PAPERS AND MONOGRAPHS OF THE FINNISH INSTITUTE AT ATHENS VOL. XVI

THESPROTIA EXPEDITION II
ENVIRONMENT AND SETTLEMENT PATTERNS

Edited by Björn Forsén and Esko Tikkala

ISSN 1237-2684
ISBN 978-952-67211-2-5

Printed in Finland by Ekenäs Tryckeri

Cover: Megalo Karvounari seen from the northeast. Courtesy of the 32nd Ephorate for Prehistoric and Classical Antiquities

Layout: Esko Tikkala

Contents

A Tower of Meals: Trenches A and F of Agios Donatos

Vivi Deckwirth

Introduction

The archaeological site known as PS 25 is an Early Hellenistic fortress located on a spur on the west side of the Paramythia mountain range. The spur forms a low hill (ca. 220 masl) known as Agios Donatos of Zervochori, with a broad view over the Kokytos valley to the south, west and north. Archaeological excavations conducted by the Thesprotia Expedition took place at the site in 2006-2009.[1] The aim of this article is to focus on the osteological fauna remains of Trench A from the excavation in 2007.[2] Trench A is located inside the only tower of the fortress and was excavated in 2006 and 2007.[3] The osteological fauna material from the excavation in 2006 at the site has already been presented and discussed by Niskanen in the first volume of the *Thesprotia Expedition*.[4] Beside Early Hellenistic finds and faunal remains, Trench A produced Roman coins, fibulae and other metal objects, as well as glass and terra sigillata pottery,[5] thus indicating an extensive re-use of the fortress in Early Roman times.

The first article discussing the osteological fauna material compared the composition of the bones recovered in 2006 at PS 25 and at the Kokytos valley bottom site of Mavromandilia, also known as PS 36, providing a comparison of the subsistence of the Early Roman period with the Early Iron Age.[6] The analysis showed a difference between the sites in the species diversity and their relative abundance. PS 25 showed, for example, a higher percentage of sheep and pig bones than PS 36, but cattle was more abundant at PS 36, which also had the only identified horse bones.[7]

In this article I am going to compare the faunal composition of the various stratigraphical layers, identified in the 2007 excavation, of Trench A. The find material of diverse metal objects and pottery, as well as the locating of a *cocciopesto* floor, allows the identification of distinct stratigraphical layers from the late second and third century AD (Loci 1-2), the first century AD (Loci 4-16) and the late third to second century BC (Loci 17-18). Because locus 3 represents a mixed layer,[8] the results of the osteological analysis of that material have been omitted from this presentation and discussion. The comparison of the faunal composition of these time periods will provide us more information on the subsistence economic aspects of Thesprotia and, especially, the Kokytos valley, during a

---

[1] See e.g. Forsén and Reynolds, this volume.

[2] A more extensive article on the fauna osteological material from the field seasons 2007-2010 of the Thesprotia Expedition at PS 25 and at the valley bottom sites PS 29 and PS 12 is in preparation by the author of this article for the third volume of the Thesprotia Expedition.

[3] See e.g. Suha 2009; Forsén and Reynolds, this volume.

[4] Niskanen 2009.

[5] For the terra sigillata pottery see Ikäheimo 2009 and Ikäheimo, this volume.

[6] Niskanen 2009.

[7] Niskanen 2009, 146-147, esp. fig. 1.

[8] B. Forsén, personal communication; Forsén and Reynolds, this volume.

time span from the Hellenistic to the Middle Roman period. An important reference site in this matter is the archaeological hill site of Kassope, located near the coast, in southern Epirus. The site is dated between 360-30 BC and its osteological fauna material has been presented in the dissertation of Friedl[9] and subsequently discussed by Boessneck.[10]

Identified taxa and their relative abundance

Most of the fragments from Trench A (76.2%) derive from the layer of the first century AD (Loci 4-16). The layers of the late second to third century AD (Loci 1-2) and of the late third to second century BC (Loci 17-18) represent 22.8% and 1.0% of the bones, respectively (Fig. 1). The layers of the late second to third century AD and that of the first century AD have a more abundant species diversity than that of the late third to second century BC. However, the number of the recovered and identified fragments is very small in the lowermost stratigraphical layer, making the interpretation of its remains difficult, especially as the aim of this article is a comparison of the faunal composition between the identified periods of time. The number of bone fragments from the lowermost layer can hardly be considered as representative or suitable for making reliable comparisons. However, loci 7-9 from Trench F at Agios Donatos date to the late second to early first century BC,[11] and would thus provide a further time-bound sample for the observation of possible changes in the animal-based subsistence. Trench F is located circa 55 metres southwest of Trench A, on the east side of the apse of the small chapel of Agios Donatos.[12] It was excavated in the field seasons of 2008 and 2009.

