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Agriculture and ironwork in the Middle Ages: new evidence of bone anvils in Spain

Agricultura y metalurgia en la Edad Media: nuevas evidencias de yunques de hueso en España

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PALABRAS CLAVES: yunques de hueso, hoces dentadas, metalurgia, agricultura, arqueología.
GAKO-HITZAK: hezurrezko ingudeak, hortzezko igitaiak, metalurgia, nekazaritza, arkeologia.

Idoia GRAU-SOLOGESTOA(1)

ABSTRACT

This paper analyzes and discusses the production and utilization of bone anvils across Europe in light of new evidence found in the Basque Country and Madrid, emphasizing the important social and economical function of these tools. A general overview of the stage of the research about these tools and about serrated sickles that were manufactured using them will be given. As an appendix, a catalogue of the evidence that has been published until now is offered.

RESUMEN

En este trabajo, se analiza y discute la producción y utilización de los yunques de hueso en Europa a la luz de nuevas evidencias encontradas en el País Vasco y en Madrid, subrayando la importante función social y económica de estas herramientas. Asimismo, se ofrece una visión general sobre el estado de la cuestión acerca de los yunques y de las hoces dentadas que eran fabricadas utilizando éstos. Como apéndice, se muestra un catálogo de las evidencias que han sido publicadas hasta el momento.

LABURPENA

Artikulu honetan, Europa osoan landu eta erabili diren hezurrezko ingudeak aztertuko dira, Euskal Herrian eta Madrilen agertu berri diren adibide batzuk abiapuntutzat hartuz. Erreminta hauek izan zuten garrantzi soziala eta ekonomikoa nabarmenduko dugu. Halaber, hezurrezko ingudeei eta hauen bidez lantzen ziren hortzezko igitaiei buruzko ikerketen egoera azaldu egingo da. Bukatzeko, argitaratu izan diren ingudeen katalogo orokor bat aurkezten da.

1.- INTRODUCTION

When preparing our masters dissertation, we came across some bone fragments that showed very characteristic triangular marks, arranged in more or less parallel and regular rows. A search of the relevant literature led us to identify them as bone anvils used to create teeth on the blade of iron sickles. Our interest in these artefacts made us search for other evidence in the province of Álava (Basque Country), where we have found around 20 new bone anvils. In Madrid, we have also identified some very early examples of bone anvils[1].

We realised that, in some cases, excavators had no clear idea of what these bones were and, in some cases, their presence was recorded in the original archaeological reports but was not mentioned in any publication, remaining hidden in what we could call the "grey" literature of archaeological research.

The aim of this paper is, in light of this new evidence, to discuss and analyze the importance of these artefacts and of the serrated sickles to understand economical and social aspects of the periods in which they were used, from Roman times to the present days.

2.- HISTORIOGRAPHY

An exhaustive overview of the historiography on this type of bone remains will not be made here, since it has already been published elsewhere (BRIOIS *et al.* 1995, RODET-BELARBI *et al.* 2002 and 2007, RODET-BELARBI and FOREST 2010, AGUIRRE et al. 2004, MORENO-GARCÍA *et al.* 2005b, 2005c and 2006, DAVIS and MORENO-GARCÍA 2007). Nevertheless, it might be a good idea to summarize some of the works that have shed light to the use and purpose of these special bone artefacts, in order to explain what we currently know about them.

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The special marks on these bones were noted a long time ago. The first known mention of them was by M. Cartailhac in 1895 (RODET-BELARBI *et al.* 2007). For many years, the relatively scarce amount of examples that were published were interpreted in many different ways: most of the authors thought that they were used as sharpeners or polishers (among others, SEMENOV 1964, BRIOIS *et al.* 1995, BENCO *et al.* 2002, RODET-BELARBI *et al.* 2002), archer bracelets (ZOZAYA 1995), idols or symbolic figurines (SERRÃO 1978, SÁ COIXÃO 1996), or even a geto-dacian writing system (BORONEANT 2005).

In the last two decades, most researchers have agreed to interpret these artefacts as anvils used by blacksmiths to create teeth on metallic sickles. The first paper in this direction was published by M. Esteban Nadal (2003), where she discussed her ethnographical work on traditional contemporary blacksmiths from southern Catalonia. This pioneer paper was almost immediately followed by other ethnoarchaeological works that confirmed the idea of the bones being used as tools of metalworkers (MONESMA 2002, AGUIRRE *et al.* 2004, ESTEBAN and CARBONELL 2004), and some general catalogues have come to light as well in the last decade (MORENO-GARCÍA *et al.* 2005c, MORENO-GARCÍA *et al.* 2006, RODET-BELARBI *et al.* 2007).

Most of the literature suggests that the occurrence of bone anvils in archaeological contexts is restricted to the Mediterranean basin: the Iberian Peninsula[2], southern France, Sardinia (GRASSI 2010) and northern Morocco (BENCO *et al.* 2002). All these findings are dated between the 5th to the 20th century AD. In addition, ethnographic examples are also known from the north of Tunisia (RODET-BELARBI *et al.* 2007). In the last few years, though, bone anvils have also been identified on the northern coasts of the Black Sea dated from the Hellenistic period to the 3rd century AD. This early occurrence has led the authors to conclude that the use of bone anvils to manufacture serrated sickles may have its origins in that area (BELDIMAN *et al.* 2010a).

An attempt to summarize all bone anvils that have been published until now has been made in this paper. The catalogue is provided at the end of this paper as an appendix (Table 2).

3.- NEW BONE ANVILS FROM ÁLAVA AND MADRID

The aim of this section is to provide details of each archaeological piece that we have recently found. This is previously unpublished material, with the exception of pieces N. 015 and 016 (GRAU 2009). The description of the characteristics of the materials will facilitate future comparisons.

