est très diversifiée mais la chasse s'est essentiellement focalisée sur les oies (*Anser albifrons*, *A. anser*), les grues (*Grus grus*, *Anthropoides virgo*), le francolin noir (*Francolinus francolinus*) et les rapaces diurnes. Parmi ces derniers, la présence remarquable du vautour fauve (*Gyps fulvus*) suggère que les Néolithiques ont porté un intérêt tout particulier pour ce charognard. D'après l'étude taphonomique des restes des principales espèces, le vautour ne semble pas avoir été consommé mais avoir été exploité uniquement pour certains produits comme la peau, les plumes, les serres et la matière osseuse, à des fins artisanales et peut-être rituelles. Ces observations viennent enrichir les témoignages archéologiques existants concernant l'importance culturelle du vautour dans certaines sociétés épipaléolithiques et néolithiques du Proche-Orient.

Key Words: Jerf el Ahmar, Syria, Bird exploitation, PPNA

Mots Clés: Jerf el Ahmar, Syrie, Exploitation des oiseaux, PPNA

Introduction

Jerf el Ahmar, a PPNA site located on the left bank of the Euphrates river in northern Syria, 100 km east of Aleppo, disappeared in 1999 after the completion of the Tichrin dam. Five campaigns of excavation were conducted by D. Stordeur and B. Jammous in collaboration with the Direction of Antiquities and Museums of Damascus.

The settlement was situated on two small hillocks separated by a small wadi, some 5 m above the original alluvial plain. To the east it is dominated by the Jebel esh Sheikh Anan (570 m.asl). The large area covered by the excavations (ca. 1000 m²) have revealed a stratigraphy comprised of about ten levels, all dated to the Mureybetian culture (between 9,500 and 8,700 BC cal.). One of the major cultural changes in this sequence can be seen in architectural concepts, where the original circular structures were progressively replaced by rectangular structures (Stordeur 1999).

As for other PPNA sites of the Middle East, this period is characterised by a subsistence economy based on diversified hunting and intensive use of wild cereals and pulses. Thus, Jerf el Ahmar lies on a strategic interface composed of different ecological zones (riverine forest, swamps, steppes and hills) which could have allowed permanent occupation. At the same time there is now convincing evidence for pre-domestic agriculture at the site (Willcox, 1996). Note, that the first evidence for animal husbandry does not appear until the middle PPNB in northern Syria (Peters *et al.* 1999).

A preliminary study of faunal remains at Jerf el Ahmar indicates that gazelle (*Gazella subgutturosa*), wild cattle (*Bos primigenius*) and equids (*Equus hemionus* and maybe *E. africanus*) are the most abundant mammals, while many other smaller species also occur (Helmer and Gourichon, un-

[1] Maison de l'Orient Méditerranéen, 7 rue Raulin, 69007 Lyon, France, lionel.gourichon@etu.uni-lyon2.fr.

published report). Systematic dry and wet sieving using a flotation tank and the overall good state of preservation of the bones (despite high fragmentation), provided a rich sample of bird remains (more than two thousands specimens) which represent about fifty taxa.

The purpose of this paper is to present the preliminary results from the analysis of the avian assemblage, with emphasis on taphonomic observations and the presence of numerous remains of the griffon vulture (*Gyps fulvus*)[2]. It was chosen here to group the different occupations at Jerf el Ahmar into one period as they reflect one relatively homogenous culture.

The avifauna of Jerf el Ahmar

Because of its geographical position between the Eurasian and African continents, the Near East is one of the major areas of migration for many birds of the highly diversified Western Palearctic group. Unfortunately, several species, particularly raptors, geese, and bustards have been drastically reduced in range and numbers during the last century, because of human activities (modern hunting, demographic pressure, etc.). As a result, the potential diversity of the birds from the interior Syrian steppe is poorly understood despite studies of the actual bird life (Baumgart 1995).

The importance of birds in the food economy of Epipalaeolithic and early Neolithic societies has already been demonstrated for the Near East (*e.g.* Pichon 1984, 1988; Tchernov 1993). For Syria only the faunal material from Mureybet has undergone an in-depth study of the problem, mainly for the Natufian levels (Pichon 1984, 1985). The analysis of the avifauna of Jerf el Ahmar (30 km farther north) is part of a research project on the seasonal subsistence activities of Neolithic communities from the upper Euphrates valley to the Syrian desert (PhD thesis in preparation), and contributes here to our knowledge of the relationships between birds and man in the past.

The principal families identified reflect a preference for birds of medium to large size (Table 1): the small birds such as the Passeriformes (with the exception of Corvidae), which generally are both diverse and very common in the area, are poorly represented. Jerf el Ahmar, being an open-air site, would have less material brought in by wild carnivores or birds of prey than rock shelters or cave sites where small birds may be over-represented.

Geese are the most common taxa (Fig. 1) in terms of the number of remains (29.2 % of the total number of specimens identified – NISP). Three species occur today in the northern regions of the Middle East: the greylag goose (*Anser anser*), the white-fronted goose (*A. albifrons*), and the lesser white-fronted goose (*A. erythropus*). Because it is extremely difficult to find morphological features on the post-cranial elements allowing clear distinction between these species, identification was essentially based on biometrical criteria (cf. Bacher 1967). In many cases, identification was only possible to genus level because many measurements overlap. *A. anser* and *A. albifrons* are equally represented and constitute the majority of goose bones. One left scapula can be attributed to the lesser white-fronted goose which is mentioned by Baumgart (1995) as a vagrant in the region. It was also identified at the Natufian site of Mallaha (Pichon 1984). From November to March, large flocks of geese winter in the Euphrates valley, foraging over swamps and grasslands.

