07. ARCH. VOL. 19 (1ª):ARCHAEOFAUNA 17/8/10 13:46 Página 133

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Avian wings as ornaments in the Magdalenian?

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ABSTRACT: A collection of cut marks on Red-legged Partridge (*Alectoris rufa*) bones from the Magdalenian site of Tossal de la Roca (Spanish Levant region) is presented. The functional study undertaken aimed at revealing the purpose with which these cut marks were made. The analyses revealed which particular muscles of the avian body were affected by each cut. The data suggest that the purpose of most, if not all, of the cut marks was to detach the wings, while the animals were still fresh, from the body. It is argued that such procedure aimed at preventing deterioration of wings so that these could be used as ornaments.

KEYWORDS: RED–LEGGED PARTRIDGE, *Alectoris rufa,* CUT MARKS, ORNAMENTS, UPPER PALAEOLITHIC, MAGDALENIAN, IBERIAN PENINSULA

RESUMEN: Se estudian las marcas de corte realizadas en huesos de perdiz (*Alectoris rufa*), procedentes del yacimiento magdaleniense del Tossal de la Roca (Levante español). Se ha realizado un estudio funcional de los cortes para conocer su intencionalidad. A tal fin, se ha analizado con detalle la parte de la anatomía muscular implicada en cada corte. Los resultados apuntan a que el propósito era separar las alas completas, mientras la carne estaba aún cruda, probablemente para que no se deteriorasen éstas durante el cocinado del animal. Se supone por ello que las alas se utilizarían posteriormente como ornamentos.

PALABRAS CLAVE: PERDIZ ROJA, *Alectoris rufa,* MARCAS DE CORTE, ORNAMENTOS, PALEOLÍTICO SUPERIOR, MAGDALENIENSE, PENÍNSULA IBÉRICA

07. ARCH. VOL. 19 (1ª):ARCHAEOFAUNA 17/8/10 13:46 Página 134

INTRODUCTION

No total agreement presently exists as to what the presence of cut marks on animal bones implies (Domínguez & Torre, 1999). For authors such as Bunn & Kroll (1986), the distribution and abundance of cut marks is a direct function of the amount of flesh that hominines could obtain. Binford (1981, 1988), on the other hand, remarked that cut marks are not located preferentially on those bones with the largest amount of flesh. For a third group of researchers including Blumenschine (1986, 1991), cut marks are the result of removing the last bits of meat from carcasses. It is important to note that most of the studies conducted to test the behavioral strategies of hominines (e.g., hunting or scavenging) as well as their butchering practices, are all based on animals –mammals– of medium to large size. For this reason, a quite different scenario may be open to those studying cut marks on birds, animals that human populations have used as a food resource since the Upper Palaeolithic.

Cut marks produced when making engravings on avian bones do not normally present many difficulties of interpretation. Much the same applies to marks made when preparing bones to be used as instruments or tools (Bouchud, 1977; Moreno-García & Pimenta, 2004). The meaning of cut marks on avian bones caused by dismembering and de-fleshing operations is far more complicated. Díez *et al*. (1995) first put forward the hypothesis that these kinds of marks were a combined result of manipulating the carcass for not only removing its flesh but also separate specific parts of the animal that could thereafter serve as decorative objects.

Only a small fraction of the faunal assemblages created by humans incorporate birds in any significant numbers. The contribution of these animals to the diet of hominines was clearly limited during the Pliocene and up to the Upper Pleistocene. Although, in terms of results, reliability depends on the amount and quality of the collections, analyzing marks on the bones of birds to infere the intentions of the hominines that handled them is useful even when working with isolated specimens. Two distinctive features of birds when compared to mammals (e.g. a comparatively reduced muscle mass and a relatively small number of muscles) allow one to easily find out which muscle or ligament was cut when a lithic tool created a cut mark on the bone surface.

The present paper is an attempt to clarify the kind of activity carried out by humans from a Magdalenian community in Iberia when they created cut marks on a series of avian bones. To assess this, a functional approach was taken. This consisted in revealing which particular muscles and ligaments humans were cutting when they made a specific cut mark on the bone surface. By doing this, it is hoped that one will understand, not only the procedure but also the intention of the activity.

MATERIAL AND METHODS

Cut marks made by lithic tools on bones of the Red-legged Partridge, *Alectoris rufa*, were first reported by Cacho *et al.* (1995) in the upper Magdalenian site of Tossal de la Roca. This is a rock shelter located in the east of the Iberian Peninsula, some 20 Km from the Mediterranean Sea. Most of the bones presented in this paper come from layer II that provided a radiocarbon date range of 12.3 ± 0.4 to 12.8 ± 0.4 ka BP. One additional bone was collected from layer III whose radiocarbon dates range from 13.4 ±1.1 to 13.7 ± 0.5 ka BP (Cacho *et al*., 1995, 2001).