The total number of analyzed bone fragments for this article from Trench A is 1846 pieces (excluding locus 3 with 391 fragments).[13] Of these, 531 fragments (28.8%) are assigned to the mammalian animal class only, without further identification to anatomical position, genus or species level, and six pieces (0.3%) unidentified as to animal class, genus, species and anatomical position. 838 fragments (45.4%) were identified only as being mammalian of origin, but allowed also the determination of their anatomical position. If possible, these fragments have been further subcategorized as belonging to a big-, middle-, small- or very small-sized mammal, in order to gain at least some more benefit from them. Some of the bones allowed even a further identification to order level, such as a middle-sized cloven-hoofed animal (*Artiodactyla*), or even to the suborder *ruminantia*. There were also plenty of shells recovered from Trench A during the excavation in 2007, as well as from Trench F, but unfortunately they have been stored apart from the bones and so far neither been counted nor analyzed further.[14] Subsequently, they have been omitted from the presentation of the absolute and relative proportions of the different animal taxa in this article (Fig. 1). This should be kept in mind when

---

[9] Friedl 1984.
[10] Boessneck 1986.
[11] B. Forsén, personal communication.
[12] Forsén and Reynolds, this volume.
[13] A minor part of the bone fragments from trench A were analysed by Markku Niskanen and the major part, as well as those from Trench F, by the author of this article.
[14] B. Forsén, personal communication.

making interpretations. A fine exotic addition in Trench A is the presence of two pieces of a tortoise shell (0.1% of all fragments).

The total amount of analyzed fragments from loci 7-9 of Trench F is 336 pieces. Of these, 97% (326/336) are mammalian and 2.7% (9/336) are bird bones (Fig. 1). Only one fragment was unidentifiable as to animal class and anatomical position. There were also bird bones in the material from Trench A, representing 1.8% (34/1846) of all fragments there.

The identified animal taxa had some minor variation in their relative abundance in the different stratigraphical layers (Fig. 1). The size and other state of preservation of the bone fragments from the lowest layer in Trench A (i.e. the late third to second century BC) allowed no identifications at all to genus or species level. However, all fragments (19 pieces) from there could be identified as mammalian in origin, some of them belonging to middle- or big-sized ruminants (5 pieces). These include teeth of middle- and big-sized ruminants, and one shaft piece of a metatarsal bone of a big-sized ruminant. Other identifications as to anatomical position consisted of three long bone shaft fragments. Also in all the other layers of Trenches A and F (i.e. from the late second/early first century BC through to the third century AD) the mammalian category is the most abundantly represented (97.0-97.8%), followed by birds (1.6-2.7%). Tortoises were identified only in the layer of the late second to third century AD of Trench A.

It is remarkable that there are no fish bones in any of the layers from Trench A or F. In the osteological material from the excavation in 2006 there was identified only one vertebra of a large trout-size-category fish.[15] Due to their structure they, as well as bird bones and shells, are less likely to be preserved in archaeological contexts. Since the whole soil material from Trench A was sieved during the excavations in 2006 and 2007,[16] this under-representation might be due to insufficient familiarity of the excavators with the respective animal remains (recognition).

The best-preserved bones in the osteological material are those with a compact structure, like metapodia, phalanges and tarsal bones, as well as teeth. The three first-named bone types also mostly allow an accurate identification to genus level, if the important morphological features are well enough preserved, and provide good samples for measurements for size estimations, as well as for possible sexing.[17] The state of preservation is of special interest when differentiating two species with very close osteomorphological resemblance to each other, for example sheep (*Ovis aries*) and goat (*Capra hircus*). The most accurate identification is based on the presence of as many morphological features as possible. Unfortunately, there usually are not enough features preserved, thus leading to the designation of a fragment as belonging to the category of *ovicaprids* only. The identified different genera and their variation in time will be discussed more properly in the following.

Cloven-hoofed animals

Middle- and big-sized cloven-hoofed animals (*Artiodactyla*) are represented in the material by various ruminants and the genus pig (*Sus*). Quite many fragments could be

---

[15] Niskanen 2009, 152 and fig. 1.
[16] B. Forsén, personal communication. However, the mesh size is not known.
[17] Berteaux and Guintard 1995.

