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## Neanderthal scraping and manual handling of raptors wing bones: Evidence from Fumane Cave. Experimental activities and comparison

Matteo Romandini <sup>a</sup>, Ivana Fiore <sup>b</sup>, Monica Gala <sup>b</sup>, Martina Cestari <sup>a</sup>, Giuseppe Guida <sup>c</sup>, Antonio Tagliacozzo <sup>b</sup>, Marco Peresani <sup>a,\*</sup>

<sup>a</sup> Dipartimento di Studi Umanistici, Sezione di Scienze Preistoriche e Antropologiche, Università degli Studi di Ferrara, Corso Ercole I d'Este 32, I-44100 Ferrara, Italy

<sup>b</sup> Polo Museale del Lazio, Museo Nazionale Preistorico Etnografico "L. Pigorini", Sezione di Bioarcheologia, P.le G. Marconi 14, I-00144 Rome, Italy

<sup>c</sup> Istituto Superiore per la Conservazione ed il Restauro, Via di San Michele 23, 00153 Roma, Italy

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### ABSTRACT

Given the still scanty amount of data ascribable to the interaction between raptors and hominins, this contribution aims to fuel the debate on the complexity of Neanderthal behavior during MIS3 in Western Eurasia. Nowadays, large raptors in general are scarce in nature, due to being top consumers in the trophic chain, and attracted hominins possibly as advantageous indicators of scavenging and feeding opportunities. Nevertheless, a symbolic rather than alimentary significance was designed from several taphonomic investigations, demonstrating various deliberate actions for removing wings, feathers and talons from raptors of different sizes. Following the results of taphonomic examinations of four raptors' (cf. *Aegypius monachus*, cf. *Gypaetus barbatus*, *Clanga clanga* and *Falco columbarius*) bones recovered from layer A9 at Fumane Cave, Italy, the data produced are here compared and supported by experimental butchering and contextualized within a wider context that ranges into the Early Upper Palaeolithic. Comparable to previous examples from Fumane and from other sites, the traces impressed on the surface of the wing bones suggest the recovery of the feathers or the wing tip adorned of the primary feathers, but also more complex and insisted interventions aimed to prepare the bone for a possible functional use.

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### 1. Introduction

Despite ephemeral evidence of human hunting or manipulation of birds since the Early Pleistocene in Europe and Western Asia (Huguet, 2007; Güleç et al., 2009), and secure evidence of edible bird consumption since the Middle Pleistocene (Roger, 2004; Blasco and Peris, 2009; Blasco and Fernández Peris, 2012a, 2012b, 2013), the current amount of data ascribable to the interaction between raptors and hominins is still scanty, and seems to begin with the Neanderthals. Traces from a handful of sites securely reveal that vultures, eagles and falcons were exploited for the extraction of claws, wings, feathers and other body parts since at least approximately 130 ky BP (Radović et al., 2015). Further, statistics from

palaeontological data show a correlation between sites and the incidence of diurnal raptors bones across a vast area, from Europe to the Levant (Finlayson et al., 2012). These findings stimulate discussions on those aspects of Neanderthal behavior related to the acquisition, processing, and the intended functional or symbolic use of these avian elements, in addition to those of anatomically modern humans. Nowadays, eagles and large raptors in general are among the most scarce birds in nature, being top consumers in the trophic chain (Chiavetta, 1981; Benasso and Perco, 1985), but we cannot exclude that their populations were larger during the Pleistocene and that this increased the frequency of interactions (Finlayson and Finlayson, in press). The attractiveness of these large and powerful diurnal birds to hominins can be perceived as possibly advantageous to scavenging, where based on the observation of vultures (Margalida et al., 2008; Krüger et al., 2015; Finlayson and Finlayson, in press), the location of freshly predated large herbivores in an open environment could be inferred (Schaller and Lowther, 1969).

\* Corresponding author.

