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EARLY NEOLITHIC VERTEBRATE FAUNA FROM LÁNYCSÓK-ÉGETTMALOM

On the Mohács Plain of southern Transdanubia I. Ecsedy and N. Kalicz carried out a rescue excavation in a part of the Lánycsók village fields called Égettmalom in 1976.[1] The site is located on a little hill west of the village and 7 to 8 kms from the Danube river. From the west and the south it is surrounded by the meander of a creek, and this fact made it an ideal and easily defensible settlement place. Thus, it is not surprising that its archaeologically explored part yielded finds from not less than eleven cultures and periods.[2] They are as follow: Neolithic (Starčevo culture, Lengyel culture), Copper Age (Balaton group, Boleraz group), Bronze Age (Vučedol-Zók culture, Somogyvár-Vinkovci culture, Kisapostag culture, culture of incrusted pottery, Urnfield culture), late La Tène period and Migration (Avar) period.

Out of the cultures and periods of the site enumerated above only the features from the Balaton group and the Avar period did not contain animal remains while those of every other culture yielded greater or lesser quantities of animal bones. More than two thirds of the animal remains were unearthed in the pits of the Starčevo culture. In fact, this is also a bone sample suitable for faunal studies. As the number of the bones recovered in pits of other cultures is too small for faunal studies, I will not deal with them in detail and will give only the lists and frequencies of the occurring species in *Table 1.*

In the site, the earliest neolithic Starčevo culture was represented by 13 (No. 1, 2, 9, 12, 13, 15, 24, 25, 26, 28, 29, 30, 31.) pits. The occurrence of the finds of this culture is very important because "on this basis it is justified to distinguish a Körös and a Starčevo line within the Körös-Starčevo-complex in Hungary too".[3]

Based on the appearance of painted pottery in the site the settlement can be dated to the first half of the lifetime of the Starčevo culture.[4]

Out of the 13 pits of the Starčevo culture, 11 yielded animal remains. Only pits No. 26 and 28 did not contain such finds. The number of bones found in any given pit is rather variable, the smallest quantity (2 specimens) coming from pits No. 15 and 29 and the largest (521 specimens nearly half of the total bone sample) from pit No. 2. From the archaezoological viewpoint, the greatest importance of the animal bone sample of Lánycsók-Égettmalom is that this is the first archaezoologically studied animal bone assemblage of this culture from the territory of Hungary.

The animal bone sample of Lánycsók-Égettmalom (from now on this means the animal bone sample of the Starčevo culture on the site) shows nearly all the characteristics of typical settlement materials: whole skeletons, larger skeletal parts with bones in anatomical order, absence of skulls and the rare occurrence of larger skull fragments suitable for type determination or whole horncores. The whole bone sample contains only two hornless brain skull fragments (sheep), three other

[1] Ecsedy (1977) 119 ff.
[2] Ecsedy (1977) 120 ff.
[3] N. Kalicz: Früh- und spätneolitische Funde in der Gemarkung des Ortes Lánycsók (Vorbericht) PécsiMuzÉvk 22 (1977) 143.
[4] Ibid.

Table 1

The fauna list of the cultures represented by small animal bone samples. 1. Lengyel culture, 2. Boleraz group, 3. Vučedol-Zók culture, 4. Kisapostag culture, 5. Somogyvár-Vinkovci culture, 6. Culture of incrustedpottery, 7. Urnfield culture, 8. Late La Tene culture.

	1	2	3	4	5	6	7	8
cattle — Bos taurus	12	19	21	5	12	4	3	5
sheep — Ovis aries L.	4	11	2	1	—	—	3	1
goat — Capra hircus L.	2	—	—	—	—	—	1	2
sheep or goat — Ovis s. Capra	14	46	38	4	5	1	6	4
pig — Sus scrofa dom L.	7	9	46	6	58	1	6	—
dog — Canis familiaris L.		6	—	2	—	—	4	—
domestic animals	39	91	107	18	75	6	23	12
aurochs — Bos primigenius Boj.	—	2	—	—	1	—	—	—
reed deer — Cervus elaphus L.	—	43	—	2	4	—	4	—
roe deer — Capreolus capreolus L.	—	—	1	—	—	—	—	—
wild swine — Sus scofa fer. L.	—	3	—	—	3	—	—	—
brown hare — Lepus europaeus Pall.	—	—	2	—	1	—	—	—
pond tortoise — Emys orbicularis L.	—	1	—	—	—	—	—	—
wild animals	—	49	3	2	9	—	4	—
total	39	140	110	20	84	6	27	12

Table 2

The species occurring and their ratios

	specimen %		individual %	
cattle — Bos taurus L.	209	20.51	14	13.73
sheep — Ovis aries L. / goat — Capra hircus L.	791	77.63	79	77.45
pig — Sus scrofa dom. L.	16	1.57	7	6.86
dog — Canis familiaris L.	3	0.29	2	1.96
domestic animals	1019	100.00	102	100.00
aurochs — Bos primigenius Boj.	31	60.78	9	47.37
red deer — Cervus elaphus L.	13	25.49	4	21.06
roe deer — Capreolus capreolus L.	1	1.96	1	5.25
wild swine — Sus scrofa fer. L.	3	5.88	2	10.53
brown hare — Lepus europaeus Pall.	1	1.96	1	5.26
bird — Avis sp. ind.	1	1.96	1	5.26
pike — Esox lucius L.	1	1.96	1	5.26
wild animals	51	100.00	19	100.00
total	1070		121	

