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Research Article

Macrofaunas of the Tabacalera Well-Deposit (Gijón, Asturias): Study of Units 83B-F

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Abstract

It analyzes the macrofauna of five stratigraphic units (83B-F) basal level of the well-cistern site Tabacalera. Coincidences and differences between units are detected, also when compared with those of the only unit studied to date (83A). The coincidences show a homogeneity of the basal level that points to a common history of the same, while the differences point to a sedimentation of remains dictated by their size (weight) that has made it possible to refine the nature of the deposit and the conditions in which produced the accumulation of skeletal remains.

Keywords: Archaeological Fauna; Mammals; Asturias; Edad Media; Taphonomy

Introduction

Archaeozoology deals with the study of the remains of animals recovered in archaeological sites. This study incorporates both macro and microscopic analyses of remains, analyses that also include molecular ones in a wide range of modalities (DNA, isotope, proteomic), as well as taphonomic, historiographic and experimental analyses with skeletal remains of everything. guy.

The objective of this research contemplates a slope that we could call biological and another of a more specifically anthropological nature. From the biological point of view, archaeological faunas report aspects related to the evolution and biogeography of animal species (introductions, extinctions, domestication, racing, etc.) and others such as bio-indication, where faunas serve to infer the evolution of the landscape, changes in climatology or the existence of pathogens and diseases. The anthropological aspects of this research are equally important. The use, consumption and domestication of different species makes it possible to investigate the interaction between humans and animals at specific times and places, but also over long periods of time in territories that go beyond the scope of the lime. The issues addressed are multiple and cover the three areas of human societies such as subsistence (consumption, productive economies), social (stratification, stratification, mobility, commerce) and the symbolic that concerns both religious aspects, for example, those related to the funerary and identity [23,28].

Being the organic remains the basis on which the archaeological research is based and the site the context where much of the physical evidence is obtained, a fundamental problem in archaeozoology is to know to what extent what is recovered (exdug) in a certain deposit, is representative of it. The representativeness of a sample is more difficult to determine if the deposit is very large and "open", which forces the selection of contexts. The content of "closed" deposits such as tombs, amphorae or sterquiliniums is usually studied in its entirety, so the problem of sample representativeness disappears. However, large-scale closed deposits, such as cisterns, wells or cisterns, often require excavations or partial studies of materials, which brings us back to the problem of representativeness on which there is abundant work [5,19,20].

In this TFG a closed but large deposit is studied, and the problem of sample representativeness is minimized little by little, as the different excavation subunits that configured it are studied.

The tabacalera deposit

The building of the old Tobacco Factory (Tabacalera, from now on) was built, after the confiscation of Mendizábal in the mid-nineteenth century, on the convent of the Augustinian Recollects. This, in turn, was built in the late seventeenth century in the tombolo of Cimadevilla, which represents the founding area of the current city of Gijón in time of Octavian Augustus (first century AD).

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The excavation campaigns from which these materials come took place between 2008-2009 in the cloister area of the old convent, although they were extended punctually until the end of 2018. As a result of these, remains of Roman civil constructions were discovered at the base of the convent, among which a watchtower stands out. Abandoned by the Romans at the end of the fifth century or the beginning of the sixth (12), the base of the tower was initially converted into a well-cistern for the supply of drinking water, both through the Cimadevilla aquifer and rainwater. From the sixth century it is postulated that this function is abandona, being then when the deposit presumably acquired its character of dump-muladar. It is speculated that the tower collapsed over the well sometime in 1390 AD, during the siege of the city by the troops of the Count of Noreña. From At that time, the deposit record was sealed until its detection. The walls, about six meters on each side, are provided with interior buttresses that helped to keep the deposits intact, as well as to ensure anoxia conditions that have made it possible to preserve the numerous organic remains in perfect condition [6,7,18,22,17].

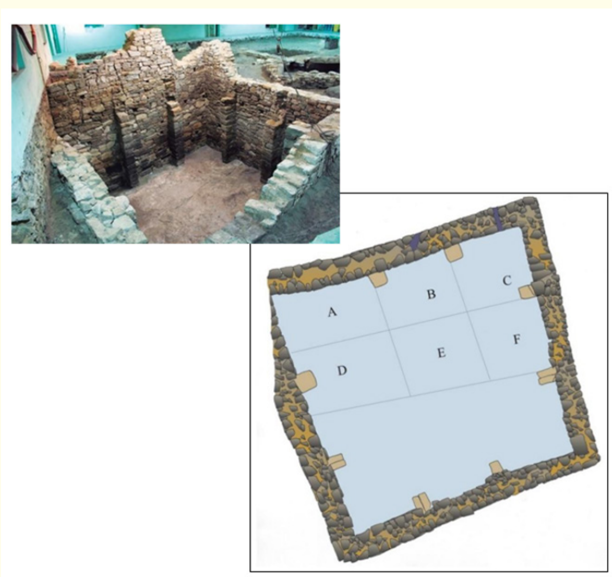

Figure 1: A. Overview of the well-tank. B. Distribution of baseline-level subunits (Taken from) [7].

The fauna of the well-deposit is one of the most relevant of the peninsular Middle Ages due to the richness of its record [9,16,17,25]. These works showed that, in addition to being rich, the fauna of Tabacalera represents a diversified set in terms of taphonomic trajectories that, in addition to the traditional remains of consumption, incorporates numerous carcasses, as well as intrusive fauna and native fauna of the Community that originally inhabited the S waters of the cistern (the so-called "*background fauna*" *sensu* Kenward, 1975 [8,13] (Figure 2).

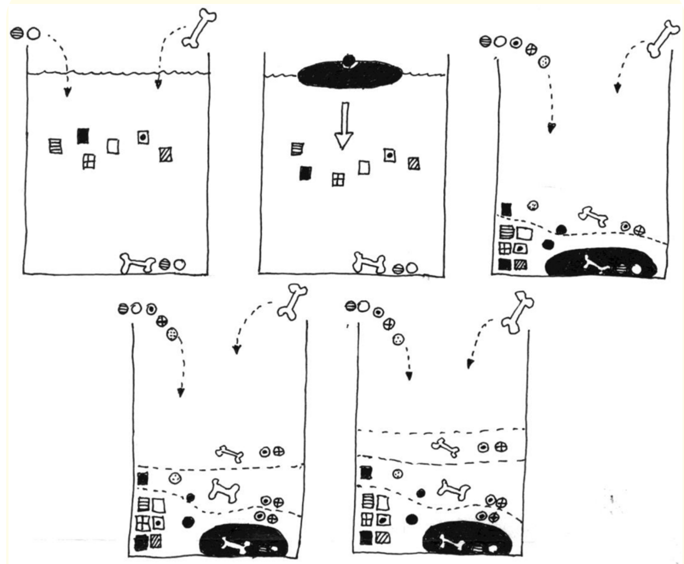

Figure 2: Genesis of the deposit of the well-cistern of Tabacalera according to the information provided by fauna A. In the functional cistern flourished a freshwater community of invertebrates, including bryozoans, mites, ostracods and insects (squares) where occasionally there would be punctual entries of small vertebrates (white circles), eggs of parasitic worms (circles with horizontal striping) and remains of consumed fauna (bone). B. The entry of bulky corpses (black ellipse) and presumably associated cadaveric fauna (black spot) breaks this balance and will determine, already in the same stratigraphic unit (EU)26 (basal), the death of most of these microinvertebrates except for those more resistant to pollution (chironomids, black squares). C. Associated with this event, we infer a drastic drop in the level of water that from the EU26 itself is manifested by a massive entry of terrestrial microinvertebrates, such as coleoptera (circles with black dot), mites (circles with crosses) and pulmonates (dotted circles). D. With the exception of chironomids, the EU25 is characterized by the dominant role of intrusive terrestrial faunas and minimal presence of consumed fauna, a process that will be accentuated in the EU24, where the fauna consumed will be anecdotal and the intrusive will reach 99.9% of the total registered (E) [21].

