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LATE PLEISTOCENE TO MIDDLE HOLOCENE FORAGING STRATEGIES IN THE MIDDLE AND LOWER AMUR BASIN*

Introduction

In this paper, we reconstruct the economy practiced by people associated with various archaeological cultures that existed in the Amur River basin in the Late Pleistocene and Early Holocene (a period covering nearly 15 thousand years). The high level of soil acidity in the Russian Far East has resulted in a paucity of biological remains from Upper Paleolithic and early Neolithic sites. Accordingly, use-wear analyses of lithic artifacts are especially important for reconstructing economic activities of ancient populations of the Amur River basin. A scarcity of data complicates interpretations of the archaeological materials and makes some of the inferences inconclusive. However, the available archaeological evidence suggests that cultures of the region developed continually over a considerably long period without any significant impacts from the outside. Comparative analyses have been carried out on the lithic artifacts of the Selemdja, Gromatukha, Osipovka, and Malyshevo cultures.

The Selemdja culture is one of the best-studied Upper Paleolithic cultures in Northern Asia. Sites attributable to the Selemdja culture have been studied in the Selemdja and middle Amur basins. Four culture-bearing horizons dating to 27 (26) – 12 ka have been recognized (Derevianko, Zenin, 1995; Derevianko, Volkov, Lee Heonjong, 1998). In the Selemdja basin, ten sites have been located. They are situated on erosion terraces (II – IV), at which sedimentation began at the end of the Karga warm period (27 – 25 ka BP). The lower culture-bearing horizon has been recognized within a thin soil layer that was formed during the final Karga warm period or else immediately on the erosion surface.

Artifacts of the Selemja culture from all the cultural horizons demonstrate a common tradition of primary reduction, as well as similar morphological tool types and manufacturing technology. Apparently, over the course of 15 thousand years early tool types developed and new tools appeared as a result of changes of the environment and adaptation strategies. Functional analyses of the stone toolkit allow us to recognize developmental trends occurring in the paleoeconomy.

The artifact collection from the lowermost culture-bearing horizon is dominated by two major types of wedge-shaped cores: cores on bifaces and on pebbles. Micro-blades were mostly detached from such cores. Large blade cores are mostly represented by cores with one flaking surface and one striking platform fashioned on large and thick pebbles. A few cores with two striking platforms and a broad flaking surface have also been noted.

Collections from the overlying horizons have yielded cores of the same types, yet narrow wedge-shaped cores are replaced by blade cores with broad flaking surfaces. In these collections, single platform cores with two flaking surfaces emerge. The collection from the uppermost horizon is dominated by sub-prismatic cores with two flaking surfaces and prismatic nuclei.

The toolkit comprises bifaces of various modifications, adze-scraper-like tools, various end-scrapers, burins, retouched blades and micro-blades, side-scrapers on flakes and large blades, notched tools on flakes, hammerstones,

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push-planes, drills, borers, and others. Percentages of the various tool types have not been calculated because of two reasons: excavation areas vary across sites and central and periphery living zones established at different layers within a single site do not always correspond to one another.

The uppermost culture-bearing horizon yielded a few arrowheads and ceramics. A date of 12,590 ± 80 BP (AA-20935) exists for the pottery. The uppermost culture-bearing horizon at the sites of the Selemdja culture has been attributed to the Early Neolithic and corresponds to the initial period of the Gromatukha culture.

Sites attributable to the Gromatukha culture have been located within the upper and middle Amur and in the Zeya basins. The best studied site is situated at the confluence of the Gromatukha and Zeya rivers (Okladnikov, Derevianko, 1977). Three culture-bearing horizons have been recognized. The lowermost horizon yielded several dates: on charcoal, 11,580 ± 190 BP (SOAN-5762), 12,340 ± 70 BP (MTS-05936), 12,380 ± 70 BP (MTS-05937), 12,300 70 BP (MTS-05938); and on pottery, 12,830 ± 120 BP (AZ-20939) and 11,500 ± 90 BP (AZ-20940). Lithic artifacts recovered from this horizon are very similar to the Selemdja uppermost cultural horizon, including primary reduction, core types, and major tool types. Apparently, the origin of the Gromatukha culture, one of the earliest Neolithic cultures in Northern, Eastern and Central Asia, is linked with the Late Selemdja period. Available radiocarbon dates suggest that the Gromatukha culture was practiced in the upper and middle Amur basin throughout 7000 years.

Archaeological materials from all three Gromatukha horizons demonstrate continuous development of primary reduction of the cores and secondary tool working, as well as economic development. Tools were mostly made of siliceous and volcanic rocks and chalcedony. The major strategies of primary reduction are illustrated by wedge-shaped, narrow-face, sub-prismatic, and prismatic cores. Knife-like blades detached from such cores were further modified into willow-leaf arrowheads, borers, in-laid parts for composite knives, and end-scrapers. The amount of bifacially worked tools is considerable and includes javelin-, spear- and arrowheads, knive-daggers and in-laid parts for composite tools. Projectile heads are mostly laurel-leaf-shaped. The proportion of combination tools including burin-knives, burin-scrapers, and knive-scrapers is considerable. Burins comprises medial, angular and lateral varieties. Heavy-duty tools include mostly bifacially worked tools reminiscent of adzes and scrapers and hand-axes fashioned on elongate and ovoid blanks. Many Gromatukha tool types resemble relevant Selemdja implements in shape and working techniques. The Gromatukha as well as the Selemdja populations were mostly engaged in hunting and fishing, and carried out nomadic or semi-sedentary way of living. The culture-bearing horizons revealed hearths and utility pits. Lithic artifacts were mostly concentrated around such features. These facts allow us to infer that people lived in portable tent-like dwellings.

The Osipovka culture has been primarily localized in the lower Amur basin. Formerly, the origin of the Gromatukha culture was linked with the Osipovka (Ibid.). However, upon the discovery of the Selemdja culture, it was regarded as the common basis for both the Osipovka and Gromatukha cultures, which were practiced by populations of common ethnic background inhabiting the Amur basin 13 – 8 ka ago.

About 20 sites attributable to the Osipovka culture have been found in the lower Amur basin. Many sites are multilayered. Among others, the sites in vicinity of the village of Sikachi-Alian, Khabarovsk, and the village of Hummi are the best explored. The Osipovka population as with the Gromatukha were nomads or semi-sedentary and lived in portable tent-like dwellings. The dates on charcoal (13,260 ± 100 BP and 10,345 ± 110 BP) and on ceramics (11,915 ± 80 BP) have been obtained for the Hummi site.

Osipovka tools were mostly made of dark grey and dark aleurolites, chalcedony, hornfels, and sandstone. Primary reduction strategy is illustrated by wedge-shaped, narrow-face and sub-prismatic cores, from which mostly microblades and small knife-like blades were detached. Such blades were used as blanks for manufacturing scrapers, burins, in-laid parts for composite tools and arrowheads. The proportion of bifacially worked tools including heads for arrows, javelins and spears, carving tools and knives-daggers is considerable. Also, numerous scrapers of various modifications, knives, burins, borers, awls, side-scrapers, push-planes, and combination tools have been found. Stone tools of the Gromatukha and Osipovka cultures are typologically similar.

The Malyshevo culture replaced the Osipovka culture in the lower Amur basin. It has been attributed to the Middle Neolithic. The culture has been dated within the chronological range of 6900 ± 260 BP (MGU-410) and 4740 ± 70 BP (SNUOO-337). The calibrated time period is 7938 – 5080 BP. The Malyshevo culture emerged in the first half of the 7th millennium BC and was probably related with the Osipovka culture.

The Malyshevo primary reduction is illustrated by the blade technique. Resulting knife-like blades were used in manufacturing arrowheads including stemmed variety, scrapers, borers, burins, in-laid parts for composite tools, and others. The majority of tools including various types of scrapers, knives, borers, sidescrapers and carving tools (partially or completely polished) were manufactured on flakes and special blanks. Stone tools of the Malyshevo and Osipovka cultures are typologically and technologically close. The major differentiating feature of the Malyshevo

population is the sedentary way of life. Bearers of this cultural tradition lived in semi-subterranean dwellings; some of them were considerably large.

Methodology

Functional study of artifacts was conducted following the use-wear analysis methodology proposed by S.A. Semenov and G.F. Korobkova (Semenov, 1957; Semenov, Korobkova, 1983; Korobkowa, 1999) and the analysis of polish traces follows studies by L. Keeley (1980). A synthetic method of use-wear analysis that was elaborated in the course of works with artifact collections from Paleolithic and Neolithic sites in Northern Asia was also employed (Volkov, 1999).

Use-wear analyses have been carried out by MBS-10 × × 16 – 56 binocular with unilateral illumination of the study object and discrete regime of amplification. More precise observations were carried out with the aid of a specially adapted Olympus BHT-M × 100 – 500 microscope with shadowless illumination through the objective. Additionally, MSPE-1 × 19 – 95 microscopes with sliding regime of amplification and strong, shadowless, two-side illumination were used.

Comparisons of use-wear signs noted on ancient tools were made with specimens from the Siberian collection of standard tools with use-wear signs.

Descriptions of tool functions are made with the help of the terminology that has been worked out in the course of technological and use-wear research (Ibid.).

The artifacts under study are mostly well-preserved; the purpose of tools has been identified for the majority of specimens. Functions of 129 tools have been identified within the Malyshevo collection, 473 specimens from the Osipovka assemblage, 665 specimens from the Gromatukha collection, and 425 artifacts from the Selemdja assemblage. The latter collection includes 186 specimens from stage 3 (18 – 13 ka), 191 specimens from stage 4 (13 – 10 ka) and only 48 specimens from stages 1 and 2 (Derevianko, Volkov, Lee Heonjong, 1998). In total, 1644 specimens have been identified as utilized tools and included in the statistical sample.

Based on previous results of functional analysis of artifacts from Neolithic and Upper Paleolithic sites of the Russian Far East (Derevianko, Volkov, 1997), we identified three primary categories of tools depending on the major economic activities: A – tools pertaining to hunting, B – fishing, and C – for processing wood, bone, and stone. Category C comprises tools that are utilized in various types of household activities not related to food supply and primary processing of hunting and fishing products (e.g., tools used in skin processing for further cutting and sewing). This category includes tools for stone, wood, horn and bone working.

Each category is further divided into subcategories related to particular activities. For instance, category A is divided into hunting tools (AI), instruments for skin processing (AII), and butchering knives (AIII). Category B comprises fishing tools (BI) and fish processing tools (BII). Category C includes tools for working organic (CI) and inorganic (CII) materials. Each subcategory includes a kit of tools for particular purposes.

Experimental use-wear analyses of archaeological collections from various Upper Paleolithic and Neolithic sites of the region provide the basis for identification the purposes of practically all tool types. Any obscurity in identifying the purposes of instruments has been avoided. Several previously unknown tool types have been recognized, which has allowed for the identification of specific morphological features of such tools. A functional differentiation of study materials has facilitated a more precise morphological identification of the tools.

Composition of the toolkit

Tools attributable to the stage 3 of the Selemdja culture are distributed across categories unevenly (Fig. 1): the proportion of implements pertaining to hunting and wood, bone and stone processing are considerably greater than that of fishing tools. The category of tools associated with hunting is dominated by butchering knives (Fig. 2, *a*). Small knives used as "table knives" have been also noted. The share of scrapers is considerably smaller; most of these implements were utilized for animal skin scraping. Hunting tools have not been recognized.

The category of tools associated with fishing is dominated by fish processing implements (Fig. 2, *b*). There are many knives whose shapes are typical for instruments utilized at mass fish processing sites (Volkov, 1986a, 1987a). The subcategory of fishing tools comprises primarily net sinkers. The proportion of such tools in category B is insignificant.

The category of implements for processing wood, bone, and stone includes a considerable proportion of tools used in stone knapping (hammerstones, retouchers, anvils) (Fig. 2, *c*). Such tools are typical of Upper Paleolithic collections. The subcategory of implements associated with working of organic material is dominated by instruments for processing wood (mostly knives and push-planes).

Tools from the Selemdja stage 4 collection are distributed across categories more evenly (Fig. 3). As with stage 3, the stage 4 assemblage shows a domination of tools pertaining to hunting. The share of tools utilized in wood, bone and stone working is smaller than hunting instruments. The proportion of tools associated with fishing is twice as great as stage 3. Category A does not include hunting tools (AI), as with stage 3 (Fig. 4, *a*),

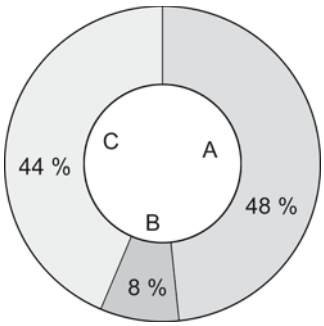

Fig. 1. Distribution of tools from Upper Paleolithic sites of the Selemdja culture stage 3 with regard to categories.
A – tools associated with hunting; B – tools associated with fishing; C – tools for processing wood, bone, and stone.

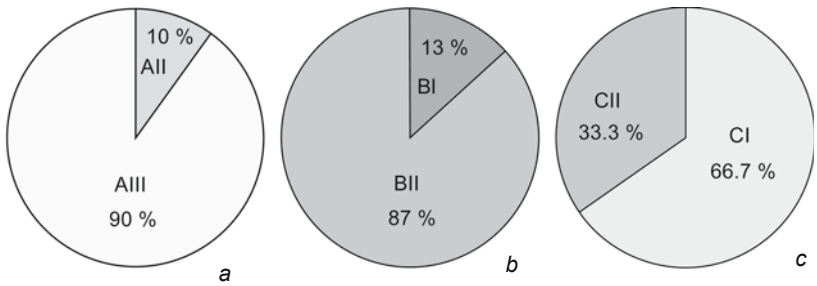

Fig. 2. Frequencies of tool groups in assemblages of categories A (*a*), B (*b*), and C (*c*) of the Selemdja Upper Paleolithic culture stage 3.
AII – tools for processing skins; AIII – butchering knives; BI – fishing tools; BII – tools for processing fish; CI and CII – tools for processing organic and inorganic materials, respectively.

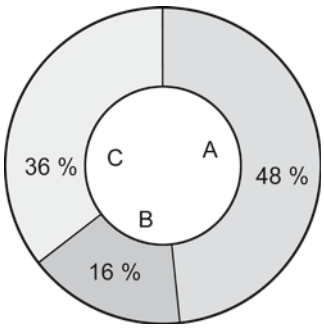

Fig. 3. Distribution of tools from Upper Paleolithic sites of the Selemdja culture stage 4 with regard to categories.
See Fig. 1 for conventions.

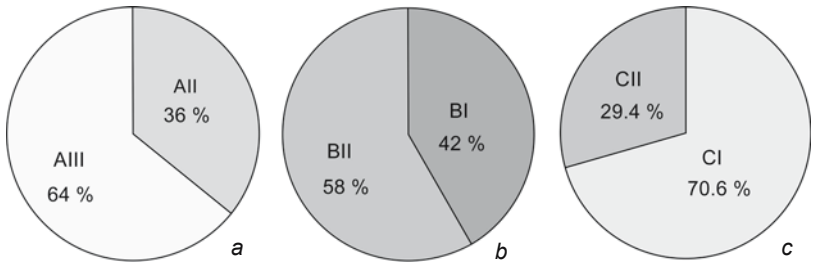

Fig. 4. Frequencies of tool groups in assemblages of categories A (*a*), B (*b*), and C (*c*) of Selemdja Upper Paleolithic culture stage 4.
See Fig. 2 for conventions.

while the share of implements utilized in skin processing increased considerably. Large scrapers (adze-scraper-like tools) used for large animal skin processing are numerous. Various types of butchering knives have been recognized. Specific knife types utilized in different operations have been established (e.g., subcategories of butchering and meat consuming knives have been identified on the basis of specific tool shapes). Fishing tools from Selemdga stage 4 demonstrate a considerable increase in the percentage of net sinkers (Fig. 4, *b*). Knives utilized in catch processing display a special shape. These data suggest an increase in the role of fishing in the economy of the population. Category C (Fig. 4, *c*) shows a relative increase of the tools utilized in processing organic matter, primarily wood. The toolkit becomes more diverse. The percentage of large adzes, push-planes and plane knives increases. Functionally, the toolkit is the same as stage 3. The low percentage of hard hammerstones can be explained by the employment of the pressure technique.

The Gromatukha toolkit (Volkov, 1986b) comprises primarily implements associated with hunting (Fig. 5). Tools utilized in meat processing constitute more than two thirds of the total number of implements. The shares of categories B and C are relatively equal. Apparently, hunting was the primary economic occupation of the Gromatukha population. Tools of category A are mostly knives used for butchering and cooking (Fig. 6, *a*). The percentage of small knives used for meat consumption is small compared to that of the Selemdja collection. Scraping tools are numerous (Volkov, 1987c); the majority of them were used for processing large animal skins. Hunting tools include heads of arrows and javelin, the proportion of arrowheads being greater. The category of tools associated with fishing (Fig. 6, *b*) is comprised mostly of laurel-leaf and asymmetrical shaped knives utilized in processing a large catch (Volkov, 1987a). The share of sinkers is not great. Category C (Fig. 6, *c*) is dominated by tools for processing wood, mostly large adzes, also designated as adze-scraper-like tools (Volkov, 1987b). The percentage of stone knapping tools is also considerable.

The Osipovka toolkit (Volkov, 1988) is dominated by implements for hunting and game processing (Fig. 7),

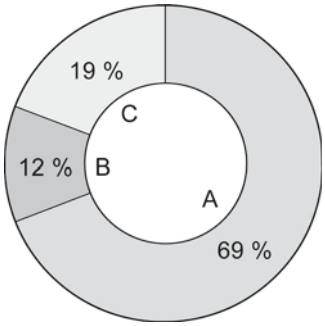

Fig. 5. Distribution of tools from Neolithic sites of the Gromatukha culture with regard to categories.
See Fig. 1 for conventions.

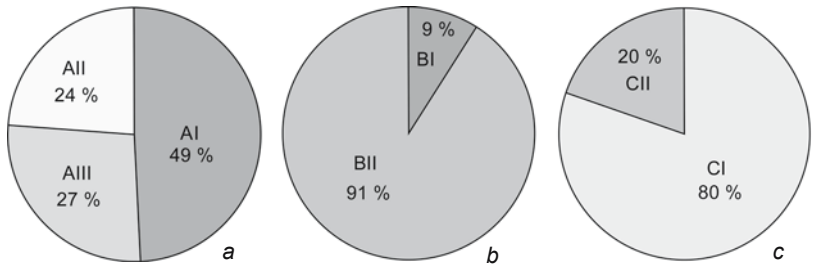

Fig. 6. Frequencies of tool groups in assemblages of categories A (*a*), B (*b*), and C (*c*) of the Gromatukha Neolithic culture.
AI – hunting tools.
See Fig. 2 for other conventions.

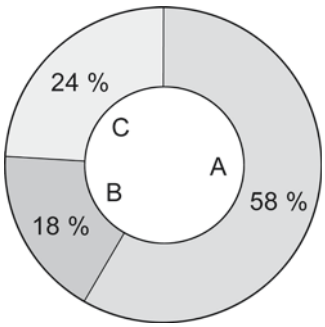

Fig. 7. Distribution of tools from Neolithic sites of the Osipovka culture with regard to categories.
See Fig. 1 for conventions.

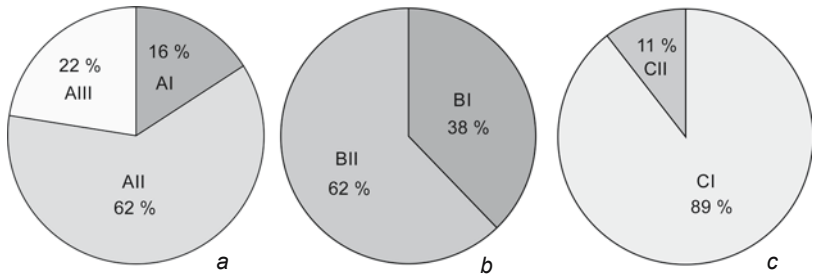

Fig. 8. Frequencies of tool groups in assemblages of categories A (*a*), B (*b*), and C (*c*) of the Osipovka Neolithic culture.
See Fig. 2 and 6 for conventions.

though the percentage of these tools is considerably smaller than the Gromatukha collection. Proportions of these two major subcategories are nearly equal. The percentage of fishing tools in Osipovka is greater than that of Gromatukha. Hunting tools (Fig. 8, *a*) are mostly arrowheads, which are thicker than the Gromatukha ones, suggesting the hunting of larger game. The proportion of such arrowheads in tools of category A is significant. The subcategory of implements related to hunting is dominated by scraping tools. These are mostly large scrapers (adze-scraper-like tools) used in large animal skin working. Net sinkers constitute more than one third of the fishing tools (Fig. 8, *b*). Nearly all fish knives are specialized for processing a large catch. The proportion of tools for processing organic matters (Fig. 8, *c*) is greater than the Upper Paleolithic collections and constitutes nearly 90 % of the total number of tools in category C. Within the subcategory of wood working tools, adzes and chisels constitute 75 % of the total. In contrast, the share of plane knives, burins, and carving tools is minor. The Osipovka collection contains tools utilized for stone grinding.

The Malyshevo assemblage displays an uneven dispersal of tools across categories. This collection is represented by equal proportions of category A and B tools, while category C instruments constitute only 7 % (Fig. 9). The subcategory of hunting tools includes only arrowheads; their proportion in category A is considerable (Fig. 10, *a*). The subcategory of skin processing tools does not contain large scrapers (adze-scraper-like tools) and scrapers of other types are few. Butchering knives do not demonstrate any particular form and are mostly made on flakes with light modifying retouch. Fishing tools contain implements utilized in fish processing (Fig. 10, *b*). Fish knives demonstrate specialized shapes, yet their proportion in the collection is minor. It seems that such types of tools were necessary only during the spawning season. Grinding tools constitute about half of the implements included in the subcategory of stone working tools. Wood working was executed with the aid of adzes polished at various degrees and made of fine-grained rocks. The dimensions of these tools are small; they can be regarded as miniature tools compared to large Gromatukha and Osipovka adzes. No plane knives, axes,

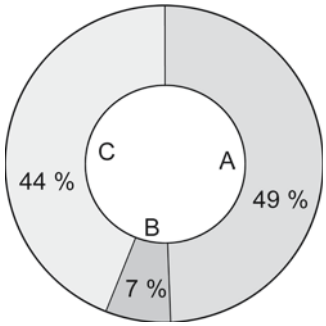

Fig. 9. Distribution of tools from Neolithic sites of the Malyshevo culture with regard to categories.
See Fig. 1 for conventions.

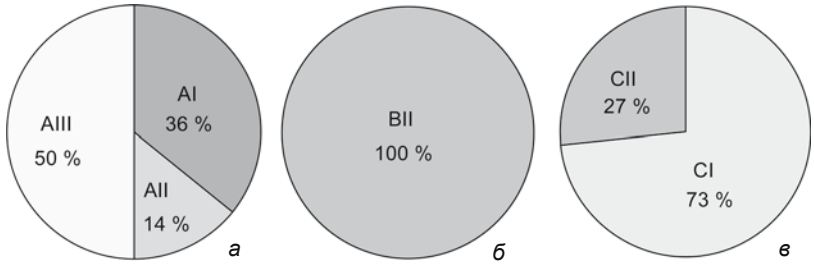

Fig. 10. Frequencies of tool groups in assemblages of categories A (*a*), B (*b*), and C (*c*) of the Malyshevo Neolithic culture.
See Fig. 2 and 6 for conventions.

burins and carving tools have been noted. The proportion of tools for processing wood is greater than that of stone working instruments (Fig. 10, *c*).

Changes in toolkit composition

In the course of analyses of paleoeconomic development in the region, additional diagrams have been generated showing major changes that occurred in the composition of the toolkits under study during the period from the Upper Paleolithic till the period of existence of the Malyshevo Neolithic culture.

The proportion of tools associated with hunting (Fig. 11) is constant throughout the Selemdja period of the Upper Paleolithic. However, when moving from the Paleolithic to the Neolithic, hunting seems to have played an increasing role in the economy. The relevant changes recognized in the Gromatukha and Osipovka cultures can be taken as a typical pattern. The Malyshevo collection can be considered atypical. The proportion of hunting tools and game processing instruments in the Malyshevo collection are considerably smaller.

The category of fishing tools and instruments for fish processing (Fig. 12) displays a different trend. The proportion of category B tools throughout the chronological period beginning from Selemdja stage 3 until the Osipovka Neolithic period increases, while during the Gromatukha and Malyshevo cultural periods, the percentage gradually decreases. The noted trend together with the changes in category A, might reflect a pattern toward an increased dependence on hunting and a decrease in fishing in the paleoeconomy as a whole.

The proportion of tools for stone, wood and bone working gradually decreases in the Selemdja, Osipovka and Gromatukha collections, while that in the Malyshevo increases (Fig. 13). As mentioned above, this category is dominated by wood working

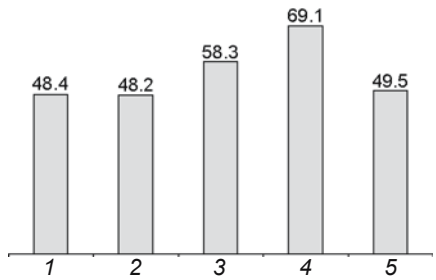

Fig. 11. Percentages of hunting and butchering tools (category A) in various archaeological assemblages.
1, *2* – Selemdja Upper Paleolithic culture, stages 3 and 4, respectively; *3* – Osipovka Neolithic culture; *4* – Gromatukha Neolithic culture; *5* – Malyshevo Neolithic culture.

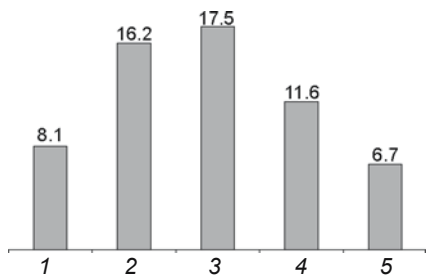

Fig. 12. Percentages of fishing and fish processing tools (category B) in various archaeological assemblages.
See Fig. 11 for conventions.

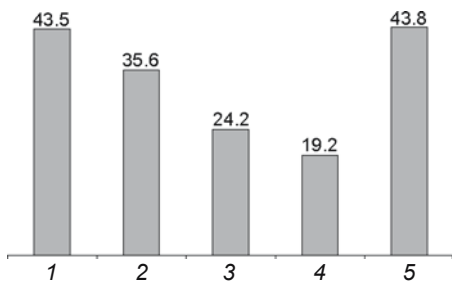

Fig. 13. Percentages of tools for processing wood, bone, and stone (category C) in various archaeological assemblages.
See Fig. 11 for conventions.

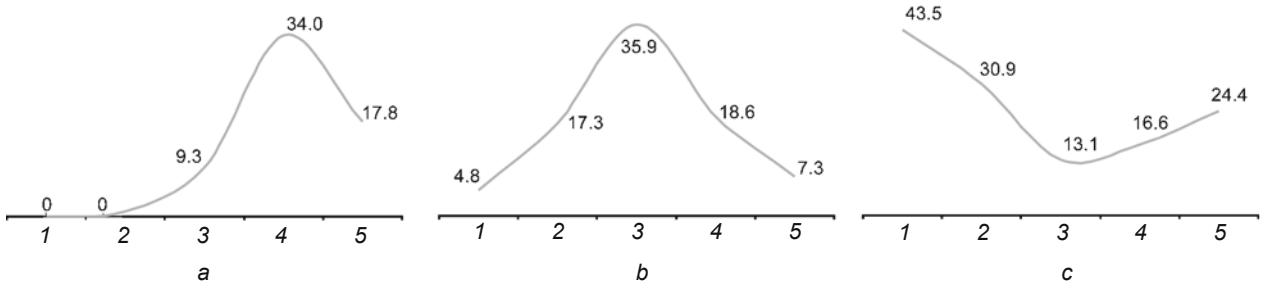

Fig. 14. Diachronic changes in the frequencies of tools associated with hunting, percent.
a – hunting tools (AI); *b* – tools for processing skins (AII); *c* – butchering knives (AIII). *1 – 5*, as in Fig. 11.

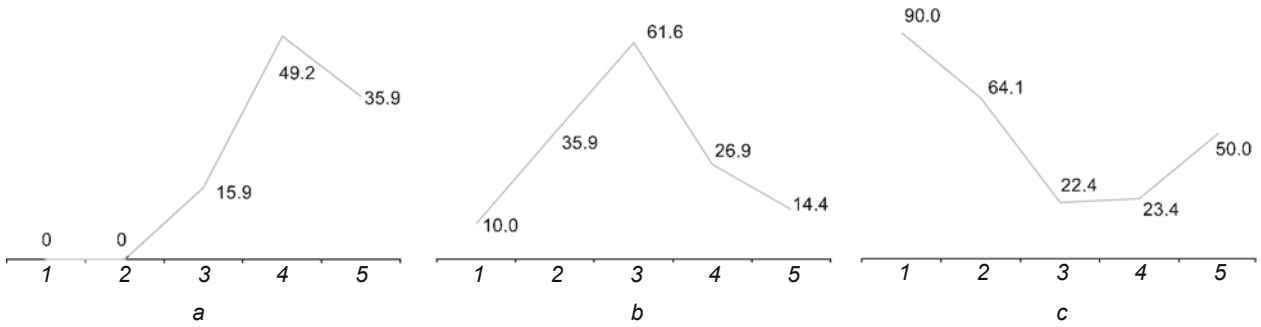

Fig. 15. Diachronic changes in the frequencies of tool groups in assemblages of category A, percent.
a – hunting tools (AI); *b* – tools for processing skins (AII); *c* – butchering knives (AIII). *1 – 5*, as in Fig. 11.

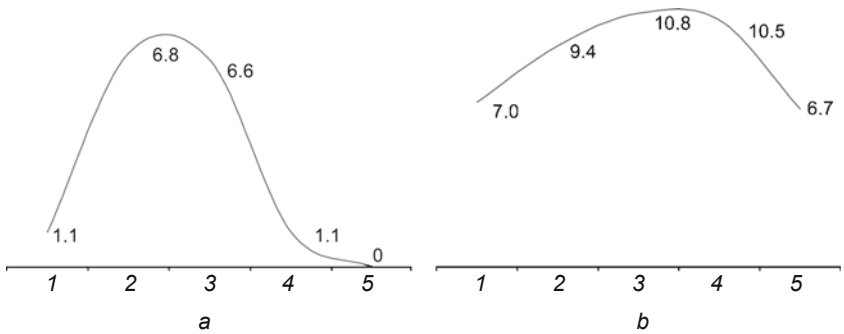

Fig. 16. Diachronic changes in the frequencies of tools associated with fishing, percent.
a – fishing tools (BI); b – fish knives (BII). *1 – 5*, as in Fig. 11.

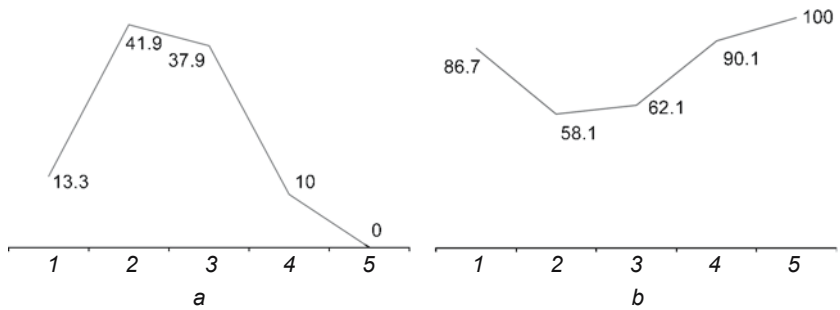

Fig. 17. Diachronic changes in the frequencies of tool groups in assemblages of category B, percent.
a – fishing tools (BI); b – fish knives (BII). *1 – 5*, as in Fig. 11.

tools. In order to describe these trends, it is necessary to compare tool subcategories.

The Selemdja toolkit does not contain any hunting tools. During the Osipovka to Gromatukha transitional period, the share of relevant tools increased from 9.3 to 34 %. The Malyshevo collection shows a low proportion of such tools (Fig. 14, *a*). The share of skin processing implements in the toolkits (Fig. 14, *b*) gradually increases from Selemdja stage 3 until the Osipovka period. During the later periods, the percentage of these tools becomes lower. The subcategory of butchering knives shows the opposite pattern (Fig. 14, *c*).

The rates of change in these tool types within category A is a good example (Fig. 15). The diagram shows a constant growth of the proportion of hunting tools throughout the Osipovka – Gromatukha period, followed by a decrease. The percentage of skin processing tools rapidly increases in the period from Selemdja stage 3 to Osipovka and decreases during the later periods. In contrast, the rate of butchering knives decreases during the Selemdja stage 3 to Osipovka and increases during later periods.

Fishing tools were most numerous during the Selemdja stage 4 (Fig. 16, *a*). The general trend from the late Paleolithic to the Neolithic is a decrease in the proportion of these tools. This tendency suggests changes in fishing technique rather than abandonment of this subsistence strategy. Tools for fish processing increase in number throughout Selemdja stage 3 to Gromatukha, and decreases during later periods (Fig. 16, *b*). It may be suggestive of the diminishing of the role of fishing in the paleoeconomy of the region. However, changes in the rates of tools within category B (Fig. 17) suggest different inferences. Proportions of fishing tools display the same tendency as the one described above, yet changes noted in the rates of catch processing apparently suggest growth of their role throughout the whole Selemdja stage 4 to the Malyshevo period. The noted decrease in the proportion of fishing tools can be explained by the replacement of net fishing by seasonal fishing during the spawning period.

The rate of implements for processing organic materials gradually decreases during the chronological period from the Selemdja stage 3 to the Gromatukha with a significant increase during the later periods when it reaches the peak (Fig. 18, *a*).

The percentage of stone working tools gradually decreases until the Osipovka period, and then increases during the later periods (Fig. 18, b). The general increase in the proportion of category C tools is caused by the

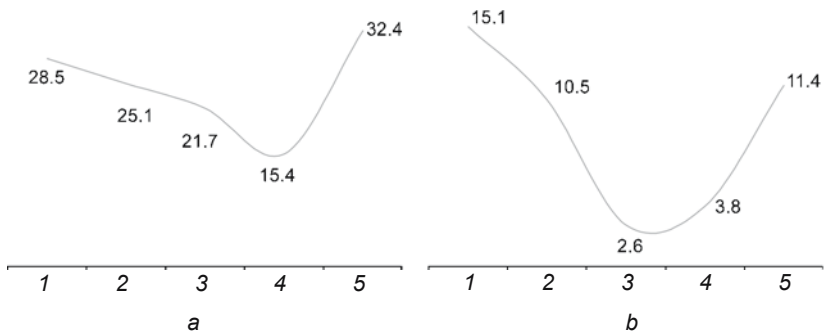

Fig. 18. Diachronic changes in the frequencies of tools for processing organic (*a*) and inorganic (*b*) materials (subcategories CI and CII), percent.
1 – 5, as in Fig. 11.

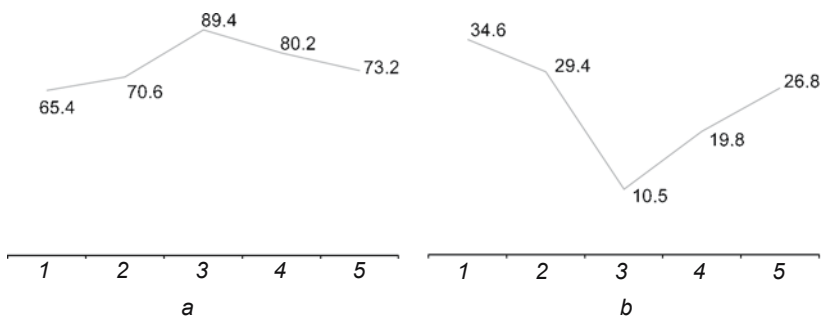

Fig. 19. Diachronic changes in the frequencies of tools for processing organic (*a*) and inorganic (*b*) materials in assemblages of category C, percent.
1 – 5, as in Fig. 11.

increase in the proportion of stone working implements, because the proportion of instruments for working organic materials (wood, bone and horn) is comparatively constant (Fig. 19). It is also noteworthy that the proportion of stone working tools in Neolithic collections is not so high as that in the Paleolithic.

General tendencies are also illustrated by variation that occurred in the economic activities of the hunter-gatherers during the transition period from the Upper Paleolithic to the Neolithic. The diagrams provide data on the changes in the major tool categories between the Selemdja Upper Paleolithic collection and the overall Neolithic collection including artifacts of the Gromatukha, Osipovka and Malyshevo cultures. The recognized trends reflect the most important changes in the regional paleoeconomy during the Pleistocene-Holocene transition.

Available data has shown that the proportion of tools associated with hunting increases (Fig. 20). Hunting seems to have played the leading role in getting high-calorie food during the Upper Paleolithic and became even more important during the later periods. Let us discuss the changes noted within category A in detail (Fig. 21). Hunting tools (AI) absent in the Upper Paleolithic collections reach 31.6 % in the Neolithic ones. The proportion of animal skin processing tools (AII) increases, while that of butchering knives (AIII) decreases. Hence, the general growth of the tools pertained to hunting (A) is formed by the high proportions of hunting and skin processing implements.

The proportion of tools associated with fishing decreases slightly (Fig. 22). This decrease can be explained by the minor proportion of fishing tools proper (Fig. 23), while the rate of fish processing tools becomes greater. It is possible that fishing ceased to be a year-round activity and may have been conducted primarily during the spawning period. The noted trend is assumed to be a characteristic feature of the Neolithic economy of the region.

The proportion of tools for processing stone, wood, bone and horn decreases considerably (Fig. 24) mostly due to the decrease in the proportion of stone working implements in the total number of tools of this category (Fig. 25). This trend has been mentioned above and can possibly be explained by replacement of the Upper

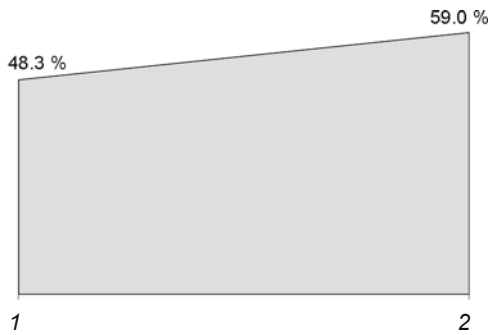

Fig. 20. Frequencies of hunting and butchering tools (category A) in Upper Paleolithic (*1*) and Neolithic (*2*) assemblages.

Fig. 22. Frequencies of fishing and fish processing tools (category B) in Upper Paleolithic (*1*) and Neolithic (*2*) assemblages.

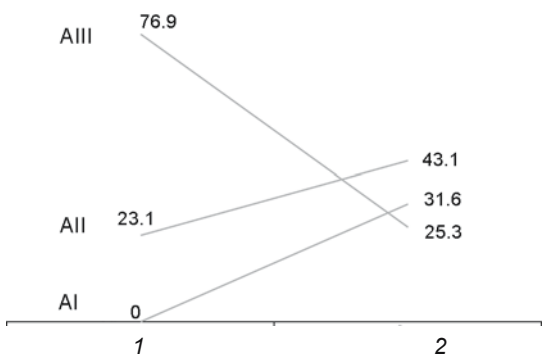

Fig. 21. Percentages of various tools in assemblages of category A.
1 – Upper Paleolithic, *2* – Neolithic.

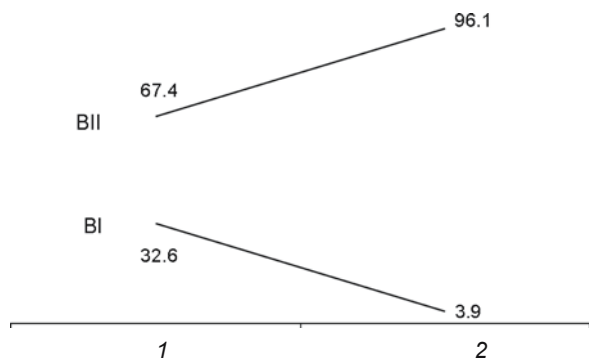

Fig. 23. Percentages of various tools in assemblages of category B.
1 – Upper Paleolithic, *2* – Neolithic.

Paleolithic stone reduction technique with the broad utilization of organic tools for stone working during the Neolithic.

The size of the region along with climatic variation facilitates further comparative studies. Selemdja Upper Paleolithic and Gromatukha Neolithic sites are primarily located over the western portion of the region; while the sites attributable to the Neolithic cultures of Osipovka and Malyshevo are situated in its eastern part. Comparative analyses of the stone tool data when accounting for geographic variation presents interesting patterns. The rate of hunting implements is higher in the Selemdja and Gromatukha cultures compared to that of the Osipovka and Malyshevo (Fig. 26, *a*), suggesting greater emphasis on hunting in the western part of the Amur basin. The rates of tools pertained to fishing are similar in these two groups (Fig. 26, *b*). The proportion of tools for processing wood, bone, horn, and stone is higher in the eastern group (Fig. 26, *c*); this high index mostly comprises the high percentage of wood working implements in the Malyshevo toolkit.

Previous studies demonstrate a close relationship between the Selemdja Upper Paleolithic and the Gromatukha Neolithic cultures. We suggest another comparative analysis of data in pairs: Selemdja – Gromatukha and Osipovka – Malyshevo. The trends seem to reflect the most general characteristic features of hunter-gatherer subsistence strategies, in which the impact of climate is insignificant. The Selemdja – Gromatukha culture complex displays a clear increase in the proportion of hunting tools, while data for Osipovka – Malyshevo suggests the opposite pattern (Fig. 27, *a*). Apparently, this data does not testify to a diminishing role of hunting in the economy; this assumption is supported by the percentage of fishing and fish processing tools (Fig. 27, *b*). These rates are constant in the Selemdja and Gromatukha collections, while those in the Osipovka and Malyshevo decrease. These changes probably reflect a general increase in the proportions of implements

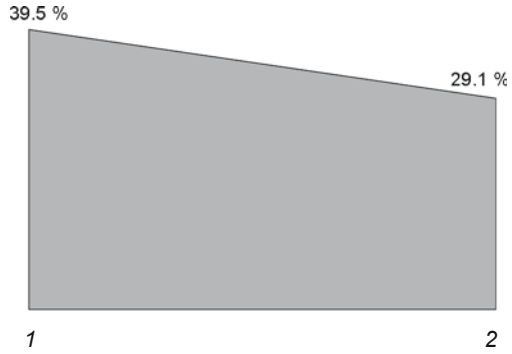

Fig. 24. Frequencies of tools for processing wood, bone, and stone (category C) in Upper Paleolithic (*1*) and Neolithic (*2*) assemblages.

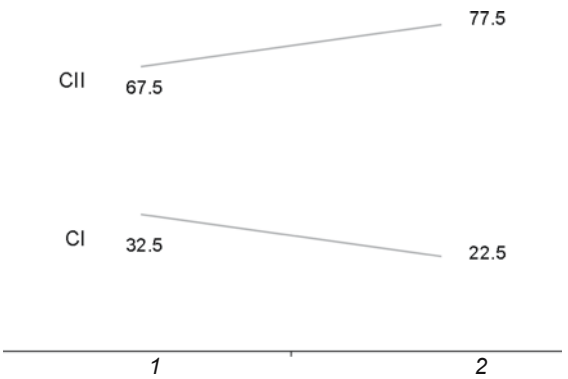

Fig. 25. Percentages of various tools in assemblages of category C.
1 – Upper Paleolithic, *2* – Neolithic.

for processing wood, bone, horn, and stone that are not directly related to hunting and fishing. The rates of these tools established for the Selemdja – Gromatukha decrease, while those noted for Osipovka – Malyshevo show twice as large a proportion (Fig. 27, *c*). The noted increase is primarily a result of considerable increase in

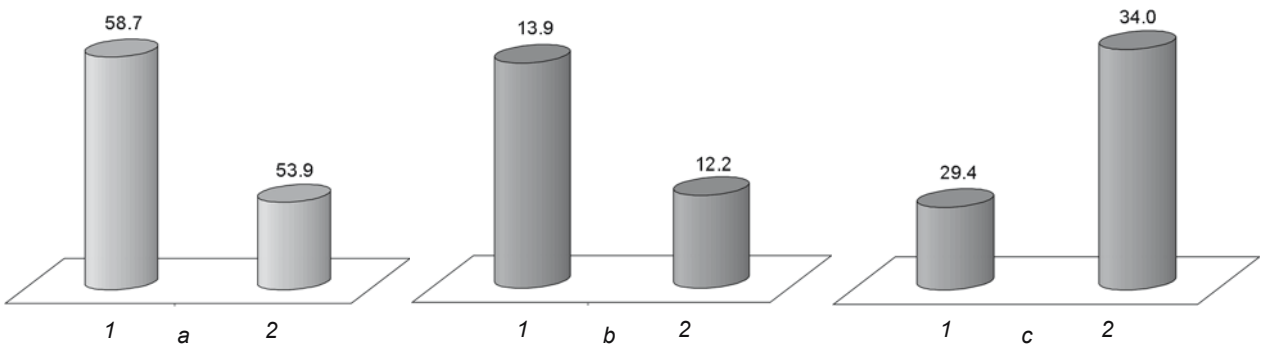

Fig. 26. Frequencies of tools of categories A (*a*), B (*b*), and C (*c*) in assemblages of western (*1*) and eastern (*2*) sites, percent.

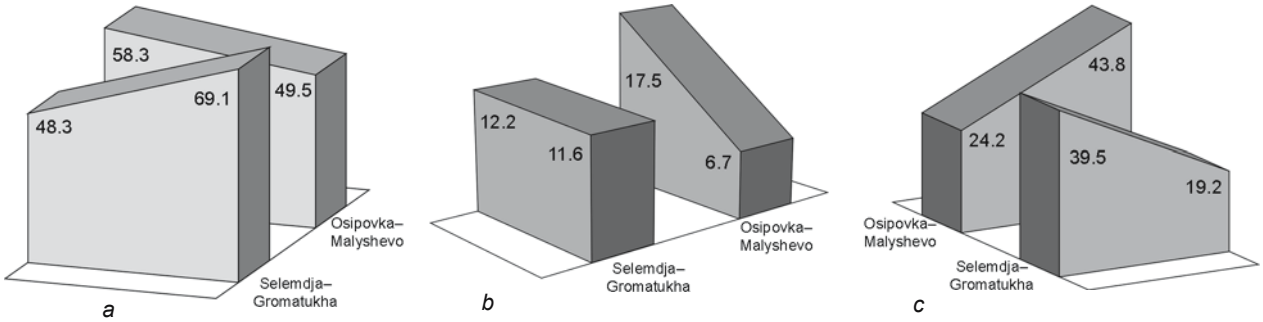

Fig. 27. Frequencies of tools of categories A (*a*), B (*b*), and C (*c*) in assemblages of western (Selemdja and Gromatukha cultures) and eastern sites (Osipovka and Malyshevo), percent.

the proportion of wood working tools, especially various kinds of adzes. Wood working seems to have become the typical occupation for the population of the eastern part of the region.

Another interesting point of our analysis is presence/absence of particular tool subcategories in the major three categories (Fig. 28). Hunting tools (AI) have been recognized in the Selemdja culture, while the Gromatukha collections show a considerable proportion of such tools within category A (Fig. 28, *a*). Assemblages from the western part of the region attributable to the Upper Paleolithic – initial Neolithic have yielded practically equal proportions of tools for animal skin working (AII); while the proportions of butchering knives (AIII) in these collections decrease considerably. Apparently, the general growth in category A implements is due to the increase in the proportion of hunting tools. The data from the eastern part of the region is quite different. The rate of hunting tools increases, while that of various scrapers decreases considerably. This trend is entirely different from that noted for the western part of the region. The resulting general decrease of category A tools is due to the sharp and considerable decrease of the proportion of scraping instruments (AII).

Patterning in the category B fishing and fish processing implements for eastern and western sites are rather similar (Fig. 28, *b*). Proportions of fishing tools decrease, those of fish processing increase. The

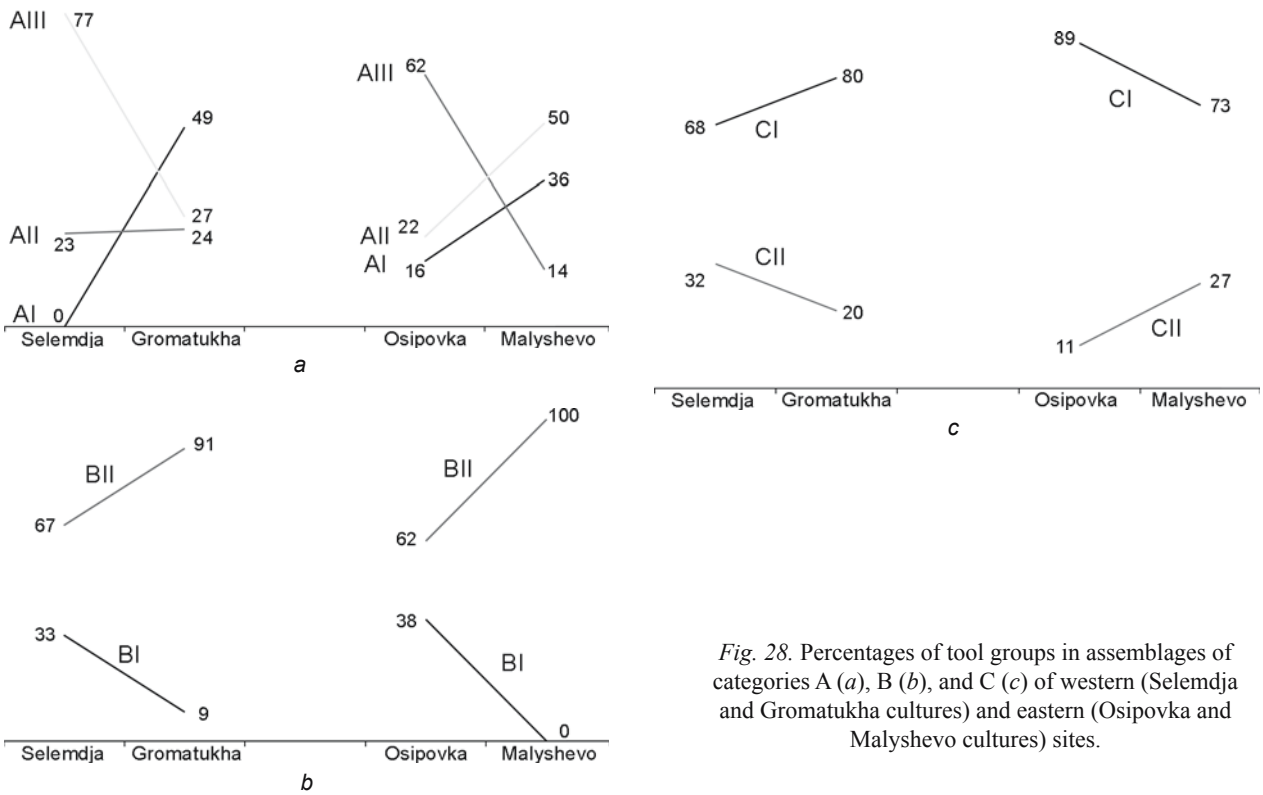

Fig. 28. Percentages of tool groups in assemblages of categories A (*a*), B (*b*), and C (*c*) of western (Selemdja and Gromatukha cultures) and eastern (Osipovka and Malyshevo cultures) sites.

noted tendency is most clear in the eastern collections; it probably testifies to the effectiveness of fishing in the eastern parts of the region.

Eastern and western collections display opposite patterning in category C toolkits (Fig. 28, *c*). The rate of stone working tools is lower in the Selemdja – Gromatukha, while the proportion in the Osipovka – Malyshevo becomes greater. Indices of tools for processing organic materials exhibit the opposite pattern: an increase in the east and a decrease in the west.

Discussion

It should be noted that the percentages established for the tools of these various categories do not directly reflect the ratios of different activities in the economy. Changes noted in toolkits reflect general changes in the economy. It is impossible to gain information on paleoeconomy from any other sources; consequently this data is important for reconstructing the main occupations of the local population during the Upper Paleolithic – Neolithic in the Russian Far East. Analyses of percentages of various tool categories within the toolkits associated with different chronological periods provide an insight into prehistoric developments in the everyday life and economic activities of the Amur basin population.

Summing up the results of this study, it seems inappropriate to highlight any particular data on tool type rates. Paleoeconomy and trends of its development are reflected in the aggregated data. Correlations should be made on the basis of all aspects of available data providing solid grounds for correct interpretations.

Data on effectiveness of particular tool types and their proportions in the toolkits can provide evidence on specificity of economic activity and suggest reasons for occurring changes. For instance, the noted gradual decrease in the number of cutting tools in the archaeological cultures presented here can be explained by a higher quality of such tools. In contrast, our experimental studies have shown that the effectiveness of scraping tools did not change considerably. Tools optimal for skin working were elaborated and produced in considerable amounts in the region as late as in the early Upper Paleolithic. Quantitative growth of such tools is understandable: the amount of hunting tools also grew during that period; consequently, the amount of material for processing also became greater.

The Upper Paleolithic-Neolithic period can be characterized by favorable and warm climatic conditions of the final Pleistocene. The end of the glacial period did not bring sharp climatic changes to southern parts of the Russian Far East region (Lapshina, 1999: 107). Available data of palynological analyses show changes primarily in humidity. During that period, steppe animal species of dry and cool habitats were replaced by moisture and warm-loving taxa, eventually replaced by modern animals (Ibid.: 107 – 108). Similar climatic changes occurred in the region of the Selemdja sites and the Gromatukha settlement. However, it is unlikely that considerable changes occurred in the local taiga fauna. Conditions of human habitation became more severe. Currently, only general climate data are available. Hopefully, the development of analytical techniques and continuation of research in paleoclimatology will provide researchers with additional information for reconstructing developmental trends in the economy of the hunter-gatherers.

Conclusions

The role of hunting and processing of hunted game became increasingly important during the Upper Paleolithic-Neolithic transition, especially in the western part of the study region. It was hunting that seems to have replaced foraging as the main source of food for the earlier populations. People seem to have started mass production of hunting tools. The tools became more standard and more effective. For instance, animal skin processing implements demonstrate amazingly perfect working features. It has been noted, that special tools were made for performing particular works. New forms of tools were elaborated and particular raw materials with specific characteristics fitting premeditated purposes were chosen. Based on the available data, the growing effectiveness of hunting and related "manufactures" can be inferred. Comparative studies of archaeological collections from many local sites have shown that fishing tools underwent the most significant changes during the Neolithic.

Collections from the western part of the study region (the Selemdja and Gromatukha cultures) indicate a gradual diminishing of the role of fishing compared to hunting. One can also infer that preferred fishing localities were changed. Upper Paleolithic hunter-gatherers seem to have caught fish in large ponds in the Salemdja mouth, most probably with the help of fishing nets. Presence of ice-picks in archaeological collections suggest winter fishing practices. On the contrary, the Gromatukha Neolithic population preferred fishing at small river mouths. Relevant collections contain very few implements suggestive of net fishing.

Increased efficiency in hunting and fishing led to economic stability during the Gromatukha period. The hunter-gatherers were only semi-sedentary. Excavations at Gromatukha revealed remains of only portable, seasonal dwellings.

Development of fishing affected the composition of the Osipovka and Malyshevo toolkits. Fishing eventually changed from year-round to highly effective seasonal

work. Seasonal fishing provided an abundant, full-calorie food source.

Fishing developed quickly in the eastern parts of the region. Evidence for this is the considerable growth of absolute and relative percentage of fish processing tools. The effect of productive fishing in the east can be thought of as a stabilizing factor in the Neolithic economy. The same can be said of the influence of effective hunting in the western part of the region.

Currently, the emergence of productive economy has been regarded as the major feature of the onset of the Neolithic (Adovasio et al., 2001: 62). This is applicable for many regions of the world. However, in the areas where development of any kind of "productive economy" is hampered by a comparatively severe climatic environment, the advent in the Neolithic is marked by emerging features of a sedentary population.

In the region under study, there are only a few Neolithic long-term settlements. Only short-term, likely seasonal settlements, have been discovered in the western parts of the region. Neolithic dwellings were comparatively small and represented rather simple portable shelters. A nomadic lifestyle based on hunting, did not facilitate human long term settlement, even in the most productive areas. During the Gromatukha period, hunting became the primary branch of the economy, while fishing was a subsidiary occupation. People preferred to live in areas more productive for hunting rather than fishing.

Dependence on fishing in the eastern part of the region led to variation in lifestyle. Fishing did not require permanent migrations in search of game. Regular spawning periods provided people with the opportunity to store large amounts of food. Effective work over a few weeks provided a sufficient food supply for the whole year. Advantages of fishing versus hunting in the region are apparent even nowadays. Naturally, the population settled at places most convenient for spawning fishing. This strategy is well illustrated by archaeological data of the Malyshevo culture. Excavations at settlements revealed quite different features. People lived in long-term, large and comparatively comfortable dwellings (Volkov, Medvedev, 2004a, b). Dwellings were semi-subterranean, had solid bases, and heat-preserving roofs. The average size of a typical dwelling reached 70 sq. m. Dwellings were used for various purposes, such as sleeping places, day-time recreation and manufacturing zones. The largest long-term constructions reached an area of 170 sq. m. There was a fire-place (sometimes several hearths) in such dwellings. Manufacturing zones were located on both sides of the entrance. The interior area was probably subdivided into "masculine" and "feminine" zones. Sleeping areas were located furthest from the entrance. The boundary between recreation and manufacturing zones is clear. Settlements with dwellings of this kind differ dramatically from the settlements with short-term dwelling constructions from the western parts of the region.

Two types of economy – hunting in the west and fishing in the east – determined different developmental trends in the paleoeconomy of the region. Specialization of the economy for seasonal fishing led to a sedentary life that can be considered a primary characteristic of the beginning of the Neolithic.

In sum, development of fishing methods and tools and what is more important specialization for spawning fish led to dramatic changes in foraging strategies of the local population. A sedentary lifestyle can be regarded as one of the most important results of the development of the paleoeconomy of the eastern parts of the region and as a characteristic feature of the onset of the Neolithic.

The functional and statistical analysis of tool assemblages is useful for examining intra- and intersite variation. This analysis helps to establish typical and atypical tool assemblages for each separate site, thereby providing information as to the general characteristics of a given site. Over the last decade, a huge body of archaeological data regarding the Middle and Lower Amur cultures was introduced. The application of functional and statistical analyses will hopefully extend our views of the prehistoric economy of the region, and offer the possibility for comparing it with economies of the adjacent regions such as China, Korea, and Japan.

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THE PALEOLITHIC FLAKE INDUSTRY IN VIETNAM

Introduction

The Paleolithic records from Asia demonstrate amazing diversity originating from the great variety of environmental and landscape zones over this vast continent. Paleolithic assemblages from the north and west share many features with stone industries in Europe, while those from East and Southeast Asia are quite different (Abramova, 1994; Boriskovsky, 1971; Derevianko, 1983). The most common feature of the East and Southeast Asian Paleolithic collections is the abundance of pebble tools, while proportions of flake tools are only minor. This feature is typical of Stone Age collections from Vietnam. The present authors made a research visit to Vietnam in 1984 – 1985 and viewed artifact collections from many local Stone Age sites. Inferences made in the course of those examinations have proven to be relevant to archaeological research currently being conducted by Vietnamese scholars (Ha Van Tan, 1998). This was one of the reasons why we have decided to review our former conclusions and point out that there are some archaeological collections that differ dramatically from the general trend of development of the Vietnamese Paleolithic.

The described collections showed an apparent dominance of flake tools over pebble tools. In particular, this is the case for the technocomplex that was recovered from the lowermost horizon in the Nguom rockshelter in the northern province of Bak Thai. We had the chance to examine the Nguom lithic collection in the History Museum in Hanoi thanks to Quang Van Cay, a member of the Museum who did research at Nguom in 1981 – 1982. Our inferences about specific features of that technocomplex were later supported by Ha Van Tan (see (Moser, 2001)), who identified a specific "Nguomien" industry of tools on flakes. This industry differed considerably from the pebble industries of Son Vi and Hoabinh (Nguyen Khak Shi, 1982), in which the proportion of flake tools is small and hardly constitutes 1 % of the total amount of artifacts showing signs of secondary working (Moser, 2001: 47). Similar artifact collections have been recovered from other grottos and rockshelters located in the vicinity of Nguom, e.g., the Mieng Ho grotto. P.I. Boriskovsky (1977: 190 – 191) analyzed the Mieng artifact collection and correlated it to certain Indian Middle Paleolithic industries. Technocomplexes of the Mieng culture were attributed to the Middle Paleolithic and mentioned among other technocomplexes in a monograph addressing basic issues of Paleolithic studies (Derevianko, Vasiliev, Markin, 1994: 203). We believe that the Nguom collection of Middle Paleolithic artifacts can be included in this list.

Nguom rockshelter

The primary information on the site has been provided by Quang Van Cay, who studied the site. We focused our research on the technocomplex associated with the lowermost horizon. Archaeological materials from this site have not been published in full; only a preliminary publication in Vietnamese was released. For that reason, we have decided to analyze the major tool and core categories established within the collection in the course of studies by the present authors rather than to provide the reader with a full description of the artifacts and relevant statistical data.

The rockshelter is located in a limestone mountain ridge containing other grottos that have also yielded

Stone Age artifacts. The sediments are 1 m thick and contain three culture-bearing horizons. Within the uppermost horizon, two sub-horizons were recognized. Both sub-units yielded artifacts of the Bak Son and Hoabinh cultures. The middle horizon contained Son Vi cultural remains, while the lowermost horizon yielded lithic artifacts of Mousterian affinity. No animal bones were found.

A few radiocarbon dates have been generated on mollusk shells: 18,600 ± 200 (Bln-26911) for the upper portion of the Hoabinh layer; 19,040 ± 400 (Bln-26911) for the lower portion of that layer; two identical dates of 23,000 ± 200 (Bln-269211, Bln-26921) are available for the upper and lower portions of the Son Vi cultural layer, and an infinite date of > 32,000 is associated with the sterile limestone block and gravel layer overlying the lowermost cultural horizon.

Artifacts from the lowermost horizon were mostly made on quartzite, basalt, liparite, and porphyry pebbles from the nearby spring.

Primary reduction is characterized by a lengthwise pattern of flaking. The core collection comprises bipolar and parallel convergent cores (Fig. 1, *3, 4*) as well as multifaceted (spheroid) and radial core varieties. Striking platforms are usually plain and retain pebble cortex, while few specimens show signs of rejuvenation. The category of spalls consists mostly of flakes; blades are few. There are some Levallois flakes (Fig. 1, *1*, *2*) mostly of the Clactonian type. However, the majority of artifacts in this category are sub-triangular Mousterian items produced using perpendicular blows.

Many flakes and blades retain the pebble cortex. This trait can be explained by the characteristics of the raw material, which consists of mostly medium-sized pebbles and very few large specimens. Despite the fact that the artifacts are mostly fashioned on pebbles, the industry under study cannot be identified as a typical pebble industry, a major feature of which is the specific "citron" reduction technique (Ranov, 1986: 28 – 31). The lowermost technocomplex is characterized by a Middle Paleolithic primary reduction strategy based on flaking bipolar and radial cores mostly using a flat-face reduction technique. The only feature that is not typical of Middle Paleolithic technology is the retention of the natural pebble cortex over most flakes' striking platforms.