	Trench A						Trench F	
	Including teeth			Excluding teeth			Including teeth	Excluding teeth
	Late 2nd to 3rd cent. AD	1st cent. AD	Late 3rd to 2nd cent. BC	Late 2nd to 3rd cent. AD	1st cent. AD	Late 3rd to 2nd cent. BC	Late 2nd to early 1st cent. BC	
Mammalia	409 (97.4%)	1376 (97.8%)	19 (100%)	367 (97.1%)	1235 (97.6%)	15 (100%)	326 (97.0%)	317 (96.9%)
Aves	7 (1.6%)	27 (1.9%)		7 (1.9%)	27 (2.1%)		9 (2.7%)	9 (2.8%)
Testudines	2 (0.5%)			2 (0.5%)				
Pisces								
Indet. to taxa	2 (0.5%)	4 (0.3%)		2 (0.5%)	4 (0.3%)		1 (0.3%)	1 (0.3%)
Total	420 (100%)	1407 (100%)	19 (100%)	378 (100%)	1266 (100%)	15 (100%)	336 (100%)	327 (100%)
Total	1846 pieces			1659 pieces			336 pieces	327 pieces

Fig. 1. The absolute and relative proportions of the different animal taxa identified from the distinct stratigraphical layers in Trench A (Loci 1-2, 4-16 and 17-18) and Trench F (Loci 7-9). Indet. = indeterminable.

	Trench A						Trench F	
	Including teeth			Excluding teeth			Including teeth	Excluding teeth
	Late 2nd to 3rd cent. AD	1st cent. AD	Late 3rd to 2nd cent. BC	Late 2nd to 3rd cent. AD	1st cent. AD	Late 3rd to 2nd cent. BC	Late 2nd to early 1st cent. BC	
Bos	2 (2.6%)	33 (10.2%)		1 (2.5%)	27 (14.1%)		2 (8.0%)	1 (6.2%)
Sus	8 (10.2%)	102 (31.5%)		4 (10.0%)	50 (26.0%)		5 (20.0%)	2 (12.5%)
Ovis	2 (2.6%)	86 (26.5%)		2 (5.0%)	48 (25.0%)		1 (4.0%)	1 (6.2%)
Capra		4 (1.2%)			4 (2.1%)		1 (4.0%)	1 (6.2%)
Ovis/Capra	33 (42.3%)	36 (11.1%)		13 (32.5%)	14 (7.3%)		4 (16.0%)	4 (25.0%)
Cervus		19 (5.9%)			19 (9.9%)		5 (20.0%)	5 (31.3%)
Lepus		14 (4.3%)			14 (7.3%)			
Mesoruminantia	31 (39.7%)	28 (8.6%)	3 (60.0%)	18 (45.0%)	14 (7.3%)	1 (100%)	4 (16.0%)	2 (12.5%)
Megaruminantia	2 (2.6%)	2 (0.6%)	2 (40.0%)	2 (5.0%)	2 (1.0%)	1 (100%)	3 (12.0%)	
Total	78 (100%)	324 (100%)	5 (100%)	40 (100%)	192 (100%)		25 (100%)	16 (100%)

Fig. 2. The absolute and relative proportions of the different identified mammalian genera and the suborder of ruminants from the distinct stratigraphical layers in Trench A (Loci 1-2, 4-16 and 17-18) and Trench F (Loci 7-9).

identified as belonging to the animal suborder ruminants (*Ruminantia*), but due to their poor state of preservation could not be accurately assigned further to the genus *Ovis/Capra*, *Bos* or *Cervus*. However, because of their relative amount in the analyzed material, I have also taken this category into account for the evaluation of the analysis results for this article (Fig. 2). The results confirm the importance of the middle-sized ruminants, especially the category of ovicaprids, as the major part of the animal-based subsistence from the late second/early first century BC till the late second to third century AD. The anatomical distribution suggests a processing of whole carcasses, and the fragments also contain some immature individuals.

Ovicaprids

Sheep (*Ovis aries*) and goat (*Capra hircus*) are difficult to distinguish from each other if the osteomorphology is not well preserved.[18] The reliability of an accurate identification rises with the amount of preserved distinct morphological features. The state of preservation of some of the fragments allowed a distinction between sheep and goat (Fig. 2). The results suggest that sheep was more common than goat during all periods in question. A similar result is observable in the osteological material of Kassope.[19] The category of ovicaprids is also there the most important one, before pig, cattle and red deer, respectively. The identified bones of ovicaprids from Trench F contain tarsal bones, proximal or distal long bone pieces, one glenoid fossa of the shoulder blade as well as one rostral mandibular fragment. Trench A has furthermore metapodial and hyoid bone fragments, phalanges, vertebrae, as well as abundant teeth. The anatomical distribution indicates the processing of whole animals. The material in Trench F consisted only of bones from adult individuals, whereas the layer of the first century AD in Trench A also had some fragments of young animals.

Cattle

The distinction between bone fragments of cattle (*Bos taurus*) and red deer (*Cervus elaphus*) can be difficult due to the fragmentary and otherwise poor state of preservation. However, though both species are very similar in skeleton size and shape, the bones of red deer are generally more slender and the attachments for muscles are more strongly formed, thus giving some indication of origin.[20] In uncertain cases the identification as a big-sized ruminant seems adequate for the purpose of this article.