As a result of the anaerobic environment and the slightly acidic pH at which the deposits have formed and maintained, the bones are in an excellent state of preservation [17,18]. Therefore, in addition to bones and shells, remains of seeds, leather, as well as the largest collection of mites recovered at any European site have been found in Tabacalera [9,10,18].

A remarkable fact of this deposit is that both conventional archaeological materials (ceramics, furniture, footwear) and some sectors of the fauna point to an upper class social stratum (nobility?), where the rare and appreciated seems to be norm. Among the remains of feeding highlights certain hunting fauna and molluscs such as oysters and tritones, now disappeared from the Asturian coasts. The clearest marker of status among mammals is the mongoose, where the presence of a juvenile also points to a breeding process in captivity conditions that is usually an identity feature of the Iberian medieval ites [17]. In view of all this, and the strategic place where the cistern was located, it does not seem to make sense to ruin it, whether it was the action of the elite that presumably controlled the water supply or the countrymen who needed drinking water for their subsistence. Both evidences, combined, reinforce the idea of a final episode very short in time that, however, generated an enormous amount of material evidence [17].

There are two proposals to explain the formation of the archaeological deposit that fills this well-cistern, as the excavators have called it. The first, offered in one of the works of the aforementioned monograph, proposes an abrupt discontinuity: "once the well ceased to fulfill its function [...] The structure was abandoned-da." Therefore, "the contents of the well-deposit [...] is the result of the abandonment of this structure, converted into a rubble dump from the late fifth century.

A.D. or early VI A.D. The materials [...] were deposited at different times [...] within a chronological arc that goes from the sixth to the eighth century" [7].

The rereading of the register subsequently carried out by Alfonso Vigil-Escalera raises a non-gradual scenario of deposit formation: "... If we assume that these deep strata [...] were signed as a result of a short-lived event" and "... that the eventtrigger for its amortization had a high probability of occurring during the last third of the... [eighth century]" [27]. A recent taphonomic study of fauna supports this alternative (Figure 2).

The two hypotheses of genesis of the deposit carry different implications, also at the level of the fauna. Thus, if, as the excavators maintain, the contents of the deposit were the result of the abandonment of the structure and were spread over a time frame of two centuries, one would expect a remarkable heterogeneity in terms of composition.

(Spectrum) of the fauna to be contemplated multitude of accumulation events of very different nature. Thus, far from expecting a slow trickle of the same taxa at all times, in stages of greater activation of the garbage dump one would expect a greater contribution of domestic fauna, while, at times of less activation the intrusive fauna of small size would predominate, such as birds, commensal rodents and certain vermin. In fact, this same variability could be expected within each phase because at some times people would throw food scraps (cattle, sheep, pigs) in so many that in others they would take pets, mules, etc. Similarly, in periods of low landfill activity, intrusive faunas would present different contributions from rodents, birds, vermin, etc. In other words, in this scenario, heterogeneity would have been the dominant note.

Yes, on the contrary, as pointed out by Vigil-Escalera (2018) [27] and the recent taphonomic analysis by Morales., *et al.* (in press) [21] (Figure 2) evidence, most of the fauna accumulated in a short period of time ("instantaneous"), one would expect a remarkable level of homogeneity not only at the level of faunal spectra (species), but also at the level of the characteristics of each species both at the level of their morphology, their sizes or the age of the specimens.

This study is carried out mainly to check whether the faunas of the basal level of Tabacalera exhibit homogeneity or heterogeneity. To carry it out, there is a first sample studied that corresponds to one of the six subunits in which this basal level was divided (called by the excavators as UE26) (Figure 1). This sample, which corresponds to subunit 83A, has analysis of the faunas of mammals, birds, fish, molluscs, mites, ostracods, cirrípeds, decapods, insects, bryozoans, flatworms and nematodes [9,10,16,17,25]. Archaeozoological investigations focused on it because it is the subunit where the highest concentration of remains were detected (more than 14,000 studied to date). This subunit will serve as an "expected value" to compare the results obtained in the remaining four subunits contemplated by this work.

Objectives

This paper deals with the analysis of the fauna of four batches of the EU 83/26 (83B, 83C, 83D and 83E), contemporaneous to 83A. There are three sets of objectives to be achieved:

- Descriptive, referring, first, to the analysis of vertebrates recovered in the four unstudied subunits of the basal level of the Tabacalera well-reservoir. In addition to identification, this will involve evaluating the morphology, osteometry, age and sex of macromammals, as well as quantifying their abundances. The key part of this descriptive will be the assignment of taxa within taphonomic "groups" to each set.
- Comparative, in order to contrast to what extent the faunas coincide or differ from those previously studied in lot 83A, for which we will resort to statistical tests. The comparison, where possible, will also be carried out by evaluating complementary parameters, such as the biometrics of the specimens of the samples studied here, and those of subunit 83A.

- Evaluative, to check to what extent the homogeneity/heterogeneity of the samples allows to confirm the hypothesis that considers all the fauna of the basal level product of a point genesis (instantaneous) of the deposit, or the alternative of a dilated genesis, according to its use as a landfill.

Material and Methods

The entire Tabacalera site has been studied on the basis of stratigraphic units, understood as homogeneous sedimentary assemblages where their components, including archaeological materials, are, for all intents and purposes, contemporaries [4].

Generically, the materials studied come from the excavations of the campaigns of 2008 and 2009, specifically from one of the two main levels under the collapse of the tower that corresponds to the stratigraphic unit 83 (UE83) ascribed to moments of the end of the century VII AD (that is, at the beginning of the Middle Ages). This EU, formed of rounded gravels immersed in a matrix of hyper-hydrated silts and clays of dark gray tonality [12], sits directly on the stone blocks that form the base of the well and has a power of between 50-75 cm. The EU was divided into six 2×2 meter lots identified as 83A, 83B, 83C, 83D, 83E and 83F. Lot 83A was published by Llorente., *et al.* (2015a) [16] while 83F, since this work focuses on the macrofauna of mammals (mainly domestic, but also wild carnivores), was discarded as containing only remains of microfauna reflecting then only the data on the number of pieces. For practical purposes, the present work refers on multiple occasions to the EU 83 although within this nomenclature subunit 83A has not been taken into account. All the remains come from Sector 20 of the excavation.

The recovery of the remains was carried out manually and by sifting, and the identification of the pieces was carried out through the comparative collection of the Archaeozoology Laboratory of the Autonomous University of Madrid.

Two methods were used to quantify remains: the Number of Remains (NR) and the Minimum Number of Individuals (NMI). Since different authors apply different criteria to calculate the NMI, to obtain this second estimator, both the number and size of the remains within each bone category were taken into account and, in those cases where this was feasible, data on the age of the Specimens.