Twenty one new bone anvils were found in the province of Álava, in the south of the Basque Country, mainly

Fig. 1. Geographical distribution of bone anvils found in the Iberian Peninsula and Southern France.

from urban interventions carried out in Vitoria-Gasteiz and Salvatierra-Agurain. A close look at another animal bone assemblage that it was being studied, recovered in the Sector 9 of the site called El Pelícano (Arroyomolinos, Madrid; excavation directed by A. Vigil-Escalera[3]), revealed the occurrence of sixteen additional bone anvils that, according to the chronologies provided by the excavators are dated between the 5th C. AD and the 7th C. AD. Therefore, these represent the oldest bone anvils found in the Iberian Peninsula, together with the one recovered in Buzanca (Madrid), derived from a Bos tibia (MORENO-GARCÍA *et al.* 2006). The geographical distribution of these new bone anvils is illustrated in Figure 1, where other evidence already published is also presented. In total, these new bone anvils found in Álava and Madrid represent 22% of the total number of archaeological bone anvils known in Spain.

The main characteristics of these bone anvils are shown in Table 1. The largest number of artifacts was found in El Pelícano and is dated between the 5th C. AD and the 7th C. AD (numbers 010, 011, 017, 018, 019, 020, 021, 022, 023, 024, 026, 027, 028, 029 and 035). They were made on different long bones of cattle and equids, and they show very irregular marks and no prior preparation of the surfaces (Figure 2).

Two small fragments of bone anvils were recovered in Aistra (Zalduondo, Álava), and are dated to the 10th C. (numbers 013 and 014). Unfortunately, they are both very badly preserved and it has only been possible to establish the anatomical element and taxon of one of them, a cattle metatarsus with at least one side smoothed down.

Some examples of late medieval bone anvils were also identified (numbers 001, 003, 007, 016, 032 and 033), found in different excavations in Vitoria-Gasteiz and Salvatierra-Agurain (Álava). They are mainly cattle metatarsals

[2] Not a single bone anvil has been found in the northern and north-western areas of the Iberian Peninsula, excluding the Basque Country and the few examples found in Freixa de Numão, Benavente, Zamora and Baltanás.

[3] We would like to thank him and L. Virseda for their help during the study of this animal bone assemblage.

Fig. 2. Marks left by the chisel on an *Equus* tibia (N.010). First half of the 6th century AD. Found in El Pelícano (Arroyomolinos, Madrid).

Fig. 3. Marks left by the chisel on a *Bos* metacarpus (N.001). Late Middle Ages. Found in C/Correría 131 - Zapatería 100-2 (Vitoria-Gasteiz, Basque Country).

and metacarpals, with the exception of one equid metatarsus (003), and in all cases one or more sides of the bone were flattened to be used as an anvil, leaving regular triangular marks (Figure 3).

In postmedieval and contemporary deposits from Vitoria-Gasteiz and Salvatierra-Agurain, bone anvils have also been found (numbers 002, 008, 009, 012, 015, 030, 031, 034, 036 and 037). All of these examples are cattle metapodials and show very regular marks on the four faces of the bone, which have also been smoothed down. The exception is the number 037, which possibly constitutes an example of an anvil that had not yet been used, with the sides flattened but no marks left by the chisel.

Other bone anvils were identified in deposits of unknown date in Vitoria-Gasteiz and El Pelícano (numbers 004, 005, 006 and 025).

Apart from the bone anvils mentioned in Table I, we know that other examples have been found in other excavations in Álava, but either the material is not yet accessible or we did not get the permission to view them. This is the case with material from two archaeological excavations in Vitoria-Gasteiz: the palace Maturana-Berastegi[4] and Catedral de Santa María (AZKÁRATE and SOLAUN 2009), both directed by A. Azkárate. At El Campillo, also in Vitoria-Gasteiz, where two bone anvils have been found (N.005 and 006), excavators identified a building as a forge (AZKÁRATE and SOLAUN 2006).

The piece N. 016 (Figure 4) requires more extensive consideration. The posterior side of the anvil shows two perforations, one of them perfectly rounded and the other one is oval. It is not possible to determine if it was first used as a bone anvil and then as something else, or *vice versa*. It looks similar to the perforated metapodials that have been interpreted as part of a machine to fabricate reels (MORENO-GARCÍA *et al.* 2005d, DAVIS AND MORENO-GARCÍA 2007, GONÇALVES *et al.* 2007), but it looks too small when compared with ethnographic examples (VEIGA DE OLIVEIRA *et al.* 1991) (Figure 5), and it was not found in an Islamic context, unlike the known examples (MORENO-GARCÍA *et al.* 2006b).

[4] This information was provided by the staff from the BIBAT Archaeological Museum of Álava.

Fig. 4. Bone anvil (N.016) from Zapatari 33, Salvatierra-Agurain (Álava) with two perforations on the posterior side.

Fig. 5. Woman with a wooden machine to fabricate linen reels in Tomar (Portugal). Photograph taken from Veiga de Oliveira et al. (1991).

