Analyses of Animal Remains and Soil in Krounovka 1 -site, Russia

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Introduction

This paper shows the analyses of animal remains and soil excavated from the layers belonging to the Neolithic Age in Krounovka site.

Cultural layers from three prehistoric periods could be confirmed at the Krounovka site: The Krounovka culture, representing the initial stage of the Iron Age during the 4 th century BC up to the 2nd century AD, the Yankovskii culture from the 8 th through 1st centuries BC, and the Zaisanovka culture from the later half of the 4th millennium BC through the first half of the 2nd millennium BC. The samples of animal remains treated in this paper were taken from house pits 4 and 5 ; wood charcoal extracted from hearth remains in house 4 produced a radiocarbon date of 4640 ±40 BP, and the associated pottery was understood to originate in the Hansi I-culture (Komoto 2003, Komoto, Obata 2004) .

The analyses compared material belonging to the Boisman culture from the 5th millennium through 4th millenium BC.

1.Animal remains

Cervidae

Roe deer (Capreolus capreolus Linnnaeus)

Mandible

The molar teeth row of the left mandible and a part of the corpus mandibulae which had preserved the anatomical position, were found in the lower cover soil immediately above the floor in the north of house pit 5, which belongs to the Neolithic period. Right mandiblae and left inscissor and *processus articularis* as well as the *processus coronoideus* and the lower part of the *corpus mandibulae* were lost. A closer investigation showed that the right mandible was not associated below this find.

There is a chance that several cervids inhabiting Siberia during that period could have been excavated: Roe deer (*Capreolus capreolus*) ; water deer (*Hydropotes inermis*) , Japanese deer (*Cervus nippon*) , red deer (*Cervus elaphus*) , elk (*Alces alces*) , and reindeer (*Rangifer tarandus*) . There was also a chance for closely related species of the moschidae family like the Siberian musk deer (*Moschus moschiferus*) to be found; but since the material actually excavated is slightly big, it is impossible to be identified as the small Siberian musk deer.

The excavated remains from the cervid family were therefore identified as that of roe deer, based on the length and size of the row of molar teeth formed by adult teeth, and on the morphology

of this row. The observations were confirmed by comparison with material from the Boisman site. The dental formula of the excavated tooth row was P2-4 M1-3. The length of the surface of the dental occlusion was measured with a nonius, the measured values are listed in table 1. The scientific names are those described by Dr. NAORA Nobuo, giving priority to the original article.

Comparing the material with the right mandible bone samples PK-3 and SM-32 – infallibly identified as roe deer – from the 1993 excavation of the Boisman site, one can observe strong commonalities in terms of numeric proportions as well as morphology, despite the fact that the molar teeth from the Boisman site – M 3 in particular – are slightly larger. The subtle differences among the measured values may be due to sexual dimorphism or age. But since the size relation of the measured values of the material from Krounovka site and Boisman site would be unequal if differences would have been caused by sexual dimorphism, the different degrees of occlusal wear relating to age should be maintained as the main cause.

According to Sheng, Otaishi et al. (2000) the shoulder height of roe deer is between 65-95 cm, the female being smaller than the male. They inhabit slopes with few trees or open bush and grassland. Some classify the big roe deer living in China and on the Korean peninsula as a subspecies called *Capreolus capreolus pygargus* Pallas, but it is as well classified as a species *bedfordi*. The big roe deer has a bigger physical constitution; during the winter season it inhabits its breeding areas in wooded land forming small herds, during the summer season it appears in the steppe or in marsh land (Nishihara 1995: 28).

It is well known that the roe deer is found in Neolithic sites all over China (Kômoto 2001). For the Elunchunzu living in the Daxiaoxinganling mountains in the northern part of the Chinese Northeast, it is an important animal resource as regards raw material for clothes and roofs, and therefore captured throughout the whole year (Komoto 2001: 352).

Y. Vostretsov, one of the principal researchers in the project points out that the excavated mandible of the roe deer may have been used as a sickle for harvesting crops. Another example of mammal teeth being used as a sickle is the canine tooth of a wild boar excavated at the Gungsan site, which is thought to belong to the Neolithic Age (Jeulmon Pottery Age) from the western coast of the Korean peninsula (Kaneko 1979: 86; Shin 1964). Goods manufactured from bones of the Japanese deer that were unearthed on sites from the Initial to the Final Jômon periods are classified as pendant decoration, and thus regarded as a means of decoration or magic (Kaneko & Oshizawa 1986b: 316). Indeed, would the molar teeth from Numazu shellmound in Miyagi prefecture (Late to Final Jomon period) or from Saihiro shellmound in Chiba prefecture (Late Jômon period) have been used as cutting tools, the length of the cutting edge would be 40 mm, by far to short. It is not impossible that material excavated from the Horino'uchi shellmound in Chiba prefecture (Waseda University, Philosophical Faculty, Material from the Institute of Archaeology & Municipal Museum for Archaeology, Ichikawa 1992, Pl. 80; Kaneko & Oshizawa 1986b: 316), which has traces of wear around a bore hole, was used as a tool for cutting the ears of plants. But the degree of the wear on the surface is not high.