The measurements follow the criteria of Driesch (1976) [2] adapted to Spanish by de Miguel and Morales (1984) [1]. As a rule, only pieces corresponding to adults (that is, with their somatic growth completed) and not deteriorated are measured. It happens that such a practice would mean that the vast majority of potentially measurable pieces in the samples would not be measured (for example, in many portions of bone with their epiphyses fused it is unknown whether the missing portion was also fused or not). For this reason, and given that what is potentially measurable is usually a minimum fraction of what is identified, the whole set was measured, taking into account those values that, for different reasons, must be taken with caution. In all cases the measurements were made with a Power fix® digital gauge and are calculated in millimeters with an estimated maximum error of ±0.1 mm.

In mammals with marked sexual dimorphism, caso of all uniparous, for sex determination the remains of the pelvis and neurocranium were compared with specimens of the reference collection.

The breakdown of the samples into taphonomic groups meets the criteria offered by Gautier in 1987 [8], to which others have been incorporated referring to the types of traces of use that are explicit in the works of Ripoll (1992) [24] and Liesau (1998) [14], following the method used in previous analyses at this site [16].

The height of the sheep withers from the maximum lateral length (LML) of the talus was estimated by applying Teichert factors [3].

For the most frequent taxa, a statistical analysis based on chi-square tests explored the coincidences and differences between batches and also with lot 83A already published. In the case of the dog, this test was used to evaluate the skeletal profiles between said lot 83A and the set 83B-E studied here. In this case, to facilitate the comparison of samples, the bone categories of this trabajo (Table 8) were readjusted to those that were once used in lot 83A [16] (Table 11).

Results

Tables 1-3 provide a breakdown of the fauna samples analyzed. These are limited samples that, at most, reach a few hundred remains.

These remains are not distributed homogeneously since the richest lot (83D) quintuples the values of the poorest (83E) while 83B, composed exclusively of mammalian remains, is the least diversified, presenting the lots 83C, 83D and 83E four other fauna categories (birds, amphibians, fish and cirripeds in different combinations) and lot 83F another (amphibians) in addition to mammals (Table 1). It is noteworthy that in no batch appeared mollusks. Taken as a whole, the 641 remains of mammals account for 75% of what has been studied, which would rise to 89% if only the identified remains are considered (724).

Group	83B	83C	83D	83E	83F	TOTAL
Mammals	219 (100)	189 (76,8)	144 (56,0)	37 (75,5)	52 (63,4)	641 (75,1)
Poultry	-	28 (11,4)	24 (9,3)	4 (8,2)	-	56 (6,6)
Amphibians	-	1 (0,4)	-	-	23 (28,0)	24 (2,8)
Pieces	-	-	2 (0,1)	-	-	2 (0,2)
Cirrípedos	-	-	-	1 (2,0)	-	1 (0,1)
YES	-	28 (11,4)	87 (33,9)	7 (14,3)	7 (8,5)	129 (15,1)
TOTAL	219 (25,7)	246 (28,8)	257 (30,1)	49 (5,7)	82 (9,6)	853 (100)

Table 1: General relationship of NR and its percentage, in parentheses, of the batches of the EU 83 analyzed in this work. SI: Unidentified.

Taxon	NR (%)	NMI (%)	NR/NMI	
Equidae (*Equus* sp.)	2 (0,3)	1 (2,0)	2,0	
Vaca (*Bos taurus)*	9 (1,4)	2 (3,9)	4,5	
Sheep (*Ovis aries)*	20 (3,1)	3 (5,9)	6,6	6,8
O/C (Sheep/Goat)	74 (11,5)	7 (13,7)	10,6	
Cabra (*Capra hircus)*	19 (3,0)	6 (11,8)	3,2	
Pork (*Sus* sp.)	59 (9,2)	4 (7,8)	14,8	
Dog (*Canis familiaris)*	318 (49,6)	14 (27,5)	22,7	
Cat (*Felis catus)*	26 (4,1)	5 (9,8)	5,2	
Hedgehog (*Erinaceus europaeus)*	3 (0,5)	1 (2,0)	3,0	
Mouse (*Talpa occidentalis)*	1 (0,2)	1 (2,0)	1,0	
Rodent (*Rodentia)*	75 (11,7)	-	-	
Badger (*Meles meles)*	1 (0,2)	1 (2,0)	1,0	
Meloncillo (*Herpestes ichneumon)*	1 (0,2)	1 (2,0)	1,0	
Zorro (*Vulpes vulpes*)	33 (5,1)	5 (9,8)	6,6	
TOTAL	641 (100)	51 (100)	-	

Table 2: General relationship of remains (NR) and NMI of mammals with their respective percentages, as well as the relationship NR / NMI of the EU 83 analyzed in this work. The NR/NMI ratio provides an average for all sheep, O/C and goats.

Taxon	83Ba	83Bb	83Ca	83Cb	83Of	83Db	83Ea	83Eb	83Fa	83Fb
Equidae	-	-	2 (1,1)	1 (7,1)	-	-	-	-	-	-
Cow	8 (3,7)	2 (10,0)	-	-	-	-	1 (2,7)	1 (13,0)	-	-
Sheep	9 (4,1)	2(10,0)	1 (0,5)	-	10 (7,0)	1 (16,7)	-	-	-	-
O/C	23 (10,5)	2 (10,0)	20 (10,6)	2 (14,3)	24 (16,7)	1 (16,7)	7 (18,9)	2 (25,0)	-	-
Goat	8 (3,7)	2 (10,0)	9 (4,8)	3 (21,4)	2 (1,4)	1 (16,7)	-	-	-	-
Pig	4 (1,8)	2 (10,0)	44 (23,3)	2 (14,3)	8 (5,6)	-	3 (8,1)	1 (13,0)	-	-
Dog	126 (57,5)	5 (25,0)	108 (57,1)	5 (35,7)	74 (51,4)	2 (33,3)	10 (27,0)	2 (25,0)	-	-

Cat	19 (8,7)	2 (10,0)	-	-	-	-	7 (18,9)	2 (25,0)	-	-
Hedgehog	-	-	-	-	-	-	-	-	3 (5,8)	(+)
Top	-	-	-	-	-	-	1 (2,7)	(+)	-	-
Rodent	-	-	1 (0,5)	(+)	17 (11,8)	(+)	8 (21,6)	(+)	49 (94,2)	(+)
Badger	-	-	1 (0,5)	(+)	-	-	-	-	-	-
Ichneumon	-	-	1 (0,5)	(+)	-	-	-	-	-	-
Fox	22 (10,0)	3 (15,0)	2 (1,1)	1 (7,1)	9 (6,3)	1 (16,7)	-	-	-	-
TOTAL	219	20	189	14	144	6	37	8	52	(+)

Table 3: General breakdown of mammals in the batches analysed according to NR(a) and NMI(b) (percentage values in parentheses) (+): NMI has not been estimated.

Limiting itself to mammals, it is observed that, both taking samples together (Table 2) and in individualized batches (Table 3), the abundance of dog remains (50% of identified mammals) is remarkable, which, like cats, they would represent companion animals (pets) and not evidence of fauna with asumida, the dominant in anthropic garbage dump-type deposits [23].

The fauna that is supposed to be consumed (cattle, pigs and sheep), on the other hand, barely reaches 30% of what is identified, although it rises to 43% if what is taken into account is the minimum number of individuals (Table 2). However, these global values do not reflect the differences that exist in the contributions of this fauna in the different lots.