E-mail addresses: [matteo.romandini@unife.it](mailto:matteo.romandini@unife.it) (M. Romandini), [iva\\_fiore@yahoo.it](mailto:iva_fiore@yahoo.it) (I. Fiore), [monarix@yahoo.it](mailto:monarix@yahoo.it) (M. Gala), [martina.cestari@student.unife.it](mailto:martina.cestari@student.unife.it) (M. Cestari), [giuseppe.guida-01@beniculturali.it](mailto:giuseppe.guida-01@beniculturali.it) (G. Guida), [antonio.tagliacozzo@beniculturali.it](mailto:antonio.tagliacozzo@beniculturali.it) (A. Tagliacozzo), [marco.peresani@unife.it](mailto:marco.peresani@unife.it) (M. Peresani).

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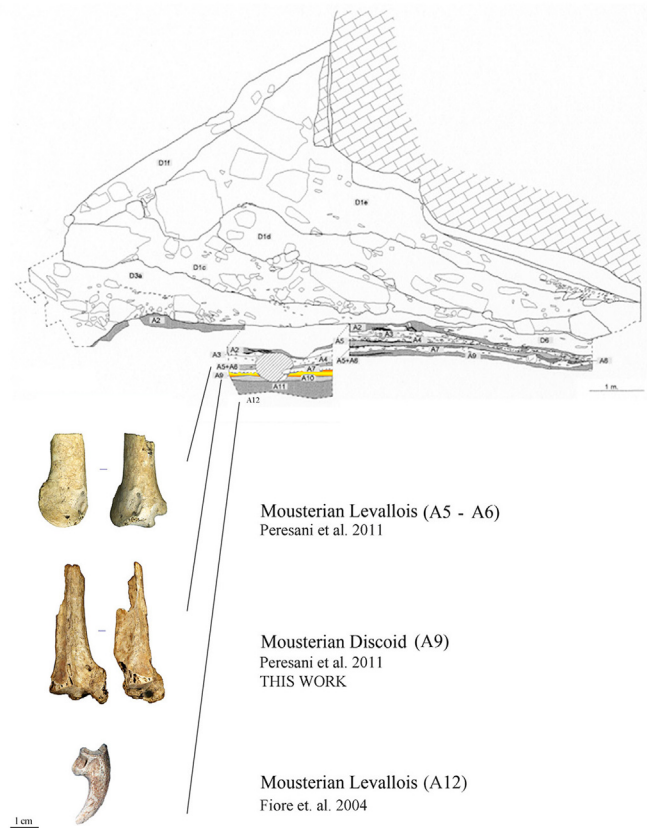
## 2. The exploitation of diurnal raptors in Europe during MP and early UP period

Although raptor bone remains are common in Pleistocene deposits (Finlayson et al., 2012), evidence for their exploitation in the Lower and Middle Palaeolithic is scarce. Among the ephemeral traces of interaction between hominins and raptors, the most known findings are represented by the isolated, cut-marked pedal phalanges of golden eagle, white-tailed eagle, and cinereous vulture, discovered at Krapina, Croatia (Radovčić et al., 2015), Grotta di Fumane (Fiore et al., 2004), and Grotta Rio Secco in Italy (Romandini et al., 2014c), Grotte de L'Hyène à Arcy-sur-Cure (Mourer-Chauviré pers. comm. in Fiore et al., 2004), Pech-de-l'Azé (Mourer-Chauviré, 1975; Soressi et al., 2008; Dibble et al., 2009), Combe-Grenal, Les Fieux (Morin and Laroulandie, 2012), and Mandrin in France (Romandini et al., 2014c). These bones resulted from converging anatomical selections, chronologically place within different periods from about 130 ky to 44–45 ky BP (Table 1), and suggest a symbolic rather than alimentary significance that was designed with the deliberate aim of removing the talon (Romandini et al., 2014c).