N.	Site	Excavators	Chronology	Taxon	Element	Marked sides
001	Correría 131 – Zapateria 100-2 (Vitoria-Gasteiz, Álava)	M. Loza and J. Niso	13-15 C.	*Bos*	Metacarpus	2 (anterior and posterior)
002	Siervas de Jesús 22 (Vitoria-Gasteiz, Álava)	F. Sáenz de Urturi	16-18 C.	*Bos*	Metatarsus	4
003	Herrería 44 (Vitoria-Gasteiz, Álava)	M. Loza and J. Niso	14 C.	*Equus*	Metatarsus	4
004	Diputación 18 (Vitoria-Gasteiz, Álava)	F. Sáenz de Urturi	n.d.	*Bos*	Metacarpus	1 (posterior)
005	Extremo Oriental del Campillo (Vitoria-Gasteiz, Álava)	A. Azkárate	n.d.	*Bos*	Metatarsus	2 (anterior and posterior)
006	Extremo Oriental del Campillo (Vitoria-Gasteiz, Álava)	A. Azkárate	n.d.	*Bos*	Metatarsus	2 (anterior and posterior)
007	Pintorería 52 (Vitoria-Gasteiz, Álava)	F. Sáenz de Urturi	14-16 C.	*Equus*	Metatarsus	4
008	Zapatari 35 (Salvatierra-Agurain, Álava)	M. Loza and J. Niso	19 C.	*Bos*	Metatarsus	4
009	Zapatari 35 (Salvatierra-Agurain, Álava)	M. Loza and J. Niso	19 C.	*Bos*	Metacarpus	4
010	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	500-550	*Equus*	Tibia	2 (anterior and posterior)
011	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	450-500	*Bos*	Metatarsus	3 (posterior, medial and lateral)
012	Diputación 18 (Vitoria-Gasteiz, Álava)	F. Sáenz de Urturi	17-19 C.	*Bos*	Metatarsus	4
013	Aistra (Zalduondo, Álava)	J.A. Quirós	10 C.	*Bos*	Metatarsus	1
014	Aistra (Zalduondo, Álava)	J.A. Quirós	10 C.	Ind.	Ind.	
015	Zapatari 33 (Salvatierra-Agurain, Álava)	R. Varón	20 C.	Ind.	Ind.	3
016	Zapatari 33 (Salvatierra-Agurain, Álava)	R. Varón	1250-1400	*Bos*	Metacarpus	2
017	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	450-550	Ind.	Tibia?	
018	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	450-500	Ind.	Ind.	
019	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	450-500	Ind.	Ind.	
020	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	450-500	*Bos*	Metatarsus	2 (at least)
021	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	7 C.	Ind.	Femur?	
022	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	500-550	Ind.	Ind.	
023	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	500-550	Ind.	Femur?	
024	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	550-600	Ind.	Ind.	
025	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	Superficial	Ind.	Ind.	
026	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	550-600	Ind.	Ind.	
027	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	450-500	Ind.	Tibia?	
028	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	400-450	*Bos*	Metatarsus	3 (posterior, medial and lateral)
029	El Pelícano (Arroyomolinos, Madrid)	A.Vigil-Escalera	450-550	*Bos*	Metacarpus	1 (posterior)
030	Txikita 22 (Vitoria-Gasteiz, Álava)	B.Renedo	Post-medieval	*Bos*	Metapodial	4
031	Txikita 22 (Vitoria-Gasteiz, Álava)	B.Renedo	Post-medieval	*Bos*	Metapodial	4
032	Txikita 22 (Vitoria-Gasteiz, Álava)	B.Renedo	14 C.	*Bos*	Metacarpus	1 (anterior)
033	Txikita 22 (Vitoria-Gasteiz, Álava)	B.Renedo	14 C.	*Bos*	Metapodial	4
034	Zapatari 33 (Salvatierra-Agurain, Álava)	R.Varón	14-16	*Bos*	Metatarsus	2 (anterior and posterior)
035	El Pelícano (Arroyomolinos, Madrid)	A. Vigil-Escalera	600-650	*Bos*	Metacarpus	4
036	Zapatari 33 (Salvatierra-Agurain, Álava)	R.Varón	13-14 C.	*Bos*	Metapodial	4
037	Zapatari 33 (Salvatierra-Agurain, Álava)	R.Varón	14-16 C.	*Bos*	Metapodial	none

Tabla 1: List of bone anvils from the Basque Country and Madrid. n.d.: not determined; Ind.: indeterminate.

4.- HOW ARE THE BONE ANVILS MADE AND USED?

Several authors have conducted ethnographical work on this subject and have extensively described the process of utilizing bones as anvils to serrate the blade of iron sickles (Figure 6), so it is not our aim to repeat here unnecessarily what has already been established (i.e. ESTEBAN 2003, AGUIRRE *et al.* 2004, ESTEBAN and CARBONELL 2004). Instead, we would like to focus on some of the more specific aspects of this process.

Fig. 6. Blacksmith pinking the sickle using a bone anvil. Photograph taken from Esteban and Carbonell (2004).

In the ethnographical literature, authors have mentioned that the blacksmiths used to prepare the bone before utilizing it. Late medieval, post-medieval and contemporary bone anvils are mainly produced from cattle metapodials and are frequently given the optimal shape to be utilized. Sometimes one or both of the ends are cut off and the sides of the shaft are smoothed down to become completely flat (all the sides can be used, but generally anterior and posterior sides are chosen) (Figure 6). However, some of the archaeological examples that have been found, and especially those dated to the Early Middle Ages (Figure 5), show no prior preparation, and in addition, marks left by the chisel are very irregular (both in shape/size and arrangement in relation to the axis of the bone) and almost any bone of the mammalian skeleton with a flat area was used as an anvil.

We believe that this must not be read only as an early stage of the development of the technique, but as a consequence of the social and economical structures that characterized this period in Western Europe. The evidence that suggests a progressive standardization of the manufacturing process of bone anvils (and thus, of serrated sickles) has already been pointed out by some authors who have noticed several characteristics of the bone anvils that are more and more frequent in medieval times: a gradual preference for cattle metatarsus, a very careful preparation of them to create the anvils, and the increasingly regular marks made by the chisel (RODET-BELARBI *et al.* 2002, MORENO-GARCÍA *et al.* 2005c, 2006 and 2007).

It has also been suggested that the use of bones as anvils implied a strong connection between two important economical activities: animal slaughter and butchery on the one side, and ironwork on the other. These pieces show "in a unique way, economical activities that seem very different and complex, but in reality they were interconnected (farming, agricultural activities, iron craft, bone and antler industry craft, woodcraft, etc.)" (BELDIMAN *et al.* 2010a). Contemporary blacksmiths that still use this technique usually buy the bones in the meat-market or directly from the slaughter house (AGUIRRE *et al.* 2004, ESTEBAN and CARBONELL 2004). For the butcher, it is a good transaction, since metapodials have a very low nutritional value (MACGREGOR 1985: 30) and were probably not sold to the public. In addition, the blacksmith may have used other animal bones that were wasted by the butcher as combustible material for the forge (BENCO *et al.* 2002). The transactions between butchers and blacksmiths might have served to reinforce social relationships between them, as ethnographical work carried out at the Riff has showed (COON 1931). In the case of Islamic towns, blacksmiths were located in the suburbs, as were all the industrial activities (MORENO-GARCÍA *et al.* 2005a: 309).

Bone is an extremely good raw material to be used as an anvil. It is strong yet flexible, perfect in order not to be broken by the chisel and not to break the sickle. The organic collagen present in the bone provides tensile strength, while stiffness and compressive strength are contributed by mineral crystals, and the special structure of the bone minimises the stress-concentrating effects (MACGREGOR 1985: 23-24). It is probably after smoothing the bone anvil down over and over again, that the cortical bone becomes too thin to last.