Thus, while the values of the NR of fauna consumed vary (with a downward trend) from lot 83C: 39% (83D: 31%; 83E: 30%; 83B: 24%) up to lot 83F lacking these (Table 3). What these changing abundances of consumed fauna reflect is the existence of a gradient that would be good to verify by alternative routes.

Before proceeding to this, the faunas studied continue to be broken down into functional groups.

Element	Cow	Sheep	O/C	Goat	Pig	Dog	Cat	Fox	TOTAL
Neurocranium	-	-	-	-	-	3	2	2	7
Visceroskull	-	-	1	-	-	2	-	-	3
Served	-	-	2	-	-	7	1	-	10
Jaw	3	-	1	-	-	2	-	-	6
Atlas	-	-	2	-	-	3	1	-	6
Axis	-	-	1	-	-	1	-	-	2
V. cervical	-	-	-	-	-	12	-	1	13
V. thoracic	-	-	-	-	-	11	3	-	14
V. lumbar	-	-	1	-	-	13	-	7	21
V. sacra	-	-	-	-	-	1	1	-	2
V. caudal	-	-	-	-	-	1	8	-	9
Rib	-	-	1	-	2	49	-	-	52
Esternebra	-	-	1	-	-	1	1	-	3
Scapula	-	-	-	-	-	3	-	1	4
Humerus	-	1	-	-	1	1	1	-	4

Radio	-	-	-	-	-	-	1	1	2
Ulna	1	-	-	-	-	2	-	-	3
Carpus	-	1	-	-	-	-	-	-	1
Metacarpus	-	2	-	2	-	-	-	4	8
Pelvis	-	-	1	-	-	1	-	1	3
Thighbone	3	-	5	-	-	2	-	1	11
Tibia	1	-	-	-	-	1	-	1	3
Patela	-	1	1	-	-	1	-	-	3
Calcaneus	-	1	-	2	-	1	-	-	4
Tarsus	-	1	2	-	-	1	-	-	4
Metatarsus	-	-	-	2	-	2	-	3	7
Metapodio	-	-	-	-	1	-	-	-	1
Phalanx 1	-	2	2	1	-	3	-	-	8
Phalanx 2	-	-	-	1	-	1	-	-	2
Phalanx 3	-	-	2	-	-	1	-	-	3
TOTAL	8	9	23	8	4	126	19	22	219

Table 4: Skeletal breakdown of macromammals in lot 83B.

Element	Sheep	O/C	Goat	Pig	Dog	Fox	TOTAL
Neurocranium	-	-	-	2	2	-	4
Visceroskull	-	1	-	3	1	-	5
Served	-	2	-	2	-	-	4
Jaw	-	7	-	3	-	-	10
Hioide	-	1	-	-	-	-	1
Atlas	-	1	-	-	1	-	2
Axis	-	-	-	1	2	-	3
Cervical vertebra	-	-	-	2	15	-	17
Thoracic vertebra	-	-	-	5	14	1	20
Lumbar vertebra	-	-	-	3	13	-	16
Caudal vertebra	-	-	-	-	1	-	1
Rib	-	-	-	5	32	-	37
Esternebra	-	3	-	1	-	-	4
Scapula	-	2	1	-	1	-	4
Humerus	-	-	-	3	2	-	5
Radio	-	-	-	3	3	-	6
Ulna	-	-	2	1	1	1	5
Carpus	-	2	-	3	-	-	5
Metacarpus	-	-	1	-	6	-	7
Pelvis	-	1	-	-	-	-	1
Fibula	-	-	-	-	2	-	2

Patela	-	-	-	-	1	-	1
Calcaneus	-	-	-	-	2	-	2
Anklebone	-	-	1	-	-	-	1
Metatarsus	-	-	1	-	-	-	1
Metapodio	-	-	-	4	-	-	4
Phalanx 1	1	-	2	2	3	-	8
Phalanx 2	-	-	1	-	-	-	1
Phalanx 3	-	-	-	1	-	-	1
Other	-	-	-	-	6	-	6
TOTAL	1	20	9	44	108	2	184

Table 5: Skeletal breakdown of macromammals in lot 83C.

Element	Sheep	O/C	Goat	Pig	Dog	Fox	TOTAL
Neurocranium	1	9	1	6	4	1	22
Visceroskull	-	4	-	-	3	-	7
Served	-	3	-	-	8	-	11
Jaw	-	-	-	-	1	-	1
Axis	-	-	-	-	1	-	1
V. cervical	-	-	-	-	5	-	5
V. thoracic	-	-	-	-	10	1	11
V. lumbar	-	2	-	-	1	3	6
Rib	-	-	-	2	19	1	22
Scapula	-	1	-	-	1	-	2
Humerus	1	-	-	-	-	-	1
Radio	-	-	-	-	1	-	1
Ulna	-	1	-	-	-	-	1
Carpus	-	1	-	-	5	-	6
Metacarpus	1	-	-	-	2	2	5
Pelvis	2	1	1	-	-	-	4
Tibia	-	-	-	-	1	-	1
Patela	-	1	-	-	1	-	2
Calcaneus	1	-	-	-	1	-	2
Anklebone	1	-	-	-	-	-	1
Tarsus	1	-	-	-	-	-	1
Metatarsus	-	-	-	-	3	1	4
Phalanx 1	2	-	-	-	5	-	7
Phalanx 2	-	-	-	-	2	-	2
Phalanx 3	-	1	-	-	-	-	1
TOTAL	10	24	2	8	74	9	127

Table 6: Skeletal breakdown of macromammals in lot 83D.

Element	Cow	O/C	Pig	Dog	Cat	TOTAL
Jaw	-	-	-	-	1	1
Axis	-	1	-	-	-	1
Cervical vertebra	-	-	1	1	-	2
Caudal vertebra	-	-	1	2	-	3
Rib	-	1	-	-	2	3
Humerus	-	-	-	2	-	2
Ulna	-	-	-	1	1	2
Metacarpus	-	-	1	-	1	2
Pelvis	-	1	-	-	-	1
Thighbone	-	1	-	-	-	1
Tibia	1	1	-	-	1	3
Patela	-	1	-	-	-	1
Calcaneus	-	-	-	1	-	1
Anklebone	-	1	-	-	1	2
Metatarsus	-	-	-	2	-	2
Other	-	-	-	1	-	1
TOTAL	1	7	3	10	7	28

Table 7: Skeletal breakdown of macromammals in lot 83E.

In this way, a punctual contribution of the mules in lot 83C is verified without the fragments of sacral vertebra and pelvis (Table 8) to determine whether the equine in question is a horse, an ass, a mule or a brothy (Table 3). What does seem clear is that, within wild mammals, the mongoose represents a pet because it is a foreign species that was found in previous analyses [15]. In front of this, it is possible that the remaining domestic mammals represent intrusive fauna that "contaminates" the deposit at different times (Figure 2). This would bring the functional groups to four (i.e., mules, pets, vermin/intrusive fauna, and consumed fauna). Skeletal spectra with the help of age data and anthropic traces on bone surfaces will help to confirm or refute this hypothesis.

Tables 4-7 break down the skeletal profiles of macromammals (that is, except mole, hedgehog, mongoose, badger and rodents) in each of the lots where their presence is recorded, while Table 8 groups these evidences for the total sample.