brain skull fragments with one horn-core (sheep), eight brain skull fragments with parts of one or both horn-cores (six sheep, two goats), two whole horn-cores (sheep) and two horn-core fragments (goats). Among the extremity bones, whole long bones are rare. Again only three humeri (sheep), one metacarpal (goat) and four metatarsals (three sheep and one goat) were preserved in this way, while all others are fragmented. Among the latter, the number of measurable specimens is small, only 54, not because they were in a very bad state of preservation but rather because the overwhelming majority of them are caprovine bones without any further species identification possible. It would therefore have been senseless to measure them. The bones rarely show marks of burning

and very rarely butchering marks. The latter always come from light implements (blades) and never from heavy ones (axes) suggesting that only the removal of the flesh was carried out with stone implements while the break-up of the bones was probably done with big unworked stones or wooden sticks.

Out of the animal remains found in the pits of the Starčevo culture at Lánycsók-Égettmalom, 1070 specimens were identified. The species occurring and their ratios are given in *Table 2*.

As Table 2 shows, the animal remains identified at Lánycsók-Égettmalom represent a rather poor fauna with a small number of species. In this fauna there can be found only the five domestic species — cattle, sheep, goat, pig, and dog — which occur in every Neolithic site of temperate belt Europe, as well as seven wild species.

Thus, the poorness of the fauna in species reflects the small number of wild species. In fact, the wild fauna — not counting the four main wild species (aurochs, red deer, roe deer and wild swine) of the Neolithic — consists of just one more wild mammal species, the brown hare, an unidentifiable bird species, and finally a fish species, the pike. It is particularly conspicuous that among the wild mammals not a single carnivore species appears although they can be found in the fauna of practically every Early Neolithic site of Hungary. One should therefore not assume that in Lánycsók, the people of the Starčevo culture did not hunt wild carnivores. They had to do that not just in order to protect their domestic stock, but also for procuring the precious furs. Remains of wild carnivores do occur in Starčevo sites in Yugoslavia.[5] In the case of Lánycsók-Égettmalom one must assume that even a bone sample over a thousand specimens is not representative in every detail. (This, — at the same time, — raises a serious question about the faunal evaluation of bone samples coming from the excavations of very small parts of settlements.)

There is an ungulate species also missing from the wild fauna. This is the European wild ass (Asinus hydruntinus Reg.) although its absence is less conspicuous than that of the wild carnivores. It is true however, that this species can generally be found in the early Neolithic sites of Hungary although not in all of them and never in large quantities. It also may be possible that this ass was rarer in the hilly, more forested regions of Transdanubia than on the great Hungarian Plain that provided an excellent habitat for this forest-steppe species. In this way, the ass was less often killed. This, plus the not very large sample, could easily result in the absence of the species in the bone sample of Lánycsók-Égettmalom.

Finally, one must speak about the rarity of fish bones at the site. Since the settlement was located on a peninsula-like hill, one can hardly suppose that its inhabitants did not fish. Furthermore, the only fish bone that comes from a large pike suggests that they made fishing excursions to the Danube or procured Danube fishes through exchange because such a large carnivorous fish could hardly live in a small creek. In this case, one must again raise the question of whether the sample is representative in every detail. It could also be true however, that fishing did not really play an essential role in securing animal protein for the inhabitants.

In comparison to animal husbandry, hunting also seems to be of secondary importance, at least relative to the domestic part of the fauna, both on the basis of the number of specimens and the number of individuals. The ratio of domestic to those of wild animals was 95.32 : 4.68 on the basis of the number of specimens and 84.30 : 15.70 on the basis of the approximate number of individuals. In the Early Neolithic such a high domestic ratio has been found only in the Greek,[6] the southern Yugoslav[7] and perhaps three Hungarian (Körös culture) sites.[8] If one compares the meat quantities of the domestic and wild animals however, the picture changes essentially (see later).

[5] Bökönyi (1970) 1703; (1976) 318.
[6] Boessneck (1962) 7, 10; Higgs (1962) 272; Jarman–Jarman (1968) 8.
[7] Bökönyi (1976) 315, 317.
[8] Bökönyi (Divostin) 9; (1977) 7.

As was mentioned earlier and as Table 2 also clearly shows, the two leading species of the animal husbandry were sheep and goat in Lányecsók-Égettmalom. They together comprised — both in the number of specimens and the number of individuals — more than three-quarters of all the domestic animals. (Sheep were far more common than goats with five sheep to each goat. This is generally so in Early Neolithic sites of Southeast Europe.) Cattle stood in next place representing ca. one fifth of the bones and nearly 14 per cent of the individuals. The pig (1.57 and 6.86 per cent respectively) and the dog (0.29 and 1.96 per cent respectively) were very rare in the domestic fauna.

The leading role of the caprovines in Early Neolithic domestic fauna of the Balkans and the Carpathian Basin is well-known. Probably the only exceptions are two settlements of the Starčevo culture, Divostin in Serbia and Lepenski Vir III on the Yugoslav side of the Iron Gate gorge of the Danube[9] and a Körös settlement in Transylvania:[10] in these sites cattle are more frequent than caprovines. Nevertheless, it is not yet clear because of the scarcity of the data, what role the more forested environment, certainly not an ideal environment for sheep-goat keeping, plays in this respect or to what extent it is an ethnic characteristic of these cultures. At any rate, one should keep the following in mind: the bone samples of the Transylvanian Körös settlements are so small that an exact evaluation is not possible on the one hand and may be the result of an unexact bone collecting procedure on the other (in such latter cases the large cattle bones and not the small caprovine remains are generally collected) then, Lepenski Vir lies in a special geographical environment which is not at all suitable for sheep-goat keeping and its economy resulted from particular local development, finally, cattle were only slightly more frequent than caprovines in Divostin.