The Nguom lowermost horizon has yielded numerous artifacts showing signs of secondary working, most of which are attributable to the Middle Paleolithic. No Levallois and Mousterian points have been noted. A few atypical points bearing traces of irregular retouch have been recognized (Fig. 2, *1, 4, 6, 9*). There are no artifacts with typical Mousterian scalar and stepped retouch. However, many artifacts

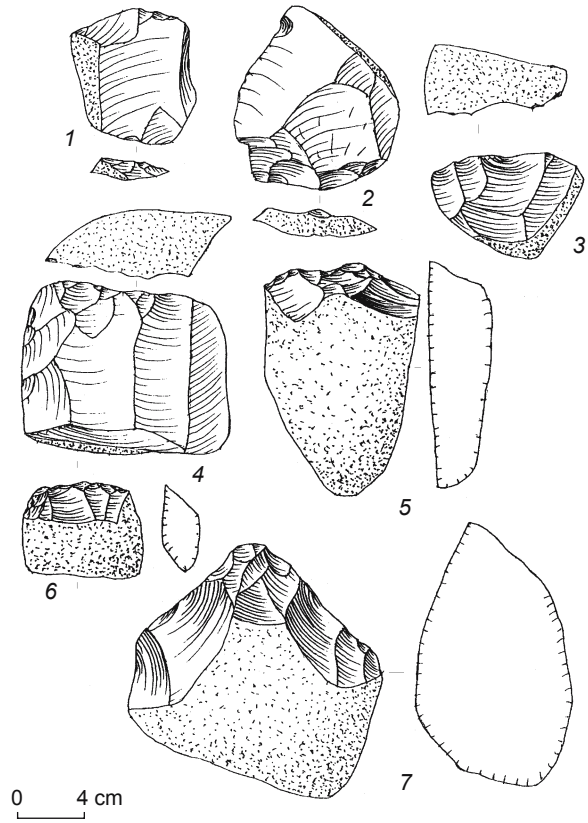

Fig. 1. Lithic artifacts from the lowermost horizon at the Nguom rockshelter.
1, *2* – Levallois flakes; *3*, *4* – cores; *5* – *7* – choppers.

demonstrate serration, and in some specimens serration is combined with flat, one-step or semi-abrupt marginal retouch.

The share of sidescrapers and scraper-like tools is considerable. These are mostly simple sidescrapers with one cutting edge and fashioned on flakes (Fig. 2, *5, 10*), while few such tools were made on complete pebbles of appropriate shapes (Fig. 2, *15*). Sidescrapers on pebbles are most typical of the Son Vi culture. Also, atypical sidescrapers with two cutting edges were noted (Fig. 2, *8*), but neither convergent, nor *déjeté* varieties were found. Few transverse (diagonal) sidescrapers were encountered (Fig. 2, *11*), while sidescrapers worked on the ventral surface are quite common in the collection. Such implements have abrupt or semi-abrupt heavily retouched edges (Fig. 3, *1, 2, 4, 5, 7*); some specimens have serrated edges (see Fig. 3, *1, 2*). Choppers also demonstrate elaborate stepped working. These chopper-like scrapers include combination tools with chisel-like ends and scraper-like edges that can together be interpreted as an accommodative feature (Fig. 3, *4*). The few sidescrapers with abrupt edge retouch can be considered atypical for this industry. No items showing Quina or semi-Quina retouch were noted.

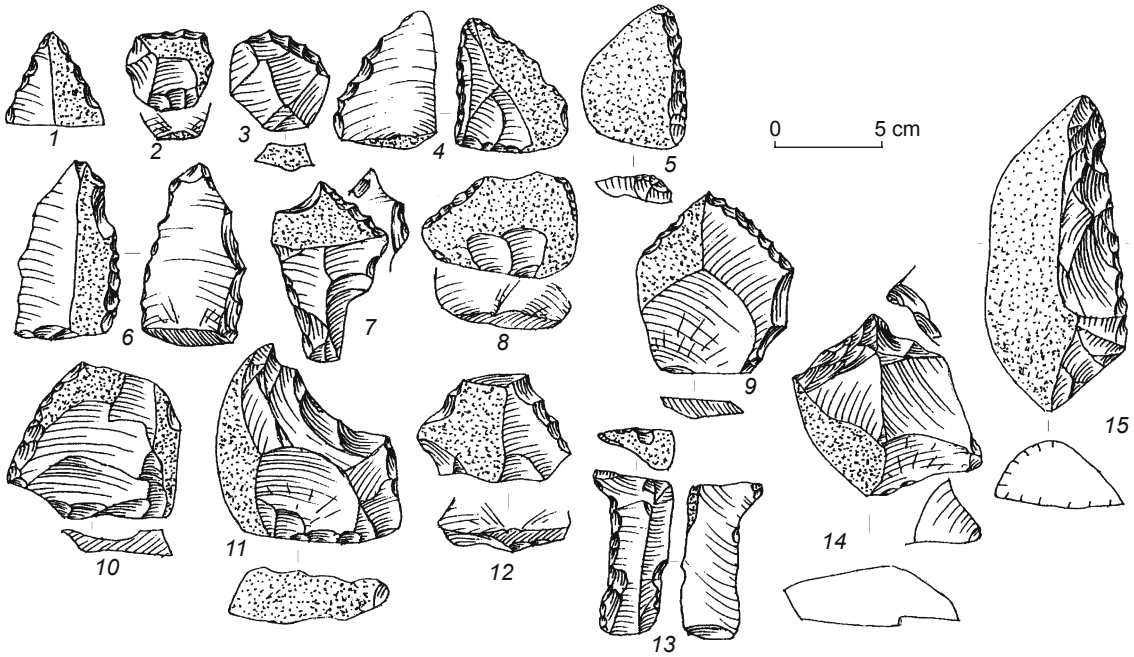

Fig. 2. Lithic artifacts from the lowermost horizon at the Nguom rockshelter.
1, *4*, *6*, *7*, *9* – flake points; *2*, *3* – endscraper-like tools; *5*, *8*, *10*, *11* – sidescrapers; *12* – denticulate tool; *13*, *14* – beak-shaped tools; *15* – pebble sidescraper.

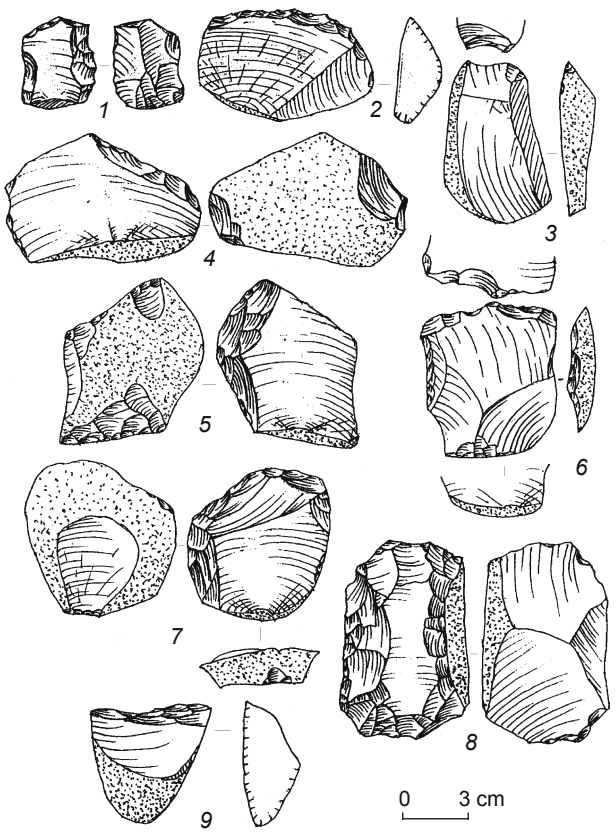

Fig. 3. Lithic artifacts from the lowermost horizon at the Nguom rockshelter.
1, *2*, *4*, *5*, *7* – sidescrapers worked on the ventral face (*4* – chisel-like tool?); *3*, *6*, *8* – chopping tools; *9* – chopper on a flat pebble.

There are no true Upper Paleolithic tools in the collection. Tools reminiscent of endscrapers on small flakes and bearing signs of semi-abrupt denticulate retouch (Fig. 2, *2, 3*) have been identified. A beak-shaped cutting tool exhibits a micro-burin spall scar on its working edge (see Fig. 2, *13*) that probably represents a use-wear sign. A point with a well prepared barb (see Fig. 2, *7*) can be conventionally interpreted as a borer.

Notched tools are few and not typical for this collection. There are many denticulate tools (see Fig. 2, *12*). Beak-shaped tools with working elements fashioned with the help of notches are also included in this category. For instance, there is a beak-shaped tool with two working ends (see Fig. 2, *14*). It should be noted that denticulate retouch is typical of Vietnamese flake tools in general. This technique of secondary working is apparent not only in the Son Vi and Hoabinh industries, but also in Neolithic assemblages.

Chisel-like (adze-like) and axe-like tools are of particular interest. They share such common features as elongate shape and traces of working on the narrow face. Usually both faces of such tools show negative scars of flat removals; some of these can be identified as use-wear signs (see Fig. 3, *6*). Experiments showed (Matyukhin, 1983: 171) that such scars appear as a result of wood working. These tools were mostly fashioned on very short flakes (see Fig. 3, *3, 4*); some were made on slightly longer flakes, but in all cases the blanks are thick (see Fig. 3, *6, 8*). Lateral sides retain natural cortex

and can be classified into two varieties: either as beveled striking platforms of Clactonian flakes (see Fig. 3, *3, 4*) or as residual pebble surfaces (see Fig. 3, *6, 8*). Some specimens show secondary working in the form of semi-abrupt retouch, typical of Mousterian sidescrapers, on the opposite edge. Choppers (see Fig. 3, *9*) might have been used for the same purposes. Adze-like and axe-like tools have been reported from many Stone Age sites of Vietnam and elsewhere in Southeast Asia. This phenomenon can be explained by environmental features of the region: humans had to adapt themselves to living in the rainforest.

Despite the fact that the collection under discussion is dominated by flake tools, it also contains true pebble tools including uni- and bifacial choppers. The size of such tools varies across the collection, yet only a few can be classified as large. Most choppers, including elongated (see Fig. 1, *5*), short (see Fig. 1, *6*) and even pointed (see Fig. 1, *7*) varieties, show unifacial working. The latter forms are typical for the Son Vi pebble industry. Similar implements have been noted in the collections of the Namtun cave. The lowermost horizon at that cave site has been attributed to the early period A of this "culture" (Nguyen Khak Shi, 1982: 7). We have not encountered any typical bifacial tools in the collection of artifacts from the lowermost horizon of the Nguom rockshelter; only implements showing partial bifacial working have been noted.

The recognized techno-typological features allow for the Middle Paleolithic attribution of the Nguon lithic industry with certain specific traits, such as clear presence of cutting tools and atypical choppers in the collection.

There are no close similarities between the Southeast Asian Middle Paleolithic and the North Eurasian Mousterian, e.g., materials from France, the Russian Plain, and the Altai (Derevianko, Markin, 1992), because of significant differences in environmental conditions. There is no need for warm clothes and cold-resistant dwellings in the tropics, and hence many stone tools used in the regions with a cold climate were not necessary for the inhabitants of the tropics.

The Nuong site

This site is located on a slope of a basalt mountain about 100 m high. It is situated on a flat alluvial plain close to the seashore, 10 km northwest of Mount Than-hoa and 5 km from the famous Mount Do, where Lower Paleolithic artifacts have been recovered. A concentration of lithic artifacts was discovered on a small plain 30 m above the base of the hill. According to our preliminary observations, the artifacts clustered at the base of the cliff. Artifacts, together with rock debris, were scattered over an area of 50 m by 10 m. The site is located on the inland mountain slope, protected by a cliff from strong winds and typhoons.

The distribution of lithic artifacts over the area allowed us to establish the possible boundaries of the site and choose a place for excavations. We decided to make a test pit (1 m by 1 m), in order to minimize possible damage to cultural layers. An area of approximately 5 m by 5 m was chosen. A few artifacts were collected from the surface of this area and the test pit was established in the center. The following stratigraphic column was recognized (from top to bottom): (1) dense and heavy brown loam with an admixture of dark basalt debris of varying size and lithic artifacts, 0.4 m thick; (2) heavy and even denser dark brown loam (clay) with an admixture of fine to coarse basalt gravel and numerous lithic artifacts, 0.1 m thick; (3) large fragments of reddish-brown basalt cemented with brown clay; the layer does not contain any artifacts, and the apparent thickness is 0.2 m. The layer seems to overlie weathered basalt bedrock.

The assembled artifacts have been subdivided into three main sets: (1) artifacts from the surface, some of which were found under basalt rocks; (2) artifacts recovered from the upper loam layer; and (3) artifacts from the lower loam layer. All the artifacts were made of basalt. Artifacts of sets 1 and 2 are grayish-yellow, while those from set 3 are brown.

Set 1 might originate from a washed out loam layer. The set totals 170 items including a few tools and cores, 158 flakes and blades, and a few chips and shatter. Two implements in this set show partial bifacial working. Set 2 comprises 152 artifacts including 132 spalls, 28 chips, some tools but no cores. Set 3 comprises 260 flakes and blades, 96 chips and 10 large retouched fragments and 3 elongated implements with retouched edges. All the three sets are morphologically homogenous, probably due to the small number of artifacts in the collection. The category of implements on spalls mostly comprises flakes and blades of medium size (from 60 to 80 mm); however, there are some large specimens.

The few recognized cores mostly illustrate the Middle Paleolithic lengthwise strategy of stone reduction, including its convergent variety. For instance, there is a sub-triangular, single platform core bearing scars of triangular-shaped flake detachments. This comparatively large core is a typical Middle Paleolithic core at its initial stage of reduction (Fig. 4, *8*).

Statistical indices are not particularly informative due to the rather small excavation area, but we provide technical indices for the three sets for comparison (Table 1).

In general, despite some variation in the qualitative indices reflecting primary reduction features (which is quite understandable in this situation), the industry

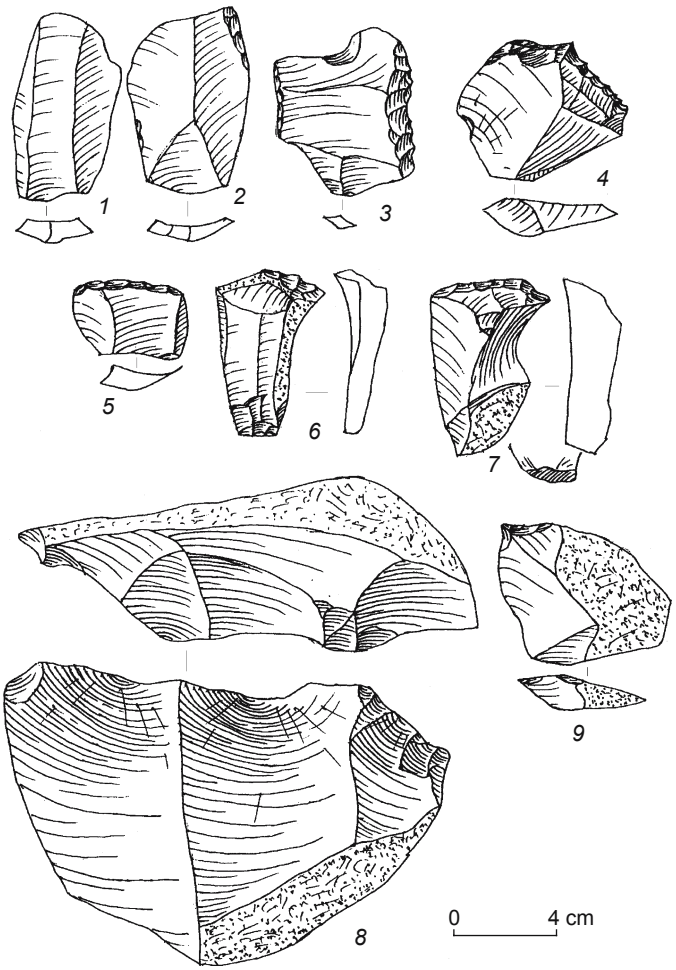

Fig. 4. Lithic artifacts from Nuong.
1, *2* – Levallois flakes (*2* – side-scraper?); *3* – sidescraper on Levallois flake; *4* – denticulate tool on flake; *5* – *7* – endscraper-like tools; *8* – single platform core; *9* – borer on flake.

is non-Levallois, non-blade-based and has a relatively low index of striking platform faceting. Most artifacts bear dihedral platforms, while a few have typical faceted platforms. However, correlations between the mean indices of the three Nuong artifact sets and those of Son Vi and Hoabinh provide some interesting information (Table 2)*.

The major characteristic features of the Son Vi and Hoabinh cultures are as follows: striking platforms mostly retain the pebble cortex; Levallois spalls are practically absent in the collections; blades are few. In contrast, the late Vien Sou assemblage comprises a relatively large number of elongated spalls that are more than twice as long as they are wide. This category of implements includes specimens with burin spalls (Boriskovsky, 1977: fig. 5).

The Nuong tool kit differs considerably from the aforementioned ones and demonstrates many features in common with the technocomplex from the lowermost horizon at Nguom. Cores in the Nuong and Nguom collections are mostly Mousterian-like, while Son Vi and Hoabinh cores are mostly amorphous.

The Nuong tool kit is dominated by flake tools, including notches and denticulates, as well as sidescrapers typical of the Mousterian (Fig. 4, *3*). The collection also comprises typical Levallois

* Indices have been generated by the present authors on available data from the cave sites of Mantyn (Son Vi) and Som Chai (Hoabinh), as well as from the Vien Sou site, which our Vietnamese colleagues attribute to the terminal period of the Son Vi culture.

Table 1. **Technical indices of lithic artifacts from Nuong, %**

Set	IL	IF	Ilam
1	8.9	24.7	9.5
2	12.1	27.2	10.7
3	3.5	20.9	5.0

Table 2. **Technical indices of lithic artifacts from Son Vi, Hoabinh, and Nuong, %**

Site	IL	IF	Icl	Ilam	Pebble striking platforms
Nuong	7.1	25.6	36	8.2	14
Namtun (Son Vi)	0.5	2.5	73	5.0	90.8
Vien Sou (Son Vi)	0	8.6	90.1	26	88.8
Xom Trai (Hoabinh)	0	10	64	2.5	76

blades and flakes (Fig. 4, *1, 2*), some of which show traces of secondary working (see Fig. 4, *2*). The proportion of the Mousterian group (according to Bordes classification) is considerable.

However, there are no simple and Levallois points. The set of sidescrapers includes simple tools with single working edges (Fig. 4, *2*; 5, *4*), double (see Fig. 4, *3*), diagonal (Fig. 5, *5*), transverse (Fig. 6, *3*), and one bifacially worked implement (Fig. 6, *2*). It cannot be excluded that this bifacial piece is a cutting tool and that the retouch is an accommodative feature, yet formally this item looks like a sidescraper. Some implements demonstrate techniques of reduction of the bulb of percussion through flat retouch (see Fig. 5, *4*). Working edges are often serrated, suggesting attribution of the relevant tools to the category of denticulate sidescrapers. The majority of the blanks used for tool production are flakes; natural rock fragments were also rarely used (see Fig. 5, *5*).

There are few Upper Paleolithic tools. This category comprises four atypical endscrapers (see Fig. 4, *5 – 7*; 5, *1*) and a typical borer on a flake (see Fig. 4, *9*). The endscrapers were modified with random rough retouch (see Fig. 5, *1*). A shortened endscraper from set 3 is noteworthy because it resembles scraper-like implements from the Nguom lowermost horizon (see Fig. 4, *5*). There are also naturally backed knives (see Fig. 5, *2*) fashioned on sub-triangular flakes.

The proportion of notched and denticulate tools is rather high (see Fig. 4, *4*); some of them represent typical denticulate sidescrapers. Serration is one of the most typical techniques of secondary working noted at many Stone Age sites, including those with pebble industries in Southeast Asia.

There are three fragments with bifacial working that were possibly blanks for comparatively long axe-like implements, and there is also one chisel like (adze-like) tool made on a large blade fragment. Similar tools have been reported from the Lower Paleolithic site of Mount Do as well as from collections of Hoabinh and Son Vi artifacts (Moser, 2001). Axe blanks from the Neolithic workshop at Dong Khoi (Boriskovsky, 1966:122 – 123) also show some similarities with the artifacts under study; however, the Dong Khoi implements have much rougher working features.

There are a few large elongated basalt fragments with lateral sides modified like sidescrapers. Such tools were designated as heavy backed chopper tools, *sekach* (Gladilin, Sitlivy, 1990: 177). Two rather large core-like implements have random alternating retouch on a sharp end, while the opposing edge is not modified and served as a back. These implements can be interpreted as chopper-like forms (see Fig. 5, *6*). The sheer absence of true pebble tools can probably be explained by characteristics of the available raw material.

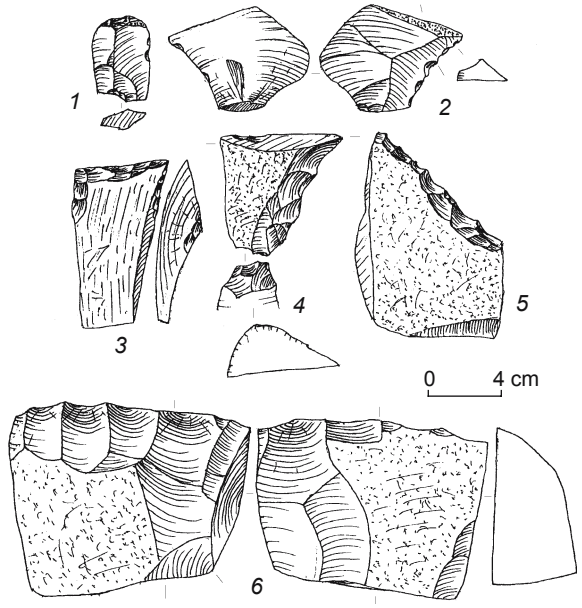

Fig. 5. Lithic artifacts from Nuong.
1 – atypical endscraper; *2* – naturally backed knife; *3* – adze-like tool on a flake fragment; *4* – denticulate sidescraper with traces of hewing; *5* – sidescraper-like tool on fragment; *6* – core-like (chopper-like) tool.

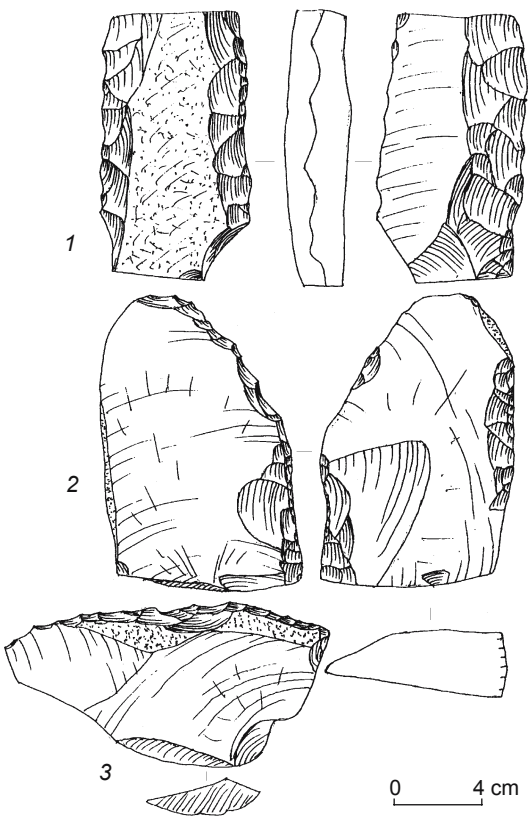

Fig. 6. Lithic artifacts from Nuong.
1 – biface (axe-like tool); *2* – thick chopping tool on flake (*sekach*?); *3* – sidescraper on flake.

Types of sites

The Nguon rockshelter seems to have been a seasonal station. Apparently, primary reduction was not a major activity at the site. This is suggested by the small number of cores. Pebbles were assembled and knapped at the river bank down the slope. Only the best examples were transported to the site.

Nuong was a workshop site at a raw material outcrop. The place was carefully chosen. The site is located on an elevated plain area on an inland mountain slope, and the mountain protects the site from sea winds. The site has a good view of the valley and lies in close proximity to raw material for tool production.

We do not agree with A.E. Matyukhin (1990), who identified this site as a specialized axe-producing workshop and attributed it to the Late Neolithic – early Bronze Age. Matyukhin, together with his Vietnamese colleagues, excavated an area of 10 sq. m at Nuong and assembled a rather large collection of artifacts. The majority of the tools were identified as blanks for axe manufacturing and were correlated exclusively with implements from the late assemblages of He Trua, Kon Tran Chien, and Dong Khoi (Ibid.: 96).

P.I. Boriskovsky compared the basalt implements from the Dong Khoi workshop with relevant items from Mount Do and noted considerable differences not merely in the preservation of surfaces, but also in the morphology of flakes (Boriskovsky, 1966: 122 – 123). Most flakes from Dong Khoi have small striking platforms with right flaking angles, and thin transverse sections. Such flakes result from bifacial processing. Nearly all flakes (over 99 %) are unretouched, unlike those from typical Paleolithic assemblages including those from Nuong and Mount Do. In addition, collections from later workshops include neither cores nor tools. The Nuong collection, in contrast, does include typical cores, tools, flakes, and debris.

The site was investigated by the present authors. It occupied a small area on the plain part of a hill 30 m above rice fields. In contrast, all the known late workshops were located close to residential sites in the foothills of the basalt mountains (Ibid.: 124). The question arises concerning the purpose of establishing a "workshop" at such a high elevation, when similar raw material is available at a more convenient place from where "axe blanks" could easily be transported. One should bear in mind that the mountain slopes were vegetated by thick forests during quite recent periods.

Unlike Matyukhin (1990: 94), who wrote that all the artifacts were recovered from a soil layer, we recognized clear stratigraphic units. Basalt artifacts from the lowermost horizon (45 cm deep) have a dark brown color compared to the lighter colors of artifacts from the upper horizon. The different states of artifact surface preservation suggest different ages.

Axe-like implements are the most typical artifacts of the Vietnamese Stone Age. Axe blanks from Dong Khoi are mostly rectangular in cross-section, while such tools from earlier periods, like implements from Nuong, are lens-shaped. It should be noted that Late Neolithic axe workshops always include fragments of polished implements, while neither Do nor Nuong have yielded such items.

Also, if one follows Matyukhin's line of reasoning, it would be strange for him that at the Do site most by-products of "axe" manufacturing are rather large (sometimes even larger than "axe blanks" themselves) Clactonian flakes. Most by-products at Nuong are small Mousterian and Levallois flakes. At the true workshop of Dong Khoi, there are mainly small and thin flakes resulting from biface manufacturing, and these products differ from those of the former two assemblages in color and state of surface preservation. Luu Tran Tieu, a researcher at the Do site, quite reasonably considers the majority of the "axe blanks" to be choppers and cleavers. All of these arguments make Matyukhin's interpretation unacceptable.

On the basis of such features as location, spatial distribution of artifacts, stratigraphy, and techno-typological features of the industry, the Nuong site has been defined as a typical workshop at a raw material outcrop. This elevated place was probably the only convenient place in the probably swampy, rainforest surroundings. Early humans might have lived there rather comfortably for a relatively long time.

Common and distinctive features of the lithic industries from Nuong and the lowermost horizon at Nguom

The major feature shared by these two collections is that most implements showing traces of secondary working were made on flakes. This characteristic feature makes these two assemblages unique among the later technocomplexes of the Son Vi and Hoabinh cultures. Presently, no earlier sites have been discovered, at least no sites with good stratigraphy. In this situation, we believe that it is reasonable to mention a rather small collection of lithic artifacts that was assembled by the present authors at the cave site of Tham Khuyen. It has been preliminarily associated with Middle Pleistocene deposits (Anisyutkin, Timofeyev, 2004).

The industries under discussion mostly possess Middle Paleolithic stone reduction technologies. These Vietnamese assemblages are closely analogous to the so-called Navasien Middle Paleolithic industries from central India and the Indo-Ganges Plane. Navasien collections of tools with secondary working are dominated by notch-denticulate tools and atypical sidescrapers fashioned on

Mousterian-like flakes (Boriskovsky, 1971: 89, 93 – 94). Unlike the Vietnamese Middle Paleolithic collections, e.g., the ones forming the Nguom lowermost horizon and Nuong, Middle Paleolithic assemblages from India include few axe-like tools, and the proportion of typical chisel-like tools is considerable (*pièces écaillées*). Such tool types have been identified by Boriskovsky (Ibid.: 88). These differences are most likely attributable to different environmental conditions.

Conclusions

The ages of the sites under study can currently be estimated on the basis of radiocarbon dates available from the Nguom sediments and from the stratigraphic position of the assemblage deposited below the Son Vi and Hoabinh layers. The radiocarbon date of > 32,000 generated for the overlying horizon can be regarded as the conventional upper chronological boundary of this technocomplex. Presently, we have no reliable estimates for the lowermost boundary.

In sum, a number of clear technocomplexes have been recognized in the Paleolithic of Vietnam. The majority of tools were made on flakes. This is the most characteristic feature of the assemblages in question and makes them quite distinct from the Son Vi and Hoabinh industries. Flake assemblages have been discovered both in cave (Nguom, Mieng Ho) and open-air (Nuong, Do) sites. Artifacts were made of various rocks, and hence specific industries under study are not linked with particular sorts of raw material. Primary reduction and secondary working technologies as well as major tool types are typical of the Eurasian Middle Paleolithic. The closest correlations can be established with the Middle Paleolithic assemblages of India. Complexes from these two areas of Asia reveal a single stage of development of lithic industries; they probably belong to a single chronological period and suggest similar environmental conditions. The assemblages under study are older than the So Vi culture. The C14 date available for the sterile layer overlying the lower culture-bearing horizon at Nguom suggests that this culture existed prior to 32,000 BP. The studied lithic industries are replaced by later ones including the Son Vi and Hoabinh cultures, which are dominated by various types of uni- and bifacial pebble tools. For instance, the present authors analyzed the artifact collection from the lowermost horizon of the Nam Tun cave, attributed to the late stage of the Son Vi culture. According to the Bordes classification, only 19 implements with traces of secondary working were fashioned on flakes out of a total of 156 items, while 128 are pebble tools.

It is highly probable that pebble tools from the Tham Khuyen cave predate the Nguom industry, especially if we regard them as contemporary with the Middle Pleistocene animal bone collection (faunal complex of Ailuropoda – Stegodon) and the early hominid teeth recovered from the cave (Anisyutkin, Timofeyev, 2004). Red sediments yielded fossils and lithic artifacts dating to a Middle Pleistocene interglacial corresponding to Mindel-Riss in Europe. Such an attribution has been proposed by Vietnamese and German paleontologists (Nguyen Lan Cuong, 1985: 99). The Tham Khuyen lithic collection includes more pebble tools than flake tools. Tham Khuyen bifaces, including some resembling handaxes (similar tool types associated with Levallois flakes have been recorded from southern Vietnam (Anisyutkin, 1992)) are well correlated with analogous bifacial forms recovered from Lower Paleolithic sites in southern China (Huang Weiven et al., 2005: 6).

Thus, lithic industries of the "Nguom type" are very interesting because they cut the continuous "pebble tradition" into two parts, of which the latter represented a clear and definite specialization. The major factor behind the specialization is the general trend towards the development of pre-Neolithic industries and the dampening of the climate during the Holocene, leading to the extension of the forest zone. It is known that climatic cooling during the Quaternary glaciations increased aridity and hence reduced the rainforest cover (for instance, in Africa and South America, the rainforest zones decreased considerably and repeatedly (Fouly, 1990: 145 – 146)). However, such an explanation is not valid for the Son Vi culture, which existed during the terminal Pleistocene, i.e. the period of the most severe climatic cooling during the late Pleniglacial. Yet, Late Paleolithic assemblages with flake tools are mostly recorded from savanna and semi-savanna landscapes in North Africa and from steppe and forest-steppe environments in Eurasia, areas where the climate was arid. This is why the impacts of environmental factors on the noted specialization cannot be entirely ignored.

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TURNING POINTS IN THE CULTURAL EVOLUTION OF PREHISTORIC PRIMORYE*

Introduction

A distinctive feature of cultural evolution is the irregular rate at which it proceeds, periods of stagnation alternating with those of rapid change. The latter are commonly described as turning points. The term is descriptive rather than explanatory, of course. Archaeological data documenting the prehistory of Primorye (Maritime Region, the Russian Far East) indicate several turning points marked by a rapid transition from one subsistence strategy to another and by the accompanying breach of continuity in cultural tradition. These changes were especially pronounced in the coastal regions of Primorye, where groups exploiting marine resources coexisted with those practicing agriculture. One of those regions is the coast around Peter the Great Bay.

Why, then, do trajectories and tempos of cultural evolutions change at certain points? We will try and explain some of the related phenomena in an environmental context.

Environmental and cultural changes in Primorye in the Middle Holocene

Tracing the paths of cultural evolution in Primorye in the Middle and early Late Holocene, we can establish four major chronological intervals referred to as "turning points." These are marked by discontinuity of cultural tradition and complex interaction between cultures based on adaptations to various marine and terrestrial resources. Archaeological evidence is relevant for such adaptations only if environmental changes are radical or even disastrous. Turning to reconstruction, we must consider two circumstances. First, environmental changes in the first and third intervals were not especially dramatic, although they did affect the trajectory of cultural evolution in prehistoric Primorye. Second, because the accumulation of archaeological data is an irregular process in terms of both quantity and quality, the information on various periods is uneven. This must have affected our reconstruction, which, apart from interpreting events, points to future directions of research.

The first interval falls during the period from 5400 – 5200 BP; the second one is dated to 4700 – 4300 BP; the third one, to 3600 – 3300 BP; and the fourth one, to 2500 – 2200 BP. All of these intervals were associated with climatic cooling and a drop in sea level. The second and fourth intervals were the most catastrophic for ancient populations in various regions of the world (Vostretsov, 2005).

Environmental changes in coastal and continental zones

According to paleogeographic reconstructions by A.M. Korotky (1994; Pervye rybolovy…, 1998: ch. 1), the following environmental changes occurred during the second and fourth intervals (Fig. 1). In the coastal zone, the transition from the warm Atlantic period to the Subboreal (4700 – 4300 BP) was characterized by

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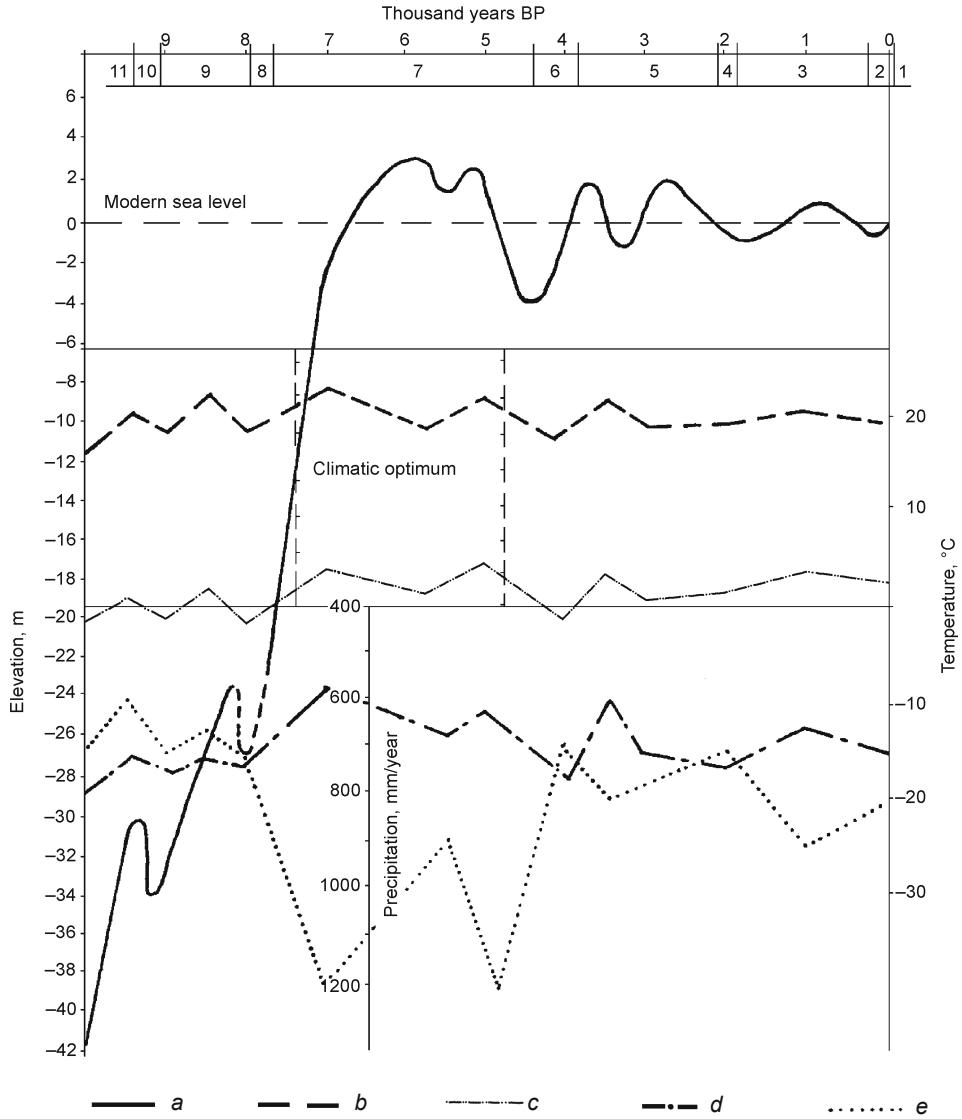

Fig. 1. Changes in climate, vegetation, and the level of the Sea of Japan in Primorye during the Holocene (after (Pervye rybolovy…, 1998: ch. 1)).

a – sea level; *b* – average temperature in August, degrees centigrade; *c* – average annual temperature, degrees centigrade; *d* – average temperature in January, degrees centigrade; *e* – annual precipitation, mm.

1 – 4 – Korean pine – oak forests with admixture of birch and alder at 2.4 ka BP; *5* – oak – broad-leaved forests with a considerable admixture of birch; *6* – coniferous – broad-leaved, oak – birch, and birch – alder forests; *7* – polydominant broad-leaved forests; *8* – birch – elm forests with elements of cryophilic vegetation; *9* – birch – broad-leaved forests; *10* – birch – elm forests in association with shrubby birch and alder; *11* – birch – elm and birch – alder forests with elements of forest-tundra.

climatic cooling. The sea level dropped by 6 – 7 m and was 3 – 4 m lower than at present. The sea regression caused drastic landscape changes in the coastal zone. Numerous lagoons and inlets disappeared, so the coastline became more even. The fourth interval (2500 – 2200 BP) also coincided with a short and abrupt climatic cooling. The sea level dropped to a point 1.5 m lower than at present, which led to the disappearance of lagoons, the formation of sea terraces, the drying of bogs, and the development of alluvial plains in river valleys. During these intervals, in areas adjacent to the coastal zone, the climate acquired a distinctly continental character: the winter became colder and summer became dryer and cooler. Precipitation decreased. Droughts in the first half of summer became more severe, and agroclimatic resources diminished.

Accordingly, environmental changes occurring during the second interval were similar to those of the fourth one.

The changes of the second interval were drastic, albeit slow, while those of the fourth interval were minor, but very rapid, leaving little time for people to develop new adaptive strategies. During these intervals, landscape changes destroyed the traditional subsistence base of hunters and fishermen. The coastal zone became more attractive for farmers, since a higher level of humidity in this region alleviated the deleterious effect of droughts on plant cultivation. Adverse environmental changes in the coastal zone occurred more rapidly and were more pronounced than in the adjoining territories. In both cases, environmental conditions caused the migration of some farming groups from inland areas to the coast.

The first and the third periods were similar with respect to environmental tendencies. They differed in the intensity of these changes and in the initial situations.

Changes in cultural traditions and subsistence strategies in Primorye

By approximately 6000 – 5000 BP (the maximum of the Atlantic transgression preceding the first interval), the earliest sites of the Boisman culture, a local and chronological variant of the comb-patterned pottery tradition, appeared on the coast from Olga Bay in eastern Primorye to the northern Korean Peninsula (Pervye rybolovy…, 1998: ch. 8). At the third stage of this culture, coinciding with the most favorable and warm conditions and preceding the cooling of the first interval, cultural contacts among bearers of the Boisman culture intensified. By this time, the Boisman culture area reached the middle and lower Amur basin (Moreva, 2005). The Boisman-1 site, representing the earliest example of maritime adaptation oriented toward the utilization of lagoon and sea resources (Fig. 2), is attributed to this period (Pervye rybolovy…, 1998: ch. 9; Vostretsov, 2001).

Approximately at the same time, early farming cultures similar to the Zaisanovka culture existed in the continental regions of Eastern Manchuria (Vostretsov et al., 2003).

Event 1. The terminal Atlantic period of the Holocene (the interval from 5400 – 5200 BP) was characterized by minor cooling and a drop in sea level (see Fig. 1). This event coincided with the end of the third stage in the evolution of the Boisman ceramic tradition, when

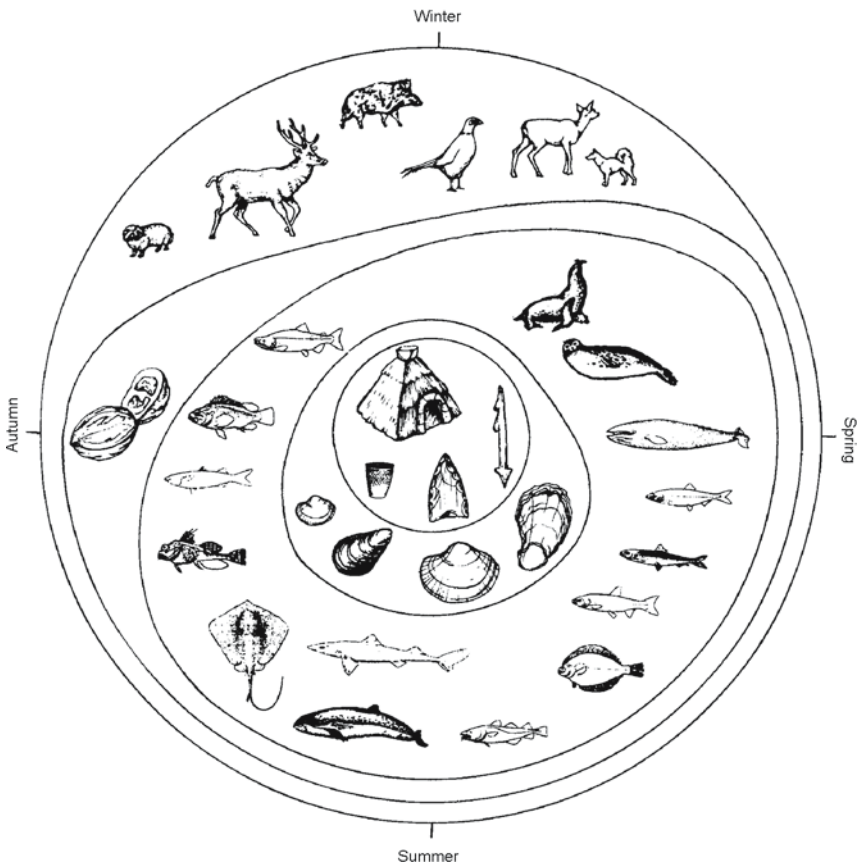

Fig. 2. Annual subsistence cycle at Boisman-1 ca 5500 BP (after (Pervye rybolovy…, 1998: ch. 9)).

the expansion of this culture was minimal (Moreva, 2005). The same environmental changes possibly triggered the movement of early agriculturalists in the western continental regions of Primorye. This process was initiated in Northern China at the beginning of the Holocene climatic optimum (7500 BP) and was long-lasting (Alkin, 2000). Its final stage can be observed in Primorye: the appearance and distribution of immigrant groups bearing a new cultural tradition designated as the tradition of cord-patterned pottery within the Zaisanovka culture (Vostretsov, 2005). Immigrants brought new technologies of stone processing and pottery making; the character of their settlement was quite different; and they also practiced a new subsistence strategy including agriculture, i.e. a new adaptation (Ibid.). The settlement of Krounovka-1 was occupied by farmers bearing the cord-patterned pottery tradition for over 500 years (four stages of site occupation can be traced stratigraphically). They cultivated millet (*Panicum miliaceum*) and perilla (*Perilla* sp.) (identified by E.A. Sergusheva). They also were engaged in hunting, fishing, and gathering of small river mollusks, Manchurian nuts, and acorns (serving as supplementary protein resources in case of a failure of the millet crop). The choice of place for the settlement, however, was motivated by agricultural needs. According to G.I. Ivanova (Andreyeva et al., 1984), lands in the middle reaches of rivers flowing into the Razdolnaya are the most productive in Primorye and adjacent regions of Manchuria.

The coexistence of two population groups, inhabiting specific zones and with subsistence bases oriented toward farming and marine resource exploitation, continued until the end of the warm Atlantic period of the Holocene.

Event 2. After 5000 BP, at the Atlantic/Subboreal boundary, a period of considerably cooler climate began (see Fig. 1). The peak of environmental changes coincided with the 4700 – 4300 BP interval. These changes caused a shortage of accessible resources and forced the Boisman population to modify their subsistence system and social behavior in order to adapt to the new conditions. Boisman people proved unable to accomplish this task, evidently due to the rapidity and scope of the environmental changes. Ultimately, the Boisman cultural tradition began to decline after the Atlantic period of the Holocene (ca 5000 BP).

During the cold episode at the beginning of the Atlantic to the Subboreal transition, the population from continental regions of Primorye, including the Krounovka River valley (Krounovka-1 site), began settling in different areas. On the coast of Peter the Great Bay, early agriculturalists bearing the cord-patterned pottery tradition occupied sites such as Rybak-1 (Garkovik, 2003), Boisman-2 (Moreva et al., 2002), Zaisanovka-7, and Posiet-1. Luzanova Sopka-2 on the southern side of Khanka Lake and Ustinovka-8 on the eastern coast of Primorye are also associated with this population (Krupyanko, Tabarev, 2004).

During the interval of 4700 – 4500 BP, coinciding with the peak of environmental changes, the settlement of Zaisanovka-7 already existed on the sand bank separating the Gladkay River mouth and Expeditsii Bay. Inhabitants of Zaisanovka developed a new subsistence strategy based on the exploitation of sea resources (Fig. 3). They caught 26 species of fish year-round (identified by A.V. Epifanova and L.N. Besednova), gathered mollusks, and hunted terrestrial and sea animals and migrant birds. The carbohydrate component of their diet was fulfilled by collecting Manchurian nuts, acorns, and hazel nuts, which were stored in large pits. The site inhabitants also gathered grapes, bird cherry (*Padus*), and Amur cork tree fruits. Numerous objects representing indirect evidence of agriculture (hand plows, hoes, reaping knives, and graters) have been found at Zaisanovka. Analogous tools are known from contemporary agricultural sites in Manchuria and Korea (Choe Chong Pil, 1990; Vostretsov et al., 2002).

Consequently, the choice of settlement location and the reconstructed annual cycle of economic activities suggest that by around 4500 BP, the people inhabiting the Zaisanovka-7 Neolithic site had established a subsistence pattern based on fishing in littoral areas, the gathering of acorns, and some hunting.

Later on, agriculturalists bearing the Zaisanovka cultural tradition settled the entire Primorye (Vostretsov, 2005). In Japan, according to the prevailing chronological scale, the Atlantic/Subboreal boundary is correlated with the Early to Late Jomon transition (Aikens, Higuchi, 1982; Rowley-Conwy, 1984). On the Korean Peninsula, the same period coincided with the Early to Late Neolithic transition in the north (Kim Yong Gang, Son Rjan Gu, 1991; So Kuk Tae, 1986) and the Early to Middle Neolithic transition in the south (Im Hyo Jae, 1988). The transition was characterized by considerable changes in the subsistence system (Chong Pil Choe, 2001). Some facts suggest that in certain regions of Northern China, as well, there were dramatic changes in subsistence strategies after 4600 BP (Ren Shinan, 2001). During the interval from 5000 to at least 4300 BP, the cultivation of rice spread from continental regions of China to the southeastern coast (Tialong Jiao, 2004).

The scope of the environmental changes at the Atlantic/Subboreal boundary is evidenced by the adaptive responses of populations inhabiting other regions of the world. For instance, in the southern and northern coasts of Peru, the transition to early farming occurred during this time period (Bashilov, 1999).

Event3. The beginning of the Subboreal was characterized by climatic warming. During this period, agriculture was still practiced by later populations associated with the Zaisanovka culture and inhabiting settlements of the Khanka group:

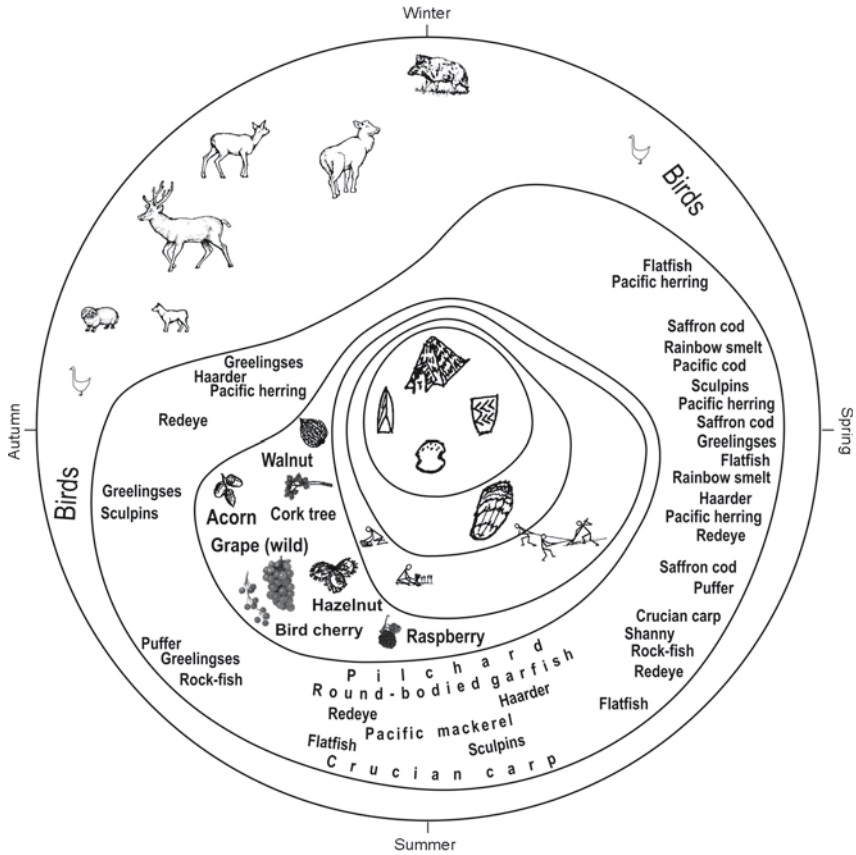

Fig. 3. Annual subsistence cycle at Zaisanovka-7 ca 4500 BP.

Novoselische-4 (lower stratum), Krounovka-1 (excavated by A.P. Okladnikov), Rettikhovka-Geologicheskaya, Mustang-1, Bogolyubovka-1, and Anuchino-14. Cooling that occurred during the interval from 3600 – 3300 BP caused the deterioration of agroclimatic conditions and forced a part of the population inhabiting continental regions to move to the coast of southern and southeastern Primorye. The eastern group of the Khanka sites such as Evstafiy-4 and Sopka Bolshaya (Yanshina, 2001, 2003; Vostretsov, 2005) testifies to this migration. The emergence of the Margaritovka culture on the coast of eastern Primorye is also attributable to this period. All dates available for Margaritovka sites (Glazkovka-2, Evstafiy-Oleg-1, Preobrazheniye-1, Zarya-3, and Monastyrka-3) fall within this interval (Yanshina, Klyuev, 2005). Like Garkavik (1967) and Andreyeva (1970), we believe that this culture marks the transition to the Bronze Age. Khanka sites dating from the end of this interval and the beginning of the next one probably demonstrate that groups of farmers still existed in remote parts of the region.

In continental and coastal Peru, the spread of maize and the emergence of a new cultural tradition coincided with the interval between 3400 – 3200 BP (Masson, 1970); the upper boundary may be later (ca 3000 BP).

The three intervals discussed above, then, were associated with the appearance of various groups of settlers and the initial stage of agriculture in Primorye (Vostretsov, 2005). This stage lasted until approximately the Early Iron Age, i.e. to 2500 BP.

Event 4. The second stage of the spread of agriculture in Primorye coincided with the interval from 2500 – 2200 BP. Starting approximately from the 5th century BC, the Krounovka culture (Tuanje) existed in continental regions of Primorye, in the area of the modern border between North Korea and China. The Krounovka population was represented by rural communities lacking evidence of clear social stratification. They cultivated millet, barley, and wheat (Yanushevich et al., 1990; Vostretsov, 1999, 2005) using the bed system of planting. Traces of this system were recorded at Krounovka-1 in 2003.

Starting from the 8th century BC, the coastal zone of southern Primorye (including the territory of the modern North Hamgyeon Province of North Korea) was inhabited by bearers of the Yankovsky archaeological culture. Their subsistence system was based on the

intense exploitation of sea resources. However, slightly inland and along parts of the coast less affected by the sea, millet and barley were cultivated to some extent. The maximum population size and density was reached in the coastal zone (Andreyeva et al., 1986). If compared with Krounovka, the Yankovsky community possessed a more complex social structure, as evidenced by dwellings differing in size and construction.

During the late 4th – early 3rd centuries BC, drastic cooling of the climate and a drop in sea level undermined the economy of the Yankovsky population. From that time on, the limited carrying capacity of arable land prompted certain groups of farmers (those associated with the Krounovka culture) to migrate to coastal areas of southern and southeastern Primorye. They assimilated a portion of the Yankovsky population. This migration entailed changes in the subsistence strategy and settlement pattern of the Krounovka people and caused cultural decline and a decrease in population density in the new lands. This was the price the Krounovka people paid for adapting to the new conditions (Vostretsov, 1999). By approximately the BC/AD boundary, the bearers of the Krounovka culture occupied the entire coastal zone with the exception of an area in the territory of the modern Khasan Region, where sea resources were more stable and diversified and where the Yankovsky population continued to exist.

The Krounovka culture in the northern part of the Sea of Japan basin and Yayoi Culture in its southern part demonstrate certain similarities in initial situations, environmental changes, and the chronology of agricultural dispersals (Akazawa, 1982; Vostretsov, 1999), leading to the spread of advanced systems of agriculture that successfully competed with developed marine economies. From that time on, agriculture was the principal economy in the region, providing an economic and social base for the early states.

Discussion and conclusion

Having examined the four periods that can be considered turning points in the cultural history of Primorye and adjacent regions of the Sea of Japan basin, we notice certain similarities that can be explained by climatic cooling with the drop in sea level, on the one hand, and by socio-economic changes caused by these factors, on the other. These consequences were the most marked in the second and fourth intervals, and they parallel similar changes in other regions of the world prompted by global environmental changes (Vostretsov, 2005). Each turning point coincided with the emergence of new cultural traditions and adaptations, and the second and fourth of these periods were marked by agricultural dispersals.

The spread of agriculture in Primorye proceeded in two stages. The beginning of each stage coincided with environmental changes (ca 5300 and 2300 BP). Climatic cooling and the drop in sea level caused the degradation of marine subsistence strategies and depopulation of coastal regions, providing conditions for the immigration of new groups associated with other cultural traditions and practicing a different subsistence strategy, specifically agriculture. Groups practicing farming interacted with those exploiting marine resources. Why, then, did agricultural adaptations eventually gain the upper hand and become predominant from the second stage onward? We will try to propose an explanatory model of the interaction between marine and agricultural adaptations at the Atlantic to Subboreal and Subboreal to Subatlantic boundaries of the Holocene, when cultural changes are marked.

As we have tried to demonstrate, cultural changes during the second and fourth turning points were caused by migrations (Vostretsov, 2004). Why migrations rather than *in situ* cultural transformation? In our view, the most plausible explanations are the higher population density and social complexity of inland agricultural groups compared to those of marine-adapted coastal groups. To our knowledge, both groups coexisted within their distribution areas.

Ethnographic data suggest that average population size and population density are higher in coastal groups than in inland groups akin to them (Yesner, 1980). The concentration of archaeological sites in coastal Primorye is many times higher than in inland areas. Also, marine-adapted coastal populations often have a more complex social structure and are more inclined to warfare due to higher population density and competition for resources (Ibid.).

Thus, in a stable situation, inland groups of agriculturalists are unlikely to replace coastal groups exploiting marine resources, since the latter are more numerous and socially complex. To survive, it would be far more profitable to avoid direct competition and live apart, which is precisely what we observe at the end of the Atlantic period. The situation changed when resources became less available due to cooling and the drop in sea level. Environmental pressure was experienced by both inland and coastal groups, which prompted them to look for adaptive solutions that might provide access to resources that had become unavailable, or to alternative resources. Even then, however, inland groups were hardly able to occupy coastal regions and replace their marine-adapted inhabitants. This might have happened only if some level of depopulation had occurred.

The most universal environmental factor behind depopulation is the disruption of the traditional resource base. The primary cause was the drop in sea level caused by cooling. During the Atlantic to Subboreal transition

(4900 – 4300 BP) and in the early Subatlantic (2220 – 2100 BP), these environmental changes triggered cultural changes in southern Primorye. Archaeological data (emergence of new sites, chronological differences, and stratigraphy) support the idea that inland groups migrated to coastal areas after the latter had mostly been abandoned.

Available data, then, allow us to formulate the key features of the model explaining the spread of agriculture into coastal areas:

1) Agriculture spreads into new territories following certain ecological stresses that disrupt traditional resource bases and subsistence strategies and cause depopulation;

2) Repopulation of abandoned coastal territories by farmers occurs rapidly and in a wave-like manner (Pervye rybolovy… 1998: ch. 8);

3) The appearance of agriculture is caused by the immigration of groups practicing a different and a more stable subsistence strategy.

All these features are observed both in Primorye and in Japan during the second and fourth intervals.

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MONGOLIAN CEREMONIAL HELMETS OF THE LATE MEDIEVAL PERIOD FROM THE STATE HERMITAGE MUSEUM COLLECTION*

Introduction

Protecting a warrior's head from blows delivered by offensive weapons has been one the most significant functions of personal defensive armor since ancient times. It is clear that the prevalence of powerful weapons like the stone battle axe made sturdy protective headgear a necessity long before the advent of metallurgy and metalwork. One blow to the head with such an axe was enough to completely disable a person. The earliest helmets and other protective headpieces were probably made from organic materials (Gorelik, 1993: 154). The invention and spread of bronze-casting production and thin-walled molding techniques in the Middle Bronze Age offered vast opportunities for manufacturing large metallic weapons, including armor. In Central Asia, the earliest known bronze cast helmets came from Late Bronze Age slab graves in Mongolia (Varenov, 1994: 91; Erdenebaatar, Hudiakov, 2000: 140; Hudiakov, 2001: 60 – 63). Protective bronze headpieces with spherical or conical domes and ornamentation were used by nomadic warriors of the Scythian period. Bronze helmets attributable to the Early Iron Age have been found in the Altai and western Central Asia (Gorelik, 1993: 168 – 170; Hudiakov, Tabaldiev, Soltobaev, 2001: 101 – 104). The earliest protective headpieces made from iron have been recovered from the graves of Central Asian nomads dating back to the Xianbi period. The Laoheshen burial in Manchuria has yielded helmets composed of narrow iron plates connected with leather cords and crowned with hemispherical tops (Rets, Yu Suhua, 1999: 50; Hudiakov, Yu Suhua, 2000: 41; Bobrov, Hudiakov, 2005: 137 – 139; Gorbunov, 2005: 214). During the subsequent period of the Middle Ages, iron helmets of various types were used by warriors of the Central Asian nomadic states – the Ancient Turks, Uighurs, Kyrgyz, Kimaks, Qidan, Mongols, and others (Gorelik, 1979: pl. 97 – 99; 1987: 168; Hudiakov, 1980: 129; 1991: 85; 1997: 53). In Southern Siberia and Central Asia, most of the finds of this sort have been dated back to the Late Middle Ages (Goreilik, 1979: 99; Bobrov, Hudiakov, 2003: 141 – 144; Hudiakov, Bobrov, 2003; Voitov, Hudiakov, 2004: 102). Since such helmets are rare and highly valuable, almost all of them have been analyzed, dated, and the data on them has been published more then once.

Beside their basic protective function, battle headpieces served as a distinctive sign of their owner's social status and military order affiliation, as well as being an indication as to whether he belonged to the military aristocracy. In Mongolia, during the Late Middle Ages, there was even a special term, *duulgat*, denoting a warrior who wore a helmet.

In ancient times, helmets made of scarce nonferrous metals were of great value. They used to be decorated with feathers, horsehair tufts, horns, and other elements performing socially significant,

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distinctive, symbolically defensive, or psychologically intimidating functions. Legends were composed about the helmets and armor of great epic heroes and military leaders; they were believed to possess magic properties protecting their owners from hostile charms. The ornamentation decorating a helmet might provide a nickname for a legendary hero or an actual military leader, and this nickname might have been permanently used in myths and historical records alongside his real name. Thus, the nickname of Alexander the Great, "Zulkarnain," the Two-Horned Iskandar, was invented by the Persians, who mistook the wings of Nike on his helmet for dreadful horns. Battle headpieces with high tops, feathers, and plumes not only distinguished military leaders from unranked warriors, but also served as a distinctive sign making commanders more visible to their troops during a battle. The fact that they were fighting together with an unconquerable and invulnerable leader gave soldiers confidence about their victory. On the other hand, a helmet having fallen from the leader's or commander's head due to his death, injury, or capture could cause panic and defeat in the battle (Ratzel, 1904: 209).

In the Middle Ages, when metal helmets became an essential attribute of the military equipment of professional soldiers and knights, a similar symbolic function was performed by ornate ceremonial military headpieces worn by noble warriors and commanders.

Thus, every new finding of this sort is of great value, since some ceremonial helmets belonged to eminent historical figures for whom they were exclusively fashioned and uniquely ornamented by a special order. Being highly precious, such battle helmets were also used for diplomatic purposes. Ornate ceremonial helmets, armor embossed with gold and silver, were offered to foreign rulers and leaders as gifts, either to curry favor, or to win their support for whatever actions or designs the giver had in mind. Major Russian museums such as the Armory Museum in Moscow's Kremlin and the State Hermitage Museum in St. Petersburg possess and display ceremonial helmets that belonged to Mongolian and Oirat noble warriors and military leaders of the Late Middle Ages and the Early Modern period. Khalkha-Mongol khans and Dzungarian kontaishes donated such helmets as diplomatic gifts to Moscow tsars. Some of the helmets were taken as trophies in war, while others were purchased by wealthy collectors. Ceremonial helmets displayed at the exposition *Medieval Culture of Mongolia* at the Hermitage Museum are of special interest*.

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History of the study of the Mongolian ceremonial helmets from the Hermitage Museum

The three helmets under consideration were a frequent topic of discussion by historians of armor and museum workers. According to the available information, these helmets were initially owned by the Arsenal of Tsarskoe Selo, founded in 1811, and were later passed on to the Imperial Hermitage collection.

Scholars paid special attention to the helmet with the dome decorated with images of dragons. In the 1891 Hermitage collection list, it is described as a "blue-steel Mongolian shishak misyurka* with cheek pieces and a mail neck guard, decorated by golden incisions and gems," and dating back to the 13th – 14th centuries (Imperatorsky Ermitazh…, 1891: 363). However, the cheek pieces and neck guard are not shown in the drawing. The description probably referred to another Mongolian helmet in the Hermitage collection. In 1894, P. von Winkler described the helmet with dragons in his book about armor of various countries and peoples. The helmet was characterized as "a shishak, presumably of the 14th century, found in Sarai" and made of "a blued steel; its surface is covered with a gold inlaid pattern depicting dragons and free designs." The picture in the book shows the helmet from the front. The ornamented plumed top, a patterned on-laid strip, a band, and a "box-like" visor are shown in detail. The dome of the helmet bears cartouches with dragon images surrounded by clouds, fire flames, and curls on both sides of the on-laid strip (Winkler, 1894: 303, fig. 327). This illustration was often reproduced by Russian and foreign authors in scientific and popular scientific books devoted to the medieval art of Mongolia.