Element	Equidae	Cow	Sheep	O/C	Goat	Pig	Dog	Cat	Fox	TOTAL
Neurocranium	-	-	1	9	1	8	9	-	3	31
Visceroskulls	-	-	-	6	-	3	6	2	-	17
Served	-	-	-	7	-	2	15	-	-	24
Jaw	-	3	-	8	-	3	3	2	-	19
Hioide	-	-	-	1	-	-	-	-	-	1
Atlas	-	-	-	3	-	-	4	-	-	7
Axis	-	-	-	2	-	1	4	1	-	8
V. cervical	-	-	-	-	-	2	32	-	1	35
V. thoracic	-	-	-	-	-	6	36	-	2	44
V. lumbar	-	-	-	3	-	3	27	3	10	46
V. sacra	1	-	-	-	-	-	1	-	-	2
V. caudal	-	-	-	-	-	1	4	1	-	6
Rib	-	-	-	2	-	9	100	10	1	122
Esternebra	-	-	-	4	-	1	1	-	-	6
Scapula	-	-	-	3	1	-	5	1	1	11

Humerus	-	-	1	-	-	4	5	-	-	10
Radio	-	-	1	-	-	3	4	1	1	10
Ulna	-	1	-	1	2	1	4	2	1	12
Carpus	-	-	-	3	-	3	5	-	-	11
Metacarpus	-	-	2	-	3	1	8	1	6	21
Pelvis	1	-	4	4	1	-	1	-	1	12
Thighbone	-	3	-	6	-	-	2	-	1	12
Tibia	-	2	-	1	-	-	2	1	1	7
Fibula	-	-	-	-	-	-	2	-	-	2
Patela	-	-	-	3	-	-	3	-	-	6
Calcaneus	-	-	2	-	2	-	5	-	-	9
Anklebone	-	-	2	1	1	-	-	1	-	5
Tarsus	-	-	1	2	-	-	1	-	-	4
Metatarsus	-	-	1	-	3	-	7	-	4	15
Metapodio	-	-	-	-	-	5	-	-	-	5
Phalanx 1	-	-	3	2	3	2	11	-	-	21
Phalanx 2	-	-	2	-	2	-	3	-	-	7
Phalanx 3	-	-	-	3	-	1	1	-	-	5
Other	-	-	-	-	-	-	7	-	-	7
TOTAL	2	9	20	74	19	59	318	26	33	560

Table 8: Skeletal breakdown of macromammals from the set of lots analyzed in this work.

Although the skeletal breakdowns show that, in general, the larger the sample, the greater the number of bone categories, ovicaprines show complementary profiles with sheep and goats, being mainly represented by elements of the axial eto skeel (skull, teeth, vertebrae) while goat and sheep are represented by elements of the appendicular skeleton (Tables 4-8). However, it is the dog that presents the most balanced skeletal profiles, not only because of the number of categories but because the distribution of these fits better than in any other taxon to the frequencies that would be expected in a complete skeleton (Table 8). In ovicaprines taken together, the bones of the hands and feet (carpus, tarsus, metapodia and phalanges) account for 27% of the NR as mandible, teeth and skull account for around 33%, with the main flesh-bearing bones (vertebrae+ribs=9%) being underrepresented (Table 8). The same happens with the pig, where it is notable the overabundance of cranial elements (more than 27% of the total pieces) and the absence of bones of the hind leg (Table 8). These profiles show that the dogs were incorporated whole into the deposit, while the fauna consumed was more biased, which would be reflecting a differential waste of the parts depending on their use for consumption (elimination of vertebrae and ribs in the case of goats and sheep or bones of the posterior stop of the pig, outside the site). In the less frequent species the samples are so diminished that they do not allow a reading of the data, but with the above it seems clear that there are two differentiated sets, that of the animals not consumed (complete skeletons and balanced skeletal profiles) and that of the animals consumed (skeletons incomplete/biased and unbalanced skeletal profiles).

Another variable that discriminates between what is consumed and not consumed is the traces of use. Cutting and processing marks do not appear in the more than 300 dog remains while they are not uncommon in ovicaprines (Figure 4). The same applies to combustion traces which, although scarce, are restricted to species that are supposed to be the object of consumption (Figure 3). The NR/NMI ratio warns about the presence of complete skeletons with a much higher value in dogs (22.7) than in sheep (3.2-10.6) and pigs (14.8) (Table 2).

With regard to the ages of the different schools, Table 9 shows a remarkable fact such as the relative abundance of non-adult cohorts (juveniles and children) compared to adults. Despite the fact that the samples have been reduced (only 49 remains have been evaluated according to this parameter), in lot 83B there are nine adults compared to twelve non-adults (ratio 1:1.3); five adults compared to nine non-adults in 83C (1:1.8) and three adults compared to four non-adults in 83D and 83E (1:1,3).

This fact, constant regardless of the species considered, with the exception of cattle and foxes, seems difficult to assess on a perspective of use given to animals, whether these pets were or consumed.

Figure 3: Ovicaprine lumbar vertebra with sagittal cut found in lot 83D.

Figure 4: Sheep sternebra of lot 83B with thermoalteration indicative of direct contact with fire. These footprints are characteristic of animals that have been roasted [23].

That is why it is necessary to broaden the interpretative context by contrasting the data referred to herewith the previous studies carried out on the mammals of the well-deposit.

Lot	83B			83C			83D			83E		
Taxon	To.	Juv.	Inf.	To.	Juv.	Inf.	To.	Juv	Inf.	To.	Juv.	Inf.
Cow	1	1	-	-	-	-	-	-	-	-	-	-
Sheep	-	2	1	-	-	-	-	-	-	-	-	-
O/C	1	-	-	1	2	1	1	1	1	1	-	1
Goat	-	2	-	1	1	1	1	-	-	-	1	-
Pig	1	-	1	1	1	-	-	-	-	-	-	-
Dog	3	2	1	2	1	1	1	1	-	1	1	-
Cat	1	1	-	-	-	-	-	-	-	1	1	1
Fox	2	1	-	-	1	-	-	1	-	-	-	-
TOTAL	9	9	3	5	6	3	3	3	1	3	2	2

Table 9: Breakdown by cohort of macromammals in the batches studied. Adult (Ad.), subadult (Subad.), juvenile (Juv.), child (Inf.).

Discussion

The faunas of lot 83a: comparative appraisal

The faunas of grid 83A have been the subject of several studies [9,15-17,25]. Although the study has not concluded, it seems clear that it is the richest set of those excavated in the well-cistern since the total of the macroscopic fauna, with about 2,000 remains identified, comfortably doubles what was studied in this work (Figure 5).

It is not surprising then that the diversity of 83A is also greater than that of the batches of this work, consisting there molluscs and echinoderms, never documented in the materials studied here. In any case, the dominance of mammals is found in this lot and, although the contribution of this group seems to be the highest of the entire well-deposit, it is evident that the contributions of all faunal groups in lots 83B-F are affected by the unidentified NR, which sometimes puts up to a third of what was studied (Table 1). In 83A, on the other hand, there are no unidentified pieces and this

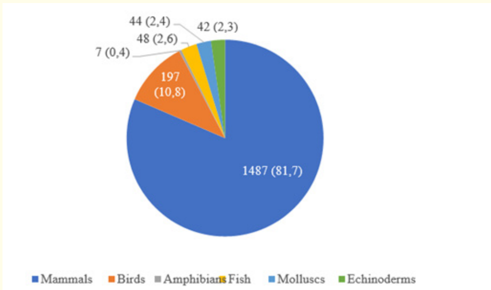

Figure 5: General list of fauna (NR and its percentage in parentheses) of lot 83A and EU82 (the NR of EU82 and lot 83A are not collected separately, except for mammals) with their respective percentages. In the case of sea urchins, the NR is not reflected due to the huge amount of fragments, although its presence is confirmed [16].

seems a remarkable fact since it is rare for this to occur in archaeozoological deposits [23]. It is verified that, if we were to eliminate the unidentified remains from the calculations, the contributions of mammals would approach or exceed that 81% registered by lot 83A (83B: 100%; 83C: 86.7%; 83D: 84.7%; 83E: 88%; 83F: 69.3%) (Table 1).