The importance of cattle seems to keep its place behind the ovicaprids and pig from the late second/early first century BC onwards till the late second to third century AD (Fig. 2). Their relative abundance is highest during the first century AD, but shows a drop with time (together with pig) for the benefit of the ovicaprids. In the layer of the late second to third century AD there was only one fragment (distal femur) of an immature individual, which indicates the use of young animals. The anatomical distribution of the fragments from the other layers indicates the processing of whole adult animals. Quite many of these bones were from the distal parts of the extremities, which do not have much meat on them, but contain fat-rich bone marrow.

---

[18] Boessneck 1969; Payne 1985; Pohlmeyer 1985; Prummel and Frisch 1986.
[19] Boessneck 1986, Tabelle a.
[20] Prummel 1988.

Deer

The genus *Cervus* is presented by 19 fragments in the layer of the first century AD and by 5 fragments in the layer of the late second/early first century BC. The other layers that were analysed did not contain any identifiable fragments. Most of the identified fragments (14 pieces) of the first century AD derive from antlers, indicating the presence of red deer (*Cervus elaphus*) and a smaller deer species. This could be the fallow deer (*Dama dama*), which is present in the Bronze and Iron Age contexts at Kastanas in Macedonia[21], and possibly also with one astragalus at Agios Donatos in the excavation material of 2006 from Trench A.[22] Red deer is represented at PS 25 during the first century AD also by fragments of the shoulder blade, a metapodial and a second phalanx as well as a piece of the mandibula with a few teeth. All these fragments belong to an adult individual. Red deer had already been identified in Trench A excavation material of 2006 with antler fragments and a second phalanx,[23] and now similar remains (two antler fragments and three phalanges of adult individuals) have been recognised in Trench F in the late second/early first century BC. Two of these phalanges showed pathological features described in more detail below. When comparing the relative proportions between the different species and at different periods of time, it is interesting to see that the genus *Cervus* in the late second/early first century BC is right behind the ovicaprids, and more abundant than pig or cattle, whereas in the first century AD their importance has dropped behind pig and cattle (Fig. 2).

Pigs

Bones and teeth of the genus pig (*Sus*) are present in the layers of the first and the late second to third century AD, as well as in the layer of the late second/early first century BC (Fig. 2). They are relatively most abundant in the first century AD, but always situated in importance after the category of ovicaprids and before cattle. The identified fragments represent almost all anatomical parts of the body: pieces and teeth of the upper and lower jaws, fragments of the shoulder blade, metapodials, phalanges, as well as pieces of the long bones of the front and hind legs (radius, ulna and femur) and pelvis. In Trench A the composition of the recovered teeth (deciduous and permanent) indicates the presence of adult and young individuals. Young animals are represented also by fragments of the upper and lower jaws as well as metapodials and phalanges. Adult individuals of both sexes are also present in Trench A, as indicated by the distinct canini. The length of the boar tusks varies from 29 to over 95 mm[24], thus indicating also the possible presence of wild pig. For the differentiation of wild and domestic pig in fragmented archaeological material, the size of the molar area (esp. M_3) and the tusk are the most useful criteria.[25] The material from Trench F is scarce, consisting only of three pieces of teeth as well as two tarsal bones. All of them belong to adult individuals.

---

[21] Becker 1986.
[22] Niskanen 2009, 151.
[23] Niskanen 2009, 151.
[24] This tusk measures 95 mm, but has a broken-off tip: M. Niskanen, personal communication.
[25] E.g. Bökönyi 1973, 1974 and 1984; Hillson 1986, 91; Davis 1987.

Birds and fishes

Bones of birds (*Aves*), as well as those of fish (*Pisces*), are most likely under-represented in the material due to their less durable structure and size. However, also without proper excavation methods (e.g. very fine-meshed sieves)[26] and some knowledge of how they look, the bones of these animal classes tend to have a lesser recovery rate. In contrast to the one fish vertebra from 2006, there are no fish bones at all in any of the layers from Trench A or F excavated in 2007 and 2008-2009 (Fig. 1). Considering the previous identification and the fact that, for example, a river runs as close as in the valley bottom, it seems highly probable that fish was also part of the subsistence at Agios Donatos during the time periods in question, but does not show itself in this recovered material. Considering the various taphonomical factors affecting the bones of a sample after the killing of an animal, it should be kept in mind that the absence of a species in an archaeological sample does not directly exclude its existence or usage as part of the subsistence in a given area *in toto*.

