



# Cira Arqueologia

N.º 5



Câmara Municipal  
de Vila Franca de Xira  
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Centro de Estudos  
ARQUEOLÓGICOS  
Vila Franca de Xira







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Apresentação - Presidente da Câmara Municipal de Vila Franca de Xira	5
<b>1</b>	9
<b>A ocupação Proto-Histórica do Alto dos Cacos (Almeirim, Portugal)</b> ELISA DE SOUSA, JOÃO PIMENTA, HENRIQUE MENDES E ANA MARGARIDA ARRUDA	
<b>2</b>	33
<b>Serra de Santa Marina, Cáceres Viejo (Casas de Millán, Cáceres, Espanha). Un Sítio Paradigmático no contexto das Guerras Sertorianas</b> CARLOS PEREIRA	
<b>3</b>	55
<b>Os Cossoiros de Porto de Sabugueiro (Muge, Salvaterra de Magos)</b> MÁRIO LONGUINHO PEREIRA	
<b>4</b>	76
<b>O Miliário da Quinta de Santa Teresa (Alenquer) e outros problemas viários associados</b> VASCO GIL MANTAS	
<b>5</b>	86
<b>A cerâmica comum da <i>villa</i> romana de Povos, Vila Franca de Xira</b> CAROLINA GRILO E CÉZER SANTOS	
<b>6</b>	116
<b>A Urbanística do Subúrbio Ocidental de <i>Felicias Iulia Olisipo</i> (Lisboa): Um Contributo da I.A.U. da Rua do Ouro n.ºs 133-145</b> RODRIGO BANHA DA SILVA E ANTÓNIO VALONGO	
<b>7</b>	149
<b>Apontamento crono-estratigráfico para a topografia histórica de <i>Olisipo</i>. A intervenção arqueológica na rua de São Mamede (Via Pública – 19), Santa Maria Maior, Lisboa</b> NUNO MOTA, CAROLINA GRILO, RUI ROBERTO DE ALMEIDA E VICTOR FILIPE	
<b>8</b>	207
<b>Cerâmicas romanas provenientes do rio Tejo, no acervo do Museu Municipal de Vila Franca de Xira. Novos e velhos dados</b> JOÃO PIMENTA, HENRIQUE MENDES E MIGUEL CORREIA	
<b>9</b>	238
<b>Animal remains from medieval and modern Vila Franca de Xira, Portugal: Excavations at the Neo-Realism Museum</b> CLEIA DETRY E JOÃO PIMENTA	
<b>10</b>	260
<b>Faiança Portuguesa dos Séculos XVI-XVIII recuperada no Tejo</b> TÂNIA MANUEL CASIMIRO E JOÃO SEQUEIRA	
<b>11</b>	274
<b>Da China ao fundo do Tejo. Fragmentos de porcelana dos Séculos XVI E XVII</b> TÂNIA MANUEL CASIMIRO E JOSÉ PEDRO HENRIQUES	



# Circa Arqueologia

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## ➤ **Animal remains from medieval and modern Vila Franca de Xira, Portugal: Excavations at the Neo-Realism Museum**

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### **ABSTRACT**

Vila Franca de Xira is a town some 32 km north-east of Lisbon on the right bank of the Tagus river. Excavations undertaken there in 2006, prior to the construction of the Neo-Realism Museum, uncovered some 20 meters of a relatively well preserved Roman road. Overlying the road were 13th century (Medieval) and Modern Period (15th/16th century) levels. Faunal remains, recovered from all these levels, indicate which taxa were consumed by the inhabitants and which were kept as companions. Most of the faunal remains are left-overs of food eaten in ancient times and include bivalves, presumably collected in the Tagus estuary, as well as the commonly found domestic species like cattle, sheep, goats, suids (pig and wild boar) and chicken. Bones of rabbits, geese, cats and otter were also present. Despite the small size of the sample, the few osteometric data indicate that cattle were larger in the Modern period than in the 13th century. This corroborates previous studies on the history of this animal in southern Portugal.

### **RESUMO**

Vila Franca de Xira é uma cidade localizada 32km a norte de Lisboa, na margem direita do rio Tejo. Escavações realizadas em 2006, na área onde viria a ser construído o Museu do Neo-Realismo em Vila Franca de Xira, puseram a descoberto uma estrada romana ainda relativamente bem preservada e numa extensão de cerca de 20 metros. Estes trabalhos cruzaram-se ainda com níveis medievais do séc. XIII e do Período Moderno dos séc. XV e XVI, onde foram recuperados restos de fauna sobre as quais versam este artigo.

Foi possível obter algumas informações sobre os animais consumidos e de companhia nos períodos Medieval e Moderno desta cidade a poucos quilómetros de Lisboa. A maioria dos restos representavam despojos de alimentação, sendo o conjunto constituído por restos de bivalves provavelmente recolhidos no estuário do Tejo bem como por espécies domésticas comuns nos sítios arqueológicos, como é o caso do gado bovino, caprinos, suídeos e galinha doméstica. Alguns restos ocasionais de coelho, ganso e mesmo de gato e lontra também foram encontrados.

Apesar de ser uma amostra pequena obtivemos ainda alguns dados osteométricos que nos sugerem que o gado bovino apresentava dimensões maiores no período moderno, corroborando trabalhos anteriores sobre a história desta espécie no sul de Portugal.

## Introduction

This report describes the faunal remains uncovered from excavations undertaken in 2006 prior to the construction of the Museum of Neo-Realism (MNR) in Vila Franca de Xira (VFX) – a town 32km north-east of Lisbon (figure 1). The principal discovery is a very large portion of a Roman road, one of the main arteries connecting Lisbon to Santarém (*Scalabis*). Its dimensions indicate that it must have been a dual carriage way whose use continued until the 15th century when it was abandoned. Some of the animal remains come from 13th century layers and a larger sample comes from the 15th/16th century.

The osteological and malacological remains considered here are probably derived from domestic refuse and include the common domestic animals such as caprines (sheep and goat), pig, cattle and horse. Birds and carnivores as well as molluscs (bivalves) are also included.

This study contributes to our understanding of medieval and modern VFX, and the faunal collection is especially important given the scarcity of zooarchaeological remains from these times in Portugal.



Figure 1  
Location of the site.

## Archaeological context

The area excavated between 2nd March and 11th April 2006 is located at the intersection of the Alves Redol and Almeida Garrett streets – in the medieval centre of the town subsequently greatly influenced by the reforms of king Manuel I in the 15th/16th century. Evidence indicates that this part of the town was occupied between the 1st century BC and the 20th century with a prolonged hiatus (Mendes & Pimenta, 2007).