Another element that until now had not been considered is the weight of the fragments. Although no assessment of this parameter has been made in this analysis, suffice it to say that in the bone collections studied they were always below 3 kg, while the bone materials of 83A exceed 40 kg (The sample of dogs alone reached 27 kg). This yields, roughly, an average weight per fragment in lot 83A around 20 g, which in batches of this work would be ranging between 5-15g (this is between 25-75% below the average weight of a remainder of 83A). The lower weight of the fragments in faunal samples containing identical taxonomic spectra indicates more pronounced fragmentation. Greater fragmentation, in turn, refers to a greater number of pieces without diagnostic parts, which then swell the category of unidentified remains [23]. This seems to be the case for the batches analyzed when compared with 83A.

If the comparison is focused on mammalian species, it is verified that the coincidences of all the lots are remarkable and that the differences between 83A and the samples studied in this work would affect only the most infrequent species (Tables 2 and 10). Thus, the dog, with a presence that accounts for almost two thirds of the NR (62%) and almost one third of the NMI (29%) of the total identified, continues to be the dominant taxon in 83A. In the other lots, the weighted value of their contribution did not reach half of that identified (49.6% of the NR and 28% of the NMI) (Tables 2 and 3). Ovicaprines would be the second set in terms of abundance with 16% of the NR and 32% of the NMI in lot 83A (in the other samples they represent 18% of the NR and 31% of the NMI), while the contribution of pigs would be practically the same in lot 83A (8.7% of the NR and 8% of the NMI) as the weighted set of the other lots studied (9.2% of the NR and 7.8% of the NMI) (Tables 2 and 10).

Taxon	NR (%)	NMI (%)	NR/NMI
Equidae	29 (2,0)	3 (4,0)	9,7
Cow	102 (6,9)	5 (6,7)	20,4
Sheep	78 (5,3)	10 (13,3)	7,8
O/C	100 (6,8)	6 (8,0)	16,7
Goat	61 (4,1)	8 (10,7)	7,6
Pig	128 (8,7)	6 (8,0)	21,3
Dog	918 (62,1)	22 (29,3)	41,7
Cat	23 (1,6)	5 (6,7)	4,6
Ichneumon	1 (0,1)	1 (1,3)	1,0
Fox	36 (2,4)	8 (10,7)	4,5
Polecat	2 (0,1)	1 (1,3)	2,0
TOTAL	1478 (100)	75 (100)	-

Table 10: General list of remains (NR) and NMI of mammals with their respective percentages, as well as the ratio NR/NMI of lot 83A. (taken, with modifications, from [16].

It is also found that, with slight variations, the pattern of dominance of the dog followed by the ovicaprines and the pig is also started if the overall contribution for 83B-E is broken down by batches (Table 3). Apart from this pattern, which again confirms the abundance of pets compared to the fauna consumed, the contributions of other taxa differ considerably between lot 83A and the rest. This affects both cattle, much more abundant in lot 83A than in the others (6.9% *vs.* 1.4% of the NR), the mules (2% in lot 83A *vs.* 0.3% in the overall 83B-E) and wild species.

Be that as it may, the biggest difference between what is studied here and what is represented in lot 83A refers to the microfauna. These, which are understood, represent intrusive elements unrelated to anthropic action, were appreciable elements of the associations studied here with the exception of lot 83B, where there are neither micromammals, nor birds, nor amphibians (83C: 13% of NR; 83D: 16%; 83E: 26.5%; 83F: 91.5%) (Tables 1 and 3). In lot 83A, these three groups account for 14% (207 remains if we add the 3 remains of micromammals to the 197 birds and 7 amphibians) (Figure 5 and Table 10). Among carnivores, missing in the samples 83B-F the polecat, anecdotal species in 83A (0.1% of the NR), and appears marginally in the 83C, the badger, which the 83A does not reflect.

Element	Donkey	Horse	Cow	Sheep	O/C	Goat	Pig	Dog	Cat	Fox	TOTAL
Skull	-	1	4	5	12	6	11	15	1	-	55
Teeth	-	7	-	1	11	-	1	94	2	-	116
Jaw	1	14	4	2	1	13	3	22	-	-	60
Vertebrae	-	3	22	2	13	-	24	201	7	-	272
Spareribs	-	-	6	-	35	-	40	168	-	-	249
Hioide	-	-	-	-	2	-	-	-	-	-	2
Scapula	-	-	3	6	-	7	4	39	1	1	61
Humerus	-	-	8	5	-	8	8	37	5	8	79
Radio	-	-	5	8	1	7	3	37	1	5	67
Ulna	-	-	4	8	-	3	3	35	2	6	61
Metacarpos	-	-	5	8	-	5	1	58	-	-	77
Pelvis	-	-	3	5	-	2	5	38	-	-	53
Thighbone	-	-	7	9	-	6	6	44	3	7	82
Tibia	-	2	4	6	11	-	7	40	1	9	80
Fibula	-	-	-	-	-	-	1	16	-	-	17
Tarsales	-	-	10	3	2	2	3	9	-	-	29
Metatarsos	-	-	7	11	-	2	7	51	-	-	78
Phalanges	-	1	6	-	12	-	1	11	-	-	31
Staff	-	-	-	-	-	-	-	3	-	-	3
TOTAL	1	28	102	78	100	61	128	918	23	36	1475

Table 11: Skeletal breakdown of macromammals in lot 83A [16].

Finally, the fox totals 36 remains in 83A (2.4% of the NR) and almost identical number in the rest of the units (83B: 22 remains [10% of the NR]; 83C: 2 [1.1%]; 83D: 9 [6.3%]).

If the skeletal profiles are taken into account, it is verified how, although the general pattern referred to above is maintained, the larger sample size of lot 83A generates some differences worthy of comment. Perhaps the main one refers to cattle, but also to pigs, whose profiles, although they still do not correspond to those of complete skeletons (appreciate the null or low values of teeth, vertebrae and ribs), are much more balanced than those of the lots studied here (Table 11). As in the samples of this work, only the dog exhibits a skeletal profile that unambiguously reflects the presence of complete skeletons.

But these balanced skeletal profiles of the dog, in this case are manifested especially if we group the NR of batches 83B-E, since, grid by grid, these profiles are much more unbalanced and even more so the smaller be the NR (Table 12). In any case, both taken as a whole and batch by batch, the differences when compared with the 83A are striking. The 83B-E samples always reflect a higher frequency of light pieces (vertebrae and ribs) and smaller pieces (phalanges), and a lower frequency of larger or larger elements. dense, case of the large appendicular bones, especially those of the hindlimb (Table 12). The significance of these numerical differences is confirmed by chi-square tests (Table 12). The only exception is the skull, a dense and oversized assemblage, but only when recovered whole. And it happens, in fact, that the statistically significant greater abundance of skulls in batches 83B-E is due to the fact that they always represent fragments while, in 83A, the 15 reviewed are complete skulls [16].