5.- TOOTHED SICKLES

Nowadays, sickles with a serrated edge are not very common in the Iberian Peninsula, but they were quite frequently used at least until the 1950s (RODET-BELARBI et al. 2007). According to Krüger (1935-9), this type of sickle was being used for harvesting cereals in all the Pyrenees, but was being substituted by sickles with a flat blade in the Basque Country, Catalonia, Asturias and southern France (p. 121), and by machinery in the Balearic islands (p. 120). If toothed-sickles have been utilized in these areas of Spain, it is worth noting that archaeological bone anvils have never been found in some of them (i.e. Asturias and Balearic is-

lands). What is the reason for this? One possibility is that although, through ethnographic studies, we know that serrated sickles were used there in the 20th century, they might not have been utilized earlier. But what seems to us more likely is related to the development of archaeological work itself – it may not be a coincidence that, in the Iberian Peninsula, the largest number of bone anvils is concentrated where most medieval sites are being excavated (i.e. Basque Country, Madrid, Catalonia, and southern Spain and Portugal).

In the same sense, the concentration of bone anvils in two periods (9th-12th and 19th-20th centuries AD, and especially in Islamic contexts) observed in the Iberian Peninsula (MORENO-GARCÍA et al. 2006 and 2007) is probably a consequence of the current archaeological research into Medieval times, focused on some geographical areas and on some chronological periods. For example, serrated metallic sickles have been found in protohistoric sites from Spain (BARRIL 1992), but not a single bone anvil has been identified from the same period (ESTEBAN and CARBONELL 2004). There are two possible explanations of this: either the sickles were manufactured in a way that did not involve the use of bone anvils, or archaeologists have overlooked them (not surprising if they were actually not looking for them). In France, the known bone anvils are dated between the 10th and the 16th centuries AD, with the largest proportion dated between the 11th and the 14th (RODET-BELARBI and FOREST 2010).

We believe that if an exhaustive search on the collections of the archaeology museums is made, and if archaeological companies are questioned about it, dozens of bone anvils would suddenly appear and complete the geographical and chronological gaps that have been noticed in the evidence.

Iron sickles are very rarely found in archaeological deposits due to the difficulty of their preservation (RODET-BELARBI et al. 2007) and the recycling of the metallic materials (MANSILLA 2012: 301). But, as indirect evidence, we can infer from the bone anvils the existence of toothed-sickles at the site or nearby. Furthermore, along with the importance of the bone anvils recovered in the archaeological interventions, it is important as well to ask ourselves about the social and economical implications of the utilization of serrated sickles. Ethnography, once again, is the most helpful source that we may get, although we need to bear in mind the necessary precautions of trying to explain past societies through straight comparison with modern ones.

About the use of serrated sickles, authors agree that they were used for harvesting all type of cereals (KRÜGER 1935-9: 119, COMET 1992: 173, VEIGA DE OLIVEIRA et al. 1983, ESTEBAN and CARBONELL 2004, BELDIMAN et al. 2010a), while sickles with a flat edge were also used for cutting grass and pasture (GARMENDIA 1989: 44). If used for harvesting cereals, the flat sickle makes the spike fall onto the floor and it cuts the plant with a big part of the straw (COMET 1992: 177); the serrated one, although cuts a smaller amount of cereals each time and makes the harvesting slower, facilitates the collection of the spikes because it is necessary to hold the bunch with the hand that is not using the sickle (KRÜGER 1935-9: 123). If with the serrated sickles a long piece of the straw is left in the field, it may suggest a type of agricultural activities in which domestic animals were left to be fed in the fields after the harvest, and therefore, manure was procured directly and was not carried from the stables to the fields (or not only). Of course it is also possible that straw was collected after the crops were harvested, but this would involve doing the work twice, so it might not be the best choice.

The typology of serrated sickles appears to vary depending both on the geographical areas (KRÜGER 1935-9: 121-122, MINGOTE 1996: 38) and on the type of plants harvested. For example, the serrated sickle that was used in the area of Valencia at the beginning of the 20th century for harvesting rice was apparently clearly distinguishable from other types (KRÜGER 1935-9: 122). An interesting question that should be studied in the future is whether we can distinguish the different types of serrated sickles from the marks that they left on the bone anvils.

There have been some attempts in the literature trying to figure out the dispersion of the two main types of sickles in Europe. Mane (1983: 156-7) concluded that flat blades were the more frequent ones in France and Italy during the 12th and 13th centuries, indeed, serrated sickles are exceptional in the French iconography (PESEZ 1998: 122), although could have been used at the same time as flat ones (COMET 1992: 178). Azuar Ruiz (1989: 363) suggested that sickles with a flat blade were a characteristic of the Islamic culture. However, according to Mingote (1996: 38), the changes in the typological characteristics of farming tools are difficult to notice and can be very local. In fact, it is not possible to link a particular culture with certain tools. It must be mentioned that toothed-sickles and flat-sickles have sometimes been found within the same site and within the same context (PESEZ 1998: 122).

Some authors have suggested that serrated sickles are more appropriate for geographical areas characterized by a dry and warm climate (HOPFEN and BIESALSKI 1955, WHITE 1967), were the straw is too tough to be cut with a flat blade. However this is not always the case (PESEZ 1998: 122-123).

García de Cortázar (1982: 173) suggested that the wide variety of typologies of farming tools can be related to their manufacture in urban contexts and their acquisition by peasants coming from the rural world. But, looking at the evidence left by bone anvils, we suspect that the different types of bone anvils can be due to economical and social changes across the time: the more recent they are, the more standardized they appear, a tendency that may be related both to the progressive specialization of blacksmiths' work and to their gradual settling in urban centers.

In other words, it appears that, at least in the Iberian Peninsula, early bone anvils and serrated sickles, dated to the 5th-10th centuries AD, were produced both in urban and rural sites, using a rough technique that implied using wha-

tever animal bone was available, irregular hammering of the blade of the sickles and, possibly, mediocre metallurgical facilities. In this context, it is very tempting to suggest that early medieval blacksmiths from the Iberian Peninsula were either not very skilled or itinerant between villages, supplying the local communities with the basic farming tools and repairing those that were damaged.

