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The faunal material from S. Salvatore, Ostiano (Cremona)

ABSTRACT

The 1980 season at S. Salvatore, Ostiano (Cremona) produced a small quantity of faunal remains. The study of these remains is of great importance because this material dates to the early bronze age rather than to the early-middle bronze age, as is common. The economy of the settlement was based essentially on cattle, with the food contribution of caprines and pigs being very minor. Red deer were of minimal significance. Perhaps cattle were also of importance for hides, for dairy products and for breeding. The measurements taken of the bones of the animals are quite comparable with those of other Italian samples studied by Barker. It seems that the economy of this settlement is not precisely the same as that of other early bronze age sites in northern Italy such as Monte Covolo (phase 4), Barche di Solferino and Isolone della Prevaldesca. In brief, the material suggests a mixed and well balanced economy with cereal agriculture and stock-raising, adapted to the specific micro-environmental context of the settlement.

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The material examined here was recovered during the excavation of an early bronze age site at S. Salvatore, Ostiano (Cremona) in May and July 1980 (see Pia 1980, figure 1). The sample is of particular interest because of its date, in that relatively few sites with faunal material may be attributed to the early, as opposed to early-middle, bronze age in this region. The sample was principally derived from five pits (see Pia 1980, figure 3) although some material was also found in the occupation level. The material was not, however, evenly distributed between the different areas.

Although there was a total of 1463 bones recovered, only 31.8% could be identified to the species level (table 1). A very restricted range of species was found. This may be explained partly by the general fragmentary nature of the sample and the poor preservation of some of the bones in that bones of smaller species may not have been recoverable. In addition the deposits were not, in general, fine sieved so that smaller bones may have been missed during excavation. However, in the small sample which was sieved, no small bone fragments were found. Domestic species constitute 97.8% of the sample in terms of the number of fragments and it is clare that game animals were of little subsistential importance. Cattle were the dominant species with caprines also being fairly common. Pigs are found in relatively small numbers. Red deer and bird bones are also found but in insignificant numbers.

TABLE 1 - S. Salvatore, Ostiano: identifiable fragments.

	Pit I	Pit II	Pit III	Pit IV	Pit V	General	Total
Cattle	128	23	8	87	2	37	285
Red deer	1	—	5	1	—	—	7
Cattle/deer	—	—	2	—	—	—	2
Caprines	48	11	10	24	7	19	119
Pigs	31	2	2	6	(1)*	9	51
Bird	1	—	—	—	—	—	1
Total identifiable	209	36	27	118	10	65	465
Ribs and vertebrae	40	2	10	20	3	2	77
Unidentifiable	553	75	95	67	22	109	921
Total	802	113	132	205	35	176	1463
% identifiable to species	26.9%	31.9%	20.5%	57.6%	28.6%	37.4%	31.8%

(1)* This one bone was found in the 30cm diameter inner core of pit V

TABLE 2 - Relative percentage of fragments of the four mammalian species.

	Pit I	Pit II	Pit III	Pit IV	Pit V	General	Total
Cattle	61.5	63.9	29.6	73.8	20.0	56.9	61.5
Red deer	0.5	—	18.5	0.8	—	—	1.5
Cattle/deer	—	—	7.4	—	—	—	0.4
Caprines	23.1	30.6	37.1	20.3	70.0	29.2	25.6
Pigs	14.9	5.5	7.4	5.1	10.0	13.9	11.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The relationship between the main species in terms of the number of fragments may be seen in table 2. There is a certain amount of variation between the different units with pits III and IV being quite different to the other areas in terms of the relative proportions of the species. Overall, however, cattle are predominant followed by caprines and then pigs.

In table 3 the more precise composition of the sample may be seen. In general a wide range of elements of cattle are found although the limb extremities are not well represented. For caprines and pigs there is a more limited range with a pre-

TABLE 3 - Anatomical elements of the three main species.

	Horn/antler	Mandible	Maxilla	Teeth	Skull	Scapula	Humerus	Radius	Ulna	Carpal	Metacarpal	Atlas	Axis	Pelvis	Femur	Patella	Tibia	Astragalus	Calcaneum	Nav. cuboid	Tarsal	Metatarsal	Phalange 1	Phalange 2	Phalange 3	Metapodial
Pit I																										
Cattle	37	8	6	8	9	3	11	11		4				6	6		9	1				7				2
Pig		14	3	5	9																					
Caprine		8		3	30		2	2														2				1
Pit II																										
Cattle	2	7	1	3	2		2			1							1						1			3
Pig			1	1																						
Caprine	1			3	4				1												1					
Pit III																										
Cattle		2			2		2													1						
Pig							1										1									
Caprine					5	1		1							1		1					1				
Pit IV																										
Cattle		18	3	12	4	1	5	10	1	3				5	1		10	2	1			8	1		2	
Pig		3		2				1																		
Caprine		2		4	2	2		5		3				1	1		2					1				1
Pit V																										
Cattle								2																		
Pig																	1									
Caprine	1			1	3			1									1									
General																										
Cattle		25	3	4							1						2	1								1
Pig		1	2	3		1																				
Caprine	2			10	2					1					2			1								1