In 1908, the three ceremonial helmets were briefly described in a catalogue of the Imperial Hermitage arsenal collections of the Middle Ages and the Renaissance, published by E.E. Lenz, a renowned historian of weaponry. He describes the above-mentioned protective headpiece as "a Mongolian helmet made of two parts riveted onto iron plates. A blued crown is ornamented with four cartouches bearing images of dragons. Only the narrow visor is preserved on a riveted crown, while the ear pieces and neck guard are missing" (Lenz, 1908: 155).

As for another helmet of cylindro-conical shape, Lenz points out that Varrand sent it to St. Petersburg from Siberia in 1845. The conical crown of the helmet is decorated with the figure of a saber-brandishing deity, who is coiled by snakes and surrounded by fire. The figure depicts a *dukshite*, one of the protector deities of

* *Shishak*, a spiked helmet; *misyurka*, a skull cap with mail veil.

the Tibetans, from whom the Mongolians adopted their faith. The crown, made from a single piece of metal, is riveted on the edge of a band deflected at a right angle. The scholar notes that to interpret the deity figure he consulted S.F. Oldenburg (Ibid.: 154). In a list of "oriental helmets" this battle headpiece is shown from the front.

Lenz describes the third helmet in a more laconic way: an iron Mongolian helmet riveted from three parts, with thick slotted strips overlying the joints; the crown is covered with broad patterns of printed silver in the Chinese manner. This helmet, which was discovered in Siberia (Ibid.), is also included in the list of "oriental helmets" from only one angle: the front.

Lenz mentions the fourth "Mongolian helmet of two halves riveted onto an iron strip; on the obverse, the joint is covered with copper slotted strips ornamented by images of dragons surrounded by a delicate floral design. Ear pieces and a neck guard are chained to the helmet; the visor is narrow" (Ibid.: 155). Unfortunately, this very specimen was not shown in the summary plate of "Oriental helmets." Judging by the given description, it differed from the three above-mentioned headpieces.

Two ceremonial Mongolian helmets from the Hermitage arsenal collection were used by M.V. Gorelik to reconstruct Late Medieval Mongolian defensive armor. Gorelik attributed them to the 15th – 18th centuries and suggested that Mongolian helmets formed the basis for the subsequent development of Manchurian military headgear (Gorelik, 1979: 99, fig. 5, *a, b*).

The present authors have examined one of the three ceremonial helmets, dated it back to the 16th – 17th centuries, and included it in the summary classification of Late Medieval military headgear. The helmet was related to the fourth variant of the first type. The authors also highlighted some aspects in the history of the study of the helmet. In the summary plate, the helmet was shown in profile for the first time – from the left – but without the dragon cartouches (Bobrov, Hudiakov, 2003: 141 – 142, pl. 1, *4*).

At present, only general information about the Mongolian ceremonial helmets owned by the Hermitage is available. Only one of these has been classified in formal terms and included in the typological scheme of the battle headgear of Late Medieval Central Asian nomads. However, each Mongolian ceremonial helmet deserves a description and a comprehensive analysis.

Description of the Mongolian ceremonial helmets

All of the ceremonial helmets under consideration are richly decorated works of art and were apparently made to order. However, in terms of structural features, it is possible to include them in the general classification scheme.

The samples in this study include protective headpieces of various types. All three helmets are made of iron. They greatly differ in the way their constituent elements are assembled, as well as in their decorative features. One helmet is attributable to a class of helmets with a riveted crown (plates of the crown are connected by overlays and rivets); the other two helmets are solid-forged. The crown of each of the helmets is oval in cross-section. While the form of their crowns relates each of the helmets to a different type, their additional ornamentation makes it possible to regard each one as a separate variant.

The helmet with a riveted crown (inventory N 3657) (Fig. 1, 2) belongs to the type marked by a sphero-conical headpiece (helmets with a spherical dome and a conical top). The occurrence of a specific "box-like" visor, forehead plate, and hemispheric top makes it possible to distinguish this piece as a variant of the sphero-conical helmets with a "box-like" visor and a hemispheric top. According to Lenz's catalogue, this helmet was brought from Siberia (1908: 154). Its dome is composed of three triangular plates or sections converging at the top. The joints are covered by narrow overlays bearing five gaps in the form of slotted circles and double-ended curls with a rhombic opening in the center. The dome is crowned with a hemispheric top with rivets. A narrow forehead plate is riveted to the lower edge of the crown. A narrow pentagonal visor composed of horizontal and crooked descending plates, is attached to the forehead plate. The height of the helmet from the base to the top is 18 cm; the height of the top is 1.5 cm; the crown is 22.5 cm in diameter in the lower part; the visor is 15 cm long, 3.5 cm wide, and 0.7 cm thick.

In the words of E.E. Lenz, the crown is ornamented with a "broad pattern of printed silver in the Chinese style" (Ibid.). Three open circles are stamped on each sector. A rhomb with double-ended curls and a heart are fashioned inside the upper circle. There are hearts surrounded by four curved figures in the center of the lower circles. Hearts have been embossed between the circles as well. Concave figures with slightly pointed edges are located along the sides of the sectors. A wide band of floral ornamentation is incused along the lower edge of the dome. The visor is decorated with a pattern in the form of interlacing vine sprouts. Six pairs of round holes run along the lower edge of the dome. They were probably used for attaching a *barmitsa** to the helmet.

One of the two solid-forged helmets (inventory N 1274) is attributable to the type of cylindro-conical

* *Barmitsa*, chain mail attached to the helmet to hang down over the shoulders.

Fig. 1. Mongolian ceremonial sphero-conical helmet.

Fig. 3. Mongolian ceremonial cylindro-conical helmet.

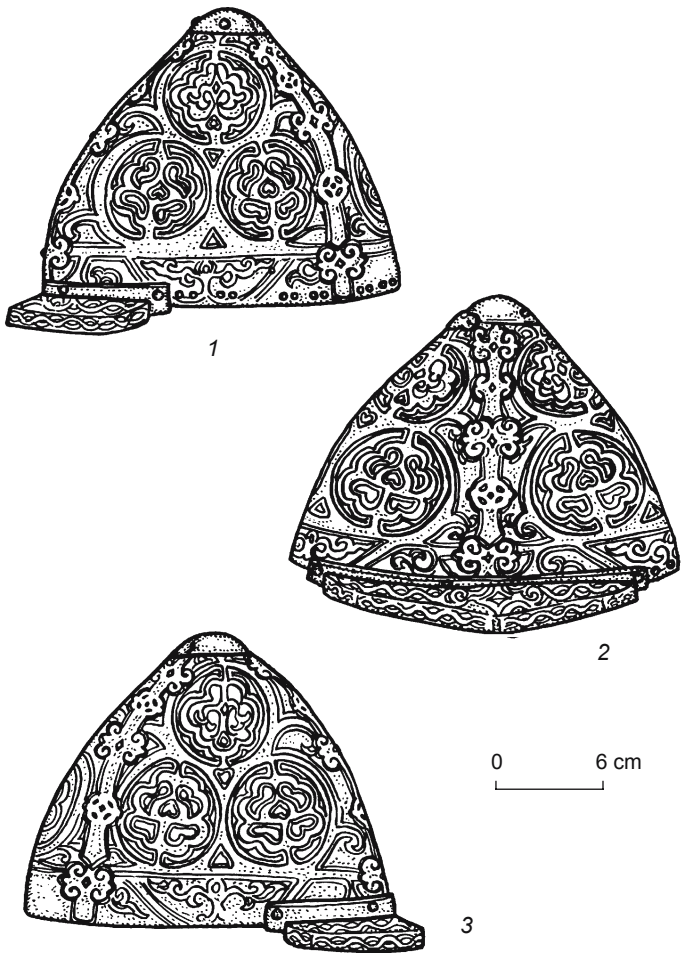

Fig. 2. Drawing of the Mongolian ceremonial sphero-conical helmet.
1 – left view, *2* – front view, *3* – right view.

pieces with a"box-like" visor and hemispherical top (Fig. 3, 4). It was also brought from Siberia (Ibid.). The construction of the dome is not typical of a Central Asian helmet. The crown consists of two elements: a wide cylindrical lower part and a conical solid-forged upper part. A decorative band composed of small bulges is situated over the place of the joint. Two more similar bands separated by a line of rivets are located on the upper part of the dome below the hemispherical top. The top is decorated with a golden stamped pattern in the form of interlacing floral shoots, stylized leaves, and curls. Twisting vine sprouts probably served as the prototype for this pattern. The apex of the top is crowned by a multi-petalled rosette with an aperture in which to insert a plume. Situated on the upper conical portion of the crown there is a golden, stamped representation of a *dokshite* – a Buddhistic guardian of the faith – or, according to another interpretation, a *dkharmapala*, holding a sword in the right hand, surrounded by coiling snakes in a ring composed of numerous tongues of flame. A riveted triangular "box-shaped" visor is ornamented with a twisting vine-shoot pattern. A line of round openings runs along the lower margin of the crown. Some of them on the left side retain rivets with globular heads similar to bolts affixing the plated *barmitsa*. The height of the helmet including the top is 19.5 cm; the height of the top is 4 cm; the visor is 11.5 cm long, 2.3 cm wide, and 1.3 cm thick.

The third helmet (inventory N 2748) is attributable to the type of protective headpiece with a conical dome (Fig. 5–7). There is a considerable diversity of opinion about this piece. In the first description of the Hermitage collection, it was termed a "Mongolian shishak misyurka" made of blued steel, and it was dated back to the Mongolian period (Imperatorsky Ermitazh…, 1891: 363). "The cheek pieces and mail neck guard" mentioned in the description are missing. P. von Winkler described it in more detail (1894: 303). However, his idea that the helmet dates from the Mongolian period and was found in Great Sarai cannot be accepted, since the shape and the ornamentation of this piece suggest that it originated from no earlier than the Late Middle Ages when the first capital of the Golden Horde had long been demolished. Lenz has noted that the helmet was "made of two parts riveted onto iron plates" (1908: 155). A thorough examination of the helmet, however, has demonstrated that its crown is solid-forged. The blued steel crown is divided into sections by decorative overlays with no functional significance. The band was also decorative. The dome of the helmet is crowned with a hemispheric scalloped top. A cylindrical socket for a plume is situated at the top. A forehead plate is riveted on the lower edge of the crown. It is narrow at the ends and wide in the middle part where the visor is attached. A "box-shaped" visor is sub-triangular in form. Round holes with partially preserved rivets are situated along the lower edge of the crown and intended for fastening a *barmitsa*. The total height of the helmet is 28 cm; the socket is 6 cm long; the lower edge of the crown is 19 cm in diameter; the forehead plate is 12.8 cm long and 3.5 cm wide; the visor is 13 cm long, 1.2 cm wide, and 1.5 cm thick.

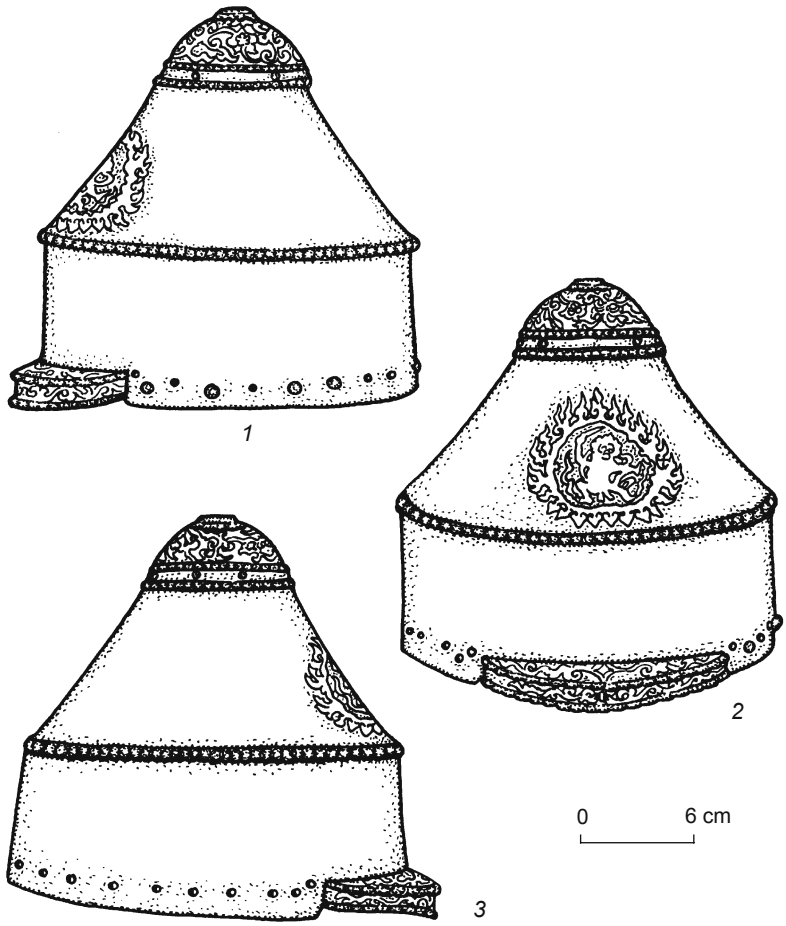

Fig. 4. Drawing of a Mongolian ceremonial cylindro-conical helmet.
1 – left view, *2* – front view, *3* – right view.

This helmet is richly decorated. The surface of each sector of the dome contains cartouches embossed with gold. A twirling, four-legged, rampant dragon with a turned-up horned head and a crest along its back and tail is situated in the center of the cartouches. The dragon's figure "blossoms" with sprouts and flowers. The frame is composed of tongues of flame and curls. It the lower part of the cartouches, floral shoots with three leaves appear on both sides of the fire circle. Vertical overlays are decorated with a stylized curling vine design situated between narrow spike-shaped stripes. A hemispheric top is ornamented with a continuous openwork slotted pattern in the form of interlacing floral shoots and curls. The socket bears three horizontal bands of floral ornamentation. Two dragons facing each other are represented on the wide part of the forehead plate. They are rendered with turned-up heads, widely open mouths, bent necks, arched bodies, and raised tails. The surface of the decorative band is also covered with the images of dragons. The visor is ornamented by stylized curling vine shoots with leaves and curls.

Initially, the present authors classified this piece as a variant of a sphero-conical helmet, with a crown composed of two pieces (Bobrov, Hudiakov, 2003: 141) based on a similar attribution suggested by E.E. Lenz, the most competent historian of armor in the early 20th century (1908: 155). However, the detailed analysis of the helmet's construction suggests that it should be identified as a solid-forged headpiece with conical dome, box-like visor, forehead plate, semispherical top, and socket.

Fig. 5. Mongolian ceremonial conical helmet.

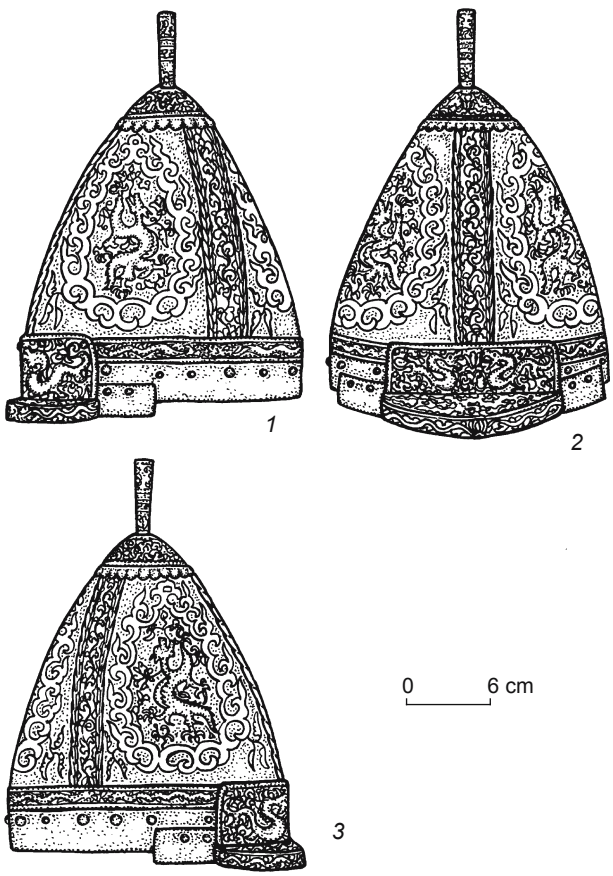

Fig. 6. Drawing of the Mongolian ceremonial conical helmet.
1 – left view, *2* – front view, *3* – right view.

Function, dating and cultural attribution of the helmets

All of the helmets under consideration could have been used to protect a warrior's head in battle. They have been forged from blued steel by highly professional armorers. According to structural peculiarities, these helmets bear a close resemblance to simpler, less ornate battle headpieces worn by Mongolian warriors of the Late Middle Ages and Early Modern period. In all three cases, a *barmitsa* was attached to the lower edge of the crown. However, the presence of highly artistic ornamentation and images of mythological characters made by gold and silver stamping suggests the significance of the symbolic function of these battle helmets. Their smart ceremonial appearance must have served to emphasize the high social status of the owner – an outstanding noble warrior, commander, or the representative of a ruling clan in the nomadic army. These helmets differ in the sophistication of their ornamentation and the presence of symbolic elements.

The sphero-conical helmet is richly decorated with silver ornamentation. However, its decoration lacks

Fig. 7. Reconstruction of the way in which a Mongolian ceremonial conical helmet was worn. Drawing by L.A. Bobrov.

symbolic images which might be significant for medieval Central and Eastern Asian heraldry. It might be interpreted as the combat headgear of a noble warrior, epic hero, or military leader.

The cylindro-conical helmet is decorated with golden embossment depicting a Buddhist guardian of the faith. This image suggests the affiliation of its owner with Lamaism, as well as serving as a kind of guardian inspiring the wearer with a feeling of invulnerability under the protection of the keepers of the true faith. The owner of this helmet must have represented certain sacred principles or forces to the other soldiers. This helmet probably belonged to one of the Mongolian princes or commanders during the period when Lamaism was spread and established in Mongolia. A cylindro-conical crown links it to Qing headgear of the 17th – 18th centuries. It is highly probable that this helmet was made after the unification of Mongolia with the Qing Empire.

The helmet ornamented with golden embossment depicting dragons is the most highly decorated. Dragon images in the East-Asian cultural tradition symbolized Imperial power. The representation of dragons on the helmet suggests that its owner was a representative of a ruling khan caste in one of the Late Medieval states. The depiction of dragons surrounded by a ring of flames implies the use of Lamaistic religious symbols in this ornamentation.

The three helmets under consideration can be attributed to the Mongolian defensive armor of the Late Middle Ages and Early Modern period. Earlier suggestions that the conical helmet with representations of dragons may date from the 13th – 14th centuries, and may have been found in Great Sarai, are unfounded (Imperatorsky Ermitazh…, 1891: 363; Winkler, 1894: 303). The reason why it could not have been found in the ruins of the capital of the Golden Horde has been given above. The presence of a forehead plate and a "box-shaped" visor on this headpiece relates it to a large group of the Late Medieval Mongolian helmets (Bobrov, Hudiakov, 2003: 141). Some decorative elements, including the slotted hemispheric upper part of the crown, place it among the headgear of the Manchurian military of the 17th century. A similar Manchurian helmet was offered as a diplomatic gift to the Russian tsar, Mikhail Fedorovich Romanov, in 1637. In 1667, Tsagan Taidja presented tsar Aleksey Mikhailovich with another helmet covered with golden leaves, as well as an expensive *kuyak* (armor vest) and some *naruchi* (forearm protection pieces) (Ibid.: 141 – 142). However, the solid-forged crown was not typical of Central Asian helmets before the 17th century. Considering the constructive and decorative elements, the given helmet is likely to be dated back to the 17th – 18th centuries. A cylindro-conical helmet with the Buddhist guardian image encircled by flames must be attributed to the same period, since the establishment and spread of Lamaism in Mongolia is associated with the reign of Avtzai-khan, a famous adherent to this religion, who ordered the damage or destruction of many medieval monuments in Mongolia in the 17th century. The sphero-conical helmet might be dated back to the 15th – 17th centuries. Helmets of this type were widely used among nomads in the Eurasian steppe during the Early and Central Middle Ages. However the combination of a sphero-conical dome and a forehead plate with a riveted "box-shaped" visor supports the idea that this implement should be dated to the Late Middle Ages.

Conclusions

The study of ceremonial helmets from the State Hermitage Museum collection makes it possible to specify their structural features, as well as important details of their ornamentation. As a result, it has become possible to use these helmets as a source for the study of Mongolian warfare and military hierarchy in the Late Middle Ages and the Early Modern period. Our analysis suggests that numerous other museum pieces of this kind that still lack information concerning their origins or provenance may yet be attributed to a specific time period and used as historical sources.

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MYTHS AND RITUALS IMPRESSED IN PETROGLYPHS OF THE ALTAI

Introduction

The Altai is well known for its unique archeological monuments, and numerous petroglyphs are especially prominent among them. Both the location of the petroglyphs along the ancient paths of the nomads and on high-mountain passes across the snow-clad ridges of the Altai, as well as their concentration in particular places, once again confirm our hypothesis that mountain "temples" under the open sky have existed since early antiquity. The dominant center in these "temples" was often represented by peculiar animal "iconostases" that had the largest depictions of animals of different sexes carved on them (Fig. 1). These monuments are characterized by their location on high places and by the depictions on vertical surfaces of separate rocks that are distinguished by their shape which are visible from a great distance (Kubarev, 2001: 77). Areas paved with stones, circular and square-shaped constructions of boulder or slate slabs put on their sides – "stone boxes" – are located at the bases of these rocks. These structures undoubtedly served as altars for sacrifices and rituals in front of sacred, possibly totemic, animal representations. One such rare complex that we discovered in the 1970s is situated near the village of Kosh-Agach on the right bank of the Chagan-Burgazy River. It is noticeable because of the prominent separately standing mountain, Zhalgyz-Tobe, which is thrown into bold relief in the southern part of the Chuya steppe. From afar, the shape of the mountain's sandstone stacks resembles a pyramid. Yet when approaching the mountain from the south, one can well see that the rocks are not that uniform: they form a kind of amphitheater created by nature. Inside, a recently built winter hut stands, well sheltered from the wind and inclement weather of all seasons. This location, convenient in all respects, had certainly been selected by the nomads in ancient times. Testimony to this assumption is provided by the debris of pottery and Neolithic stone instruments which we have found around the mountain. Rock drawings, one Ancient Turkic runic inscription, several steles, and Bronze Age graves around the upper portion of the location confirm our suggestion. The Zhalgyz-Tobe complex bears an obvious resemblance to the "amphitheater" and "iconostasis" from Turu-Alty (the right bank of the Barbugazy River). A distinctive feature of the Zhalgyz-Bobe open-air complex is its great acoustic conditions. Here, even soft voices uttered from the top of the mountain are sufficiently magnified as to be audible at the foot of the mountain. It is reasonable to suppose that people of ancient times also noticed this natural phenomenon, and perhaps used it for some ritual purpose, or for prayers connected with the widespread Asian cult of mountains and individual peaks distinguished by their unusual shape and solitary position in semidesert areas.

For the last decade, a small team of Russian, Mongolian, and American specialists have worked in the Altai and Mongolia. As part of the Altai Project, they have conducted systematic research on the petroglyphs dated from the Neolithic to the modern ethnographic period. In previous years, this team discovered and explored several important monuments of petroglyphic art. New graphic materials allow us to address such complicated issues as the reconstruction of the mythology and beliefs of the most ancient animal-breeders of Central Asia.

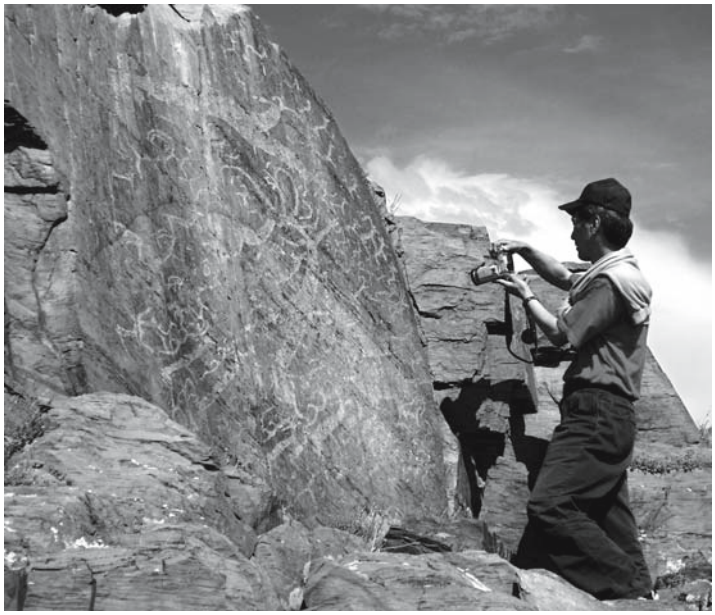

Fig. 1. Petroglyphic composition with deer figures. Tutu-Alty. Russian Altai.

Astral symbolism in the art of ancient nomads

In Early Bronze Age Altai and Mongolia, artists (shamans or mediators?) often endowed the domestic and wild animals that they depicted with sacred functions. For this purpose they invented a simple method of marking sacred animals with various magical symbols drawn near the depictions, which were directly connected with astral symbolism and primitive magic. Such compositions recall pictographic writing. In some cases it is possible to sufficiently interpret the narrative subjects of rituals and ceremonial actions that took place thousands of years ago, or even to get close to deciphering some of the mythological beliefs of the ancient population of the Altai Mountains.

A great deal of the sacralized petroglyphic depictions appear in the Middle Bronze Age and in the period of ancient nomads. In the

Fig. 2. Representations of sun-horned animals.
1 – 6, *8*, *10*, *12* – Tsagaan-Salaa/Baga-Oigur, *7* – Shiveet-Khairkhan, *11* – Khar-Chuluu (Mongolian Altai); *9* – Irbistu (Russian Altai).

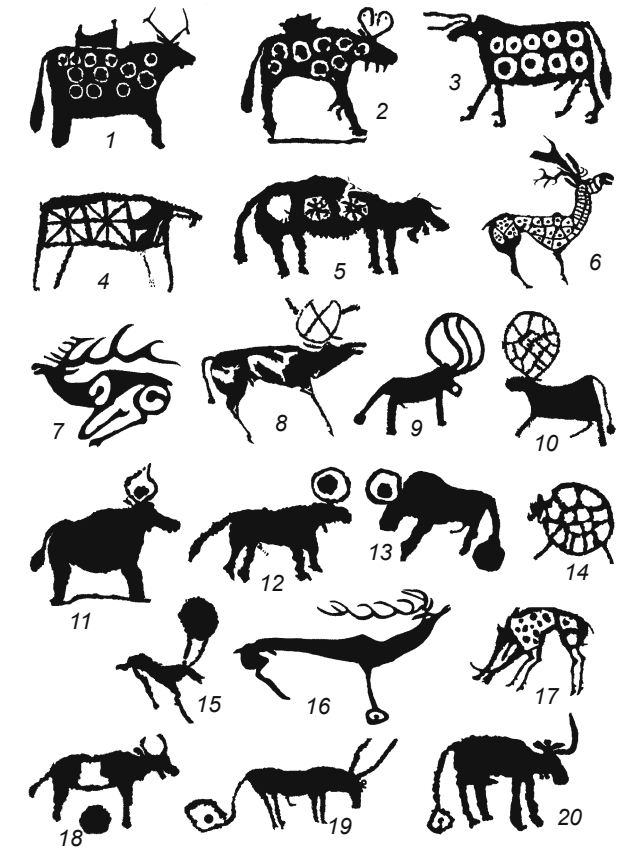

Fig. 3. Representations of various animals with astral symbols on horns, bodies, and tails.
1 – 3, *11* – Kalbak-Tash, *7*, *16* – Elangash (Russian Altai); *4*, *5*, *8 – 10*, *12*, *14*, *18* – Tsagaan-Salaa/Baga-Oigur, *6*, *17* – Shiveet-Khairkhan, *13*, *15*, *19*, *20* – Tsagaan-Gol (Mongolian Altai).

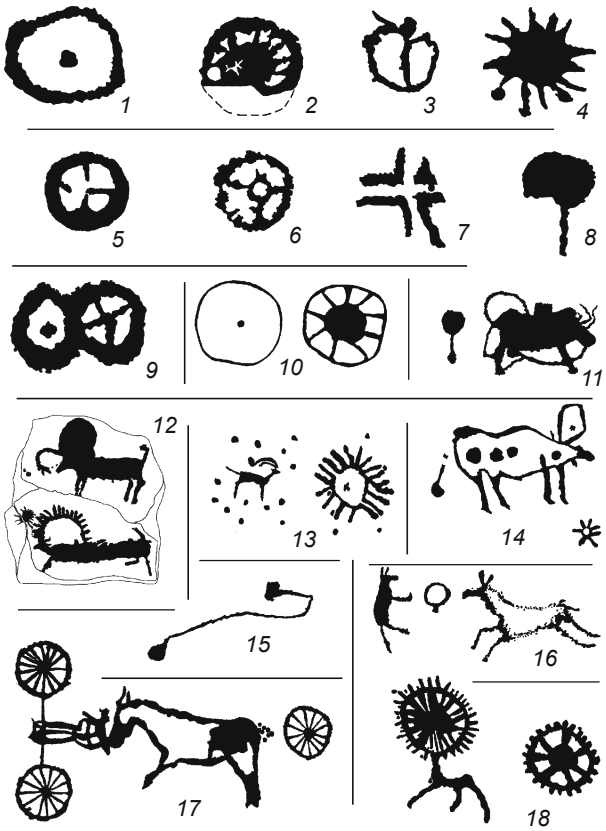

Fig. 4. Astral signs and symbols of various forms.
1 – 8, *17* – Tsagaan-Salaa/Baga-Oigur, *9*, *12*, *13*, *18* – Tsagaan-Gol, *10*, *11*, *15*, *16* – Khar-Salaa (Mongolian Altai); *14* – Irbistu (Russian Altai).

Fig. 5. Wooden figurine of a deer – main decoration of a sacred head-dress. Pazyryk culture. Ulandryk IV, mound 5. Russian Altai.

Fig. 6. Wooden tips of a torque in the form of rams in bas-relief. Pazyryk culture. Barburgazy I, mound 18. Russian Altai.

Altai and Mongolia, these are mostly represented by symbols in the form of discs, rings, and spirals included in the context of large compositions of animal forms, or discs with rays on animal horns, bodies, and tails (Fig. 2 – 4). Exactly the same figurative elements are present in small-scale plastic art from the mounds of Ulandryk and Yustyd (Chuya steppe), though these are combined in a different way: the symbol of a luminary (a sun or moon ?) in the form of a disc is gripped between the hoofs of a running deer (Fig. 5), or represented with a bas-relief spiral inscribed in the hip of a ram (Fig. 6), or as a globe-shaped stand for a figurine of a celestial horse which served as a decoration for a woman's metal hairpin (Fig. 7). The symbolical connection between wooden figures of various animals and the sun, and/or the celestial sphere, is even more reinforced by covering these items with sheet gold. In our view, it is quite clear that the depiction of one and the same mythological personage in different media required completely different stylistic methods and technical means. If the sacred essence of zoomorphic representations in woodwork was marked either by gilding, or through different astral symbols

Fig. 7. Bronze hairpin decorated with horse figurine on a globe-shaped stand. Pazyryk culture. Ulandryk IV, mound 2. Russian Altai.

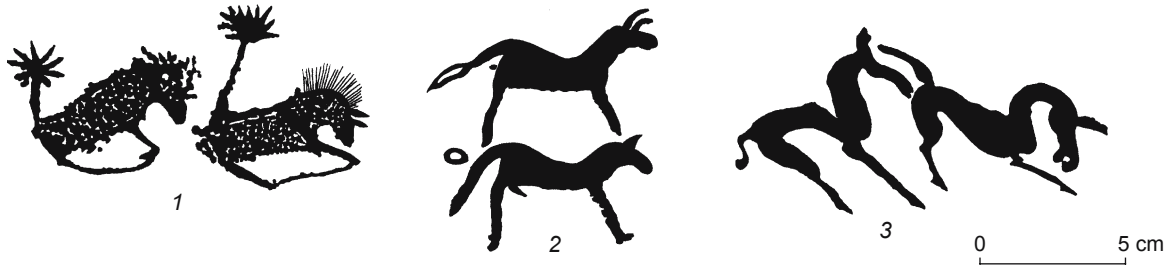

Fig. 8. Representations of paired horse figures on petroglyphs.
1 – Kalbak-Tash (Russian Altai); *2*, *3* – Tsagaan-Salaa/Baga-Oigur (Mongolian Altai).

Fig. 9. Representations of winged horses on petroglyphs.
1, *2* – Elangash (Russian Altai); *3* – Shiveet-Khairkhan (Mongolian Altai).

on animals' cruppers, on stone surfaces these symbols were merely carved or pecked, thereby narrowly limiting the creative opportunities available to ancient artists. Nevertheless, the representations of "celestial" horses also occur among the petroglyphs of the Altai. We can point to a drawing in Kalbak-Tash where globes with rays are shown at the ends of the lifted tails of two horses (Fig. 8, *1*). This gives us every reason to consider this representation as sacred since there can be no doubt that its subjects belong to the celestial realm. Two drawings are known among the petroglyphs of Elangash (Fig. 9, *1*, *2*), where a triangular-shaped projection is pecked onto the backs of horses. This projection is associated with a bird's wing. A similar drawing can be found among the petroglyphs of the Shiveet-Khairkhan Mountain in the Mongolian Altai (Fig. 9, *3*). On the other hand, the triangular projection on the horse's back might be an unfinished depiction of a horseman. Among several dozen equine figurines from the mounds of the Chuya steppe, only one (from Ulandryk) has been lacerated to make a slot for the insertion of wings (Fig. 10) (Kubarev, 1987: 108).

If we compare petroglyphic drawings with miniature wooden figurines from the burials of the Pazyryk culture, we can identify one more regular feature: the horses were quite often depicted in pairs. Sometimes they are of different sexes (cf. Fig. 8, *2*; 11), in other instances they look absolutely the same without obvious sexual characteristics (cf. Fig. 8, *3*, and 12). The image of horses in pairs is also common in depictions from Katanda and Ulandryk. A pair of realistic horse figures was found in the mounds of Barburgazy. One of them has an emphatically distinguished phallus (see Fig. 11). Is it possible that in such paired representations a stallion and a mare were implied? If this is the case, we have to suppose that, according to the beliefs of ancient nomads, such animal pairs accompanying the dead to the other world were meant to graze there on an "eternal pasture" and reproduce new horses for their owners. The cult of creatures of different sexes, or rather, the fertility cult, was connected with the idea of a successful continuation of the human race and the growth of livestock. It had already emerged in Siberia in the Neolithic period and remained there until the ethnographic period (Okladnikov, 1955: 305 – 306). The figures of invariably repeating pairs of people, elk, deer, horses, and many other animals of different sexes, sometimes even depicted in the position of copulation, are widespread among the petroglyphs of Central Asia. In other instances, like the paired figurines of miniature horses that can be seen in the Altai series, they are of the same type (see Fig. 12). Such representations should be viewed as manifestations or vestiges of the ancient twin cult. Thus, in Indo-Iranian mythology the Ashvin twins (the sons of the Sun and the mare, Ashvini) bring wealth and fertility to the people. In the Rigveda, the twins appear sometimes as young people flying on a chariot, and sometimes as miraculous horses (Ivanov, 1974: 107). Paired symbols which reflected a dualistic cosmology along with a twin cult are well known in various forms (or texts) in the whole ancient world (Akishev, 1984: pl. VII; Martynov, 1979: pl. 48, and others). A pair of magical horses, Feitu and Tsueti, appears in ancient Chinese myths, apparently borrowed

from the Indo-European circle of ideas connected with miraculous celestial horses (Yuan Ke, 1965: 225, 246). The twin cult among cattle-breeders can be observed in the Kazakh heroic epics that tell us about the sacrifice of the twin-born horses (Koblandy-Batyr, 1975: 260). The twin motive in the form of paired horse heads is reflected in many figurative objects of the Eurasian peoples. These objects cannot be mentioned here due to their great number.

In the collection of Altai horse figurines, one may see individual items which directly pertain to the celestial cult and the cult of luminaries. The horses are represented on a globe-shaped stand that symbolizes the radiant sun. Their pronounced connection to the sun is emphasized by the gold that covers the entire representation. It is appropriate to remember epithets from ancient sources like: "golden horses," "horses of morning dawn color" (quoted after (Belenitsky, 1948: 163)). In the sacred Avestian hymns, the sun is called "Like-a-rapid-horse." Thus it becomes clear why horses were sacrificed at deer-stones and kereksurs (burial structures) in Central Asia, which are also semantically linked to the celestial and solar cult. The Massagets also sacrificed horses to the sun (Herodotus, 1972: 79). Several figurines of horses with comb-shaped bases that resemble a half-moon were found in Altai graves. They crowned the head-dresses of those who had been interred, and were completely covered with sheet gold. This reflects the beliefs of the ancient nomads of the Altai, embodied in these miniature figurines, in a celestial golden horse shining like the sun and the moon. The interpretation that the comb-shaped base is a bird's head – one more symbol of the celestial realm – does not contradict this hypothesis. This idea is embodied in a more explicit way in a pair of horse figures from Barburgazy (see Fig. 11). Solar and lunar signs are carved on their bodies signifying that they are celestial horses. Similar depictions of horses with symbols of the sun are found among the Oglakhty petroglyphs (Vyatkina, 1961: fig. 1 – 3). O.S. Sovetova, calling them "notable" describes the style of the depictions, decoration, and origin of the Tagar "ornamented" horses in detail (Sovetova, 2005: 36 – 45). A unique pair from the petroglyphs of Kalbak-Tash, with their manes and tails forming sun rays, belongs to the circle of these cosmic horses (see Fig. 8, *1*).

According to A.K. Akishev, the Saks of Dzhetysu identified horses with the image of the sun: "A team of four Issyk horses is a quadriga. The Sun, the entire Cosmos, appeared in the Indo-Iranian myths in the form of a chariot" (Akishev, 1984: 33). Representations of mythical winged horses appear among the petroglyphs of Central Asia (Bernshtam, 1949: 130) and the Minusinsk Basin (Chlenova, 1981: fig. 4 – 6). Researchers are unanimous in their opinion that the appearance of such

Fig. 10. Wooden horse figurines with holes for inserted ears and horns in the head and a slit for inserting wings in the back (shown with an arrow). Pazyryk culture. Ulandryk IV, mound 3. Russian Altai.

Fig. 11. Wooden paired horse figurines with astral symbols on their cruppers and front legs. Pazyryk culture. Barburgazy I, mound 18. Russian Altai.

Fig. 12. Wooden paired horse figurines of the same type (the twin motif). Pazyryk culture. Ulandryk IV, mound 2. Russian Altai.

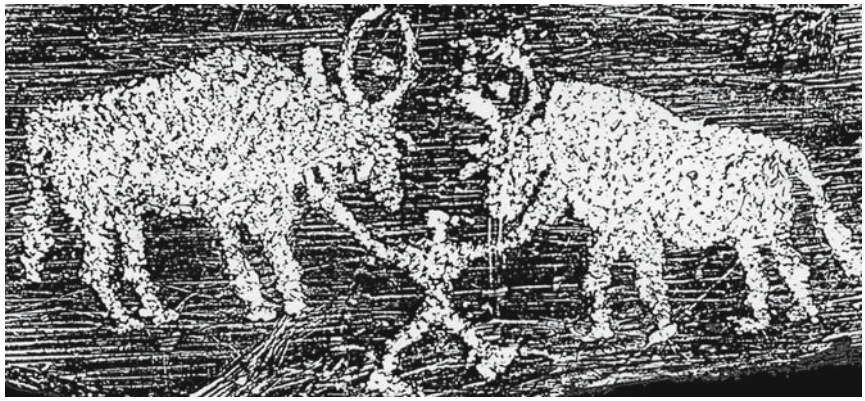

Fig. 13. Scene "Subdual of celestial bulls" copied on micalent paper. Khar-Salaa. Mongolian Altai.

depictions in Siberia was prompted by notions about the legendary horses of Fergana and Tokharistan. These horses were believed to have originated from the copulation of mares from the royal herd with unusual winged horses that lived in a cave high up in the mountains (Bichurin, 1950: 285).

The decorative canon that developed in the period of the ancient nomads, or the so-called "Altai animal style," is manifested in an especially typical way in the depictions of deer on the petroglyphs of Shiveet-Khairkhan, one more unique monument of the petroglyphic art of the Mongolian Altai. The images of deer are the most numerous here. This is quite understandable since the deer has always been one of the central figures in the Indo-Iranian and Turkic-Mongolian mythologies. The deer's cosmic essence is clearly highlighted: in the petroglyphs the same ancient solar symbol – a disc with rays – is depicted on the horns of individual deer (see Fig. 2, *3 – 9*). In other drawings, the bodies of deer are filled with geometrical figures – squares, triangles, and ovals with dots or even deep holes in the middle of the horns (see Fig. 3, *6*, *7*). Such signs are also connected with astral symbolism. In other graphic versions of the mythical solar deer, this symbol looks somewhat different: a slanting cross, a circle (see Fig. 3, *8*, *9*), lozenge, or a Φ-shaped figure located on the head, between the horns or even on the back of the animal.

In Mongolia, as well as in the Altai, many animal representations are accompanied by contoured circles and pecked discs – the signs of the sun and the moon. On the drawings they are located both within the circle, formed by the horns of the bulls (Fig. 13), and above the circle of horns (see Fig. 3, *11 – 13*, *15*). In some cases, horns are carved in the form of entire oval discs above which a series of large dots is purposefully arrayed, and in one instance 14 rays project from such a disc (see Fig. 2, *11*). Solar signs are noticeable in the tips of tails executed in the form of a circle with a dot in the center (see Fig. 3, *19*, *20*), or globe-shaped, sometimes of a clearly hypertrophied size (see Fig. 3, *13*). The symbols of the sun and moon can be seen in the decoration of bulls' bodies (rounded, semi-lunar, cruciform, and stellar figures) (see Fig. 3, *1 – 5*). In a way, such signs serve as a code-key which makes it possible to identify the cosmic, probably lunar and solar, semantics in the representations of the bulls.

Formal similarity to solar and lunar signs (a circle with an inscribed cross or dot in the center) can be seen in the wheels of a uniaxial carriage depicted among the petroglyphs of Baga-Oigur. Astral signs similar in shape often appear in the Altai as single drawings (see Fig. 4, *1*, *3*, *5*, *6*), and at the Tsagaan-Gol in one instance they are rendered as a pair (see Fig. 4, *9*). Versions of this form, in which the center of one or both circles has been chipped with a deep hole of projected rays, can be found in the valleys of the rivers Khar-Salaa and Tsagaan-Gol (see Fig. 4, *10*, *18*), in the latter case one of the signs has a zoomorphic appearance – it is stricken in the place of the head of a very stylized animal figure. It would be reasonable to interpret these images also as signs of the sun and moon, but it is very difficult to prove this, since the wheels of Bronze Age chariots were depicted in the same way (see Fig. 4, *17*).

Perhaps, we can also see the bowl-shaped indentations on rock surfaces in the Tsagaan-Gol valley, which appear in organic combination with the figure of a goat and the traditionally inscribed graphic symbol of the sun – a circle with rays and dot in the center (see Fig. 4, *13*), as astral signs. Such representation of the sun, now executed in continuous dotted indentation, was found in the same location on a separate stone (see Fig. 4, *4*).

Among the rarely encountered magical signs in the Mongolian Altai there is a cross (see Fig. 4, *7*; 14) and an oval disc with a descending stripe. The single example of the latter is known among the petroglyphs of Baga-Oigur (see Fig. 4, *8*), but earlier we had discovered – and

Fig. 14. Representations of bulls and astral symbol in the form of a cross. Pass to the Tsagaan-Gol valley. Mongolian Altai.

D. Tseveendorj (1999: 131) published – the symbols of exactly the same shape from Khar-Yamaa. Similar signs on a smaller scale decorate two hemispheres over the head of a ram and the horns of a bull in the drawings from Baga-Oigur (Fig. 15). It is clear that these two drawings should be included in the group representing sacred animals that are marked with solar symbols. Perhaps this sign's meaning has something in common with another sign – a rounded disc joined by a thin line-stroke to a disc of smaller diameter (see Fig. 4, *11*). The location of this symbol behind a bull once again informs us about the sacred election of this animal and its dedication to higher solar gods. We should mention two more signs of unusual form which we discovered in the Khar-Salaa valley. One of them is a pair of carved bowl-shaped cavities connected with a sinuous line, the other one is a circle with a short triangular projection in its lower part (see Fig. 4, *15*, *16*). If the second sign is located between two depictions of horses and can be identified as a symbol of the sun and the celestial realm, the first one is not accompanied by any other drawings which would allow us to uncover its semantics. However, it can be considered to be one of the main astral symbols of the Early Bronze Age if it is taken to be analogous to the other "spectacle-shaped" signs widespread among the petroglyphs of Karatau, Tamala, and Dzhungaria. The meaning of such signs and their combinations was revealed by the research of the petroglyphic drawings of Saimala-Tash (Martynov, Mariyashev, Abetekov, 1992: 128 – 132).

In contrast to the numerous animal figures marked with astral signs, anthropomorphic representations of solar divinities appear in the Altai very rarely (Fig. 16).

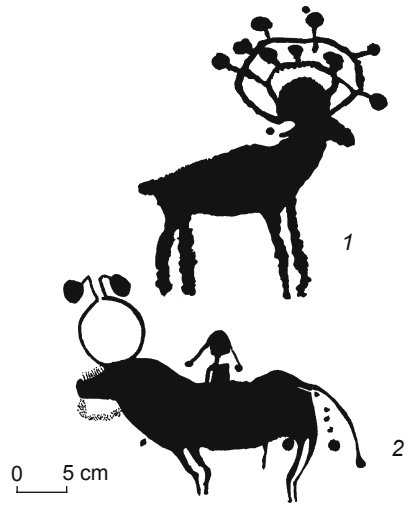

Fig. 15. Representations of the ram and the bull with astral symbols on their horns. Baga-Oigur. Mongolian Altai.

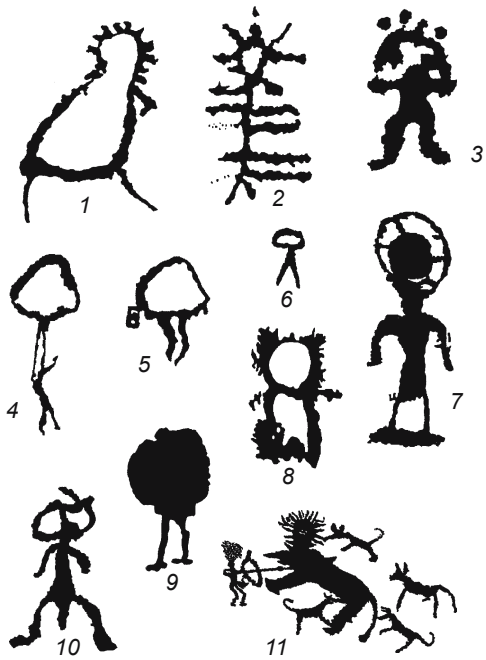

Fig. 16. Anthropomorphic solar creatures with heads or head-dresses (?) of various shapes.
1 – 8, *11* – Tsagaan-Salaa/Baga-Oigur, *9*, *10* – Tsagaan-Gol (Mongolian Altai).

They look very schematic, one may even say primitive. The main feature that distinguishes them from the depictions of ordinary people is their contour, or silhouetted head (or head-dress?) of exaggerated size. Sometimes a halo composed of rays of light or a series of dots is shown around it. The sex of these beings is unclear, but the presence of a phallus in at least two figures shows them to be certainly masculine gendered (Fig. 16, *4*, *10*). A "walking" sun is depicted in a wholly

different way on a single miniature petroglyph in the Tsagaan-Gol valley. Beneath the rounded disc, the ancient artist depicted two legs, but these are the legs of a bird and not of a human being (Fig. 16, *9*). Thus, what we have here is a new type among the petroglyphs of the Altai: an ornithomorphic representation of a lunar or solar divinity.

Identical graphic solar and lunar symbols as well as motifs of sun-horned animals, or a "walking" solar divinity, are known from other monuments of the petroglyphic art in the Altai (Okladnikov et al., 1979: pl. 7, *4*; 29, *1*, etc.; Kubarev, Jacobson, 1996: fig. 132, 284, 467, 508, 616, etc.), Mongolia (Okladnikov, 1980: 68; Tseveendorj et al., 2004: fig. 55, 211, 314, etc.), Kazakhstan (Mariyashev, Goryachev, 1998: fig. 2, 11, 17, 63), and Central Asia (Martynov, Mariyashev, Abetekov, 1992: fig. 12, 20, 49 – 54, 67, etc.). Similar solar symbols are found among petroglyphs in Tuva. They are similarly located near animal representations and are often combined with "masks" dated to the Bronze Age (Devlet, 1998: pl. 11, *32*; 14, *37*; 15, *20*). The wheels of carriages and chariots, horses, and other animals are also marked with solar signs in the Bronze Age petroglyphs of Northern China (Gai Shanlin, 1989: fig. 231, 253, 259, 304, etc.). It is important to remember the numerous "sun-headed" zoo-anthropomorphic representations in polychromic paintings and engravings of the Karakol culture in the Altai. Having been found in closed burial complexes these representations made it possible to determine the period of their creation with more precision, as well as to discern the meaning of several characters from the petroglyphs of Tamgala and Saimala-Tash (Martynov, Mariyashev, Abetekov, 1992: 28). This, in turn, made it possible to acquire a certain cultural and chronological reference point that has allowed scholars to give a relatively precise dating to similar subjects in the petroglyphic art of the Altai (Kubarev, 1992, 1993).

The meaning of the scenes and a reconstruction of mythological ideas

The representation of a fantastic deer at Tsagaan-Salaa in the Mongolian Altai (see Fig. 2, *8*) is a unique illustration of the astral myth about the origin of the sun, the moon, and the stars. A row of five "golden" luminaries is depicted on its horns, above its back, and on its tail. Each luminary has from seven to nine rays. The multiplicity of luminaries in this scene (possibly associated with the sun and moon) reminds us of the Altai myth about the brightest stars, Uch-myigak – "three Siberian does" (the Constellation of Orion), that ascended into the sky when fleeing the pursuit of a hunter. The celestial archer Erkhij-mergen who "brought down the extra-luminaries with a shot" (Neklyudov, 1992: 172) is also connected with the solar cycle of Mongolian myths. In our opinion, an authentic fragment of the cosmogony myth is represented on the petroglyphs of Irbistu, an ancient figurative complex, recently discovered in the Kosh-Agach Region of the Altai Republic (Kubarev et al., 2002). This rock miniature includes a depiction of a bull and a solar sign in the form of bow-shaped cavity framed with seven rays (see Fig. 4, *14*). On the bull's body three rounded spots are carved, which can be interpreted as a depiction of the Constellation Orion, a well-known astral symbol of Eurasian peoples (Potanin, 1883; Neklyudov, 1992; Eroshkin, 2002; and others)*. Zoomorphic representations with similar signs appear on other Altai petroglyphs (Oroktoi (Karban) at the Katun River (Okladnikova, 1984: pl. 25, *5*), at the right bank of the Chaganka River (Labetsky, 2000: fig. 1)). These images are dated to the Bronze Age, as is the drawing from Irbistu.

An even more vivid illustration that confirms the mythological character of individual animal depictions is represented by a small but, in our opinion, quite easily deciphered subject of a petroglyph from the valley of the Tsagaan-Gol River. On each opposite facet of the same stone, a figurine of a goat or a ram is pecked (see Fig. 4, *12*). On the northern facet, its horns form a solid round disc (moon?), and on the southern facet, the horns look like a bow with short rays. The bow reaches the back of the animal (rising sun?). For a more cogent and correct perception of the solar image the artist has additionally carved a small disc with 13 rays – one more symbol of the sun – in front of the animal's horns.

One can judge the mythological meaning of individual representations among the petroglyphs of the Mongolian Altai on the basis of a very curious scene which we discovered in the middle section of the Khar-Salaa River. We are not going to analyze the entire composition, but we would like to highlight a large taurine figure with lyriform horns which smoothly turns into a frontally depicted female figure (Fig. 17). This unusual and original artistic invention, which appears for the first time among the petroglyphs of the Altai, probably demonstrates a direct connection between the celestial bull and the female divinity. Such a new contamination reminds us V.V. Ivanov's article, in which he writes that sacred "bulls possess a (visible or invisible) sign of their belonging to the divinity" (Ivanov, 1991). The question of whether this may apply to the exact divinity represented in the drawing immediately comes to mind. Archeological traces of the cult of the sacred bull are found in many ancient cattle-breeding cultures. The bull as a personification of

* See (Berezkin, 2005) for more detail on the mythological motif of cosmic hunt.

a god on earth was already known in the ancient Iranian mythological tradition of 3000 – 2000 BC. Apparently, at the same time or somewhat later, representations of divine bulls marked with magical signs appeared among the petroglyphs of the Altai.

One more composition is interesting in terms of its semantic reconstruction (Khar-Salaa VI). On this composition, the bull literally lifts a man on its horns. The man is depicted with widely spread legs and raised arms (Fig. 18); in one hand he holds a shepherd's stick or staff. In contrast to the drawing with the figure on the bull's horns described above, this figure is that of a male (the phallus is shown). Therefore we should offer a different interpretation of this scene. For that purpose, as in the first case, we need to employ data borrowed from world mythology. Thus, an Old-Iranian myth describes the combat with and slaying of the primordial bull by the cultural hero, Ahriman, just as Greek mythology depicts the hero, Theseus, accomplishing the same feat. "Such myths could be connected to a ritual contest with a bull, as well as a sacrifice of a sacred bull" (Ibid.). It is possible that the culmination of a similar ritual is depicted in our composition. Although it is a great distance from Greece to the Altai, such a comparison is more than acceptable since representations of mythical bulls happen to be in some of the earliest petroglyphs of Khar-Salaa. These belong to the time when the first Indo-Iranians migrated with their herds to the area of the Altai mountains and steppes. K. Jettmar called the people of Caucasian appearance "Proto-Tohars." These were the same people whose mummies were found in the Gumugou burial ground (Northwestern Xinjiang). Jettmar suggested that these people migrated to this area around 1500 BC and compared their head-dresses (felt caps with feather plumes), which were well-preserved in the graves, with the feather head-dresses of the "sun-headed" beings in drawings and engravings of the Karakol culture of the Altai (Jettmar, 1998: fig. 6, 7; Kubarev, 1988: fig. 18).

The coitus subject, or the so-called scene of "sacred marriage," occurs very often in the petroglyphs of the Mongolian Altai. For example, in Khar-Salaa VII in a small composition of wild goats and deer, the central and most important element is represented by the coitus scene (Fig. 19). It is easy to determine the sex of the copulating beings. A male-contoured figure with bent legs in the area of his knees has phallus and testicles; the silhouette of a female figure has a rounded belly (the sign of pregnancy?), her hands support her wide spread legs. One more character is present in the scene – an archer shooting a goat. In this drawing, the head of the copulating male is connected to the bow, and his arm is directed towards the back of the goat. With this simple gesture, the artist connected all the participants of the ritual or mythological scene, in which the fertility

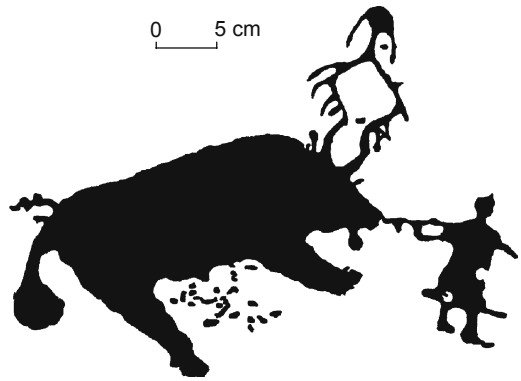

Fig. 17. Representation of a bull whose horns are stylized similar to a female figure. Khar-Salaa. Mongolian Altai.

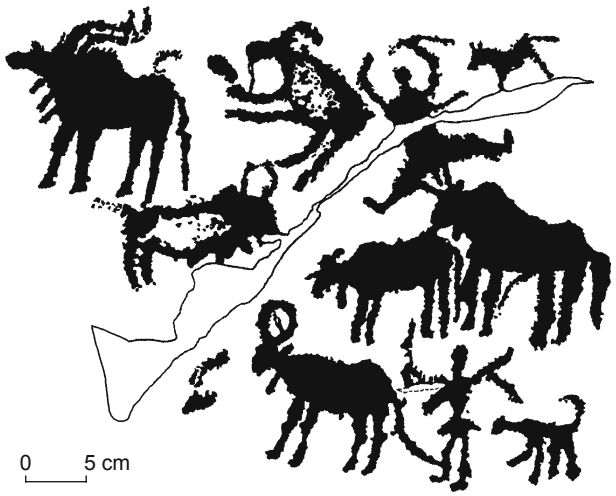

Fig. 18. Scene "Fight with the bull." Khar-Salaa. Mongolian Altai.

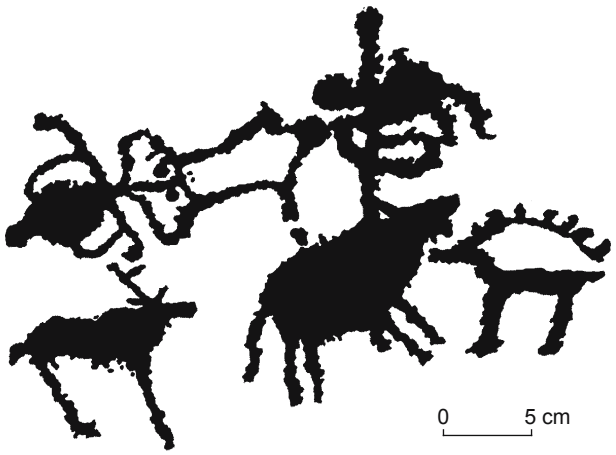

Fig. 19. Scene "Sacred marriage." Khar-Salaa. Mongolian Altai.

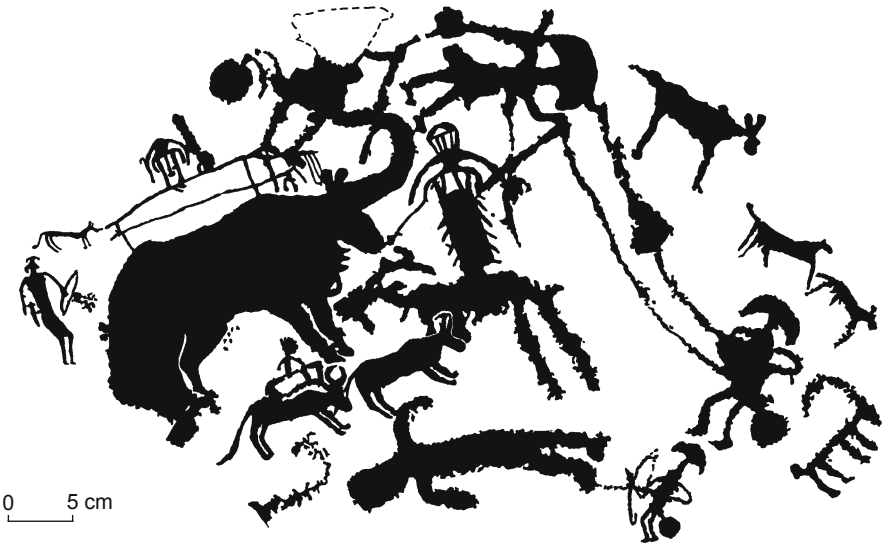

Fig. 20. Composition of several scenes: "goddess" with a bull, warriors combat, prostrate giant, etc. Khar-Salaa. Mongolian Altai.

cult and the desire for a successful hunt are combined. It is interesting to observe that such "records" or pictograms, possibly rendering archaic ideas of intimate relations between the hunters and the proprietress of the forest or mountains for securing a bountiful hunt, were preserved among the peoples of Siberia until the modern ethnographic period (Potapov, 1991: 181 – 182). Another similar scene of coitus is located not far from the composition described above. Here the human figures are extremely schematic, it is still easy to identify a male (the phallus) and a female (wide spread legs) who is probable holding a goat by its leg. In the coitus scenes of the petroglyphs of Central Asia, the animal representations, usually of goats and bulls that served as the symbols of fertility, are often accompanied by female figures. Ancient nomads sincerely believed that the fertility of animals could be transferred to a woman in the mysterious moment of conception.

Another composition rich with pictorial elements is very interesting in terms of its semantic deciphering. In this composition two warriors with spears oppose each other, but the main role is played by a massive bull and a female (Fig. 20). There is no doubt that this is a woman. Her long, flapping clothes, along with her braids and high miter-shaped headdress are all obvious signs of her gender. In one hand she is holding a rein leading to a bull's muzzle, in the other hand she holds an object in the form of stick or staff, the opposite end of which is being grasped by a man. This object may also belong to a man since a half-preserved depiction of a man with a similar "instrument" is known. The woman's legs are hidden under the flap of her clothes and are directly adjacent to a large silhouette of a goat figure. On the bull's back, a rectangular load-bearing pack of rectangular shape is carved with separate lines. A woman with long braids is represented on top of the pack. Behind the bull a human being wearing a crescent-shaped headdress and armed with a dagger and bow is depicted. In the lowest part of the scene and, more precisely, on the forefront lies an unarmed giant, at whom a person in a crescent-shaped headdress shoots. This composition is unique because it may contain figurative elements of at least four myths which transmit the texts of Indo-European mythology in a very general way. The first and most important theme is a sacral connection between the goddess and the celestial bull. The second subject is the ritual contest with the bull and the bull's sacrifice. The third and fourth fragments are dedicated to the combat of cultural heroes and to the myth of giants. Incidentally, the giant, who is depicted at the bottom of the composition lying in a prostrate position, could also be a divine hero from whose body the world was created. "These beliefs are rooted in extreme antiquity. Great numbers of peoples have myths which tell us that the universe was formed from the body of primordial giant, hero, or divinity. The Orphic hymns of the ancient Greeks describe the creation of the world from the body of Zeus. The Persians had Ormuzd, the Finns – Ilmatar, the Tibetans – Goddess-Mother Klumo, the ancient Chinese – the Titan Pan Gu" (Evsyukov, Komissarov, 1985: 91).

Especially impressive are the compositions of numerous figures from Khar-Salaa VIII, where the main and the most significant figures are represented by bulls, around which all of the events of the mythological scenario unfold. Some of the figures are executed in the

so-called decorative style, others using the contour and silhouette technique. They are often paired, sometimes opposed, or located one behind the other, or one above the other. Several depictions of bulls are distinguished by their great size (from 120 to 200 cm long), emphasizing the fact that these animals have been set apart as sacred over and above other animals.

At first sight there doesn't seem to be anything supernatural or mythical in these drawings. Thus, for example, one of the scenes (Fig. 21) seems to be quite commonplace and mundane: a woman leads two bulls by the reins to a small dwelling (a rectangular figure with a square prominence in its upper part), inside of which one can easily notice two small human figures (children?). Yet the shape of the horns, which form an almost ideal circle, along with additional non-functional decorative elements like a series of little circles on the bulls' chests, as well as the ornamentation of crossed lines on the body of one bull, relate directly to ideograms connected with graphic symbols of the sky. These signs suggest that the subject belongs to a mythological narrative, and these bulls represent sacred animals. In ancient Mesopotamia, in Central Asia of 3000 – 2000 BC, in ancient Iranian and Indian traditions, the Bull is first of all the image of the lunar deity. In Iranian mythology, the moon is described as "The-Bull-possessing-semen," in Sumerian and Akkadian mythology, the god of the moon is named "Sin" (Ivanov, 1991).