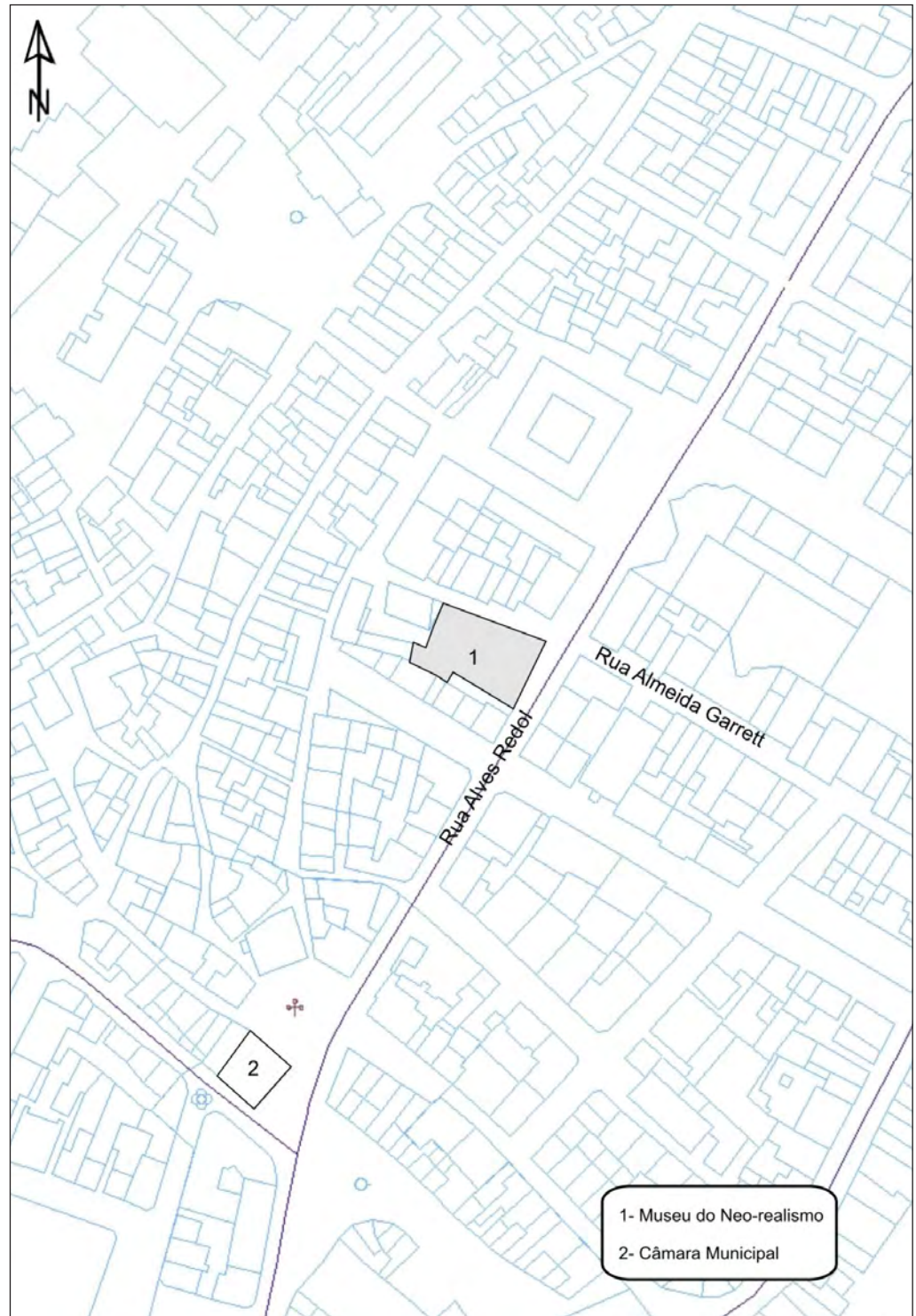


Figure 2  
Location of the area excavated (1) in Vila Franca de Xira.



One important structure uncovered was a section the old “Royal Road”. The excavation of this area proved its roman origin and subsequent use at different times for over 1500 years. Its abandonment is well attested in multiple stratigraphic units comprising stones that had been removed and which are well dated to the beginning of the 15th century, providing us with a chronology for its abandonment (Mendes & Pimenta, 2007a).

VFX’s importance lay in its location – midway between the two cities of *Olisipio* or *al-Usbuna* (Lisbon) and *Scallabis* or *Santarín* (Santarém), in Roman/Moslem times. Situated both on river and land routes, VFX was an important town.

This predominantly agricultural region also explored the natural resources. Both terrestrial and fluvial commerce was especially important to both Christians and Moors. Therefore in 1147, the king, D. Afonso Henriques, donated the town of Cira to the English Crusaders as a reward for their help and as part of his general plan to defend Lisbon.

The instability of the territory at the time and the likely high costs, led the king to “award” the English Crusaders, and lead King Sancho in 1200 to assign to D. Raulino, along with other Flemish personalities, the management of this territory. This region was subsequently donated to D. Froila Hermiges in 1206. Going by donation to the order of the Temple in 1214 (Lucas, 2003).

With the conquest of Santarém and Lisbon, the Tagus valley became the frontier with the Almoravid Empire, witnessing a particularly intense effort to increase the population and fortification of this area. It is in this context Alverca, Alhandra, Vila Franca de Xira and Povos all became important frontier towns.

Little is known about the ancient settlement of Vila Franca in medieval times. The available documents allow us to situate it, in a small elevation along the old St.<sup>a</sup> Sofia River in the vicinity of the old Roman road where there also existed a tower and village defences (Pimenta & Mendes, 2007).

Situated outside the medieval centre, the area studied here was urbanized only following the 15th and 16th century administrative reforms of King Manuel. These had a profound impact on the lower part of the town and the riverside area. An understanding of the multiple human occupations detected here corroborates this evolution of the space, attesting its peripheral character in relation to the urban nucleus, until at least the middle of the 16th century.

The urban area, subject of the present intervention, had already been demolished in the late 1990s to make way for a parking lot. Old maps show a series of buildings organized around a wide patio, which is still preserved.

The methodology we adopted was directly related to the state of preservation of the site and the need to record all the archaeology in this area. The archaeology indicates five major phases for this sector (Pimenta and Mendes, 2007).

**Phase 1** – Corresponds to the earliest occupation, situated directly on the silt-clayey Kimeridjiansubstrate and covered in some areas by alluvial deposits. An imposing carefully constructed stone structure was detected with a southwest-northeast alignment. The excavation of a large area showed that this structure formed part of an old Roman road securely dated to the first century AD. It had been delimited by well-built side walls and with a width of 5.2 metres, it extended some 20 metres (Figure 3 and 4).

Despite their unequal states of repair, the space between the two walls was filled with a strong foundation of irregular blocks of limestone and sandstone joined by clay. These Stratigraphic Units (SU) – [20], [32], [61] and [62] – correspond to a very compact homogeneous pavement still preserved in some areas with two rows of overlapping stones (SU[61] and [62]). A study of the stratigraphy indicates that this pavement was not the original road, but rather the foundations for a covering of large slabs. This became more evident when it was noted that this pavement still retained the irregular edges, showing no attrition like the preserved *in situ* slabs.

The original pavement of the road (consisting of large slabs; SU [93] and [97]) was found above the foundation. However, since the Middle Ages, much of this had been removed with the exception of a small well preserved section identified in the excavation. This comprised large irregular shaped limestone slabs – whose surface is polished as a result of wear caused by use over the centuries.

**Phase 2** – A repair of the road pavement registered in square A6-A5 was identified as phase 2. Here, under the levels of abandonment/destruction of the road, SU [19], emerged a layer of yellowish-brown sandy clay, SU [92], consisting for the main part of beaten gravel with calcareous medium sized limestones. It has proven difficult to date this repair as no archaeological materials were found in its vicinity.