During the Early Middle Ages, there was not a sustained demand for specialized artisans so they had to keep moving from one settlement to another, wherever they were required. Systems of interchange have been extensively studied by Wickham (2005), who mentions that most of the early medieval artisans were itinerant[5]. This is the case, for example, for stonemasons, which have been studied by Sánchez Zufiaurre (2005). Vigil-Escalera (2003) has suggested that, in the area of Madrid, potters were moving from one village to another. The production of glass, on the other hand, was centralized. In the north of the Iberian Peninsula we know very few early medieval sites where ironwork was produced in permanent workshops, such as Bagoeta (AZKÁRATE *et al.* 2009), Gasteiz (AZKÁRATE and SOLAUN 2006 and 2009) in Álava and Mata del Palomar (pers. comm. J.A. Quirós) in Segovia.

The ability of pinking the blade of iron sickles using bones as anvils is supposed to be characterized by some level of specialization of the blacksmith (AGUIRRE *et al.* 2004). It has to be done by an expert or, if not, by an apprentice (MORENO-GARCÍA *et al.* 2005a). This technique is used both when the sickle is produced and when it needs to be repaired. To create teeth on the iron sickles, the blacksmith would need a place to heat the blade and a place to put it into water, facilities that are quite easy to create wherever it is needed, unlike the foundry that would be necessary to fabricate the sickles. This fact could have favoured the mobility of the blacksmiths wherever they were needed. Of course, more work needs to be done on bone anvils (and especially on the earlier ones) to increase the evidence that can support this idea.

Nevertheless, we should not focus our attention merely on the study of typologies, but also on the technical systems that produced the archaeological evidence. In the case of farming tools, establishing categories of types may be misleading– different types could be used for the same purpose and one type could be used for different purposes (MINGOTE 1996: 28-52). In this sense, it needs to be mentioned that sickles have a polyvalent use –they can be utilized for harvesting cereals, but also grass, bushes, herbs, etc., but, according to Comet (1992: 183), sickles were progressively substituted by the scythe in France to cut grass. The scythe was faster, but also more expensive than the sickle and could only be used by specialists (COMET 1992: 191, and PESEZ 1998. 123). Scythes are more appropriate for harvesting in flat fields, while sickles can be used in uneven landscapes (PESEZ 1998: 123).

Comet also suggested a very interesting relationship between the use of small tools for harvesting, such as the sickle, and child labor, unlike the scythe, which he linked to specialists and wage-earning workers (p. 191-192). Fenton (1985: 116), on the basis of contemporary evidence from Scotland, noticed that women's work in the harvest was clearly connected to the use of serrated sickles. This association of women and small and lighter tools for harvesting has been noticed also in some African countries (IFAD, FAO & GOVERNMENT OF JAPAN 1998: 18), and both Wiesner and Roberts suggested as well that women used to prefer smaller tools for all agricultural activities in general (WIESNER 2000: 110; ROBERTS 1979).

6.- UTILIZATION OF BONE ANVILS ACROSS EUROPE: CHANGES THROUGH TIME

In Figure 7, we show the frequency of taxa and skeletal elements that are used as bone anvils across Europe in different time periods, considering as well the new bone anvils mentioned in this paper. The list of the sites that have been taken into account is provided as an appendix at the end of this paper (Table 2), along with the ones that have been excluded from this analysis due to their uncertain or broad chronology.

The bone anvils dated to the Hellenistic period are not included in this study, because they are poorly known. Beldiman *et al.* (2010a) mention that they have been found in the Ukrainian sites of Olbia, Neapolis and Thanagoria, but do not give any further information about them. Moreno-García *et al.* (2007) mention ten bone anvils in Ukraine (four *Bos* metacarpi, three metatarsi and one tibia, and two *Equus* metatarsi), but they might not be referring to the same ones.

Roman evidence (total bone anvils: 41) has only been found at the Romanian site of Histria (BELDIMAN and SZTANCS 2009, BELDIMAN *et al.* 2010a and 2010b) and in Pantanello, in southern Italy (GÁL 2010). The only dated

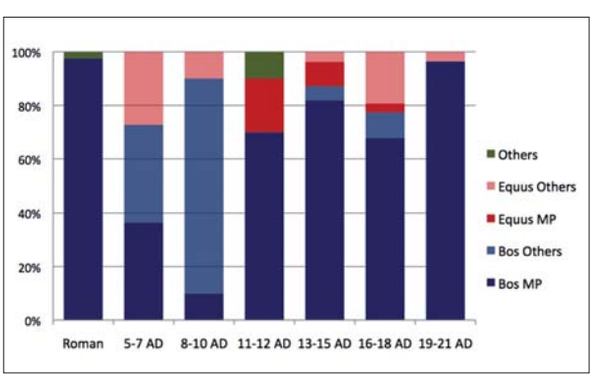

Fig. 7. Frequency of taxa and skeletal elements chosen as bone anvils in different periods. MP: metapodials. Others: other taxa. Undetermined bones have not been taken into account.

[5] See pp. 985-1171 from WICKHAM (2005).

bone anvil made from *Cervus* antler was found in Histria, but other anvils made on antler have been found as well in Durostorum (Romania) and Saharna Noua (Moldavia) (BELDIMAN *et al*. 2010a), although their chronology is not certain. In Roman times, the vast majority of bone anvils are metapodials of cattle, suggesting a very good availability of this material. The Roman economy, urban-based and oriented towards the market, probably made the butchers and slaughter-houses able to supply the blacksmiths most of the bones that they needed as raw materials.

Bone anvils from the second group (5th-7th centuries AD) come from the French site of Paulhan (RODET-BELARBI *et al*. 2007) and the Spanish sites of Buzanca (MORENO-GARCÍA *et al*. 2006) and El Pelícano. The sample is small (total: 11) and refer to very different geographic areas, but compared to Roman times differences are clear: equid bones are used as anvils for the first time and represent almost the 30% of the assemblage; the proportion of cattle metapodials and other skeletal elements is almost equal. It should be mentioned that, from the nine indetermined fragments found in El Pelícano, at least four are long bones (two femuri and two tibiae), although the taxon is uncertain. Furthermore, the bones from El Pelícano and Buzanca were not prepared (flattened and smoothed down) to be used as anvils. This fact, along with the utilization of any skeletal element and without any clear preference for a certain taxon is due to the social and economical situation of the former Western provinces of the Roman Empire in the first centuries after it collapsed.