In lot 83A, as in those studied here, the acémilas are not only represented by a very small number of elements, but the characteristics of these, in particular their sporadic distribution (a horse skull in 83A, a portion of the hind leg in 83C), point to punctual discards of carcasses that would end up in the deposit. for reasons that can only be speculated on (Tables 8 and 12).

With regard to ages, the data obtained in 83A by Llorente., *et al.* (2015a) [16] are interesting when compared with the others (Tables 9 and 13).

The most striking fact is the appearance in 83A of a cohort, that of subadults, which could not be found in batches 83B-E. These are animals of adult size and weight for all purposes, where there

Element	83rd	83B	83C	83D	83E	83B-E
Skull	15 (1,6)	5 (4)	3 (2,9)	7 (9,6*)	0	15 (4,8*)
Teeth	94 (10,3)	7 (5,6)	0	8 (11)	0	15 (4,8)
Jaw	22 (2,4)	2 (1,6)	0	1 (1,4)	0	3 (1)
Vertebrae	201 (22)	42 (33,3*)	46 (44,7*)	17 (23,3)	3 (37,5*)	108 (34,8*)
Spareribs	168 (18,4)	50 (39,7*)	32 (31,1*)	19 (26)	0	101 (32,6*)
Scapula	39 (4,3)	3 (2,4)	1 (1)	1 (1,4)	0	5 (1,6)
Humerus	37 (4)	1 (0,8)	2 (1,9)	0	2 (25*)	5 (1,6)
Radio	37 (4)	0	3 (2,9)	1 (1,4)	0	4 (1,3)
Ulna	35 (3,8)	2 (1,6)	1 (1)	0	1 (12,5*)	4 (1,3)
Metacarpos	58 (6,3)	0	6 (5,8)	7 (9,6)	0	13 (4,2)
Pelvis	38 (4,2)	1 (0,8)	0	0	0	1 (0,3)
Thighbone	44 (4,8)	2 (1,6)	0	0	0	2 (0,6)
Tibia+Fibula	56 (6,1)	1 (0,8*)	1 (1*)	1 (1,4)	0	3 (1*)
Tarsales	9 (1)	2 (1,6)	2 (1,9)	1 (1,4)	0	5 (1,6)
Metatarsos	51 (5,6)	2 (1,6)	0	3 (4,1)	2 (25*)	7 (2,3)
Phalanges	11 (1,2)	5 (4*)	6 (5,8*)	7 (9,6*)	0	18 (5,8*)
TOTAL	915	126	103	73	8	310

Table 12: Batch breakdown of the skeletal categories of the dog in Tabacalera according to their NR and corresponding percentages (*= significant difference).

Lot	83A				83B-E			
Taxon	**To.**	**Subad.**	**Juv.**	**Inf.**	**To.**	**Subad.**	**Juv.**	**Inf.**
Horse	2	-	-	-	-	-	-	-
Donkey	1	-	-	-	-	-	-	-
Cow	1	1	1	-	1	-	1	-
Sheep	4	4	1	1	-	-	2	-
O/C	2	2	3	-	4	-	3	3
Goat	4	-	1	-	2	-	3	1
Pig	-	2	1	3	2	-	1	2
Dog	20	1	2	-	7	-	5	2
Cat	2	-	1	2	2	-	2	1
Fox	4	2	2	-	3	-	2	-
TOTAL	40	12	12	6	21	-	19	9

Table 13: Breakdown by cohort of macromammals of lot 83A. Adult (Ad.), subadult (Subad.), juvenile (Juv.), child (Inf.).

is evidence of the still incomplete fusion of ossification centers. These subadults are found in dogs and foxes, as well as in all species subject to consumption, with the exception of goats (Table 13). This cohort, which can be incorporated into that of adult animals because they are mature animals [26] causes the "adult-subadult" ratio obtained in the rest of the batches to be reversed in lot 83A. In fact, if in the present study, the ratio ranged from 1.3-1.8 non-adults per adult individual, 83A presents almost a third of non-adults than adults (2.88:1). This is not a one-off issue, because this adult dominance affects the mainherds (cattle: 2:1; sheep: 4:1; goat: 4:1) and is particularly biased in dogs (10.5:1) where 20 of the 23 individuals are adults (Table 13).

As was the case with the samples of lot 83A, the traces of use, on which it is not possible to extend here, confirm the existence of a fauna consumed, coinciding with the cattle, pig and goat herds, and other fauna that does not incorporate any trace of use (percussions, cuts, thermoalterations). Within this are the mules, pets and wild mammals [16].

Finally, as far as singular footprints are concerned, three stand out. In the first place, the elevation of sheep, the only species consumed whose size could be estimated with biometric indices. The values shown by the samples of lot 83A speak of very pequeñas (alturaenlacruz: 5 1.9-54.3 cm [¥̄= 53.1 cm]), which sehanquerido a similar con the current unimproved Asturian xalda breed [16]. Their ranges and mean value are identical to those obtained in two astragalus of lots 83D and 83E whose LML, after application of the LML index of Driesch and Boessneck, (1974) [3] (22.68), yielded valoresen the cruz of 52.2 and 5 4.9 c m (¥̄= 53.6 cm).

Figure 6: To. Thoracic vertebrae of Tabacalera mesomorphic dogs with pathological curvatures of the neural processes (Photo. To. Morals). B. Detail of the illustration "how to make good cam de trayella" (the Book of the Montería of Alfonso XI, century. XIV, Library of the Royal Palace, Madrid). Leather corselets are seen adjusted to the body of dogs with buckles. https://www.google.com/search?rlz=1C1AOHY_esES712ES713&sxsrf=ALeKk00OblcxoPTGXANVlgg bBWLuT3DIOw:1590321004484&source=univ&tbm=isch&q=la+caza+del+jabal%C3%AD+libro+de+l a+monter%C3%ADa+palacio+real+de+madrid&sa=X&ved=2ahUKEwjA97O0t8zpAhWIsRQKHcMpD OgQsAR6BAgGEAE&biw=1280&bih=605#imgrc=ZtDBOClyNGm78M

The second singularity to note is that the right humerus of the mongoose of lot 83C has an identical size to the left humerus found in lot 83A (72.5 cm maximum length in 83A compared to 71.7 cm in 83C) [16]. The third singularity is the thoracic vertebrae recovered in batches 83B-D whose neural processes show a marked deformity (Figure 6). These were found on numerous occasions in lot 83A, although they were not explained at the time [16]. Later studies (unpublished) indicate that such deformations may have been caused by leather corsets that, by means of buckles, were adjusted to the hunting dogs of the Middle Ages to protect them from animals such as wild boars or bears [11] (Figure 6B).

These singularities, like others that are not specified here, indicate a homogeneity of the faunas of all sectors of the EU83 that not only speak of a morphological (racial?) similarity between the different taxa, but also suggest that the same species seems to have dispersed throughout all of them.

Conclusions

The analyses of lots 83B-F show faunas that are essentially similar between grids, and also with those reported in lot 83A, but whose differences are equally significant.