**Phase 3** – This stage includes several stratigraphic units belonging to both medieval and modern times and attributed to progressive abandonment and destruction of the road. The excavation of an extensive area allowed the identification of several contexts that, despite not having a direct correlation, seem to be contemporary and represent the slow dismantlement of the road. It is from these levels that the osteological remains studied here were collected.

Among these “destruction interfaces”, a large ditch parallel to the road’s boundary wall, SU [42], was found in squares A6 and B6. This negative structure, SU[40], extended some 8 meters and continued beyond the limits of the excavation under Almeida Garrett Street. Its construction partly cuts the wall, SU[42], as well as pavement levels and preparation of the road SU [20], [93], [96] and [97] (Figure 6). Its semicircular interior was filled by SU [19] and contained abundant fauna of mammals, birds and shells as well as ceramics.

**Phase 4** – Although quite disturbed, it was possible to identify remains of various stone structures corresponding to the buildings existing here prior to construction of the car park. The stratigraphic correlation allows us to understand the order in which this was constructed during the mid-eighteenth century.

**Phase 5** – We attribute to this stage the levels directly related to the machinery work, prior to the beginning of the archaeological work and that disturbed the stratigraphy in this sector, SU[36] to [39] and [41]. These levels correspond to mixed strata that disturbed pre-existing contexts. [FIGS. 3, 4, 5, E 6](#)

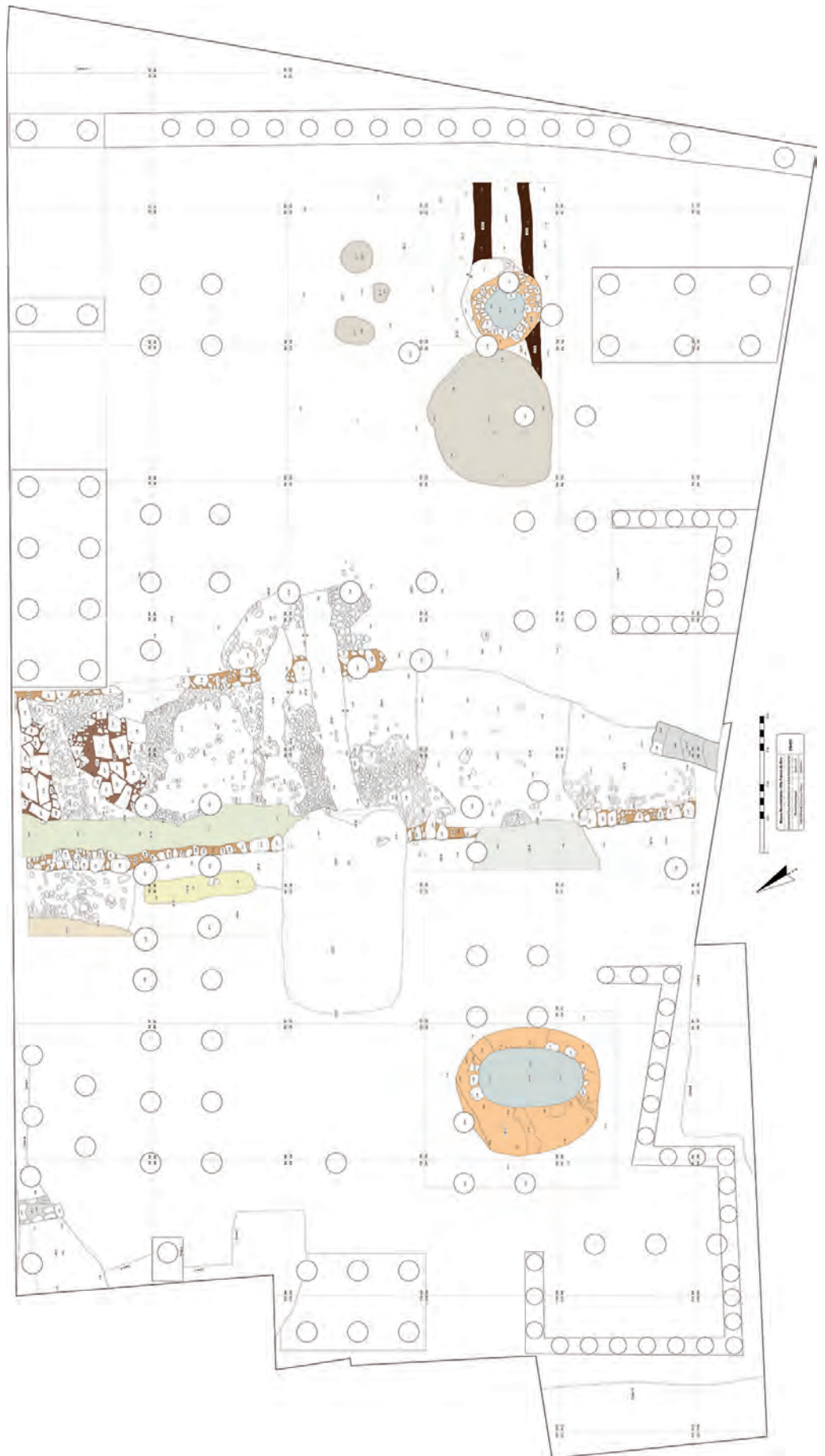


Figure 3  
Map of the excavated  
area.





Figure 4  
General view of the  
excavated area.





**Figure 5**  
Photograph showing  
details of the  
pavement SU [93].

**Figure 6**  
Photography of the  
ditch excavation  
SU[40].

## Methods

All animal remains were studied but only certain parts were recorded as in Davis (1992). Epiphyseal fusion and dental eruption/wear stages were recorded as in Payne (1987) for sheep and goat and (Grant, 1982) for pig/wild boar and cattle.

Measurements were taken according to Driesch (1976).

Bone surfaces were observed for the possible effects of cut, burn and other agents.

## Animal remains

Only 32 skeletal remains, all mammals, were found in the 13th century layers. In the modern levels, besides mammals, birds and bivalve molluscs were also found.

Although larger and more diverse than the medieval levels, the modern ones include 186 mammal bones, 11 bird bones and 49 mollusc shells, making a total of 246 animal remains. Although small, this sample does help interpret the modern and medieval occupation of the centre of VFX (see Figure 7).

Due to time constraints – this was an emergency excavation – bones were collected by hand. This probably explains the scarcity of smaller taxa like rabbits and rodents. Bones in general are well preserved.

## Molluscs

These invertebrates were found only in later periods, indicating that this resource was not appreciated in medieval times, or, more probable, shells were jettisoned in some other part of the city. Proximity to the Tagus estuary would have provided easy access to aquatic resources.