Phasianidae, mainly represented by the black francolin (*Francolinus francolinus*), were frequently hunted (21.9 %), though they are far from being equivalent in size to geese. Remains of quail (*Coturnix coturnix*) and chukar partridge (*Alectoris chukar*) are less numerous than those noted from other Epipalaeolithic and early Neolithic sites in the southern Levant (Pichon 1984, 1994; Tchernov 1993, 1994). Unlike the chukar, which is found in open areas, the francolin lives in densely brush-covered lowlands, generally close to permanent water. The Euphrates valley, with its tamarisk thickets, is indeed its year-round habitat. Both species are common in the area, and quail is only a summer visitor, breeding in the cultivated fields of northern and western Syria.

Along with the geese and partridges, cranes can be considered prime game birds (13.1 %). Among the two species identified, the common crane (*Grus grus*) was the most abundant. This large bird occurs today in the Middle East during migratory periods, usually during the passage from the end of

[2] This work was summarized in a poster presented at the 5th International Conference of ASWA.

Table 1. Identified bird remains at Jerf el Ahmar. The percentages are based on the NISP (the MNI is given for information but were not used in the present study).

Families	Taxa		NISP	%	MNI
ARDEIDAE					
	Ardea cinerea	Grey Heron	2	0.1	1
CICONIIDAE					
	Ciconia nigra	Black Stork	3	0.2	2
	Ciconia sp.	Unidentified Storks	2	0.1	
THRESKIORNITHIDAE					
	Geronticus eremita	Bald Ibis	1	0.1	1
ANATIDAE					
(35.1 %)	*Anser* cf. *erythropus*	Lesser White-fronted Goose	1	0.1	1
	Anser albifrons	White-fronted Goose	92	5.9	9
	Anser anser	Greylag Goose	112	7.2	14
	Anser ssp.	Unident. Geese	248	16.0	
	Anas penelope	Wigeon	2	0.1	1
	Anas crecca	Teal	2	0.1	1
	Anas platyrhynchos	Mallard	12	0.8	2
	Anas angustirostris	Marbled Teal	2	0.1	1
	Anas ssp.	Unident. Dabbling Ducks	39	2.5	
	Netta rufina	Red-crested Pochard	1	0.1	1
	Aythya ferina	Pochard	1	0.1	1
	Aythya nyroca	Ferruginous Duck	2	0.1	1
	Aythya fuligula	Tufted Duck	5	0.3	2
	Aythya ssp.	Unident. Pochards	14	0.9	
	Mergus merganser	Goosander	1	0.1	1
	Anatinae indet.	Unident. Ducks	11	0.7	
ACCIPITRIDAE					
(16.5 %)	*Milvus migrans*	Black Kite	2	0.1	1
	Milvus sp.	Red/black Kite	2	0.1	
	Neophron percnopterus	Egyptian Vulture	1	0.1	1
	Gyps fulvus	Griffon Vulture	193	12.4	10
	Aegypius monachus	Black Vulture	1	0.1	1
	Circus aeruginosus	Marsh Harrier	3	0.2	1
	Circus ssp.	Harrier(s)	2	0.1	1
	Accipiter gentilis	Goshawk	5	0.3	3
	Buteo buteo	Buzzard	10	0.6	3
	Aquila chrysaetos	Golden Eagle	2	0.1	2
	Aquila ssp.	Unident. Eagles	8	0.5	
	Accipitridae indet.	Unident. Accipitridae	27	1.7	
PANDIONIDAE					
	Pandion haliaetus	Osprey	5	0.3	1
FALCONIDAE					
	Falco tinnunculus	Kestrel	1	0.1	1
PHASIANIDAE					
(21.9 %)	*Alectoris chukar*	Chukar	17	1.1	5
	Francolinus francolinus	Black Francolin	241	15.5	28
	Coturnix coturnix	Quail	1	0.1	1
	Phasianidae ssp.	Unidentified Partridges	81	5.2	
GRUIDAE					
(13.1 %)	*Grus grus*	Common Crane	163	10.5	9
	Anthropoides virgo	Demoiselle Crane	36	2.3	4
	Gruidae indet.	Unident. Cranes	5	0.3	
OTIDIDAE					
(4.4 %)	*Tetrax tetrax*	Little Bustard	1	0.1	1
	Otis tarda	Great Bustard	67	4.3	6
BURHINIDAE					
	Burhinus oedicnemus	Stone Curlew	1	0.1	1
SCOLOPACIDAE					
	Philomachus pugnax	Ruff	1	0.1	1
	Gallinago gallinago	Snipe	1	0.1	1
	Numenius arquata	Curlew	3	0.2	2
COLUMBIDAE					
	Columba livia/oenas	Rock/Stock Dove	5	0.3	2
	Columba palumbus	Wood Pigeon	5	0.3	1
	Streptopelia turtur	Turtle Dove	10	0.6	2
	Streptopelia sp.	Unident. Lesser Doves	8	0.5	

Table 1. continued

Families	Taxa		NISP	%	MNI
STRIGIDAE					
	Bubo bubo	Eagle Owl	1	0.1	1
	Athene noctua	Little Owl	1	0.1	1
	Asio flammeus	Short-eared Owl	2	0.1	1
	Asio sp.	Long/Short-eared Owl	1	0.1	
CORACIIDAE					
	Coracias garrulus	Roller	1	0.1	1
CORVIDAE					
(5.2 %)	*Pica pica*	Magpie	5	0.3	2
	Corvus monedula	Jackdaw	4	0.3	1
	Corvus corone/frugilegus	Carrion/Hooded Crow	65	4.2	8
	Corvus corax	Raven	2	0.1	1
	Corvidae indet.	Unident. Corvidae	5	0.3	
PASSERIFORMES					
	Indeterminata	Songbirds	6	0.4	
Total NISP			**1554**	**100.0**	

October to November, and then in March and early April. For Syria, wintering could have been more common in the past as suggested by some recent observations in the northern and central regions (Baumgart 1995).Bones of demoiselle crane (*Anthropoides virgo*), which winter in Africa, were also identified but were less frequent (20 % of finds among Gruidae). The remains found at Jerf el Ahmar and other archaeological sites (*e.g.* El Kowm 2 and Qdeir, Late PPNB, unpublished study) suggest that this crane was a regular visitor to Syria during autumn and spring.