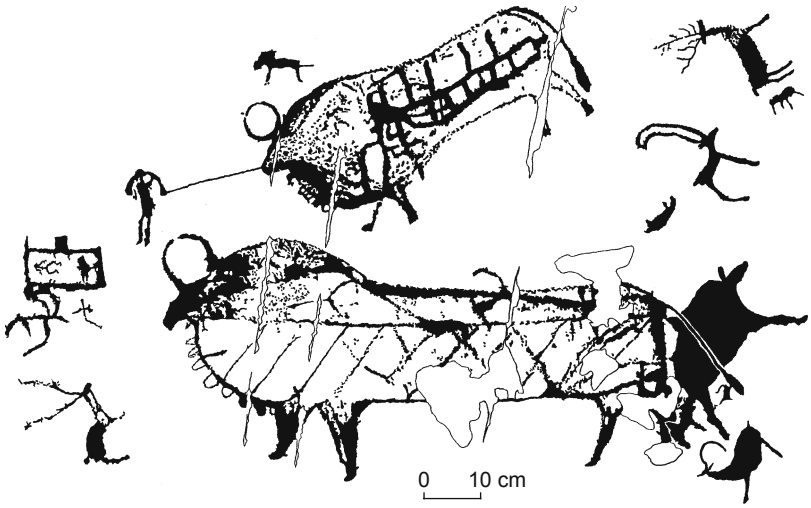

Fig. 21. Scene "Female and celestial bulls." Khar-Salaa. Mongolian Altai.

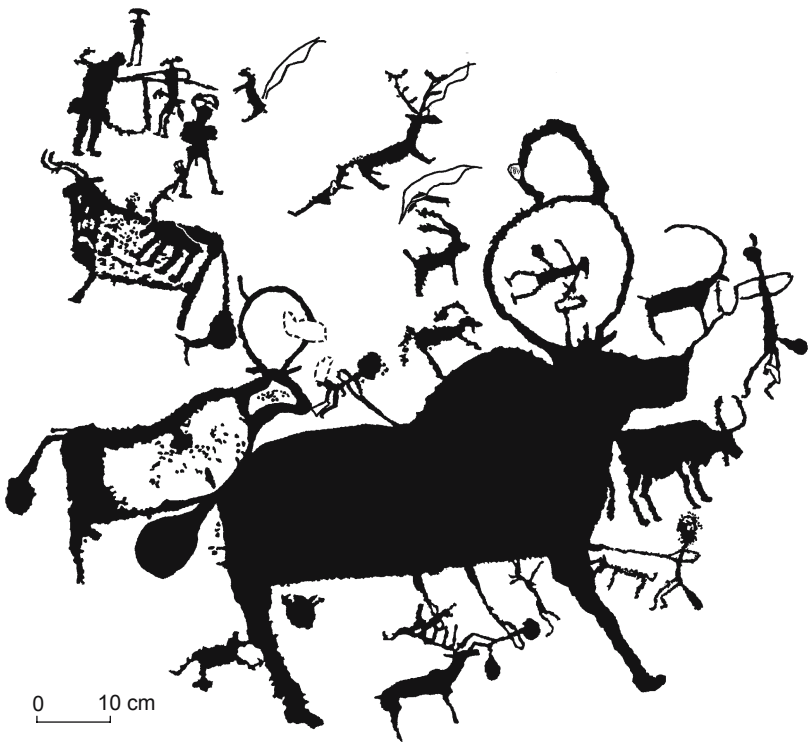

Fig. 22. Composition of several scenes: "goddess" with the bull, killing-sacrifice of the celestial bull, and combat of the hero with the giant. Khar-Salaa. Mongolian Altai.

The largest bull figure in Khar-Salaa appears in another composition executed on a horizontal surface of residual rock (Fig. 22). An outline of a circle joins the bull's big moon-like horns. This circle is undoubtedly related to solar and lunar symbols which "brings" the figure of the bull near the celestial realm. The rein which is connected to the bull's muzzle is held by a woman (?) in a high headdress. The contents of the scene and its characters' iconography resemble the composition with the four mythological subjects described above. These are also closely related in terms of their typography. In this scene there are three mythological motifs: a fight with a giant (upper left), the connection of the female divinity with the bull, and the sacrifice of the bull, in which four warriors with "tails" are aiming their spears at the bull's chest, stomach, and back. The fourth warrior (his figure is depicted inside the ring-shaped horns) shoots his bow at the bull's head.

Fig. 23. View from the east to the location of petroglyphs in Khar-Chuluu.
In the foreground are the representations of sun-horned bulls,
at the background – the sacred mountain Shiveet-Khairkhan. Mongolian Altai.

Fig. 24. Scene "Cosmic predators hunting
for sun-horned elk." Tsagaan-Gol. Mongolian Altai.

This study by no means contains all of the subjects of the Mongolian petroglyphs that can be correlated to particular mythological texts, but even the ones that we examine here do bear a striking resemblance to the Altai petroglyphs. These petroglyphic monuments are similar in their composition, in the characters involved, and in the mythological content of their scenes. Dozens of expressive compositions with many figures, and celestial bulls, deer, female divinities, and warriors armed with spears and clubs play the main role in such compositions in Elangash, Irbistu, and Kalbak-Tash. In some scenes, men accompany (guard?) bulls, women, and children; in other compositions, they fight with each other, or even do combat with the giants (Kubarev, 1987; Kubarev, Jacobson, 1996: fig. 132, 150, 284, 449, 451 – 459, etc.). Consequently, the Mongolian Altai petroglyphs of the Bronze Age are undoubtedly close in cultural and chronological terms, and serve as a valuable historical resource allowing us to make a reliable reconstruction of the religious and mythological beliefs of ancient cattle-breeders and hunters of Central Asia.

Yet it is possible that some compositions among the petroglyphs of the Mongolian Altai illustrate ancient rituals or ceremonies related to yearly sacrifices to gods, spirits, or "owners" of the mountains and woods. The sacred location where these rituals were performed in ancient times could be picturesque rocks, called by local residents "Khar-Chuluu" – lit. "Black Stones" (Fig. 23). The total quantity of drawings (both scenes and individual depictions), including previously unknown petroglyphs, amount to at least 250 drawings, according to our calculations. They are mainly located on rock and stone surfaces which face south (Fig. 24). The first drawings were made in the Bronze Age, on the horizontal surface of a giant block that was probably left after the glacier's movement down the Tsagaan-Gol valley, on the very top of the ridge. These consist of representations of a dagger, a large figure of a deer, and a bowl-shaped cavity. Much later, smaller figures of goats and hunters were pecked over them. If we try to decipher the meaning of the first, more ancient layer of drawings, what we see is a laconic pictogram. It can be "read" approximately in this sequence: (1) deer – sacrificial animal; (2) dagger –

instrument for performing the ritual; and (3) bowl-shaped cavity – a "vessel" for the blood of a sacrificial animal. Such an interpretation of the possible function of the bowl-shaped cavities which are often located on horizontal surfaces is not new; A.P. Okladnikov has already attributed the same purpose to a series of holes on the petroglyphs of Mongolia (Okladnikov, 1983: 33). He writes that "by means of magic they needed to secure abundant prey, to make the animal voluntarily go towards the wishes and will of the hunter in order to become his sacrifice so that the animal will feed people who are hungry and longing for the food of its sacrificial flesh and blood. Yet, it was no less important to consider the needs of the next day, which also threatened the tribe's survival with the possibility that the sorrows of famine and even death by starvation might ensue … to ensure the fertility of the animals... and to reproduce; to increase by means of sacred rituals not only the quantity of animals, but also the power of the human community that stood against natural forces and hostile human groups" (Okladnikov, 1980: 97).

Conclusions

Ancient sanctuaries with petroglyphic representations, both known and recently discovered in Central Asia, functioned for many thousands of years and belonged to hunters and animal-breeders. Predominant scenes of hunting, depictions of the main trade animals and armed people apparently testify to regular ceremonies and magical rituals with a particular worldview in the background. This worldview endowed the sun and the cosmos with the ability to reproduce both dead people, as well as slaughtered animals. For example, a ritual reflected in the compositions of the sacred "altar," situated at the eastern foot of the Shiveet-Khairkhan Mountain, directly points to the fact that ancient people always cared about lost tribesman and the animals they killed, and that they tried to be active participants in a ritual of "resurrection-birth" for both men and prey. This hidden and mysterious sanctuary was also a place of sun worship, and prayers to the good and evil spirits upon whom depended the well-being of entire community, family, and individual person, according to the ancient worldview, were offered up here.

Some scholars view petroglyphs as an inexhaustible source of information on the mythological beliefs of ancient tribes. Others think that they record only real historical events or memories of hunting and the ancient economy. By way of compromise between these two views, one might summarize these opinions by referring to the brief but concise conclusion of A.P. Okladnikov, who writes: "In regards to such a remote time, one cannot speak exclusively about everyday art, or exclusively about mythological creativity. The mythological realm was undoubtedly interconnected with the quotidian realm, and both realms were influenced by factors functioning as a specific synthetic complex" (Ibid.: 76).

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PLASTER MASKS OF THE YENISEI MUMMIES: TECHNOLOGY AND PAINTING

Introduction

The present article is a continuation of the article *The Yenisei Mummies: Archaeological Sources and Anatomical Examination*, published in this journal in 2003 (Vadetskaya, Protasov, 2003: 36 – 47), which addresses the masks of mummies from the late Tagar (Tes stage) burial mound at Novye Mochagi (virtually no remains of plaster masks from other similar mounds are available).

The mound is situated 12 km west of Sayanogorsk, near the village of Kaly, Khakassia. It was excavated in 1983 by a team of the Middle Yenisei expedition from the Institute for the History of Material Culture, headed by N.Yu. Kuzmin. Unlike dozens of other synchronous burial structures, the burial chamber in this mound, 11 m by 12 m in size, was arranged on the surface rather than in a pit. It was made of turf and encircled by a stone curb. Its inner walls were faced with birch-bark and wooden slabs, and surrounded by vertically placed logs. In the center, there was a timber frame, 7.5 m by 7.5 m in size and at least 50 cm high. Inside more than eighty mummies were placed on what appear to be benches. They had fallen down and lay in disarray, but in close proximity to one another, and were not separated by layers of earth. Most of the skeletons were preserved intact but 23 mummies were represented either by crania and scattered postcranial bones, or parts of skeletons connected by soft tissues. Between the turf walls and the timber frame, the remains of at least thirty persons were found (mostly crania, isolated or heaped). The timber frame had been disturbed by looters, and two reasons may account for the presence of human remains outside it: either intact mummies had been buried in the timber frame, and their parts outside it, or, what's more likely, the crania with a few isolated bones were thrown out of the frame by the looters.

Physical conditions caused by the burning of the chamber contributed to the preservation of clay, bones, and organic matter. Under the skeletons and on them, a brownish layer of decayed grass, up to 1.5 m thick, was partly preserved. Some arm and leg bones were also are covered with grass. The crania are trepanated and filled with grass. On the outside, the crania and the cervical vertebrae were coated with clay, over which a thin layer of plaster was applied. In some instances, bluish-green glass beads imitating pupils were found in the clay filling the orbits. On some clay and plaster masks, remains of red and black paint were preserved (N.Yu. Kuzmin, Report on the excavations conducted by the Sayanogorsk division of the Middle Yenisei Expedition on the territory of Oznachennoe irrigation system in 1983 – IIMK Archives, F. 35, Inv. 1, 1983, D. 146, pp. 2 – 17; see also (Kuzmin, 1985: 216 – 217)).

During cleaning, the thin and cracked plaster masks had shattered into small pieces. In some fifty cases, the excavators had separated fragments of masks from the crania, and in two cases they were strengthened along with the underlying clay. Nearly all of the human remains were handed to St. Petersburg Museum of Anthropology and Ethnography, but twenty crania with

Fig. 1. Cranium of skeleton 13 with a piece of plaster on the clay filling of the orbit. Photograph by N.Yu. Kuzmin (IIMK RAN Photographic Archives, D. 3087, N 537).

the best-preserved clay and fragments of masks have remained at the Institute for the History of Material Culture.

Based on his first impressions during the excavations, N.Yu. Kuzmin (Kuzmin, 1985a: 48; 1991: 153; Kuzmin, Varlamov, 1988: 146 – 155) published his interpretation of the burial rite without even bothering to unpack the crania and the remains of the masks. Only thirteen years later, after the excavations had been concluded and before departing to Germany, did he report on these finds and propose to start studying them. By that time, only four crania coated with clay had remained relatively well preserved. They were published by the senior author (Vadetskaya, 1999: fig. 85, *2*; 2004: 302, fig. 1, *3*, *4*, *6*; Vadetskaya, Protasov, 2003: fig. 3 – 6). The remaining specimens had fallen apart. Clay was preserved on fragments of eight crania. The initial appearance of three more crania with pieces of plaster masks can be seen on three field photographs. However, at present it is impossible to identify them even on the two best photographs (Fig. 1, 2), so determinations made by a physical anthropologist (Mednikova, 2001: 214 – 220, fig. 2 – 4) cannot be used. Nor was it possible to identify the crania to which the fragments of masks belonged. Analysis revealed cranial fragments coated with clay to be more informative than were intact crania. The former analyses were conducted in order to assess the physical condition of the corpses at the time of mummification. The objective of the latter analysis was to evaluate the composition of the clay*.

It was established that clay had been applied on crania after most of the soft tissue had decomposed. However, some of these tissues, having dried out, had been preserved in the outer parts of the cranial channels, orbits, vertebrae, etc. Further study revealed

* A medical examination was carried out by the autopsist V.A. Protasov, a chemical analysis of clay was conducted by E.Yu. Mednikova, the chemical composition of plaster and paint was assessed by L.S. Gavrilenko, and botanical determinations were made by M.I. Kolosova.

Fig. 2. Cranium of skeleton 2 with pieces of plaster mask on the eyes and mouth. Photograph by N.Yu. Kuzmin (IIMK RAN Photographic Archives, D. 3087, N 536).

that the sequence of the modeling of the head was as follows: first the frontal part of the cranium was filled with grass, and the oral, nasal, and orbital cavities with clay, and then the entire cranium along with the cervical vertebrae were coated with clay (Vadetskaya, Protasov, 2003: 41 – 46). The vegetable mass filling the cranial cavity included reed (Ibid.: fig. 13; Vadetskaya, 2004: 307) or a mixture of willow and birch twigs with motley grass and grain.

The clay paste contained a small amount of grass, wool, and lime as a binding component. Pieces of lime were added to the paste, apparently to destroy soft tissues in hard-to-reach parts of the cranium. Isolated parts were normally filled with clay without the binding component (Mednikova, 2002: 256; Vadetskaya, 2004: 307). Five heads from the same mine were evidently modeled with a beige clay with touches of gray or pink shading. The sixth specimen is made of reddish-brown clay, naturally colored by goethite (Egorkov, 2002: 236). This clay differs not only in color, but also in composition from the clay that was used in the other specimens (Mednikova, 2002: 256), and apparently comes from another mine.

Along with the study of clay on crania, chemical analyses of plaster masks were conducted (Vadetskaya, 2004: 307). Their results are discussed in the present article. Imprints on the insides of the masks made it possible to assess the facial features of the mummies. Evidently, the two kinds of mummies, one with a mask and one without mask, stem from two rites related to the idea of a "living corpse" and a "dead corpse," that is, of physical death versus ritually acknowledged death.

Materials and methods

Remains of plaster coatings with clay are the best-preserved on two crania. Pictures of both have been published. Plaster coatings are commonly described as masks although plaster and clay covered the entire cranium and the neck.

Cranium N 34, that of a female aged 25 – 35, was coated with a 1 – 1.5 cm thick layer of clay and a 2 – 4 cm thick layer of plaster. The eyes and lips on the mask are closed. On the cheeks, traces of a zigzag-like pattern with trefoils and circles on opposite ends are barely visible. Between the eyes, in the glabellar region, there is a fragment of a red figure (Vadetskaya, 1999: fig. 85, *2*; 2004: fig. 1, *4*; Vadetskaya, Protasov, 2003: fig. 6; Mednikova, 2001: 219, fig. 4, *b*).

On cranium N 46 (that of a male aged about 35), the clay layer was 1.5 cm thick. On the clay, a red stripe, 1.5 cm wide, crossing the face in the lip region, is preserved, and in the temporal region, part of a black circle appears. The clay is coated with plaster, the remains of which are preserved in the region of the right eye, temple, and upper part of the cheeks. The plaster mask is painted with red ocher, which is present also on the inside of the plaster layer covering the clay. This suggests that both the surface of the clay and the organic matter (leather or cloth) that had decomposed might have been painted. In several places, a thin layer of cinnabar is superimposed on the damaged ocher layer; on the temple, there is a black circle (the black paint was made of charcoal). Consequently, the mask had been repainted, and the painting on it generally matches that on the mummy's head (Mednikova, 2001: 219, fig. 2; Vadetskaya, Protasov, 2003: fig. 4; Vadetskaya, 2004: fig. 1, *6*).

Remains of clay and plaster are present on three more destroyed crania. On the clay head of a male (N 45), modeled on the cranium, pieces of a red plaster mask cover the eye, part of the cheek, and the lips on the right side. In the mandibular region, red paint has remained on the clay under the plaster facing (Mednikova, 2001: 219; Vadetskaya, Protasov, 2003: fig. 8, *2*). Pieces of a similar mask are present on the clay head modeled on the cranium (N 33) of a male aged 40 – 49 (in the eye, cheek, and lip region on the left side). Inside the eye slit, red paint is present on the clay (Mednikova, 2001: 219, fig. 2). Plaster, painted red, is partly preserved on the clay filling the orbit of a head modeled on cranium N 47 (possibly that of a female aged 15 – 19) (Ibid.: 219). Altogether, five clay heads had red masks. Four of them are male, and one was that of an adolescent female. One white mask with a red design was that of a female. The clay coating under the masks on male crania was also painted red.

Fragments of plaster were removed from fifty more crania during the excavations. These fragments are mostly small, fragile, 1 – 5 mm thick, and some of them were assembled into larger fragments of 47 masks with parts of cheeks, lips, and necks. Parts of foreheads, noses, and ears are very few. Only twelve masks were restored to one half of their size or more.

At the State Hermitage Physical and Chemical Laboratory, fifteen variously preserved masks (two of them on crania) were analyzed along with more than 100 separate fragments. To evaluate the technology and assess the properties of the masks, we have analyzed the structure of the fragments, the composition of clay and organic substances, the techniques of coating and painting, the composition of the paint, and the organic admixtures. Special attention was paid to the inner surface of the masks and the imprints on it; this helped assess not only technological processes, but also certain ritual actions to which dead persons were subjected. Traces of restoration were uncovered (these included replastering and repainting), attesting to a prolonged funerary rite.

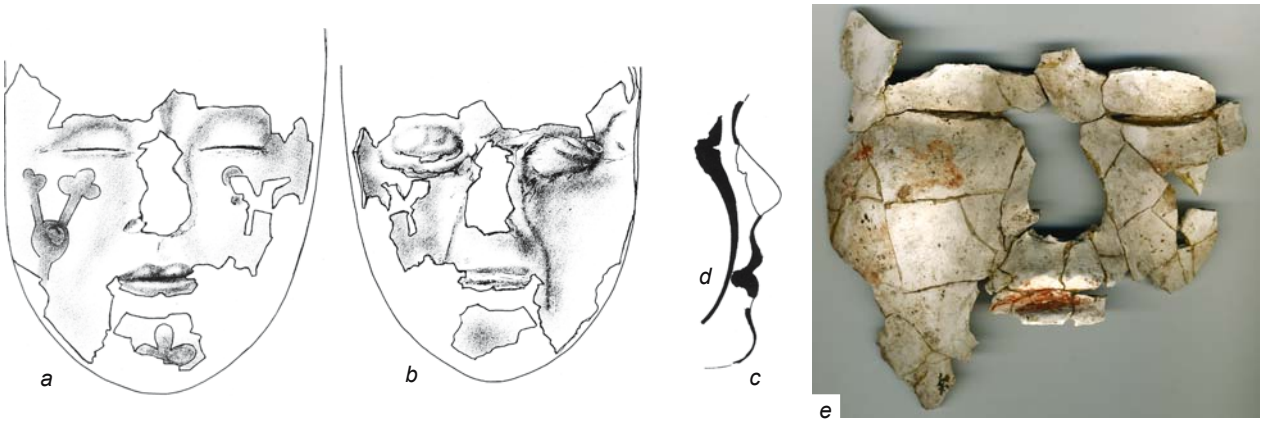

Fig. 3. Mask N 50. Drawings (*a* – *d*) and photograph of the outside (*e*).
a – facial side; *b* – inside; *c* – profile of the facial side; *d* – profile of the inside.

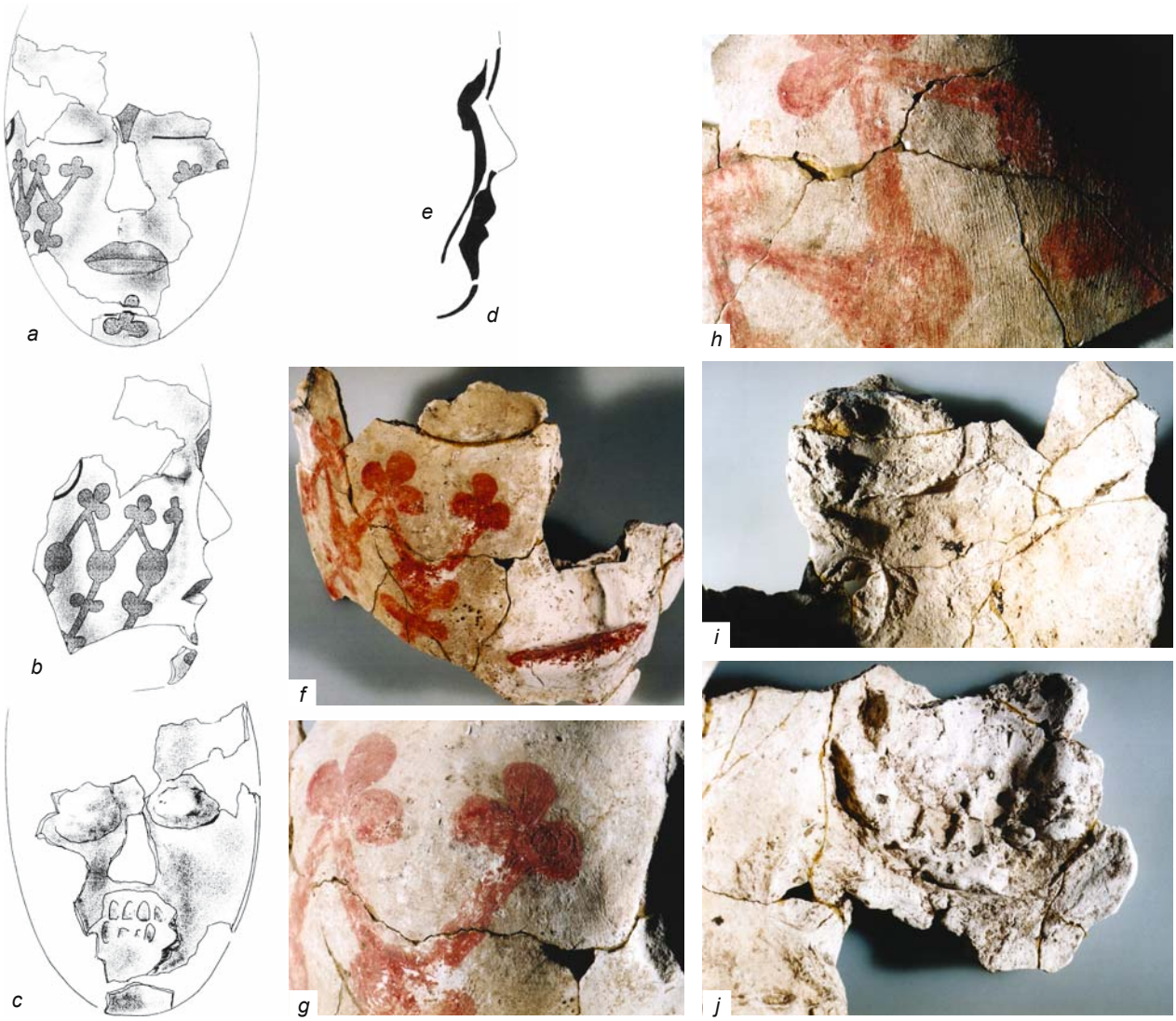

Fig. 4. Mask N 43. Drawings (*a* – *e*) and photographs (*f* – *j*).
a – facial side; *b* – right side; *c* – inside; *d* – profile of the outside; *e* – profile of the inside; *f* – right half; *g* – pattern incised with a sharp tool and painted with cinnabar; *h* – traces of brush on the facing; *i* – imprints of two patches of cloth in the eye region (a rectangular one covered by an oval one), and patches of cloth sewn together on the inside of the mask; *j* – imprints of teeth on the plaster plate.

The methods used were microscopy, microchemical analysis, infrared Fourier spectroscopy and microspectroscopy (conducted by I.A. Grigorieva), and x-ray fluorescent spectral analysis (S.V. Khavrin). Vegetable particles (wood, bast, spine) were assessed microscopically on the basis of anatomical features of cell elements and fragments of tissues including fragments of the epidermis of sprouts and leaves (M.I. Kolosova). The results enabled us to provide detailed characteristics for each mask (prepared for a joint catalog of Tagar and Tashtyk masks). Data on two masks have been published in the present article*.

Mask N 50 (15.5 cm by 14.5 cm). Forehead, nose, and part of the left cheek are missing. The walls are mostly 1 – 5 mm thick (5 – 12 mm thick in the lip region). The material is white, dense, hard, and fragile. The thickness of the inner layer is approximately 1 mm, that of the middle layer, 1 – 3 mm, and that of the outer layer, below 1 mm. The lips are painted with red ocher; on the cheeks, there is a painted design consisting of a solid circle with two trefoils on a long stem; on the chin, a trefoil is painted, and in the glabellar region, a triangle. On the fragment of the neck, there is a black horizontal stripe. The inside of the mask bears imprints of grass and of crude relief seams; in the eye region, there are two 5 mm thick plaster plates with imprints of patches of cloth, and in the mouth region, a plate with imprints of teeth (Fig. 3). The plaster contains calcium carbonate (1 %), argillaceous compounds enriched with iron oxides (8.7 %), and sand (1.8 %).

Mask N 43 (19 cm by 14.5 cm). The forehead, the nose, the peripheral parts of the cheeks, and many minor details are missing (Fig. 4, *a*, *b*). The thickness of the mask is 1.5 – 3 mm, and in some areas it is larger (up to 5 mm) (Fig. 4, *d*, *e*). The plaster is cream-colored, porous, and comparatively hard. Above the irregular layer of plaster, a 0.5 mm thick coating is applied. Its surface is smoothed with a coarse brush, traces of which are visible (Fig. 4, *h*). The surface bears designs that were first incised with a sharp object against an incompletely dried facing (Fig. 4, *g*) and then painted with cinnobar: a triangle between the eyes, a trefoil on the chin, and parallel connected stems with trefoils and solid circles, arranged in a diagonal fashion on the cheeks (Fig. 4, *b*, *f*). On the lips, a thick layer of cinnabar is present. Eye slits and a circular line on the temple are marked with black paint made of pulverized charcoal. On the inside, remains of clay are preserved, and in the mouth region, imprints of teeth (Fig. 4, *c*, *j*). In the eye region, there are imprints of rectangular patches of cloth, and near them, imprints of seams that connected pieces of cloth with which the clay head was sheathed (Fig. 4, *i*). On the place of the nose, a trapezoid area is delimited with a painted line. Thus, on the outside of the eye and mouth areas, a thicker layer of plaster was applied on cloth and filled the depressions. The principal component of the paste was plaster containing calcium carbonate (up to 2.5 %), argillaceous compounds with iron oxides (3.5 %) and sand (1.5 %). The infrared spectrum also points to the presence of calcium carbonate and iron oxides in the paste.

Stages in the reconstruction of the faces of the mummies

On the inside of all of the masks, there are imprints of seams, leather, or, less often, intertwined fibers of cloth. In the eye and mouth regions, there are plaster plates coalescent with the masks and bearing imprints of the cloth patches that are placed on them. Traces of intertwined fibers of fabric are usually present in the eye region. These traces are less common between the lips, possibly because imprints of teeth had effaced them. We will now examine this in more detail.

On the inside of each mask, there are imprints of animal skins, folds of coarse fabric, and relief seams which might have emerged when patches of leather or cloth were sewn together with the glover's stitch. Many fragments reveal imprints of grass stalks or plant remains, and of cloth. It can be concluded that the crania were coated with clay and sheathed with patches of leather or cloth sewn together. Patches of cloth were connected with delicate seams, and those of leather, with crude relief seams (see Fig. 4, i; 5, *a*).

On the inside of each mask, in the eye region, there are plaster knobs, the thickness of which varies from 3.5 mm (masks N 35a, 36b, 43a, 50, 50a, etc.) to 10 mm (mask N 36, a)*. The knobs bear imprints of rectangular or oval whip-stitched patches of cloth 3 cm by 2 cm, 3 cm by 3 cm, or 4 cm by 4 cm (see Fig. 4, i; 5, *b*; 6, *b*; 7, *b*, *c*). So the orbits of the mummies were covered with pieces of cloth, on which plaster was applied. Between the lips on the inside of the masks, there are 5 – 10 mm thick stripes of plaster ranging from 4 cm by 0.5 cm to 6 cm by 2 cm in size. They exhibit distinct imprints of teeth (see Fig. 4, *j*; 7, *d*), and, on mask N 37, an actual piece of tooth. It can be suggested that the mummy's head sewn with leather had open eyes and partly exposed teeth. The fact that the imprints are situated in specific places like the eye and mouth regions attests to modeling techniques. The thickened layer of plaster in the eye region, subrectangular in shape, a narrow elongate stripe

* Their drawings were made by L.A. Sokolova, who assembled parts of all of the other masks.

* In several cases, the same number refers to two masks, one from a separate cranium and one from a skeleton; these were denoted by different letters.

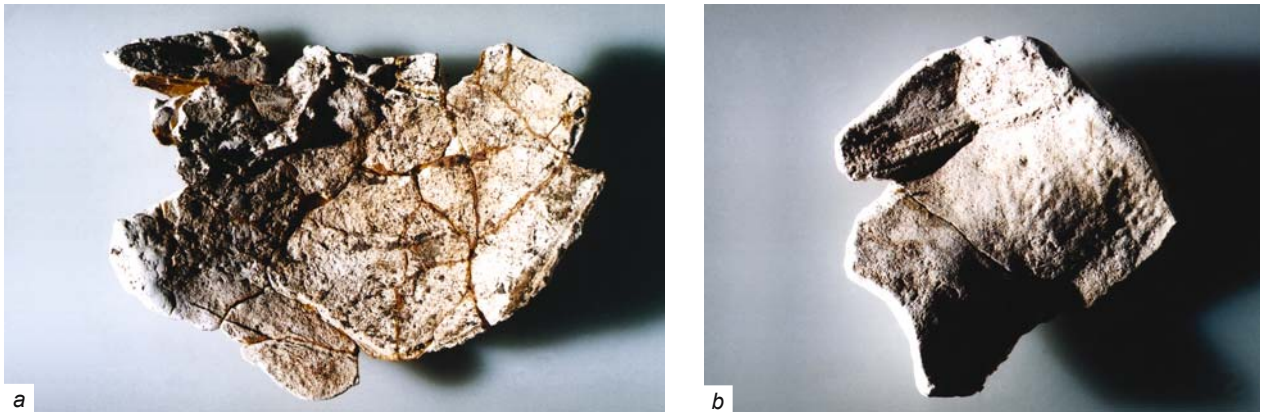

Fig. 5. Mask N 42.
a – imprints of plants, leather, and coarse seams connecting pieces of the leather sheath on the mummy's head; *b* – imprints of cloth in the eye region.

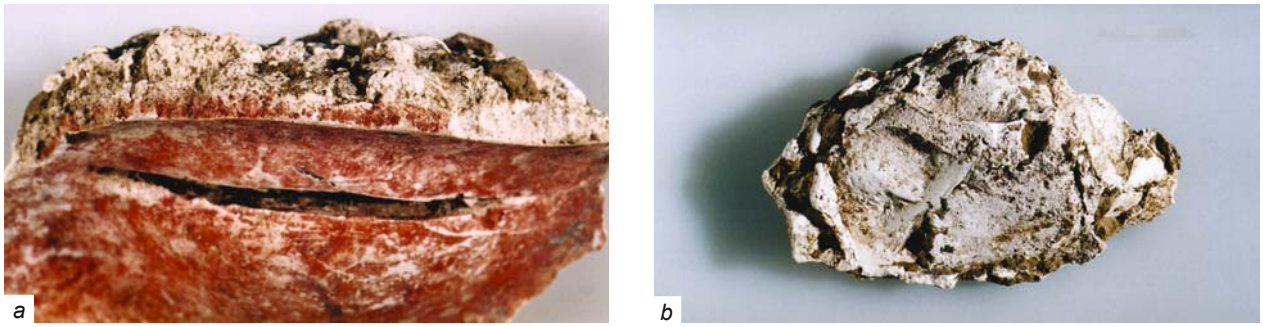

Fig. 6. Mask N 38.
a – eye slit painted with ocher and red pigment below it; *b* – imprints of a rectangular plate and coarse seams in the eye region.

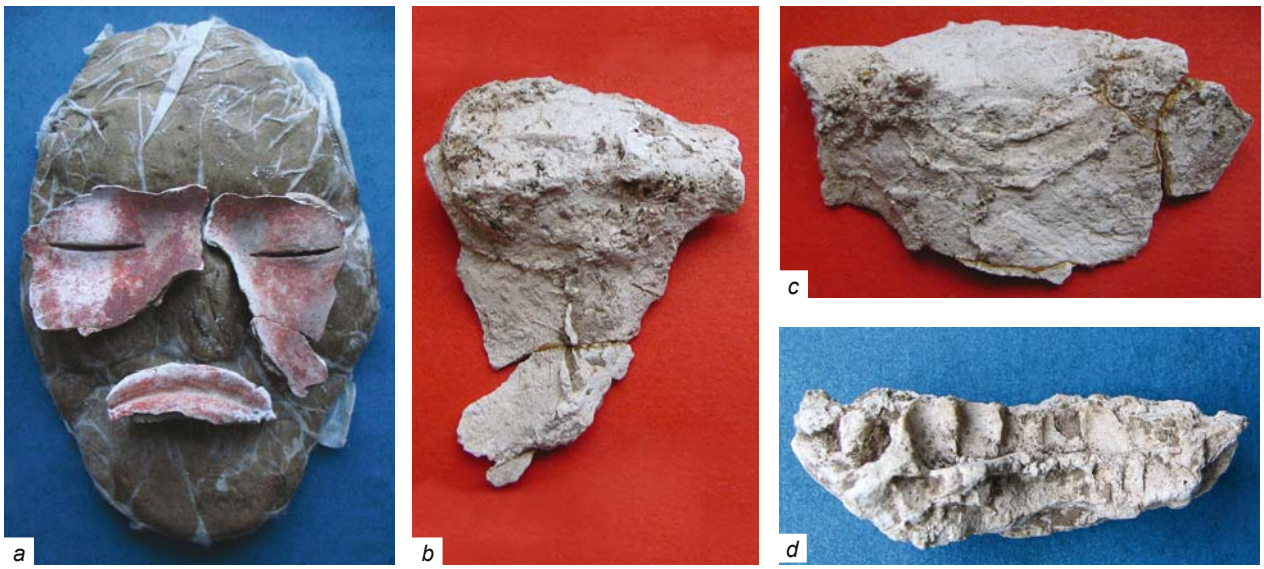

Fig. 7. Mask N 39.
a – eyes with pieces of cheeks and lip; *b* – imprints of two patches of cloth and plaster plate in the left eye region; *c* – imprints of two pieces of cloth in the right eye region; *d* – imprints of teeth on the plaster plate in the lip region.

of plaster between the lips, and a thickened (up to 9 mm) layer of plaster, always with imprints of teeth, in the mouth region suggest that before the mask was applied, the underlying layer of plaster had been pressed into the orbits filled with clay and into the open mouth, and partly filled these cavities. Judging from the imprints of intertwined fibers of cloth on rectangular or oval whipstitched patches, these patches were used to cover the eyes and the mouth of virtually all of the mummies. Certain seams are rather thick; apparently, patches of cloth were not merely placed on the eyes, but were sewn to the cloth or the leather sheath with the glover's stitch. After that, plaster was applied and pressed into the facial cavities, and finally the mask was applied.

The mummy's leather face was evidently painted. Traces of red paint are visible through a microscope not only on the outside, but also on the inside of the masks (N 32, 38, and cranium N 46), and the skin on the mummies' heads is imprinted on the inside. On crania N 33, 45, and 46, red paint is visible on the clay underlying the masks. While paint might have poured down along the rims of the mask during painting (Fig. 6, *a*), cranium N 46 reveals ocher both on the clay under the mask and on the inside of the mask. Apparently, when the painted skin had decomposed, paint settled either on the clay or on the inside of the mask.

A mummy's face, coated with clay and sewn with leather, with open eyes in which glass beads were inserted to imitate pupils, and a half-open mouth in which teeth were visible, can be associated with a living, or rather, a revived, person (see Fig. 1, 2) (Vadetskaya, Protasov, 2003: fig. 3; Vadetskaya, 2004: fig. 1, *3*). In contrast, a mummy with a

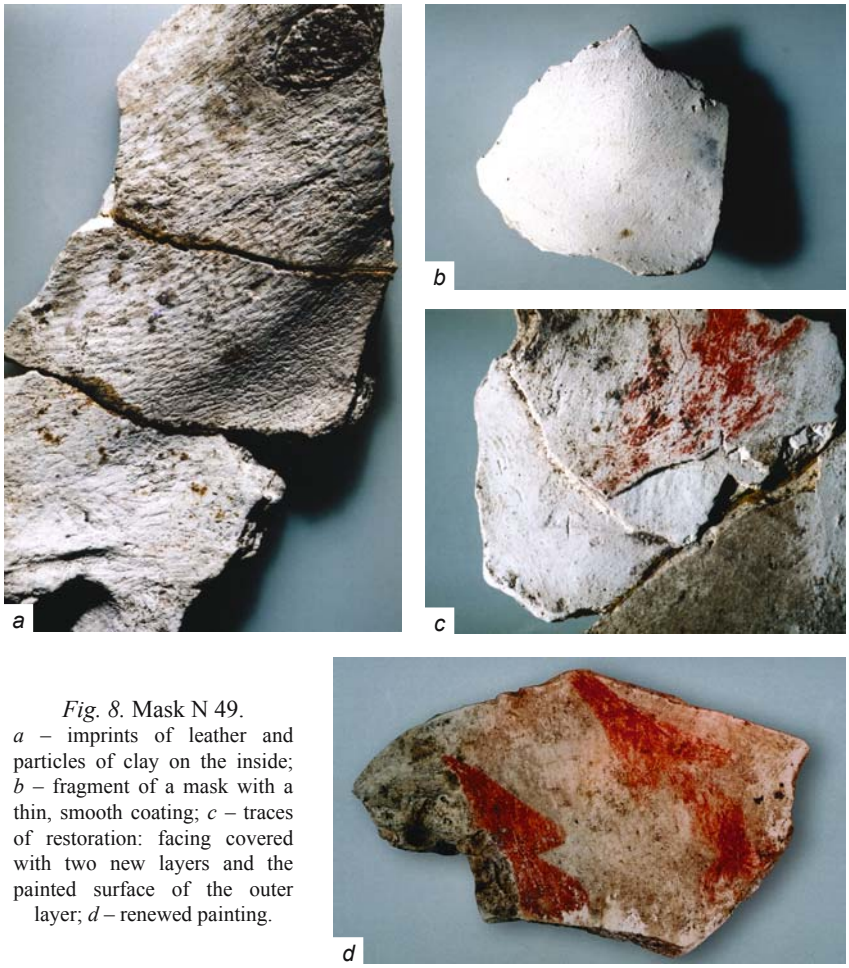

Fig. 8. Mask N 49.
a – imprints of leather and particles of clay on the inside; *b* – fragment of a mask with a thin, smooth coating; *c* – traces of restoration: facing covered with two new layers and the painted surface of the outer layer; *d* – renewed painting.

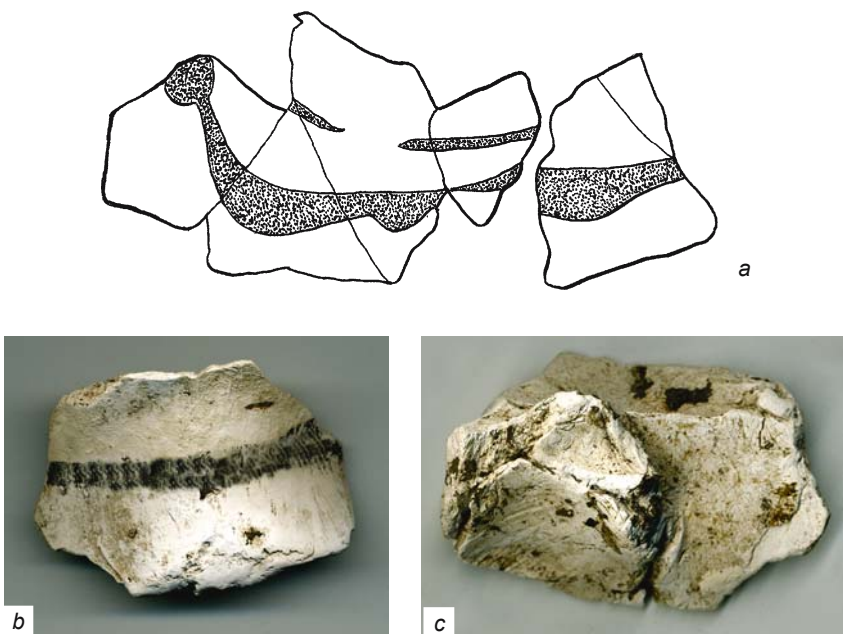

Fig. 9. Mask N 50a.
a – red painting on the forehead (drawing); *b* – fragment of neck with a black stripe; *c* – plaster plate on the inside of the chin region.

plaster mask having closed eyes and mouth, resembled a dead person (see Fig. 3, *4*) (Vadetskaya, Protasov, 2003: fig. 6; Vadetskaya, 2004: fig. 1, *4*). Both reflected various stages of transition to the other world and were related to various rites. A certain amount of time elapsed between the modeling of the mummy's head and the making of the mask, and during that time, the mummies' heads might have been destroyed. Indirect facts suggest that this was indeed the case. Thus, apart from the imprints of leather and cloth, the insides of some plaster fragments reveal particles of clay or plant fibers stuck to it (see Fig. 5, *a*; 8, *a*). They might have gotten there from the leather sheath or even from the braincase, which had somehow been partly damaged. The mummy's left orbit was destroyed, probably when mask N 35a was being manufactured. The damaged place was covered with a piece of cloth, and a 5 cm thick layer of plaster was applied to it; then another piece of cloth was placed above the plaster, and finally a 3 mm thick plaster coating was applied. The right orbit, which is intact, was covered with a piece of cloth, and remained uncoated. Eyes of the mummy under mask N 39 were treated likewise (see Fig. 7, *b*, *c*). Possibly, after being damaged, the orbit under mask N 44 was covered with two patches of cloth (3 cm by 2 cm and 3.5 cm by 2.3 cm) rather than with just one patch. Particles of plaster stuck to the inside of mask N 50a in the chin or neck region (Fig. 9, *c*), apparently remained from the filling of the crack in the mandible.

The composition of the paste and the technology involved in the making of masks

The natural composition of plaster was evaluated in thirteen masks. In eight cases, special admixtures were found. They were added in the process of mixing plaster with water (see Table**)**.

Natural gypsum contained clay, sand, and limestone. Plaster rock with approximately 10 % additives is the most suitable for the production of adhesives and is used for obtaining technical, molding, and medical plaster. Plaster with approximately 25 % of additives is lower in quality, but the material can still be used for construction purposes if the content of additives does not exceed 35 %. The results of analyses demonstrate that the masks were made of a relatively pure plaster consisting of no more than 10 % additives. It is mostly whitish, dense, hard, and fragile. Certain masks are quite white and hard, especially in the coating layer. Additives include wool and crushed vegetable substances such as the remains of grass (identified by a fragment of a stalk epithelium), but their proportion is low. Many masks also contain a small amount of pulverized charcoal. An important parameter in the manufacturing of a mask is solidification rate*.

Apparently, the manufacturers of Yenisei masks used some of these techniques and were able to produce the masks on a wide scale. For instance, they were able to use the optimal plaster-water proportion to increase solidification time without the loss of strength, and added substances such as gelatins, milk, whey, or alum to make the masks harder. The presence of organic additives in the paste is confirmed by infrared spectroscopy.

The thickness of the masks is generally 4 – 5 mm or 6 – 7 mm, less frequently up to 8 mm. It is larger (up to 10 mm) in the neck and nose regions. Two to three layers of plaster were applied, and then the mask was covered with a thin (below 1 mm) coating. The thickness of the lower layer is normally 1 – 2 mm (in rare cases it is larger), that of the principal layer, 1 mm to 3–5 mm; in thickened places, an additional third layer was applied. The inner layer was normally thoroughly dried before the next layer was applied, as evidenced by distinct boundaries between the layers (these boundaries are barely distinguishable when drying was insufficient).

The outer facing provided the ground for painting. In many masks, it is dense and hard, its color is pure white, and its surface is smooth. The color of the facing layer is often much lighter than that of the underlying layers,

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* Solidification rate is defined by the proportion of substances that result from heating plaster, the quantity of natural pollutants, and the size of the particles. The solidification of plaster during heating is an exothermic reaction, accompanied by a minor increase in volume at the final stages. Adding electrolytes can regulate solidification time and degree of expansion. Plaster mixed with gelatin or other organic colloids hardens much slower than usual. Borax and acetates slow down solidification. The opposite effect is achieved by adding alum, other sulphates, and chlorides of alkali elements. Hardening proceeds more rapidly when catalysts such as lime or limestone are added. However, both borax and alum make plaster artifacts harder, because both reduce expansion during solidification. This is especially important when the size of the product is strictly standardized. In this case, pulverized calcined plaster is mixed with a borax or alum solution or the latter is applied on the surface of the end product to achieve superficial hardening. Combining accelerators and inhibitors, one can arrive at an optimal solidification rate and obtain a strong product. Another factor affecting solidification time, expansion degree, strength, and porosity is the calcined plaster-water proportion. With the 100:60 proportion, solidification time is approximately 7 min, and with the 100:80 proportion it increases up to 10.5 min., but the compressive strength becomes lower. Calcined and pulverized plaster becomes especially strong, if it is soaked in an alum solution for one day, and then dried, and recalcined.

Content of natural admixtures and additives in gypsum paste, percent

Mask number	Calcium carbonate	Iron oxides	Sand	Additives
42	3.0	9.6	2.4	Crushed charcoal
50a	1.0	8.7	1.8	–
49	2.0	6.1	0.5	Organic compounds
32	Small amount in the coating layer	4.3	0.7	–
43a	2.5	3.5	1.5	–
33a	2.0	2.4	4.1	Charcoal, wool, grass
33b	Traces	2.4	2.0	Plant remains, wool, charcoal
46a	»	1.5	3.2	Plant remains, wool
41b	–	–	–	Grass, charcoal, hair
35a	2.0	Traces	Traces	Hair
Unnumbered	Small amount	–	–	Organic compounds, charcoal

and its thickness is quite small and regular. Possibly the coating paste was a liquid and was poured over the mask. If so, no additional treatment was required (see Fig. 8, *b*). The surface of other masks is smooth as well, but in these cases, traces attest to additional treatment with a coarse brush (see Fig. 4, *h*). The coating consists of nearly pure gypsum, the proportion of admixtures is low, but the content of calcium carbonate is somewhat higher than in the principal layers, as evidenced by infrared spectral analysis. While it would be premature to suggest that lime was intentionally added even in small quantities can make plaster harder, more plastic and water-resistant, and less porous.

Eye slits were incised on wet plaster. They are deep, and their edges are smooth.

Painting

According to N.Yu. Kuzmin, the plaster masks were white, gray, or yellow, and painted red and black. The clay faces of some mummies, in his opinion, were painted likewise, and only the eyes and lips were plastered (Kuzmin, 1985a: 217; Kuzmin, Varlamov, 1988: 149).

Actually, some masks are white and painted red and black, whereas others (about as many) are red. Neither yellow nor gray masks were found. Some had become somewhat covered in soot by fire that had destroyed the burial construction.

Traces of paint on clay under the plaster masks were apparently present on leather sheaths. In each case the front part of the mummy's head was covered with a plaster mask, of which only the eyes and parts of the cheeks and lips are normally preserved. As noted above, the eye and mouth regions of the leather sheath were covered with patches of cloth and coated with plaster. For this reason, there is always more plaster in these regions than elsewhere.

Some white masks have a creamy shade due to a high content of iron oxides that had not been thoroughly removed during the preparation of the coating layer. Against the incompletely dried white facing layer, the design was first incised and then painted. Some masks were painted red all over (see Fig. 7, *a*; 10). The pigments were mainly ocher of various shades (red, tawny, and orange), cinnabar, a grayish-blue mineral paint, and charcoal. Also, a mixture of cinnabar and ocher was used.

On fragments of red masks, the upper rims of the eye slits are painted black. On one mask, there is a black circular line in the temple region. On white masks, only the lips are painted completely red, and in other places partly preserved red patterns are present. Painting bearing standard designs covers specific places such as cheeks, glabellar region, chin, and neck (see Fig. 4, *a*, *b*). Cheeks are densely painted with trefoils on one or two long stems with solid circles. In the middle of certain stems, pairs of leaves are drawn (see Fig. 4, *b*). In the lower part of the cheeks, the stems end either with a dot or with a narrow triangle (mask N 45a). A similar narrow triangle is drawn between the eyes, and the chin is usually decorated with a trefoil (except

Fig. 10. Mask N 36b. Fragments of the forehead, eye, and pieces of cheeks and lips.

on mask N 41, where a circle is drawn in this place) (Fig. 11). Sometimes trefoils are replaced with solid circles. Black paint marks deep eye slits, and a horizontal stripe up to 5 mm wide is drawn on the neck (see Fig. 9, *b*). Apparently a black circle or semicircle was drawn on the temple, but fragments of the mask's temporal and frontal regions are few. On mask N 50a, two parallel lines are drawn across the forehead; one of them is margined with triangular protrusions on one side and ends with a circle (Fig. 9, *a*). Two parallel red lines under the eye are present in mask N 51 (Fig. 12) and on the cheek of mask N 41 (see Fig. 11).

Masks with designs were apparently those of females, and those painted completely red were male. The former suggestion is supported by the presence of two similar masks on two female crania. One of them (N 34) is from the same mound; another one is from a grave at Kamenka (Pshenitsyna, 1975: 46 – 47, fig. 2). The latter suggestion is corroborated by three male crania with the remains of red masks from the same mound described above (N 33, 45, and 46). However, the fourth cranium (N 47) with plaster painted red in the eye area was tentatively diagnosed as that of a girl aged 15 – 19 (Mednikova, 2001: 219).

Apparently, no relationship existed between the design and the paint. Thus, the same design was painted with ocher on four masks and with cinnabar on three. In some instances, the painting was first made with ocher and then renewed with cinnabar. Therefore traces of ocher or cinnabar can serve as chronological indicators.

Neither the composition of designs on the masks nor the principal motif (trefoil) occur in local decorative patterns on Tagar artifacts. If the three dots in friezes on vessels from the transitional Tagar-Tashtyk burial grounds Kamenka III and Tepsei VII and on a vessel from the Tes burial mound Tepsei XVI (Vadetskaya, 1999: fig. 65, 84) are schematic trefoils, then this symbol was not of local origin.

The analysis of painting on the masks indicates that a quarter of the masks were repainted. Usually the red ocher layer was covered with new paint (cinnabar). Sometimes the mask was not only repainted, but also underwent a high-quality restoration.

Thus, mask N 49 reveals three very thin facings separated by distinct boundaries (see Fig. 8, *в*). Each

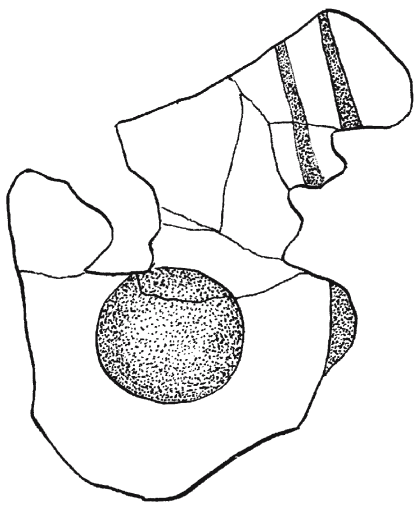

Fig. 11. Mask N 41. Chin and part of cheek with red paint.

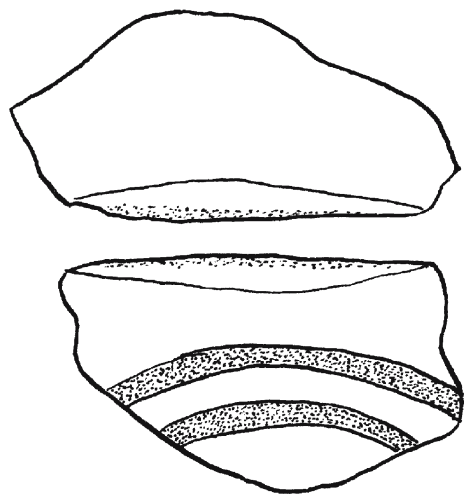

Fig. 12. Mask N 51. Eye with red paint under the lower eyelid.

layer has a very smooth surface. Only the outer layer is painted, first with red ocher and then with cinnabar (see Fig. 8, *d*), which filled the damaged places and cracks in the outer layer and covered the sides of the fragments. Given that the facings were applied at different times, the mask must have been restored at least thrice.

Mask N 38 reveals red pigment under the eye slit painted with ocher (see Fig. 6, *a*). Judging by fragments on which the sides of the mask are painted, new facing was followed by repainting. This mask was restored at least twice. The number of examples can be enlarged.

Traces of restoration, which included either repainting alone or refacing followed by repainting, indicate that considerable time must have passed between the making of the mask on a mummy and the burial.

Conclusion

The study of masks from Novye Mochagi sheds new light on mummies and masks studied earlier. A coarse leather sheath on a clay face was present in a mummy from Beresh. The leather face with eye slits and a sewn-on nose was covered with a plaster mask (Vadetskaya, 1999: fig. 82, *2*). Eye slits were cut in the leather sheath of the Beresh mummy evidently to enable the mummy to "see." The poor preservation of the plaster prevented us from examining the inside of the Beresh mask, but on the insides of masks removed from clay heads found in other mounds (Kyzyl-Kul, Tes, Tas-Khyl) there were plaster plates in the eye regions and imprints of teeth in the lip region (Vadetskaya, 2004: 299). This means that these masks had also been modeled on the clay heads of mummies with open eyes and mouths. The facial sides of the masks were either white (Tas-Khyl), or bright red (Kyzyl-Kul). According to A.V. Adrianov, black stripes or circles were present on red masks (Vadetskaya, 2004: 299). He apparently referred to semicircular stripes on temples, as in mask on cranium N 46 from Novye Mochagi, because fragments of other parts of the masks from three burial mounds (Kyzyl-Kul, Novye Mochagi, and Lisiy) bear no traces of black paint (only soot is present).

Late Tagar mounds are tentatively being subdivided into two periods (last two centuries BC and first two centuries AD, generally coinciding with the Hunno-Sarmatian period). Each mound was an entire cemetery and contained a large grave with dozens of buried persons. The mounds are either separated by large distances or stand alone. S.A. Teploukhov (1929: 48 – 49) was probably the first to note that graves contained remains that had undergone two burials, or bones that had remained from the primary burial, and that these re-buried remains had been burned down in the burial chambers. The graves demonstrate two main trends in the evolution of the funerary rite: bronze items (including miniature ones) were being gradually replaced by iron ones, and mummifying techniques were becoming more and more sophisticated. The skill of modeling heads with clay was being acquired gradually. At first, grass and birch-bark were used for reconstruction, then birch-bark and clay, and finally clay and leather. The material of which masks were made changed as well. The evolution of the technology of modeling the heads of mummies (first without clay, then with clay but without plaster masks, and finally with plaster masks) is documented by excavations of a mound near Sabinka (Vadetskaya, 2004: 307). Technological innovations notwithstanding, the basic feature of the rite, motivated by social or religious reasons, remained unchanged: large groups of people who had died at various times had to be buried together. For this reason, the results of the analysis of mummies from Novye Mochagi concern not only all later mounds (those of the Tes period), but earlier (Tagar) ones as well. In all of them, human remains that had been subjected to various treatments were collected. The treatments included temporary burial followed by exhumation and "revival" through modeling the body, then the acknowledgement of final death by covering the face with the mask, and finally cremation in the chamber. These acts were separated by considerable time periods, with rites accompanying each act. Overall, the funerary rite was not merely complex, but very prolonged given the necessity of accumulating the mummies in sufficient number and, occasionally, restoring them. Also, the first analyses of vegetable remains used in manufacturing mummies uphold the earlier conclusion, made on the basis of studying the clay paste, that the dead had been brought from various places (Ibid.: 302). Possibly each generation of Tagar villagers participated in these rites and in the construction of the mound once or twice in their lives on average.

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ARCHAEOZOOLOGICAL APPROACH TO COMPLEXITY: ANIMAL REMAINS FROM TWO METALLURGICAL SITES FROM THE EASTERN AND WESTERN CORNERS OF EUROPE

Introduction

Despite its importance in the study of subsistence economies and paleoenvironmental reconstruction, archaeozoology has very seldom played a prominent role in the study of technological development, one of the agencies underlying the unfolding of human history. The reasons for such a situation are manifold, but a recurring theme is that fauna remains essentially unmodified in light of technological development, or, at least, that the signals it provides are not as clear as those provided by other archaeological items (Lyman, 1994; Antipina, 2004a).

The subsistence system in the Bronze Age involved three fields – agriculture, animal breeding, and metallurgy. The first two were not radically improved upon technologically for another few millennia. Metallurgy became the first instance in human history in which a productive branch not directly connected with food production radically transformed the nature of both things and phenomena (Hauptmann, 1991; Chernykh, 1992).

The origin and development of metallurgy in Western Europe was associated with a process of social complexity. The chronological coincidence of these processes has often been interpreted in terms of a cause-effect relationship that has gone uncontested in the course of time (see (The Origins…, 1995)). This model of social transformation is based on a series of propositions, the main ones being the following:

1. Control over raw materials was the source of elite power.
2. Metal production was invariably commercialized.
3. Specialization and social divisions within society were a consequence of the development of metallurgy.

Some other researchers have criticized the simpler version of this technological determinism, maintaining that factors such as a favorable economic and social life were often as important as, if not actually more important than, the technological preconditions for the adoption of a particular technology (Renfrew, 1978; McGlade J., McGlade J.M., 1989). Such a dependence on the way a technology is accepted socially not only means that the same invention will not always lead to the same cultural transformations, but also that previous ways of life might play a crucial role in the development of the phenomenon. This brings us back to information about the initial system of subsistence and particular to archaeozoological materials.

In two corners of Europe – Iberia and the East European Steppe (EES from here onwards), in the Bronze Age two very different situations existed in relation to the development of metallurgy.

For the Iberian Peninsula, the model originally put forward by Lull (1983) for the El Argar – the most representative of the Bronze Age cultures – has gained wide acceptance despite some serious drawbacks (Gilman, 1981; Chapman, 1984). Lull's model includes all the general propositions put forward for the Bronze

Age of other parts of Europe, while adding the following specific ones:

4. Cultural expansion proceeded from the coastal zone of Southeast Iberia into the hinterland and was triggered by the need to exploit new sources of metal.

5. Economic organization was based on the existence of specialized communities carrying out complementary activities (mining, food production, etc.).

6. Intensive metallurgical activities eventually led to a crisis in the southern part of the peninsula involving the exhaustion of mineral resources and the deforestation of the environment.

All of these propositions are interconnected, and even the most general ones are amenable to analysis and testing. Of special importance to us are the propositions connected with archaeozoology to a greater or lesser degree. Many years ago one of the present authors demonstrated that the faunal data invoked by Lull and others to support the ecological crisis due to intense deforestation in Southeast Iberia in the Late Bronze Age were not only inconclusive but also grossly misinterpreted (Morales, 1990). Some time later, Montero (1993), in his very thorough analysis of El Argar metallurgy, substantiated its local character and showed its questionable role not only in the origin and consolidation of an elite in Southeast Iberia but also in the origin of any ecological crisis during the Bronze Age in that region.

Contrary to Lull, most of the propositions put forward for the EES seem to rest on firm ground. The Bronze Age here witnesses the correlation of mining and metallurgical activities with a shift in the settlement patterns whereby previously nomadic animal breeding populations became sedentary (Chernykh, 1992; Černych et al., 1998). Such a shift is not only marked by a spectacular increase in the number of sedentary sites during the Bronze Age but also by the development, by the Late Bronze Age, of a very homogeneous cultural entity – the Srubnaya (Timber Frame), spreading from the Dnieper River in the west to the Ural River in the east. The Srubnaya entity does not exhibit any clear social differentiation trends within the society, its economy firmly anchored to cattle breeding and mining metallurgy (for the discussion of the faunal features of the Srubnaya see (Morales, Antipina, 2000, 2003; Antipina, Morales, 2005)). Thus, the "social effect of metallurgy" postulated for Western Europe didn't work always in the same way.

Despite the lack of evidence of social complexity or elite power control, metal and mineral ore did circulate widely among sites located within the EES, most of which record traces of metallurgy (Chernykh et al., 2002). Over such a homogeneous background, two sites stand out by virtue of their huge scale of production:

– Gorny, located in the Kargaly mining region close to the Asian border, in the Southern Ural steppe. It has been postulated that this area was the sole provider of copper for the Volga-Ural area of the Srubnaya entity. Gorny is thus important in terms of ore production, with metallurgy carried out on a far more reduced scale probably to cover local needs (Chernykh, 2000; Kuzminykh, 2004).

– The economy of the Mosolovka settlement, located in the Upper Don region in the forest-steppe landscape, far to the west of Kargaly, was specialised for metal working (Pryakhin, 1996).

Two (2 and 5) of the aforementioned propositions are amenable to further exploration from an archaeozoological standpoint. The main aims of this paper are to explore whether any traces of specialization connected with metallurgy and detected in both Srubnaya and El Argar-type sites could have influenced animal husbandry strategies, and to examine the use of animals and their remains for utilitarian and non-utilitarian purposes.

If traces are recorded on the archaeozoological materials, we would like to discuss some of their consequences and to explore the application of animal bones in future studies of social and technological complexity.

Materials and methods

Before presenting specific archaeozoological data, we will consider some of the propositions being tested.

If the onset of mining and metallurgy triggered the appearance of specialized sites devoted to these activities, one should expect some kinds of archaeozoological signatures to appear in the faunal remains. Such signatures should include, at the very least, three types of evidence.

1. Food consumption. If one considers mining and metallurgical sites as communities devoted to the production of inedible products (ore or metal), then it should be assumed that most of the edible items must have reached the settlement through trade/exchange. If this is the case, then it is likely that the range of edible items is less than at sites where food is being produced. Such reduction should affect edible items in different ways so that the ones most easily produced or most common in the region should be in the overwhelming majority in these places. In other words, a reduction in diversity can correspond to the dominance of a few products. The import of foodstuff into mining-metallurgist sites, often from distant places, could occasionally result in the appearance of exotic species in floral and faunal remains, and of unusually looking breeds of animals in faunal samples.

Many lines of evidence indicate that meat consumption was significantly higher at metallurgical and mining sites at this time in the EES (Kozlovskaya, 2002a). The

reasons for this may have to do with meat being a more energetic foodstuff for people engaged in heavy work, but may also relate to the social status of miners in their societies (Chernykh, 2000).

On ethnographic grounds, one can see that social status of a man can be marked by meat consumption. Even in "egalitarian" societies, meat consumption differed between men and women (Kozlovskaya, 2002b).

The evaluation of meat consumption can be indirectly analyzed not only through the taxonomic spectrum of the osteological collection but also by the study of the skeletal spectra, age-sex composition of the samples and the analysis of the butchering traces.