There were no identified bird bones in the layer of the late third to second century BC (Fig. 1). Of all the identified bird bones, 62.8% (27/43 pieces) derive from the layer of the first century AD, whereas only 16.3% (7/43 pieces) are from the layer of the late second to third century AD and 20.9% (9/43) from the layer of the late second/early first century BC. The precise identification of bird species from bones faces problems, since there are many species which are similar in their osteological morphology and size.[27] In the analysed material, most identified pieces were fragments of long bone shafts without any preserved features to allow a more accurate classification. However, some pieces could be identified as fragments of a femur, a tibia, a tarso-metatarsus and the proximal synsacrum (frontal part of the fused caudal vertebra column) of a chicken-sized bird. Especially the tibia and the tarso-metatarsus confirmed the presence of domestic fowl at the site during the first century AD. Other anatomical parts present were fragments of the coracoid (part of the pectoral girdle), humerus and radius, but their state of preservation allowed no accurate identification of either size or species. However, the anatomical composition of the fragments indicates that birds were probably handled as whole carcasses at the site. There was also one fragment of a long bone indicating the utilization of immature individuals. The bone material from the layer of the late second/early first century BC in Trench F contained nine bird bone fragments, representing 2.7% of all animal bones from the layer. The anatomical composition was similar to that of Trench A, with most fragments deriving from long bones, affirming the presence of domestic fowl (7/9 pieces) also during this period of time. One of the fragments was a tarso-metatarsus with a spur, thus indicating the presence of a male. All identified fragments in the material from this layer seem to belong to adult individuals. An intriguing find from 2008 are some egg shell fragments from Trench F. However, they have not yet been further analyzed.[28]

---

[26] As already mentioned, a sieve was used only during the excavations in 2006 and 2007.
[27] E.g. Cohen and Serjeantson 1996.
[28] B. Forsén, personal communication.

Dogs

The osteological material of the first century AD from Trench A had three fragments of phalanges, which are possibly dog (*Canis familiaris*) in origin. Two of them had unfused epiphyses, thus indicating the presence of an immature individual. A maxillary fragment of a rather small-sized domestic dog was already identified in the excavation material of 2006 from PS 25.[29] At the site of Kassope different sizes of dogs are known, but the most common type there is that of a slender spitz kind of dog.[30] There were no identified fragments of dog in the analyzed osteological material of the other layers from Trenches A and F at Agios Donatos.

Exotics

Both Trench A in 2007 and Trench F in 2008-2009 produced shells in large quantities. Unfortunately, they have not yet been counted nor further analysed,[31] and thus are omitted from Fig. 1, which presents the absolute and relative proportions of the different taxa in the animal-based subsistence at Agios Donatos. However, Niskanen reports[32] the preliminary results of the analysis of the shells recovered at the excavation in 2006 from PS 25. David E. Reese has identified them as *Cerastoderma glaucum* (cockle), *Hexaplex trunculus* and *Haustellum brandaris* (sea snail species, both previously known under *Murex* sp.) as well as various *Helix* species (land snail). Some of them are also present at Kassope, being used there as food as well as a source for the colours of purple red and purple blue.[33]

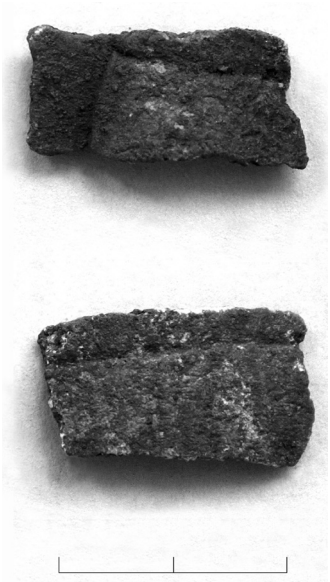

Fig. 3. Two fragments of a tortoise (*Testudines*) shell from the layer of the late second to third century AD in Trench A.

Two pieces of a tortoise (*Testudines*) shell in the layer of the late second to third century AD in Trench A represent another exotic species in the material from 2007 (Fig. 1 and 3). There were no such identifications among the bones of 2006, nor in Trench F. However, at Kassope there are, in addition to shell pieces, also fragments of bones bearing butchering marks, thus indicating their utilization to enrich the cooking.[34] Still, there are so far no identified bones of the order *Testudines* in the refuse fauna at Agios Donatos. So the shell fragments should be interpreted with caution and cannot be taken as definite evidence for using tortoises as a food resource at this site.

---

[29] Niskanen 2009, 147.
[30] Boessneck 1986, 138-139.
[31] B. Forsén, personal communication.
[32] Niskanen 2009, 146, esp. note 8.
[33] Boessneck 1986, 140 and Tabelle e.
[34] Boessneck 1986, 139 and Tabelle a.