dominance of capital elements. This may be an actual occurrence but it may also be a reflection of other factors. These elements are perhaps more readily identifiable even when relatively fragmented. Teeth, because of their robust structure, are more likely to survive than other bone types. In addition, it seems probable that these are less susceptible to pre-depositional destruction and fragmentation because of the lack of associated usable resources. Therefore, although this may be indicative of certain butchery practices, the evidence is inconclusive, especially when the sample is so small.

TABLE 4 - Minimum number of individuals.

	Results for whole sample		Cumulative results for each individual unit	
Cattle	6	50.0%	14	35.8%
Red deer	1	8.3%	3	7.7%
Caprines	2	16.7%	9	23.1%
Pigs	2	16.7%	12	30.8%
Bird	1	8.3%	1	2.6%
Total	12	100.0%	39	100.0%

The calculation of proportions based on the number of fragments is open to much criticism so in tables 4 and 5 two other methods are used. The minimum number of individuals count eliminates such possible biases as different numbers of bones per species, different potential amounts of fragmentation, variations in the use of animals, and post-depositional fragmentation. Two sets of results are given for each species. The first assumes that the sample is one entity, that is, that any one animal could be found in more than one context. The second assumes that each pit is an individual sample. The figures have been calculated by one of two methods:

1. the grater number of left or right of any one tooth type, when at least half the tooth is present in each case;
2. the greater number of left or right of the proximal or distal epiphysis of a limb bone.

Consideration of age and stature also have to be included in both cases. The results in general corroborate the picture obtained previously; with cattle being the dominant species represented and caprines being present in fair numbers. Pigs are still of slight importance. The high figure for pigs in column 2 of table 4 is not necessarily of particular segnificance and probably is due mainly to the tendency of minimum number of individuals calculations to overemphasise the less common species present, rather than being a true reflection of the situation.

The relative proportions of the three major species in terms of the potential contribution to the meat supply is shown in table 5. The figures for meat weight are based on those given by Cram (1967: 79). This further demonstrates the enormous importance of cattle in the subsistence regime, with both pigs and caprines being of slight inportance in comparison.

TABLE 5 - Proportion of the meat supply potentially contributed by the three major species.

% of fragments x meat weight expressed as a percentage of the total								
	Meat weight per animal in kg.	Pit I	Pit II	Pit III	Pit IV	Pit V	General	Total
Cattle	226	91.4%	93.0%	83.2%	95.5%	65.7%	90.0%	92.1%
Caprines	27	4.1	5.4	12.6	3.2	27.7	5.6	4.6
Pigs	45	4.5	1.6	4.2	1.3	6.6	4.4	3.3
Titol		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

% of minimum number of inidviduals x meat weight expressed as a percentage of the total			
	Meat weigt per animal in kg.	Whole sample	Cumulative results
Cattle	226	90.3%	80.0%
Caprines	27	3.6	6.2
Pigs	45	6.1	13.8

TABLE 6 - Mortality data.

	FUSION			DENTITION		
		less than	more than		less than	more than
Cattle	12/18	1	12	5/6	2	2 2 3
	18/24	—	1	15/18	2	4
	24/30	1	6	24/30		3
	30/36	2	4	28/36	2 2	
	36/48	6	4			
Caprines	10	—	2	3/5		1 2
	18/24	1	—	9/12		4
	36/42	—	1	18/24		2
				21/24	1	3
Pigs				4/6		1 5
				12/16	1	
				17/22		7

Comparatively few data are available on the mortality ages of the animals represented in the sample (table 6). The ages have been calculated on the basis of either the dentition or the fusion of the limb bones. The figures for the dentition are based on those given by Silver (1969) and Grant (1975) and for the fusion on Silver (1969). Althougt there are problems due to diachronically differential rates of development, the general patterns which emerge are valid. For cattle the range of ages is from below 12/18 months to over 36/48 months although, on the basis of tooth wear, no really old animals are found. The majority of bones are, however, from animals of 3-4 years of age. For caprines the evidence is less. One animal appears to have died whilst less than 18-24 months but the rest of the sample may be mature animals. The evidence for pigs is based solely on dentition. One animal died whilst young but the majority were culled when mature.