2. Bone tools production and bone processing. In spite of the appearance of metals, throughout the Bronze Age, implements made of bone were fairly common (at El Argar-type sites only 15 % of metal artefacts are classified as tools (Montero, 2002), whereas at places like Gorny this value rises to 22 % (Kuzminykh, 2004)).

If bone tools were important in mining, one could assume that the toolkits from mining/metallurgical sites might exhibit differences from those of farming/ stockbreeding sites. Thus, in the case of mining, instruments such as chisels should be in high demand. For metallurgical activities, bones were apparently used to produce special tools associated with the pumping of air into ovens but also as a substrate in cupellation activities or simply as fuel. The involvement of bones in mining and metallurgical operations should result in the presence in osteological collections of a substantial number of remains fragmented in a standard way.

The question of bone use by miners and metallurgists can be resolved through the analysis of bone tools, traces of processing, and calculation of burned bones in contextually defined areas of the settlement, etc.

3. Ritual use of animals. Life in both mining and metallurgical communities was characterized by a high level of ritual activity. The reasons were not always clear though it is evident that mining is a very risky activity. In metallurgy, the process of transformation of ore into metal can be seen as something marvellous and magical. That is why finding of traces of ritual practices with animals, including ritual butchering, in such societies seems to be quite natural (Walter, 1937).

Evidence of ritual practices can be recorded through patterns of skeletal profiles or specific cut-marks and other signs on certain bones, the analysis of animal burials and of ritual objects (amulets) associated with the fauna. In any case, though, it is necessary to take into account archaeological context and other independent information.

For the archaeozoological analysis we have taken the materials from only two sites. Archaeologists consider them to be salient examples of specialization connected with mining and metallurgy. The choice was done on the basis of sampling, comparability, and the quality of available archaeological and archaeobiological information. Osteological collections from the sites of Peñalosa (Jaén, southeast Spain) and Gorny (Kargaly, Southern Ural, Russia), in spite of the differences that will be discussed below, have been studied by us using almost identical procedures.

As we got the initial data directly, we know all about their limitations and potentialities as well as those small details that never appear in faunal reports, though they may offer interesting hints for further analysis (Breton, Morales, 2000; Antipina, 2004b).

Peñalosa

The site of Peñalosa (38°10' N; 3°47' E) lies in Andalusia in the middle of a broad territory on the southern slopes of the eastern Sierra Moreno. This area featured a wealth of polymetallic sites and metallurgical activities during the second millennium BC (Proyecto Peñalosa, 2000). The village is spread along a shale promontory on the right margin of the presently dammed Rumblar River in the form of three terraces and a fortification above them.

The earliest layer of Peñalosa dates from the Late Neolithic. After the main phase of occupation during the Bronze Age, there were two sporadic occupations during Roman times and the Middle Ages. The main occupation dates from the time of the El Argar culture, spanning from 1500 – 1300 BC (Ibid.).

The excavations covered an area of approximately 1200 sq. m, and the depth of the Bronze Age layers ranged between 0.5 and 1 m. The damming of the Rumblar River affected the nature of the excavation; the lower terrace lies regularly below water for half of the year, whereas the middle terrace is only occasionally inundated and the upper terrace and fortification are never so. As expected, this influenced the condition of the faunal remains.

Peñalosa is clearly a complex site. Thorough excavations (involving flotation of the sediments) have retrieved large quantities of botanical remains of cultivated and wild plants, as well as bones and various archaeological materials that indicate the existence of a diversified economy including agriculture. All areas of the village contained individual graves within the houses in the Late Bronze Age cultural tradition.

Judging by the structure of the site, its architecture and the artefacts found, metallurgical production took place all over the site and smelting was the main activity (Moreno et al., 2003). Archaeometallurgical specimens recovered from the site represent all stages of the metallurgical process, from the mineral extraction to

the final manufacture of products. Cupriferous minerals found at this settlement, however, generally appear as very small fragments. Such minerals have also been found in the process of transformation where a heat source was used to get them ready for the fusion process.

The site investigators hypothesize the existence of social stratification based on possession and utilization of metal at such "top-level metallurgical centers like Peñalosa" (Ibid.). Their argument, however, is founded on differences between funerary goods such as daggers, swords, and personal adornments (Cámara, 2001). According to Contreras and Cámara (2002), these differences correlate strongly with those among the dwellings, for only some houses show signs of mineral storage areas, consumption of large animals (bovine and equine), and an abundance of decorated ceramics. For these reasons, the authors conclude that at Peñalosa, metal became a symbol of status despite the fact that metallurgy has been documented in all dwellings. Metal was also used for utilitarian purposes, since in addition to punch tools, needles and awls, "the presence of cutting elements used in the quartering of animals has also been indirectly documented" (Moreno et al., 2003).

The importance of Peñalosa in the interregional commerce of metal is evidenced by the presence of ingots "intended for accumulation and circulation" (Ibid.). However their sizes in photos raise doubts about their function.

Although the faunal analysis of the osteological collection from Peñalosa was published quite recently (Breton, Morales, 2000), a preliminary report appeared in 1992 (Contreras et al., 1992). In order to facilitate the comparison with Gorny, we have undertaken here a review of the materials including the separation of the unidentified fraction into large and medium-sized mammals as well the recalculation of the abundance estimates, the calculation of the fracture index, and a detailed microspatial analysis of the remains.

Gorny

Gorny is a Srubnaya mining and metallurgical site located on a hilltop in the Kargaly mining area (52°15' N; 54°46' E). The richest accumulation of minerals lies in a patchy series of veins under some 10 – 12 m of shale deposits, which led to the development of a complex multi-story system of galleries as well as a "lunar" landscape of craters of varying sizes (Chernykh, 2002).

The excavated area equals 1208 sq. m, constituting approximately 3 % of the settlement territory. Cultural layers, 2 to 2.5 m thick, contained a vast collection of archaeological remains attributable to the Bronze Age. Approximately 2.5 million animal bones have been found there, probably representing the largest faunal sample thus far studied in the world (Chernykh, 2004).

Two stages of occupation have been recorded at Gorny. The brief earliest stage (phase A) is represented by a seasonal occupation site, where miners lived in small dwellings ("pit dwellings" or "dwelling burrows") accommodating three or four people. The second stage (phase B) demonstrates a shift to sedentary life as well as an intensification of production activities. Archaeologists have been able to document that the miners built new trenches for permanent dwellings, while ore and smelting yards stood directly on top of abandoned and intentionally filled former dwelling spaces (trenches). Radiocarbon dates allow one to recognize the end of the occupation at Gorny, set between 1690 – 1390 BC, but do not allow one to define the boundaries of the A and B stages (Chernykh, 2002).

Essentially all of the materials at Gorny, including ceramics, metal, slag, bone tools, animal remains, etc., retrieved through manual sorting of the sediments as well as during several instances of sieving and flotation, reflect the gigantic scale of mining activities throughout the occupation period. A homogenous use of animals during both phases can be traced (Antipina, 1999, 2004b); no evidence of agriculture has been recorded (Lebedeva, 2004). On account of this, it has been hypothesized that the subsistence economy was based on a trade/exchange system (Chernykh, 2002; Antipina et al., 2002). At Gorny, the traded item was essentially ore, whereas for the neighbouring stockbreeding tribes the exchange involved cattle, their main source of wealth.

This model has been confirmed by independent data sets, including the presence of significant amounts of ore in a specific "ore yard" and in a ritual trench, the extensive amount of copper impregnation in all of the animal bones that rendered a characteristic bluish-green stain to their surfaces, the gigantic dimensions of ore production at Kargaly during the Bronze Age, the wide circulation of ores from the Kargaly region throughout the EES during this time period (Chernykh, 2002), and, finally, the peculiar age-sex structure and the variability of sizes of individuals within cattle populations (Antipina, 1999, 2004b).

In spite of the large differences in the sizes of the faunal samples, there are good reasons to compare Peñalosa and Gorny:

1. Although the cultural strata are deeper at Gorny, the excavated areas are almost identical in both sites (i.e., approximately 1200 sq. m).

2. Estimates of the number of people living during any particular moment at these settlements lie within a comparable range of some 100 – 150 inhabitants for Gorny (Chernykh, 2002) and between 200 – 300 for Peñalosa (Proyecto Peñalosa, 2000).

3. Both sites were permanent occupation places at essentially the same time and for equivalent lengths of occupation (i.e., 1700 – 1400 BC vs. 1500 – 1300 BC). In addition, both are located within territories rich in mineral ores, in mountainous areas with continental climates characterized by hot, dry summers and cold, humid winters (though at Gorny, the winter temperatures (the January average temperature, –20 °C) are far more extreme than are those at Peñalosa).

4. Both sites have been thoroughly excavated by similar methods and, equally important, both faunas have been studied by us following very similar analytical procedures. Contextually, both faunas represent leftovers from meals.

5. The studies of both sites have been completed by now (Ibid.; Chernykh, 2004), so that not only are the context and general economy well established, but there are also detailed data on the pollen, seeds, metals, sediments, human remains, micro-spatial aspects, etc. of both settlements that provide a reliable interpretive framework for the data obtained on the faunal remains.

In addition to the general protocols concerning identification, quantification, osteometry, age and sex structure, recording of pathology, butchery marks, etc., the comparative analysis also included two additional techniques having to do with the recording of the natural preservation of the bones and their fracture patterns.

Recording the condition of the bones has been carried out following a qualitative approach that combines Behrensmeyer's classical weathering stages (Behrensmeyer, 1978) with our five-mark coding of natural preservation for the fracturing of bones (Antipina, 1999). These stages have proven useful in our analysis of the Gorny and Peñalosa remains.

The second protocol we have used is the fracturing index (FI), which is simply defined by the number of remains (either identified to species (NISP), unidentified or total) in a standard volume of 1 dm^3 (Ibid.). This index has been estimated for the NISP and unidentified bone fractions from many sites in Russia, ranging from the Neolithic to the Middle Ages, so that comparisons can be now made against a diverse background of contexts.

The skeletal spectra and abundance analyses have taken the number of remains (NISP) into account and, occasionally, NISPs have been normed (NNISP) (Grayson, 1984; Lyman, 1994). Context and micro-spatial information have always been taken into account, but data are presented according to the main excavation units. In the case of Peñalosa, these included the three terraces and the fortification. At Gorny, the four stratigraphic stages correspond to chronological phases.

For the main domestic and wild taxa, the skeletal spectra have been framed against theoretical frequency distributions in order to test for similarities and

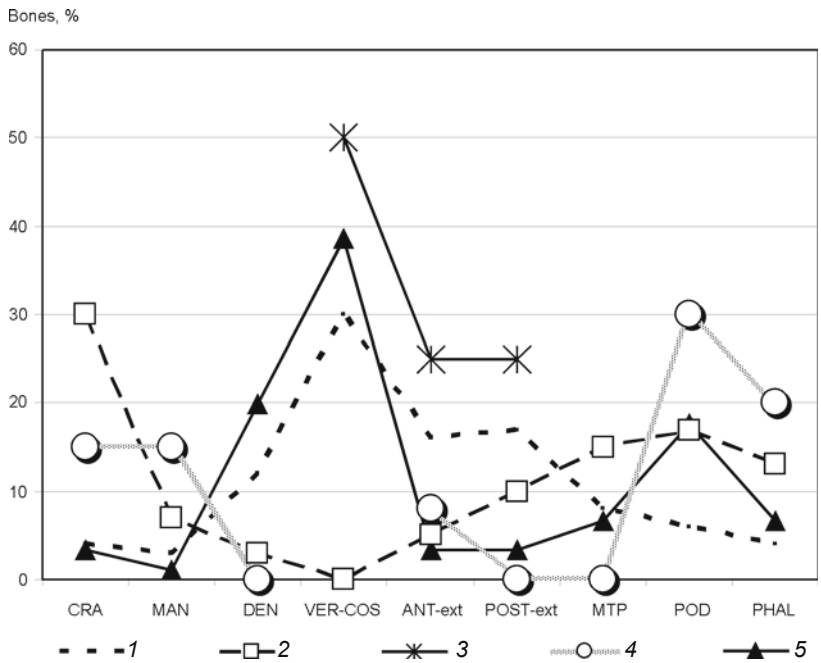

Fig. 1. Skeletal profiles of four models of bone frequencies described in the text (*1 – 4*) and the bone frequencies of the various skeletal portions in a single ungulate skeleton (*5*).
Models: *1* – kitchen; *2* – hunting; *3* – trade; *4* – ritual.
Hereafter: CRA – skull; MAN – mandible; DEN – teeth; VER-COS – vertebrae and ribs; ANT-ext – scapula, humerus, radius, and ulna; POST-ext – pelvis, femur, tibia, and patella; MTP – metapodials; POD – carpals and tarsals; PHAL – phalanges.

differences in the indicated skeletal patterns ("meaty" and "non-meaty"). These general models are only reliable when combined with data on the state of preservation, human activity traces, context and other complementary information.

Once a standard model has been defined (in our case, the average skeletal profile of a terrestrial mammal), five theoretical deviations are apparent in archaeological contexts (Fig. 1):

1. ***Kitchen model*** (for domestic mammals). Essentially defined by a significant increase in the "meaty" portions (i.e., vertebrae, ribs, fore- and hind leg bones above the ankle and knee), occasionally accompanied by a decrease of the remaining portions although in most cases these distributions do not deviate significantly from those to be found in a complete skeleton. The kitchen model implies butchery and consumption of meat directly at a site. As stated previously, complimentary data need to be considered, for sometimes some of the frequency categories become deflated for quite specific reasons (e.g., use of bones as tools).

2. ***Hunting model.*** Skeletal spectra on wild taxa exhibiting two alternatives:

a) in animals used mainly for meat this model is essentially a wild taxa version of the kitchen model.

b) when only specific parts of animals are used, there is often an inflation of non-meaty portions (e.g., antlers/skulls and metapodials) along with a deflation of the "meaty" portions.

3. ***Trade model***. Essentially, a restricted version of the kitchen model where non-meaty portions tend to disappear altogether. Such peculiarities of the skeletal spectrum can mean the import of specially prepared animal carcasses into settlements: some "non-market" parts of carcasses (skin with caudal vertebrae, heads, and distal parts of lower extremities with hooves) were separated for trade purposes. Often the procedure took place outside of a settlement. It is clear that to confirm the importation of meat, a detailed analysis of butchering marks is necessary. Even when the spectrum is completely similar to that of the kitchen model, one need to analyze age/sex structure and other peculiarities of animals, so that not to miss the results of trade delivery of live animals against the background of kitchen profile of their remains.

4. ***Ritual model***. Often restricted to a few taxa at any site, this model shows high proportions of certain bones or skeletal parts, in particular skulls, horns, scapulae and astragalus (occasionally some or all of the phalanges), most often as isolated specimens. Some segments of the kitchen profile might also indicate ritual activity. This model is based on abundant ethnographic and archaeological information (see (Svyatilischa…, 2000)). All domestic animals may be subjected to ritual practices and, among the wild species, often only the most dangerous ones are included (e.g., wild boar, carnivores). Context is vital in this case and butchery marks are also particularly helpful (Morales, 1989; Morales A., Morales D.C., 1996).

5. ***Multipurpose model***. This model is defined when a particular skeletal profile does not conform to any of the previous models and cannot be explained by preservation biases (see, e.g., (Brain 1981)).

Results

The data on faunal composition (Table 1) and FI (Table 2) indicate a series of similarities and differences at both sites:

1. The percentage of identified remains is almost three times higher from Peñalosa than from Gorny (see Table 1). Such a difference must be attributed to the differential fracture of bones and this is reflected in the FI, which is systematically higher at Gorny (FI = 105) than at Peñalosa (FI = 70). These values nevertheless indicate that the amount of fracturing at both sites is extensive, exceeding what is usual for kitchen/meal leftovers, which, based on our research on Iberian and Russian sites, usually exhibits FI values below 50 (Antipina, 1999). The state of natural preservation of the bones is not good at Peñalosa, where most score between 2 and 3, and only occasionally, 4 (Breton, Morales, 2000), so that one can most safely attribute Peñalosa's high FI values to *post-mortem* destruction of non-anthropic nature. A wealth of weathering signs and regular presence of dog bite marks support such hypothesis.

At Gorny, on the other hand, the excellent condition of preservation of the remains (i.e., systematically 5) indicates that the still higher values of the FI reflect human activity to be the main causal agent of the fracturing, a fact further corroborated by the recurrent and stereotypical pattern of long-bone fracturing through impact and by the striking absence of dog bite marks (for a description of this fracturing process see (Morales, Antipina, 2003; Antipina, 2004b)).

2. The distribution of taxa and skeletal elements appears to be more homogeneous at Gorny (Table 3), where huge sample sizes undoubtedly buffer random variation, than at Peñalosa where such variation probably biased the taxonomic spectrum at least in the smallest of the habitation units (see Table 3, 4).

3. Despite its lower diversity (i.e., five vs. eleven species) and far smaller sample size, the contribution of wild mammals is significantly higher at Peñalosa (close to 24 % of the NISP) than at Gorny, where this faunal sector is insignificant (0.2 % of the NISP; see Table 1). Even when deer antlers are removed, wild mammals would still represent 16 % of the identified remains at Peñalosa, testifying to the importance of hunting. Whether animals were hunted for meat or for other products is difficult to

Table 1. **Taxonomic composition of faunal remains from Peñalosa and Gorny**

Taxon	Peñalosa		Gorny	
	Number of bones	%	Number of bones	%
Bos taurus	354	24.2	291,260	80.6
Equus caballus	246	16.8	7565	2.1
Equus asinus	–	–	3	0.001
Ovis/Capra	377	25.8	60,932	16.9
Sus domesticus	99	6.8	1004	0.3
Canis familiaris	38	2.6	158	0.04
Domestic animals (total)	1114	76.1	360,922	99.8
Castor fiber	–	–	106	0.03
Lepus europaeus	–	–	76	0.02
Oryctolagus cuniculus	98	6.7	–	–
Ursus arctos	–	–	39	0.01
Canis lupus	–	–	2	0.001
Vulpes vulpes	–	–	257	0.1
Lutra lutra	–	–	4	0.001
Meles meles	–	–	1	0.0003
Mustela sp.	–	–	5	0.001
Sus scrofa	9	0.6	12	0.00
Alces alces	–	–	47	0.01
Cervus elaphus	230 (113)*	15.7	–	–
Capreolus capreolus	10	0.7	25	0.01
Capra pyrenaica	3	0.2	–	–
Wild animals (total)	350	23.9	574	0.2
Identifiable to species level (grand total)	1464	36.5	361,496	14.0
Mammalia (large-sized)	1450	–	2,091,192	–
Mammalia (middle-sized)	500	–	129,419	–
Mammalia indet.	582	–	–	–
Aves indet.	13	–	4	–
Pisces indet.	–	–	2	–
Unidentified (grand total)	2545	63.5	2,220,617	86.0
Grand total	**4009**	**100**	**2,582,113**	**100**

* Number in parentheses after the red deer NISP at Peñalosa refers to the number of antler fragments in the total.

say, but the fact that not even a single carnivore bone has been identified there might indicate very focused hunting activity on certain species (at Gorny, more than 53 % of the wild mammals NISP corresponded to carnivores; see Table 1).

4. Epiphyseal fusion data on cattle long bones evidence a dominance of animals over 18 months of age at both sites. Data on tooth eruption, replacement and wear stresses this second feature, for it seems clear that the strategy at Gorny focuses on subadult and young adults whereas at Peñalosa only old adults and senile specimens dominate (Fig. 2). In other words, at Gorny the targeting appears to have been for meat, whereas at Peñalosa a more diversified subsistence strategy, where a

Table 2. **Bone remains, their volumes, and FI in the stratigraphic units of Peñalosa and Gorny**

Unit	NISP	UNID	Total	Volume (NISP)	Volume (UNID)	Volume (Total)	FI (NISP)	FI (UNID)	FI (Total)
Peñalosa									
Lower terrace (UH-I, II, III, IV)	91	114	205	0.4	1.1	1.5	227.5	103.6	136.7
Middle terrace (UH-V, VI)	431	1163	1594	12	10.0	22	35.9	116.3	72.5
Upper terrace (UH-VIIa, VIIb, VIII, IX)	596	1068	1664	13.6	12	25.6	43.8	89.0	65.0
Total	1118	2345	3463	26	23.1	49.1	43.0	101.5	70.5
Fortification (UH-X)	346	200	546	10	2	12.0	34.6	100.0	45.5
Grand total	1464	2545	4009	36	25.1	61.1	40.7	101.4	65.6
Gorny									
A	9430	57,934	67,364	94	576	670	100.3	100.6	100.5
B1	75,296	462,530	537,826	787	4838	5625	95.7	95.6	95.6
B2	23,285	143,035	166,320	218	1340	1558	106.8	106.7	106.8
B3	251,075	1,542,312	1,793,387	2864	17,595	20,459	87.7	87.7	87.7
B 1–3	2410	14,806	17216	30	182	212	80.3	81.4	81.2
Grand total	361,496	2,220,617	2,582,113	3427	21,053	24,480	105.5	105.5	105.5

Table 3. **The distribution of domestic animal remains in the stratigraphic units of Peñalosa and Gorny (percentages of the total NISP of domestic taxa)**

Unit	NISP	Domestic	Species				
			Cattle	Horse	Sheep/goat	Pig	Dog
Peñalosa							
Lower terrace	84	80.0	25	7.1	42.9	22.6	2.4
Middle terrace	299	69.4	47.5	13.4	30.4	7.0	1.7
Upper terrace	455	78.2	39.8	4.0	42.9	10.1	3.2
Total	838	74.9	41.1	7.6	38.4	10.3	2.6
Fortification	276	79.8	3.6	66.0	19.9	4.7	5.8
Grand total	1114	76.1	31.8	22.1	33.8	8.9	3.4
Gorny							
A	9422	99.9	81.6	2.5	15.4	0.2	0.3
B1	75,154	99.8	78.9	1.4	19.3	0.4	0.04
B2	23,266	99.8	79.7	1.5	18.5	0.3	0.04
B3	250,740	99.8	81.3	2.2	16.2	0.3	0.04
Grand total	358,582	99.8	80.7	2.1	16.9	0.3	0.05

Table 4. **Distribution of mammal bones in the fine-scale stratigraphic units of Peñalosa**

Species	I	II	III	IV	V	VI	VIIa	VIIb	VIII	IX	X	∑ A*	∑ B**	∑ B, %
Horse	1			5	30	10	10	6		2	182	246	64	5.0
Cattle	11	1	1	8	46	96	58	122	1		10	354	354	27.6
Sheep/goat	3	6	9	18	29	62	27	149	3	16	55	377	377	29.4
Pig	9			10	14	7	6	40			13	99	99	7.7
Dog	1			1	3	2	2	13			16	38	38	3.0
Red deer	1	2	2	8	76	44	10	64		4	19	230	230	17.9
Roe deer					1			9				10	10	0.8
Wild boar				2		1		6				9	9	0.7
Wild goat								3				3	3	0.2
Rabbit	3		1	2	5	5	12	14	1	4	51	98	98	7.6
ID	29	9	13	54	204	227	125	426	5	26	346	1464	1282	100
UNID	12	7	25	70	450	710	200	858			200	2532	2532	
Grand total	41	16	38	124	654	937	325	1284	5	26	546	3996	3814	

*∑ A = total NISP
**∑ B = total NISP, excluding the fortification (habitation unit X)

living animal is more useful than a dead one, seems to have been in operation.

The systematic slaughtering of young adults and sub-adults could be taken as proof of a very specialized stockbreeding strategy at Gorny, yet two additional lines of evidence do not support such a hypothesis (Antipina, 1999, 2004b): (1) regular slaughtering of pregnant females, both cows and mares, and (2) a presence of less than 10 % old-adults (as productive females).

No stockbreeders could afford such practices as part of their husbandry strategy yet both features would conform better in the case of an export of surplus. For this reason, the hypothesis that the inhabitants of Gorny could not possibly be stockbreeders gains further support.

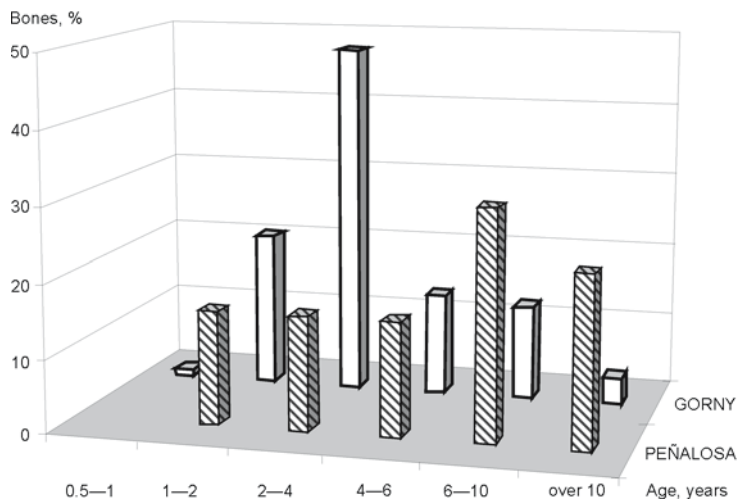

Fig. 2. Cattle age-structure at Peñalosa and Gorny based on tooth eruption, replacement and wear.

5. Skeletal profiles of cattle at both Peñalosa and Gorny conform best to the kitchen model (see Fig. 1; 3, *A*) due to an increased proportion of the upper limb (proximal) elements. But at Gorny, if we combine such a profile with the aforementioned age/sex structure data from cattle, one should reject this skeletal profile as indicative of the kitchen model and assimilate it instead with that of the trade-model.

Two significant deviations, nevertheless, include a quite striking under-representation of ribs and vertebrae at both sites as well as an overrepresentation of phalanges at Gorny. The first feature appears to have been caused by two very different agents. At Gorny, ribs (and, secondarily, vertebrae) appear to have been systematically turned into tools of various, often unexplained, functions. As a result, many were probably destroyed and thus were included as unidentified specimens in the large-mammal fraction. At Peñalosa, poor preservation together with the

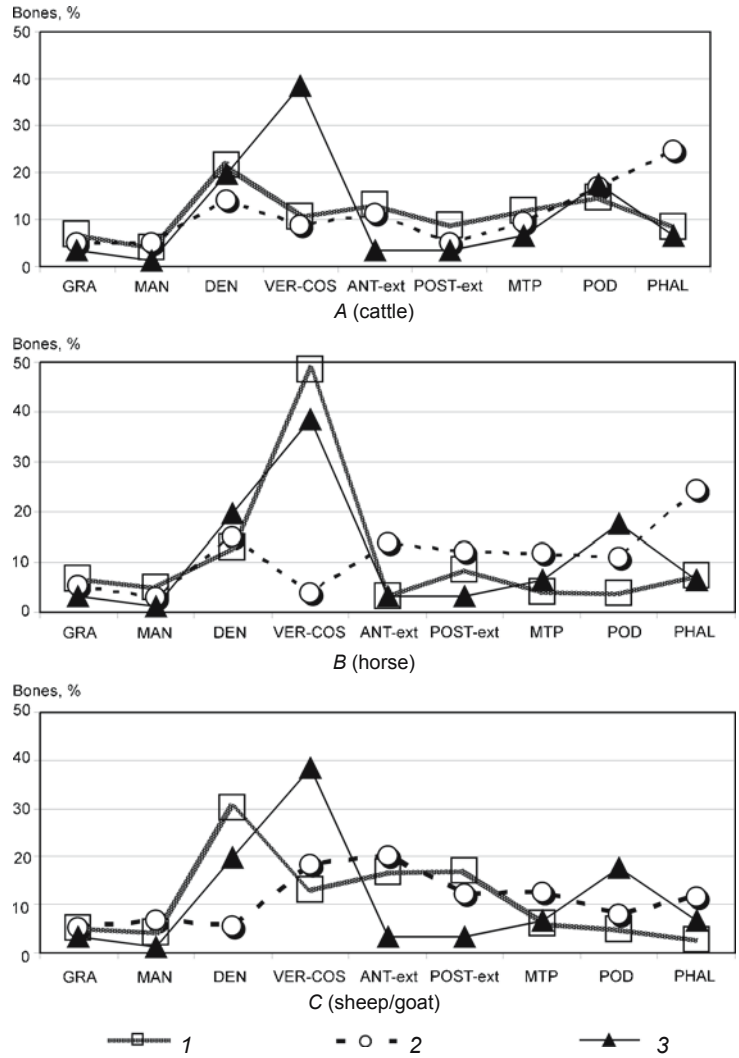

Fig. 3. Skeletal spectra from the main domestic stocks at Peñalosa (*1*) and Gorny (*2*) compared with the standard model based on one average land mammal (*3*).

equal presence of two large-sized ruminants (cattle and red deer) meant that most of the ribs and vertebrae could not be taxonomically identified and were incorporated to the large-mammal unidentified remains fraction.

The high frequency of cattle phalanges at Gorny, on the other hand, appears to be connected to a non-utilitarian (ritual) use of cattle bones (Antipina, 2004b).

6. Skeletal profiles from other domestic species – horse and ovicaprines – at both Peñalosa and Gorny conform best to the kitchen model. However, again, there is an under-representation of vertebrae and ribs for horse at Gorny and for ovicaprines in both settlements and probably for the same reasons as previously explained for cattle (see Fig. 1; 3, *B*, *C*). Once again, horse phalanges at Gorny exhibit a significant deviation from expected values probably for the same ritual causes discussed for cattle. At Peñalosa, on the other hand, horses fit the kitchen model far better including both vertebrae and ribs than was the case for cattle. In this case, the numerous rib fragments exhibited butchery marks but no traces of tool-making activities.

One can likewise infer that the kitchen model for these species reflects trade rather than stockbreeding at Gorny from the complementary data on the age and sex profiles of these stocks. These data show an almost total dominance of young adult ewes and probably adult stallions (Ibid.) that contrasts with the far more even populations of ovicaprines reported for Peñalosa (Bretón, Morales, 2000).

7. Size variation of cattle at Peñalosa is suggestive of a highly homogenous population of small-sized animals quite similar to those described for many Iberian Bronze Age sites, in particular those located on poor pasturelands as was the case there (Contreras et al.,

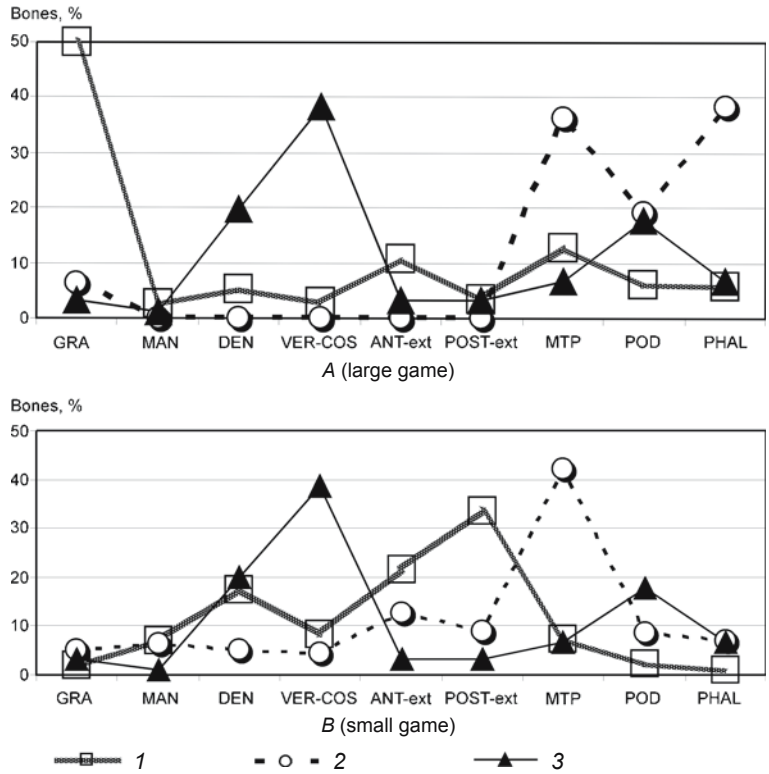

Fig. 4. Skeletal spectra of wild game at Peñalosa and Gorny compared with the standard model represented by one average terrestrial mammal. See Fig. 3 for conventions.

1992; Breton, Morales, 2000; Driesch, 1972). Gorny, in contrast, exhibits an enormous amount of heterogeneity where sizes have a normal distribution that ranges from the smallest cows documented at Peñalosa (estimated withers height around 90 cm; (Breton, Morales, 2000)) well into the range of the wild aurochs (*Bos primigenius*) from Northern Europe.

No single prehistoric site in Europe exhibits such a wide range of variation and this indicates the presence of many different "breeds" that, in the absence of agriculture, one can most parsimoniously explain in terms of an extensive network of interchange, involving the movement of many different cattle populations throughout the EES territories.

8. The very focused beef-trading economy at Gorny seems to be additionally indicated by the dominance of cattle in all of the samples (i.e., that 80 % vs. 24 % in case of Peñalosa; see Tables 1, 3, 4) and trade is further demonstrated by the presence of such exotic domestic taxa as mules and donkeys (Antipina, 1999, 2004b) and by data provided by the wild game. In this way, if one takes into account that all of the recorded remains of elk (*Alces alces*) belong exclusively to two individuals and never during the Holocene was the Southern Ural steppe region part of the elk habitat, these bones reinforce the connections through trade/exchange of Gorny's inhabitants with their neighbours from the northern forest-steppe territories where elk was numerous (Antipina, 2004b). At Peñalosa, the absence of "exotic" species as, for example, marine shells or fishes from the Mediterranean such as those that have been now documented at other inland sites of the El Argar culture (Driesch, 1972; Lauk, 1976) could reflect a far smaller (restricted?) scale of animal exploitation strategies.

9. Skeletal spectra of wild game, with the exception of rabbits, large and small game at both Gorny and Peñalosa, conform to the second version of the hunting model showing use of wild animals for reasons in addition to the procurement of meat (see Fig. 1, 4). In the case of Peñalosa, the dominance of red deer antlers (113), all apparently shed (Breton, Morales 2000), suggests winter collecting. Antler, amounting to 50 % of the red deer sample, was probably sought to a greater extent than meat. It is important to stress that no bone tools made of antler have been ever found at Peñalosa and this could be taken to indicate the export of such items outside the settlement. Equally plausible (and equally unprovable!), however, one should not forget that deer antlers have been systematically used as rudimentary ploughs by early agrarian people (Krasnov, 1971). The dominance

Table 5. **Selected features of faunal samples from Peñalosa and Gorny**

Features	Peñalosa		Gorny	
	Number	%	Number	%
Dog bites	57	4	–	–
Copper impregnation	4	0.3	325,346	90
Animal graves	–	–	6	–
Bone amulets	–	–	512	–
Bone tools	30	2	22,173	6.1
Mining bone tools	–	–	9940	45 of tools
Burned bones	80	5.5	650	0.2
Chop marks	115	8	>600	0.2
Cut marks (metal)	18	1.2	> 20,000	5.5
Fractures (impact)	100	7	> 60,000	17
Draught pathologies (cattle)	1	0.1*	57	0.02*
Draught pathologies (horse)	1	0.1*	20	0.01*
NISP	1464	100	36,1496	100

* Proportion of NISP of cattle or horse.

of elk metapodials and phalanges at Gorny, on the other hand, was connected with their importance for making tools, as providers of very resistant skin, and also for ritual (Antipina, 2004b).

A final series of the recorded differences between the sites is presented in Table 5. Since these differences do not strictly refer to subsistence strategies, they will be considered in a wider context.

Discussion

From what has been presented thus far, it appears that Gorny and Peñalosa represent, from an archaeozoological standpoint, two very different economic situations within the mining and metal production world of the European Bronze Age. Thus, whereas the fauna from Gorny has taxonomic and biological features consistent with the importation of animals, the fauna from Peñalosa is indicative of local production in an agrarian world where meat provided by the domestic stocks apparently constituted a secondary contribution to the economy.

No evidence of social stratification has been detected at Gorny, despite the enormous scale of its mining production. This, obviously, can be taken to indicate that economic organization in the EES was based on the existence of specialized communities.

At Peñalosa, where no such specialization has been detected, both mining and metallurgy were apparently carried out at a quite modest scale and combined with farming. On the other hand, social stratification was evident. As previously stated, such differences were established on the basis of metallic objects associated with individuals in graves as well as with different items in various dwellings, since "only some of them show signs of mineral storage areas, consumption of large animals (bovine and equine) and an abundance of decorated ceramics" (Moreno et al., 2003).

The examination of special areas for consumption of large ungulates has showed once more that the arguments favoring social differences based on fauna are rather weak.

Table 4 demonstrates that the distribution of animal remains in the different dwellings of Peñalosa is far from homogeneous, but the reasons for this need not necessary have to do with social factors. Actually, there is correlation between total NISP and the number of taxa ($R = 0.75$) and cattle NISPs ($R = 0.73$) per dwelling. This indicates that the presence or abundance of cattle remains may be explained by the sample size rather than by other, less parsimonious, causes.

In the case of horse, on the other hand, the very low correlation of its samples with overall sample size ($R = 0.48$) indicates a more irregular distribution of remains. Indeed, Table 4 indicates that nearly 75 % of

the horse bones were retrieved in the fortification area, and thus there may be some reason to support social stratification on archaeozoological grounds. As it turns out, the horse sample from the fortification constitutes a quite peculiar collection. The skeletal composition indicates the presence of almost complete skeletons from three individuals (one subadult and two adult) where only the scapulae and metapodials are missing. The presence of multiple butchery and cut marks on the vertebrae, ribs and tarsals reflect an intensive and stereotyped pattern of defleshing. Finally, the exceptional state of preservation of the bones (4 on our previously defined scale), absence of bite marks, etc. contrast with the condition recorded for the Peñalosa bones in general and testify to a rapid deposition of the remains (Bretón, Morales, 2000).

For all these reasons we believe that the horses from the fortification area reflect a very brief episode in the site history and it would be methodologically unsound to consider them together with the other animal samples, whose taphonomic history appears to be quite different. Arguing for the presence of aristocratic elite on these grounds would be risky.

In fact, other lines of evidence at Peñalosa speak against bovine and equine consumption as a practice of the elite. In this way, not only are cattle remains at their lowest in the fortification, but horse and cattle remains exhibit a negative correlation ($R = -0.37$) among the dwellings. Perhaps more significant, when the fortification data are taken out of the analysis, this correlation is nil ($R = 0.07$) indicating that the horse and cattle remains follow independent trajectories at Peñalosa.

Moreover, one needs to note the independence of additional data – old ages of the cattle, the abundance of rabbits in the fortification area, and other evidence. Thus, again we suggest that the distribution of neither horse nor cattle remains implies social differences at Peñalosa. In fact, if one were to ignore the episode of the horse consumption at the fortification, the Peñalosa stockbreeding strategy would be typical for any Iberian Bronze Age farming community (Driesch, 1972; Harrison, 1985).

With respect to lifestyles, one should mention the significant evidence of ritual practices involving animals at Gorny but not at Peñalosa (see Table 5). It makes sense that ritual slaughtering, bone amulets and animal graves could be indicators of the need for protection in a world where life was permanently at risk and where pure luck often determined both success and disaster. Their absence in Peñalosa is not strange in the sense that none of the equivalent Iberian faunas exhibited such traits. This fact is more revealing of the "average" condition of the Peñalosa fauna for Southeast Iberia than of its contrasts with the East European Steppe world, and it indirectly stresses the differences between a farming community and a specialized metallurgical community.

Two "faunal" lines of evidence reveal the different scales of mining and metallurgical activities practiced at both sites (see Table 5). They are the copper impregnation in the faunal remains (0.3 % of the sample at Peñalosa vs. 90 % at Gorny), and the bone tools associated with mining (none at Peñalosa, close to 10,000 at Gorny).

Both reinforce the idea that, contrary to what has been proposed, Peñalosa's scale of mining and metallurgical production remained modest and could not be properly considered as that of a "top-level metallurgical center" (Moreno et al., 2003) on archaeozoological grounds. This is obviously not the case for Gorny.

Conclusions

The main goal of this research is to test whether, from an archaeozoological standpoint, the specialized metallurgical economy determines the whole economic organization of the society. At first glance, we obtained ambiguous conclusions.

Lull's presupposition that during the El Argar period, the economy of the Iberian Peninsula implied the existence of specialized communities, was not supported by the archaeozoological materials from "such a highly developed metallurgical center" as Peñalosa. But, as for the EES, the archaeological collection from Gorny – a specialised settlement of miners and metallurgists of the Late Bronze age – clearly testifies to the existence of specialized communities supplementing each other in various ways: some were producing ore, while others produced food.

Furthermore, faunal materials from Peñalosa failed to reveal even hints of trade or exchange activities there, but the thesis of invariable commercialization of mining-metallurgical activity was supported by the archaeological materials from Gorny.

Such ambiguous results reflect, first of all, the Peñalosa archaeozoological information and its inconsistencies with archaeological reconstructions of status and economy at the settlement. There are two ways to explain this. One may accept such "inconsistencies" at Peñalosa either by deciding that the site was not a part of the El Argar world, as archaeologists see it, i.e. as a highly developed specialized metallurgical center with an elite group living there. Or, one may conclude that faunal data cannot be properly used to resolve such questions. The former way seems more reliable, but we cannot reject the latter without inspection. By doing so, one would not only be dismissing the validity of the features detected at Gorny, but one would also be forced to reject the great similarities existing between the faunas from Peñalosa and those from well documented El Argar-type settlements such as Fuente Alamo, Los Millares or Cerro de la Encina (Driesch, 1972; Driesch, Boessneck,

1985). At this last site, for example, the data even revealed an episode of horse consumption very similar to the one documented at Peñalosa. Thus, before dismissing archaeozoological evidence as irrelevant to address the issues at stake – in particular the triggers for complex social stratification not only in Iberia but also throughout Europe – one should analyze the extent to which clear and reliable faunal information will correlate with other archaeological data at each individual site.

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DISCUSSION

ISSUES IN THE STUDY OF PREHISTORIC ART

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ON THE MEANING OF CERTAIN STYLISTIC FEATURES IN THE FACES OF ANCIENT TURKIC SCULPTURES

Introduction

Ancient Turkic sculptures include representations of men, armed or not, holding a vessel, as well as those of separate heads and faces, and a few figures holding vessels, with arms uplifted to the breast. In many instances, the faces are stylized. The eyebrows are often connected and form a single relief with the nose. Sometimes, the T-shaped configuration of eyebrows and nose combines with large eyes. Due to stylization, sculptured faces are hardly realistic, i.e. they do not represent specific human faces. It appears that stylized elements were meaningful.

Distribution of the T-shaped relief rendering eyebrows and nose and the origin of this feature from a technological standpoint

A T-shaped configuration of eyebrows and nose similar to that observed on sculptures has also been recorded on cast bronze "masks" (Sher, 1966: 67; Kyzlasov, Korol, 1990: 129) as well as on wooden heads of Eezi* (Ivanov, 1979: 185 – 186, fig. 179). The combined bas-relief of eyebrows and nose is also typical of medieval Oriental coroplastics and toreutics (Meshkeris, 1962: pl. VI, *69*, *77*; X, *112*; XVI, *299*; XVII, *304, 305*; XVIII, *315*, *317*; XXIV, *364*; XXV, *365*, and others; Marschak, 1986: fig. 32, 33, 193, 198; Trever, Lukonin, 1987: fig. 26, and others) (see *Figure, 5*). The combination of "eyebrows–nose" and large eyes seen on Turkic sculptures, especially Western Turkic ones*, also occurs in specimens of Sogdian and Iranian coroplastic and toreutic art; it is also present on a golden jug from Nagy-Szent-Miklós, Hungary, and on medieval cast "masks" (Meshkeris, 1962: pl. XVII, *304*, *305*; XVIII, *315*; XXIV, *364*; XXVIII, *374*; XXIX, *378*, *379*; Trever, Lukonin, 1987: fig. 18, 22, 32, 34; Kurmankulov, 1980: fig. 3, *2*; Kyzlasov, Korol, 1990: fig. 43, *2*; Haussig, 1992: fig. 114) (see *Figure, 4*).

The stylized T-shaped representations of eyebrows and nose were widely distributed in both time and space. Examples are heads from Lepenski Vir (Serbia), Ancient Mesopotamian sculptures, those of Celts and Mixtec, etc. This stylistic feature is compatible with various materials, although it appears the most appropriate for plastic substances used for application, molding, and casting. Casting with the usual technique of filling the mold with molten metal required a relative simplicity of the mold or of the model, lack of complex profile or small details on the surface (Weinstein, Koreniako, 1988: 48). This condition must have been met by matrices for making clay figurines. In both cases, the merging of certain details was motivated by technology**. Perhaps the T-shaped relief representation of the eyebrows and nose on Ancient Turkic stone sculptures was borrowed from techniques used in sculpturing from plastic materials. Modifications of this technique on stone sculptures resulted in the counter-relief and contour rendition of eyebrows and nose as a single feature.

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* Eezi is the drum spirit-master in Altaic traditional culture.

* Those found on the territory of the Western Turkic Kaganate.

** The iconography of wooden sculptures of Eesi apparently derived from metal prototypes, as evidenced by metal overlays covering the eyebrows and the nose (as a solid piece), as well as the moustache, the mouth, and the beard (Ivanov, 1979: 98 – 99, 101).

Morphological analysis of the T-shaped figure rendering nose and eyebrows on Ancient Turkic sculptures

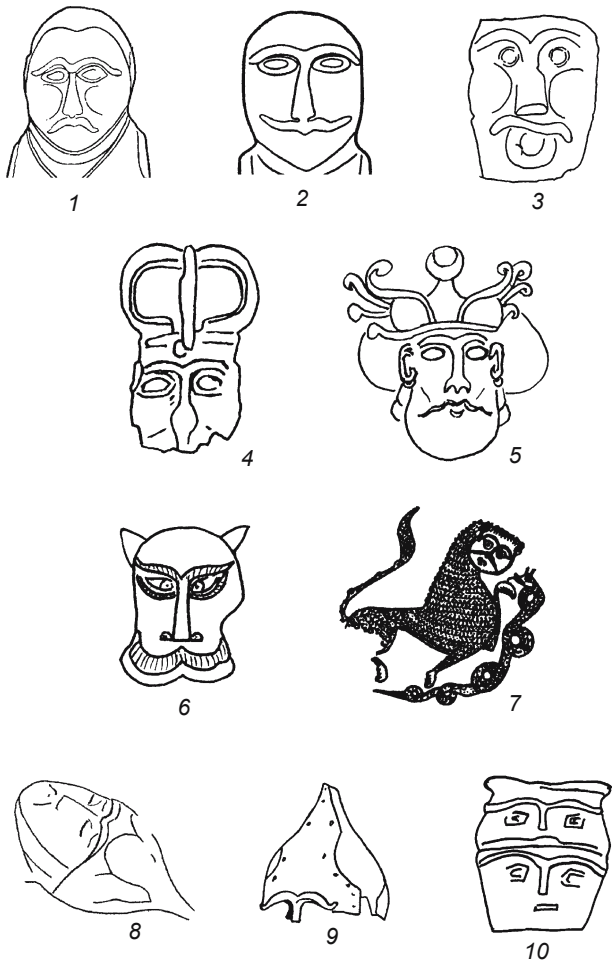
Discussing the solid relief feature representing eyebrows and nose on Ancient Turkic sculptures, Ya.A. Sher (1966: 66) paid special attention to the way in which the eyebrows were rendered. As he noted, the stylization of the eyebrows was a peculiar technical and artistic feature: they were shown as a single wavy line with a downward bend above the nose and upward bends above the eyes. The tips of the eyebrows were bent upward in an unnatural manner. Sometimes, connected eyebrows were separated from the nose, but more often they formed a single relief with the nose. On some sculptures, the eyebrows, while being connected with the nose, were distinct from it (Ibid.: pl. VII, *31*; VIII; IX, *39*) (see *Figure, 1*).

Based on Sher's observation, it can be hypothesized that the T-shaped feature in rendering eyebrows and nose on Ancient Turkic sculptures refers to the stylization of eyebrows drawn together.

Sher suggested that the stylization of eyebrows on Turkic sculptures might be meaningful (Ibid.: 67). He cited the Chinese chronicle *Beishi* as saying that certain citizens of the Yueban state had practiced a special custom with regard to eyebrows. They trimmed their eyebrows and smeared them with flour paste to make them glossy (Bichurin, 1950: 259). In Sher's opinion, repercussions of this custom are present in the Kazakh *Legend of the Dead and Living Men and of their Friendship.* The dead hero is described as a young man with beautifully painted eyebrows (Valikhanov, 1985: 66). More examples can be cited to support the idea that beliefs related to eyebrows were spread among Turkic peoples in various epochs. Thus, in an Ancient Turkic epitaph in honor of Kul-Tegin, Bilge-Kagan complains that the eyes and eyebrows of his subjects would be "damaged" by crying (Malov, 1951: 43). The hero of the Turkmenian epic *Gor-Ogly* chants praises of his beloved's beauty in the following words: "I would turn the earth which she treaded into paint for my eyebrows" (Gor-ogly, 1983: 436). One of the traditional women's ornaments worn in western Central Asia was *koshi-tillo* (from Turkic *kosh*, "eyebrows") with a representation of eyebrows drawn together (Sukhareva, 1982: 100, fig. 25), etc.

The meaning of connected eyebrows in the western Central Asian tradition

O.A. Sukhareva has tried to explain the meaning of connected eyebrows in western Central Asian cultures. In her words, according to an ancient tradition, such



Medieval parallels to stylistic features of faces on Ancient Turkic statues.
1, *2* – Ancient Turkic stone sculptures (after (Sher, 1966)); *3* – ceramic mask of a demon-warrior (after (Jisl, 1970)); *4* – bronze buckle (after (Kurmankulov, 1980)); *5*, *6* – details of silver dishes (after (Marschak, 1986)); *7* – representation on a ceramic dish (after (Danilenko, 1991)); *8* – detail of a wall painting (after (Belenitsky, 1973)); *9* – iron helmet (after (Gorelik, 1993)); *10* – bronze mask (after (Dautova, 1980)).

eyebrows were viewed as an indicator of beauty. They are represented on heads topping the lids of ossuaries, as well as on a bas-relief face decorating a terracotta vessel from Kafyrkala, and on miniatures in medieval books. Characters of the miniatures displaying such eyebrows include a beautiful maiden to whom the poet Navoi recites his poems; a beautiful maiden receiving Sheibanikhan's message; and a handsome boy with a falcon (Ibid.: 118). This interpretation is hardly complete. One can compare this with a belief recorded by R. Karutz (1910: 135) on Mangyshlak, the eastern Caspian coast, in the early 1900s: connected eyebrows bring luck both to a man, who will marry a beauty, and to a woman, who will be loved by her husband.

Connected eyebrows on medieval representations of warriors and demons

Discussing the meaning of connected eyebrows on Ancient Turkic sculptures, one should remember that most of these represent warriors. The same feature is present in other medieval representations of warriors as well. Connected eyebrows are painted on the helmet of a defeated warrior in a battle scene on one of the Pendzhikent frescoes (Belenitsky, 1973: fig. 28, 29) (see *Figure*, *8*). It can be suggested that the same feature is rendered by overlays representing eyebrows and nose on 1st millennium BC helmets found in Eurasian steppes and on adjacent territories (Gorelik, 1993: fig. 7, *5*, *14*, *21*, *23*). In a way, these overlays duplicated a facial feature of a warrior who was fighting or ready to fight, as evidenced by a bronze representation of a man wearing a helmet, from a burial ground near Kenkhi, Chechnya, dating from the 7th – 12th centuries (Dautova, 1980: 106) (see *Figure*, *10*).

In certain overlays showing eyebrows and nose as a single feature, the eyebrow tips are slightly bent upward, as on sculptures (Gorelik, 1993: fig. 7, *27*; 9, *27*) (see *Figure*, *9*). Notably, representations of cats in toreutic art display the same feature: connected eyebrows and nose as a single relief (Marschak, 1986: fig. 24, 196, 197) (see *Figure, 6*). The same feature is present on the face of a lion with a human face, killing a serpent, on a 13th-century ceramic dish from Chersonesus (Danilenko, 1991: fig. 2, *11*) (see *Figure*, *7*).

Eyebrows drawn together in a frown combined with bulging eyes is seen in medieval East Asian (Chinese, Korean, Japanese, etc.) sculptures and drawings of divine warriors and monsters (demons) (Haussig, 1992: fig. 263, 301, 304, 305, 358, etc.).

Interestingly, masks of warrior demons were also found in Ancient Turkic sites such as Tonyukuk and Kul-Tegin (Jisl, 1970: pl. 1, *2 – 4*). The Kul-Tegin mask is modeled after Chinese representations of *taoteh* (beast of prey) with eyebrows drawn together, bulging eyes, and bared teeth. Similar masks from Tonyukuk resemble faces of Ancient Turkic statues (see *Figure*, *3*).

Connected eyebrows as an epic motif

What might the joined eyebrows as part of the medieval warrior's appearance have meant? The heroic epic may provide an answer.

Joined (or connected) eyebrows on the hero's face are mentioned in epic poems of several Turkic peoples. Thus, in the Altaic heroic epic *Maadai-Kara*, the hero's wife tells him that she has given birth to a boy, who is likely to become a powerful hero:

"He has no navel, his abdomen is smooth," she said,
"His eyebrows are connected," she said,
Skins of sixty leopards
Has he tossed about
(Maadai-Kara, 1973: 269).

In Yakutian epic poems *olonkho*, joined (or connected) eyebrows of heroes are compared with voracious weasels. The morose countenance of the epic hero Niurgun Bootur is described thus:

*His long nose** looked like
The fore shank
Of a proud steed;
His long eyebrows resembled
A pair of lined-up
Gray ermines.
(Niurgun Bootur Stremitelny..., 1947: 103).

Joined eyebrows are one of the "heroic" features of the infant Khunan-Kara, whose name is eponymous to the Tuvinian heroic epic:

Between the black eyebrows on his forehead
There is black-and-white hair
Of a three-year-old dreadful leopard
(Tuvinskie geroicheskie skazaniya, 1997: 83).

In the Khakassian heroic epic *Altyn-Aryg*, connected eyebrows are a feature of a malicious woman Pora-Ninchi (Altyn-Aryg, 1988: 524). Pora-Ninchi of another epic, *Ai-Khuuchin*, is described likewise (Khakasskiy geroicheskiy epos..., 1997: 223). This Pora-Ninchi demonstrates certain heroic characteristics. A horse is unable to move her, and she is ready to fight Khan-Mirgen in case he defeats her husband (Ibid.: 261). Concerning the connected eyebrows of another malicious female character, Khara-Ninchi, V.E. Mainogasheva (Ibid.: 443) notes that in epic poems, a woman with connected eyebrows is a chthonian and demonic being.

In the Kirghiz heroic epic *Manas*, eyebrows of the enemy strong man, Atan, resemble black dogs lying with tucked legs (Manas, 1988: 385). Dzholoi's eyebrow is compared with a dreadful bird of prey (Manas, 1990: 395), and Kongurbay's eyebrows are like molting vultures (Ibid.: 352). Epic poems often mention a thundery brow

* The long nose is a peculiar feature of the Kirghiz epic hero Manas: "Should one look at his nose – / It resembles the sheath of a sword" (Manas, 1988: 430). The passages quoted hardly imply that the hero's features look Caucasoid. The same *olonkho* of *Niurgun Bootur* says that the bird Yeksiokyu, whose appearance was assumed by a shamaness friendly to the hero, had a long pointed beak similar to an icepick (Niurgun Bootur Stremitelny…, 1947: 151). According to a Kazakh saying, "The steed has large lips, and the hero has a large nose" (Toktabai, 2004: 80). A long nose peculiar to certain Ancient Turkic statues should also be regarded as a stylistic peculiarity.

(Koblandy-batyr…, 1975: 336, 362, 364). In the Tadjik epic *Gurugli* (1987: 400) attributes of power of the hero Avaz include veins overhanging the eyebrows, and each vein on his forehead is said to be trembling with rage (Ibid.: 388). Veins on the brow of the furious Khongor swell (Dzhangar, 1990: 214), and when Khan Solo was on the rampage, "his eyes, resembling black lakes, bulged, and his bare forehead overhung the eyes" (Nikiforov, 1995: 78). The face of the enraged Khan Mergen, with joined brows and blood-shot eyes, emanates coldness (Ibid.: 175).

The meaning of joined eyebrows in the epic

Although the meaning of joined eyebrows is not explained in the Turkic epic, it becomes evident from the description of the hero's rage. In the epic, fury is manifested in outward signs (Gatsak, 1989: 25 – 36; Ermolenko, 2003a). The strength of the affect is metaphorized by fire or, on the contrary, by acute cold. The hero's face is glowing with fire, or, alternatively, his eyes exude cold. Rage is evidenced by signs of utmost bodily strain: the hero is said to be swelling like a mountain, his back is arched like a birch-tree, his muscles clang like a strained bowstring, his hair bristles on his crown, he changes countenance in a dreadful manner, etc. Bodily strain is evidenced by eyebrows drawn together and bulging eyes*. The epic hero's facial expression, then, is a grimace of rage.

The bow as an epic and poetic metaphor of eyebrows drawn together in fury

In the Indian epic tradition, eyebrows drawn together is evidently associated with rage: "And, having gathered his brows – *a clear sign of fury* – Pandava blew the large devadatta shell" (Mahabharata, 1993: 47). In *The Ocean of Tales* by Somadeva (11th century), wrathfully joined eyebrows are compared to a strained bow. Heroes of one of the tales "are standing silently, their faces are distorted with rage, their eyebrows are knit, as though hinting at strained bows" (Somadeva, 1982: 321). In another tale, "Vayupatha's eyebrows were curved, and it appeared as though fury itself had strained his bow to destroy his adversaries" (Ibid.: 361). Interestingly, in *The Ocean of Tales*, beautiful females are said to resemble furious warriors, i.e. those inebriated with fight: "...alcohol made the beautiful females' eyes red and their eyebrows curved, as though anger was boiling up in them..." (Ibid.: 379). Likewise, in the Arab folk epic novel *Sirat Antara*, Ardashir plies Abla with wine until her cheeks turn red and her eyebrows curve like a strained bow. "And when the wine had gotten into her head, she scoffed at the danger and began deliberating how to kill the prince even at the expense of her life" (Zhizn..., 1968: 314).

The beautiful females' eyebrows are compared with strained bows in *Shakhnameh* (Firdousi, 1993: 176). In *Gor-Ogly*, Kambar, posing as an itinerant ashug (poet), chants to the beauty Kharman-Dialy: "Your eyes are murderers, and your eyebrows are a bow" (Gor-ogly, 1983: 712).

The comparison of females' eyebrows with weapons is not accidental. Epic beauties prompted heroes to perform exploits, and sometimes they acted as the heroes' opponents in duels.

The archaic heroic epic reveals a close connection between the female's image and the idea of "ecstatic fury" and "sanguinary fight." Olga Freidenberg (1997: 74) wrote that for the archaic mind, "...the meaning of copulation was close to that of fight. <...> Based on that parallel, a rich syncretic military-erotic metaphorics eventually emerged." For instance, in Oriental poetry, the beautiful female is described as "voracious." Was this the reason why connected eyebrows were part of the Oriental ideal of beauty, and portraits of beautiful women as well as pictures of lovers, decorated hilts or sheaths of mid-18th to early 19th century Iranian daggers and sabers? (Ivanov, Lukonin, Smesova, 1984: fig. 89, 90, 96).

Wide-open eyes as a sign of the epic hero's fury

The huge eyes of epic heroes attest not merely to their gigantesque appearance, but to rage as well. The eyes of the heroes of *olonkho* are said to be round as coils of the bridle (Niurgun Bootur stremitelny..., 1947: 103) or resembling upturned copper cauldrons (Stroptivy Kulun Kullustuur..., 1985: 344). The heroes' eyes are compared with black cups (Altyn-Aryg, 1988: 281), large tea bowls (Gor-ogly, 1983: 593), black caves (Manas, 1988: 409), and lakes (Nikiforov, 1995: 76).

It can be suggested that the image of huge "gaping" eyes looking like caves, wells, etc., conforms to the belief that the hero can "swallow" his adversary with his gaze. Thus, with regard to Manas, the epic says:

> His eyes are as deep as lakes,
> And should he gaze when in a rage,
> He looks ready to devour everyone he sees
> (Manas, 1988: 442).

It is not incidental that Manas's large mouth and deep-set eyes are accentuated (Manas, 1990: 443). In epic tales which are clearly more late, realistic

* M.M. Bakhtin (1990: 351) mentions that bulging eyes attest to pure physical strain.

descriptions of eyes dilated by rage are found. Thus, the heroes of *Manas*, before felling their enemies with sabers, show the whites of their eyes (Manas, 1988: 476). In an Altaic heroic tale, the enraged Yerlik's beard protrudes like tusks, and his eyes bulge (Nikiforov, 1995: 63). When the heroine of the Tuvinian heroic tale Bora-Shelei is enraged, she is said to frown and stare, and her bulging eyes are clear as lakes (Tuvinske geroicheskie skazaniya, 1997: 347).

According to *Mahabharata* (1990: 43), in the battle, the two heroes heaped insults on each other and devoured one another with their eyes, widened by rage.

All these passages demonstrate that the artistic features of Ancient Turkic statues (contracted eyebrows and markedly large eyes) are paralleled by hyperbolic clichés describing the facial expression of enraged heroes in various epics.

Ethological parallels

The idea that epic descriptions of facial signs of anger are realistic, although exaggerated, is supported by modern human ethological studies, specifically those of emotional facial expressions and gestures (Eibl-Eibesfeldt, 1997). The communicative role of facial expression is extremely high (Ibid.: 619). According to Eibl-Eibesfeldt, expressions marking basic emotions, which are universal and include anger, grief, joy, fear, amazement, and disgust, are universal as well. Their universality is evidently due to the underlying neural and muscular mechanisms. Facial expression is controlled by both the limbic system and the neocortex. Ability to perceive emotional facial expressions and respond to them is a function of the right hemisphere (Ibid.: 663). Observations on congenitally deaf and blind children demonstrate that many expressions of anger may have evolved as adaptations (Ibid.: 528). These include the contraction of eyebrows. In many human cultures, anger is also expressed by a threatening ("withering") stare. In this expression, eye slits are dilated due to raised upper eyelids, the whites of the eyes are visible, and the eyes seem to blaze (Ibid.: 655: fig. 5.6). "Bulging eyes" enhance this effect. The computer simulation of the action of facial muscles has yielded expressions which are unrealistic, but have been registered in works of art. In a scheme compiled by P. Ekman and showing combined actions of the forehead and eyebrow muscles, one variant is a face with contracted and upraised eyebrows. According to Ekman, this combination, known from artistic representations, is unnatural (Ibid.: 632). Eibl-Eibesfeldt found it to be an expression of rage in Kabuki actors wearing grimaces with make-up. He relates such expressions to aggressive and threatening behavior.

Eibl-Eibesfeldt noted that faces of ancient and traditional apotropaic representations showing eyebrows drawn together, bulging eyes, and bared teeth, express threat (Ibid.: 123, fig. 2.56; 125, fig. 2.58; 671, fig. 6.75,*b*). Ethological observations are in line with studies of prehistoric and traditional art. For instance, R. Nenova-Merdjanova (2000: 303 – 304) has analyzed Roman anthropomorphous apotropaic images, specifically vessels for olive oil shaped as heads, busts, full figures, etc. The distinctive features of their faces are joined eyebrows overhanging the eyes, wide-open eyes, half-open mouths or turned-down corners of shut mouths, and huge or ugly noses.

The issue of the Ancient Turkic epic

Comparisons between iconographic observations and heroic epics that postdate them is based on a premise that the epic itself with its clichés, and the epic milieu* had existed during the Ancient Turkic period. M.P. Griaznov (1961) was among the first to compare the themes of late 1st millennium BC – 1st millennium AD works of art associated with various periods and cultures with themes of modern Turkic and Mongolian epics. Thereby he acknowledged the unity of the epic tradition of the steppe peoples over more than two millennia. Based on these comparisons, he dated the formation of the heroic epic to the early nomadic period and listed the principal epic themes**.