Noteworthy is also the identification of the genus *Lepus* in the material of the first century AD. There were none in the other layers of Trench A (or in the material from the excavation in 2006), nor in Trench F. But as already mentioned, this does not exclude their possible usage also during other times. Almost all the identified fragments were from long bones of the front and hind extremities. The presence of a fragment from the proximal shoulder blade confirms the handling of those parts with most meat. The genus *Lepus* is also present at Kassope.[35]

Butchering marks and pathological features

Butchering and cutting marks are evident on some fragments of vertebrae, scapulae and long bone shaft pieces, proximal and distal ends as well as rib bones and phalanges of adult and young animals. The locations of the marks indicate a predetermined mode of cutting to dismember and further divide the carcasses, to make the handling easier and to use as much as possible of them. For example, the utilization of the fat-rich spine and bone marrow is finely indicated by some vertebrae split in half.

Pathological features were identified only on two bones deriving from the layer of the late second/early first century BC in Trench F. Both of them are phalanges and belong to red deer. One showed minor extra bone formation (*exostoses*) near the lateral distal condylus, and the other a more marked modification of the whole phalanx due to inflammation of the articular face and the bone structure beneath (*arthritis* and *osteitis*/*osteomyelitis*).

Conclusions and discussion

Based on the various find materials it is possible to distinguish three layers in Trench A at PS 25, representing the late second to third century AD, the first century AD as well as the late third to second century BC. However, the osteological material from the latter layer was very scarce and allowed no identifications beyond animal class, except a few fragments of middle- and big-sized ruminants. Thus, in order to expand the comparison of the faunal composition of the subsistence also into the pre-Christian era, the osteological material from loci 7-9 in Trench F, dated to the late second to early first century BC, was included in this study as well.

The fauna osteological remains of Trenches A and F at PS 25 show moderate differences in their animal composition and more variation in their relative proportions in the different periods of time examined here. The category of ovicaprids is the most abundant in all periods examined, and furthermore, sheep seem to be more plentiful than goat. This is consistent with the material from Kassope, dated between 360-30 BC, and the Early Roman material from the excavation at Agios Donatos in 2006.[36] However, at the Early Iron Age site PS 36 cattle is more abundant than the ovicaprids, and pig represents only a minority there, together with horse.[37] It is interesting to notice that there

---

[35] Boessneck 1986.
[36] Boessneck 1986; Niskanen 2009.
[37] Niskanen 2009.

are so far no remains of any equids among the bones from PS 25. The relative importance of cattle and pig seems to reverse permanently at some stage during the middle of the first millennium BC,[38] with pig already being more abundant than cattle in the material dated to the late second/early first century BC at PS 25.

It is noteworthy that the composition of the fauna in the material of the late second/early first century BC has changed also in another respect. The importance of cervids in the subsistence has risen, and poses the second animal category after ovicaprids in the subsistence economy. Pig and cattle come only behind these species. This shift to a more wild-mammal-based subsistence towards the end of the pre-Christian era is also present, and more evident, in the material from Kassope, where the relative proportion of wild animals can be followed more continuously from the fourth till the first century BC.[39]

During the first century AD the relative proportions of the fauna compositions change once again. The category of ovicaprids is still the most abundant, after which come pig and cattle, respectively. Cervids, on the other hand, now represent only a minor part and are subsequently missing from the material of the late second to third century AD. However, as already stated, the fact that a species is non-existent in an archaeological fauna sample does not imply that it was not exploited at all during the period in question. This concerns also the category of fish. Although all the soil from Trench A at PS 25 was sieved in 2006 and 2007, there was only one vertebra of a large trout-size-category fish recovered in 2006. Due to various taphonomical factors, bones of fish and birds, as well as shells, are usually under-represented in archaeological samples. This explains also the low amount of preserved bird bones, allowing only the identification of domestic fowl in the layers of the first centuries BC and AD. The animal class of mollusca was left out from the interpretation of the results, since they have not yet been counted or analysed. However, there were plenty of them recovered during the excavations in Trench A, as well as Trench F. A good equivalent for this is again Kassope, with various kinds of shells identified.[40]

The results of this examination of the fauna osteological material from the excavations of Trenches A and F at PS 25 add to and confirm the previous observations on the animal-based subsistence in the Kokytos river valley and those at the nearby site of Kassope. They also are in accordance with ancient literary sources stating that Epirus had a strong animal husbandry-based economy from the Archaic period into Roman times.[41] The shift in the animal species observed could be linked with the economic situation of the first century BC described by Hernandez.[42] Epirus then traded secondary products (wool, skins, milk and cheese) for grain. However, in my opinion, the trade could also include animals like sheep and goats *in toto*, and thus would present itself as a declining proportion of these animals in the faunal remains, with other animal sources (e.g. wild mammals) more abundant. Further possible environmental, political and other social backgrounds causing the noticed shifts in the relative proportions of the various species have already been discussed by Niskanen in his article concerning the finds from PS 25

[38] Niskanen 2009, 152.
[39] Boessneck 1986, 138 and esp. Tabelle 136.
[40] Boessneck 1986.
[41] Hernandez 2010, 65-80.
[42] Hernandez 2010, 79-80.

and PS 36 in 2006.[43] Additional knowledge of the changing animal-based subsistence patterns in Thesprotia will be gained through the analysis of the remaining osteological material from the excavations by the Thesprotia Expedition at PS 25 as well as at the sites of PS 12 and PS 29.