North of Greece, cattle, not counting the three cases mentioned above, always fell behind the caprovines and before the pig in the Early Neolithic domestic faunas.

Table 3

The frequencies of the domestic species and the domestic-wild-ratio in Early Neolithic settlements of the Balkans and the Carpathian Basin

	cattle	sheep goat	pig	dog	domestic animals	wild animals	specimens
Argissa Magula[11]	4.76	84.15	9.99	0.18	99.08	0.92	
Nea Nikomedeia[12]	14.55	70.45	14.77	0.23	93.00	7.00	
Knossos[13]	16.25	65.27	17.14	1.24	99.95	0.05	2025
Achilleion[14]	4.02	88.04	6.93	1.01	93.14	6.86	961
Anza I—III[15]	9.80	79.56	9.26	1.38	95.75	4.25	3250
Divostin I[16]	50.82	44.63	3.82	0.73	91.55	8.45	2401
Lepenski Vir III[17]	62.09	13.41	1.32	23.18	25.50	74.50	2369
Ludas-Budzsák[18]	13.13	86.13	0.37	0.37	79.08	20.92	2735
Gura Baçiului[19]	57.06	36.47	5.88	0.59	96.59	3.41	176
Letul Vechi[20]	34.78	60.87	4.35	—	93.88	6.12	49
Maroslele-Pana[21]	26.52	70.16	1.66	1.66	67.04	32.96	275
Gyálarét[22]	30.37	63.56	4.67	1.40	73.05	26.95	393
Röszke-Ludvár[23]	17.96	76.41	1.64	3.99	40.82	59.18	2088
Deszk-Olajkút[24]	29.39	70.21	0.20	0.20	80.16	19.84	
Tiszajenő-Szárazérpart[25]	26.44	72.84	0.48	0.24	91.23	8.77	456

[9] BÖKÖNYI (Divostin) 9; (1970) 1703 f.
[10] NECRASOV (1961) 266.
[11] BOESSNECK (1962) 7.
[12] HIGGS (1962) 272.
[13] JARMAN—JARMAN (1968).
[14] BÖKÖNYI (Achilleion) 7.
[15] BÖKÖNYI (1976) 317.
[16] BÖKÖNYI (Divostin) 9.
[17] BÖKÖNYI (1970) 1703.
[18] BÖKÖNYI (1974) 436.
[19] NECRASOV (1961) 266; (1964) 169.
[20] NECRASOV (1964) 169.
[21] S. BÖKÖNYI: A maroslele—panai neolithikus telep gerinces faunája (The vertebrate fauna of the neolithic settlement at Maroslele—Pana) ArchÉrt 91 (1964) 87.
[22] BÖKÖNYI (1974) 364.
[23] BÖKÖNYI (1974) 396.
[24] BÖKÖNYI (1977) 7.
[25] Ibid.

As regards the ratios of the domestic species and the importance of animal keeping in comparison to hunting, the Early Neolithic domestic fauna of Lánycsók-Égettmalom resembles most those of the Starčevo culture of Anza (Yugoslav Macedonia) among the Early Neolithic sites of the Balkan Peninsula and the Carpathian Basin (see *Table 3).*

The only difference between the domestic faunas of Anza and Lánycsók-Égettmalom is that in Anza the ratio of cattle is a little lower and that of the pig is a little higher than in Lánycsók. This latter is caused by the fact that first Anza lies very near Greece, in a similar geographical environment, and second that in the Early Neolithic sites of Greece, pig was more frequent than cattle.

As for the sites of the Early Neolithic Körös culture in Hungary, the fauna of Lánycsók-Égettmalom shows an extreme similarity to that of Tiszajenő-Szárazérpart. Not counting the domestic-wild ratio, but the frequencies of the domestic species, the fauna of Lánycsók-Égettmalom resembles those of practically each Körös settlement, particularly those of Maroslele-Pana and Röszke-Ludvár. Thus, one may reasonably assume that both the Starčevo and the Körös culture had the same Southeast European animal husbandry type of Near Eastern origin.[26]

As regards hunting, it strongly dependend in the Early Neolithic of the Balkans and the Carpathian Basin but also in other regions and periods,[27] on the environment. There was no uniform hunting type. The locally frequent wild species were always hunted first. Thus, the fact that in Lánycsók-Égettmalom the aurochs was the most frequently killed species shows that it occurred in great numbers in the region although the huge amount of meat obtainable must also have played a role here in the choice of the kill.

At the same time, the fact that a given species occurred in the wild fauna of a site proved the existence of a well-determined ecozone, the habitat of the given species, somewhere in the vicinity of the lightly forested environment (forest steppe, Parklandschaft). The red deer prefers dense forest with much undergrowth, and wild swine likes the wet, although not necessarily wooded areas. The environmental needs of the brown hare are more or less similar to those of the aurochs and roe deer. Thus, the Early Neolithic inhabitants of Lánycsók-Égettmalom exploited these ecozones, and as the occurrence of a big pike proves, probably made fishing excursions to the Danube.

The distribution of the bone samples of the different species according to bone types is given in Table 4.