A diverse group of diurnal birds of prey were identified, which include ten taxa. They range from small harriers (*Circus* ssp.) to large black vulture (*Aegypius monachus*). However, most were represented only by a low number of bones and would have not played a substantial role in Neolithic hunting. The griffon vulture (*Gyps fulvus*) is an exception: with 193 identified remains (12.4 % of the avian bones), it was by far the most common. The main anatomical elements of this raptor are easily identifiable using morphological and biometrical criteria, though badly preserved remains can be confused with the black vulture. Here, a single specimen (a left cuneiform) was attributed to the latter species. Many skeletal parts were recovered for the griffon vulture (Table 2), even cranial parts. Its skeletal representation was particularly significant and this relatively high frequency suggests a specific human interest in this large scavenger (see below).

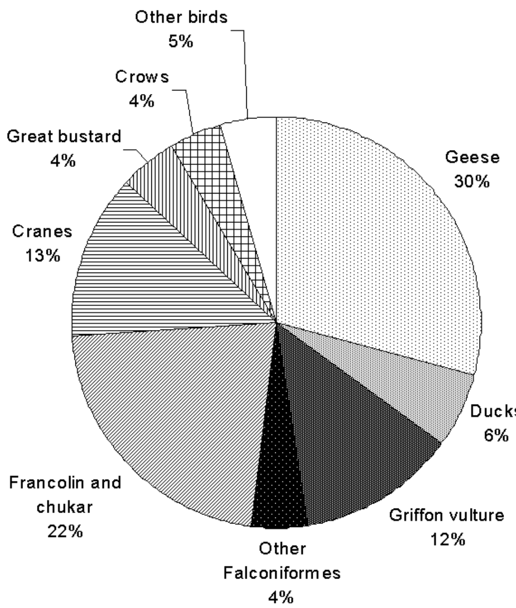


Fig. 1. Frequencies of the principal bird groups (based on the NISP).

Waterfowl were represented by nine species at Jerf el Ahmar, including dabbling as well as diving ducks, the former being more numerous than the latter. Most are migrants, wintering in freshwater areas of the Near East; some populations of mallard (*Anas platyrhynchos*) and marbled teal (*A. angustirostris*) can live year-round in northern Syria. Among the Anatinae, the goosander (*Mergus merganser*) was attested by one sternum on the basis of clear morphological and biometrical criteria. It has a northern Palearctic distribution and today it is a vagrant species in Syria. However, small flocks are known to winter in Turkey, Iraq and Israel (Hüe and Etchécopar 1970; Cramp and Simmons 1977). The goosander was also identified in Syria in the PPNA occupation of Cheikh Hassan (Gourichon unpublished study), in the southern Levant at the Early Epipalaeolitic site of Ohalo 2 (Simmons and Nadel 1998) and at the Natufian site of Mallaha (Pichon 1984).

Table 2. Bone remains of *Gyps fulvus*.

Anatomical elements	Left	Right	**NISP**
Cranium			3
Premaxillary			1
Mandible			5
Quadrate	5	3	8
Cervical vertebrae			8
Furcula			1
Humerus	1	3	4
Ulna	10	4	14
Radius	5	7	12
Cuneiform	1	3	4
Carpometacarpus	3	5	8
Anterior phalanges			
1 of digit II		4	4
2 of digit II	5	3	8
1 of digit III		1	1
Tibiotarsus		1	1
Tarsometatarsus	9	6	15
Metatarsal I	1		1
Posterior phalanges			
1 of digit I	5	2	7
2 of digit I	5	1	6
1 of digit II	2	3	5
2 of digit II	5	6	11
3 of digit II	7	9	16
1 of digit III	4	4	8
2 of digit III	2	5	7
3 of digit III	6	4	10
4 of digit III	3	6	9
1 of digit IV	2	4	6
4 of digit IV	3	1	4
5 of digit IV	1	2	3
2 of digit I or 3 of digit II			3
Total NISP			**193**

Note that low frequencies of duck bones were recovered (5.9 %) which contrasts with the high frequencies observed in the Natufian and Khiamian levels of Mureybet (Pichon *op. cit.*; Gourichon unpublished study).

The great bustard (*Otis tarda*) was poorly represented (4.3 %). This typical steppe bird is a winter visitor today in northern Syria from their breeding grounds in Turkey. Nevertheless, one cannot exclude a larger distribution in the past with reduced human pressure and slightly more humid conditions at this latitude (Helmer *et al.* 1998). Twenty kilometres farther north, the great bustard was the most commonly hunted bird in the Early PPNB site of Dja’de el Mughara (Gourichon unpublished study).

Crows (*Corvus corone/frugilegus*) may have also been game birds of secondary value (4.2 %). The remaining taxa represent a minor part in the avian assemblage with less than 1 % of the bone assemblage but provide evidence of the broad spectrum bird exploitation during Neolithic times.