In order to recognize those bone implements as cutting tools, it has to be judged with caution whether the part that is considered the cutting blade could resist this utilization, and whether there

are lines and other traces of wear or abrasion to be observed. Unfortunately, there is no ground for positively understanding products made from the mandibles of Japanese deer ? neither excavated from Krounovka site or from any region in Japan ? as cutting tools. But this problem is not to be hastily decided in this or the other direction. The opinion of the Japanese and Russian archaeologists taking part in the project about the meaning of the bone objects has to be asked widely, the debate is controversy, and it should go on cautiously.

As an example for a large quantity of mandibles of roe deer unearthed, the Gungsan site mentioned earlier should be brought up. In the case of material from house pit 5 at Krounovka site, it is possible that it dissolved in the slightly acidic soil with 6.88-6.95, while only the enamel material of the canine teeth could be excavated.

2. Soil

It became necessary to check the soil pH because the ratio of excavated pollen for pollen analysis was extremely low during the last year, as well as the preservation of bones was particularly bad. Since the formal procedures to carry out soil are troublesome, it was decided to grasp an idea of the tendencies in soil pH during the excavation on site.

In normal cases a liquid extract is produced with pure water or purified water from the soil in order to determine the soil pH. But since it was difficult to obtain such water, times when water is particularly warm or times when photosynthesis of aquatic vegetation is particularly active were avoided. River water taken around 10:00 am and 3:00 pm was used to measure. The river water showed values of 7.35-7.38 and 7.49-7.58, that change of degree would be under influence of sun shine and water temperature. The measured values are listed in Table 2.

Slightly higher values can be observed in burnt soils and layers with bone fragments and other traces of living. This may be due to the influence of ash and burnt soil, but strangely enough the soil from the hearth samples in house pit 5, are slightly acid although containing ash. Generally speaking, ash of plant origin has a tendency to be more alkaline. But if the ash was produced with fossil fuel that contains sulfide or if it consists of strongly acidic material, it is possible to obtain measurement results like this.

One may assume that these numbers are the result of influences generated during the period in which the site was buried under earth rather than reflecting the original situation. If this is true, one may think of the following possibilities: Soil samples from these sedimentary layers were all taken from the southern section of the excavation area, so the milieu of the house remains when they were buried, or the conditions of conservation after the excavation may have been different, thus producing different numbers. Oxidation may have been stimulated because it was exposed to the air during the long time of the excavation, repeatedly watered with a spray pump. But when soil samples were taken, the altered parts from the surface were avoided, and it is doubtful whether the excavation period of two weeks could generate such a difference. In the future other soil samples should be measured anew, plant opal from these samples should be identified as well as minerals and organic matters studied in detail with X-ray diffraction analysis.

References

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Table 1. List of measurement on Molar, Mandible, *Capreolus sp.*

Length of Molar () indicate Length of worn surface of Molar	M1	M2	M3	P2-P4	M1-M3	P2-M3	Scientific Name	Note
Krounovka site	(12.44)		(13.38)	(33.72)	(43.94)	(77.80)	*Cap. capreolus*	Left
Boisman site	13.30 (13.30)	13.80 (13.80)	17.80 (16.80)	31.60	45.85	78.45	*Cap. capreolus*	Right
Kou-Chia-wan (Zdansky)	11.5	12.4	18.0				*Cap. mantchuricus*	
Gu Xiang Tun (Naora) 2 nd excavation	9.6	10.0	14.5	23.1	34.5	58.0	*Cap. mantchuricus*	Left M 1 : worn 'e' degree
Gu Xiang Tun (Naora) 1 st excavation			19.0 (16.5)				*Cap. Mantchuricus*	Left M 3 : worn 'd' degree
Gu Xiang Tun (Naora) 1 st excavation			(15.0)				*Cap. Mantchuricus*	Right M 3 : worn 'd' degree
Modern (Naora)	10. 0	12. 0	15. 0				*Cap. mantchuricus*	

Table. 2 Soil pH and includings in layers, the Krounovka 1 site, Russia

layer	pH degree				Note		
	1 st measurement	2 nd measurement	3 rd mesurement	Average	Chacoal	Includings	Soil
	waterpH for extract : 7. 35-7. 38	water pH for extract : 7. 49-7. 58	water pH for extract : 7. 49-7. 58				
surface		7.37		7.37	contain	many small pebble	silt-finesand
1		7.28	7.26	7.27		small pebble smaller amount than surface	silt-finesand
2		7.26		7.26		many plant roots	silt-finesand
3	7.47	7.32		7.40			sand、cover soil of remains ?
4		7.40	7.38	7.39			sand、cover soil of remains ?
5		7.21	7.27	7.24			fine sand
6	7.24	7.27	7.26				sand
7		7.34	7.35	7.35	contain	fracture of bones	fine sand
8		7.48	7.33	7.41	contain	burnt soil	finesand-coarse sand
9	7.29	7.27		7.28	contain	burnt soil	sand
10	7.24	7.20		7.22			fine sand
11		7.13	7.29	7.21			fine sand
12	7.24	7.16		7.20			fine sand
13		7.20		7.20			fine sand
lower 14	7.18	7.28		7.23	small amount		sand
5th dwelling			6.95	6.95			
5th dwelling			6.88	6.88			
average	7.28	7.28	7.22	7.24			