Returning to the detailed discussion of the different domestic and wild species, it can be stated that the 209 domestic *cattle* remains come from 4 juvenile, 6 subadult and 4 adult individuals. The cattle bone sample shows a rather bad state of preservation. Its best specimens are a left horn-core (its base fragmented, its tip broken off) and a right horn-core fragment. The whole horn-core *(Fig. 1; 1)* is medium long, more than medium thick with a nearly circular cross-section and a form resembling that of the aurochs's horn-core. The horn-core fragment *(Fig. 1; 2)* comes from a definitely thicker and in all probability longer horn-core than that of the one above. It is a little flattened, and its form cannot be determined. It cannot come from an aurochs because its wall is much thinner than that of the aurochs horn-cores. In all probability, the whole horn-core is from a cow and the horn-core fragment is from a bull. Both specimens represent individuals of the so-called primigenius type similar to the aurochs. As is well-known, the overwhelming majority of the early domestic cattle unsurprisingly belonged to this craniological type since their wild ancestor also had the same craniological features.

Unfortunately, there are no whole metapodials among the cattle remains, and the withers height can therefore not be determined. The great majority of the few measurable extremity bone

[26] Bökönyi (1977) 5.

[27] S. Bökönyi: Environmental and cultural differences as reflected in the animal bone samples from five early neolithic sites in Southwest Asia. In: R. H. Meadow—M. A. Zeder: Approaches to faunal analysis in the Middle East. PeabodyMusBull 2 (1978) 61.

Table 4

Bone kind frequencies in the different species

	1	2	3	4	5	6	7	8	9	10	11	total
brain skull fragment	18	36	4	—	—	2	—	—	—	—	—	60
naso-facial fragment	17	48	1	—	1	—	—	—	—	—	1	68
horn-core + antler	6	8	—	—	1	3	—	—	—	—	—	18
upper tooth	6	3	—	—	1	1	—	—	—	—	—	11
mandible	16	122	3	—	3	—	—	—	—	—	—	144
lower tooth	1	—	3	1	3	—	—	—	—	—	—	8
cervical vertebra	14	65	—	1	2	1	—	—	—	—	—	83
dorsal vertebra	8	11	—	—	1	—	—	—	1	—	—	21
lumbar vertebra	—	29	—	—	—	—	—	—	—	—	—	29
os sacrum	—	4	—	—	—	—	—	—	—	—	—	4
caudal vertebra	—	—	—	—	1	—	—	—	—	—	—	1
rib	—	4	—	—	—	—	—	—	—	—	—	4
scapula	10	34	2	—	1	—	—	—	—	—	—	47
humerus	7	61	—	—	—	—	—	—	—	—	—	68
radius	14	68	1	—	2	3	—	1	—	—	—	89
ulna	9	18	—	—	—	—	1	—	—	—	—	28
carpal	1	3	—	—	—	1	—	—	—	—	—	5
metacarpal	10	24	—	—	—	—	—	—	—	1	—	35
pelvis	7	46	—	1	—	—	—	—	—	—	—	54
femur	11	73	—	—	5	1	—	—	—	—	—	90
patella	1	—	—	—	1	—	—	—	—	—	—	2
tibia	9	89	2	—	5	1	—	1	—	—	—	107
tarsal	14	13	—	—	—	—	—	—	—	—	—	27
metatarsal	7	24	—	—	—	—	—	1	—	—	—	32
phalanx I	14	7	—	—	3	—	—	—	—	—	—	24
phalanx II	4	1	—	—	1	—	—	—	—	—	—	6
phalanx III	5	—	—	—	—	—	—	—	—	—	—	5
altogether	209	791	16	3	31	13	1	3	1	1	1	1070

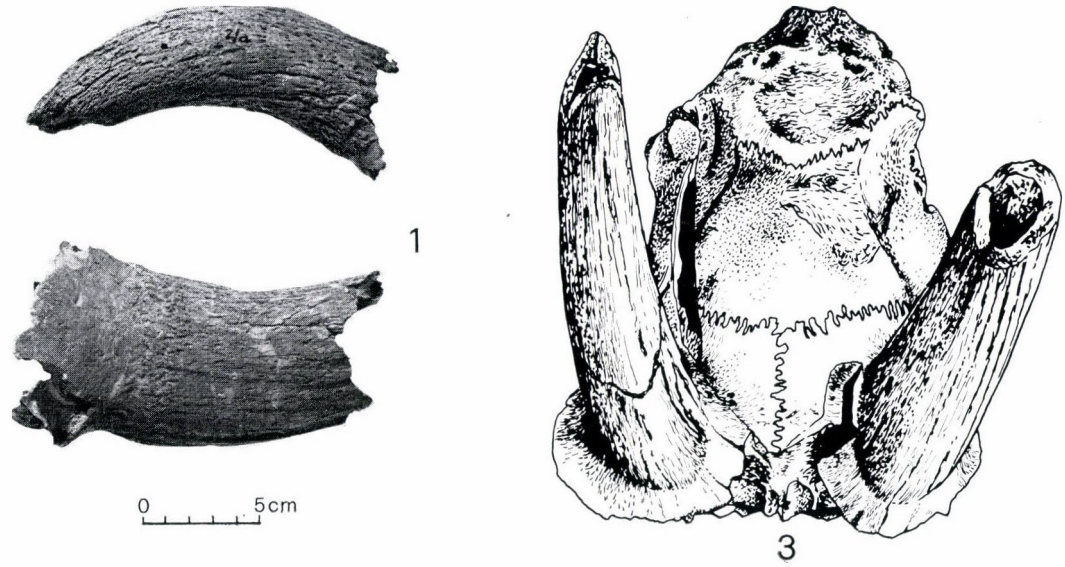
1. cattle, 2. sheep/goat, 3. pig, 4. dog, 5. aurochs, 6. red deer, 7. roe deer, 8. wild swine, 9. brown hare 10. bird, 11. pike