Relatively few bones could be measured because of the high level of fragmentation. Those measurements that were possible are listed in the appendix. In figure 1 the width and thickness of the distal epiphysis of cattle tibia are shown in comparison with those from other sites in Italy as described by Barker (1972, 1975, 1976, 1977-79). The measurements from S. Salvatore, Ostiano are spread throughout the range of neolithic and bronze age data. The specimens do not seem therefore to be markedly large or small.

Although there is no actual evidence for the presence of goats as opposed to sheep as all horn cores are of sheep and the main distinguishing bones are not present, this does not mean that goats are not contained in the sample.

Discussion

It therefore seems that a mixed economy was prevalent at S. Salvatore, Ostiano. The cattle, which were of stature comparable to other neolithic and bronze age examples in Italy, were raised for a variety of reasons such as meat, hides, milk and breeding. The absence of aged animals suggests that cattle were not used for traction. Caprines were probably of little significance as a meat resource and may have been kept principally for their live products. Pigs may have been raised within a slow-fattening regime and culled when they had reached an optimum weigth with respect to effort involved in their upkeep.

The type of economy suggested by the faunal material fits in well with the archaeobotanical evidence (Nisbet 1980). A broad base is again indicated with barley (**Hordeum vulgare**) and wheat (**Triticum aestivum-compactum** Schiem., **Triticum compactum** Host.) associated with a variety of wild resources such as hazel nuts (**Corylus avellana**) and cornelian cherries (**Cornus mas**). The evidence for mixed forest cover in the vicinity of the site indicates that an extensive system of

pig raising involving a slow-fattening regime would have perfectly feasible. This environment would have been suitable for such animals as deer so that it is somewhat surprising that they constitute such a small percentage (2.2%) of the total. With reference to the environment of the site it is also surprising that no fish remains were found as the site is on the former course of the River Oglio.

There does seem to be a certain amount of spatial variation in terms of the species present between the five pits. In particular pit III is markedly different to the general pattern. Firstly, deer remains, albeit includins 4 pieces of antler and only indicating at least one individual, are more numerous in terms of the number of fragments than in any other context. Secondly, caprines are more numerous than cattle. Thirdly, a smaller proportion of the bones is identifiable to the species level. This variation may be caused by various factors. It is possible that the remains are the debris of tool manufacture. This would be supported by the fact that deer remains, including antler, are quite common. Alternatively the differences may be due to pits having been used at different periods in the occupation of the site. Seasonality may also have caused differences. However, it is impossible to provide the exact cause of the variation and the possibility does in fact remain that it is an artificial rather than a real phenomenon caused by the relatively small size of the sample.

The data must now be compared with other samples of the same date and/or from the same area. The comparison will be made with Monte Covolo (phase 4) (BARKER 1977-79), Barche di Solferino (RIEDEL 1976, 1977) and Isolone della Prevaldesca (RIEDEL 1975, 1977). Barche di Solferino is of early-middle bronze age date, Monte Covolo (phase 4) of early-middle bronze age date and Isolone della Prevaldesca is an early, middle and late bronze age site.

Monte Covolo (phase 4). Although a similar proportion of the sample was identifiable to the species level, a wider range of species was found. The relationship between the main species is quite different for at Monte Covolo the sample is fairly evenly split between cattle, pigs and caprines both in terms of the number of fragments and the minimum number of individuals. As far as it is possible to tell, however, the way in which the animals were exploited was very similar.

Barche di Solferino. Again a far wider range of species was found here and a much larger proportion (87%) was identifiable. The proportion of cattle, caprines and pigs are similar to Monte Covolo (phase 4). Young animals constitute more than half of the sample, with immature pigs being particularly predominant. A mixed economy was still however prevalent.

Isolone della Prevaldesca. A considerable proportion (97%) of this sample was identifiable and there is a fairly wide range of species present. The proportions of the three main species are more similar to S. Salvatore, Ostiano than the other two sites although pigs are of more importance.

That the sample from S. Salvatore, Ostiano is not precisely typical of settlements of similar date or in the same area is apparent from the above brief comparisons. The basic constituents are, however, essentially the same. In brief, the economic strategy revealed by the faunal material, and, in addition the archaeobotanical and general archaeological data, suggests a mixed and well balanced subsistence regime with both cereal agriculture and stock raising, adapted to the specific micro-environmental context of the site.

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APPENDIX: METRIC DATA FROM S. SALVATORE, OSTIANO

The following measurements were taken (all in millimetres). L = maximum length of a complete bone.