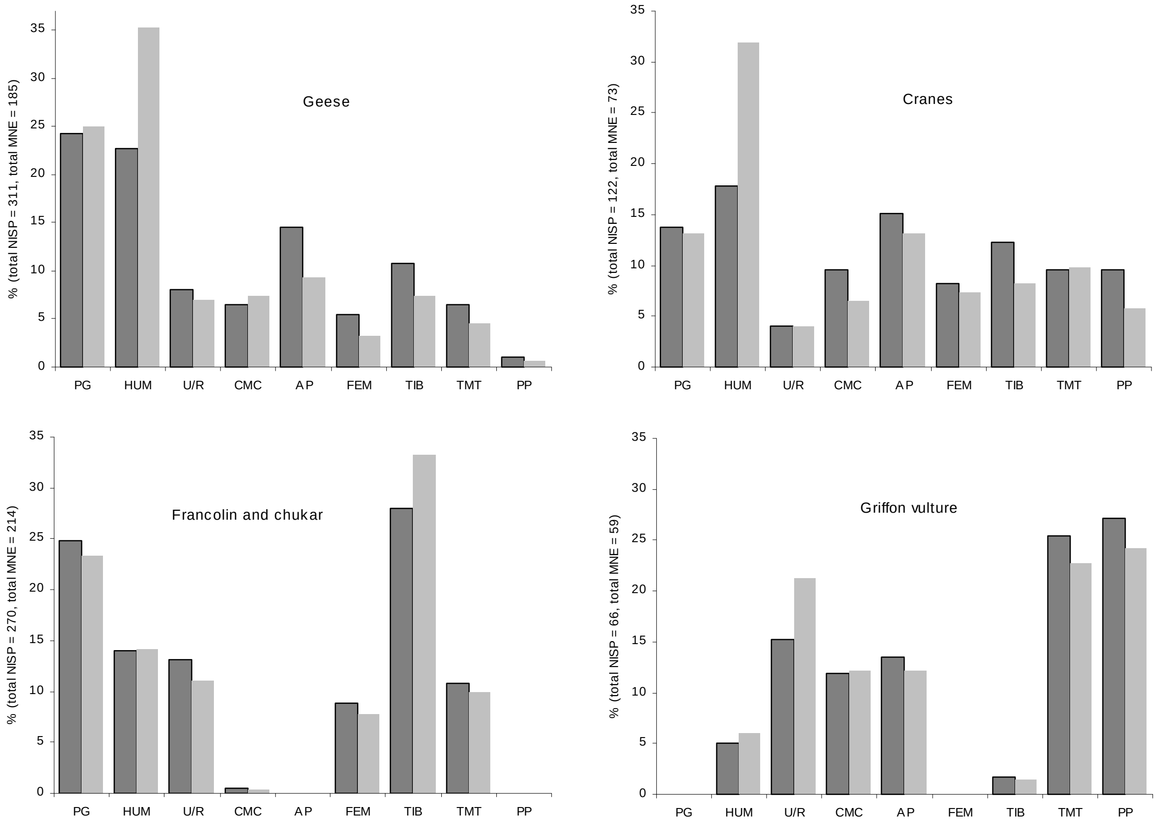
Differential skeletal preservation and butchering evidence

In order to compare the post-mortem deposition of birds and collect further information about their game status, taphonomical analysis *sensu lato* has been undertaken. During the last three decades, taphonomy became an integral part of archaeozoology and has commonly been incorporated in bird bone studies (*e.g.* Mourer-Chauviré 1979, 1983; Vilette 1983; Pichon 1984; Ericson 1987; Lefèvre 1989; Livingston 1989; Tchernov 1993)[3]. Because the material here is limited it was chosen to study the relative abundance of the skeletal elements and the butchering evidence for the major taxa.

The skeletal distributions have been presented so that the relative importance of the limb bones and the pectoral girdle (sternum, furcula, coracoid and scapula) appear both in terms of number of identified specimens (NISP) and of minimum number of elements (MNE) (Figs. 2-5). Only the most frequently ocurring bone in anatomical groups (pectoral girdle, ulna/radius, anterior and posterior phalanges) was taken into account (*e.g.* the scapula in geese and the coracoid in francolins for the pectoral region). For many bird groups, the direct comparison between NISP and MNE frequencies indicates that, as related to bone robustness and the length/width index of the diaphysis, humerus, ulna, radius and tibiotarsus have a higher likelihood of breaking than other bones (cf. Lefèvre and Pasquet 1994).

The bone ratios of the geese and cranes show an over-representation of shoulder elements and humeri (Figs. 2 and 3). Resemblance is statistically confirmed by a chi-square test on the distributions (with MNE and without posterior phalanges, $\chi^2 = 6.58$, df = 7). Concerning the lower number of duck bones, the proportion of the “triosseum” complex (*i.e.* coracoid, sternum and scapula) is also important although other wing elements are well represented. The bone frequencies of the Anatidae from Netiv Hagdud, a PPNA settlement located in the Jordan valley (Palestine), is similar (Tchernov 1994). According to Tchernov, “the only logical explanation (…) is that skeletal parts which included the

[3] See also the pioneering studies of Bouchud (1953) and Koby (1957).



Figs. 2-5. Graphs showing skeletal distributions of geese (*Anser ssp.*), cranes (*G. grus* + *Anthropoides virgo*), Phasianidae (*F. francolinus* + *Alectoris chukar*) and griffon vulture (*Gyps fulvus*). Based on the MNE (dark texture) and the NISP (light texture) of the principal anatomical parts: pectoral girdle (PG), humerus (HUM), ulna or radius (U/R), carpometacarpus (CMC), anterior phalanges (AP), femur (FEM), tibiotarsus (TIB), tarsometatarsus (TMT), posterior phalanges (PP).

pectoral muscles were commonly brought back to the site, while other parts of the carcass and the head were left outside the site perhaps where the birds were hunted" (*op. cit.*, p. 17). Differential transport is, in fact, only one explanation among others. Actually, all skeletal elements were recovered in the sample from Jerf el Ahmar, even the small posterior phalanges and the mandibles. Moreover, larger animals such as gazelles were also brought back complete to the site, the abundance of metapodials and phalanges being strongly significant.