The most frequent species in the 15th/16th century levels (table 1; figure 7) is the oyster, a much appreciated bivalve since Iron Age and common in nearby Tagus estuary (Detry et al. 2016). The species of oyster identified at MNR is *Ostrea edulis*. The specimens found at VFX are round and with striation patterns lateral to the hinge - typical of the common oyster. Only two small shells of juveniles were difficult to identify, but most probably belong to *O. edulis*. It was not possible to identify specimens of *Crassostrea angulata* in this assemblage. *C. angulata* survives better in temperatures ranging from 5 to 25°C and with a salinity of 16 to 36‰ (Hutchinson & Hawkins, 1992). According to the Portuguese Environmental Agency (<http://www.apambiente.pt/index.php?ref=x77>) the salinity of the Tagus estuary would be too low (5 to 10‰) in the VFX region for this species to thrive. However, several kilometres downstream, near Sta Iria da Azóia or even further downstream in Lisbon, conditions are conducive to the growth of banks of this species. It is likely therefore that oysters brought into VFX were collected locally. Also in the past the Tagus valley was less filled with sediments and so the tides would have progressed further upstream bringing more saline waters as has been suggested for Muge (Daveau, 1980, Schrieck, 2002/2003). It is possible that in medieval times conditions allowed oysters to inhabit the local riverside.

Mitochondrial DNA analysis indicates that the Asiatic oyster (*C. gigas*) and the Portuguese oyster (*C. angulata*) were very closely related species. It is therefore possible that *C. angulata* was derived from *C. gigas* (Boudry et al., 1998). These authors suggest that *C. Gigas* was introduced by Portuguese sailors into Europe – an introduction that may have occurred during the second half of the 16th century following the Portuguese arrival in Japan in 1542 and the Pacific coast of Asia where *C. gigas* is present. In fact the authors do not observe any example of *Crassostrea* in Portuguese archaeological assemblages although today *C. angulata* is the most common oyster in the Tagus valley. The absence of this species at MNR supports this hypothesis.

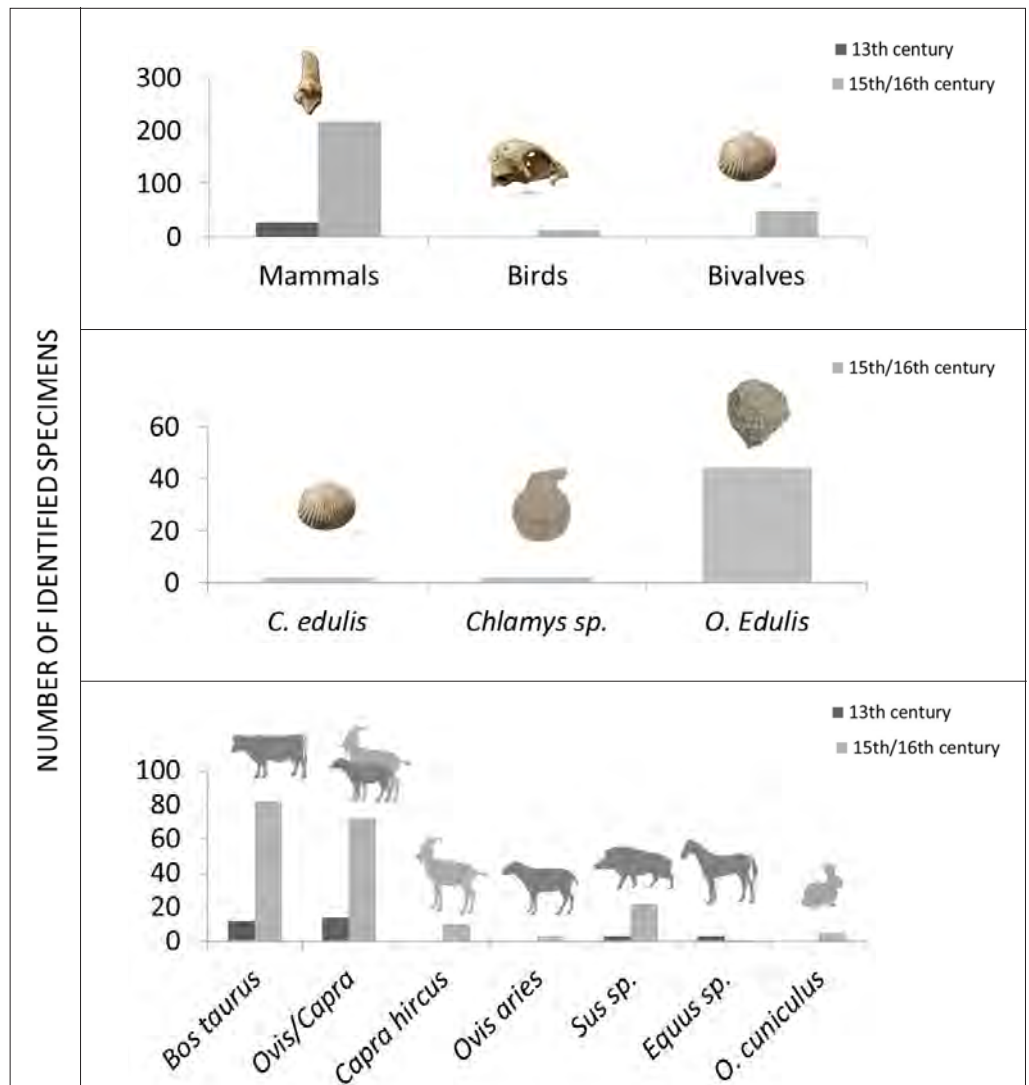


An alternative hypothesis is that *C. angulata* was introduced into the Pacific by Portuguese sailors. Both Lentacker (1986) and Vis & Kasse (2009) identify *Crassostrea* in prehistoric periods in the Tagus valley. Hence it seems more likely that this oyster was introduced to Asia from Europe.

Independently of the direction of introduction, *C. angulata* has not been found in the archaeological sites in the Lisbon or VFX area. It is probable therefore that during the MNR occupation the Tagus valley was inhabited solely by *Ostrea edulis* and even if *Crassostrea* was present, it must have been greatly outnumbered.

**Table 1** Number of identified specimens (NISP) of Bivalves from the 15th/16th century layers in the modern period stratigraphic units at the Neo-Realism Museum in Vila Franca de Xira.

	NISP	%
<i>Chlamys cf. varia</i>	2	4
<i>Pecten maximus</i>	1	2
Ostreaceae	6	12
<i>Ostrea edulis</i>	38	78
<i>Cerastoderma edule</i>	2	4
TOTAL	49	



**Figure 7** Numbers of identified specimens recovered at the Museum of Neo-Realism in Vila Franca de Xira in Medieval and Modern periods.

## Mammals

Mammals comprise the main group of animals recovered at MNR, and perhaps the main source of protein for Medieval and Modern inhabitants of VFX.

The mammals were the only group found in the medieval layers. In the 15/16th century Mammals constitute 80% of the assemblage in terms of identified specimens and probably considerably more in terms of meat weight.

In the 13th century there were a mere 32 mammal bones – most sheep/goat and cattle – domestic animals that were probably economically the most important. These layers also included a cat mandible.

In the modern period the assemblage is a little larger and therefore includes a wider variety species. Besides caprines and cattle, it includes rabbit and the presence of goat could be confirmed (see fig. 7, table 2).