[43] Niskanen 2009, 152-153.

Bibliography

Becker 1986 = V.C. Becker, *Kastanas: Die Tierknochenfunde* (Prähistorische Archäologie in Südosteuropa 5), Berlin 1986.

Berteaux and Guintard 1995 = D. Berteaux and C. Guintard, 'Osteometric Study of the Metapodials of Amsterdam Island Feral Cattle', *Acta Theriologica* 40 (1995), 97-110.

Boessneck 1969 = J. Boessneck, 'Osteological Differences between Sheep (*Ovis aries Linné*) and Goat (*Capra hircus Linné*)', in D. Brothwell and E. Higgs (eds.), *Science in Archaeology. A Survey of Progress and Research* (2nd ed.), London 1969.

Boessneck 1986 = J. Boessneck, 'Zooarchäologische Ergebnisse an den Tierknochen- und Molluskenfunden', in W. Hoepfner and E.-L. Schwandner (eds.), *Haus und Stadt im klassischen Griechenland* (Wohnen in der klassischen Polis 1), Munich 1986, 136-140.

Bökönyi 1973 = S. Bökönyi, 'Stock breeding', in D.R. Theocharis (ed.), *Neolithic Greece*, Athens 1973, 165-178.

Bökönyi 1974 = S. Bökönyi, *History of Domestic Mammals in Central and Eastern Europe*, Budapest 1974.

Bökönyi 1984 = S. Bökönyi, *Animal Husbandry and Hunting in Tác-Gorsium*, Budapest 1984.

Cohen and Serjeantson 1996 = A. Cohen and D. Serjeantson, *A Manual for the Identification of Bird Bones from Archaeological Sites*, London 1996.

Davis 1987 = S.J.M. Davis, *The Archaeology of Animals*, London 1987, 133-154.

Friedl 1984 = H. Friedl, *Tierknochenfunde aus Kassope/Griechenland (4.-1. Jh. v. Chr.)*, unpubl. PhD diss., University of Munich 1984.

Hernandez 2010 = D.R. Hernandez, *Excavations of the Roman Forum at Butrint (2004-2007): The Archaeology of a Hellenistic and Roman Port in Epirus*, unpubl. PhD diss., University of Cincinnati 2010.

Hillson 1986 = S. Hillson, *Teeth* (Cambridge Manuals in Archaeology), Cambridge 1986, 90-92.

Ikäheimo 2009 = J.P. Ikäheimo, 'Stamped Terra Sigillata from Agios Donatos', in B. Forsén (ed.), *Thesprotia Expedition* I. *Towards a Regional History* (PMFIA XV), Helsinki 2009, 155-165.

Niskanen 2009 = M. Niskanen, 'A Shift in Animal Species Used for Food from the Early Iron Age to the Roman Period', in B. Forsén (ed.), *Thesprotia Expedition* I. Towards a Regional History (PMFIA XV), Helsinki 2009, 145-154.

Payne 1985 = S. Payne, 'Morphological Distinctions between the Mandibular Teeth of Young Sheep, *Ovis*, and Goats, *Capra*', *Journal of Archaeological Science* 1985, 12, 139-147.

Pohlmeyer 1985 = K. Pohlmeyer, *Zur vergleichenden Anatomie von Damtier (Dama dama L. 1758), Schaf (Ovis aries L. 1758) und Ziege (Capra hircus L. 1758). Osteologie und postnatale Osteogenese*, Berlin 1985.

Prummel 1988 = W. Prummel, *Distinguishing Features on Postcranial Skeletal Elements of Cattle, Bos primigenius f. taurus, and Red Deer, Cervus elaphus* (Schriften aus der archäologisch-zoologischen Arbeitsgruppe Schleswig-Kiel 12), Kiel 1988.

Prummel and Frisch 1986 = W. Prummel and H.-J. Frisch, 'A Guide for the Distinction of Species, Sex and Body Side in Bones of Sheep and Goat', *JAS* 1986, 13, 567-577.

Suha 2009 = M. Suha, 'The Fortification Walls of Agios Donatos', in B. Forsén (ed.), *Thesprotia Expedition* I. *Towards a Regional History* (PMFIA XV), Helsinki 2009, 119-132.