The available evidence for the period between the 8th and the 10th centuries AD is scarce (total: 10). Bone anvils have only been found in two sites of this period: Isle-Jourdain, in France (RODET-BELARBI *et al*. 2007) and Aistra, in the Basque Country. Further work should be done on materials from this period to evaluate whether the proportions are representative of those times.

Evidence recovered in contexts dated in the 11th and 12th centuries is also scarce (total: 10), and they come from Samatan and Rieumes (France), (RODET-BELARBI *et al*. 2007), Lleida (AGUIRRE *et al*. 2004, RODET-BELARBi *et al*. 2007) and Seville (MORENO-GARCÍA *et al*. 2007). Almost all the bone anvils from this period were metapodials, mainly from cattle, which is clearly different from the previous periods. The only non-bovine specimen is represented by an anvil made from a dromedary *(Camelus dromedarius)* bone, in this case a radius found in Seville. This is the only known example of a bone anvil made from a camelid.

The largest group of bone anvils is dated between the 13th and the 15th centuries (total: 184), including several sites in France, Spain and Portugal. The progressive standardization of the manufacturing process of the bone anvils is visible by now, as most of them are from cattle metapodials (82%) and equid metapodials (10%). In fact, all the anvils found in Spain are made with metapodials.

Postmedieval bone anvils dated between the 16th and 18th centuries (total: 32) also indicates a preference for cattle metapodials. The graph shown in Figure 7 may look a little distorted due to the assemblage recently found in Sassari (Sardinia) (GRASSI 2010), which appears to be exceptional in two ways: first, it is the only one known that contains bone anvils in any Mediterranean island and, second, the proportion of the taxa[6] and the skeletal elements used as anvils is different from the other samples found elsewhere in Europe in this period, with the exception of the only bone anvil dated in the 16th century found in Hungary, a *Bos* radius (GÁL *et al*. 2010).

The preference for cattle metapodials is evident in the bone anvils dated between the 19th and the 21st centuries (total: 28), where the only exception is again an *Equus* tibia from Sassari (GRASSI 2010).

7.- DISCUSSION

With the new bone anvils mentioned in this paper, the number of such artifacts in Spain has considerably increased, with those from El Pelícano representing some of the oldest examples in the Iberian Peninsula. When we were looking for new evidence, we realized that this type of archaeological artifact is not well known to excavators, and sometimes the presence of bone anvils remains hidden in unpublished archaeological reports or it is never mentioned. Some of the bone anvils are easily distinguishable, because the bone was prepared before being used and the marks left by the chisel are very clear. However, when such preparation did not occur (which is typical of the examples dated to the Early Middle Ages), bone anvils are difficult to spot and only a close look to the shape and the distribution of the marks can help us identifying them. The gaps that we observe in the geographical distribution and chronologies of the bone anvils may be due to our limited knowledge of the real number and location of them. Hence, we believe it is necessary to search for them and ask excavators if they have ever found this kind of item.

Ethnography has proved to be of exceptional help for understanding the process of manufacturing bone anvils and the way they were used. Most of the economical and social inferences that we can make about bone anvils and toothed sickles also comes from ethnographic examples. On the one hand, some considerations about the work of blacksmiths can be made. Their work in this case was closely related to the butchers', who provided them the raw material that they required to make and repair the toothed sickles. The differences between techniques used in Roman times and those typical of the period afterwards, and also those following the progressive standardization

[6] The number of bone anvils made in equid bones from Sassari is surprisingly high, given that the total number of equid remains when compared to *Bos* is relatively small (pers. comm. E. Grassi).

and refinement of the technique that we can observe from the Early Middle Ages to the 20th century, were due to the social and economical characteristics of each period. The particularities of early medieval bone anvils make us think that blacksmiths may have been itinerant, as has been suggested for other artisans.

We can also mention some ideas about agricultural activities implied by the presence of bone anvils. The evidence of toothed sickles in archaeological excavations is scarce, but we know around 700 examples of bone anvils across Europe and northern Africa, and they can be seen as indirect proof of the presence of these tools. We hope that the catalogue of artifacts provided here will constitute a useful and updated source which will make the data more accessible. As we have mentioned above, serrated sickles are used for harvesting cereals leaving most of the straw on the field, so that livestock can be fed there afterwards, which would provide direct manure to the soil. Finally, we would like to highlight that ethnography suggests a strong connection of child and female labor with the use of small tools, such as serrated sickles, for harvesting.

In conclusion, we would like to emphasize the importance of bone anvils as indicators of economical activities that were of central importance to peasants' lives, such as ironwork and agriculture.