If we start from the basis that it is the same deposit, whose excavation units have been arbitrarily designed (2×2 m), it is striking in lot 83A the highest concentration of bones, bone elements of animals of greater size, of older cohorts and of the larger skeletal pieces (in fact, of less fragmented pieces in many cases). This concentration in this grid generates a gradient where the batch furthest from it (83F; Figure 1), only incorporates microvertebrate faunas, while the percentages of these microfaunas, non-adult animals, smaller bones, etc. decrease in the NW-SE direction as we move away from 83A (Figure 1). Indeed, this allows us to glimpse a verifiable interpretative framework that explains the gradients (differential abundances) of taxa, cohorts and weight/density of pieces between grids. From the above evidence, it is deduced that the base of the well-depósito was in the direction SE-NW, being the 83A, the deepest unit (the most NW), followed by 83B, 83C, 83D and 83E, and the shallowest 83F. In this scenario, the gradients to which we have been referring could perfectly be explained through a gravitational displacement model according to which the bones would remain in the place where they were. originally deposited only to the extent that gravity did not cause in them a post-depositional displacement towards the deepest areas of the base of the cistern. This behavior only makes sense if the deposit was flooded while the deposition of the bones/carcasses was taking place, which implies that the gradients of fauna and larger pieces in the SE-NW direction had to occur, in no small way measured, before the total loss of water in the well-tank. In other words, most, if not all, of the macrofauna of the cistern had to be incorporated into the tank before it lost the water it stored, with lot 83A acting as sink. It will be necessary to contrast this hypothesis, which comes to support the scenario proposed by Vigil-Escalera (2018) [27], from alternative analytical approaches.

Thanks

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Bibliography

1. De Miguel FJ and Morales A. "Catalogue for an identification of the measurements of the skeleton postcraneal of mammals in Spain". In: I Conference on Methodology Prehistoric. Soria (1984): 299-305.
2. Driesch A. A guide to the measurement of animal bones from archaeological sites: as developed by the Institut für Palaeoanatomie, Domestikationsforschung und Geschichte derTiermedizin of the University of Munich. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge Mass (1976).
3. Driesch A and Boessneck J. "Critical remarks on the calculation of withers from length measurements of prehistoric and protohistoric animal bones". *Mammalological Notices* 22 (1974): 325-348.
4. Escribano S. "Quantitative strategies for the study of archaeological ceramics. A proposal from the case of historical ceramics from Alava". *Munibe Antropologia- Arkeologia* 68 (2017): 289-300.
5. Estevez J. "Wildlife Issues in Archaeology". En: Archaeology. Consejo Superior de Investigaciones Científicas, Madrid (1991): 57-81.
6. Fernandez C. "History of the Gijón archaeology project". *Complutum* 6.1 (1996): 29-37 .
7. Fernandez C., *et al*. "The archaeological record. Excavations in sector 20". In: La Fábrica de Tabacos de Gijón: Arqueología e Historia de un espacio milenario. City Council of Gijón, Gijón (2015): 114-125.
8. Gautier A. "Tafonomic groups: how and why?". *Archaeozoología* 1.2 (1987): 47-52.
9. González To." The subfossil oribatid mites from the well-deposit of the Tabacalera de Gijón". In: La Fábrica de Tabacos de Gijón: Arqueología e Historia de un espacio milenario. City Council of Gijón, Gijón (2015): 266-275.
10. González A. "Micro-Zooarchaeology: the Invertebrates of the well-deposit of Tabacalera (Gijón, Asturias, s.V-VIII d.C.)". Unpublished doctoral thesis. Universidad Autónoma de Madrid, Department of Biology, Madrid (2017).
11. Gutiérrez de la Vega J. "Libro de la Montería del rey D". Alfonso XI. Printing and Foundry of M. Tello, Madrid (1877).
12. Jiménez-Sánchez M., *et al*. "The sedimentary fill of the reservoir of the antIgua Factory of Tobaccos of Gijón: one file geological of the centuries VI-VIII". In: The Factory de Tabacos de Gijón: Archaeology and History of a millenary space. City Council of Gijón, Gijón (2015): 184-193.
13. Kenward H. "Pitfalls in the environmental interpretation of insect death assemblages". *Journal of Archaeological Science* 2.2 (1975): 85-94.
14. Liesau C. "El Soto de Medinilla: Faunas of Iron Age mammals in the Duero Valley (Valladolid, Spain)". *Archeofauna* 7 (1998): 11-210.
15. Llorente L., *et al*. "Native or foreign? The Tabacale mongoosera and its contribution to the history of the species". In: The Factory of Tabacos de Gijón: Archaeology and History of a millenary space. City Council of Gijón, Gijón (2015b): 246-251.
16. Llorente L., *et al*. "The fauna of the well-ofGranary Roman of the Factory of Tobaccos of Gijón. Aspects General of the units Stratigraphic 25 and 26". In: The Tobacco Factory of Gijón: Archaeology and History of one space millennial. Town hall of Gijón, Gijón (2015a): 226-237.
17. Llorente L and Morales A. "The molluscs of the well-deposit of Tabacalera". In: La Fábrica de Tabacos de Gijón: Arqueología e Historia de un espacio milenario. City Council of Gijón, Gijón (2015): 260-265.
18. López J., *et al*. "Estimation of height at the withers of dogs (Canis lupus f. familiaris Linnaeus, 1758) recovered in a high-medieval filling of the cistern of the old Tabacalera factory (Gijón, Asturias)". Boletín de la Real Sociedad Española de Historia Natural, Sección Biológica 106.1-4 (2012): 127-136.
19. Meadow R. "Animal Bones: Problems from the Archaeologist together with some possible solutions". *Paléorient* 6 (1980): 65-77.

20. Morales A. "Problems of interpretation of the faunal data from the deposits". In: Arqueología Medieval Española. II Congress. Volume 1. Volume 1: Presentations. Community of Madrid, Ministry of Culture and Sports. Dirección General de Patrimonio Histórico, Madrid (1987): 33-45.

21. Morales A., *et al*. "Punctual or gradual? A zooarchaeological reflection on the genesis of the well-deposit of Tabacalera (Gijón, Asturias)". Cuadernos de Prehistoria y Arqueología de la UAM, 40.

22. Plataforma Tabacalera Gijón. The building (2018).

23. Reitz E and Wing E. "Zooarchaeology". 2ª ed. Manuals in Archaeology Cambridge University Press, Cambridge (2008).

24. Ripoll M. "Hunting marks, intentional fractures and carnivore bites on prehistoric bones from the Spanish Mediterranean". Institute of Culture "Juan Gil Albert" Provincial Council of Alicante, Alicante (1992).

25. Roselló E., *et al*. "The fish from the Tabacalera well-reservoir (Unit Stratigraphic 26)". In: The Tobacco Factory of Gijón: Archaeology and History of a space millennial. Town hall of Gijón, Gijón, (2015): 252-259.

26. Silver IA. "The Ageing of Domestic Animals". En: Science in Archaeology: A Comprehensive Survey of Progress and Research. Basic Books, Nueva York (1963): 250-268.

27. Vigil-Escalera A. "Archaeological rereading of the well-cistern of the fortress of Gijón (Asturias, Northern Spain): the civitas Gegionem during the first century of the Kingdom of Asturias (720-840 AD)". Munibe Antropologia-Arkeologia 69 (2018): 265-281.

28. Wolverton S and Nagaoka L. "Zooarcheology: Investigating Past Interactions Between Humans and Other Animals". En: Ethnozoology: Animals in our Lives. University of North Texas Press, Denton, (2017): 25-43.