Mandible: 1. maximum lenght M3 – 2. maximum length M3-M1 – 3. maximum length P4-P2

Maxilla: 1. maximum length M3

Scapula: 1. maximum thickness distal epiphysis – 2. maximum thickness distal articulation

Humerus: 1. maximum width distal epiphysis – 2. maximum thickness distal epiphysis – 3. maximum height distal articulation – 4. maximum width distal articulation

Metacarpal: 1. maximum width proximal epiphxsis – 2. maximum width proximal epiphysis – 3. maximum width distal fusion point – 4. maximum thickness distal fusion point – 5. maximum width distal epiphysis

Tibia: 1. maximum width distal epiphysis – 2. maximum thickness distal epiphysis

Astragalus: 1. maximum lenght lateral side – 2. maximum thickness lateral side, measured from baseline to anterior side – 3. maximum length medial side

Metatarsal: 1. maximum width proximal epiphysis – 2. maximum thickness proximal epiphysis – 3. maximum width distal fusion point – 4. maximum thickness distal fusion point – 5. maximum width distal epiphysis

CATTLE							
Phase	Bone	1	2	3	4	5	L
IV	Mandible	32.1	78.1	44.3			
I	Scapula	53.1	49.9				
I		54.0	49.5				
I	Humerus	71.7	64.8	38.0	67.9		
I		71.3	74.0	36.3	70.8		
I		75.3	78.6	42.5	73.5		
IV		70.4		34.5	74.5		
IV				43.4			
IV		77.6	68.1	44.2	74.8		
I	Radius	80.3	78.4	42.2	36.3		
I		79.0	76.6				
IV				38.8			
IV		71.7	69.8	39.1	35.3		
IV		81.1	78.9	44.2	42.2		
I	Metacarpal	51.8	31.2				
I				49.9	29.5	56.0	
IV		54.9	33.3				
I	Tibia	63.1	45.5				
I		49.8	35.7				
IV		51.6	36.8				
IV		58.3	41.2				
General		64.7	46.4				
I	Astragalus	51.3	28.6	55.9			
IV		52.0	31.1	56.7			
IV		56.7	34.8	65.2			
General		59.9	36.5	67.3			
I	Metatarsal	46.9	46.0	51.0	38.3	54.9	228.0
IV		42.6	43.4				
IV		50.1	47.0				
PIGS							
I	Mandible	29.5	62.1				
General		28.1	62.4				
I	Maxilla	30.0					
I		26.4					
CAPRINES							
I	Mandible	17.6					
IV		19.9					
I	Humerus	28.3	18.9	17.2	29.2		
IV	Metacarpal	19.2	13.5				
General	Astragalus	25.4	15.8	27.4			

RIASSUNTO

La campagna 1980 a S. Salvatore, Ostiano (Cremona) ha restituito una piccola quantità di resti faunistici. Lo studio di questi reperti si è rivelato estremamente importante perché questo materiale data all'antica età del Bronzo, e non all'antica-media età del Bronzo, come al solito. L'economia della stazione era basata essenzialmente sui bovini, mentre minore era il contributo alimentare di capre/pecore e di suidi. I cervi erano di significato minimo. Forse, i bovini avevano anche importanza per la pelle, per i prodotti della latteria e per l'allevamento. Le misure ossee di questi animali sono state paragonate con quelle di altri giacimenti italiani studiati da Barker. Pare che l'economia di questa stazione non è precisamente la stessa degli altri insediamenti dell'antica età del Bronzo in Italia settentrionale, come Monte Covolo (fase 4), Barche di Solferino e Isolone della Prevaldesca. Brevemente, il materiale suggerisce una economia mista e ben equilibrata con l'agricoltura e l'allevamento, adatto al contesto specifico e micro-ambientale della stazione.

RÉSUMÉ

Les fouilles à S. Salvatore, Ostiano (Cremona) en 1980 ont produit une petite quantité de restes de faune. L'étude de ces restes est d'une grande importace parce-que cet échantillon appartient au Bronze Ancien et non a l'âge du Bronze Ancien-Moyen comme d'habitude. L'économie vivrière de ce gisement était basée essenitellement sur les bovins, avec seulement une petite contribution alimentaire des caprines et des porcines. Les cerfs étaient d'une importance minime. Peut-être les bovins étaient aussi importants pour leurs peaux, leurs profuits laitiers et pour l'élévage. Les mesures prises des ossements sont assez comparables avec celles d'autres échantillons d'Italie étudiés par Barker. Il paraît que l'économie de ce gisement n'est pas précisement identique à celle des autres gisements du Bronze Ancien en Italie septentrional, comme Monte Covolo (phase 4), Barche di Solferino et Isolone della Prevaldesca. En résumé, l'tude de cet échantillon deifaune indique une économie mixte et bien quilibré avec l'agriculture et l'élévage, adaptée au micro-environnement spécifique du gisement.

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