With regard to the Phasianidae, the tibiotarsus is predominant (26.9 % of their finds). Pichon (1983) already observed this phenomenon at Hayonim and Mallaha (Israel) where a number of distal tibiotarsi of *Alectoris chukar* was used for the fabrication of beads. Bone beads were found at Jerf el Ahmar but are difficult to identify to species and no tibiotarsus of Phasianidae showed clear marks of manufacture[4]. Curiously, this pattern has not been noticed in bone assemblages of another medium-sized Galliformes, the grouse (*Lagopus lagopus* or *L. mutus*), generally abundant in Late Palaeolithic sites in Europe (cf. Mourer-Chauviré 1983). On the contrary, a parallel can be seen with chicken bones from Saxon sites where the tibiotarsus ("drumstick") was dominant, followed by the femur and the tarsometatarsus (Coy 1983, 1997; see also Ericson 1987). However, verifying whether this differential preservation resulted from butchering processes or from other factors (such as specific bone density) remains problematic. Apart from the tibiotarsus, at Jerf el Ahmar, the coracoid is very common among the specimens of Phasianidae (18.8 %) and close to the frequencies observed at Mallaha and Hayonim (Pichon 1984) and at Netiv Hagdud (Tchernov 1994). In the case of the coracoid there appears then to be a similarity with the skeletal distribution of grouse at a number of archaeological sites (Mourer-Chauviré 1983; Diez Fernandez-Lomana *et al.* 1995; Laroulandie 1998).

[4] Only one tibiotarsus of francolin shows fine transversal cut-marks on the anterior face of the diaphysis, perhaps related to the removal of the skin.

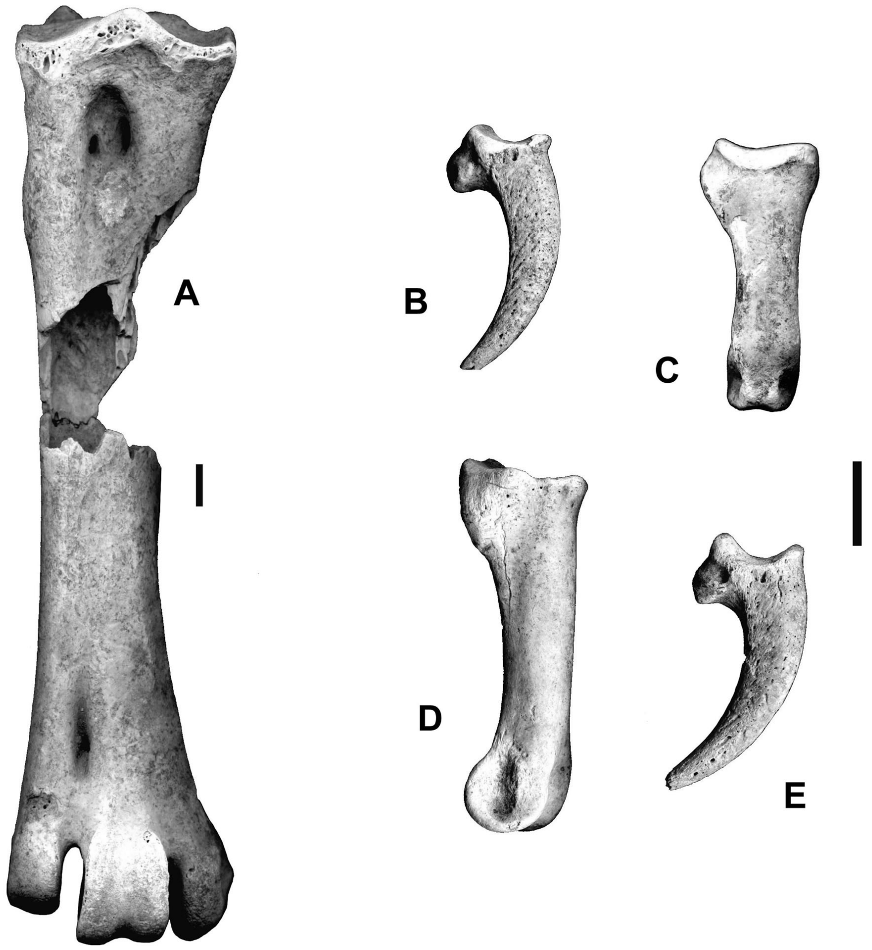


Fig. 6. Bone remains of *Gyps fulvus* (1 cm bar). A: right tarsometatarsus; B: left phalanx 2 of post. digit I; C: left phalanx 1 of post. digit I; D: right phalanx 1 of post. digit III; E: right phalanx 3 of post. digit II.