It should be remembered that eyebrows drawn together and wide-open eyes are stylistic features that are unrelated to specific linguistic communities or chronological periods. Of course, the Ancient Turks were able to recognize signs of rage similar to those described in the epics, and so were other peoples, as evidenced by a Chinese source. *Xuishu* describes the feat of the Chinese warrior Yui Giu-lo, who, in AD 589, frightened the Turks by his furious countenance. Together with several horsemen, Yui Giu-lo attacked the Turks. "Doing this, he opened his eyes wide and shouted so loudly that all the enemies lost heart"(Liu Mau-tsai, 1958: 120)***. Generally, there is reason to believe that the Ancient Turks associated gallantry with fury.

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* B.N. Putilov (1988: 17) wrote with regard to this notion: "The epic milieu is connected with the extant epic; its judgments, its social practices, and its ongoing struggle are supported by traditions of the epic world."

** E.M. Meletinsky (1963: 248 – 249) acknowledged the existence of the heroic epic among the Scythians, Sarmato-Alans, Ancient Turks, and Mongols; however, he found no evidence of the "Scythian legacy" in the epics of Siberian Turks.

*** A loud cry, too, evidences the epic hero's fury.

Discussion and conclusions

Rendering eyebrows and nose as a single feature on Ancient Turkic statues of warriors can be interpreted as a stylization of eyebrows drawn together, which, like dilated eyes, was evidently part of a furious hero's image.

This stylistic device is also seen on Ancient Turkic statues of unarmed men and in busts (see *Figure*, *2*). Sculptures representing facial signs of rage were possibly associated with those of warriors. Originally, weapons may have been present on such representations. Because, as we believe, statues of medieval nomads were painted and/or dressed (the latter is especially likely with regard to busts) to make them look more natural, weapons might have been painted or attached to the clothes (Ermolenko, Kurmankulov, 2002: 86 – 87; Ermolenko, 2003b). Weapons are not shown on an Ancient Turkic statue in the Khendergeh valley, Tuva, representing a man holding two human heads (Kyzlasov, 1964: fig. 3). Also, the enclosure of stones near which this unique statue is placed has no balbals. L.R. Kyzlasov believed that the Khendergeh sculpture depicts a warrior with trophies – heads of enemies (Ibid.: 35). Indeed, since this idea is supported both by Chinese sources, which mention such trophies, and by artistic and folklore parallels (Ermolenko, 2004: 60), this appears to be the only possible explanation. If so, the absence of weapons on Ancient Turkic statues, like on balbals belonging to the enclosures around the statues, does not disprove the idea that depicted persons were warriors. Connecting eyebrows and nose in a T-shaped fashion was not peculiar to the Turks; this stylistic feature was widely distributed in ancient and medieval art. Later, it was common in Kypchak and Polovets sculpture, although its meaning might have been different. Because the large eyes of Ancient Turkic statues are probably a stylistic feature, it is not likely that they attest to an anthropological type.

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TOWARD A DISCUSSION ON THE INFORMATION CONTENT OF PETROGLYPHS AND THE METHODS OF THEIR STUDY

While discussion of the issues included on the pages of this journal does not take vehemently polemical form, it is nevertheless unlikely that all the participants share similar positions about the given cultural phenomena, or agree with everything said throughout the course of the debate. As a rule, the authors of the papers published under this heading analyze their own new archaeological materials, formally linking them to the discussion of the subject matter and touching upon only some isolated aspects of the problem being considered. From this discussion, a good opportunity has arisen to consider both the most controversial topics, as well as the most polemical articles.

In my view, the content of E. Jacobson's paper "Petroglyphs and the qualification of Bronze Age mortuary archaeology," which had been published two years before the discussion began (Jacobson, 2002) is of particular interest in this respect. The main postulates of the author's methodology were then repeatedly proposed for discussion in a paper written jointly with H.-P. Francfort, which, along with the paper by Ya.A. Sher, opened up the current debate (Francfort, Jacobson, 2004).

In the paper published in 2002, Jacobson, the American art historian, used the rich materials of the petroglyphs of the Mongolian Altai, obtained by the Russian-American-Mongolian expedition, to consider the question of the interpretation of the Bronze Age rock art of the Mongolian Altai.

In addition to the more commonly adopted archaeological approaches to the study of rock art objects, Jacobson offers her own analysis of the Bronze Age petroglyphs. This analysis, in her opinion, adequately responds to the need to give a fuller account of the images pecked and engraved on the rocks of Mongolian Altai, with due regard to their context (2002: 32). The researcher correctly notes the objective difficulties associated with the subdivision of Central Asian Bronze Age rock images into different cultural-chronological groups. Jacobson's main conclusion is that the North Asian Bronze Age petroglyphs, and particularly those of the Altai, are considerably more informative in themselves than the data archaeologists obtain from the study of presumably contemporary burial contexts. "The world reflected in North Asian Bronze Age petroglyphs" – she writes, – "is considerably more complex and more nuanced than anything indicated in presumably contemporary burial practices" (Ibid.: 45 – 46). In her opinion, rock images linked to the emotional impulses of ancient artists and serving to reflect life, "by their very nature ... deny the conservative and idealizing traditions that dominate the burial rituals" and "do not submit to typological analysis." Nevertheless, they can provide us with a more profound idea of the past than we derive from the materials of excavation archaeology (Ibid.).

A number of similar conclusions, sometimes in mitigated – and sometimes in a more polemically acute – form are repeated in a jointly authored paper by E. Jacobson and H.-P. Francfort (2004), in which they advance new approaches to the analysis of the abundant petroglyphic material obtained while carrying out international research projects in Central Asia and Southern Siberia, or accumulated by various research institutions in Eurasian countries. The authors consider some of their approaches to be innovatory and based on

an aspiration to depart from the traditional perception of rock art content (Ibid.: 69).

In Francfort and Jacobson's opinion, "there are several approaches to rock art that have as yet hardly been considered with respect to the petroglyphs of North and Central Asia," and two of them deserve special attention. However, in their paper they describe only one of them, "which has to do with social approaches to the study of rock art and particularly to the manner in which rock art both reflects and mediates gender relationships in the society in question" (Ibid.: 68). The authors believe that the application of the social approach along with a critical re-examination of a number of scenes and images can contribute to a more profound understanding of the real essence of social relations in ancient times (Ibid.: 69). These statements were put forward in the paper which opened the discussion, and they certainly need to be scrutinized, even though the authors specify only one of several approaches "that have as yet hardly been considered."

Undoubtedly, it is important that the authors of the publication under consideration have noted the main problems and controversies associated with the interpretation of North Asian rock art, and have outlined ways and means of approaching the information contained in petroglyphs. Their vast practical experience in the study of many famous monuments of Central Asian rock art (Saimaly-Tash, Ust-Tuba, Tepsei, Aral-Tolgoi, Tsagan-Salaa/Baga-Oigor, etc.) has allowed them to demonstrate the productivity of the chosen research strategy using comparative materials.

However, the proposed approaches and methodologies, which have not yet received adequate consideration with respect to the rock art of North Asia, would be of particular interest and of greater value if they were successfully applied to some other monuments of rock art. Unfortunately, the paper in question neither indicates the source of the materials with which these methodologies in the study of the social aspects of rock art were worked out, nor what is meant by this notion. In addition, it remains unclear which petroglyphs were used to establish "gender relationships in the society in question" (what was their age and geographical location?), and how exactly this was done. One may recall the works by E.A. Novgorodova devoted to the Central Asian materials (1984: 43 – 44; 1989: 99 – 100). Regarding the peculiar petroglyphs of Chuluut, where three feminine figures "are situated one above another in such a way that the legs of the uppermost figure are simultaneously the hands of the second one, and the legs of the latter are the hands of the third figure," the researcher interpreted them as the expression of the "idea of the infinity of the human unity through many generations." The idea of motherhood is repeated three times: "grand-grandmother, grandmother, and mother bearing the beginning of a new life" (Novgorodova, 1984: 43). "The three-stage figure represents diachronic generations of women, connected with each other in time; this is a kind of the tree of life with matrilineal descent" (Ibid.: 44, fig.13). Such an interpretation, while not indisputable, is, in my opinion, interesting enough. Jacobson, though, pays little attention to this interpretation, as she considers it to be either unfounded, or else as having no bearing on the notion of relational bonds in rock art.

In Jacobson's published work, there is a repeated emphasis on the use of the methods of art criticism, since "the study of petroglyphs lies somewhere between science and art" (Francfort, Jacobson, 2004: 76). Such a definition of the "spheres of influence" of different muses, as well as the ranking of research methodologies, does not appear to be well substantiated. The attempts to affirm the priority of the approach borrowed from art criticism over the methodology of archaeological (historical) research, as well as certain unfounded appraisals, and Jacobson's main conclusion about the information content of petroglyphs, give rise to objections.

Discussing the information content of rock art and comparing the possibilities of analyzing mortuary materials and petroglyphs, Jacobson touches upon the problem of interpreting images of wheeled vehicles (Jacobson, 2002: 44 – 45, Francfort, Jacobson, 2004: 68). This is an extremely important subject, which enjoys a long and venerable tradition in Soviet and Russian scholarly literature on the topic. Here I will dwell only on the interpretation of this subject, though, in my view, there are other theses in Jacobson's work devoted to the interpretation of Altai petroglyphs, which also demand critical examination.

The scenes depicting wheeled vehicles in Central Asian and Southern Siberian petroglyphs were actively studied by archaeologists in the second half of the last century. These researchers worked out special methods for studying the wheeled vehicles of Eurasia that accorded with the materials of rock images, which was considered an informative and relevant source of archeological data (Kozhin, 1968, 1977, 1987, 1990; Kadyrbaev, Mariyashev, 1973, 1977; Zhukov, Ranov, 1974; Devlet M.A., 1976, 1982, 1998, 2004; Littauer, 1977; Novgorodova, 1978, 1984, 1989; Sher, 1980; Pyatkin, 1985; Leontiev, 1980, 2000; Varenov, 1983, 1990a, 1990b; Novozhenov, 1989, 1994; Okladnikova, 1988; Filippova, 1990; Mariyashev, Potapov, 1992; Zhang Zhiyao, 1993; Savinov, 1997, 2002; Cheremisin, 2003; Cheremisin, Borisova, 1999; Balonov, 2000; Ranov, 2001; Francfort, 2002; Kubarev, 2004a; and others).

One of the most important works in the field is V.A. Novozhenov's monograph "Rock Images of Wheeled Vehicles in Central Asia (on the Problem

of the Migrations of the Inhabitants of the Eurasian steppes during the Eneolithic and Bronze Age)". The author provides the most complete corpus of rock images of wheeled vehicles in the region, works out the typology of these images, distinguishes different types of vehicles by means of studying both their images on rocks and artifacts from burial assemblages, shows the role of wheeled vehicles in the culture of the animal-breeders of the mountain and steppe belts of Eurasia, proposes a reconstruction of migrations that had taken place in the Eurasian steppes from the late 4th to the 2nd millennia BC, and interprets some petroglyphic scenes as constituent parts of the symbolical communicative system of the steppe animal-breeders (Novozhenov, 1994).

At the same time, the potential for further scientific research has not been exhausted, and many questions remain controversial. It is not always possible to perform an unambiguous interpretation of the scenes with wheeled vehicles. For example, in a number of petroglyphs it is hard to say if they reproduce two-wheeled or four-wheeled vehicles, "joint carts" or a "collision of chariots." The construction of some schematically depicted vehicles cannot be determined for certain either. The context of the scenes is often unclear, so that it is impossible to say whether the rock images under consideration represent earthly or heavenly vehicles, real means of conveyance or indicators of certain mythological subjects. Nor is it always possible to say whether the anthropomorphic characters depicted as standing on the vehicles are divine beings, heroes of myth, or military leaders.

Also included in the discussion are the ethnic attributes of the creators of these rock scenes, the functions of wheeled vehicles in the Bronze Age (hunting, war, or cult ceremonies?), the chronological significance of some constructive details of the depicted vehicles (particularly, wheels with spokes and without them), the combination of the depictions of wheeled vehicles with animal images, the semantics of rock scenes with vehicles and the methods of their study, as well as the origin and formation of different Eurasian traditions of depicting wheeled vehicles (Kozhin, 1968, 1977, 1987; Sher, 1978, 1980; Novgorodova, 1984; Evsyukov, 1984; Evsyukov, Komissarov, 1985; Varenov, 1990a; Novozhenov, 1994; Tsimidanov, 1996; Sergeeva, 2000; Savinov, 2002; Slobodzyan, 2002a, b; Francfort, 1998, 2002; and others).

The study of Bronze Age rock images of wheeled vehicles enabled researchers to assess the level of development of ancient technologies and the technical means used in migrations, to uncover cultural contacts between different Bronze Age populations, to evaluate ancient Eurasian communications, to reconstruct the direction and limits of ethnocultural contacts, as well as the distribution of pictorial traditions, to interpret the content of mythological subjects, to make sound judgements about the ethnic affiliation of the creators of these petroglyphs, and so on. The consideration of these problems is of great importance for our understanding of cultural interactions in the Eurasian steppes during the Bronze Age.

Francfort and Jacobson reject the possibility that the images of wheeled vehicles may represent war chariots, since "in North Asia, not a single instance of a battle scene between competing chariots has been identified" (2004: 72). In their view, "the careful examination of images involving a wheeled vehicle would indicate that there is no consistent pictorial justification for identifying this as a (war) chariot" (Ibid.; Jacobson, 2002: 44 – 45).

I consider this point of view unduly radical, since the images of light two-wheeled carts with anthropomorphic characters standing on them have traditionally been identified as battle chariots, which also could have been used by Bronze Age people of the Eurasian steppes for hunting and ritual ceremonies. If one follows the reasoning of critically disposed authors who base their conclusions upon the criteria of art criticism, rather than upon the totality of archaeological records, then the complete absence of a scene in which a cow is being milked in the rock art of the Eurasian steppes should logically be perceived as evidence that such a practice was unknown in the Eurasian Bronze Age, and that this lack of evidence might serve as the basis for rejecting the existence of cattle-breeding cultures in this region. The question of whether or not we should accept an approach which rejects the identification of pictorial traditions with archaeological cultures in favor of "critical and informed examination of the social relationships that lie behind – and are expressed through – rock art" (Francfort, Jacobson, 2004: 68 – 69, 76; Jacobson, 2002: 45 – 46), will be discussed further.

The idea that "the world reflected in petroglyphs ... is considerably more complex and more nuanced than anything indicated in presumably contemporary burial practices" (Ibid.: 46) is no more than an illusion. The subjects of the Central Asian Bronze Age petroglyphs in which anthropomorphic images are involved are rather monotonous (it is hardly possible to determine for certain who or what exactly is represented here – heroes, divine beings, spirits-ancestors, mythical zooanthropomorphic beings, or disguised participants of ritual actions). Hunting or chasing animals, military or ritual combat, wheeled vehicles and "migrations," so called erotic (coital) scenes, and often incomprehensible "ritual actions" and "signs" constitute the chief repertoire of subjects which repeat themselves in countless variations on the rock art of Eurasian steppes and mountains.

Images of permanent dwellings are rare and schematic, while those of portable dwellings are not known at all; neither are there images of plants and certain species of animals. In a great deal of graphic traditions of the Bronze Age, animals are represented more realistically than anthropomorphic characters, whose images are schematic. Female figures are few, and they are most often found in ritual contexts. Images of children are absent, which leads one to conclude that it would be very hypothetical to see in the petroglyphs some depiction of family ties or relationships. In the images of rock art, it is impossible to determine for certain to what extent the real world is being reflected. Image-making might have played an important role in rituals, in which case the events of real life would have been connected to mythological paradigms (see (Sher, 1980: 257–289; 2004; Devlet E.G., Devlet M.A., 2000, 2005)).

In my view, any discourse about "the role of the individual artist in the fashioning of images and compositions," about notions of an individualistic basis supporting ancient artistic activity, or about the evaluation of the quality of pictorial images is of little significance in the study of scenes with wheeled vehicles. I think that the imperative to reveal "the artistic features of each individual image," to assess their expressiveness (Francfort, Jacobson, 2004: 65 – 66), and other such principles, which are put forward as examples of new approaches in the study of North and Central Asian rock art, can hardly be accepted as a methodological foundation. Unfortunately, these researchers have not suggested any innovatory methods "for ferreting out more substantial issues relating to social order and gendered beliefs, practices, and rituals" (Ibid.: 69), apart from the ones borrowed from approaches in art criticism.

In addition, it seems to me that there are no methodological grounds for the attempt made by earlier art theorists to do an extra-archaeological study of the information contained in the Bronze Age petroglyphs of Central Asia (Jacobson, 2002). Untenable also are Jacobson's references to any particular "emotional" and "artistic" qualities in rock art images. According to Jacobson, these images appear as the result of the realizations of the creative potential of individual "artists," and this is why the information contained in the petroglyphs "is considerably more complex and more nuanced than anything indicated in presumably contemporary burial practices" (Ibid.: 45 – 46).

One should see behind burial constructions the emotions of their creators, human feelings associated with the death of relatives and fellow tribesmen, the content of funeral rites which united ancient societies, reflecting at the same time those very details of social structure, tribal beliefs, customs, and rituals which are meant to be seen in some vague "expressive impulses" of rock artists (Ibid.: 46). It appears that the degree of human emotion indicated by the expenditure of labor associated with the burial practices of ancient populations of North Asia is quite comparable to the emotional constituent of rock art as postulated by art theorists. It is unlikely that archaeologists would ever agree with the statement that "the vision of life seen through Bronze Age petroglyphs is much richer than can be found in any mortuary context," or that the complex ornamental design on grave vessels serves to express the good taste and individuality of the interred (Ibid.: 45 – 46).

To give an "archaeological alternative" to innovatory approaches of this kind, let us turn to the conclusions about the wheeled vehicles of Eurasia, which resulted from a complex analysis of the archaeological record (including petroglyphs) by E.E. Kuz'mina (1974; 1980; 1994a; 1994b: 165 – 194; 2000a; 2000b; 2001), E.A. Novgorodova (1978; 1984: 60 – 81; 1989: 140 – 165), Ya.A. Sher (1980: 194 – 200), M.A. Devlet (1990: 102 – 108; 1998: 181 – 184), P.M. Kozhin (1987: 112; 1990), and V.A. Novozhenov (1994). In addition, the reader is referred to the reconstructions of A.V. Varenov, M.V. Gorelik, V.B. Kovalevskaya, S.A. Komissarov, S.T. Kozhanov, A.I. Soloviev, Y.S. Hudiakov, and some other archaeologists.

E.E. Kuz'mina notes that the interments of warrior-charioteers, who represented an elite group of Indo-Arians in the Eurasia steppes, include remains of chariots (wheels with spokes and pairs of draught-horses), cheek-pieces, sets of weapons, including bronze and stone axes, knive-daggers, spears, stone and bone arrowheads, heads of whips, and adzes (2000b: 72 – 75). The rock images of armed anthropomorphic characters standing on wheeled vehicles, that is of warriors shooting arrows, or warriors with other weapons (for instance, with mace and spear, as in Elangash), as well as the arms from the Sintashta and Anyan assemblages with chariots, confirm the use of wheeled vehicles in battles.

M.A. Devlet describes a rock scene in the Sayan canyon of the Yenisey, in which a warrior standing on the platform of a two-horse chariot shoots an arrow at the head of an armed unmounted enemy (1990: 106; 1998: 184; 2004: 45 – 50, fig. 24, *3*). The wheeled vehicles depicted on the rocks of Chuluut and Khovd-Somon were identified by E.A. Novgorodova as chariots, and this interpretation has been supported by other archaeologists. The similarity between Bronze Age images of wheeled vehicles over the vast territories of Central Asia and Southern Siberia was considered by Novgorodova to have come as the result of the introduction of new methods of warfare and new military equipment (1989: 163 – 164).

The linguistic evidence is also of critical importance. The results analyzing ancient Near Eastern written records enable linguists to speak about the existence of chariots in the Indo-Iranian period; the Indo-Iranian word for this vehicle corresponds to the Hittite word for a chariot (Gamkrelidze, Ivanov, 1994: 728). Kuz'mina points out that the ancient Indo-European, Semitic and Chinese languages had separate words for wheeled vehicles and chariots. "A chariot is a light military carriage with two spoked-wheels and a relay" ((1994b: 276), for a similar definition see (Novozhenov, 1994: 89 – 90, 253, 255)). To designate a certain type of carriage depicted on archaeological artifacts as well as Eurasian petroglyphs, Francfort uses the English word "chariot" and the French "char," which leaves no doubt as to whether actual combat chariots exited or not (Francfort, 1998, 2002). In light of this evidence, the entertainment of any doubt about an analogous identity in the images of wheeled vehicles in North Asia would seem unusual (Francfort, Jacobson, 2004: 72). Perhaps, the opinion that the North Asian petroglyphs represent only wheeled carriages and not chariots belongs to Jacobson (2002: 44 – 45).

Behind the refusal to acknowledge the wheeled vehicles represented in North Asian petroglyphs as real two-wheeled carts, light chariots, lies the unwillingness to take into account the results of the typological analysis of rock images and artifacts from burial assemblages, as well as the social relationships under which wheeled vehicles served as a means for waging war, and a cultural item of social prestige – an accoutrement that characterized one's "elite" status. This is precisely how Francfort assesses the role of chariots in the Bronze and Iron Ages of eastern Eurasia, emphasizing not the military but only the transportation functions of these vehicles, which served to get hunters to a prestigious hunting ground. The petroglyphic images of chariots symbolize the elite character of such actions (Francfort, 2002: 81, 84). The participants of the discussion about the functions of Eurasian chariots often refer to the Iliad, where chariots are mentioned to have been used for getting fighter-heroes to the locations of combat on foot, but there need be no doubt that the ancient Near Eastern chariots had a military function also (see (Gorelik, 1985; Kozhin, 1985; Kuz'mina, 1994b; Novozhenov, 1994; Nefedkin, 2001; and others)).

In his analysis of ancient Altai weaponry as it is reflected in petroglyphs, V.D. Kubarev also notes the absence of battle scenes with chariots, drawing the conclusion that the petroglyphs of the Altai do not confirm the use of chariots in military operations (2004b: 76). At the same time, he expresses reasonable doubts regarding the possibility that chariots were used to hunt mountain goat, in spite of the fact such a scene is depicted in the rocks of the Mongolian Altai. Kubarev thinks that the scenes with chariots (particularly those representing the combination of a chariot with a deer image) reflect their creator's mythological conceptions.

The absence in Eurasian rock art of multi-figured battle or duel scenes with the participating warriors standing on chariots provides grounds for the view that the chariots served only for transporting combatants, or for other prestigious activities like the czar's hunt. However, according to modern notions of the nature of ancient art (Francfort and Jacobson also refer to these, citing E. Gombrich), it is based on the conceptual principle and not on the "photographic" one, which should be taken into account in our interpretations and reconstructions of the content of rock images. In my view, the subjects of the Central Asian petroglyphs with chariots are semantically stable. The stylistics of these images are repeated in such a considerable number of Eurasian sites with rock art, that the doubts of some foreign colleagues regarding the adequacy of definitions for the types vehicles depicted seem groundless (Jacobson, 2002: 44 – 45; Francfort, Jacobson, 2004: 72)*.

In my opinion, the mere fact that a chariot is depicted begets a whole range of semantic meanings connected to military symbolism and determining the context of scenes and images. In order to express the triumph of a conqueror, or to emphasize the specific character of the mode of transport used by the supreme deity, there was no need to reproduce graphically the whole narrative of a myth, or each of its episodes. It was enough to visualize the corresponding "mythopoetical formula" (Sher, 2004: 38 – 41). B.N. Pyatkin (1987) proposes an interpretation of symbols associated with chariots in burial complexes, which makes it possible to speak about different ways of presenting mythologemes.

The conclusion that the Eurasian rock images of light two-wheeled vehicles cannot be identified as chariots, though made on the basis of a "careful study" of the subject (albeit using methods that make it possible to obtain reliable historical information), is, in my view, absolutely illegitimate and demonstrates once again

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* Their position appears to be more than unusual, since certain other objects depicted on the Altai rocks are assessed by Jacobson rather peremptorily. For example, taking an analogy from the accessories of present-day Mongolian hunters, she sees in the rocks so-called *dalluurs* – inexplicable attributes of anthropomorphic rock images of the Bronze Age. The identification of "enigmatic women-birds" at Kalbak-Tash is absolutely improbable in my view. In some petroglyphic scenes of the Mongolian Altai the researcher sees the theme of "struggle for securing hunting grounds," etc. (Jacobson, 2002: 43).

both the conditional character of definitions used by art theorists and the limited nature of their approach to the analysis of prehistoric art (see (Pervobytnoe iskusstvo…, 1998: 8 – 12; Sher, 2000: 82 – 83; 2004: 43 – 44; and others)). The methodology of historical research is more appropriate in the given case. The tactic of using chariots has been reconstructed on the basis of the study of weaponry from the Yin assemblages. According to A.V. Varenov, this tactic consisted in shooting arrows at the foot enemies from middle and long distances (see (Varenov, 1990b: 70 – 71; 1980; Soloviev, 2003: 39, fig. 31; p. 43; p. 50 – 51, fig. 52)). In Y.S. Hudiakov's opinion (2002), detachments of chariots were used as shock troops: they served to break hostile lines in the open steppe, and to pursue the enemy. The importance of chariot troops for the Caucasoid population of Central Asia of the 2nd to the 1st millennia BC is reflected by *khereksurs* (when viewed from above they resemble wheels with spokes) and deer-stones, showing images of warrior-charioteers possessing characteristic sets of arms (Hudiakov, 1987a, b)*.

It should be stressed that rock images represent the main source of data about the chariots of Southern Siberia and Central Asia (Hudiakov, 2002: 139 – 141). It appears that the methodologically correct reconstructions, based on relevant materials, can be more adequate to the historical reality of the past, than conclusions based on the criteria of art criticism (the absence of battle scenes with chariots as the reason to reject the very existence of war chariots).

The petroglyphs studied by the present author in the southeast of Russian Altai reveal a series of images of chariots. They are shown here in detail, especially if the images are made using the graffiti technique, or by a combination of pecking and engraving (Fig. 1, 2). In some cases a spectator can clearly see reins in the driver's hands (Fig. 3; 4, *3*; 5; 6; 7). The reins, an important element in operating the chariot, were often shown in the form of lines incised along a pole. This is the case both when the driver is absent (Fig. 5, *3*) and when an unharnessed chariot is shown (Fig. 8, *2*). In the composition of Sook-Tyt, where a number of chariots following each other are represented on the right bank of the Chagan River, the reins are depicted as being attached to the belt of the first driver (see Fig. 6). In all likelihood, this is the case in the scene from the Shin-Oozy area (see Fig. 8, *1*), where the warrior-charioteer is standing on a chariot platform and shooting arrows. The simplest way of attaching reins is to tie them round the driver's hips.

Attaching the reins in order to free the hands of warriors standing on a chariot could have been accomplished with the help of special devices – driver's buckles, which are known from Late Bronze Age graves of Southern Siberia and China (Varenov, 1984). On deer-stones, the objects, resembling such buckles, are shown suspended on warriors' belts. It is quite possible that they are present on rock images too. Perhaps an analysis of the most detailed engraved images of chariots will make it possible to identify such reproductions in Eurasian petroglyphs (see Fig. 8, *1*; 9). For instance, rock images from the Negev Desert on the Sinai Peninsula demonstrate the practice of attaching reins to the driver's belt, while the driver's hands are occupied with weapons (Anati, 1981: 52 – 53, 77) (Fig. 10).

As to the constructive features of the chariots used by the inhabitants of the Altai in the 2nd millennium BC, as far as one can judge on the basis of rock images, they were rather similar to the chariots known in the adjacent regions of Central Asia and Southern Siberia. This similarity can be accounted for by the evolution of modes of transportation and by the migration processes in the Eurasian steppes, the history of which witnessed both intrusions and military conflicts between the bearers of different archaeological cultures. There is no doubt that archaeological records reflect the content and character of historical processes, and that the methodology of archaeological research makes it possible to adequately perceive the information contained in these records.

The reliable identification of the construction of the depicted chariots is of great importance to our conclusions about the content of the scenes with chariots in Altai petroglyphs. One should also take into account a certain community of mythological ideas among the Bronze Age populations of the Eurasian steppes. In our analyses of the semantics of rock images, it is necessary to pay more attention to the mythological context, associated with petroglyphic images of chariots in Central Asia and Southern Siberia. In particular, wheeled vehicles at Elangash are often present in multi-figured compositions, and not infrequently a pair of anthropomorphic characters is depicted on one chariot (Okladnikov et al., 1979: pl. 40, 42, 83). In addition, in some cases several images of chariots are concentrated here in one plane. The same regularities are characteristic of the petroglyphs of the Mongolian Altai.

As to the methods of art criticism, aimed at the revelation of "artistic features of each individual image" (Francfort, Jacobson, 2004: 66), their application, in my view, does not provide researchers with any significant advantage in their search for an adequate elucidation of historical problems associated with the study of prehistoric art. Thus, it seems altogether utopian when the opinion is expressed, as it has been

* Let us note that in both cases these are the author's interpretations, made on the basis of a study from various sources. The degree of reliability of the proposed reconstructions may vary.

Fig. 1. Kalbak-Tash.

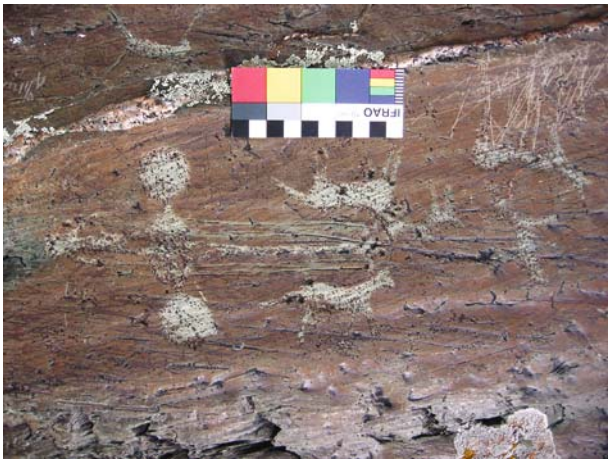

Fig. 2. Elangash.

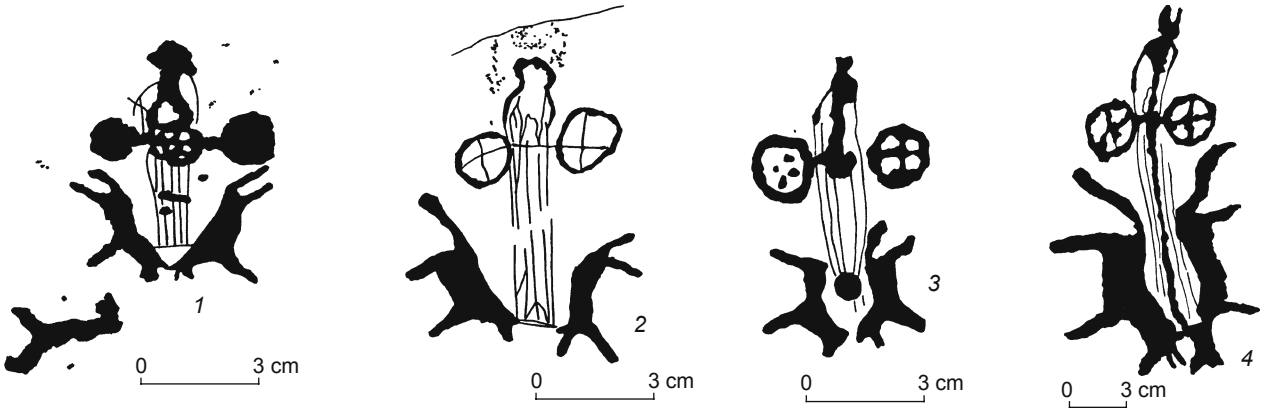

Fig. 3. Kalbak-Tash.

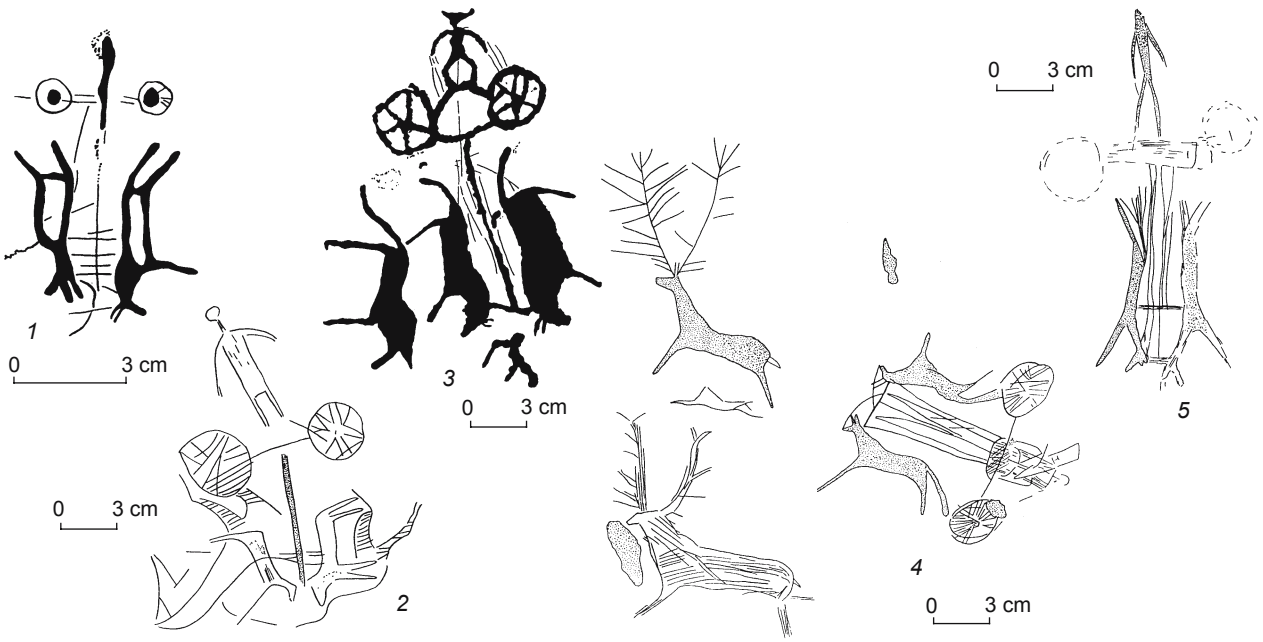

Fig. 4. Elangash (*1*, *3*) and Shin-Oozy (*2*, *4*, *5*).

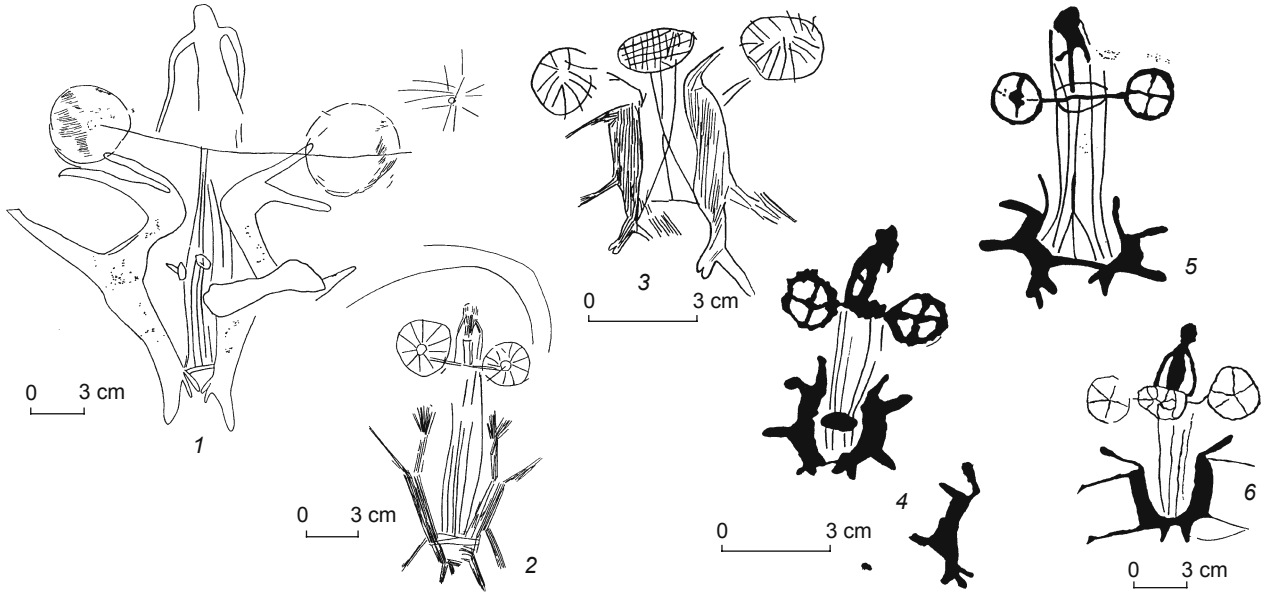

Fig. 5. Shin-Oozy (*1 – 3*), Kalbak-Tash (*4*, *5*), and Elangash (*6*).

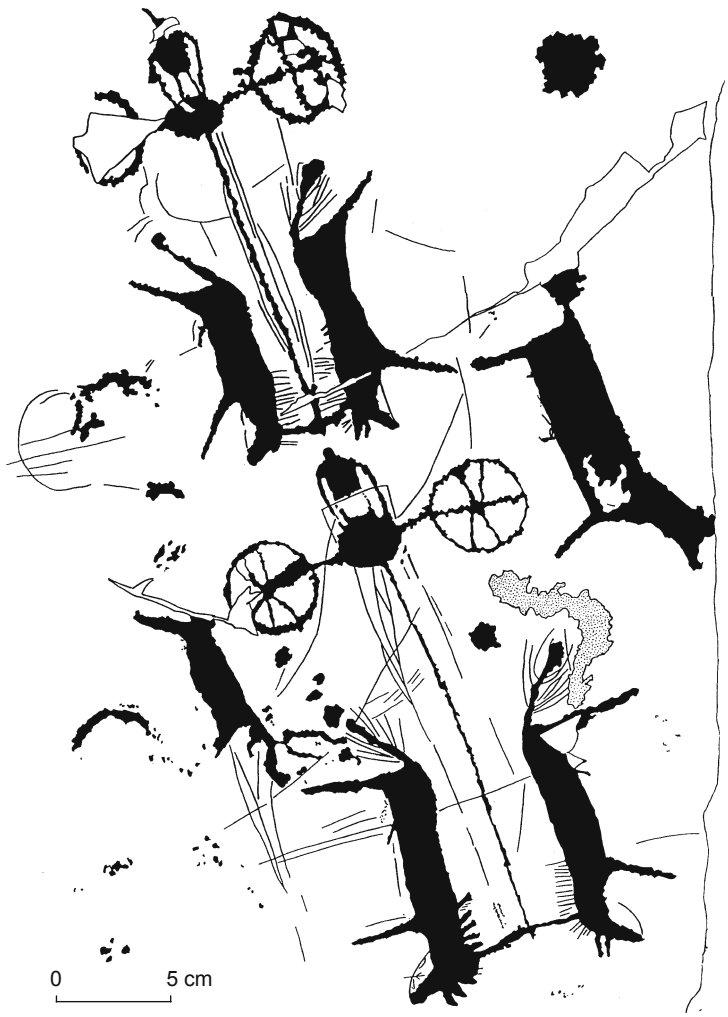

Fig. 6. Sook-Tyt.

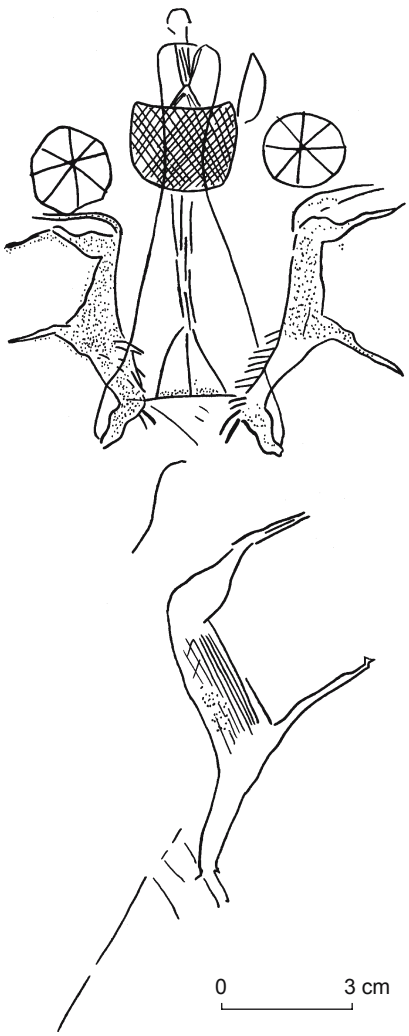

Fig. 7. Abidzhai.

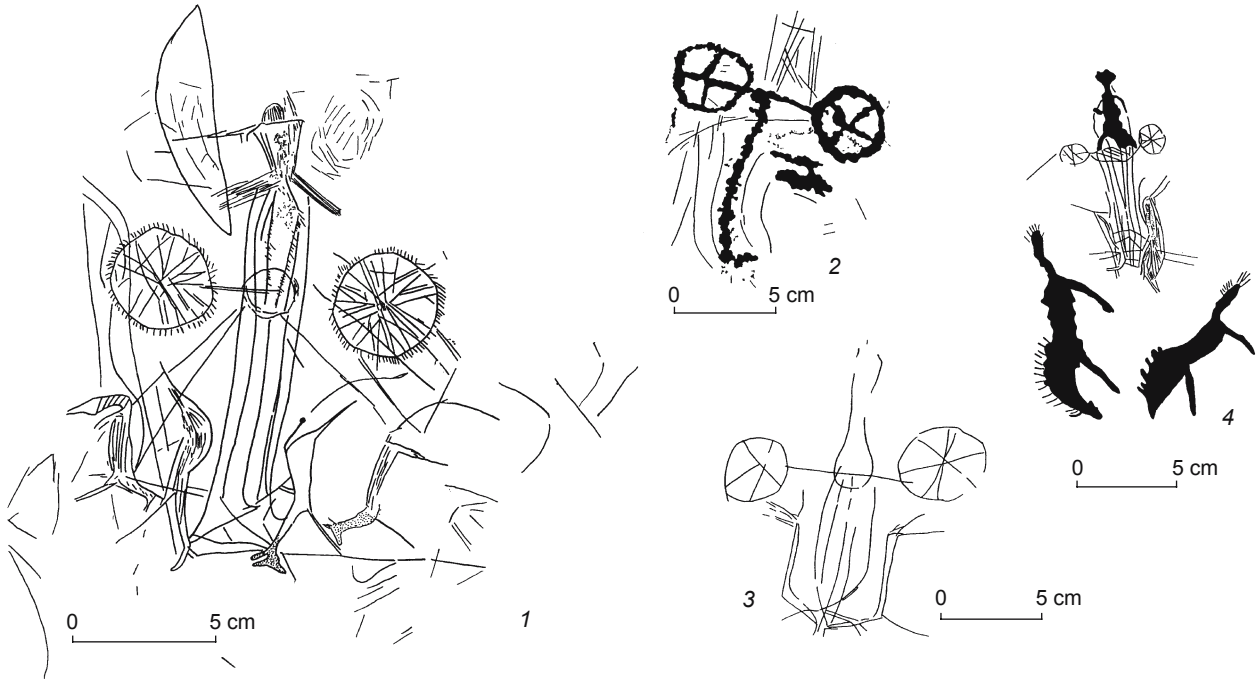

Fig. 8. Shin-Oozy (*1*), Sook-Tyt (*2*), Chaganka (*3*), and Kalbak-Tash (*4*).

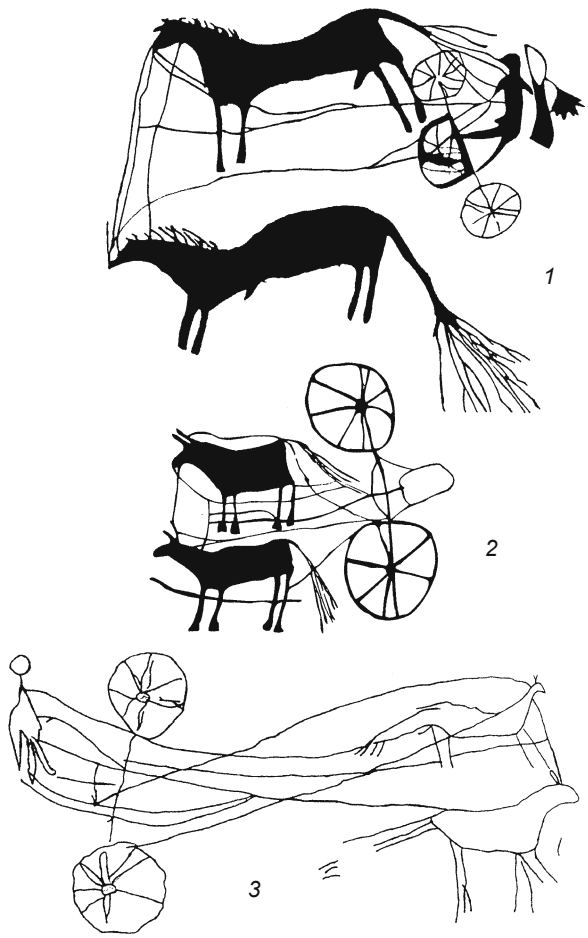

Fig. 9. Eshki-Olmes (after (Mariyashev, Goryachev, 2002)).

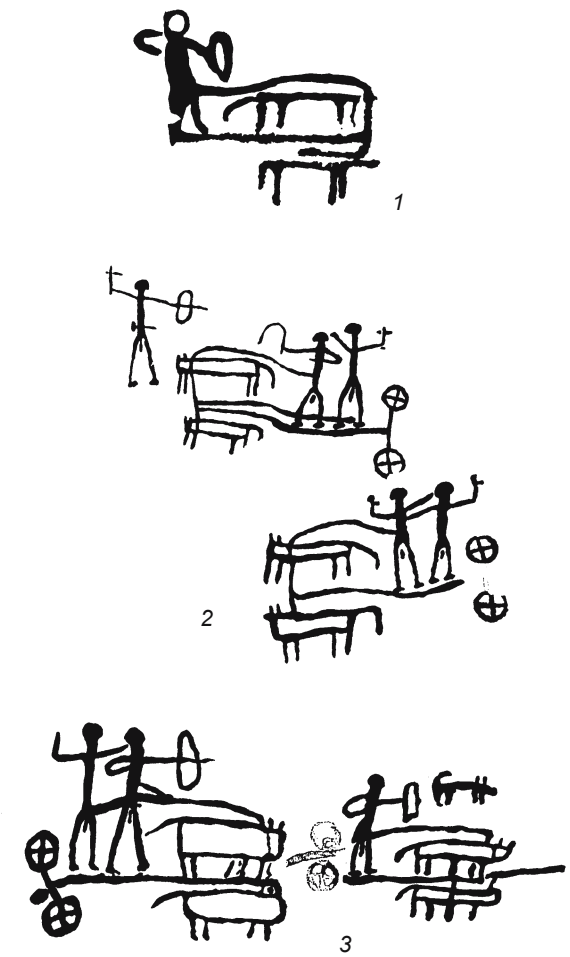

Fig. 10. Negev Desert (after (Anati, 1981)).

by some over the course of this discussion, that art theorists will "move archeologists aside to take on the problem of the origins of art" (Grigoriev, 2004: 49). No comment is needed here: the desire to be moved aside is evidently provoked not so much by the achievements of art theorists in the study of Paleolithic images, since there really are none, as by an ambivalent attitude toward one's own capabilities as an archaeologist. The only thing that can be said with full confidence is that the degree of applicability of the definitions and methods of modern art criticism toward Paleolithic art is even narrower that it is regarding the Early Metal Period images.

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ETHNO-CULTURAL INTERACTION OF THE NORTHERN KOMI-ZYRIANS AND THE RUSSIANS IN THE REALM OF SACRAL SYMBOLISM

The Slavic population of the Russian North is geographically surrounded by historically existing areas of the peoples belonging to the Finno-Ugric linguistic group. This group includes Baltic-Finnish, Saam, Volga, and Perm subgroups as well as the Nenets people belonging to the Samoyed group.

In the northwest, the Russian-speaking region borders the territories of the Saams (the Lapps), the Karelians, the Finns, the Ingrians (Izhora), and the Vepses. The Nenets camping grounds are located at the northern border, while along its eastern frontier (from the north to the south) there live the Komi-Zyrians, the Komi-Permyaks, and the Udmurts. In the lower Kama region, the Russian-speaking territory borders the ethnic area of the Mari (the Cheremis).

In the language and culture of the Russian population one can trace the substrate complex which goes back to ancient inter-ethnic contacts of the Russians with the autochthonous population, which eventually dissolved in the Russian ethnos.

The Russian-speaking population had especially strong ties with the Komi, the Karelians, the Vepses, and disperse groups of Finno-Ugric-speaking peoples beyond their main habitation. These contacts enhanced mutual enrichment of cultural traditions, including traditions in the realm of religious and mythological concepts and ceremonial practices. Interethnic interaction extended in time for more than a thousand years and was so deep and multifaceted that today it is impossible to define precisely and reliably which components of spiritual (and often material) culture are "originally Russian," and which ones the Slavs borrowed from the peoples of the Finno-Ugric group (yet undoubtedly the connection in the opposite direction also took place). One of the most complicated problems is the level of interactive dissemination in the realm of mythology, and in particular in the realm of sacral symbolism.

The cross is one of the most ancient sacral signs in mythical-epic and religious systems; it is the main symbol of Christianity. Roadside crosses, memorial crosses, adoration crosses, and votive crosses had a status of local sacred objects (Belova, 2002). They could often function as village sacred objects, functionally identical to honored stones, springs, and trees (Panchenko, 1998: 183).

As the key symbol of the Christian faith, the Cross constitutes the most important element that demonstrates the union with one or another ethnic and cultural group. The tradition of erecting wooden crosses can be singled out among other aspects from the realm of cult and ritual which were directed at sacralization of a landscape which was becoming habitable. Road crosses and votive (the '*obrok'* or 'tribute') crosses is a widespread phenomenon among the Slavic population of Eastern Europe (Speransky, 1895; Khristov, 2002; and others). The facts that such sacred objects (wooden and stone) were venerated is well known both in European Russia (Shlyapkin, 1907; Panchenko, 1998; and others), and in Siberia (Lyubimova, Golubkova, 2000).

The tradition of erecting wooden crosses became widespread in the Russian North. Such crosses stand at the sea coast and at the outskirts of villages, and are unique monuments of traditional folk culture. Crosses with a height sometimes reaching up to 8 m were raised on uninhabited northern islands, and on the coast of the

White and the Barents seas (Boyarsky, 2001; Stolyarov, 2001; Yasinski, Ovsyannikov, 2003: 336 – 352). Set up on stone mounds on the Solovetsk Archipelago, they were well noticeable from the sea (Fomin, 1797: 13, 92). Often the crosses were erected on agricultural or trade territories – fields or fishing places (Ovsyannikov, Chukova, 1989: 47; Filin, Frizin, 2001: 166 – 174; and others). They served both as votive crosses set up by peasants or sailors as a sign of gratefulness to God for deliverance, successful fishery or the like, as monuments to deceased fisherman as well as navigation marks and beacons (Dmitrieva, 1986; Ovsyannikov, Yasinski, 1995; Filin, Frizin, 2001). Crosses could serve as landmarks (Yashkina, 1998: 337), road signs (Kurilov, 2004: 71 – 72), memorial signs of historical persons' visits to the locality (Kritsky, 1988) or might mark the places in some way connected with legendary characters (Yashkina, 1998: 346 – 350).

The habit of setting up votive wooden crosses is also known to the Komi-Zyrians (Ovsyannikov, Yasinski, 1995: 36; Smirnova, Chuviyurov, 2002). The genesis of the Komi people belonged to the 10th – 14th centuries; the ethnic basis for the Komi people constituted the tribes of Vychegodsk Perm who populated the Upper and Middle Kama region (Zherebtsov, 1982: 23, 26 ff). The process of the Komi-Zyrians' settling and their formation of the ethnic territory embraced the 14th–19th centuries, and settling beyond its limits occurred in the 17th – early 20th century. The Komi and the Russians developed the basin of the Pechora chiefly in the 18th – 20th centuries. In the 17th century, there were only three settlements in the lower Pechora: the town of Pustozersk, which appeared in the early 16th century, Ust-Tsilma sloboda (village), founded by a Novgorod dweller in 1544 – 1545, and Izhma, which appeared between 1568 and 1575. Izhma sloboda for a long time remained the only settlement of the Komi. Only in the late 18th century did Mokhcha, Gam, Sizyabsk, Bakur, and Mosh'yuga appear around it. After that the Izhma dwellers started to settle along the Pechora River. In general, the subethnic group of the Izhma Komi was formed on the basis of the Russian migrants from Ust-Tsilma, the Komi-Zyrians from Vym, Udora, Sysola, and other places. Among them there were several Nenets families, which settled and mixed up with the Komi and Russians (Ibid.: 78 – 80). In the second quarter of the 19th century, Izhma reindeer breeders who had roamed earlier in the basin of the Lower Ob and in the eastern foothills of the Urals, started colonization of the Lower Ob region. This process happened at a very rapid pace and constituted a basis for creation of the ethnic-territorial group of the Ob Komi. The main centers of this group's settlement in the 19th – early 20th century were the villages of Saranpaul, Muzhi, and the town of Berezov (Ibid.: 180; Konakov, Kotov, 1991: 51 – 52).

During the field research in the villages of the northern Izhma Komi, who live along the lower reaches of the Izhma River (villages Sizyabsk, Bakur, Yol of the Izhma Region of the Komi Republic – FMA* 2003) and in the Lower Ob region (Berezovo village of the Khanty Mansiysk Autonomous District, villages Muzhi, Ovgort of the Yamal-Nenets Autonomous District of the Tyumen Province – FMA 2004), votive and adoration wooden crosses and related legends and traditions were recorded.

One of the most conspicuous wooden crosses of the Izhma Komi, connected with many legends, is located in the Northern Urals, on a height several kilometers from the village of Muzhi. According to the recollection of old-timers, it was set up by the first Izhma settlers in the Northern Ob region as a sign for remembering the crossing of the Urals. "*People came to Siberia from Izhma, that is from Komi. Many families crossed over the Urals with their reindeer, with sheep. Many people came here. And they climbed the mountain here. And they saw a river. A river – that means that the mountains are passed, soon there will be a village. And on this place they set up a cross*" (FMA, Muzhi village). The cross was made of birch: they cut the branches, rough-hewed the trunk and nailed the transverse crossbeam (Ibid.).

The adoration cross which stood on one of the highest mountains of the Northern Urals (until the 1950s) between Izhma and the village of Muzhi, marked the halfway point for the Izhma migrants coming to Western Siberia. Near this cross, the reindeer breeders stopped to take a rest, they prayed and gave sacrifice (bread, alcoholic drinks), and drank vodka from copper bells, taken off the reindeer (Ibid.).

The sacralization of the territory is related to the apotropaic functions of the Cross. The Komi-Zyrians of the Lower Ob region had ideas that the evil spirits could not cross the Ural mountain ridge. "*There* [at Izhma] *for some reason things seemed to appear. Maybe the evil spirits don't cross the Urals. They always talked about it, there were many incidents. But here it is different. The evil spirit cannot cross the Urals*" (Ibid.). Consequently, the cross erected on the summit also signified a landscape-mythological border.

Numerous legends concerning this cross constitute a methodical appeal to its protective functions. Several legends relate that the cross in spite of repeated acts of destruction, was always restored on its former spot. In the first half of the 20th century (the precise data is not known), there occurred an enormous forest fire which threatened to spread to the village of Muzhi. The villagers having gathered together went in the direction of the Ural Mountains – to the summit where the wooden cross erected by Izhma's first migrants to Siberia used to

* Field materials of the author.

stand (by that time it had fallen). Reaching this place (on the height over the Yugan River) people started to pray. There arose a wind that brought black rain clouds. Rain started to pour and immediately put out the fire, which had already reached Muzhi. After that event people built up a new wooden cross which stood for several decades. Now there is another cross, which was erected in the 1990s (Ibid.).

In different times, the cross remained the local object of pilgrimage. "*Beyond the Muzhi there stood a cross on the highest place, on the way to Til'tim. The cross stands on a clearing in the middle of the woods, beyond it is the tundra. We would go to the cross to pray."* "*When prayerful old women go to the cross, they rest there, eat there. The clearing is clean there. In the summer cloudberries grow. The clearing is large, one can well see the cross on the mountain. People would always stop at this clearing and take a rest."* "*One woman was very sick. She had sore legs. She said, "If God allows me, in the summer I will cross the Yugan, get on my knees and will walk to the cross on my knees." In this way she went up to the cross on her knees. And people went behind her and watched so she would not deceive them that she went on her knees. But she went for her own sake – why would she deceive anybody? Then she lived for many years and walked on her feet"* (Ibid.).

In the village of Sizyabsk of the Izhma Region in the Komi Republic, on the territory of a farm on the outskirts of the village, in 2003 there stood a wooden six-pointed cross (Fig. 1) with a great number of small scraps of material of different colors with little crosses sewn on them (Fig. 2, 3). The cross was old (erected in the beginning of the 20th century), already crooked; it was supported by the wall of a barn. According to the report of local residents, there used to be several wooden crosses around the village which closed the roads leading to the village to evil spirits (*leshaki* – wood-goblins), the "walking" dead, guarded from pestilence and loss of cattle. In time those fell down; this cross also fell, but several years later it was raised and set up not far from the place where it used to stand – on a road leading to the old cemetery.

According to the reports of the informants, women sewed little crosses on the scraps of material and pinned them to the wooden cross in order to prevent misfortune threatening to occur (death from disease, cattle pestilence), to enlist the protection of powers from above in some important business. This process was accompanied by prayers and requests for healing or granting various blessings. The cross was named "St. Panteleimon's"*, which testifies to its role as an adoration Cross and protector from diseases (saint Panteleimon became popular in folk Orthodoxy as a healer). It is possible that originally this cross was votive as most of the crosses in the rural area (Yasinski, Ovsyannikov, 2003: 343), yet the circumstances of its being erected could not be clarified due to the remoteness of the events. It is known that still in the 1950s there stood six crosses in Sizyabsk. They were located at three entrances to the village (three, two, and one)*. Local residents remember that all the crosses had their names (most likely also in accordance with saints' names) but they were forgotten with time.

The Sizyabsk Cross of St. Panteleimon besides the mentioned functions also carried out the role of village protector, not letting into the village evil spirits and the "walking" dead (the stories about their adventures and attempts to harm people are popular among the local dwellers). "*The place where the cross stands now used to be the end of the village. Further on lies the road to the old cemetery* [this part is now occupied by new buildings of the village – **O.G.**]. *The cross was set up so that the dead could not get into the village and harm the living people*" (FMA, Sizyabsk village).

Similar crosses were erected in other villages of the Izhma area. According to the reports of residents from the village of Bakur, in the 1920s there occurred a cattle plague. Gathering together, the dwellers set up a wooden cross at the outskirts of the village on a high bank of the Kuriya River. After that the cattle plague ceased. The villagers would go to the cross to pray and make various requests. The cross stood there until the end of the 1940s (FMA, Bakur village).

The Izhma Komi who migrated to Western Siberia in the middle of the 19th century, preserved the tradition of setting up votive crosses in case of misfortune and in order to avoid it. In the village of Saranpaul (one of the largest villages of the Komi in the eastern part of the Urals) two wooden crosses about 2 m high stood until the middle of the 20th century in the center of the village and at the outskirts, at the road leading towards the woods. One of them was set up during a reindeer epidemic, and after that the pestilence stopped (FMA, Berezovo village). In 1919 the Tobolsk traveler G.M. Dmitriev-Sadovnikov while crossing Saranpaul thus wrote in his journal: "In the midst of the village there is a large ornate cross with roof and icons, encircled by a little fence" (Dmitriev-Sadovnikov, 2000: 16). A wooden four-pointed cross with gable roof, of about human height stood until the end of the 1940s in the center of the village of Muzhi. The place where it was located was fenced in. It was also erected on the occasion of the loss of reindeer in the 1910s (FMA, Muzhi village).

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* According to the field materials, kindly provided by Y.A. Krasheninnikova, the researcher of the Institute of Language, Literature and History of the Komi Scientific Center, the Ural Branch of the Russian Academy of Sciences.

* See the previous note.

Fig. 1. Cross from the Sizyabsk village.

Fig. 2. Fragment of the cross from the Sizyabsk village (middle part).

Fig. 3. Fragment of the cross from the Sizyabsk village (lower part).

Fig. 4. Cross from the Yol village.

The habit of setting up or restoring votive crosses also exists today, with a modern modification. For example, a wooden six-pointed cross with gable roof (Fig. 4) was set up in the village of Yol on the territory of the farmstead of a young entrepreneur. The initiator of this was his mother. Formerly, in her childhood years (the late 1930s – early 1940s) a wooden cross stood not far from that place. The place where now the farmstead of her son is located, used to be the end of the village, and nobody lived there. In the end of the 1990s, at a family meeting they decided to restore the destroyed sanctuary. "*A cross is needed so that everything goes well. Everything was very bad for him (for my son). I prayed and promised God to set up the cross, the same one as used to stand there. I begged my son to set it up. And everything has become well both in his family and at work*" (FMA, Yol village).

Different types of crosses are known in the Christian world: baptismal crosses, pectoral crosses, altar table crosses, graveyard crosses, crosses crowning the cupolas of churches, crosses depicted on textiles, wooden or stone crosses in the system of landscape space, and so on. Cemetery crosses are the most common in the realm of cultural landscape. Some researchers directly connect the origin of graveyard wooden poles, and along with them the roadside wooden crosses, with Old Slavic burials "on the poles, at the roads" (Freiman, 1936; Dintses, 1947). The habit of overground burials on large wooden poles, recurrent in the 11th – 13th centuries among a number of Eastern-Slavic tribes, was preserved for a long time as a component of apotropaic magic (Orfinsky, 1998: 62). Therefore burial poles (the poles of the dead) and later pole-chapels, genetically connected with them, were set up at the entrances to villages and at crossroads (Ibid.). At the same time, in the development of types and forms of headstones (including poles, "golbets" – a type of box-room, and crosses) one can see the connection with the symbolism

of the house (Ibid.: 62 – 63; Frizin, 2001: 199 – 233). Accordingly, the cross represents ideally a simplified model of the tomb both in Christian (the headstone which announces the victory over death and hope for resurrection) and pagan contexts (its vertical part (the pole) is necessary for the transfer into the other world, and the roof symbolizes the ultramundane dwelling) (Frizin, 2001: 226).

Grave edifices and burial ritual, as a rule, demonstrate archaic forms and the most conservative religious notions. The unique attitude of the Izhma Komi towards the Cross, which does not fully correspond to the Christian cult, is reflected in the decoration of grave monuments in local cemeteries. Most of them are represented by wooden edifices resembling poles and columns of different height, or obelisks; sometimes anthropomorphic figures can also be found. "The Cross could be viewed both as a symbol of the Christian faith, and simultaneously as the abode of the deceased's soul" (Panchenko, 1998: 193). This statement can be related to anthropomorphic monuments on the graves. Coming to the graveyard, relatives talked to the deceased, fixing their eyes on the grave edifice; they put food at its base.

One should also mention the prohibition against putting metal objects into the coffin or on the grave (this was explained that "in the afterlife the demons are attracted to everything metal like a magnet"), even the baptismal metallic cross of the deceased was exchanged for a wooden one (Sharapov, 2001: 300 – 303). Evidently, wooden grave edifices and objects are connected with the Komi's ideas that after death the soul of a person moves into a tree, and with myths about the arboreal double of a person (Belitser, 1958: 321, 322). This, in turn, has something in common with archaic Slavic rituals, when at the graves of the dead before installation of the memorial cross a wooden stick or twig was stuck into the ground (Zavoiko, 1914: 98 – 99).