fragments are from large cattle. Only a small proportion of them comes from medium size cattle Small cattle do not appear in the site. This picture is quite characteristic for the Early Neolithic sites of the Balkans and the Carpathian Basin. Also, it is characteristic that the so-called transitional individuals between the wild and domestic cattle (cross-breedings or more frequently freshly domesticated individuals) are also extremely rare. It is so in Lánycsók-Égettmalom as well: only a scapula fragment with 73.5 mm distal width points to such an individual. This means that even if local domestication of cattle had happened in the settlement, it was rare and of small importance.

The 791 caprovine bones are from 2 newborn, 11 juvenile, 33 subadult, 27 adult and 6 mature individuals. Out of these, 103 specimens representing 1 newborn, 2 juvenile, 12 subadult and 6 adult individuals come from *sheep*.

The sheep bone sample is the best preserved part of the animal bone assemblage of Lánycsók-Égettmalom. It contains not only skull fragments suitable for type determination, but also whole metatarsals that can be used for the calculation of the withers height, the most important characteristic of body size.

The sheep horn-cores of Lánycsók-Égettmalom can be divided into three groups: a. long heavy, outward leaning and twisted horn-cores with a cross-section triangular at their base and more flattened distally (copper sheep type, it is not represented by whole horn-cores only by fragments), b. short, slightly curved, non-twisted, goat horn-core-like but essentially shorter cores (palustris type = turbary sheep; 3 whole horn-cores *[Fig. 2; 1]* and 4 fragments), c. short, slightly



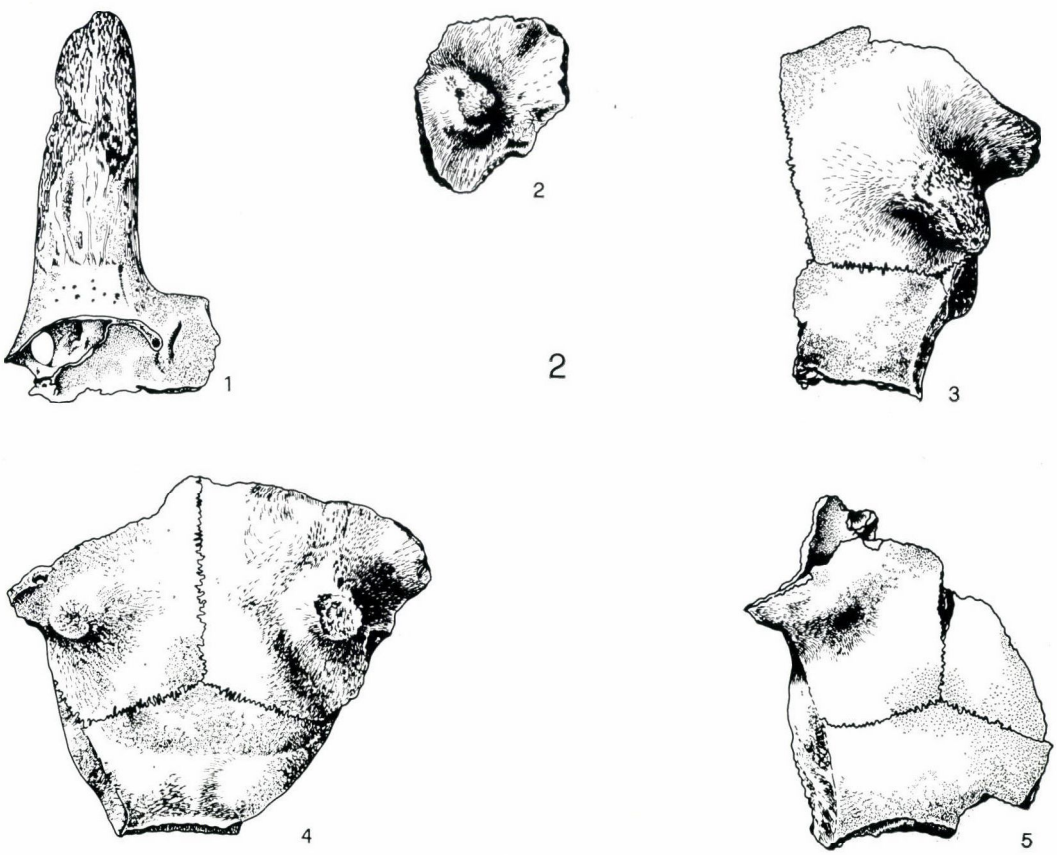


Fig. 1. Cattle horn-cores
Fig. 2. 1: Turbary sheep horn-core; 2—3: Brain skull fragments of sheep with rudimentary horn-cores; 4—5: Brain skull fragments of hornless sheep
Fig. 3. Goat brain skull fragment

curved, rudimentary horn-cores with an almost perfect circular cross-section (two specimens *Fig. 2; 2—3*).