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			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**
Foix (Ariège)		13-14			2	8	1	8	3		1			1				24	Rodet-Belarbi *et al* (2007)
Montaillou (Ariège)		13-15						1					1					2	Rodet-Belarbi *et al* (2007)
Montesquieu Avantès (Ariège)		n.d.							1									1	Rodet-Belarbi *et al* (2007)
Pamiers (Ariège)		13-14			1	8		24	2	1	2			3		5		46	Rodet-Belarbi *et al* (2007)
Castelnaudary (Aude)		n.d.						1										1	Rodet-Belarbi *et al* (2007)
Couiza (Aude)		n.d.														2		2	Rodet-Belarbi *et al* (2007)
Lastours (Aude)		e. 12						1	2					1	1			5	Rodet-Belarbi *et al* (2007)
Limoux (Aude)		12-13						7	5							12		24	Rodet-Belarbi *et al* (2007)
Isle-Jourdain (Gers)		10-11	7		1	1				1						1		11	Rodet-Belarbi *et al* (2007)
Samatan (Gers)		11-12							1									1	Rodet-Belarbi *et al* (2007)
Clermont-le-Fort (Haut-Garonne)		13							1									1	Rodet-Belarbi *et al* (2007)
Cornebarrieu (Haute-Garonne)		medieval			4		4			1						1		10	Rodet-Belarbi *et al* (2007)
Martes-Tolosane (Haute-Garonne)		n.d.														2		2	Rodet-Belarbi *et al* (2007)
Mauvezin-de-l'Isle (Haute-Garonne)		12-14							1									1	Rodet-Belarbi *et al* (2007)
Muret (Haute-Garonne)		14						3	1									4	Rodet-Belarbi *et al* (2007)
Rieumes (Haute-Garonne)		10-12							3									3	Rodet-Belarbi *et al* (2007)
St-Laurent-sur-Save (Haute-Garonne)		12-14							1									1	Rodet-Belarbi *et al* (2007)
Toulouse (Haute-Garonne)		12-14	1		1			4	3		1							10	Rodet-Belarbi *et al* (2007)
Lourdes (Hautes-Pyrénées)		n.d.						1										1	Rodet-Belarbi *et al* (2007)
Tarbes (Hautes-Pyrénées)		12-14						3										3	Rodet-Belarbi *et al* (2007)
Béziers (Heráult)		e. 13-15						1	2									3	Rodet-Belarbi *et al* (2007)
Clermon-l'Hérault (Heráult)		medieval									1							1	Rodet-Belarbi *et al* (2007)
Paulhan (Heráult)		7-8	1				2					2						5	Rodet-Belarbi *et al* (2007)
Servian (Heráult)		n.d.						1								1		2	Rodet-Belarbi *et al* (2007)
Labrit (Landes)		14-15				5		6	22									33	Rodet-Belarbi *et al* (2007)
Canet (Pyrénées-Orientales)		12-14						1										1	Rodet-Belarbi *et al* (2007)
Elne (Pyrénées-Orientales)		12-14						2										2	Rodet-Belarbi *et al* (2007)
Perpignan (Pyrénées-Orientales)		Latemed.						1										1	Rodet-Belarbi *et al* (2007)
Cordes (Tarn)		15							3									3	Rodet-Belarbi *et al* (2007)
Lavaur (Tarn)		n.d.														1		1	Rodet-Belarbi *et al* (2007)
TOTAL	**France**		**9**		**9**	**22**	**7**	**65**	**51**	**3**	**5**	**2**	**1**	**5**	**1**	**25**		**205**	

			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**	
Beja		15-17				3		4										7	Rodet-Belarbi *et al* (2007)	
Freixo de Numão		medieval														2		2	Aguirre *et al* (2004)	
Cachopo, Tavira		n.d.														1		1	Moreno *et al* (2006)	
Mouraria, Lx		14-15				3		1										4	Rodet-Belarbi *et al* (2007)	
Palmela		15				1												1	Rodet-Belarbi *et al* (2007)	
Santarém		18-19				8		8								1		17	Rodet-Belarbi *et al* (2007)	
Sesimbra		n.d.				1												1	Rodet-Belarbi et al (2007)	
Sesimbra		n.d.														5		5	Moreno *et al* (2006)	
Silves		15-16														1		1	Moreno *et al* (2006)	
Silves		12-13	1	1	1	7	1	1		3	1		2	2		7		27	Moreno *et al* (2006)	
Torre Vedras		15-17				3	1	5										9	Rodet-Belarbi *et al* (2007)	
TOTAL	**Portugal**		**1**	**1**	**1**	**26**	**2**	**19**		**3**	**1**		**2**	**2**		**17**		**75**		

			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**	
Al-Basra		9-10	1		3,5		3,5		178						1			187	Benco *et al* (2002)	
TOTAL	**Morocco**		**1**		**3,5**		**3,5**		**178**						**1**			**187**		

			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**	
Béja		21															1	1	Moreno et al (2007)	Dromedary metatarsus
TOTAL	**Tunisia**																**1**	**1**		

			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**	
n.d.						4	1	3						2				10	Moreno et al (2007), pers. comm. E.	
Antipina																				
Olbia		Hellen.?														x			Beldiman *et al* (2010)	
Neapolis		Hellen.?														x			Beldiman *et al* (2010)	
Thanagoria		Hellen.?														x			Beldiman *et al* (2010)	
TOTAL	**Ukrania**					**4**	**1**	**3**						**2**				**10**		

			Bos							*Equus*										
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**	
Budapest (Fényes, Perc and Mókus st.)		10-13											1					1	Gál et al (2010)	
Hajdúnánás–Fürjhalom-dűlő		10-13						1										1	Gál et al (2010)	
Cegléd–Fertály-földek II		10-13		1	5		1			10	1	4	3				3	28	Gál et al (2010)	2 Bos pelvis, 1 Bos femur
Kolon		Early med														41		41	Gál et al (2010)	
Baj–Öreg-Kovács-hegy		16			1													1	Gál et al (2010)	
TOTAL	**Hungary**			**1**	**6**		**1**	**1**		**10**	**1**	**4**	**4**			**41**	**3**	**72**		

			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**	
Histria (Constanta)		2							1								1	2	Beldiman et al (2010)	Cervus antler
Histria (Constanta)		2-3							39									39	Beldiman et al (2010)	
Ostrov-Durostorum (Constanta)		n.d.															4	4	Beldiman et al (2010)	Cervus antler
Chitila (Ilfov)		n.d.															13	13	Beldiman et al (2010)	Cervus antler
TOTAL	**Romania**								**40**								**18**	**58**		

			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**	
Saharna Noua		n.d.															1	1	Beldiman et al (2010)	Cervus antler
TOTAL	**Moldavia**																**1**	**1**		

			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**	
Castello, A 1500, Sassari		16-17								2						1		3	Grassi (2010)	
Castello, A 1500, Sassari		16-17				1												1	Grassi (2010)	
Castello, A 1500, Sassari		16-17							1									1	Grassi (2010)	
Castello, A 1500, Sassari		16-17					1			2						1		4	Grassi (2010)	
Castello, A 1500, Sassari		16-17														1		1	Grassi (2010)	
Castello, A 600, Sassari		16-17								1								1	Grassi (2010)	
Castello, A 9000, Sassari		17					1						1			1		3	Grassi (2010)	
Castello, A 1000, Sassari		18-19											1					1	Grassi (2010)	
Ex-Infermeria S.Pietro, Ampliamento, Sassari		16-18												1				1	Grassi (2010)	
Pantanello, chora of Metaponto		2 BC-1 AD				1													Erika Gál (2010)	
TOTAL	**Italy**					**2**	**2**		**1**	**5**			**2**	**1**		**4**		**17**		