Concerning the absence of the crosses on some graves, the locals explained that it was not customary to set up a cross the first year because it "*prevents the dead from coming out of the grave.*" "*It is difficult for him* [the dead] *to be beneath the sod. He should get used to mother earth, to not go into the darkness right away. First time should pass. And after a year he will leave us for good, then the cross can be set up*" (FMA, Bakur village). However, crosses were absent from many old graves too. Poles and obelisks besides their function as monuments to the dead, served as a kind of support: "*when the dead rises* [from the grave]*, he holds on to a pole*" (FMA, villages of Bakur and Ovgort). The tomb cross was also viewed as auxiliary means for the final exit of the dead from the earth – after the Second Coming of Christ: "*After the Second Coming when the end of the world begins, all the dead come out of their graves. The crosses on the graves are set up so their ancestors would hold onto them while standing up to meet Christ*" (FMA, Bakur village). According to this argument, the cross does not allow the dead to leave his grave and keeps him in the earth until the eschatological culmination – the moment of the Second Coming.

Thus, according to the views of the Izhma Komi, the dead behave in a relatively active manner, especially in the first year after the funeral – when going to the other world they do not cut off their connections with this world, with their relatives; they regularly arise, walk around the cemetery, communicate (both among themselves and with living relatives); they can visit their homes yet such visits are unwanted excluding memorial days when parents are especially invited for the meal (besides calendar ancestor commemoration days, the Izhma Zyrians had a custom of inviting deceased parents "for lunch" every Saturday and fairly often visit the cemetery to communicate with the ancestry and "treat" them).

V.N. Belitser wrote that on the border of 19th – 20th centuries tomb crosses were set up only by prosperous peasants, and the rest limited themselves to simple poles which were rough-hewed by axe, giving them the shape of a human figure (Belitser, 1958: 329). The Komi Old Believers had a belief that the cross on the grave was granted to very religious people only, who undeviatingly observed the canons of the Old Faith (they should make themselves worthy of it). The main bulk of simple Old Believers deserved a pole with a little icon cut into it (with the representation of Christ for the male graves and of the Mother of God on the female graves). Poles without icons, with rounded tops – "knobs" – marked the burials of those who strangled themselves and of all those who died bad deaths and thus were not worthy of the holy icons (Shurgin, 1996: 184). The field material cited above allow us to suggest that the reason for setting up a cross or a pole on the grave is determined not by property status or social level of the dead but religious principles, going back to pre-Christian beliefs, based on the ancestors' cult which allowed for their walking on the earth after death. It should be emphasized that the Zyrians' attitude to this "fact" is neutral-positive as opposed to the unambiguously negative reaction to the "apparitions" of the dead which belonged to the category of the "*hostage*" (Zelenin, 1995: 39 – 88) equated with the *undead*. That is, the wandering on earth of these *hostage*-dead and the coming out from the grave of the ancestors who died a natural death are the phenomena of different kinds.

In general, one can view the Komi Zyrians's attitude towards the dead as similar to their attitude towards living people. For example, it is forbidden to throw earth upon the coffin (and to avoid that they set walls made of planks inside the grave and construct a roof above the coffin) since it is believed that the dead can feel pain

and fear (FMA, villages of Bakur, Sizyabsk, Muzhi, and Ovgort). Sometimes they make a little window in the cover or side of the coffin so that the dead "*could look*" into this world (a version: "*so it would be bright*") (Belitser, 1958: 329) (similar beliefs were written down by Yu.A. Krasheninnikova in 2000 – 2003 among the Izhma Zyrians).

It is worth noting that, according to folk beliefs, the activity of the dead with negative status (*impure*, *hostage*) is traditionally higher than that of their deceased ancestors (Zelenin, 1995: 39 – 88). Thus in the society, where the faith in daily and ubiquitous contacts with the representatives of the other world is so strong (in particular among the Izhma Komi), various amulets and rituals aimed at neutralizing malicious representatives of the other world are just logical and natural. The crosses set up at the entrances to the villages were aimed to not letting unwelcome guests from the other world. First of all with this people wanted to protect themselves from harmful spirits – demons and the *hostage*-dead. The latter were ascribed with the capability of inflicting diseases, cattle pestilence, drought, night frosts, and bad harvests (Ibid.: 39 – 140) – exactly those misfortunes against which there was a custom to set up votive crosses.

The connection between the crosses on the graves of the ancestors and rituals directed toward healing diseases is demonstrated by the materials of Yu.A. Trusman (St. Petersburg Province, last quarter of the 19th century). Local residents put offerings in the form of linen scraps of material, wool, and money upon such crosses, that promised health and well-being (Trusman, 1885: 193 – 194).

The building of sacred crosses among the Izhma Komi has many aspects in common with the eastern Slavic rituals of making *obydennye* (common) *towels* and the building of *obydennye churches*, similarly aimed at fighting epidemics (more rarely – drought, hail, and lengthy rains) (Zelenin, 1994). In the case of a cattle pestilence, the Byelorussians set up a wooden cross at a road beyond the village (which men made in one night) and hung a towel on it (woven by women in the same time period) and after that the ending of the epidemic disease was expected. A ritual towel hanging on the cross served a direct barrier for the disease and death: it was believed that death reaching this barrier could not cross it, turned away and passed by (Ibid.: 195 – 196, 200 – 201).

Wooden crosses richly decorated with woven towels, belts, and bands (and called the '*obrok*' or 'tribute' crosses) stood in the settlements and at roads throughout all of Byelorussia (Belorusy, 1998: 256). Occasional collective rituals, performed in extreme cases (during drought, pestilence, or epidemic) and addressed to road and other types of crosses were widely practiced in Byelorussia and the Western Ukraine (Lysenko, 1998: 182 – 184). The most prevalent form of vow was the promise to donate a square of cloth or towel "for the cross." The Russian population of the Arkhangelsk Province had a widespread custom of setting wooden crosses and poles (which were called '*little chapels*') at the sides of the streets, at the entrances to the villages, at roads, crossroads, in groves and so on. They often hung "pieces of fretted cloth, patterned linen or canvas," upon which little crosses were embroidered (Efimenko, 1877: 32 – 33). High votive crosses at Mezen were decorated with aprons, silk scarves, and dolls; people put money there (Permilovskaya, 2001: 238).

Comparing eastern Slavic rituals connected with wooden crosses, with the tradition of setting up crosses by the Izhma Komi as well as the custom of hanging scraps of material and little sewn crosses upon the cross of St. Panteleimon in the village of Sizyabsk (see Fig. 1 – 3), one cannot but notice an obvious resemblance. Secondly, both were erected in case of loss of cattle. Thirdly, the scraps of material in a certain sense can be brought into correlation with the *obydennye towels*. The informants emphasized that little crosses are sewed on scraps of material, which then are pinned up to the cross "with prayers and requests." In this case, the motive of the secondary sacralization of the scraps of material is present. It was believed that cloth possessed a certain sacred status, which was increased when the representation of the cross appeared on it (moreover, little crosses are not painted but are embroidered or sewn on, which can be connected with craft magic), and it increases even more when it is attached to a wooden cross, as a sacrifice put on the altar receives absolute sanctity. If in eastern Slavic rituals *obydennoe cloth* was prepared by all the women of the village, here, apparently, one can see a local version which had an individual expression (when prayers and requests relate not to the whole community but to individual persons) responding more to a socio-cultural tendency in the modern worldview.

Among the Izhma Komi, the correlation between the scraps of material with little crosses hung on the cross and the dead was denoted only in a relative sense. During the interview most of the residents of Sizyabsk did not connect this custom with commemoration of the dead. Yet along with many remarks on apotropaic and "pleading" functions of the scraps of material there also sounded such an opinion: "*These scraps of material with crosses are memos to the buried here from their relatives who live far and cannot visit their dear graves. Passing by, the strangers see the crosses and from this the souls of the dead feel that their relatives remember them*" (FMA, Sizyabsk village). Perhaps an opinion which preserved the rudiments of ancient tradition of road burial expressed itself in the context of this statement. The dead, whose souls have dissolved into the surrounding world, find embodiment in scraps of

material dedicated to them, just as they are personified in grave monuments, icons, and photographs. Evidently, according to the beliefs of the local dwellers, the dead look at the world through the eyes of other persons – through the eyes of people passing by who took a look at the cross and commemorated them.

Despite the fact that this opinion was registered only once, it is very interesting in a sense of comparing it with similar rituals in the Russian population. In Novgorod Province, there was a custom of hanging scraps of material or towels with embroidered black or red crosses upon trees and road crosses. In the past, these towels and scraps of material were nailed to the outer walls of houses for six weeks after the death of one of the household members on the basis of the belief that the soul of the dead for forty days flies to its house, washes with water, and wipes with the embroidered towel (Gerasimov, 1895: 124). To a certain degree this custom has something in common with the tradition (which the Slavs and the Finno-Ugric peoples had in all places) to leave towels on grave monuments, as well as with the Komi's custom to hang a clean towel when the dead is in the house – so that his soul after having washed could wipe itself. Yet in the text of M.K. Gerasimov, the precise time is indicated: the soul flies to its house until the fortieth day. Here it is not explained for whom the towels hung on road crosses after the fortieth day are intended.

According to popular Orthodox beliefs, on the fortieth day the soul of the deceased bids farewell to its relatives and home, passing on to the other world for good (it will visit its intimate people only on commemoration days). Evidently, it has become one of the family's guardian ancestors (if, certainly, we are speaking about the soul of a person who died from old age) (Sedakova, 2004: 31 – 32). Accordingly, the towels intended for the dead until the fortieth day had to be located within the home space, and after that time they were evicted out of its boundaries. If the towel nailed to the wall of the house was intended for a specific soul – for a person who had recently passed away – apparently, after the removal of the towel to the road cross, the meaning of the towel became somewhat more abstract (for the whole assembly of the ancestors). In this situation one can notice an analogy with personal (mainly textile) possessions of the deceased which one had to get rid of also within forty days. They were partly destroyed by burning or putting in a stream of water (Ibid.: 52 – 54). It was believed that in this way the things reached the other world. The other part of the dead person's things was given out to relatives and neighbors "for the commemoration of the soul" (there also existed a custom of letting the coffin down on long strips of linen which afterwards were cut into small pieces-"towels" and were divided up between those who came for the burial) (Ibid.: 203 – 204). Here the motive of continuing the life of the deceased person in this world is present. Personal things of the deceased, cuts of fabric, and other sacrificial objects which were distributed to those close to the dead, served as attributes of the deceased, substituting for him in the world of the living. Perhaps through such objects and people who used them the souls could sense this world just as they looked through the eyes of the people who passed by, saw the crosses and memorial scraps of material. In this way the dissolution of the soul in society occurred, necessary for the soul's rebirth and new coming to the earth. And until then the souls of the dead, while in the other world visited this world – they had a need for food and other attributes such as scraps of material or towels.

On the one hand, the meaning of towels and scraps of material was interpreted as a direct gift to the dead (towels hung on grave monuments and grave fences or cloth-"memos" on a road cross). On the other hand, textile goods were viewed as amulets or sacrificial gifts aimed at coaxing the spirits and obtaining help and protection in some important enterprise. But even in this case the addressees were the representatives of the world of the dead: either ancestors who died and became guardian spirits or *hostage*-dead from whose impact people protected themselves by two methods – scaring them away or coaxing with gifts. For example, hanging pieces of cloth on trees – "*to the mermaid for a garment*" – was a widespread ritual in the Slavic world (Zelenin, 1995: 187). Mermaids were considered *hostage*-dead, representing a certain danger both for the people and for the harvest (they could cause storms, rains or drought) and demanded for themselves propitiatory sacrifice in the form of scraps of material, towels or off-cuts of linen. Mermaids who received a generous gift could make the giver happy and grant him, for example, a good harvest of flax or "getting along" (deftness) in spinning, and so on (Schein, 1902: 317; Vinogradova, 1986: 102).

Thus the purpose of the pieces of fabric with little crosses, which hang upon crosses and trees, becomes clear: these are dedicated to the deceased.

One more symbol of the Christian cult – the Crucifix – is adapted by the Izhma Komi-Zyrians in a peculiar manner.

In the attic of a house in the village of Bakur in 2003, a fragment of a wooden Crucifix was located (Fig. 5 – 9). Its main part – a sculpture of Jesus Christ made of wood and painted was preserved; the cross was lost. The height of the figure is approximately 110 – 120 cm. The parts of his body and his features are proportionate. His head is bent and slightly lowered, his eyes are closed. His hands and feet are shown pierced with nails and blood streams from his wounds. On the right side of his chest bloodshot spots are depicted. The statue represents Christ undressed – only wearing a waistcloth. The sculpture is executed in

Fig. 5. Sculptural representation of Jesus Christ (the fragment of the Crucifix) from the Bakur village.

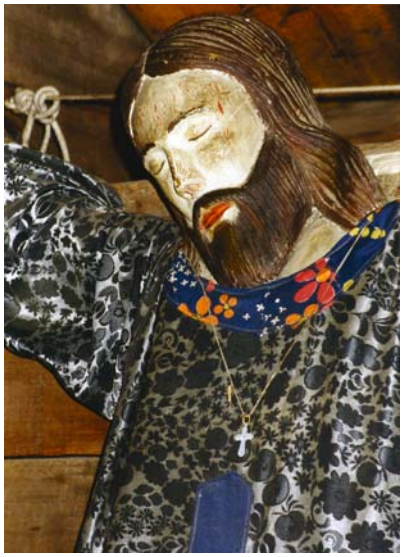

Fig. 6. Fragment of the wooden sculpture of Christ.

Fig. 7. Fragment of the wooden sculpture of Christ.

Fig. 8. Demonstration of the clothing which the sculpture was robed in.

Fig. 9. Demonstration of the sculpture of Christ.

a fine manner. All the small details are thoroughly worked over. The features of Christ's face are carved accurately and delicately. His hair, mustache and beard, ribs which naturalistically show through the skin, smooth folds of the waistcloth rise above in relief. This piece can be approximately dated to the end of the 19th century.

The attic where the sculpture was kept, was the upper part of the dwelling house. Half of this premise was used for storage of old furniture, gardening equipment, and various utensils, and for storage of dried herbs. In the brighter part of the attic not far from a small window, the sculpture surrounded by icons was located. It stood on a little stand covered with towels and scarves. At its feet there were candles, put on a saucer and into a can (Fig. 7). In the same place candles and a croissant lay in a little bowl covered with a sheet of paper. Thus this part of the attic represented a makeshift altar whose main sacred object was the fragment of the Crucifix.

The keeper of this fragment Olga Semyonovna Kaneva told us the story of the statue. When in Bakur they were destroying the church according to the decree of the Soviet government (the informant attributes this event to the end of 1930s; according to other sources, this happened in the early 1950s), together with the icons the Crucifix was thrown away. The believers (who were the majority of the village) could not allow for the desecration of the holy objects. They took the icons to their homes and carefully hid them. Olga Semyonovna's mother-in-law brought home the wooden sculpture of Jesus Christ already detached from the cross. Later it was set in the attic. Their house became in a way a center for the statue's veneration, partially replacing the destroyed (until now not yet restored) church. People came there to pray to Christ, light candles and

address various requests. In most cases, they asked for the healing of sick relatives or the successful outcome of certain enterprises. More often women came to the Crucifix even if the matter was concerned with praying for success in male occupations (hunting, reindeer farming); they asked for success for their men – husbands, sons, fathers, and brothers. They usually gave vows that in case of a successful outcome they would give Christ gifts. The statue was brought scarves, towels and clothes, "treated" with pies and bread, candles were lit.

In the end of the 1950s, the husband and two sons of one of the village women went to the tundra and did not return at the expected time. The worried woman came to the sculpture and started to pray to Christ about the return of her dear ones. She gave a vow that if her husband and sons survived, Christ would be given a beautiful shirt as a gift (until then the statue was still not dressed). The next day her husband and sons returned home unharmed. As a sign of her gratefulness the woman sewed a shirt and clothed the statue in it. On the chest of the shirt she embroidered a cross. Later other villagers started to give similar vows and in cases of healing from serious diseases or returning lost people from the taiga, they donated Christ new clothes.

In the summer of 2003, the sculpture was robed in two shirts with crosses sewn in an overlay pattern (see Fig. 8, 9). A large pocket (from colored fabric) was sewn to the lap of the upper shirt. A little tin cross was put on the statue's neck. Scarves and towels, put at the feet of the Crucifix were also decorated with embroidery or an overlay pattern in the form of a cross (in the center). Women would come to the attic of Kaneva's house to pray. They would light candles. Clothes were given as a gift not very often – only in the case of a successful outcome of especially important matters relating to life and death. The amount of shirts put on the statue was different (from one to three). When the clothing turned shabby, it was changed to new ones. Sometimes the Crucifix was given new outfits within a short period of time, then the shirts were put one on top of the other. If the "shirts became worn-out" and for a long time nobody brought clothes as a gift, the owner of the house sewed new clothing for Christ herself.

In essence, the Crucifix (or even its fragment) is the Cross. The Christian religion has very harmoniously assimilated the ancient solar symbolism of the Cross and thoroughly contaminated it with its doctrines. Popular Orthodoxy, which absorbed many pagan traditions, through operating with this symbol raised up from the depths of consciousness other more ancient strata of a religious worldview. The Cross was perceived not only as the tool of Christ's death and the symbol of his resurrection, but also as a primordial solar sign which defended from dark forces, hostile to nature and the human being. As a result of this, Christ depicted as crucified on the Cross could act as guardian spirit. The connection between the death and resurrection of the Lord with the Cross interweaves Christian symbolism with pagan: the Cross, being a solar sign, manifests the idea of regeneration and eternal life, and opposition to the forces of darkness.

Scarves and towels with embroidered (or sewn) crosses which were brought as a gift to Christ, in fact could be a modification of the scraps of material pinned to a road cross or hung on trees.

Thus the facts presented here show one more version of adaptation of the Christian cult. In the ritual-folklore complex and ritual practices of the Izhma Komi the elements of different mythological notions vividly manifest themselves. The origination of these elements was extended over time and was connected with different religious systems. At the same time, the common symbolism is preserved. The cross represents a unique model for research in this direction.

The idea of setting up a votive cross was evidently borrowed by the Komi-Zyrians from the Russian population. This is testified by numerous examples of building similar crosses in the Slavic world. Besides, according to the reports of the priests from the Arkhangelsk Province from the year of 1880, at that time such crosses existed in all parishes, and not in a small amount (for example, crosses in the Conception parish of the Kholmogory Uezd (District) numbered 22) (Ovsyannikov, Yasinski, 1995: 28 – 37). In this connection one may point to the remarkable fact that most of the crosses were located near the Russian or the Pomor settlements or where the Russian population was predominant. Near the Izhma village only two crosses are reported. One is placed in front of the village, at the parting of the ways; apparently crosses were set in such places according to ancient custom. The other one is behind the village, on the meadow (Ibid.: 36).

Thus, the Christian symbol became closely combined with the pagan beliefs of the Komi-Zyrians. The close nature of such combinations, on the one hand, points to a certain degree of universality of components in both early mythological and developed religious symbols. On the other hand, it allows us to suggest that the tradition of setting up crosses and associated sacrifices is close to analogous pre-Christian rituals of the Komi, and, first of all, to the cult of trees which is widespread among the Finno-Ugric peoples. Sacred trees which guard the whole village community and its territory as well as personal guardian-trees are known in the realm of ritual and everyday life of the Komi-Zyrians. Besides, trees on the grave or in the graveyard according to their beliefs, could serve as monuments to the deceased and as a means of communication between living people and the dead or the spirits of the other world (Sharapov, 1993).

List of main informants

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FOLKLORE-MYTHOLOGICAL PARALLELS AMONG PEOPLES OF WESTERN SIBERIA, NORTHEASTERN ASIA, AND THE LOWER AMUR – PRIMORYE REGION*

The folklore and mythology of Western Siberia, Northeastern Asia, and the Lower Amur – Primorye region share a series of common tales, or more to the point, tale-producing motifs. None of them have been studied to any extent, and many remain completely unnoticed. Some motifs connect Western Siberia and Northeastern Asia, while others are know in Western Siberia and among the people of the Lower Amur. There are also motifs represented in all three areas. In America, the same motifs are mostly found in Alaska, the Northwest Coast, and the Plateau, i.e. in the areas which are relatively close to Asia. These are more typically told by the Indians than by the Eskimo. Among the Yakuts and the Tungus, the motifs in question are either absent or represented by peculiar variants, while among the Turkic- and Mongol-speaking people of Southern Siberia no parallels are found at all. Such an areal distribution might be explained by the suggestion that a unified Siberian folklore province disintegrated relatively recently, after the arrival of the Yakuts and the Tungus. The new-comers borrowed some motifs from the substratum and brought others from their homeland. Earlier, similar sets of folklore-mythological motifs were typical both in Siberia as well as in the North American Northwest.

In a short paper, we can examine only a few selected tales (motifs) which evince the former cultural unity of Siberia. After this we will address some more distant parallels to get an idea of the place of "Trans-Siberian" mythology in the Eurasian – American context.

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Western Siberia – Northeastern Asia – Alaska

The Blind Hunter. A woman directs her blind husband's arrow at an animal, then lies to him by saying that he has missed, then eats the meat herself. The man realizes that he has been deceived and usually regains his sight. In Northeastern Asia, this motif was known to the Yukaghirs (Zhukova, Chernetsov, 1994: 66 – 68; Nikolaeva, Zhukova, Demina, 1989, N 48: 29 – 33) and Even (Lamut) (Novikova, 1987: 76 – 77); in Western Siberia, it was recorded among the Khanty. The Even and two Yukaghir versions are similar in details. In these versions, an old hunter goes blind. When he discovers the truth, he leaves his wife alone on an ant-hill. In one of the Khanty variants (Pelikh, 1972: 376 – 377), an old man is about to slide down a hill. Before doing so, he takes out his eyes and puts them aside, but his wife finds and hides them. The old man thinks that magpies have stolen them. The old woman tells her husband that an elk is nearby, asks him to shoot it, lies that he missed, and eats the venison herself. The old man says that her brother has come, builds a new log-hut near their old dwelling, and digs a tunnel from the new hut to the old one. While crawling through this tunnel from one hut to another, the old man represents himself as both himself in the first hut, and the feigned brother in the other. The old woman believes the ruse, feeds her "brother,"

and tells him about her tricks. The "brother" gives her advice not to torment her husband anymore. In the end, the old man gets stuck in the tunnel, at which point the old woman pushes him though with a poker, and gives him his eyes back. According to another version (Lukina, 1990, N 65: 189 – 191), the wife observes how her husband takes his eyes out of their sockets saying, "Samlak ram-ram-ram." Otherwise, the plot is the same. From what the old woman says, the feigned brother finds out that his eyes are hidden in a chest. He finds them and scolds his wife.

This story belongs to the Western Siberian trickster cycle that has parallels in the Northeastern Asia and Northwestern North America (for example, the episode with the eyes being put aside is typical of the Koryaks, Kamchadals, Eskimo, and Athabaskan groups). Stories connected with the Eastern Siberian trickster (Ivul' among the Tungus) are totally different. In America the *Blind hunter* motif is known to the Eskimo*, most of the Northern Athabaskans**, the Indians of the Northwest Coast***, and some Indian groups of the Great Basin and Northern Plains****. In all American Indian and Siberian texts, the hunter is deceived by his wife as he aims at a deer or elk. Among the Eskimo, he aims at a bear while the deceiver is the hunter's mother.

The motif of the *Feigned dead man* (Trickster feigns death and eats grave offerings, K1867) also demonstrates the West-Siberian – Paleo-Asiatic – American parallels.

Nenets (three versions) (Vasiliev, 1992: 5 – 6; Kupriyanova, 1960: N 13, pp. 98 – 99; Lar, 2001: 273 – 277). Yeompu (Yompu, Yombo) tells his mother, grandmother, or wife that he is dying and asks her to put him in a bark vessel with caviar at his grave. His relative, seeing the alleged dead man eating the caviar, cries out that some bears, or a devil, are coming. The frightened Yompu jumps out of the grave.

Enets (three variants) (Sorokina, Bolina, 2005: N 1, pp. 17 – 20; N 5, pp. 30 – 31; N 6, pp. 34 – 36). Dëa lives in his hut with an old woman and a boy (sometimes the boy is his younger brother). He plays dead, and the salmon caviar is put in his grave. The boy sees how Dëa is eating the grave offerings and cries out that bears are coming. Dëa jumps out of the grave.

Khanty (Lukina, 1990: N 31, pp. 125 – 127). Imikhity tells his aunt that he is dying, asks her to put his body under a boat together with his fishing net, axe, and cooking pot. When the aunt visits the grave, she sees the wet net and the fresh fire-place and thinks that someone has used the grave goods. The trickster's uncle, who is able to transform himself into a bear, tells the aunt that her nephew has deceived her. The aunt pretends that a bear is attacking her, and the supposed dead man comes back to life.

Northern Mansi (Kupriyanova, 1960: 92). Ekva-pygris', who lives with his grandmother, tells her that he will die on a certain day. The grandmother buries him near a fish-trap. One day she visits the place and mourns there. Her grandchild suddenly grabs her kerchief, proving to be alive, and they return home.

Kets (Dulzon, 1966: N 12, p. 39). Kasket pretends to be dying and asks his grandmother to bury him. She visits his grave and sees that his lips are "red as caviar." This means that he is actually alive. A similar trick is later repeated by the grandmother herself.

No direct parallels for such an episode are found among the ***Selkups.*** The data on Selkup folklore are insufficient, so this motif could be actually known to them. One of their stories, about a lazy son who says that he would rather be buried than work, could be the initial part of the *False dead man* tale (Ibid.: N 48, p. 31).

In Northeastern Asia, the *False dead man* was known to the Yukaghirs, Paleo-Asiats, Kamchadals, and Chukotka Eskimo.

Yukaghirs (Bogoras, 1918: N 4, pp. 48 – 49). An old man pretends that he is dying and asks his wife to leave him with all his possessions in the abandoned house. The old woman carries the body to the burial place. When she jumps over a creek, she makes an indecent sound. This makes her husband laugh. Their son notices this, but his mother does not believe him. After several days, the boy notices smoke over the abandoned house. The old woman looks into it and sees her husband eating the meat of a fat elk. She plucks a partridge and tells it to fly in and scratch the man with its claws. The man gets scared and runs home. His wife beats him, and then they make it up.

Chukchi (Bogoras, 1902: N 10, p. 648). Raven is playing dead. His wife, Miti, carries his corpse to the old underground burial house and makes an indecent sound on the way. Raven laughs, their son notices, but Miti does not believe him. She leaves some bags with meat and fat at the burial place and goes away. Fox sees Raven cooking

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* (Boas, 1888: 625 – 627; 1901: N 4, pp. 168 – 171; Hall, 1975: N PM56, pp. 245 – 247; Hawkes, 1916: 157 – 158; Holtved, 1951: N 37, pp. 152 – 165; Keithahn, 1958: 76 – 79; Kroeber, 1899: N 6, pp. 169; Lucier, 1958: N 11, pp. 96 – 98; Menovschikov, 1985: N 230, pp. 445 – 449; Mishler, 2003: 53; Norman, 1990: 81 – 86; Nungak, Arima, 1969: 51; Rasmussen, 1930a: 77 – 80; 1930b: 108 – 109; 1931: 232 – 236; 1932: 204 – 205; Spencer, 1959: 396 – 397).

** (Boas, 1916: 827 – 828; Farrand, 1900: N 21, pp. 35 – 36; Krauss, 1982: 88 – 89; McClelland, 1975: 78; Petitot, 1886: N 32, pp. 226 – 229; Smelcer, 1992, pp. 113 – 114; 1993: 57 – 60; 1997: 37 – 39; Teit, 1921: N 34, pp. 226 – 228; Vaudrin, 1969: 15 – 18).

*** (Boas, 1910: N 33, pp. 447 – 452; 1916: 246 – 250, 825 – 827; De Laguna, 1972, pp. 888 – 889; McIlwraith, 1948: 661 – 662).

**** (Dorsey, 1904: N 26, p. 32; Dorsey, Kroeber, 1903: N 125 – 127, pp. 282 – 287; Lowie, 1924: N 49, p. 78; Mason, 1910: N 4, p. 301; Skinner, 1925: N 36, pp. 496 – 497).

food (or just notices smoke above the lodge) and tells Miti about it. Miti cuts off one of her breasts, sews a plucked partridge in its place, and then falls on Raven through the smoke hole. Raven gets scared and returns home.

Koryaks (Karaginski dialect) (Zhukova, 1988: N 38, pp. 143 – 145). Big Raven (Kutkyniaku) pretends to be dying and asks Miti to put a mortar, a pestle, some fat, and some fire wood on his grave. He climbs out of the burial pit, and eats ground meat and fat. Seeing his sons coming, he climbs back into the grave. In his Raven guise, he flies home to peck the jerked meat. When his sons recognize him, he is ashamed and returns.

Koryaks (Maritime) (Jochelson, 1908: N 65, p. 224). Big Raven (Quikinn.a'qu) hitches some mice to his sledge and rides to the Reindeer people. They laugh at him and put a heavy load of meat on his sledge, but the mice carry it away. Coming home, Quikinn.a'qu pretends to be dying and asks his sons not to burn his corpse, but to put it into an empty underground house with a lot of food. There he eats alone. His sons secretly look into the house and tell their mother about the deceit. She cuts off her breasts, attaches them to the plucked ptarmigan and tells it to fly to Quikinn.a'qu. He gets scared and returns to his wife.

Alutors (Kibrik, Kodzasov, Muravieva, 2000: N 2, pp. 21 – 24). Qutkinniaqu pretends to be dying, asks Miti not to bury him in the ground, but to leave him alone in an old underground house with all his possessions. He sets some noose traps, and cooks and eats hares and partridges. Miti sends her sons to see their father's burial place. Qutkinniaqu fails to make his sons believe that he is dead. Miti comes to beat him, they become reconciled, and return home.

Kamchadals (three versions) (Menovschikov, 1974: N 167 – 169, pp. 508 – 512). Raven says that he will die soon, and asks Miti to put food in his grave. When all the supplies are eaten up, he pretends to return from the land of the dead. In one of the versions, Raven's daughter notices her father laughing, but people do not believe her. Then she sees fire at the burial pit.

Chukotka Eskimo (Chaplino village, four versions) (Kozlov, 1956: 190; Menovschikov, 1985: N 33, 34, pp. 76 – 78; N 101, pp. 244 – 245). A hunter pretends to be dying and asks to be buried with his fishing net. A polar fox or partridge tells his wife that the supposed dead man is fishing and eating the catch by himself. His wife throws a wooden crow or a plucked partridge into the underground house used as a burial place. Her husband gets scared and returns to his wife.

The name of the trickster's wife in the Chaplino text is Miti. This might mean that the tale was borrowed from some Paleo-Asiatic group, especially since no parallels are known among the American Eskimo. Though in North America the tale is not known to the Eskimo, it is recorded among the Indians of the Northwest Coast. All the Siberian versions are more similar to each other than to the American ones.

Koyukon (Jetté, 1908: 363 – 364). Raven plays dead, asks his nephews to leave him alone, and then to send his two wives to the place. He eats some meat that the nephews have hidden there and rejoins his wives. In another text (De Laguna, 1995: N 37, p. 266), Raven pretends to die because he is eager to know how people would react to his death. Those who disbelieve or talk badly about him are beaten.

Tanaina (Rooth, 1971: 189, 208, 235). Raven flies into a whale and kills it from the inside. The dead whale floats to the shore. Raven tells the people that it is dangerous to eat the whale, and advices them to move away. He then pretends to be mortally ill and asks to be left alone with his snow-shoes on his burial place. He then eats up the whale by himself.

Tlingit (Boas, 1895: N XXV/1, p. 315). Raven and Kintsino come to the people who have fish oil. Raven tells Kintsino that he will die, asks to be put into a coffin and to tell the people to abandon the place without taking oil with them. Kintsino ties Raven up firmly, and then eats the oil himself. When Raven breaks out of the coffin, all of the oil has been eaten up.

Tsimshian (Boas, 1916: N 17, pp. 72 – 73). Raven transforms a piece of rotten willow wood into a slave. They come to a house full of codfish. The slave tells the people that a great chief has come. Raven pretends that codfish oil has dropped into his ear and plays dead. The slave is instructed to send people away and to put Raven in a coffin. However, he ties the coffin firmly and eats the best fish himself. Then he releases Raven and both eat as much as they want.

Kwakiutl (two versions) (Boas 1910: N 12, pp. 135 – 141; 1916, N 40, p. 707). Mink says that he is dying, rejects any kind sort of burial, and asks the people to abandon him on an islet. Some girls find him there eating salmon caviar. Mink explains that he has been revived thanks to his magic powers.

Coastal Salish (Comox, group adjacent to the Kwakiutl) (Boas, 1895: N 4, pp. 73 – 74). Mink says he is dying, asks to be abandoned in a grave on an islet. His wife marries Raccoon. Mink coaxes some salmon to come nearer to him, kills them, and then falls asleep. Wolf carries the fish away, but before doing so, smears Mink's lips with fish oil to make him believe that he has eaten all the salmon himself. Boas mentions another Salish (Chehalis?) version of the same tale in which Mink is also a protagonist (Boas, 1916: 707).

Western Siberia – Lower Amur – Chukotka – Plateau and the southern Northwest Coast

The motif of the *Stolen possessions* (a person turns into baby, is picked up and adopted by an old couple, grows

up, asks to load all their possessions into canoe, and sails away) is also a part of the Western Siberian trickster cycle. Among the Nenets and Enets, the *Feigned dead man* and the *Stolen possessions* are linked as episodes of one and the same text.

Nenets (Yamal) (Lar, 2001: 273 – 277). After escaping from the place of his "burial," Yombu turns into a baby, and creeps under the old woman's skirt. After being adopted by the old couple, he grows up in three days. He asks his adopted parents to kill the last reindeer and load the meat into the canoe. Then he sails away with all the meat.

Enets (Sorokina, Bolina, 2005: N 7, pp. 37 – 38). When an old woman comes out of her hut, *Dëa* grasps her hand, forces her to tell husband that she has delivered a child, and then turns into a baby. When he grows up, he asks his adopted father to kill a reindeer and to move to another place. Sailing away in a canoe with all the meat, he cries to the old people that not their son but Dëa. In another version, he comes to another old woman where he feigns death to eat salmon caviar (Ibid.: N 1, pp. 17 – 20).

Nganasans (Porotova, 1980: 21 – 24). *Diaiku* kicks a tree stump and gets stuck to it. An old man carries him home and tells his wife that a polar fox has been caught in his snare. *Diaiku* turns into a baby and creeps under the old woman's skirt. The old couple adopts him, and he grows up. He asks them to slaughter their only reindeer and put meat in a canoe. Sailing away, he cries to his adopted parents that he is not their son but *Diaiku*.

Dolgans (this motif is most probably borrowed from the Samoyed substratum) (Efremov, 2000: N 17, pp. 277 – 281). *Laaiku* turns into a baby. Jige-baba believes that she has born him. *Laaiku* grows up. He asks the parents to slaughter their only reindeer and moves to the opposite bank of the river. Sailing away in a canoe, he cries that he is *Laaiku*.

Negidals (Khasanova, Pevnov, 2003: N 68, pp. 135 – 136). Fox fashions some eyes for himself made of dark bilberries and then turns into small boy. An old man finds him and adopts him, though the old woman suspects a trick. When the boy has grown up, he asks that all of the possessions be put into a canoe and to let him paddle away. This is the way he carries away the old couple's property.

Though in the Pacific zone the motif of *Stolen possessions* has been recorded only among the Negidals, one of the Koryak texts cited above is definitely related to the same theme. Big Raven first disappears with the loaded sledge, and then he pretends to be dying (Jochelson, 1908: N 65, p. 224). There are no complete analogies to the *Stolen possessions* in America, but the initial episode (trickster turns into baby and is picked up by a woman) as well as the end of the story (trickster acquires his real guise and encroaches upon the property of those who have adopted him) are present in dozens of the Indian myths across the Plateau, the southern Northwest Coast and adjacent areas of California, and in the Great Basin. In most stories like this, Coyote is adopted by women who keep all the fish behind a dam. He breaks the dam and lets the salmon into the rivers (Bierhorst, 1985: 142 – 143).

Tragic incest. A brother marries his sister. When their children find out that their parents are siblings, they kill them, or the father kills the children, or the parents commit suicide.

Smart sister. A sister and a brother live alone. The brother does not agree to have incestuous relations. The sister tricks him into marrying her by pretending to be a stranger.

Mansi: A sister pretends to be a stranger; her brother kills her and their son (Lukina, 1990: N 124, pp. 327 – 332). ***Mansi***: A brother makes a wooden doll in the shape of a woman. His sister destroys it, but makes him believe that she is the doll who has come to life, and that she is bearing his son (Ibid., 1990: N 123, pp. 326 – 327). ***Udeghe***: A sister erects a hut at some distance from their old hut, pretending to be a stranger. Her brother marries her, and then he kills her, and abandons their small son and daughter in the forest (Arseniyev, 1995: 166 – 167). ***Oroch***: same as in the Udeghe (Ibid.: 167 – 169). According to another version, a young man learns of the incestuous marriage of his parents and commits them to the open sea in a boat without oars (Margaritov, 1888: 28 – 29). ***Ulchi***: a brother and sister do not know at first about their blood relations. Their son, then their daughter together with the incestuous parents, are turned into evil spirits (Smoliak, 1991: 78 – 79). ***Chukchi***: Everyone dies. The brother and sister remain alone. The sister builds her hut at a distance pretending to be a stranger. Their descendants people the land again (Bogoras, 1928: N 11, pp. 312 – 316). ***Ethnically mixed population of Markovo***: sister builds a hut some distance away pretending to be a stranger. Her brother kills her (Bogoras, 1918: N 7, pp. 131 – 132). ***Lillooet, Coastal Salish, Quileute***: Somebody visits a girl at night, she secretly smears her lover with a charcoal. In the morning she recognizes her brother; and they run away to live together. When their son understands who his parents are, they burn themselves alive (Andrade, 1931: N 56, pp. 165 – 171; Boas, 1895: N 4, pp. 37 – 40; Teit, 1912: N 34, p. 340).

Western Siberia – Lower Amur

The structure of the tale, which the present author calls *Girl and witch get gifts from relations*, is more complex in comparison with the cases described above. A girl and a witch are each getting married. They must bring gifts from their relations. The girl finds her brother(s) or sister who had disappeared at the beginning of the story. She receives rich presents from them. The witch brings objects of no value at all.

These episodes are inserted into a longer series of adventures of the heroine. The Nenets and Enets versions contain the most obvious parallels for texts from the Russian Far East. Among the Kets (Alekseyenko, 2001: N 133, pp. 240 – 244; Dulzon, 1972: N 75, pp. 83 – 86) only the beginning of the plot is recorded (the witch kills the heroine's mother). In the Nganasan, Selkup, and Ob Ugrian texts, the corresponding incidents become much more understandable if compared with the Nenets and Enets tales.

Nenets (Golovnev, 2004: 248 – 251). Parne and Nenei-ne go to pick grass for insoles. Parne drowns Nenei-ne. Nenei-ne's daughter notices her mother's ear-rings in the grass brought by home Parne, and then she overhears Parne promising her children to cook the meat of Nenei-ne's offspring for them. The Nenei-ne girl runs away with her younger brother. Throwing some objects behind her, she creates mountains and other obstacles in the way of their pursuer. An old woman ferries the children across a river, drowns Parne before she reaches them, and tells the children not to look back. When the brother looks back, he gets cut in two by tree branches. He asks his sister to abandon him on a sand hill. The girl continues her travel and steps into a hole. The Parne girl comes out of it and imposes herself as her companion.

They meet two men. Parne gets into the sledge of the owner of the white reindeer. Nenei-ne's daughter gets into the sledge of the owner of the black reindeer. After some time, both girls must present gifts to their husbands. Parne goes to the hole in the ground and returns with a herd of mice. Nenei-ne's daughter finds her brother who turns to be alive. He gives her new clothes and reindeer. Parne is thrown into the fire and mosquitoes emerge from the ashes.

Nenets (Labanauskas, 2001: 155 – 163). Seven brothers leave to go on a hunt and ask their sister not to go outdoors. Their sister breaks the ban, discovers her brothers' footprints, understands that the boys have turned into different animals and have gone in many directions. The youngest brother becomes a bear. His sister comes to his den. The bear's wife tells her to follow a path between willow bushes, but she walks along a high place. When she sits down on a stump, a witch comes out of it and takes the girl's clothes. The girl then puts on the clothes received from the bear's wife.

The witch marries the owner of the white reindeer, while the girl marries his brother who has black reindeer. The father-in-law sends his daughters-in-law to bring gifts from their relatives. The bear gives his sister the sledge harnessed with mammoths and loaded with a lot of property. When the witch comes, her sledge is pulled by mice which the old people trample. In the final part of the tale, the witch substitutes the girl's child with her own and is punished.

Enets (Sorokina, Bolina, 2005: N 13, pp. 82 – 88). A witch and a woman live together. The woman has two small daughters. The witch takes her companion to pick grass for insoles and offers to groom her head for insects. Then she kills her by thrusting an awl into her ear, brings her body home, cooks it, and eats it. The elder girl recognizes her mother's remains. When the sisters run away, the elder throws objects behind her which turn into obstacles in the pursuer's way.

An old man ferries the girls across river, drowns the witch, and warns the girls not to pick up anything on the island. The younger girl breaks the ban and asks to be left in a bear's den. The elder girl comes across a tree stump from which the witch suddenly appears. They walk together. The witch gets into the sledge of the man whose reindeer are white, while the girl gets into the sledge of his brother whose reindeer are black. The father-in-law asks both daughters-in-law to go to their relatives and bring presents. The Enets woman comes to the bear's den, from which her sister and two bear emerge to greet her. The bear gives the Enets woman two sledges full of rich gifts. The witch brings the mice, which are her reindeer. The old man kicks them to death. The Enets woman gives birth to a boy, the witch substitutes him with her own child but the deception is exposed. They burn her and the ashes turn into mosquitoes.

Nganasans (Porotova, 1980: 13 – 19). An ogress and a woman live together. They each have two daughters. The ogress takes the woman to cut willow twigs, asks her to bow down toward water, and cuts her head off. The murdered woman's daughters hear the ogress telling her children that she will eat the brains of the murdered woman, and that her daughters will eat the brains of the victim's children. The girls run away. Their mother's decorations thrown behind them turn into a mountain and a lake. An old man ferries the girls across a river and drowns the ogress. In the morning, the sisters cannot find any opening in the old man's house. The younger turns into a needle and makes it outside through a crack, but the elder gets stuck. The younger tries to pull her out and in doing so tears her head off. She leaves the head in the bear's den, and then continues her journey. The ogress jumps out of a tree stump and imposes herself on the girls by accompanying them. The end of the story, which was probably the same as in the Enets tale, is missing.

Northern Selkup (Tuchkova, 2004: 208 – 209). Netenka ('a girl') and Tomnenka ('a frog') live at the same camp. Tomnenka invites Netenka to pick grass for insoles and kills her by thrusting an awl into her ear. Netenka's daughter sees how her mother has been slaughtered, and hears Tomnenka telling her children that they will taste the meat of Netenka's children. The girl takes her younger brother and runs away. Her brother pricks himself with an awl or a drill and dies. His sister buries him. Tomnenka's daughter jumps from under a stump, follows the Netenka-girl using wooden bowls instead of skis. Both girls get married. Netenka gives

birth to a boy and Tomnenka substitutes him with a pup. Netenka's husband abandons her, the puppy helps her to hunt, and plays with a boy who comes out of the water. This boy proves to be Netenka's son. She forgives her husband, and Tomnenka is executed. The motif of *Gifts of relations* is absent here but there are other features typical of the tales in question, such as the *Younger brother allegedly dies on the way*.

Northern Mansi (Kupriyanova, 1960: 109 – 112; Lukina, 1990: N 128, pp. 334 – 336). Mos-ne and Por-ne live together. Each of them has a son and a daughter. Por-ne invites Mos-ne to pick dry grass for insoles. Por-ne then suggests that they slide down a slope, and kills Mos-ne by sliding over her with iron skis. Mos-ne's children find their mother's bowels and run away to her sister's place throwing behind them a comb, a whetstone, and matches. The thrown objects turn into a thicket, a mountain, and a fire. When the children sit down on a bed, it falls apart. Three Par-ne appear, and one of them imposes herself as the children's companion. The boy pricks his finger with an awl and dies. Par-ne gets into the sledge of the owner of the white reindeer, while the young Mos-ne gets into the sledge of the owner of the black reindeer. The story goes on to describe a failed attempt to conceal the Sun.

Khanty (Lukina, 1990: N 28, pp. 101 – 104). Fox-woman and Hare-woman live together. Both have children. Fox suggests that they go tobogganing, and then slides over Hare breaking her back. Hare's son and daughter see how Fox gives her own children the meat of their mother. They run away, throwing behind them a comb, a whetstone, and a flint. The objects turn into a thicket, a mountain, and a fire. Fox lags far behind. While the sister is eating cloudberries, the brother falls down through the earth. After this episode, the sister receives her dead mother's name, Mos-woman. She kicks a stump, and a new Por-woman jumps out of it. Por-woman suggests she and Mos-woman bathe, then steals Mos-woman's fur clothes, and gives her bark-clothes to wear instead.

While in town, Mos-woman marries the son of the "Town Rural Old man" while Por-woman marries the son of the Old Tonton (this personage is a poor man and a trickster). Mos-woman comes to the place where her brother had disappeared and finds a house there. A bear comes in, takes its hide off, and proves to be her brother. He then sends his sister to a herd of reindeer.

Oroch (Margaritov, 1888: 29). Seven brothers wound a squirrel. Being afraid of the squirrels' revenge, they hide their sister under a hearth and shoot arrows into the sky. Each arrow hits the back of the previous one and they form a chain. The brothers climb it and disappear into the sky. Their sister travels in search of them and meets Frog. Frog takes her clothes away from her. The girl hides inside of a wooden stick. Two men come and the elder sits down near Frog, while the younger sits down near the stick. He cuts the stick with his knife and sees blood. The elder goes away with Frog, while the younger returns after the forgotten knife and finds the girl. Both men bring their wives home. Both daughters-in-law have to bring their relatives to their father-in-law. Frog brings hers, and then is driven out. The girl calls to her brothers, they descend from the sky, and present her with rich clothes.

Udeghe (Lebedeva et al., 1998: N 31, pp. 107, 227 – 235, 474 – 476). Both Udeghe versions (one of them recorded by V.K. Arseniyev) are not much different from the Oroch one. The seven brothers of the girl descend from the sky and bring rich presents to her father-in-law while Frog's presents are worth nothing.

Negidal (Tsintsius, 1982: N 25, 135 – 139). A father drives his daughter away. She meets Frog, who takes the girl's clothes and ornaments and put them on herself. The girl turns into a stick. Two brothers come, one of them marries Frog, another cuts the stick, sees the blood, returns after the forgotten knife, and finds the girl. The father of both brothers asks his daughters-in-law to bring refreshments and a dowry to show their relatives. Frog cooks frog eggs, and brings some leaves and frogs. The girl goes to a certain larch where sacks with food and clothes fall from the top of the tree. Two men, who prove to be the girl's relatives, descend from the sky. They return the clothes and decorations that Frog had taken from her. Frog and her husband hang themselves.

The context of these Western Siberian and Lower Amur stories is not completely identical but the following episodes are typical of the both regions: (1) girl leaves her home; (2) loses her brother(s) or sister who abandon the human world; (3) meets witch or frog who deals harshly with her; (4) the girl and the witch (frog) marry two brothers or neighbors; 5) the lost (mistaken for dead) brother(s) or sister help(s) the girl to overcome the witch. A similar series of episodes is not known elsewhere, with the exception of some Tungus and Yakut tales which include, however, only motifs which are typical either of the folklore of Lower Amur or Western Siberian. The Amur and the Western Siberian myths have some episodes in common which are unknown in Yakut and Tungus tales (e.g., the motif of the girl having seven brothers). This means that the Tungus and the Yakuts could not have been intermediaries in transmitting the plot across Siberia, but rather borrowed it from an unknown substratum.

Yakuts (Vitashevski, 1914: N II. 1, pp. 459 – 458). Two orphan girls find a stone that turns into a baby boy, and then into an ogre. The sisters run away from him. An old woman stretches her leg out to become a bridge upon which the sisters step to cross over the river. The pursuer is drowned. The sisters go further and meet a demonic woman who locks them up in a closet. The younger girl escapes through a crack, but the elder gets stuck and her head is torn off. The younger takes her sister's head

with her. The head agrees to be left only on a tree hit by lightning. The younger sister comes to Frog who hides her. Frog's husband discovers the girl, and tells Frog and the girl to bring presents from their relatives. Frog brings worms and leeches. The girl returns to the place where she left her sister's head and finds her sister married to Thunder. Thunder gives the girl valuable objects, and tramples down the leeches. The husband tells both wives to spend a night on the roof of the house. Frog freezes to death. There is another Yakut text with a similar plot which is fragmentary (Ibid.: N I. 5, pp. 456 – 458).

Tungus (Sym River, western tributary of the Yenisei). Wolverine has eaten the mother of two Hare-girls. They come to an old woman who tells them what path they should follow. They choose the wrong one and end up in a house without openings. The elder girl slips through a crack, but the younger gets stuck. Her severed head asks the sister to leave her, not on a log, but on a tree hit by lightning. There she marries Thunder. The younger sister comes to Frog. The text is then cut short and distorted. It is only told that the "reindeer" brought by Frog were insects and since that time frogs have lived in water (Vasilevich, 1936: N 22, pp. 23 – 24).

"Trans-Siberian" mythology in the Eurasian – American context

The motifs examined here differ from those which are widespread across Southern Siberia, Central and Western Asia and in North America east of the Rockies (Berezkin, 2003; 2005c: 148 – 151). First of all, the content of texts is different. The motifs of the Southern Siberian group describe the deeds of a young, male hero, while the protagonist of the trans-Siberian tales is always a child, a young woman, or a trickster. The area spread of the folkloric elements in question also is different. As it has been already noted, those motifs and tales, which were probably distributed throughout trans-Siberia before the Tungus and Yakut migrations, are localized in the North American North-West, i.e. across territories that are relatively close to Asia. This situation might be taken as an argument in favor of their late dissemination; inasmuch as we are concerned with details, such a suggestion would make sense. However, when we appeal to a wide set of Eurasian and American data, the situation looks different. The same motifs (perhaps, more rare or with some modifications unknown in Siberia) are represented across the whole Circum-Pacific region, and are absent in continental Eurasia. For example, the *Blind hunter* is known in Brazil among the Paresi of Mato Groso (Pereira, 1987: N 163, pp. 662 – 663), while the Siberian tale about the girl and the witch contains common elements with the most popular trans-American tale about *Girls in search of the marriage partner* (Berezkin, 1999). More precisely, this tale is distributed throughout the Circum-Pacific area, having been recorded also among the Ainu, as well as in Australia and New Guinea. The motif of the *Arrow chain* used to climb up to the sky that is found in the Udeghe and Oroch myths is one of the most typical Circum-Pacific myths widely known in North and South America, Australia, Melanesia, Malaysia, and Indonesia, though totally absent in Africa, Europe, and across most of Eurasia.

The tale known to Americanists as *Bear-woman and Deer-woman* is especially significant. Two women live together and have children. One of them is often associated with a bear or other big mammal predator, another with an herbivorous animal or a weaker predator. The first one kills her companion and then has a discussion with her children about the best way to kill and cook the victim's offspring. The orphan children take revenge on the murderer by killing her children, or by escaping. In Western Siberia, this story initiates a series of the adventures for the heroine who runs away from her mother's murderer, and then has to take a witch as a companion. As it has already been mentioned, this series of episodes is recorded among all the Western Siberian people including the Kets. In most Siberian and American versions, the ogress kills her victim when they both go to pick grass or wild tubers. Usually the ogress offers to groom the victim's head, but bites her neck or thrusts a sharp object into her ear instead. Sometimes she drowns her. Though the Western Siberian ogress is not named Bear directly, her name "Por" is associated with the Ob Ugrian Por moiety. The ancestor of this moiety was considered to be a bear, while the ancestor of the Mos moiety was a hare or a female goose (Kulemzin, 2000: 200, 203 – 204).

In North America, the *Bear-woman and Deer-woman* myth is found across a wide but compact area in the western part of the continent from the Salish to the Eastern Pueblo* as well as among the Menomini

* (Adamson, 1934: 43 – 46, 211 – 213; Barker, 1963: N 1, pp. 7 – 13; Barrett, 1933: N 87 – 90, pp. 327 – 354; Benedict, 1926: N 16, pp. 15 – 6; Boas, 1895: N 9, pp. 81; 1901: N 15, pp. 118 – 128; 1928:. 274; Dixon, 1902: N 9, pp. 79 – 83; Dubois, Demetracopoulou, 1931: N 36, pp. 352 – 354; Espinosa, 1936: N 30, p. 97; Gatschet, 1890: pp. 118 – 123; Gifford, 1917: N 2, pp. 286 – 292; N 13, pp. 333 – 334; 1923, N 23, pp. 357 – 359; Goddard, 1906: N 2, pp. 135 – 136; 1909: N 17, pp. 221 – 222; Haeberlin, 1924: N 31, pp. 422 – 425; Hilbert, 1985: pp. 130 – 136; Jacobs, 1940: N 13, pp. 152 – 155; 1945, pp. 115 – 119, 360 – 363; 1958: N 15, pp. 141 – 156; Kelly, 1938: N 202, pp. 431 – 432; Kroeber, 1907: N 10, pp. 203 – 204; 1919: N 11, pp. 349, 351; Lowie: 1909, N 9, pp. 253 – 254; Merriam, 1993: 103 – 109, 111 – 112; Oswalt, 1964: N 5, pp. 57 – 65; Parsons, 1926: N 60, pp. 155 – 157; 1931: 137; 1932: N 16, pp. 403 – 404; 1940: N 52, pp. 109 – 111; Sapir, 1909: N 13, pp. 117 – 123; 1910: N 24, pp. 207 – 208; Smith, 1993: 37 – 38; Steward, 1936: N 28, p. 388; Teit, 1898: N XXII, pp. 69 – 71; 1909: N 21, 62, pp. 681 – 683, 753; 1912: N 19, pp. 322 – 323; Uldall, Shipley, 1966: N 2, pp. 21 – 25.).

of the Great Lakes region (Bloomfield, 1928: N 110, pp. 493 – 501). In many texts, the children of the murdered woman escape by crossing over a river on the extended leg or neck of a person who is waiting for them on the opposite bank. This motif is absent in Western Siberia, but is known among the Yakuts (including the northern groups), Kirenga Tungus, Oroch, Nivkhs, Yukaghirs, and Kerek*. In all cases the person who runs away from the ogre and crosses the body of water along the leg-bridge is a young or small girl, or two children, but never a male hero. The Siberian and North American motif of the *Leg-(or neck-) bridge* is not known anywhere else.

Parallels for Siberian myths are found in South America though there (in the Chaco area) both the murderer and the victim are males associated with jaguar, wolf (Chrysocyon branchyrus), and deer (Calífano, 1974: 49; Wilbert, Simoneau, 1982: N 2 – 4, pp. 38 – 44; 1987: N 101–103, pp. 403 – 418). But more noteworthy are parallels found in South and Southeast Asia.

Tibetans of Sikkim (Krapivina, 2001: 135 – 143). Hare-woman and Bear-woman live nearby. Each has a son. When both go to dig wild tubers, Bear-woman kills her companion. The Hare-boy tricks the Bear-cub into being crushed by hard quern-stone and runs away. Bear-woman pursues him but is killed by Tiger.

Loda (Halmahera) (Baarda, 1904: N 12, pp. 438 – 441). Two co-wives go fishing together, and one pushes the other into the water, slaughters her, brings the meat home, and tells the victim's son and daughter that she is cooking fish. The children hear their mother's voice from the cooking pot. They roast the ogress' own child, and then run away. A bird helps them to cross a river, and drowns the pursuer. Similar tales are recorded in other areas of Eastern Indonesia (Dixon, 1916: 338), but the corresponding texts are still unavailable to me.

The association of the antagonist and her victim with the bear and the hare respectively allows us to compare the Sikkim tale with the Ob Ugrian ones (Por-ne and Mos-ne; cf. also the tales of the Sym Tungus). The motif of the antagonist's child being killed by the victim's children (and not just the flight of the latter to save their lives) connects the South and Southeast Asian versions with the North American *Bear-woman and Deer-woman* tales. Moreover, in almost all versions the victim's children use similar methods to kill the antagonist's children, the latter being suffocated by smoke or roasted alive. All these common motifs in the texts of traditions widely dispersed across Asia and America can be interpreted as the relics of a continuous cultural space which later disintegrated.

By now about a hundred tale-producing motifs peculiar to the Indo-Pacific region have been discovered; about two dozens of these being particularly known to peoples of Northeastern Asia, the Lower Amur, and Western (but not Eastern or Southern) Siberia (Berezkin 2005a; 2005b: 148 – 150). Some of these motifs are also encountered among the Lapps. The motifs in question stand in opposition to the motifs of another group, that of continental Eurasia. The suggestion that in the past Siberian mythologies contained mainly Indo-Pacific motifs helps us understand the reason that all the folkloric traditions of the American Indians (and possibly also Amerindian languages, though there is no consensus among the linguists on this point) share so many common elements. Though the early migrants to the New World probably moved along two different routes (down the Pacific coast and across Central Alaska), both of these routes originated in the regions of Asia (near the Pacific coast and somewhere in Eastern Siberia) which in the Late Pleistocene had been inhabited by people with a rather similar culture. Against this background, the group of folklore-mythological motifs peculiar to the central areas of North America having parallels in the depths of continental Eurasia are thrown into even greater relief.

* (Avrorin, Lebedeva, 1966: N 56, pp. 204 – 206; Bereznitsky, 2003: N 35, pp. 133 – 134; Vitashevski, 1914: 459 – 465; Gurvich, 1977: 174; Menovschikov, 1974: N 113, pp. 352 – 356; Pinegina, Konenkin, 1952: 58 – 61; Sivtsev, Efremov, 1990: 64 – 71; Ergis, 1964: N 66, pp. 245 – 246; Bogoras, 1918: N 9, pp. 61 – 64).

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THE NORTHWESTERN ALTAI: FOUR SEASONS

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SUMMER. PEASANT TRADES IN THE LAND OF SOLONESHNOE: FROM THE PAST TO THE FUTURE

The Soloneshnoe Region of the Altai Territory was established in 1924. It united big and small villages situated in the Anui River valley and its tributaries. These villages were founded by Russian peasants with various historic backgrounds. Some were descendants of the Russian pioneers of Siberia, others migrated into this country over considerably later periods. This part of the Northwestern Altai is rich in natural resources and includes various landscape zones such as mountain taiga, steppe areas, floodplain meadows, and highland pastures. The complicated interaction of ecological and ethnic-cultural factors determined the agrarian technological cycle and the corresponding calendar of traditional peasant activities throughout the year.

The history of active exploitation of the land of Soloneshnoe began as early as the 19th century. The oldest family of the region calculates up to seven or eight generations. During the 19th century, new villages appeared in the river valleys and intermountain depressions: Sibiryachikha (founded in 1824), Soloneshnoe (1828), Topolnoe (1829), Telezhikha, Demino, Karpovo and Tumanovo (1857), Cheremshanka (1867), Alesandrovka, Bolshaya Rechka, Kalinikha, Lyutaevo, Medvedevka (1876), Berezovka (1877), Matveyevka, Talovka (1878), Verkh-Solonovka (1890), and many others. These villages developed as a result of interaction between old-timers and new settlers immigrating into the region during later periods (Drozhetski, 2004).

At the end of the 19th century, the old-timers constituted the larger portion of the population in villages along the Anui River. The core of this community were descendants of migrants arriving in the region in the 18th century. Basic elements of their culture developed in the Russian North, the Urals (Vyatka and Perm Provinces), and eastern Ural region (Tobolsk Province), i.e. in the areas where principal migration flows to Siberia had formed.

The Old Believers played an important role in the exploitation of the Altai. Trying to protect and preserve their original faith, they moved away from the regions strongly controlled by the official government and the church. The Old Believers were searching for the land of promise called Belovodye (White Water), which, in their minds, might be situated east of the Ural Mountains. “Having reached Kamen [mountains],” a Siberian journalist G. Grebenshchikov (1914) wrote in his essay *Altaic Russia*, “sectarian hermits settled in the most picturesque places and combined the salvation of their souls with the contemplation of virgin nature, the more so because they wanted to resemble the saints in all respects. They cherished an unshakable belief that holy ‘Belovodye’ was that very paradise lost and regained, toward which the persecuted Russians made their way through tortures, blood, and crimes. At the moment when the wandering sectarian took his copper icon out, the chronicler was able to write, in his birch-bark scroll, that here, in the backwoods of a foreign kingdom, a new pillar of the Russian boundary had been erected.”

The Old Believers and old-timers chose their place of residence due to such factors as free arable lands, forest ensuring timber for building, and pastures. The settlement of the highlands was an arduous task. However, already at the beginning of the 19th century, the Altai become one of the most rapidly developing regions, both economically and socially, of Russia. M.M Speransky, a famous statesman and reformer, visited the Altai in the 1820s and came to the conclusion that “this land [the Altai] was predestined for strong people and significant achievements in agriculture, trade, and industry”(Altaisky krai). Speransky deemed it expedient to replace serfs and adscript peasants working in Altai mines with hired free workers and free migrants.

The formation of the migrant ethnocultural group started in the Altai after the Decree of 1865 had been adopted. This Decree opened the boundaries of the Altai Mountain District to migrants. Later on, in 1881, 1889 and 1896, additional decrees regulating procedures of immigration were adopted. These legal rules caused mass migration of people from the Tomsk, Tobolsk, Orenburg, Perm, Tambov, Voronezh, Viatka, Riazan, Samara, and other Russian provinces to the Altai. The reforms of P.A. Stolypin gave an impulse to peasant migrations.

At the threshold of the 19th and 20th centuries, due to active migration processes and the breaking up of large settlements into smaller communities, the largest concentration of villages emerged in the territory of the present day Soloneshnoe Region. According to data of the

1926 census, there were more than 80 villages including about 30 villages of immigrants and about 20 villages founded in the course of social-political reforms of the 1920s (Scheglova, 2004b: 188).

The history of exploitation of the region was determined by gradual involvement of the Anui basin landscapes into the system of peasant land tenure and trades.

The Soloneshnoe Region (along with the Altai and Charysh Regions) is included in the Altai ecological-economic agrarian zone of the Altai Territory according to a number of natural, climatic, and economic parameters. The Altai agrarian zone is situated in the steppe zone of low elevation, forest-steppe middle-elevation mountains, and sub-alpine meadows. Arable land occupies only about 10 % of the total territory due to the mostly mountain landscape. Pastures constitute 79 % of the total economically exploited land. Climatic conditions of this mountain zone allows for growing few types of crops dominated by technical crops and coarse grains. Meadows and pastures in the Anui valley provide the excellent facilities for livestock breeding and production of meat, dairy products, sheep breeding, and production of wool and meat as well as breeding Siberian deer (maral) and horses (Yashutin, 1999).

Presently, the population of the Soloneshnoe Region is engaged in various branches of economy including agriculture, animal husbandry, and local small enterprises producing honey, butter and cheese, production of felt winter boots, and others. This economic model began developing as early as the 19th century.

Old-timers elaborated their own system of adaptation to the Altai piedmont and mountain environment. This system was dominated by elements of culture typical of northern Russia. Cultural traditions of local and migrant populations supplemented this basic system.

The availability of free lands favored the development of agrarian entrepreneurship in the Altai and in Siberia in general. The sheer absence of landlords resulted in a considerably high level of economic well-being of peasants. Consequently, Siberian farms were generally larger and more efficient compared to the farms in most of European Russia, and the number of Siberian farms grew rapidly (Ilinykh, 1999).

According to the data of 1913, a typical Siberian peasant family consisted of six persons and owned over six desyatins* of arable land, about four horses, more than two cows, almost five sheep and goats, and about two pigs (Ibid.).