Earlier the copper sheep and the turbary sheep were considered two distinct breeds although, since the studies of Reitsma[28] it has been known that the first constituted the male and the second the female of the European prehistoric sheep type. (Interestingly, one of the copper sheep horn-core fragments of the site is conspicuously large; it obviously comes from a ram which reached its full maturity.) The rudimentary horn-cores still developed under the influence of domestication in the Early Neolithic; they are probably from females. The hornless individuals (again resulting from domestication) also represent females *(Fig. 2; 4—5)*. The earliest hornless domestic sheep are known from the earliest, Bush Mordeh phase of the site of Ali Kosh, West Iran, ca. 7.500 B. C.[29] Hornless sheep reached Europe already with the first wave of domestic sheep (or developed as an independent mutation here) around the middle of the 7th mill. B. C.[30] They appeared in Hungary with the first sheep wave too and they can be found in practically every site of the Körös culture.[31]

If one considers the copper sheep males, the turbary, rudimentarily horned and hornless sheep females, then the ram-ewe ratio in the site is 2 : 10 (two turbary sheep horn-core fragments come from one individual).

From the ca. 112, 118 and ca. 121 mm length of the three whole metatarsals the withers heights calculated with Zalkin's coefficients[32] are 54.43, 57.35 and 58.81 cm respectively. Those withers heights are lower than the ca. 60 cm average withers height of the Neolithic sheep of the Carpathian Basin[33] although, they reach the ca. 55 cm average of those of the Balkans and Central Europe.[34] In fact, other measurable extremity bone fragments also belong to the same size category.

The 21 *goat* bones are from 5 subadult and 4 adult individuals.

The goat bone sample is nearly as good as that of the sheep for it contains a brain skull with two incomplete horn-cores *(Fig. 3)*, a right os frontale fragment with the basal part of the horn-core (the horn-cores of the first and the horn-core fragment of the second specimen can be measured), two horn-core fragments that are not measurable although, their type can be determined, one whole metacarpal and one metatarsal as well.

The basal horn-ceor fragment of the os frontale, — based on its considerable size —, comes from a buck. Unfortunately, its type cannot be determined. Remains of such large goat bucks often appear in early Neolithic sites of Southeast Europe and the Carpathian Basin. The three other horn-core and horn-core fragments respectively are of medium size, two of them belong to the so-called prisca type (outwards leaning and twisted), and the third one represents the so-called aegagrus type (non-twisted, scimitar form). It is very possible that all of them come from females. Thus, the ratio of males to females is 1 : 3. Although that is a normal sexual ratio, it nevertheless cannot be considered representative because of the small number of cases.

The withers heights determined with Schramm's coefficients[35] from the 97 mm greatest length of the whole metacarpus and the ca. 107 mm greatest length of the one whole metatarsus are 55.78 and 57.14 cm respectively. These point to rather small goats, obviously females. It is

[28] G. Reitsma: Zoologisch Onderzoek der Nederlandsche Terpen. 1. Her Schaap. Wageningen 1932, 45.

[29] Fr. Hole—K. V. Flannery: The prehistory of Southwestern Iran: a preliminary report. ProcPS 33 (1967) 172 f.

[30] Bökönyi (Achilleion) 22.

[31] Bökönyi (1974) 160.

[32] V. I. Zalkin: Izmenčivosty metapodij u ovec — The variability of metapodials in sheep. Bjull. Mosk. Obšč. Isprit. Prir., Otd. Biol. 66 (1961) 115—132.

[33] Bökönyi (1974) 167.

[34] S. Bökönyi: The introduction of sheep breeding to Europe. Ethnozootechn 21 (1978) 66.

[35] Z. Schramm: Kosci dlugie a wysokosc w klebie u kozy — Long bones and height in withers of goat. Roczn. Wyzsz. Szkol. Roln. w Poznan. 36 (1967) 89—105.

surprising because one is used to prehistoric goats which are generally larger than sheep. Also, three measurable extremity bone fragments fall into this size category but the radius fragment with 40 mm proximal width and the metatarsal fragment with 28.2 mm distal each point to large individuals, clearly bucks. They also show considerable sexual dimorphism.

The *pig* remains from the site — from 4 juvenile, 2 subadult and 1 adult individuals — as with the dog bones are in the worst state of preservation among the animal remains. None of them can be measured and thus it may only be said about them that they are from small individuals.

The three *dog* remains are from a subadult and an adult individual. They also can not be measured, but they clearly come from small animals obviously palustris group that was so widespread in the Neolithic.

The 31 bones from *aurochs*, the most common wild species, are from one juvenile, four subadult and four adult individuals. The most interesting specimen is a right horn-core fragment belonging to a strong bull. Among the measurable bones both a lower M_3 and a proximal radius fragment point to small to medium size individuals while a distal scapula fragment comes from a medium size animal. Probably all three were cows.

The 13 *red deer* bones are from both juvenile and subadult individuals, the age of two further individuals cannot be determined. The 50 mm distal width of the only measurable bone, a tibia fragment, represents a small deer, obviously a female. At the same time a shed antler fragment excels with its large size: its 265 mm burr circumference is above the well-known high average of the Neolithic red deer in Hungary.

The only *roe deer* bone coming from a subadult individual does not reveal anything about the size of the animal.

Out of the 3 *wild swine* bones — from a subadult and an adult individual — the adult metapodium is very big, obviously representing a boar while the size of the other animal cannot be judged.

The dorsal vertebra, the only *brown hare* remain from the site — comes from a subadult individual. It also does not give any information about the size of the animal.