Among the 12 avian taxa at Tossal de la Roca (Table 1), only the bones of the Red-legged Partridge bear cut marks. This partridge is common nowadays in the Mediterranean region of the Iberian Peninsula and its fossil remains are among the most common birds during the Upper Pleistocene (Sánchez, 2004). The 62 bones from Tossal de la Roca attributed to this species, constitute the largest collection among the birds from this site (Table 1). The richest sample appears in level II (41 remains) of the inner excavation. Seven additional partridge bones were collected at the entrance of the shelter. Cut marks appeared on 10 bones: 6 humeri, 3 coracoids and 1 scapula (Table 2).

Nomenclature on the osteology and myology follows Baumel & Witmer (1993) and Van den Berge & Zweers (1993), respectively. The description of ligament attachments follows Baumel & Raikow (1993).

RESULTS

Coracoid (Figures 1-3)

1. Complete left specimen, level III: A series of almost parallel cut marks is located at the

07. ARCH. VOL. 19 (1ª):ARCHAEOFAUNA 17/8/10 13:46 Página 135

Location	Inner cave			Outer cave		
Level	**I**	**II**	**III**	**L I**	**IIa**	**IIb**
Alectoris rufa	8	41	6	4	3	-
Columba livia/oenas	-	-	-	-	1	-
Tyto alba	1	-	-	-	-	-
Bubo bubo	1	-	-	-	-	-
Strix aluco	1	-	-	-	-	-
Athene noctua	-	-	1	-	-	-
Sturnus sp.	1	-	-	-	-	2
Ptyonoprogne rupestris	-	-	1	-	-	-
Petronia petronia	-	-	-	-	-	-
Corvidae indet.	1	-	1	-	-	-
Garrulus glandarius	-	-	-	-	-	1
Pica pica	-	-	1	-	-	-

TABLE 1

The bird assemblage from Tossal de la Roca showing the number of remains per levels.

ELEMENT	1	2	3	4	5	6	7	8	9	10	11	12
Vertebrae	1	-	-	-	-	-	-	-	-	-	-	-
Scapulae	9	-	-	-	-	-	-	-	-	-	-	-
Coracoids	9	-	-	-	-	-	-	-	-	-	-	-
Furculae	1	-	-	-	-	-	-	-	-	-	-	-
Humeri	16	-	-	-	-	-	-	1	1	-	1	-
Radii	3	-	-	-	-	-	-	-	-	1	-	-
Carpometacarpii	-	-	-	-	-	-	1	-	-	-	-	1
Phalanxes (alar)	-	-	-	-	-	-	-	-	-	1	-	-
Sterna	2	-	-	-	-	-	-	-	-	-	-	-
Sinsacra	1	-	-	-	-	-	-	-	-	-	-	-
Femora	1	-	-	-	-	-	-	-	-	-	-	-
Tibiotarsi	10	1	-	-	2	1	1	-	-	-	-	-
Tarsometatarsii	6	-	-	-	-	-	1	-	-	-	-	-
Phalanxes (pedal)	3	-	1	1	-	-	-	-	-	-	-	-

TABLE 2

Skeletal spectra from the Tossal de la Roca bird assemblage. Taxa: *Alectoris rufa* (1), *Columba livia/oenas* (2), *Tyto alba* (3), *Bubo bubo* (4), *Strix aluco* (5), *Athene noctua* (6), *Sturnus* sp. (7), *Ptyonoprogne rupestris* (8), *Petronia petronia* (9), Corvidae indet. (10), *Garrulus glandarius* (11) and *Pica pica* (12).

furcular facet and the coraco-humeral facet (Figure 1). The marks were produced when cutting the *ligamentum acrocoracohumerale*, apparently to separate the humerus from the coracoid.

2. Cranial portion, level II: Short and parallel cuts on the inner border of the glenoid facet or *facies articularis humeralis* (Figure 2). The idea was to cut the *coracoscapulare interosseum* ligament that connects the humeral articular facet of the glenoid process (*facies articularis humeralis*) of the scapula with the humeral articular facet of the coracoid, with which the humerus articulates at the shoulder joint.
3. Left complete specimen, level II: Short and parallel cut marks on the upper inner border of the *facies articularis humeralis* (Figure 3). These cut marks were made once the major muscles that attach the trunk to the forelimbs, such as the *musculus pectoralis*, the *musculus latissimus dorsi* and the *musculus*