### *Bos taurus* (cattle)

By medieval times it is unlikely that the wild form of *Bos* – the aurochs – was present as this animal had long been extinct in the Iberian Peninsula; probably since Bronze or Iron Age times (Castaños, 1991; Cardoso, 2002). The cattle bones at VFX all clearly belonged to the domestic form, and are the most common taxon in the modern layers. In the 13th century it was only slightly less frequent than the smaller bovids.

In the modern period all parts of the skeleton are present, the parts with meat being particularly frequent, but also bones with less meat such as metapodials or tibiae (see table 3 and 4). All parts of the animal skeleton were, it seems, exploited. In Medieval times the pattern seems to have been somewhat different as only bones surrounded by little or no meat are present (though the sample is very small).

Metrical data from several Portuguese sites indicate a size increase of cattle following the Christian *reconquista* (Davis, 2008; Davis et al., 2012) – a pattern that is repeated here at the MNR where the three measurements for metacarpals from the 15th/16th century are considerably larger than those found in the 13th century (see figure 8). The data for the astragalus (figure 9) are similar.

Another interesting aspect concerning the metacarpals is the presence of an arthropathy on the distal articulation which could be stress-induced and may reflect the use of the animal for traction (fig. 10), typical of animals used in agriculture to pull the plough.

### *Ovis aries* and *Capra hircus* (sheep and goat)

Most bones of sheep and goats are difficult to distinguish. In the 13th century levels none of the bones recovered could be identified to species level and so their identity is left as “sheep/goat”.

In the 15th century deposit, however, 10 bones could be identified as goat (*Capra hircus*) and three as sheep (*Ovis aries*).

Orlando Ribeiro (1992) wrote that sheep in Portugal were mainly kept for their wool and milk, while goats were much appreciated for their milk. Both sheep and goat of course were also eaten. According to Ribeiro the sheep is better adapted to dry areas in the south, goats to more mountainous environments and goats were generally excluded from areas subject to intensive agriculture to prevent them of grazing cultivated plants. The area surrounding VFX has rather steep slopes and is not conducive to intensive cultivation. This may well explain why there appear to have been more goats than sheep. Of course it also possible that the inhabitants of VFX appreciated goat milk and goat milk derivatives!

The 17th century inhabitants of the monastery of Santa Clara-a-Velha near Coimbra had a marked preference for sheep (Detry et al. 2014).

Figure 11 shows the measurements of sheep humeri. The VFX sheep from the 15th/16th century are similar in size to the ones in the Roman period of Monte Molião (Detry & Arruda, 2013) and Modern period of Castelo de Palmela (Detry et al. in press) but larger than the ones found north of Lisbon at Santa Clara-a-Velha Monastery in Coimbra (Detry et al., 2014).

### **Sus sp. (pig and wild boar)**

Although the wild boar is still common in Portugal, all the measurable bones are of smaller size and therefore more likely to have belonged to the domestic species (see fig. 12 and 13). Furthermore their identity as pig rather than wild boar seems more logical given the general scarcity of wild (hunted) animals in the VFX faunal assemblage.

Only three bones of pig were found in the 13th century a mere 9% of the assemblage, and similar to the percentage of equids, a group rarely consumed.

In Medieval VFX the pork was perhaps less appreciated than beef, probably because in pig secondary products are not exploited. A religious explanation is unlikely given that VFX was always inhabited by Christians.

Later, in the modern period, although more bones were found, the frequency of pig is still low indicating that it continued to play a minor role only in the economy of VFX. A greater abundance of teeth is also found – half of the suid remains. The measurements of a third molar tooth indicate it more probably belonged to a pig rather than wild boar (fig. 13).

### **Equidae (horse or donkey)**

Remains of equids are often found in small quantities in archaeological sites. Their scarcity reflects the fact that they are only rarely eaten.

In the 13th century levels at MNR, we identified three inferior deciduous teeth (dp2, dp3 and dp4) probably belonging to donkey. This animal was therefore quite young, certainly less than one year old, the age when they lose the milk teeth. Figure 14 shows the enamel folds on the occlusal surface. Note the 'V' shaped internal fold – a characteristic of the ass rather than the horse. Donkeys were much used to carry goods and people.

The 15th century layers contained two equid bones – a distal tibia and a proximal metacarpal. It seems unlikely that they were consumed – confirmed by an absence of cutmarks.

### **Carnivores**

One well preserved cat (cf. *Felis catus*) mandible (fig. 15) was recovered in a 13th century context. It has a first molar whose antero-posterior crown length measures 7,1 mm making it comparable to domestic cats in figure 12 of Davis et al. (2008).

This species was probably first domesticated in the Middle East (Vigne *et al.*, 2004) and it has also been crossed with the autochthonous wild Iberian cats. Cats were common pets in households since its domestication.

An otter (*Lutra lutra*) cranium, found in the layers dated to the 15th and 16th century, is shown in figure 16. This animal is common in Portugal near rivers and streams, but today less so in the Tagus valley due to human pressure. It was much appreciated for its fur.

### **Birds**

All bird remains were found in the modern period levels, and none in the earlier layers presumably due to the smallness of these earlier samples.



The most common bird, not surprisingly, is the domestic chicken, brought by the Phoenicians to the Iberian Peninsula but in general more common in the modern period (Hernandez Carrasquilla, 1992).

One humerus of a medium sized *Anas* sp. may have belonged to the domestic duck.

An interesting goose cranium was also found with a fracture – possible evidence of a blow delivered to kill the animal (fig. 17) and very similar to others seen in Santa Clara-a-Velha monastery, also a modern period assemblage (Moreno-Garcia & Detry, 2010). These remains of duck may have belonged to the domestic form, although it is not known when the duck was first domesticated. In Portugal duck is common in Modern Period sites (Moreno-Garcia & Detry, 2010; and 17th century Silos from Carnide-Lisbon, Detry & Davis, *in prep.*).

**Table 2** Total of Number of Identified Specimens [ (NISP) and Minimum Number of Individuals of mammals (MNI) in the medieval and modern periods at the Neo-Realism Museum in Vila Franca de Xira.

	13TH CENTURY				15TH/16TH CENTURY			
	NISP		MNI		NISP		MNI	
	N	%	N	%	N	%	N	%
<i>Bos taurus</i>	12	36%	3	43%	82	42%	4	29%
<i>Ovis/Capra</i>	14	42%	1	14%	72	37%	4	29%
<i>Capra hircus</i>	0	0%	0	0%	10	5%	1	7%
<i>Ovis aries</i>	0	0%	0	0%	3	2%	1	7%
<i>Sus</i> sp.	3	9%	1	14%	22	11%	1	7%
<i>Equus</i> sp.	3	9%	1	14%	1	1%	1	7%
<i>O. cuniculus</i>	0	0	0	0%	5	3%	1	7%
<i>Lutra lutra</i>	0	0%	0	0%	1	1%	1	7%
<i>Felis catus</i>	1	3%	1	14%	0	0%		
<b>Total</b>	<b>33</b>	<b>100%</b>	<b>7</b>	<b>100%</b>	<b>196</b>	<b>100%</b>	<b>14</b>	<b>100%</b>

## Taphonomy

Most of the animal remains from the MNR are very well preserved. Only one bone has burn-marks, probably caused during cooking. The general lack of burn marks may reflect the cooking methods used; i.e., stewing and frying rather than roasting or grilling.