The only *bird* bone from the site, a proximal carpo-metacarpal fragment, comes from a large but unidentifiable bird species.

Finally the *pike* maxilla fragment is from a large individual that — as already mentioned — could not live in the small creek in the vicinity of the settlement but was probably caught in the not very far distant Danube River.

As regards the exploitation of the different animal species of the settlement, it is obvious on the one hand that first of all the flesh of every species was consumed. Even the dog was no exception in this respect, and though Lányesók-Égettmalom yielded no evidence of this, dog bones broken up for the marrow and brain-cases opened for the brain demonstrate it in other Neolithic sites. (In Europe the consumption of dog meat ceased only around the end of the Bronze Age.[36]) If one knows, on the other hand, that animals kept for their meat were and still are slaughtered first in their juvenile and subadult ages, and that other "secondary" uses of the domestic animals (wool, milk, draught power, etc.) can be exploited if the animals reach their adult age, studying the age group proportions (kill-off patterns) of the domestic species of Lányesók-Égettmalom one can understand that such "secondary" exploitation could only exist in the case of cattle and caprovines and even there only to a very small extent. Even in these species adult individuals occurred in such small numbers in the settlement that they could essentially function only as members of

[36] Bökönyi (1974) 320.

the breeding stock increasing it at small rate. Of course, it could happen that the milk of the females of the breeding stock was used (cattle, goat, sheep) or that the wool of the sheep was shorn. (There is no direct evidence although, it is very probable that goats at least but possibly sheep as well were also milked by 5000 B. C. For the occurrence of wooly sheep in the Near East in the 6th mill. B. C. a clay figurine is the evidence.[37]) On this basis one can hardly agree with Dennel who supposes that in the Early Neolithic of Bulgaria the greater part of the animal protein consumed came from milk and not from meat.[38] Of course, the dog was also exploited in other ways like house and herd protecting, and hunting companionship. This latter may be stated however, only by extrapolation from other Neolithic sites because, the small dog bone sample of Lánycsók-Égettmalom does not show this directly. Naturally, the skins of all domestic species were used too.

There is no need to prove that the occurring wild species were hunted for their meat first of all since all but the unidentifiable bird species are of typical "meat" animals. Of course, the skins were used too but horns, antlers, sinews, tusks, etc, were also considered valuable raw materials in tool making.

As regards the meat quantity yielded by the different species it is senseless to try to determine the absolute quantities, not just because the methods for the determination of the meat quantity are also quite inaccurate.[39] Instead of this, we attempted to determine the relative quantities starting with the fact that the meat quantity of a cow is equivalent to that of 7 caprovines or 4 to 5 (in average 4.5) pigs, and that the meat quantity of 30, 10 and 6 roe deers is equivalent with that of an aurochs, red deer or wild swine respectively.

Starting out from the approximate numbers of individuals and counting in caprovine and roe deer units it could be stated that cattle yielded about 52 per cent of the domestic meat quantity while at the same time only 42 per cent of the domestic meat originated from the more common caprovines. Pig and dog were unimportant yielding only 5.5 per cent and 0.5 per cent of the meat respectively. Among the wild animals the aurochs yielded the greatest meat quantity by far (83.5 per cent), the meat of red deer represented more than 12 per cent, that of the wild swine 3.7 per cent, and that of the roe deer contributed a mere 0.3 per cent. The meat quantity of the other hunted animals was unimportant.

It is quite hazardous to attempt to compare the meat quantity yielded by the domestic animals to those of the wild animals, in other words to determine the ratio of the produced meat to that of the hunted meat. However, starting out from the fact that a prehistoric roe deer was of the same size or even a little larger than a contemporaneous caprovine, it can be determined

Table 5

The relative meat quantity of the different species

Domestic animals				Wild animals			
species	individual	caprovine unit	%	species	individual	roe deer unit	%
cattle	14	98	52.0	aurochs	9	270	83.6
sheep/goat	79	79	42.0	red deer	4	40	12.4
pig	7	10.5	5.5	roe deer	1	1	0.3
dog	2	1	0.5	wild swine	2	12	3.7
total	102	188.5	100.0	total	16	323	100.0

[37] BÖKÖNYI (1974) 160, Fig. 44.

[38] R. W. DENNEL: Stone age farming in Bulgaria. The Ill. London News 1972, Sept. 72.

[39] R. W. CASTEEL: Faunal assemblages and the "Wiegemethode" or weight method. JFieldA 5 (1978) 71—77.

that the meat quantity obtained by hunting was about twice that produced by animal keeping in Lánycsók-Égettmalom (see Table 5). This is certainly an extremely interesting case in the economic history of the Early Neolithic in Hungary, in spite of the fact that this picture can in no way be generalized because in this site the high wild meat ratio is the result of the comparatively high frequency of the aurochs.