07. ARCH. VOL. 19 (1ª):ARCHAEOFAUNA 17/8/10 13:46 Página 136

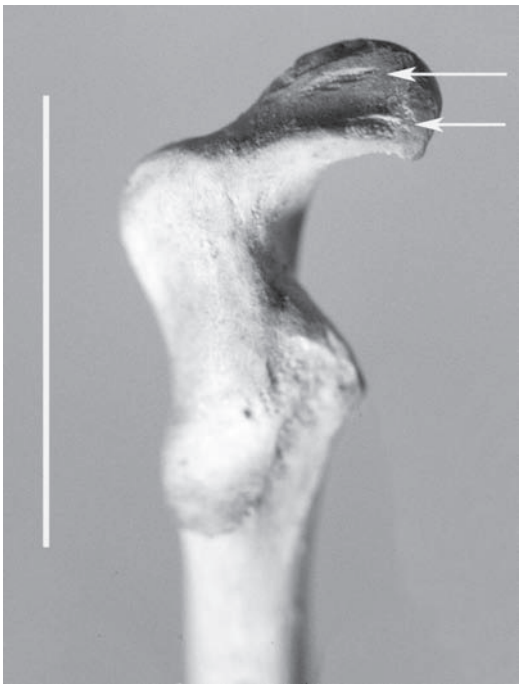

FIGURE 1

Cranial end of a coracoid (dorsal view) of Red-legged Partridge with arrows pointing to the cut marks (Scale bar = 10 mm).

FIGURE 2

Cranial end of a coracoid (lateral-dorsal view) of Red-legged Partridge with arrows pointing to the cut marks (Scale bar = 10 mm).

deltoideus to be were cut off. Their purpose seems the same as in the previous case. In the surface corresponding to the *canalis triosseus* of the bone, between the procoracoid and the brachial tuberosity, there are few short cut marks parallel to each other and to the longitudinal axis. The marks might have been made to separate the humerus from the coracoid, perhaps cutting through the *musculus coracobrachialis cranialis*, after separating the wings and the shoulder girdle from the trunk.

The intention of the cut marks on the coracoids was to dissarticulate the thoracic girdle to separate the wing from the body.

Scapula (Figure 4)

1. An almost complete left specimen, level II: The bone shows a series of short and parallel cut marks in the lateral margin of the proximal half, below the scapular neck. Some of these cut marks are deep and wide. They might have been produced when cutting the *scapulohumeralis caudalis* or the *infraspinatus* muscles which attach to the lateral side of the scapula –immediately behind the *musculus dorsalis cranialis*– and on the *crus ventrale fossae* of the humerus or *margo ventralis* of the bicipital crest. In the ventral side of the bone, many small and shallow cut marks are observed as well. These are located on the medial border and arranged obliquely to the main axis of the bone. These marks must have been produced when separating the scapula from the rib cage, cutting through the *musculus serratus profundus*, joining the ribs with the ventral part of the scapula.

Humerus (Figure 5)

1. An almost complete right specimen lacking its distal end, level II: there is one long cut

07. ARCH. VOL. 19 (1ª):ARCHAEOFAUNA 17/8/10 13:46 Página 137

FIGURE 3

Cranial end of coracoid (lateral view) of Red-legged Partridge with arrow pointing to the cut marks (Scale bar = 10 mm).

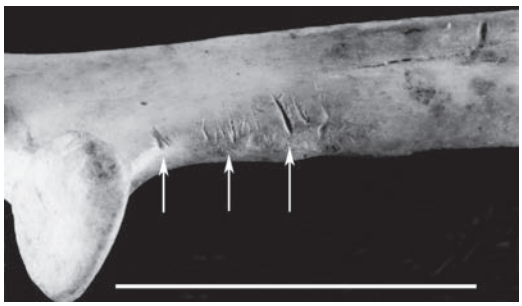

FIGURE 4

Scapula (dorsal view) of Red-legged Partridge with arrows pointing to the cut marks (Scale bar = 10 mm).

mark on the insertion of the *musculus latissimus dorsi* (Figure 5). The mark was produced when cutting the *musculus latissimus dorsi, scapulotriceps* and the *humerotriceps. Musculus latissimus dorsi* connects the humerus to the scapula. *Musculus scapulotriceps* arises from the scapula and from the

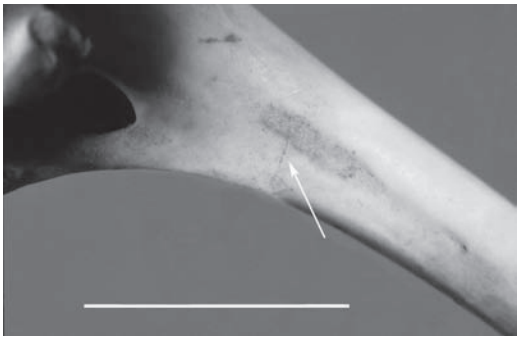

FIGURE 5

Humerus (anconal view) of Red-legged Partridge with arrow pointing to the cut mark (Scale bar = 10 mm).

humerus and attaches distally on the end of the ulna (Van den Berge & Zweers, 1993). *Musculus humerotriceps* has attachments of other muscles on it (e.g., *m. scapulohumeralis cranialis, m. scapulohumeralis caudalis* and *m. latissimus dorsi*) near the *fossa pneumotricipitalis* of the humerus. The other end of this muscle attaches to the olecranon of the ulna (Van den Berge & Zweers, 1993). These cuts separated the distal part of the wing (i.e., forearm and hand) from the rest of the carcass and allowed one to place the humerus and the ulna+radius in whatever position was judged appropriate before the soft tissues dried and the wing became rigid.