Animal-induced damage; i.e., gnawing, was also recognised. In the 13th century a bone that had been gnawed, probably by a dog, an animal rarely found in domestic refuse, since they are normally not part of food refuse. In the more recent levels there are more gnawed bones as well as punctured ones. The first are normally more typical of canids and the second may be attributed to felids.

Human alteration of these remains can be seen in cut-marks – of two types – slim and coarse. Coarse cuts were probably made by chopping with a cleaver. In the 13th century both types are evident, but in the 15th/16th century, chop-marks are much more abundant. Choppers were clearly more frequently used to butcher the carcasses and perhaps long bones would be cut in smaller parts for cooking in pans. FIG. 9, 10, 11, 12, 13, 14, 15, 16, 17

## Conclusion

In spite of all the subtractions of potential information previously made, an emergency archaeological intervention of the building of the future The Museum of Neo-Realism,

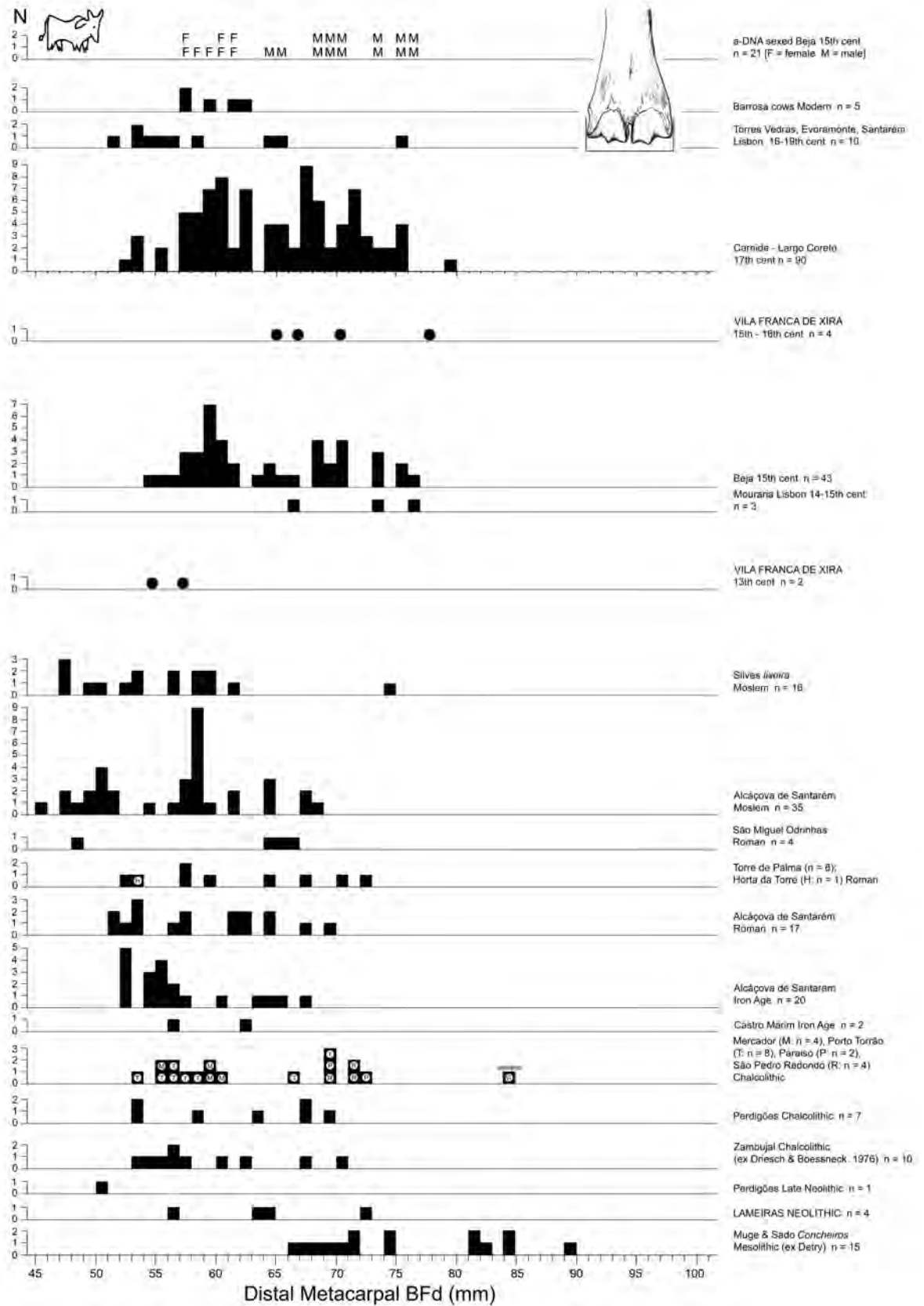
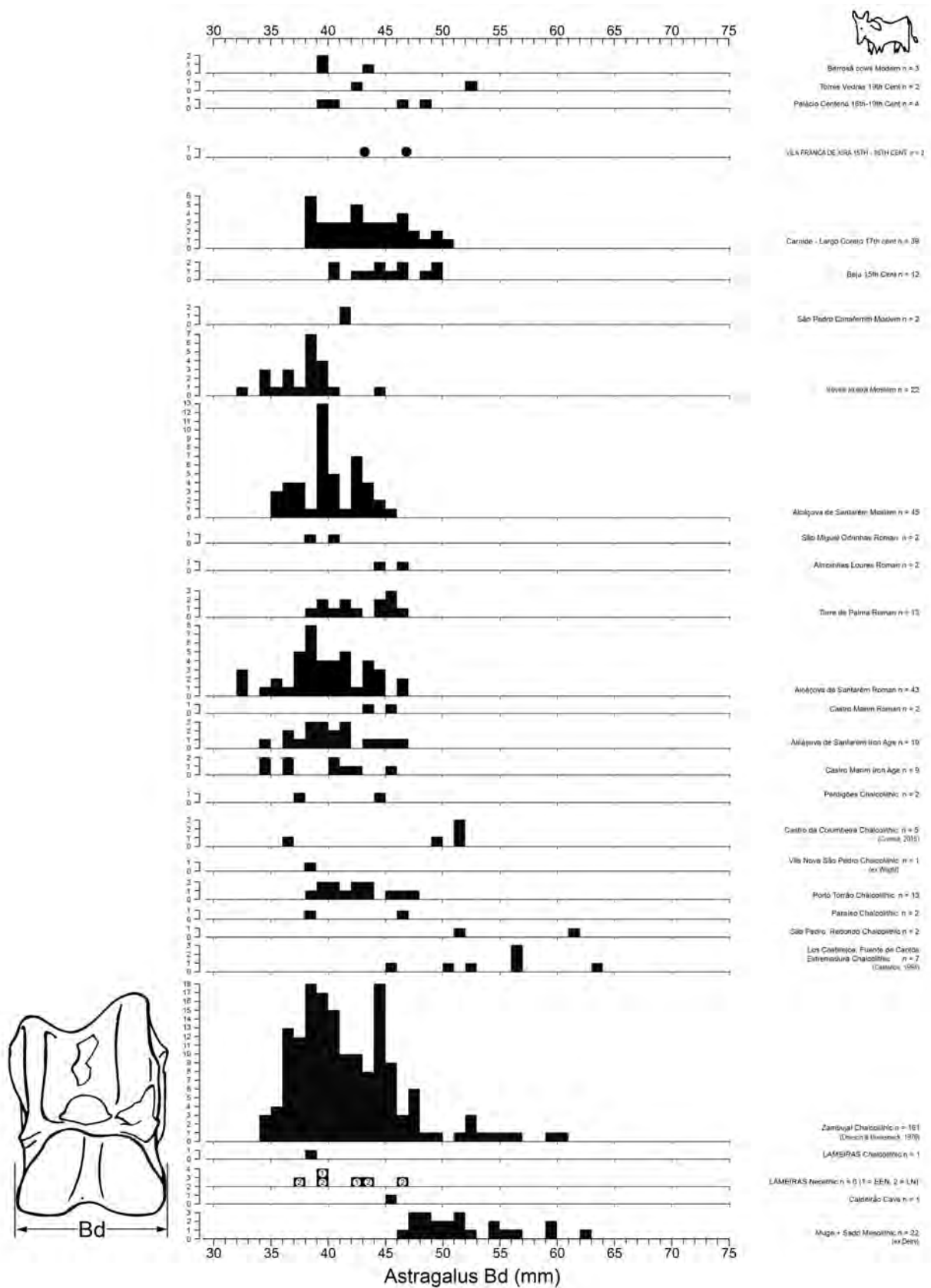