When compared to the other taxa, the histogram of the griffon vulture can be distinguished by an over-representation of the forearm (ulna/radius, carpometacarpus and anterior phalanges) and the distal elements of the legs (tarsometatarsus and posterior phalanges). Almost half of the total finds were posterior phalanges (Fig. 6). Feet and claws are common skeletal parts in raptor assemblages (diurnal and nocturnal) from archaeological sites (*e.g.* Pichon 1985; Tchernov 1993; Gourichon 1994; Eastham 1998 ; Simmons and Nadel 1998). These small compact bones may have been better preserved than long bones, and claws of birds of prey are easier to identify than toe elements of other bird families, but these explanations alone cannot account for their very high frequency at Jerf el Ahmar where posterior phalanges of geese, cranes and bustards were also identified. Tchernov (1993) has suggested that the claws of Falconiformes at Netiv Hagdud were used as tools but direct evidence such as surface wear or cut-marks have not been observed. Nevertheless, this explanation is an interesting hypothesis since complete feet or isolated toes could have been kept as ornaments or symbolic trophies (also proposed by Simmons and Nadel [1998] for Ohalo II) without necessarily further modification other than the drying process. The remains of other diurnal raptors (both identified and unidentified) at Jerf el Ahmar, when studied together, reflect the same ratios as the griffon vulture: the carpometacarpus with anterior phalanges constitute exactly one third of the 69 specimens, and the tarsometatarsus with posterior phalanges the second third.

Butchering marks were frequently observed in the avian material, especially for the large species: geese (on 12.6 % of their remains), cranes (11.8 %), bustards (12.1 %) and vultures (8.1 %). Wings

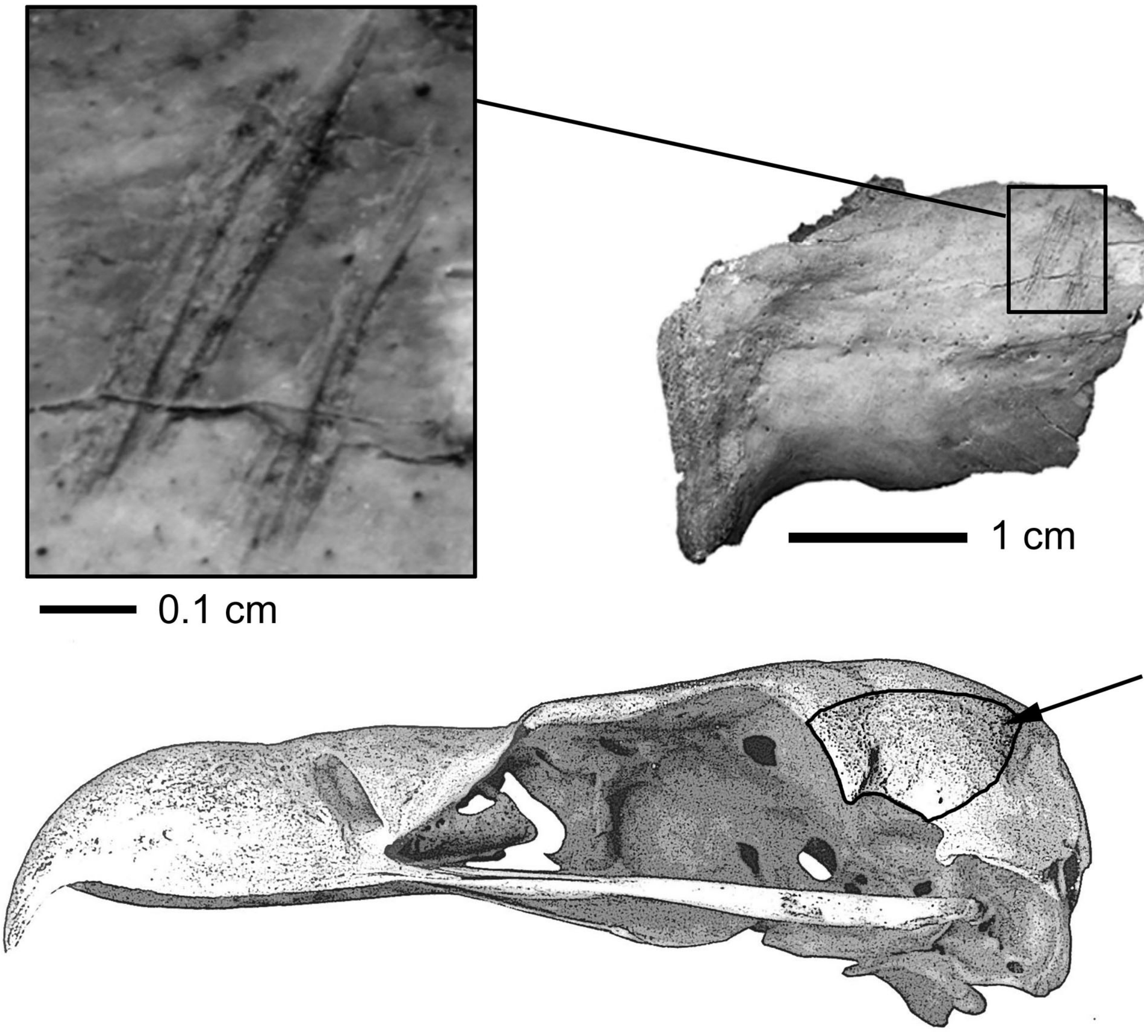


Fig. 7. Traces of “scalping” on a skull fragment of *Gyps fulvus*.

were dismembered from the pectoral girdle or between the humerus and the forearm, legs at the level of the distal tibiotarsus.

Skinning marks on the ulna of cranes, geese and vultures are probably related to the removal of all the feathers in one motion as opposed to individual plucking. The dis-articulation cut-marks at each extremity and an extensive scraping of the surface of one bone find indicate that the ulna and the radius of griffon vultures were selected for use. For this bird, one other fragment of ulna diaphysis exhibits curious notches placed at regular intervals. Moreover, fine cut-marks were found on a fragment of parietal (Fig. 7), suggesting that the head may have been scalped. Finally, removal of toes using stone tools was occasionally practised on *G. grus*, *O. tarda* and *G. fulvus*. Intentional breakage was scarce.