			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**	
Córdoba (Andalucía)		9-12														14		14	Rodet-Belarbi et al (2007)	
Motril (Andalucía)		13-15													1			1	Aguirre et al (2004)	
Sevilla (Andalucía)		11-12															1	1	Moreno et al (2007)	
Alcañiz (Aragón)		16-18														1		1	Rodet-Belarbi et al (2007)	
Ciudad Real (Castilla-La Mancha)		12														2		2	Rodet-Belarbi et al (2007)	
Ávila (Castilla y León)		13-15														2		2	Rodet-Belarbi et al (2007)	
Benavente (Castilla y León)		n.d.														14		14	Aguirre et al (2004)	
Zamora (Castilla y León)		16-18														1		1	Rodet-Belarbi et al (2007)	
Lleida (Cataluña)		12				1		1						1				3	Rodet-Belarbi et al (2007)	
Lleida (Cataluña)		m. 10-12						1			1							2	Rodet-Belarbi et al (2007)	
Lleida (Cataluña)		10-12														1		1	Aguirre et al (2004)	
Lleida (Cataluña)		n.d.														11		11	Aguirre et al (2004)	
Lleida (Cataluña)		m. 12-13														1		1	Rodet-Belarbi et al (2007)	
Lleida (Cataluña)		14-15							1									1	Rodet-Belarbi et al (2007)	

			Bos							*Equus*									
Site	**Country**	**Chron.**	**Md.**	**Hu.**	**Ra.**	**Mc.**	**Ti.**	**Mt.**	**Mp.**	**Ra.**	**Mc.**	**Pe.**	**Ti.**	**Mt.**	**Mp**	**Ind.**	**Oth.**	**TOTAL**	**Reference**
Lleida (Cataluña)		e. 16-17						1	1									2	Rodet-Belarbi et al (2007)
Lleida (Cataluña)		n.d.				1		1										2	Rodet-Belarbi et al (2007)
Olèrdola (Cataluña)		9-12														9		9	Aguirre et al (2004)
Tarragona (Cataluña)		e. 13						1			1				1			3	Rodet-Belarbi et al (2007)
Tarragona (Cataluña)		e. 14-m.15						1										1	Rodet-Belarbi et al (2007)
Tarragona (Cataluña)		medieval										1						1	Rodet-Belarbi et al (2007)
Tarragona (Cataluña)		n.d.				1			1							1		3	Rodet-Belarbi et al (2007)
Calahorra (La Rioja)		medieval														1		1	Rodet-Belarbi et al (2007)
Buzanca (Madrid)		5-6					1											1	Moreno et al (2006)
Colmenar Viejo (Madrid)		16-18														1		1	Rodet-Belarbi et al (2007)
Pamplona (Navarra)		n.d.														X			Aguirre et al (2004)
Alicante (Valencia)		19-20														3		3	Rodet-Belarbi et al (2007)
Gandía (Valencia)		13-15														2		2	Rodet-Belarbi et al (2007)
Gandía (Valencia)		16-18														3		3	Rodet-Belarbi et al (2007)
Valencia (Valencia)		11-12														3		3	Rodet-Belarbi et al (2007)
Valencia (Valencia)		e.13						1							1			2	Esteban y Carbonell (2004)
Valencia (Valencia)		16-18														4		4	Rodet-Belarbi et al (2007)
Játiva (Valencia)		20														x			Aguirre et al (2004)
Arrasate-Mondragón (Basque C.)		19-20							9									9	Aguirre et al (2004)
San Sebastián (Basque C.)		19-20														2		2	Aguirre et al (2004)
San Sebastián (Basque C.)		n.d.														X			Aguirre et al (2004)
Segovia (Castilla y León)		medieval								1								1	Rodet-Belarbi et al (2007)
Baltanás (Castilla y León)		medieval				x													Martín and San Gregorio (2011)
Catedral Vitoria-Gasteiz (Basque C.)																X			Azkárate andSolaun (2009)
Zapatari 33, Salvatierra (Basque C.)		19-20														1		1	Grau (2009)
Zapatari 33, Salvatierra (Basque C.)		e. 13-14				1												1	Grau (2009)
Zapatari 33, Salvatierra (Basque C.)		13-14							1									1	Unpublished
Zapatari 33, Salvatierra (Basque C.)		14-16						1	1									2	Unpublished
Zapatari 35, Salvatierra (Basque C.)		19				1			1									2	Unpublished
Aistra (Basque C.)		10							1							1		2	Unpublished
Siervas de Jesús, Vitoria-Gasteiz (Basque C.)		16-19							1									1	Unpublished
Diputación, Vitoria-Gasteiz (Basque C.)		n.d.				1												1	Unpublished
Diputación, Vitoria-Gasteiz (Basque C.)		17-19							1									1	Unpublished
Pintorería, Vitoria-Gasteiz (Basque C.)		14-16													1			1	Unpublished
Correría/Zapatería, Vitoria-Gasteiz (Basque C.)		Latemed.				1												1	Unpublished
Herrería, Vitoria-Gasteiz (Basque C.)		e. 14													1			1	Unpublished
Txikita, Vitoria-Gasteiz (Basque C.)		14				1			1									2	Unpublished
Txikita, Vitoria-Gasteiz (Basque C.)		Postmed.							2									2	Unpublished
El Campillo, Vitoria-Gasteiz (Basque C.)		n.d.							2									2	Unpublished
El Pelícano (Madrid)		b. 6					1						1			2		4	Unpublished
El Pelícano (Madrid)		e. 5					2									3		5	Unpublished
El Pelícano (Madrid)		m. 5-m. 6				1										1		2	Unpublished
El Pelícano (Madrid)		e. 6														2		2	Unpublished
El Pelícano (Madrid)		superficial														1		1	Unpublished
El Pelícano (Madrid)		e.5-7														1			Unpublished
TOTAL	**Spain**					**9**	**1**	**26**	**9**		**3**		**1**	**3**	**3**	**88**	**1**	**144**	

Tabla 2: Catalogue of the bone anvils recovered until now in Europe and Northern Africa. Md.: mandible; Hu.: humerus; Ra.: radius; Mc.: metacarpus; Ti.: tibia; Mt.: metatarsus; Mp.: metapodial; Pe.: pelvis; Ind.: indetermined (either taxon or element); Oth.: other. b.: beginning; m. mid; e.: end.