MEASUREMENT TABLES

Horn-core

Measurements: 1. greatest length
2. greatest diameter
3. smallest diameter
4. circumference of the base

	1	2	3	4	
1.	—	62	49.5	179	cattle
2.	—	77	57	215	cattle
3.	38	24	17	77	sheep
4.	67*	26	16	73	sheep
5.	90	35	21	89	sheep
6.	—	30	19.5	81	sheep
7.	185*	37	25	101	goat
8.	—	42	30*	115	goat

Lower row of teeth

Measurements: 1. P_1—P_3
2. length of M_3

1.	87	—	aurochs
2.	—	42	aurochs

Atlas

Measurements: 1. length of ventral arch
2. length of dorsal arch
3. width of cranial articular surface
4. width of caudal articular surface
5. greatest width
6. greatest height

	1	2	3	4	5	6	
1	41	42	102	92	145	80	cattle
2	43	41.5	100*	94	—	78	cattle
3	43	—	104	94.5	146	—	cattle

Scapula

Measurements: 1. width of collum scapulae
2. width of angulus articularis
3. diameter of facies articularis

	1	2	3	
1	55	69	48.5	cattle
2	58	73.5	51	cattle
3	70	81.5	61	cattle

Humerus

Measurements:
1. greatest length
2. width of proximal epiphysis
3. smallest width of diaphysis
4. width of distal epiphysis
5. diameter of proximal epiphysis
6. smallest diameter of diaphysis
7. diameter of distal epiphysis

	1	2	3	4	5	6	7	
1	132	—	14.5	27.5	27.5	13.5	23.5	sheep
2	137	36	14	27.5	39	13.5	24.5	sheep
3	137	36.5	14	28	38	13.5	24.7	sheep
4	—	—	—	25	—	—	22.7	sheep
5	—	—	—	25.3	—	—	22.5	sheep
6	—	—	14.5	26	—	15	23.5	sheep
7	—	—	—	26	—	—	23.7	sheep
8	—	—	—	26.3	—	—	24.5	sheep
9	—	—	—	27	—	—	22.5	sheep
10	—	—	—	27	—	—	24	sheep
11	—	—	14	27.5	—	14.5	25	sheep
12	—	—	—	27.7	—	—	25.5	sheep
13	—	—	—	28	—	—	25.5	sheep
14	—	—	13.5	29	—	14.5	23.7	sheep
15	—	—	14.5	30.5	—	15	27	sheep
16	—	—	—	31.5	—	—	26.3	goat

Radius

Measurements:
1. width of proximal epiphysis
2. smallest width of diaphysis
3. width of distal epiphysis
4. diameter of proximal epiphysis
5. smallest diameter of diaphysis
6. diameter of distal epiphysis

	1	2	3	4	5	6	
1	84	40	—	42	24	—	cattle
2	84	44	—	—	28	—	cattle
3	89	—	—	43	—	—	cattle
4	99	—	—	52	—	—	aurochs
5	—	—	72	—	—	46	cattle
6	—	—	73	—	—	46	cattle
7	29.5	—	—	16.5	10	—	sheep
8	30	—	—	17	—	—	sheep
9	30	—	—	17.5	9.7	—	sheep
10	30	—	—	17	9.5	—	goat
11	40	—	—	21	—	—	goat

Metacarpus

Measurements:
1. greatest length
2. width of proximal epiphysis
3. smallest width of diaphysis
4. width of distal epiphysis
5. diameter of proximal epiphysis
6. smallest diameter of diaphysis
7. diameter of distal epiphysis

	1	2	3	4	5	6	7	
1	—	62	—	—	42	—	—	cattle
2	—	—	—	61	—	—	34	cattle
3	—	—	—	61.5	—	—	36	cattle
4	—	21.3	13	—	15	—	—	sheep
5	—	24	—	—	16.8	—	—	sheep
6	—	—	—	22	—	9	14	sheep
7	—	—	—	23.3	—	8.7	15	sheep
8	97	23	14.7	26.5	17	9.5	16	goat

Femur

Measurements: 1. width of proximal epiphysis
2. smallest width of diaphysis
3. width of distal epiphysis
4. diameter of proximal epiphysis
5. smallest diameter of diaphysis
6. diameter of distal epiphysis

	1	2	3	4	5	6	
1	41.5	15.5	—	22	15.5	—	sheep
2	—	—	36.5	—	—	44	sheep
3	—	16.3	37	—	17	42	sheep
4	44	19	—	25	18	—	goat

Tibia

Measurements: 1. width of distal epiphysis
2. diameter of distal epiphysis

	1	2	
1	65	47	cattle
2	50	39.5	red deer

Calcaneus

Measurements: 1. greatest length
2. greatest width
3. greatest diameter

	1	2	3	
1	131	48	56	cattle
2	140	46	60	cattle
3	140*	48	48	cattle

Metatarsus

Measurements: 1. greatest length
2. width of proximal epiphysis
3. smallest width of diaphysis
4. width of distal epiphysis
5. diameter of proximal epiphysis
6. smallest diameter of diaphysis
7. diameter of distal epiphysis

	1	2	3	4	5	6	7	
1	112*	21	12.5	25	—	10.5	16.3	sheep
2	118.5	17	10.2	20.5	17	7.8	14.7	sheep
3	121*	19*	11	22.3	—	9	15.2	sheep
4	—	18	11	—	18	—	—	sheep
5	—	20	12	—	19	—	—	sheep
6	—	—	—	22	—	9	15	sheep
7	—	—	—	23.5	—	—	16	sheep
8	—	—	—	24*	—	—	16.5	sheep
9	107	20.7	13	24.5	19.8	10.5	16	goat
10	—	—	—	28.2	—	—	18.7	goat

5* ca.

ABBREVIATIONS

BÖKÖNYI (1970) = S. BÖKÖNYI: Animal remains from Lepenski Vir. Science 167, 3926 (1970) 1702–1704.

BÖKÖNYI (1974) = S. BÖKÖNYI: History of domestic mammals in Central and Eastern Europe. Budapest 1974.

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