Complete burnt bones are relatively common for the species in question but provide little information since it is often impossible to separate the specimens which really came from the hearths (as a result of cooking) from those carbonised during fires which destroyed buildings. However, concerning the cranes, the geese and the francolins, relative recurrences of charred zones on the breast elements and on the wing and leg extremities argue for a roasting of entire individuals or separated limbs.

In summary, the differential skeletal preservation displays a variation between groups of birds and between anatomical parts. From a general point of view, three major trends can be observed. Firstly, the pectoral girdle and the proximal part of the hind limb (humerus) of the geese, the partridges and the cranes are well represented. Secondly, the abundance of the tibiotarsi distinguished the Phasianidae from the other taxa. Thirdly, the extremities of the wings and legs were better preserved for *Gyps fulvus* and other Falconiformes. Assuming that the geese and the francolins were hunted primarily for food, high frequencies of the pectoral girdle and the proximal wings suggest meat consumption. As pointed out by Tchernov (1993), the breast region has the most massive muscles (although the proximal parts of the legs are also important). Following this argument, the same distribution observed in cranes and other birds would indicate that they were consumed (without excluding the use of other products). The griffon vulture, inversely, appears to have been exploited only for its feet and feathers, as well as bone as a raw material. Schütz and König (1983) reported different uses of vulture parts in the past. Among various examples, flutes were fashioned out of their long wing bones from prehistoric to Roman times (Fages and Mourer-Chauviré 1983).

Some other taphonomic considerations

Structural properties of the skeleton (bone density, presence or absence of marrow, cortical wall thickness) are highly variable between taxonomic groups and certainly played a role in the bone preservation in sediments, as illustrated for some birds by Livingston (1989) and Higgins (1999). For example, feet of birds of prey are more robust than those of waterfowl. In order to verify whether the anatomical characteristics agree with the taphonomic observations it would be preferable to undertake experimental studies on a large number of species. Other factors could intervene prior to burying of the bones and it is thus necessary to briefly examine certain human or animal activities which could have modified the avian assemblage, for example on-site butchering, meat conservation, eating habits and carnivore scavenging.

1. Butchering techniques, as noted above, do not seem to substantially affect the assemblage at Jerf el Ahmar and intentional breakage is more typical of the mammalian bones. Anatomical parts could, however, have been selected and dispersed after butchering, one part being kept for specific uses (preparation of food, collection of feathers or claws, etc.) and the remainder discarded.
2. Meat storage including drying and smoking processes, which imply removal of meat from the bone, leaves fine scraping marks (Diez Fernandez-Lomana *et al.* 1995). On the one hand these kinds of traces were very scarce at Jerf el Ahmar and are not considered evidence of this practice; on the other hand, the use of salt, common in the area, is not to be excluded for preserving meat on the bone.
3. Cooking should not have directly affected skeletal distributions but eating habits can be an important factor in bone destruction. For example, in Holocene sites of Southern Patagonia, Lefèvre and Pasquet (1994) recorded systematic breakage of the extremities of the ulnae and radii in many bird species. Their observations suggest that these bones were chewed or crunched by people to consume the cartilaginous epiphysis and marrow content[5] as occurs sometimes for chicken bones today. Similar cases were found in other avian assemblages (Gourichon 1994; Eastham 1998). At Jerf el Ahmar, there were no specimens which provided evidence of such eating habits and the few tooth marks were attributable to carnivores or rodents.
4. Even after butchering and cooking, bones once discarded can still be destroyed, for example, by scavengers. In the mammalian assemblage from Jerf el Ahmar, partially digested bones are abundant and provide evidence for the presence of domestic dogs within the village itself. Some distal metapodials, astragali and phalanges of gazelles, and bones as large as the first phalange of equids (*Equus hemionus* or *E. africanus*) indeed exhibit a typical corroded appearance attributed to carnivore digestion (see Payne and Munson 1985; Horwitz 1991). Thus, the destructive action of the gastric juices and chewing might have destroyed the fragile bird bones if dogs ate them. Only one distal tibiotarsus of goose was partially digested (or regurgitated) in the present sample but up to fifty bones of Anatidae at Mureybet (among 3357 avian remains, unpublished study) were affected in this way. In addition, gnawing marks made by rodents were recognised on some specimens. This indicates that animal agents played a supplementary role after the anthropic treatment of the bird carcasses and before natural decay and the action of chemicals in the soil set in.

[5] Special analysis of bone density and presence of marrow in bird skeletons was undertaken by Higgins (1997).

In conclusion, even if it is difficult to precisely recognise the primary factors responsible for the modification of the bone assemblage, it appears that the distinct patterns observed in the skeletal distributions of the birds most commonly hunted at Jerf el Ahmar are, at least in part, a consequence of the different status accorded by the inhabitants to the birds of prey as compared to the birds which were characteristically sources of food (geese, cranes, francolins, bustards).

Archaeological evidence for vultures

The griffon vulture is a carrion feeder, with a wing-span of between 240-280 cm, slightly smaller than the black vulture (*Aegypius monachus*) which was also identified in the avifauna of Jerf el Ahmar. Other scavengers or half-scavengers, like the Egyptian vulture (*Neophron percnopterus*) and the black kite (*Milvus migrans*), were also hunted. The actual geographical distribution of the griffon vulture is the Western Palearctic region and Central Asia, within lower middle latitudes with warm climates. During the 20th century, breeding places disappeared one by one in Syria and neighbouring countries, and this bird became seriously endangered in the area (Baumgart 1995). Some colonies still may be found in parts of northern and central Syria (Palmyra, Deir ez-Zor). The griffon vultures are gregari-

Fig. 8. “Grooved stone” with pictograms (1 cm bar).

ous around their nesting or roosting sites, usually cliffs which are often inaccessible, and at carcasse sites. Thus, these birds were probably caught at feeding sites since after "feasting" they are often unable to take off (Cramp and Simmons 1980).