Other evidence is sparse across Europe, but records, in some cases, a backdating of the acquisition of valuable avian plumage elements in human history, strengthening our picture of behavioral complexity among Neanderthals. At Fumane, traces of bird exploitation demonstrate that Neanderthals (Peresani et al., 2011) manifested an interest in the wings of lammergeier (*Gypaetus barbatus*) and red-footed falcon (*Falco vespertinus*), and the talons of golden eagle (*Aquila chrysaetos*) (Fig. 1). In Gibraltar, Vanguard and Gorham's Caves yielded a cut-marked Eurasian griffon ulnae (Finlayson et al., 2012), traces ascribable to the defleshing or disarticulation of a golden eagle proximal femur, and an indeterminate falcon distal humerus have been reported respectively from Les Fieux (Gerbe et al., 2014) and Grotte du Noisetier, France (Morin and Laroulandie, 2012), which at a general level cannot exclude the occasional consumption of raptors by archaic humans. To reinforce the non-alimentary relation between hominins and large raptors, Gavrís and Taykova (2004) argue that the skeleton of the golden eagle found isolated from any other avifaunal remain at Buran-Kaya III, level C, in Eastern Crimea, containing a Streletskayan technocomplex, results from an exploitation targeted to recover its foot bones, talons, and beak.

The early Upper Paleolithic records a large interest in birds both as alimentary resources and as raw material in the spectrum of hunted species (Flannery, 1969; Stiner, 2001; Stiner and Munro, 2002; Hockett and Haws, 2009). Nevertheless, if we exclude the exceptional case of Bois Ragot (Laroulandie, 2000), or the cut-marked snowy owl claw in the Aurignacian at Quina Aval (Mallye et al., 2013), the diurnal raptors were not exploited for recovering foot bones and, primarily, claws, as observed in the Middle Paleolithic. During the Uluzzian, for which attribution to Neanderthal or Anatomically Modern Humans is disputed (Benazzi et al., 2011; Zilhão et al., 2015; Peresani et al., 2016), an interest in golden eagle was evidenced at Fumane (Tagliacozzo et al., 2013). Again, in the early Upper Paleolithic, long bone diaphysis and especially wing elements were attractive to be used as flutes (Buisson, 1990; Conard et al., 2009).

Birds can thus also be viewed like sources for supplying hard raw material for technical purposes. Authentic worked mammal bones, which result from a real transformation process by percussion techniques (Anzidei, 2001; Rosell et al., 2011; Saccà, 2012; Romandini et al., 2014a; Santucci et al., 2015) and sometimes also by abrasion, grinding and polishing (Gaudzinski, 1999; Soressi et al., 2013), are known in the Eurasian Lower and Middle



**Fig. 1.** Fumane cave: longitudinal section of the deposits included in macro-units A and D with some of the previously published cut-marked raptor bones: A12, pedal phalanx of golden eagle (*Aquila chrysaetos*); A9, distal end of right ulna of lammergeier (*Gypaetus barbatus*); A5–A6, distal end of carpometacarpus of cinereous vulture (*Aegypius monachus*) (by Fiore et al., 2004; Peresani et al., 2011).

Palaeolithic. The intensification of bone tool production and the development of techniques specific to this kind of raw material is associated with the transitional Upper/Middle Palaeolithic technocomplexes such as the Castelperronian and Uluzzian (e.g. d'Errico et al., 1998, 2003, 2012b), and in the successive Upper Palaeolithic, the vast archaeological record shows how modern humans modified bone by different techniques to produce formal tools usable for specific functions (Piel-Desruisseaux, 1986; Liolios, 2006). Outside Eurasia, bone tools are part of the equipment associated with modern human behavior during the MSA (McBrearty and Brooks, 2000; Henshilwood et al., 2001; d'Errico et al., 2012a). Also, bones from birds were used as raw material for producing tools and ornamental objects in the Palaeolithic, but the practice to modify these pneumatic structures is extremely rare before the Upper Palaeolithic, represented only by the Castelperronian diaphyses sectioned into sawed or notched tubular elements, found at Grotte du Renne, France (Leroi-Gourhan and Leroi-Gourhan, 1965; d'Errico et al., 1998) and by the late MSA awl found at Blombos Cave, South-Africa (d'Errico and Henshilwood, 2007).

To fuel debates around archaic hominin behavior, this work presents new evidence of interactions between Neanderthals and raptors. Following the results of taphonomic examinations of a small set of bones recovered from layer A9 at Fumane Cave, Italy, the data produced are compared and supported by experimental butchering and contextualized within a wider context that ranges into the Upper Palaeolithic.

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