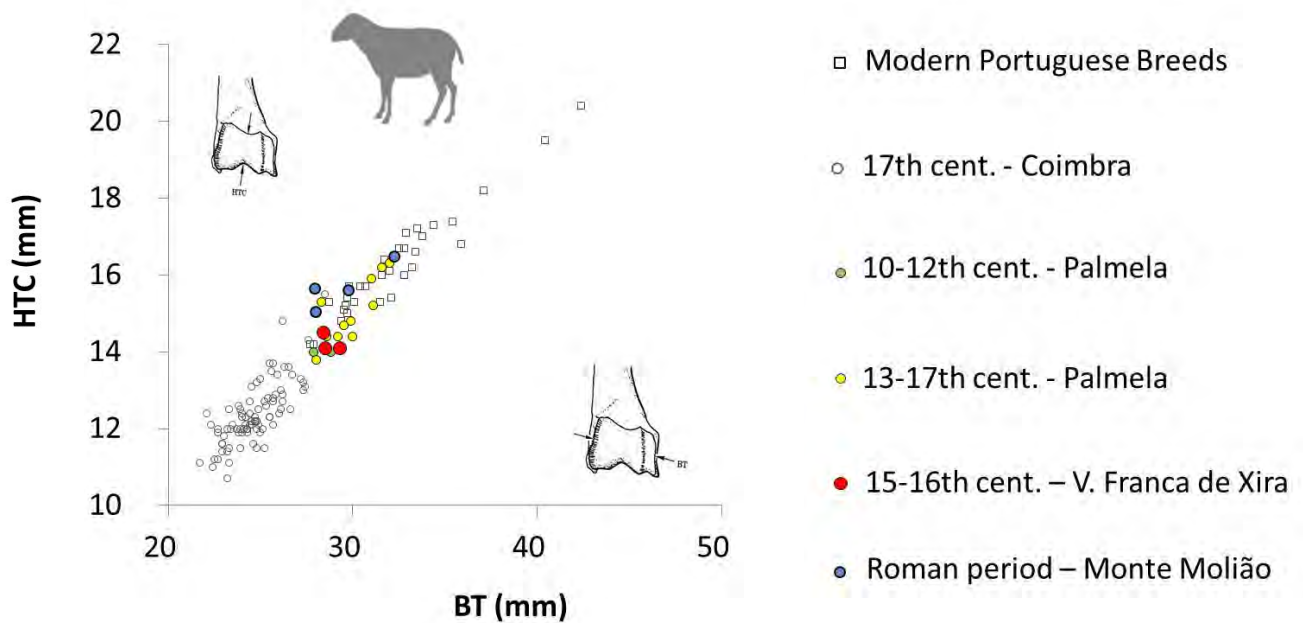
Figure 8 A series of stacked histograms showing the distal widths of cattle/aurochs metacarpals in millimeters from a series of sites in southern Portugal from Mesolithic to modern times; adapted from Davis, (in prep.) with measurements from Zambujal of Driesch & Boessneck (1976).



Figures 9 A series of stacked histograms showing the distal widths of cattle/aurochs astragali in millimeters from a series of sites in southern Portugal from Mesolithic to modern times; adapted from Davis, (in prep.).

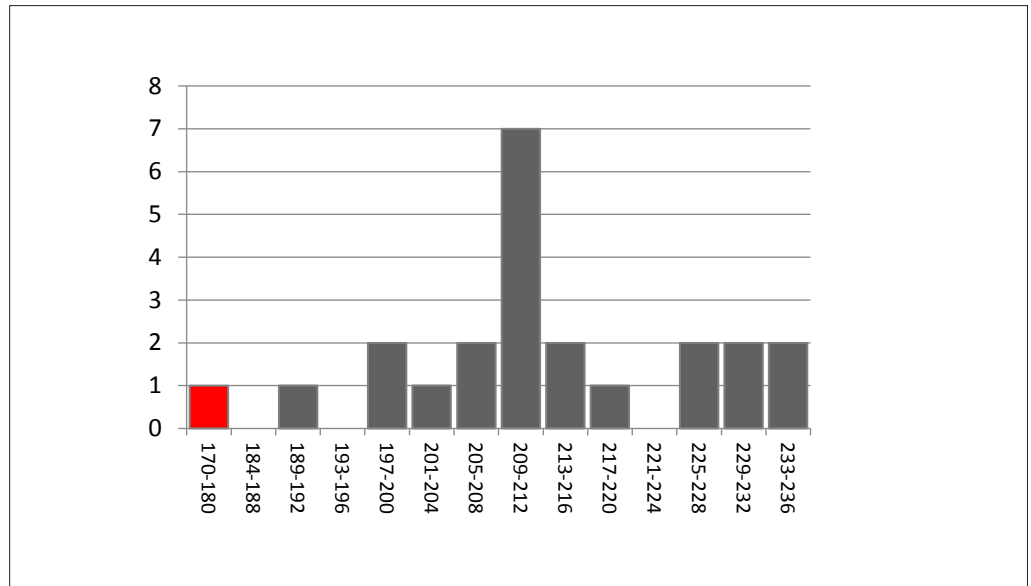


**Figure 10**  
Two metacarpals of *Bos taurus*. from the Museum of Neo-Realism (Vila Franca de Xira), on the left from the 13th century and on the right from the modern levels. Note the difference in size between them. The enlarged medial condyle on the right metapodials shows an arthropathy possibly caused by excessive strain in life.