PAPERS AND MONOGRAPHS OF THE FINNISH INSTITUTE AT ATHENS

I Paavo Castrén (ed.), POST-HERULIAN ATHENS. ASPECTS OF LIFE AND CULTURE IN ATHENS, A.D. 267-529. Helsinki 1994. ISBN 951-95295-2-7. xi + 192 pp. + 34 figs. (Out of Print)

II Björn Forsén and Greg Stanton (eds.), THE PNYX IN THE HISTORY OF ATHENS. PROCEEDINGS OF AN INTERNATIONAL COLLOQUIUM ORGANISED BY THE FINNISH INSTITUTE AT ATHENS, 7-9 OCTOBER 1994. Helsinki 1996. ISBN 951-95295-3-5. vi + 142 pp. + 2 pls. + 68 figs.

III Petra Pakkanen, INTERPRETING EARLY HELLENISTIC RELIGION. A STUDY BASED ON THE MYSTERY CULT OF DEMETER AND THE CULT OF ISIS. Helsinki 1996. ISBN 951-95295-4-3. 170 pp. + app.

IV Björn Forsén, GRIECHISCHE GLIEDERWEIHUNGEN. EINE UNTERSUCHUNG ZU IHRER TYPOLOGIE UND IHRER RELIGIONS- UND SOZIALGESCHICHTLICHEN BEDEUTUNG. Helsinki 1996. ISBN 951-95295-5-1. ii + 225 S. + 115 Abb.

V Arja Karivieri, THE ATHENIAN LAMP INDUSTRY IN LATE ANTIQUITY. Helsinki 1996. ISBN 951-95295-6-X. ii + 328 pp. + 39 figs. + 56 pls.

VI Jaakko Frösén (ed.), EARLY HELLENISTIC ATHENS. SYMPTOMS OF A CHANGE. Helsinki 1997. ISBN 951-95295-7-8. iv + 226 pp. + 16 pls.

VII Olli Salomies (ed.), THE GREEK EAST IN THE ROMAN CONTEXT. PROCEEDINGS OF A COLLOQUIUM ORGANIZED BY THE FINNISH INSTITUTE AT ATHENS, MAY 21 AND 22, 1999. Helsinki 2001. ISBN 951-98806-0-7. iii + 217 pp. + 9 pls. + 3 maps.

VIII Leena Pietilä-Castrén and Marjaana Vesterinen (eds.), GRAPTA POIKILA I. Helsinki 2003. ISBN 951-98806-1-5. 133 pp.

IX Maria Gourdouba, Leena Pietilä-Castrén and Esko Tikkala (eds.), THE EASTERN MEDITERRANEAN IN THE LATE ANTIQUE AND EARLY BYZANTINE PERIODS. Helsinki 2004. ISBN 951-98806-3-1. 98 pp.

X Petra Pakkanen, AUGUST MYHRBERG AND NORTH-EUROPEAN PHILHELLENISM. BUILDING A MYTH OF A HERO. Helsinki 2006. ISBN 951-98806-5-8. 260 pp.

XI Leena Pietilä-Castrén, THE GRAECO-ROMAN TERRACOTTA FIGURINES OF FINLAND AND THEIR COLLECTORS. Helsinki 2007. ISBN 978-951-98806-6-2. 100 pp.

XII Maria Niku, THE OFFICIAL STATUS OF THE FOREIGN RESIDENTS IN ATHENS, 322–120 B.C. Helsinki 2007. ISBN 978-951-98806-7-9. ii + 181 pp. + app.

XIII Björn Forsén and Giovanni Salmeri (eds.), THE PROVINCE STRIKES BACK. IMPERIAL DYNAMICS IN THE EASTERN MEDITERRANEAN. Helsinki 2008. ISBN 978-951-98806-8-6. 215 pp.

XIV Leena Pietilä-Castrén and Vesa Vahtikari (eds.), GRAPTA POIKILA II. SAINTS AND HEROES. Helsinki 2008. ISBN 978-951-98806-9-3. 133 pp.

XV Björn Forsén (ed.), THESPROTIA EXPEDITION I. TOWARDS A REGIONAL HISTORY. Helsinki 2009. ISBN 978-952-67211-0-1. ii + 276 pp.

XVI Björn Forsén and Esko Tikkala (eds.), THESPROTIA EXPEDITION II. ENVIRONMENT AND SETTLEMENT PATTERNS. Helsinki 2011. ISBN 978-952-67211-2-5. iii + 392 pp.

Distribution:
Bookstore Tiedekirja, Kirkkokatu 14, FI-00170 Helsinki, Finland (fax: + 358-9-635 017, e-mail: tiedekirja@tsv.fi)
Hestia Bookstore, Solonos 60, GR-10672 Athens, Greece (fax: +30-210-360 6759, e-mail: sales@estiabookstore.gr)

FINNISH INSTITUTE AT ATHENS