While remains of large birds of prey were recovered from many archaeological sites, the high frequency of a single species, like the griffon vulture at Jerf el Ahmar, has rarely been reported in the literature. At Ksar 'Akil (Upper Pleistocene, Lebanon), 34 bones of *G. fulvus*, 10 of *A. monachus* and 11 of *Aquila* cf. *chrysaetos*, were identified (Kersten 1991, after Hooijer 1961). The bones of griffon vultures represented 25.6 % of the avian assemblage but, according to the inventory, could have represented only two individuals. Every long bone was present, as well as anterior and posterior phalanges. In this rock shelter context, Kersten examined the question of natural (since some birds nest or roost on cliffs) versus human deposition of the raptor bones and concluded that they were of anthropogenic origin due to the presence of burning traces on some bones. The question of whether or not the Accipitridae were consumed was not broached.

Another bone assemblage relative to this study was recovered at the Epipalaeolithic site of Zawi Chemi Shanidar in northern Iraq (Solecki and McGovern 1980): skull remains of more than 15 goats (probably *Capra aegagrus*) were associated with 13 bones of bearded vulture (*Gypaetus barbatus*), 5 of griffon vulture, 73 of white-tailed eagle (*Haliaeetus albicilla*), 15 of a small unspecified eagle and one of great bustard. In this assemblage, mainly distal parts of the wings are present. The occurrence of large birds, the particular skeletal distribution and the evidence of the removal of wings, seen in the light of other archaeological and ethnological analogies, led the authors to suggest the use of the feathers (or complete wings) for ornamental costumes used in rituals.

Fig. 9. Little stone figurine (1 cm bar).

In the near contemporaneous site of Hayonim, Pichon (1984) described 11 remains of griffon vulture and 10 remains of black vulture. Although this is again a cave context with potential natural bone accumulation, deep cutmarks on some wing elements[6] indicated that these birds were hunted. All long bones were represented as well as posterior phalanges. Concerning *A. monachus*, a sectioned radius and a tubular artefact fashioned on ulna were found close to a human burial.

Perhaps the best known archaeological evidence for vultures comes from Çatal Hüyük, a PPNB settlement in southern Anatolia (Mellaart 1967). Large wall paintings inside the buildings represented several vultures[7] flying around headless human bodies. See Mellaart (*op. cit.*) and Solecki and McGovern (1980) for descriptions and interpretations. It is generally believed that these scenes depict special funeral customs where vultures could have been involved. In one case, skulls of vultures were incorporated in the relief decorations. The symbolic status of this bird in the recent and more distant past is well documented and, as a rule, is related to the dead. Reviewing the literature, Solecki and McGovern (1980) and

[6] One scraped diaphysis of ulna resembles the find from Jerf el Ahmar.
[7] Solecki and McGovern (1980, after Mellaart 1967) have designated these raptors *G. fulvus*. Nevertheless, as suggested by Schütz and Konig (1983), most of the paintings could have been a representation of *A. monachus*, based on the frequent presence of a marked neck ruff.

Schütz and König (1983) have provided ample information on this aspect (see also Rea [1986] for a case study on New World vultures).
Returning to Jerf el Ahmar, archaeological evidence indicates that raptors had some kind of symbolic status during the tenth millennium. Two engraved stones (Stordeur and Jammous 1996) show a bird of prey with spread wings and with the characteristic beak visible (Fig. 8). Among a number of small animal figurines found at the site, one is clearly reminiscence of the head of a bird of prey (Fig. 9). Even more impressive are two pillars in limestone which were part of what is interpreted as a collective building. Although they were damaged, certain characters strongly suggest that these stones were carved into the form of a large Accipitrid (Fig. 10). Finds from Nemrik in northern Irak (Koslowski 1990), contemporary with Jerf el Ahmar, have also yielded representations of vultures or eagles. Taken as a whole, archaeozoological and archaeological evidence indicates that the vulture was of particular importance in the symbolic systems of early Neolithic societies.

Conclusion

The richness and diversity of the avifauna indicates that birds were a significant food resource at Jerf el Ahmar, especially in late autumn, winter and early spring when the number of local species increased considerably due to the presence of migrants. Further, different ecological zones around the settlement – riverine forest, swamps and steppes – were exploited. Hunting focused on large-sized, gregarious species such as geese and cranes, while francolins were a common game available year-round in the surroundings. As in many other Epipalaeolithic and Neolithic sites in the Near East, diurnal birds of prey were also exploited. Their diversity is remarkable although one species, the griffon

Fig. 10. Limestone pillar (ca. 1 m high).

vulture, appears to have been more important than the others.
If evidence from the skeletal distribution leaves little doubt that geese, ducks, cranes, bustards and francolins were hunted for food, this may not have been the case for the birds of prey. The rarity of the pectoral elements and the proximal parts of the wings of the vultures, together with the butchering pattern, suggests that the carcasses were processed exclusively for the removal of skin, feathers and claws, and possibly used for some ritual purposes.

The finds from Jerf el Ahmar are of special interest because they corroborate archaeozoological evidence from Zawi Chemi Shanidar and Hayonim, and archaeological data from a number of sites which suggest that vultures and other raptors played a significant role in the culture of Neolithic societies of the Near East. This conclusion is further reinforced by a number of archaeological finds at Jerf el Ahmar which show representations of what appear to be large birds of prey.

Finally, “Ancient man could hardly fail to notice these huge birds, magnificent flyers, as a power symbol and at the same time viewing their raptorial and scavenging habits, bestowing on them supernatural powers related to death or the dead” (Solecki and McGovern 1980: 94).

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