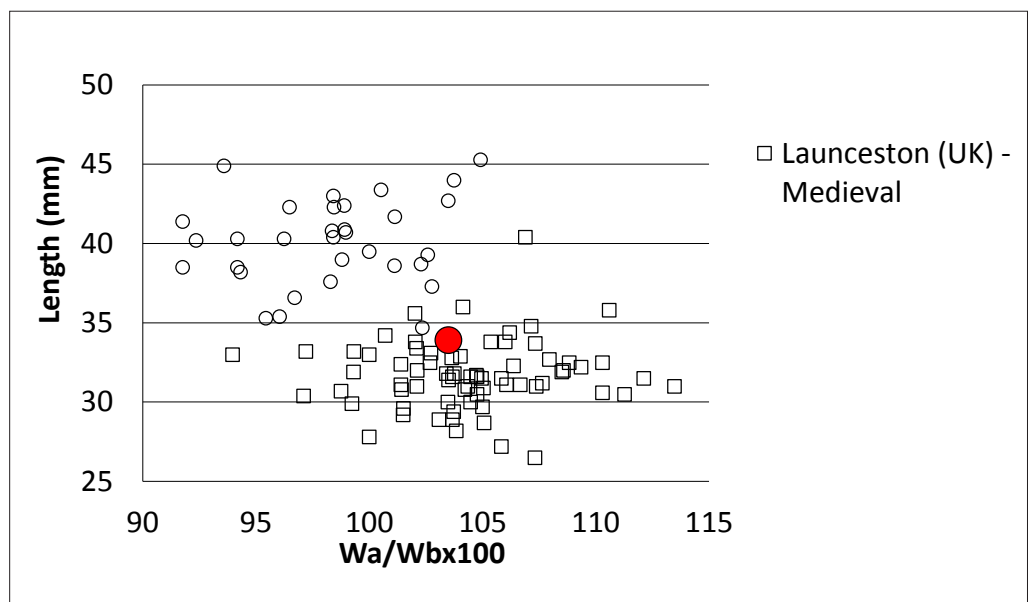


**Figure 11**  
Measurements (in mm) of sheep (*Ovis aries*) distal humerus. Minimum trochlear diameter (HTC) and trochlea width (BT). Several Portuguese contexts are compared. Those from Modern period levels at VFX described herein. Those from Monte Molião are from the Roman period (Detry & Arruda, 2013), those from Castelo de Palmela (south of Lisbon) are from the Islamic (10-12th centuries) and Christian (13th-17th centuries) levels (Detry et al., in press.) and those from Coimbra are from the 17th century levels of Santa Clara-a-Velha monastery, north of Lisbon (Detry et al., 2014). The modern Portuguese breeds come from the Laboratory of Archaeosciences reference collection and are from the autochthonous Portuguese breeds – Churra da Terra Quente, Merina Branca and Merina Preta.

**Figure 12**  
Measurements of the humerus minimum diameter of the trochlea (HTC) in tenths of a millimetre. The grey bars represent mesolithic wild boar from the Muge shell middens (Detry, 2007), and the red square is a single *Sus* from 15th/16th century Vila Franca de Xira.



**Figure 13**  
Measurements of *Sus* lower third molars from medieval Launceston Castle, England (Albarella & Davis, 1994) and modern wild boar from Syria and Israel (Davis unpublished). The red circle represents the M3 from Vila Franca de Xira – identified as probable pig rather than wild boar.



**Figure 14**  
Equid (possibly *Equus asinus*) inferior deciduous teeth; dP2 – dP4 from the 13th century.



Figure 15  
Domestic cat (*Felis catus*) mandible from the 13th century levels, Museum of Neo-Realism.



Figure 16  
Otter (*Lutra lutra*) cranium from the 15th/16th century.

Figure 17  
Goose (*Anser anser*) cranium. Note the fracture – a possible cause of death of this bird. Modern Period – 15th/16th century.

allowed us to obtain information about the human occupation in this space, although with a prolonged hiatus, of more than one thousand years (Pimenta & Mendes, 2012).

The study of the identified units reveals a set of dumps, a useful source of information about waste disposal in Medieval and Modern Vila Franca de Xira. This study of the food remains identified sheds some light upon the diets of the inhabitants of Vila Franca Xira as well as providing some corroborative evidence for the timing of livestock improvements.

The people who inhabited Vila Franca de Xira in Medieval and Modern times consumed and used mainly domestic animals.

Animal improvement was attested in sheep and cattle, the first was of normal size at this period and 15th/16th century cattle were larger than those from earlier periods. A metacarpal exhibits signs of arthropathy indicating the overexploitation of this animal presumably to carry goods and/or agriculture tools.

The presence in the modern period, of duck and geese – both probably already domestic, is also consistent with other contemporary sites in Portugal. And when considered together, the spectrum of taxa was clearly greater than in earlier times.

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**Table 3** Number of identified remains by part of the skeleton in mammals, remnants recovered from the modern period layers (13th century). In parentheses are teeth within the mandible, without parentheses are loose teeth.

		BOS TAURUS	OVIS/CAPRA	SUS SP.	EQUUS SP.
Teeth (Inferior)					
Pre-Molar3			(1)		
Pre-Molar4			(1)		
Molar 1			(2)		
Molar 2			(2)		
Molar 3			1(2)		
Molar 1/2					3
Total Teeth		0	9	0	3
Bones					
Distal Humerus	F		1		
Distal Metacarpal	F	3	1		
Distal Tibia	F	5			
	UE			1	
	UM			1	
Astragalus	F			1	
Distal Metatarsal	F	0,5			
Distal Metapodial	F	0,5			
Phalanx1	F	1			
Phalanx3	F	2	3		
TOTAL		12	14	3	3
NMI		3	1	1	1



**Table 4** Number of identified remains by part of the skeleton in mammals, remains recovered from the modern layers (15th/16th century). In parentheses are teeth within the mandible, without parentheses are loose teeth.

		BOS TAURUS	OVIS/ CAPRA	CAPRA HIRCUS	OVIS ARIES	SUS SP.	EQUUS SP.	O. CUNICULUS
Teeth (Inferior)								
Incisor		1				4		
Canine						2(2)		
Deciduous Pre-Molar2				(2)				
Deciduous Pre-Molar3				(2)				
Deciduous Pre-Molar4				(2)				
Pre-Molar2			(2)					
Pre-Molar3		(2)	(6)					
Pre-Molar4		(2)	(7)					
Molar 1		(1)	(7)			(1)		
Molar 2		(1)	(7)			(1)		
Molar 3		2(2)	(8)			(1)		
Molar 1/2		2	2			1(1)		
Total Teeth		13	39	6	0	13	0	
Bones								
DistalScapula	F	1	6					
	I	1						
Distal humerus	F	3	4	2	2	2		2
Distal Radius	F	1	2					
	UM		2					
	UE	1				1		
Distal Metacarpal	F	7				1	*1 Proximal	
Pelvis (Acetabulum)	F	5	6					2
	I	1	2			1		
Distal Femur	F	1				1		1
	UM		1			1		
	UE		1					
Distal Tibia	F	5	5				1	
	FV					1		
	UM		2					
Calcaneum	F	1		1				
	UM				1	1		
	FV	1						
	I	2						
Astragalus	F	7		1				
Distal Metatarsal	F	4	1					
Phalanx1	F	11	1					
	FV	1						
Phalanx2	F	8						
Phalanx3	F	9						
TOTAL		82	72	10	3	22	1	5
NMI		4	4	1	1	1	1	1

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