2. An almost complete right specimen lacking its distal end, level II: This bone also shows some short cut marks on the head, near the *incisura capitis* or capital groove. These marks were made when cutting the *labrum scapulare* and the *ligamentum coracoscapulare ventrale*. The former ligament joins the proximal end of the humerus and the *facies articularis humeralis* of the coracoid. In addition, the later connects the cranial surface of the *facies articularis humeralis* of the scapula with the coracoid. These cuts were made when dissarticulating the shoulder joint.
3. Diaphysis of one left specimen, level II: There are two long cut marks on the anconal side, just above the insertion of the *musculus latissimus dorsi*. The action producing such marks was probably made when cutting the *scapulotriceps* muscle and, perhaps, the *humerotriceps* as well. This action probably aimed at avoiding the consequences of the

07. ARCH. VOL. 19 (1ª):ARCHAEOFAUNA 17/8/10 13:46 Página 138

rigor mortis, allowing for a certain handling of the wing while still fresh (see final comment on the first specimen of the humeri).

4. Diaphysis of one right specimen, level II: Short cut marks on the ventral side of the bone were, again made when cutting the *humerotriceps* and *scapulotriceps* muscles. The intention one may assume similar to that from the preceding case.
5. An almost complete left specimen lacking its distal end, level II: The bone bears some slight and short parallel cuts in the palmar side of the shaft. These marks were made to cut the *scapulotriceps* muscle. Again, one may assume a similar intention to that of the two previous cases.
6. Distal end of a left specimen, level II: Only the pectoral part of the distal half of this bone remains. There are two sets of cut marks, but all the marks are incomplete because they continued on the lost ventral half of the bone. The bone exhibits deep and parallel cut marks in the brachial depression, above the dorsal condyle. It is interesting to note that these marks are placed above the insertion of the *musculus brachialis* which arises from the distal end of the humerus and from the proximal end of the ulna. For such reason, the intention was not to cut the *musculus brachialis,* but the *musculus bicipitalis* as well as the *pars propatagialis* of the *musculus pectoralis* instead. There are also some parallel cut marks on the opposite (i.e., anconal) side of the bone, just over the *epicondylus dorsalis*. The marks made on the anconal face would have been produced when cutting two specific muscles, namely the *biceps brachii* and the *humerotriceps*. The marks on the palmar face were made when cutting the *brachialis anticus* muscle, that joins the humerus just above the proximal cut marks, and the proximal end of the ulna. These two operations could have been performed to prevent the wing from bending when the muscles dried. No evidence of a complete disarticulation at the elbow joint exists.

DISCUSSION AND CONCLUSIONS

Whatever the intentions of humans for handling partridges and making cut marks in such a manner, it seems clear that they developed a most meticulous and stereotyped behaviour. It would be surprising that such accuracy would have been only motivated by an immediate interest in the consumption of the birds. In addition, it seems that cut marks present on the bones of medium sized birds, in particular partridges whose weight is around 500 g (viscera included), were done before cooking because once boiled or roasted, the muscles and ligaments soften and carcasses can be easily defleshed by hand. Thus, if the aim was to cook the bird, it would have been only necessary, after removing the feathers, to make some cuts at the level of the abdomen to eviscerate the animal. In this case, only portions of the sternum might have exhibited occasional cut marks but none would have been present in any of the aforementioned bones.

The cut marks made when separating the forelimbs from the shoulder girdle were done on fresh animals, with the intention of preventing the wings from further deterioration. In addition, several marks may best be explained as a consequence of cutting muscles and ligaments to enable a certain handling of the wing before the *rigor mortis* appeared.

We can reasonably think that the inhabitants of Tossal de la Roca sought to preserve the wings of partridges with their feathers in good condition. Use of wings as ornaments seems more than a mere possibility given the available ethnographic evidence (Heizer & Hewes, 1940; Koch, 1976; Corona Martínez, 2002). Probably, this was not an isolated practice at Tossal de la Roca. Indeed, avian bones with cut marks in the same anatomical portions, have been documented at various European sites dated at the end of the Palaeolithic period (e.g., Vilette, 1983) and the idea that these represented evidences of this use of wings as ornamental elements should not be disregarded.

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