The population census of 1916 provided the following figures. The average patch of arable land in the Altai in general was 7.9 desyatins, while that in the steppe and forest steppe zones of the Altai where agriculture was a leading branch of the economy, equaled 10 desyatins. The average farmer owned more than three horses, about three cows; 11.7 % of farms owned five and more cows; 1.3 % of the Altai farms had 10 and more heads of livestock. In the steppe parts of the Altai, occupied by migrants from central and southern parts of European Russia, the average farms were run by six and more people (Razgon, Koldakov, Pozharskaya, 2002).

Difficult environmental conditions in the Northwestern Altai, where the winter temperatures are low, the summer is hot and often dry, the topography is mostly hilly with narrow river valleys and taiga forestation, stipulated development of mostly animal husbandry (Scheglova, 2005: 112). The average family consisted of six persons (data from the sample evaluation of records of the 1916 census) and owned more than 20 heads of livestock including horses and cows; the proportions of sheep, goats, and pigs were lower. Many farmers kept more than 10 cows. The richest families owned stocks of one hundred and even two hundred cows. Meanwhile agriculture remained an important branch in the economy of the Russian population of the Northwestern Altai. In the early 20th century, each family owned a patch of land of about 6 desyatins and some meadow land producing hay. There was no private land ownership in the Altai as well as in Siberia in general. Arable and pasture lands were owned by peasant communities. After Stolypin's reforms, the land was owned and inherited by farmsteads.

Most peasant families owned plots of arable land and grew wheat, oats, and flax. Old residents recalled that all villagers knew the locations of plots, but could not tell the sizes of the areas under the crops, since everything was estimated by the eye. No official measuring was executed until the year 1920. About one half of all arable lands remained free from planting. These patches were not ploughed for several years. Some portions were ploughed in one year so that in the following year this land would be used for growing wheat or oat. By mid June, all land was divided into small patches, and variety of growing crops produced a motley coloration of fields. Three fifths of the population built small summer cabins at their patches. People lived in those houses during sowing and harvesting and kept their labor tools there (Shvetsov, 2004: 474).

Peasant life in early 20th-century Northwestern Altai ran its course according to the agricultural calendar: from sowing (St. Nicholas Day in spring, May 9) to cutting the crops (St. Peter's day, June 29). On the day when sowing began, peasants used to light the icon-lamp and the whole family prayed. During the week of the veneration of the cross (during Great Lent), the priest blessed the seeds. People tried to finish sowing by the second half of May: "There is no spring after St. Nicholas Day, sowing is not allowed," "If George brings water, then Nicholas will bring grass." Berries were not picked before St. Peter's

* Desyatina, an old land measure equivalent to 2.7 acres.

Day. On the day of St. Kyricos and St. Julita (July 15) and on St. Elijah's Day (July 20) haying was prohibited: "God forbid – do not hay on that day" (Yavnova, 2004: 308). In August, three days called Honey Saviour Day, Apple Saviour Day (Transfiguration), and Nut Saviour Day, followed in succession, after which harvesting began. On St. Simeon's Day, people watched the last flock of cranes heading south. Around the day of the Protection of the Virgin (October 1), the first snow fell, and match-making began. After that day, women started their winter activities, mostly spinning. The first frosts were the time for laying in stores of food for the winter.

Winter brought seasonal preparations at home and wild holidays. Peasants finished thrashing grain, stored up firewood, repaired the house and implements; some hired out as coachmen. During Christmastide, lasting from Christmas to Epiphany, teams of carol singers and mummers in masks and costumes made rounds of the village, visiting the houses one by one. After Christmas, the meat-eating period began, and this was the wedding season. Epiphany was celebrated with special ceremonies: burning straw meant "warming Christ's feet." Those who had taken part in Christmastide mummery, redeemed their sin on Epiphany day by dunking in "the Jordan" (a hole in the ice on the river that represents the actual Jordan River). At Shrovetide (*Maslenitsa*), marking the end of winter, young girls sleighed in groups of four and sang songs. They wore satin and cashmere shawls and felt boots embroidered with a red design. Horses were decorated with ribbons. The boys would ride on horseback. From Shrovetide Wednesday, young people would enjoy sledding and kissing (Motuznaya, 2004: 302 – 303). By the end of Shrovetide, the merry fuss calmed down. Shrovetide Sunday was called Forgiveness day. People made low bows to one another and repented to be cleansed of their sins before Great Lent.

They fasted for seven weeks to prepare for the "Holiday of Holidays," the bright Easter (Christ's Resurrection). The beginning of spring coincided with the Forty Martyrs' day, when ritual rolls shaped as birds were baked. On Annunciation Day, distaffs were taken out of the houses, and weather forecasts for the coming summer were made: "If the day is hot, the summer will be rainy." Weaving works were usually finished by Easter. By the end of Easter week, on St. Thomas's Sunday (Red Hill Sunday) people began performing circle dances. Summer began on Trinity Day (the fiftieth day after Easter), and soon there was another fasting period. In general, the Russians had four Lenten periods a year.

In peasant tradition, the year was comprised of economic and religious cycles marked by the interchanging of working days and holidays. The life of each family was subdued to natural cycles and was a part of the life of the village and religious community. The Russian old-timers used to discuss their problems and make decisions at meetings. A village elder was elected and his orders held irreproachable authority. The elder made decisions on the most important social and economic questions. In early spring, he examined the fences around the fields to prevent cattle from trampling down the sprouting crops. On almost every Sunday, a bridge or a road were repaired. If a fire broke out, the elder sent people to ring the alarm bell and fight the fire. His responsibility was to discourage people from picking unripe hops, cherries, and nuts, and to order the forester to prevent unsanctioned cutting down of the forest. On Sundays and major holidays, church services were held, and donations and alms were collected. "God's goods" such as cows, calves, sheep, fowls, geese, as well as fabrics, were auctioned off (Shvetsov, 2004: 476).

The special saint's day of each local church was an event to which other people came from surrounding areas. People from all the nearby villages came to Soloneshnoe on St. Peter's day (June 29), and were treated as relatives. On that day, haying began, followed by harvesting grain and vegetables.

Fairs served as shows of peasants' wellbeing and demonstrated results of their labor. Seasonal wholesale trade was a result of the emerging private enterprise in the rural economy. In the late 19th century, a number of annual fairs were held in the piedmont and highland regions of the Biysk District. A Christmas fair in Sibiryachikha was the first to be established in the Anui valley, as early as 1891. There were 250 homesteads in Sibiryachikha at that time, and in its sphere of influence there were forty smaller villages. This fair was established despite the activities of the economic board of the local Cossack military region, which strove to prevent competition between Sibiryachikha and other Cossack villages where the stations of Antonievka and Charyshskaya were held by Cossack detachments. Sibiryachikha was situated between the two Cossack stations (45 versts from Charyshskaya), and most of its people were Old Believers. The formal reason for the prohibition of the Sibiryachikha fair was the idea that Sibiryachikha residents did not need any luxury goods because of their religious regulations, hence they did not need any fair (Scheglova, 2004a: 88). Nevertheless, the fair opened, mostly thanks to the immigrants. Construction of the Trans-Siberian railway increased immigration to Siberia considerably. During the period between 1896 – 1913, more than 3 million people arrived in southwestern Siberia. About one half of them settled in the Tomsk Province, to which the Altai belonged.

In 1885 – 1905, the rate of immigration to Siberia was 76 thousand, while in 1911 – 1913, it was 270 thousand. The highest rates were noted in 1906 – 1910, when the annual immigration rate equaled 500 thousand. Between 1897 – 1914, the rural population of Siberia increased from 5.3 million to 9.2 million. The number of farms increased

by 60 % (twice that in the Tomsk Province). Agricultural regions of the Altai were occupied especially quickly by immigrants from central provinces of European Russia, the Ukraine, and Byelorussia (Ilinykh, 1999).

The Northwestern Altai was mostly exploited due to migrations from other regions of Siberia. People of this territory descended from pioneers, mostly Old Believers. However, the immigration flow to the Altai, too, was considerable: in 1886 – 1890, 86 families arrived at what is currently the Soloneshnoe municipality; 158 families in 1896 – 1990; 266 families in 1906 – 1910, and 200 families in 1911 – 1915 (Drozhetsky, 2004: 78 – 79).

At the turn of the 20th century, many dozens of people came for permanent residence in the Northwestern Altai every year, mostly from the Tomsk Province (58 %). However, the number of people arriving from other places was also large: 10 % from the Perm Province, 6 % from the Orenburg Province, 3 % from the Tobolsk Province, and 23 % from other Russian provinces. New rural communities were established; people needed essentials, and trade developed (Ibid.: 78).

The gross trade amount at the Sibiryachikha fair in 1897, 1904, and 1911 equaled approximately 12.5 thousand rubles. Additionally, autumn (October 14 – 21) and summer (June 23 – 30) fairs were set up. The gross trade amounts at these fairs were 11.5 and 19 thousand rubles, respectively. Ironware, fabrics, and fancy goods were traded; grain from steppe regions was also for sale. Local people traded fat, butter, wax, honey, pine seeds, game, fur, horned animals, horses, felt, and horse skin. At the summer fair, they also traded in handicraft goods: homemade fabric, wooden and ceramic ware, Siberian pine barrels, harnesses, etc. (Scheglova, 2004a: 95).

Soloneshnoe established its own fairs later than Sibiryachikha did: first the St. Nicholas fair in winter, and then another one in summer. The last fair in Soloneshnoe took place in 1918. At that time, the Soloneshnoe population was 2 thousand, 57 % of which were old-timers. V.N. Schvetsov, one of the oldest residents of Soloneshnoe, wrote in his memoirs that the last Nicholas winter fair was held in Soloneshnoe in 1918. Peasants from nearby villages came to sell their goods. The last time, Schvetsov's parents, Nikolay Seliverstovich and Alexandra Rodionovna, brought there linseed, tow, hazel grouses, and two cartfuls of oat. A pood* of oat cost 60 kopeks and a pair of hazel grouses, 25 kopeks. His parents bought a mechanical distaff, three poods of salt, one pood of dried fish, and a pound of *pryaniks* (spice-cakes) for their children (Schvetsov, 2004: 476).

Political reforms of 1917 – 1920 changed the life of the Altai rural population dramatically. At the turn of the century, the peasant economy boomed. Soloneshnoe, the center of a highland district, was surrounded by pioneer villages with developed animal husbandry and handicrafts. The village was situated on the major transportation route to the upper reaches of the Katun River.

The gross value of goods sold at the winter fair at Soloneshnoe equaled 12 thousand rubles in 1897; 14 thousand in 1904, 11 thousand in 1911. The respective figures for the summer fair in Soloneshnoe are 12 thousand rubles in 1904 and 5 thousand in 1911 (Scheglova, 2001: 444 – 445).

A major factor of economic growth was the development of local enterprises engaged in the processing of agricultural products. Some local peasants in Soloneshnoe and the nearby villages became merchants and enterprisers. Thus, the annual sales of Savva Kirillovich Posysoev of Sibiryachikha amounted to three thousand rubles; those of Agafia Vasilievna Bronnikova of Telezhikha, to one thousand rubles. In Bely Anui, there were two prominent merchants: Nestor Varlamovich Aksenov, a merchant of the second guild (2.5 thousand rubles), and Ipat Dorofeevich Efimov (1.5 thousand rubles). The richest merchants living in Cherny Anui were Trofim Antipovich Dunaev (4 thousand rubles) and Ekaterina Lvovna Krichevtseva, a merchant of the second guild (1.5 thousand rubles) (Scheglova, 2004a: 90).

Pavel Mikhailovich Deikov ran a dairy factory in the village of Bulatovo. The factory processed up to 4 thousand poods of milk and produced 170 poods of butter that was traded to Esman's firm in Biysk to be exported to Europe. Deikov also had small dairy factories in other Altai villages, like Medvedevka, Telezhikha, Cherny Anui, etc. The major dairy was located in Soloneshnoe. In 1901, it processed 7 thousand poods of milk and produced 300 poods of butter. The high level of the local food processing industry resulted from the development and modernization of farms owned by descendants of pioneers (Scheglova, 2001: 444; 2004a: 90 – 94).

Dairy husbandry was one of the stable sectors of the economy in the Soloneshnoe Region. Specialized dairies existed in several villages. Modern dairying is largely based on late 19th – early 20th century practices.

In 1900 – 1902, cheese dairies emerged in the Altai. At present, there are about sixty of them in the Altai Region. Cheese dairying was mostly introduced by immigrants from western Russian provinces, as well as from the Baltic provinces, Finland, and Switzerland. For instance, in 1916, the Lehrherr brothers of Switzerland arrived with their families at the Cossack station of Antonievskaia in the Anui valley. Christian Davydovich was the manager of a cheese dairy, while his brother Davyd Davydovich was a specialist in cheese dairying. From that time on, this sector of dairy husbandry developed in the Altai. At present, the Altai produces more than 20 various sorts of cheese – one tenth of the rennet cheese production in Russia. It was a "Swiss" cheese that has made this region famous as one of the cheese producing areas.

* A pood equaled 16.38 kg.

Traditions of cheese dairying has developed in the Northwestern Altai as well. In the 1930s, industrial dairying was launched in Soloneshnoe. The factory was reconstructed and its production grew throughout the 1960s – 1990s. Currently, the Soloneshnoe dairy factory can process 45 tons of milk and produce up to 3 tons of butter and 5 tons of cheese daily. While these production rates are much higher than those of the early 20th century, the incipient dairy industry of that period set the prospects for the market economy in the region.

In the early 20th century, handicrafts, animal husbandry and dairy and meat production were the major branches of economy in rural areas of the Northwestern Altai. Since the production was commercial, peasants engaged in this home industry often ceased to perform agricultural activities. In 1919, the Biysk District had 234 small factories processing animal and vegetable products (Solovieva, 2002). The development of small factories in the Altai was related to immigration. Among the immigrants were specialists in various trades such as wool and leather production, as well as potters, carpenters, coopers, harness makers, etc. (Solovieva, 1981).

Old residents claim that immigrants introduced the kick-wheel and made pottery production commercial, after which the production of hand-made pottery declined. The spread of porcelain along with the development of dairy production resulted in the decline of home-made ceramics. Greater amounts of milk were sold, hence the necessity for home dairy processing became minor. As a result, less house-ware was needed. This trend was characteristic for many regions in Western Siberia and the Altai (Novikov, 1999: 74 – 75).

Simultaneous to the decline in ceramic production, barrel manufacturing was developed in the Northwestern Altai. This trade was practiced by immigrants from the Perm and Vyatka Provinces. These were mostly forest and forest steppe regions, not convenient for agriculture. They were mostly engaged in wood processing trades, including extraction of tar, cooperage, and timbering. Production of barrels and packages of various sorts was economically profitable because of the growing production of butter as well as high demand for Altai honey at various Russian fairs.

Apiculture is one of the most popular trades among other agrarian branches in the Altai. The gross production of honey in the early 2000s reached on average 5 thousand tons per year, including 2000 tons of high quality honey. The Altai is among other leading provinces of Russia in production of high quality honey. The largest beekeeping farms (over 1500 bee families) are situated in six forest-steppe and piedmont regions of the Altai Territory including the Soloneshnoe. The local population is traditionally engaged in honey production. This tradition is rooted in the culture of the Russian pioneers and Old Believers.

In the late 19th century, a new trade of animal skin and wool processing appeared in the Altai along with the traditional peasant trades. Immigrants from the Vladimir Province invented the processing of hide and fur, while peasants migrating from Nizhni Novgorod introduced the tradition of manufacturing felt winter boots (valenki) invented in the Semenovski District of Nizhni Novgorod Province as early as the 18th century.

In 1874, I.G. Poliakov, merchant of the second guild, founded the first factory of sheepskin processing and production of fur coats and felt boots in Barnaul. Soon he was listed among the most prominent merchants trading in felt boots and *Barnaulka* fur coats named after the town. In 1917, about 150 felt boot producing factories functioned in the Altai, of which 90 were located in Barnaul, the major city of the Altai Territory. In 1918, a pair of felt boots cost from 10 to 55 rubles at various fairs in the region, while the average price for a cow was 16 rubles and that of a horse was 20 rubles (Istoriya Altaya; Shumilov, 2005). Even wealthy peasants could afford not more than one pair of felt boots. There was a common saying: The first to get up from their sleeping place over the oven, is the first to get the felt boots. At that time this type of footwear was in fashion making production of such goods highly profitable.

Later, the production of felt boots became one of the most important occupations in the Province. During World War II and hard years after the war, felt boots were among the necessities for life. By the end of the 20th century, felt boot production declined. However, in the 1990s, felt boot production was revived in Tumanovo, the Soloneshnoe Region. Artisans were hired, new machinery was bought, and old technologies were reconstructed. This factory exists to this day, meeting the needs of the region's dwellers for traditional boots, which are irreplaceable in peasant daily life.

Manufacture of felt boots and fur coats in the Altai are based on the local sheep breeding. Mostly sheep with thin wool are bred. Such sheep were imported to the Altai in the 1860s. This sort of sheep (along with Kyrgys fat-tail and ordinary Russian breeds) became wide spread over the steppe regions of the Altai due to the rising rates on land leasing in the southern provinces of Russia and in the Caucasus. Sheep husbandry needed new pastures, for instance in Siberia. In 1904 – 1905, immigrants drove their herds of sheep through the Kazakhstan steppes into the Zmeinogorsky District of the Altai and settled in the Loktevsk steppe. In 1906, a lower price for railroad shipment of sheep was adopted, and the number of sheep in the Altai increased considerably. In 1913, the total amount of fine-fleeced sheep in the Altai equaled nearly 26 thousand; sometime later, the local Altai pedigree was bred (Kuznetsov, 1988).

The abundant supply of raw wool stipulated development of related manufactures, felt and felt goods

production in particular. These manufactures were and are still located in the steppe zone of the Altai. The Northwestern Altai is special in this respect due to its unique environmental conditions. The piedmont and high-elevation pastures allow for developing complex types of animal husbandry. In the middle of the 19th century, the Anui valley was populated by Kazakh immigrants. This population was mostly nomadic and horses and small ungulates were the major species, causing considerable changes in the general composition of livestock. However, the census of 1916 showed that the average number of sheep in Russian and Kazakh farms in the Anui valley did not exceed 20 individuals; there was a tendency towards its growth. Gradually, felt manufacturing became a popular trade in the region. In the early 20th century, felt mats were among other popular items traded in local fairs.

Sheep husbandry is among other important branches of the economy of the Soloneshnoe Region. The total amount of sheep in state-owned farms has increased as much as in private farms. However, the production of beef and dairy products is still a leading trade in the region. In total, 11 farms work in this branch, and their number and gross product are increasing.

However, currently the agriculture of the Altai, similar to many other regions in Russia, is undergoing tough times. The general quantity of livestock is decreasing due to cuts in the budget support of the agrarian-industrial complex. There is a dramatic disparity in prices on agricultural and industrial products and fuel. The unemployment rate is high in rural regions; the rate of migration from rural to urban areas is increasing. Young people are abandoning the land that was lived on by generations of their ancestors. These processes worry the older citizens of Altai villages who have dedicated their lives to revival and development of the economy and culture of their native lands.

The problems of the early 21st century are comparable to the hardships of past periods occurring in the history of the Altai peasantry. According to historical records, there were more than 30 campaigns for the reorganization of the economy of agriculture during the Soviet period (Scheglova, 2004b: 130). It began with collectivization of private farms. This reform changed the principles of peasant economy and patterns in organization of rural life. Several Soviet campaigns, such as collectivization and deprivation of wealthy peasants of the major part of their property occurred in the 1930s, the program of formation of large collective farms from several smaller ones in the 1950s, and liquidation of "non-perspective" farms in the 1960s – 1980s left their destructive impacts on peasant culture.

During World War II (1941 – 1945), 2625 citizens of the Soloneshnoe village died. In the post-war period, the economic basis of agricultural labor was especially low, when peasant labor was rewarded once a year by the share of total crop proportionate to the number of working days. Hardships of that period caused a very low income of peasants and hence a high rate of migration to cities. There were some attempts to develop other trades in the Altai, for instance development of mining ore processing. But they were not successful in the Soloneshnoe Region. The wolfram mine and the village of Mulchino were abandoned during the post-war period.

Social-economic experiments in the creation of large Soviet collective farms were made during the 1950s – 1970s. During that period, many small villages were abandoned because of their "low perspectives." New patterns of land exploitation were not always successful. One the one hand, it led to creation of large farms producing a great amount of products for industrial processing. On the other hand, traditional models of small villages and farms oriented towards the maximal profit of exploitation of their micro-landscape were abandoned. As a result of this policy, traditional relationships between peasants and the surrounding nature were destructed.

By the late 1980s, the infrastructure of 32 towns located over the area of 3529 sq. km was created and it has remained basically unchanged until today.

In the early 1990s, the course of political and economic reforms carried out in Russia altered the general idea of the previous periods that large collective farms were economically profitable. The Altai government has made efforts to develop private farms along with various types of state and share holder owned enterprises. The general tendency towards development of mostly individual agricultural enterprises has led to the formation of interest in traditional models of farm running and old forms of small-scale manufacturing. At the same time, new branches of economy have been developed.

In the 1990s, deer husbandry became one of the efficient branches of the economy of the Northwestern Altai. Siberian deer (maral) farms are mostly located in thin larch forests with patches of meadows and water resources.

Deer breeding emerged in the Altai as early as in the mid 19th century. This economic branch began its development due to the efforts of the Old Believer population of the Buhktarma basin. Large maral farm "gardens" existed there as early as the late 19th century. They exported deer antlers mostly to China. In 1927, the first collective deer farm was founded in the Shebalino Region of the Altai Republic. As a result, the amount of deer antlers grew and the quality of processing of the deer farm products increased. In the 1930s, axis deer from the Amur region were brought to the Altai, and farmers began procurement of their antlers.

The Soloneshnoe region started Siberian deer breeding in the 1970s. Presently, the livestock includes Siberian and axis deer. There are seven large deer farms in the

Soloneshnoe region. In the summer, deer are herded in forest parks surrounded by fences. A rich variety of herbs and numerous water springs provide good nutrition for these animals. June is the month of sawing deer antlers, "dags." Deer dags are in great demand in Japan, Korea, China, and other countries. Currently, deer husbandry is one of the most important branches of the economy. It is profitable and allows for sustainable development of the region. New developments of the agricultural economy form new images: new sayings have appeared in folklore: "There are different ways of earning money: with one's head, hands, and horns."

The environment and climate of the Northwestern Altai benefit horse breeding. The mountain slopes are covered with meadows and steppes rich in various grasses and herbs. In the 19th century, horses were regarded as the major "strategic resource" providing the most important means of transportation. Horse husbandry was profitable, because Soloneshnoe was situated on the main road leading to the central and southern region of the Altai Mountains. The roads gained special importance due to the emergence of fairs. During the years of World War I and the Russian revolution in the early 20th century, all the horses were expropriated. Later on there were collectivization campaigns and industrialization of agriculture. These processes resulted in the decline of horse breeding. However, interest in this branch of economy renewed in the 1980s. The total amount of horses in state farms has decreased recently; yet horse breeding still exists as a branch of the economy. Currently, more than half of the total number of horses is in private farms.

There are four large horse farms in the Altai Province: Altaiskoye, Novotalitskoe, "Sibir," and "Novy Put." New farms have recently emerged in the mountain-steppe zone of the Altai. Horse breeding has become one of the most profitable branches of the economy. For instance, the "Medvedevskoye" farm in the Soloneshnoe Region has been licensed in breeding horses of the Orlov trotters and Russian cart-horses. Farmers are eager to revive breeding of the Orlov trotters as one of the most famous Russian pedigree. There is a saying concerning this type: an Orlov horse is good for cart driving and as a mounting horse for a military leader. O.P Kuznetsov, one of the heads of the "Medvedevskoye" horse farm, said that they chose the Orlov horse for breeding not only because of a good business prognosis but also because the Orlov horse is one of the tokens of Russia symbolizing its future progress.

In the 1990s, an association of horse breeding farms of the piedmont regions of the Altai was established. State and collective farms as well as individual farmers engaged in horse breeding became members of this association. Development of horse breeding has changed not only traditional models of economic activities but also helped establishing new dates in the traditional calendar of peasant holidays. Since the early 1990s, the association of horse breeders has established holidays with horse races. The first such races were carried out in the Anuisk village. Currently, about a dozen horse farms including the "Medvedevskoye" farm have carried out such horse races each year. The annual cycle of feasts with horse races usually begins at the former Cossack station of Antonievka, Petropavlovsky Region. The holiday normally coincides with the Day of Furrowing, celebrating the end of spring sowing, on the first Sunday in June. Horse races take place all year round in different villages of the region. The winter horse racing takes place on February 23. This day is celebrated as Men's Day in Russia, hence the horse racing is dedicated to men.

Every year, the Soloneshnoe Region invites horse breeders from the entire piedmont Altai. For several days, the local airfield turns into a horse race-course. Horses run, making their owners proud of their peasant background and arousing faith in the future wellbeing of the Altai countryside.

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1. Expanse of the Anui valley. Soloneshnoe village.

Seven to eight generations of Old Believers have been living in villages along the Anui valley. Those who moved to the Altai highlands a long time ago looked for a promised land and a better fortune. What they found was their homeland and land to plow.

Opening the door in an old peasant house means opening a door into someone's life. Inside, there are grandmother's books, dad's accordion, and tales of tough guys of old who lived before the "takeover" and then engaged in the fratricidal Civil War. Household gods of later years are World War II frontline letters folded in a triangular fashion, a photograph of a young mother and that of her son on his return from Chechnya. Each house has its own history… Around the Anui village – the blue mountains. They seem to be an earthly heaven, but how can one get there…

2. Family of Matvey Shadrintsev, manager of the "Medvedevskoye" horse-breeding farm in Soloneshnoe.

3. “Medvedevskoye” stable in Soloneshnoe.

The village of Soloneshnoe is famous for its annual horse races. Russian colors flutter in the wind, and trotters of the glorious Orel breed career across the field. Journalists while visiting usually want to know what’s so special about the Orel horses. “That’s where Russia begins,” they are answered, “Red Square, the Volga, Gagarin, and the Orel trotter.” Horse breeders know the pedigrees of studhorses better than they know their own horses. Histories of horses are intertwined with human lives. Racing horses make their owners recall the past and cherish hopes for the future.

4. Horseracing in Soloneshnoe.

5. Trinity Sunday in Topolnoye.

On the fiftieth day after Easter (Pentecost), when the Holy Spirit descends to the earth, the Anui villagers celebrate Trinity Sunday, said to be the birth of summer. Until quite recently, people used to think that this "girls' holiday" with circle dances and the ritual breaking of birch twigs would soon turn into the recollections from youth of old women. However, traditions return, and girls and old women alike dance together on a new Trinity Sunday.

6. Members of the folklore ensemble in Topolnoye.

7. Trinity Day outing in Topolonoye.

On Trinity Sunday, women are not allowed to work. Ordinary weekdays give way to a cheerful holiday of traditional costumes tailored "in our Polish fashion" ("Poles" was the dialectal word for the Old Believers), old songs sung not in a concert-like manner, but in a circle dance on a meadow, traditional fortune-telling with birch wreaths referring to one's future life and fiancé-to-be. What if it comes true?

8. Trinity Day circle dance in Topolnoye.

9. Siberian deer farm near Tog-Altai.

Why should a stag have antlers? No one seems to know. What everyone knows is that antlers make one mighty. Wounds from freshly cut dags are scarlet. Boiling tubs emit steam. In the Altai, June is the time for cutting dags. The job involves neither cruelty nor compassion – nothing but the energy of humans and animals raging inside the narrow corrals. The stag's eyes are purple, and you can look inside them. A red silhouette is flying out of the darkness into the space of a green park.

10. Procurement of dags in the Siberian deer farm near Tog-Altai.

11. Evening milking is over. Topolnoye village.

The day begins with a rooster crowing and the first milking. Red, blue, and green buckets with white milk are lined up for the milk tanker along the fences. Milk streams are flowing, cheese is ripening in the cellars. Day after day, women see the cows off and then meet them. Tanker drivers receive milk according to procuring orders. Tons of milk measure women's labor and endurance.

12. Cheese is ripening at the Soloneshnoe cheese-making plant.

13. Noon while haymaking

The peasant calendar defines the alternating of weekdays and holidays. In the past, holidays were seasonal, later they marked revolutionary events. Calendars change, but traditions persist. "When will you start cutting hay?" we asked a passerby. "On Peter's day," he replied, "when the grass is ripe."

14. July mowing at its height.

15. End of a July mowing day.

Scythes are no longer used by the Anui villagers, the peasant rite gave way to a production cycle. And yet every hour counts: sunny days alternate with rainy ones. God forbid, the grass will wilt and the hay will get wet… This is why the peasant custom of helping one another is still practiced: together, any work can be done.

16. Done with haying.

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PITUITARY DWARFISM IN AN EARLY BRONZE AGE INDIVIDUAL FROM TUVA

Introduction

The present article addresses the case of pituitary dwarfism in an individual buried in an Early Bronze Age grave in Tuva. Dwarfism can result from several hereditary and nonhereditary diseases, endocrine and otherwise. Its principal symptom is an abnormally small body length (below 130 cm in males, and below 120 cm in females). The cause of hereditary dwarfism is the deficit of growth hormone or, less often, its inactivity. Such dwarfism is described as hypothalamo-pituitary or pituitary. It is sometimes caused by the insensitivity of hormone-binding cell receptors of peripheral tissues to growth hormone (this cause underlies constitutional dwarfism in certain African tribes). Alternatively, dwarfism can result from cerebral injury, cerebral infection, intoxication, or tumor of the hypothalamus. It may be part of certain genetic syndromes causing skeletal malformation. In pituitary dwarfism, the child initially develops normally, but at the age of 2 – 4, an abrupt arrest of growth occurs. Bodily proportions usually remain normal, and no mental deficiency is observed.

Only a few cases of dwarfism in prehistoric populations have been described. A recent case study covers a region of endemic iodine deficiency – the Swiss Alps (Ortner, Hotz, 2005). The case described below is the first from Russia. We will address the manifestations of the disease, its etiology, and concomitant conditions.

The individual in question was a member of a Central Asian early nomadic society, which, consequently, was able to support severely handicapped individuals for a long time, despite the nomadic lifestyle. Pathological changes of all bones make it quite difficult to determine the individual's sex based on the totality of standard criteria. However, certain indications as to sexual attribution do exist (see below).

Grave 2, in which the skeleton was discovered, was excavated in mound 12, one of the Dogehe-Baary group of mounds, situated on the high right-bank terrace of the Biy-Khem (the Bolshoy, or Big, Yenisei), 5 km upstream from its confluence with the Kaa-Khem (the Maly, or Small, Yenisei). The burial dates from the early stage of the Uyuk-Sagly culture, 6th – 4th centuries BC (Chugunov, 1998).

Materials and methods

The cranium and the postcranial bones are well preserved. All parts of the skeleton reveal generalized pathological changes. Diagnostics based on prehistoric remains, especially in cases of malformation, require a microanatomical examination (Frost, 1989; Shultz, 2001), which was conducted using standard histological techniques (Ham, Cormack, 1979). Samples of cortical bone were taken from the femoral midshaft, and those of cancellous bone, from the greater trochanter, with a preserved growth plate. Samples were demineralized, thin sections were stained with hematoxylin, eosin, and alcyan blue. Microscopic examination revealed marked changes in the structure of bone tissue and in growth

plates, making it possible to diagnose the disease and put forward certain suggestions as to its course. In addition, standard osteometric measurements were taken in order to assess certain physical parameters of the individual and specify the sex.

Results and discussion

Osteometric data, compared with average values for the unaffected part of the population (Tables 1 and 2), suggest that the proportions of the cranium and of the postcranial

Table 1. **Cranial measurements of the pituitary dwarf from Dogehe-Baary-2 compared to averages for unaffected population members**

Traits	Mound 12, burial 2	Females			Males		
	x	*x*	*n*	*s*	*x*	*n*	*s*
1	2	3	4	5	6	7	8
1. Cranial length	153.0	180.0	8	7.9	186.20	10	9.39
8. Cranial breadth	134.0	139.9	7	3.9	141.00	9	4.66
8:1. Cranial index	87.6	78.5	8	4.0	76.38	9	5.81
17. Cranial height (basion)	110.0	132.6	8	4.2	132.71	7	7.11
20. Cranial height (porion)	102.0	115.3	8	4.1	116.29	7	4.15
5. Cranial base length	81.0	101.9	7	4.3	103.57	7	5.77
9. Minimal frontal breadth	86.0	94.8	8	4.5	95.34	11	4.16
10. Maximal frontal breadth	112.0	121.1	8	4.7	120.88	8	4.39
9:8. Fronto-cranial breadth index	64.2	68.3	8	3.1	67.14	9	3.94
29. Frontal chord	113.5	106.1	8	3.1	109.86	9	8.55
25. Sagittal arch	312.0	365.7	9	9.8	372.10	10	17.41
26. Frontal arch	119.0	125.9	8	5.6	130.56	9	7.14
27. Parietal arch	109.0	126.5	8	8.4	124.44	9	9.50
28. Occipital arch	84.0	114.3	8	7.6	115.60	10	6.83
26:25. Fronto-sagittal index	38.1	34.4	9	1.1	35.22	9	1.32
27:25. Parieto-sagittal index	34.9	34.5	9	1.9	33.54	9	1.59
28:25. Occipito-sagittal index	26.9	31.1	9	1.8	31.23	9	1.48
28:27. Occipito-parietal index	77.1	90.5	9	10.3	93.43	9	8.21
Transverse frontal curvature angle	133.0	140.3	7	3.9	136.65	10	3.65
Sub.NB. Frontal subtense	25.0	27.4	7	1.2	25.61	9	2.50
Sub.NB:29. Sagittal frontal curvature index	22.0	26.0	8	1.4	23.30	9	1.10
Occipital curvature subtense	22.3	24.9	8	2.5	25.36	10	3.19
45. Bizygomatic breadth	115.0	125.3	6	4.4	135.17	6	3.31
45:8. Horizontal facio-cranial index	85.8	90.4	6	2.8	95.71	6	5.92
40. Facial base length	83.0	96.3	7	3.6	98.00	6	4.10
40:5. Facial prominence index	102.5	95.2	8	3.8	95.99	6	3.33
48. Upper facial height	52.0	67.2	6	3.8	71.29	7	3.45
48:17. Vertical facio-cranial index	47.3	52.0	7	3.4	53.74	6	4.81
60. Alveolar arch length	46.0	50.5	8	1.9	53.0	7	2.3
61. Alveolar arch breadth	60.0	61.5	8	2.7	63.8	6	2.3

Table 1 (continued)

1	2	3	4	5	6	7	8
61:60. Alveolar index	130.4	120.6	9	7.2	121.6	6	1.7
62. Palatal length	39.0	43.5	8	2.5	43.0	7	4.0
63. Palatal breadth	36.2	34.3	8	2.5	38.7	7	5.1
63:62. Palatal index	92.8	78.3	9	7.6	77.4	6	7.70
55. Nasal height	41.3	49.9	7	2.1	51.6	7	3.0
54. Nasal breadth	23.0	25.1	7	2.0	24.3	8	2.3
54:55. Nasal index	55.7	50.0	8	3.4	48.0	7	4.0
51. Orbital breadth (mf)	37.6	42.3	7	2.3	42.7	6	2.1
51a. Orbital breadth (d)	36.1	39.7	7	2.1	39.9	6	1.3
52. Orbital height	26.9	33.0	7	1.9	32.0	7	1.4
51:52. Orbital index (mf)	71.5	78.0	8	5.3	75.8	6	3.9
52:51a. Orbital index (d)	74.5	82.8	8	5.6	80.9	6	3.9
Naso-malar angle	147.1	143.4	7	7.0	139.7	11	4.1
Zygo-maxillary angle	133.4	136.1	8	5.5	134.0	8	5.7
SC. Simotic breadth	7.5	8.2	7	2.1	8.6	9	2.0
SS. Simotic subtense	1.5	3.5	7	1.1	4.2	9	1.0
SS:SC. Simotic index	20.0	41.5	8	7.9	50.0	9	13.3
MC. Maxillo-frontal breadth	17.8	20.3	7	3.0	19.3	6	2.6
MS. Maxillo-frontal subtense	4.6	6.7	7	1.3	6.9	6	1.0
MS:MC. Maxillo-frontal index	25.8	32.6	8	8.2	36.6	6	7.5
DC. Dacryal breadth	19.1	23.1	8	2.8	21.7	6	3.2
DS. Dacryal subtense	6.0	10.9	7	1.8	11.5	6	2.1
DS:DC. Dacryal index	31.4	46.8	8	7.6	53.8	6	11.6
FC. Canine fossa depth, mm	2.8	3.4	8	1.6	3.8	8	1.7
Malar subtense, according to Woo	11.3	11.5	8	2.0	11.9	6	1.4
Malar width, according to Woo	44.6	51.9	8	3.5	55.6	6	2.3
Malar curvature index, according to Woo	25.3	22.8	9	3.5	21.4	6	2.8
32. Frontal profile angle (nasion)	86.0	86.4	8	5.5	83.0	6	3.3
GM/FH. Frontal profile angle (glabella)	80.0	81.9	8	5.7	76.2	6	3.3
72. Total facial profile angle	86.0	86.0	7	5.4	87.67	6	3.08
73. Medial facial profile angle	90.0	88.0	7	5.1	89.67	6	3.72
74. Alveolar angle	66.0	82.7	7	7.0	81.17	6	6.15
75. Nasal bones inclination angle	71.0	62.5	6	7.1	64.25	4	6.40
75(1). Nasal bones prominence angle	15.0	23.3	6	6.0	22.20	5	4.71
Glabella prominence (Martin 1–6)	3.0	2.8	8	0.7	4.31	13	1.11
Superciliary arches (1–3)	2.0	1.8	8	0.5	2.00	13	0.00
Inion (Broca 0–5)	0.0	1.4	8	2.3	1.50	12	2.28
Mastoid process (1–3)	1.0	2.4	8	0.7	2.92	12	0.29
Anterior nasal spine (Broca 1–5)	1.0	3.9	7	0.9	2.75	8	1.39

Table 2. **Measurements of postcranial bones of the pituitary dwarf from Dogehe-Baary-2 compared to averages for unaffected population members**

	Mound 12, burial 2		Females*		Males*	
	Right	Left	*x*	*n*	*x*	*n*
	x	*x*				
1	2	3	4	5	6	7
Humerus						
1. Maximal length	–	222.0	295.7	10	322.1	11.0
2. Total length	–	219.0	290.4	9	319.0	10.0
3. Upper epiphysis breadth	–	234.0	44.2	10	49.3	12.0
4. Lower epiphysis breadth	40	43.0	58.9	12	64.6	14.0
5. Maximal breadth at midshaft	13	13.0	20.9	14	23.1	15.0
6. Minimal breadth at midshaft	12	12.0	16.2	14	19.1	15.0
7. Minimal shaft circumference	39	40.0	58.1	13	66.4	14.0
6:5. Index of section	92.3	92.3	77.8	14	82.3	15.0
7:1. Robusticity index	–	18.0	19.0	9	20.8	10.0
Radius						
2. Physiological length	154	154.0	217.0	6	234.2	9.0
Ulna						
2. Physiological length	162	162.0	220.5	6	237.4	7.0
Clavicle						
1. Maximal length	108	104.0	136.1	7	153.3	4.0
6. Circumference at midshaft	24	24.0	34.1	7	40.2	5.0
6:1. Robusticity index	22.2	23.1	25.2	7	26.6	4.0
Femur						
1. Maximal length	–	306.0	412.2	12	448.3	7.0
2. Length in natural condition	–	305.0	408.9	12	446.3	7.0
21. Bicondylar breadth	–	54.0	72.9	10	81.5	8.0
6. Sagittal diameter at midshaft	–	16.0	24.3	12	28.6	9.0
7. Transverse diameter at midshaft	–	14.0	25.2	12	29.6	9.0
9. Upper transverse diameter of shaft	–	14.0	30.8	13	32.6	10.0
10. Upper sagittal diameter of shaft	–	16.0	21.6	13	26.3	10.0
8. Shaft circumference	–	48.0	78.0	12	91.6	9.0
8:2. Robusticity index	–	15.7	19.2	11	20.5	7.0
6:7. Pilastric index	–	114.3	97.1	12	96.8	9.0
10:9. Platymery index	–	114.3	70.7	13	80.7	10.0

Table 2 (continued)

1	2	3	4	5	6	7
Tibia						
1. Total length	237	237.0	341.7	16	367.7	7.0
5. Upper epiphysis width	48	48.0	69.2	13	76.7	7.0
8. Sagittal diameter at midshaft	17	17.0	26.8	16	30.6	11.0
8a. Sagittal diameter at nutrient foramen	17	18.0	30.5	16	35.6	11.0
9. Transverse diameter at midshaft	14	13.0	20.1	16	22.1	11.0
9a. Transverse diameter at nutrient foramen	15	14.0	22.4	16	24.3	11.0
10. Midshaft circumference	48	49.0	74.8	16	84.1	11.0
10b. Smallest circumference	45	45.0	68.1	16	75.5	11.0
9a:8a. Index of section	88.2	77.8	73.5	16	68.2	11.0
10b:1.Robusticity index	19	19.0	20.0	15	20.6	6.0
Skeletal proportions						
Tibio-femoral index (T1:F2)	–	77.7	80.4	5	83.0	5.0
Humero-femoral index (H1:F2)	–	72.8	72.4	5	72.1	3.0
Body length according to various methods						
L. Manouvrier	107.9 / 109.2**	112.0 / 113.1**	155.1	14	165.5	10.0
K. Pearson and A. Lee	135.0 / 130.5	135.3 / 132.3	154.5	14	165.0	10.0
A. Telkka	–	–	155.7	14	167.1	10.0
C. Dupertuis and J. Hadden	138.4 / 132.6	137.1 / 132.4	159.0	14	169.5	10.0
V.V. Bunak	–	134.0 / 131.2	155.6	4	167.4	4.0
G.F. Debetz	–	138.0 / 134.5	156.9	4	173.4	4.0
Average	127.1 – 124.1	131.3 / 128.7	156.1	14	167.2	10.0

* For group means, dimensions of right and left bones are pooled.
** The first value is body length estimated for males, the second value refers to females.

skeleton are generally normal. Infantile features of the skull include hyperbrachycrany, large nasal index, and very flat nasal bones. Marked glabellar relief suggests that the individual was male. Dimensions of the long bones are close to those of modern children aged 7 (Fedosova, 2003; Bass, 1987). Estimates of body length based on formulae for both males and females range within 124 – 131 cm, supporting our conclusion that the individual was male.

Traits such as facial flatness, measured by both naso-malar and zygo-maxillary angles, point to Mongoloid affinities and link the individual with other population members.

The individual characteristics are as follows. Cranial proportions (Fig. 1) fall within the normal range. The outer table of the left parietal bone displays a small depression evidently resulting from an injury (Fig. 1, *1*). The frontal squama reveals a round lesion of the outer table (Fig. 1, *2*); its edges are smooth and elevated (this can be a well healed injury). The sutures are well formed. Posterior portions of the sagittal and lambdoid sutures are nearly obliterated .

In the mandible (Fig. 2), lower incisors, second left premolar, and left molars are lacking, and their alveoli are resorbed (Fig. 2, *1*). Crowns of the right molars are abraded to one half of their height (Fig. 2, *5*). All teeth display calculus, and the roots are exposed to one third of their length, corresponding to a second-degree periodontal disease. One premolar never erupted.

Fig. 1. Cranium in lateral view.
1 – injury of the outer table of the parietal bone;
2 – depression on the frontal squama.

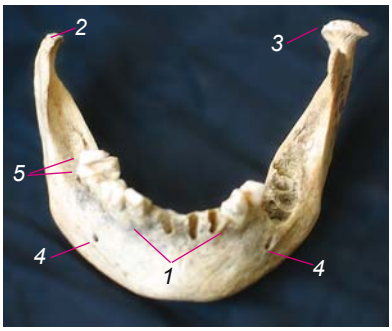


Fig. 2. Mandible.
1 – atrophic changes of the alveolar process; *2* – right condyle; *3* – left condyle; *4* – displacement of mental foramen; *5* – attrition of molar crowns.

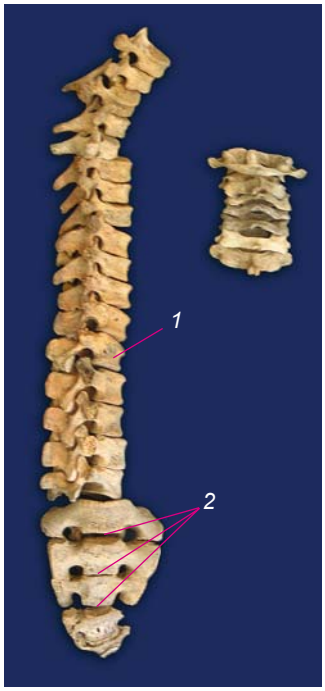


Fig. 3. Spine.
1 – reduction of height of the first lumbar vertebra; *2* – absence of fusion of sacral vertebrae.

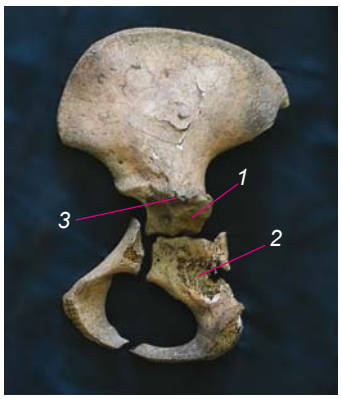


Fig. 4. Pelvic bones.
1 – acetabulum; *2*, *3* – symptoms of inflammatory process.

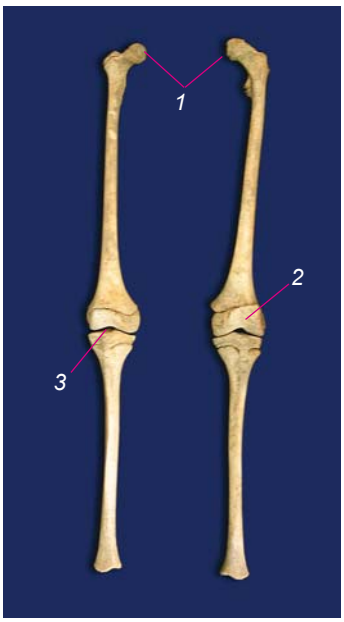


Fig. 5. Lower limb bones.
1 – femoral heads; *2* – distal epiphysis of the left femur; *3* – proximal epiphysis of the right tibia.

Fig. 6. Sternum.

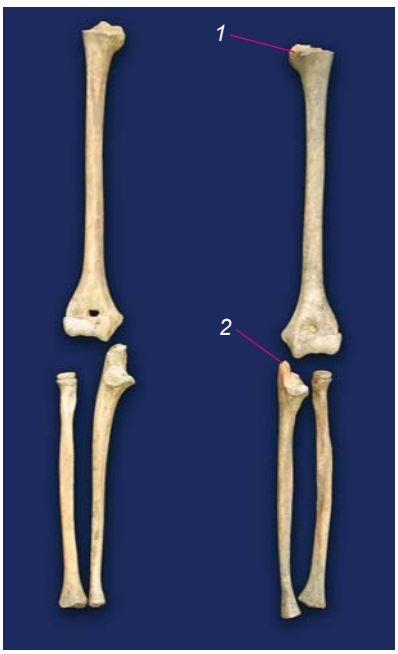


Fig. 7. Upper limb bones.
1 – proximal epiphysis of the left humerus;
2 – proximal epiphysis of the left ulna.

Apparently, dental eruption was hampered by the small size of the mandible. The right condyle is virtually absent (Fig. 2, *2*); the left one is small (Fig. 2, *3*), and its articular surface reveals a defect (the trabecular bone is exposed). Clinically, such changes are accompanied by reduced mobility of joints and by pain. The roughening on the lateral surface of the mandibular angle (place of attachment of the masseter muscle) is virtually absent on both sides, whereas that on the medial surface, where the medial pterygoid muscle is attached, is well expressed. Because both muscles are synergetic, the changes can be due to the redistribution of mechanical stress caused by pain in the temporo-mandibular joint. The mental foramen is shifted posteriorly, to the level of the first molar (normally it is situated at the level of the first premolar or between the premolars) (Fig. 2, *4*). Based on the totality of dental traits, the individual's age was no less than 45.

In the backbone (Fig. 3), the body of the first lumbar vertebra is somewhat lower than normal (Fig. 3, *1*). There are no visible degenerative changes or flattening. Sacral segments have not fused (Fig. 3, *2*).

Constituents of the pelvic bones have similarly not fused (Fig. 4). Fragments of the acetabulum reveal no articular surface (facies lunatum) (Fig. 4, *1*). The ischium (Fig. 4, *2*) and the lateral surface of the iliac crest (Fig. 4, *3*) exhibit traces of an inflammatory process.

The femoral heads (Fig. 5) are small and lack articular surfaces (Fig. 5, *1*). The epiphyses and the trochanters (both greater and lesser) display growth plates. The femoral shafts are thin. The lower metaphysis is funnel-shaped, and the growth plate is retained. The femora are asymmetric, the left one being longer due to a larger distal epiphysis (Fig. 5, *2*). In the right distal epiphysis, the intercondylar notch is indistinct, and in the proximal epiphysis of the right tibia, the outline of the intercondylar eminence is smoothed (Fig. 5, *3*). The medial malleoli are lacking. The maximal length of the left bones is considerably larger than that of the right ones. The apophyses are indistinct.

The sternum (Fig. 6) consists of five separate segments. Its total length is approximately 11 cm. The ribs are long, their angles are indistinct, and the 12th pair is lacking.

The heads of the humeri (Fig. 7) are destroyed, the left one is lacking (Fig. 7, *1*), and the cancellous bone of the metaphysis is exposed. The distal epiphyses are better preserved. The proximal epiphyses of the radii exhibit growth plates. The left ulna lacks the olecranon process (Fig. 7, *2*). The apophyses are quite indistinct.

The histological examination of the bone samples revealed marked anomalies in bone structure and in growth plates. The cortical bone (Fig. 8) displays numerous microscopic fractures (Fig. 8, *1*) and basophilic lines (Fig. 8, *4*) caused by remodeling. The vascular canals (Fig. 8, *2*) are very sparse. Certain cells contain nuclei (Fig. 8, *3*). Concentric lamellae of secondary osteons (Haversian systems) have not been revealed.

In samples of cancellous bone (Fig. 9), the trabecular plates are thin (Fig. 9, *1*), the connections between them are disrupted (Fig. 9, *2*), and microscopic fractures are observed (Fig. 9, *3*, *4*). Strikingly, the cartilage, including a fragment of a growth plate in the basis of the greater trochanter, is retained (Fig. 10, *1*). It is present among the atrophic bone structures evidencing remodeling (Fig. 10, *3*, *4*). Staining with alcyan blue reveals the presence of proteoglycans, acquiring an intense blue coloration (Fig. 10, *2*), lacunae of chondrocytes, and even fragments of their destroyed nuclei (Fig. 11, *1*). No tendency for the replacement of the cartilage by bone has been observed, since vessels penetrating the adjacent bone are absent. Basophilic lines in trabecular plates (Fig. 11, *2*) attest to the remodeling of bone. The preserved growth plate is markedly altered (Fig. 12). Chondroblasts, which make up one of the layers of the growth plate, are shaped like irregular, vertically compressed pillars (Fig. 12, *2*). This is a symptom of vicious bone formation. In the matrix (Fig. 12, *2*), proteoglycans are retained (stained blue). Large lacunae in the cartilage evidence dystrophic changes (Fig. 12, *3*).

The histological examination, then, has revealed numerous structural disturbances of the bone and cartilage, including osteoporosis with the disruption of connection between trabeculae, functional deficiency of cortical bone of the shafts (microscopic fractures), dystrophic changes in the cartilaginous matrix, and deficient bone formation.

In sum, both the macroscopic examination (visible pathological changes and standard anthropometric measurements) and the microscopic examination (histological analysis of bone tissue) reveal clinical manifestations of the malfunction of the anterior pituitary. These include dwarfism combined with normal bodily proportions, absence of synostoses in postcranial bones, and lack of expressed secondary sexual characteristics. The arrest of osteogenic processes and of the growth of internal organs usually occurs at the age of 4 – 6. Skeletal symptoms of this disease include lack of synostoses in long bones (Rusakov, 1959; Volkov, 1968; Revell, 1985; Lagunova, 1989; Suslova, 1989).

The somatotropic hormone (STH), secreted by the anterior pituitary, specifically its somatomedins, affect the production of the insulin-like factor in the liver, contributing to the chondroplastic and periostal bone formation, and to skeletal growth. The target of STH is the cartilage, specifically the epiphysary plate, in which the chondrocytes proliferate and mineralize (Riggs, Melton, 1988; Rodionova, 1989; Lavrentsova, Onoprienko, 1996; Bykov, 2001).

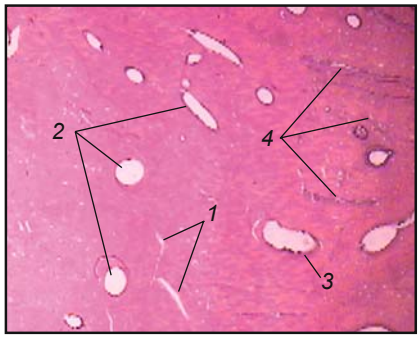


Fig. 8. Decalcified sample of the cortical bone, hematoxylin and eosin staining.
1 – microscopic fractures; *2* – vascular canals; *3* – nucleus of the osteocyte; *4* – basophilic lines.

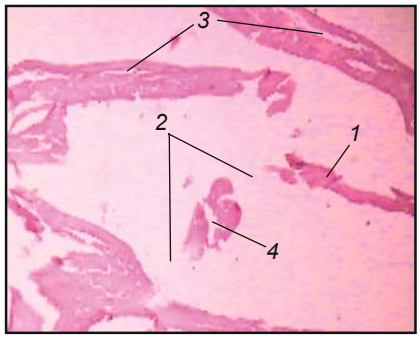
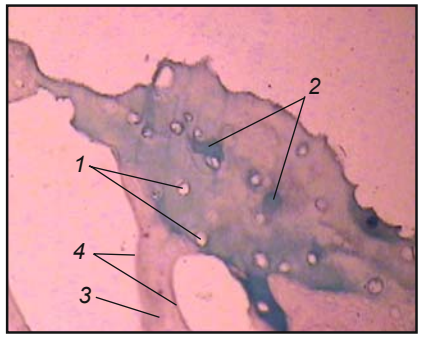


Fig. 9. Cancellous bone (greater trochanter of the femur). Hematoxylin and eosin staining. Microscopic picture of osteoporosis:
1 – thin, atrophic trabeculae; *2* – disruption of the connection between trabeculae; *3* – longitudinal microscopic fractures; *4* – transverse microscopic fractures.



Puñ. 10. Part of the greater trochanter of the femur. Stained with alcyan blue.
1 – lacunae in the cartilage; *2* – cartilage; *3* – atrophic bony structures; *4* – traces of remodeling.

Fig. 11. Part of the greater trochanter.
1 – stained matrices of lacunae in the cartilage and nuclei of chondroblasts; *2* – basophilic lines in trabeculae.

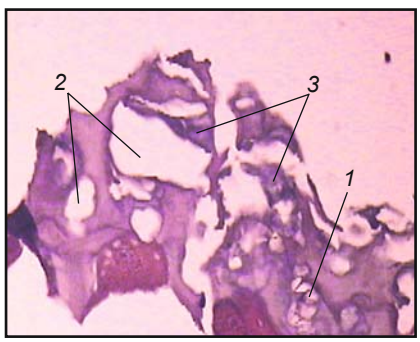


Fig. 12. Part of the greater trochanter. Growth plate. Stained with alcyan blue.
1 – pillars; *2* – matrix with retained proteoglycans (stained blue); *3* – lacunae in the cartilage.

Pituitary dwarfism is caused by the insufficient secretion of STH due to the underdevelopment of the pituitary, or inflammatory or tumoral processes therein. The secretion of other hormones such as thyrotropic and gonadotropic, too, is lowered. The deficit of STH causes the arrest of bone and cartilage formation in all parts of the skeleton, resulting in its underdevelopment. The chondroplastic growth of bone sometimes continues. However, appositional bone growth is not accompanied by the remodeling of bone. Microscopically, small islands of cartilage are visible inside the bone tissue, pointing to the arrest of bone growth. Resorption, too, slows down, usually resulting in the presence of old, unremodeled bone structures (Revell, 1985; Riggs, Melton, 1988; Lagunova, 1989; Suslova, 1989).

The structural deficiency of the bone tissue in pituitary dwarfism makes the bones fragile, as evidenced by healed fractures, microscopic fractures of trabeculae, and multiple or limited osteochondropathies with all skeletal bones being affected (Rusakov, 1959; Nekachalov, 2000). In the case under discussion, the clinical picture typical of pituitary dwarfism is markedly complicated by epiphysary dysplasia (Lagunova, 1989; Suslova, 1989). The most affected are the hip joints, the shoulder joints, and the temporo-mandibular joints. Lesions of proximal parts of the skeleton are one of the key symptoms of this disease. The combination of pituitary malfunction with a severe form of epiphysary dysplasia aggravates the clinical picture, which must have included reduced mobility of joints, severe contractures, and pain. Other symptoms include inflammatory processes in pelvic bones, and aseptic necrosis of the left humeral head and of the mandibular condyle.

Conclusions

A comprehensive examination of the abnormal skeleton from an early nomadic burial associated with the Uyuk-Sagly culture (Tuva, 6th – 4th centuries BC) has made it possible to diagnose the condition as pituitary dwarfism. The sex of the individual was tentatively determined as male, although secondary sexual characteristics are quite indistinct in such a condition. The individual's peculiarities possibly included a clumsy gait, limping,

a barrel-shaped chest, scoliosis, permanent pain in the joints, and their reduced mobility. All this, along with the underdevelopment of apophyses of the upper and lower limb bones must have caused decreased mobility and, as a likely result, obesity. The cranium exhibits healed injuries, suggesting that the individual was the target of aggression. In fact, he could have died following a brain injury. His age at death, however, was no less than 45. Such a long life span for pituitary dwarfism complicated by epiphyseal dysplasia is unique even at the present level of medicine.

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INJURIES ON HUMAN SKELETAL REMAINS FROM SOPKA-2 AND THEIR RELEVANCE FOR SOCIAL RELATIONSHIPS AMONG THE BARABA STEPPE POPULATIONS

In 2003, under a research project headed by T.A. Chikisheva, multidisciplinary studies of human skeletal remains from Sopka-2 were initiated. Sopka-2 is a group of mounds on the Baraba steppe, Southern Siberia, dating from various periods and excavated by V.I. Molodin.

Based on a special program of skeletal studies aimed at environmental and social reconstruction (Istoricheskaya ekologiya…, 1998), morphological and pathological changes in skeletal remains of 595 individuals of various ages, both male and female, were described. Skeletal remains have been brought to the laboratory rather selectively over many field seasons, so that at present, variably preserved postcranial bones of only 345 individuals are available. This precluded us from conducting a complete statistical analysis of certain indicators of physiological stress. However, because the sample is large, and most individuals have been attributed to specific chronological periods and cultures*, certain tendencies in the distribution of morphological and pathological markers were discovered.

The present article is part of a larger study and addresses only problems relevant to archaeology. Our first task was to examine how skeletal studies can help in reconstructing the social environment and relationships between various social groups.

Cranial injuries are known to be distinctive markers of aggression and adverse social tendencies. Also, the nature and location of skeletal fractures may be used as indirect indicators of social conditions under which specific injuries were inflicted. Therefore, cranial and postcranial injuries may indirectly point to the nature of social relationships in a prehistoric population. This has been demonstrated more than once using skeletal samples dating from various periods (see (Buzhilova, 2005) for a review).

The second task was to examine skeletal injuries resulting from manipulations of the head and body. These manipulations can leave traces such as perforations, incisions, compressed fractures, and other injuries in specific areas, resulting from beheading, scalping, ritual dismembering, cannibalism, etc. (Buzhilova, Vnukov, Antipina, 1999; Mednikova, Lebedinskaya, 1999; Mednikova, 2000; Buzhilova et al., 2002; Syrovatko, Kozlovskaya, 2004).

Some manipulations causing particular cranial injuries can be identified as trepanations. Medical and ritual aspects of this practice were tightly intertwined. Paleopathological data suggest that already in early samples, many kinds of trepanations can be diagnosed as having resulted from the treatment of cranial injuries. Other kinds can apparently be related to transformation and initiation rites, and can therefore be regarded as "transformation means" similar to psychotropic drugs, ecstatic dances, masks, and other phenomena familiar to

* We thank A.E. Grishin for this information.

ethnologists. Such trepanations demonstrate an archaic ideological blend of incipient art, religion, and early beliefs concerning nature and society (Mednikova, 2001).

Common injuries and the reconstruction of their context

The examination of a rather large cranial sample (211 male, 259 female, and 125 indiscriminate crania, including 37 infantile and juvenile) showed that cranial injuries in adults were frequent.

These injuries can be tentatively subdivided into two categories: (1) healed, and (2) perimortem, i.e. inflicted after, or immediately before death. Within each of these groups, certain varieties can be established.

Healed injuries occur in 4.7 % of male crania and in 4.3 % of female crania (ten and eleven cases, respectively). Series dating from various periods were pooled, but the general lack of sex differences may indirectly point to social tension that might have developed during certain time periods. Assessing the factors underlying this tension will only be possible when other sources are used.

We will now examine these cases with regard to the possible social context. Two males, mature (N 62 "A", mound 6, burial 10) and young (N 325), display healed fractures of nasal bones. In the former case, the injury was inflicted by a direct contact blow, and in the latter case, by a blow from the right side. The first man, then, was unable to duck, whereas the second one might have avoided a sharper right hook.

Both males are associated with various stages of the Krotovo culture. Another healed fracture of nasal bones caused by a blow from the right is present on the cranium of a young male (N 630) associated with Fedorovka stage of the Andronov culture. Other facial injuries include those of anterior teeth on the cranium of a mature male (N 400, mound 57, burial 5) (Fig. 1). The burial is associated with the Krotovo culture.

In the female sample, healed fractures of the nasal bones were detected in eight cases. All these individuals are young or mature (N 81 "B"; 140; 171 "C", mound 22, burial 26; N 180 "A"; 235, mound 25, burial 17; N 351; 479, mound 60, burial 1; N 656 "A"). The nature of these injuries suggests that most of them resulted from direct blows, and one from a blow from the left: the woman, trying to avoid the blow, stepped backward and to the right.

Nearly all female skeletons are from Krotovo burials, though one is earlier (Igrekov culture, N 656 "A") and one is later (Early Turkic period, N 351). One other mature Krotovo female (N 44, mound 4, burial 1) displays a facial injury resulting from a direct blow in the upper anterior teeth. Most of their crowns are broken and their color has been altered because of inflammation.

Injuries to the face are somewhat more frequent in females (3.5 %) than in males (1.9 %). This may have been due to gender relationships among Krotovo people, since one half of healed cranial injuries in females (six cases out of eleven) affect nasal bones. Evidently males could afford to use physical force in disputes with women, and, judging by the nature of injuries, the latter did not dare to avoid the blows.

Physical aggression is evidenced by other cranial injuries as well. Some of these affected the frontal bone and were apparently caused by a weapon with a sharp, possibly cutting edge. Like the facial injuries described above, these resulted from direct blows inflicted by someone facing the victim. Crania of two mature males (N 86, mound 12, burial 5, and N 181, burial 59) possess healed injuries 2 — 3.5 cm long and less than 1 cm wide. These cuts are situated either in the middle of the frontal bone or on its left portion, implying that the aggressors were right-handed.

The victims are associated with various archaeological cultures: Krotovo (N 181) and Early Turkic (N 86). In the large female sample, only one such case was registered: the cranium of a young woman from a Krotovo burial (N 81 "B", mound 11, burial 4) exhibits a cut in the left supraorbital region and a healed fracture of nasal bones. The total number of healed facial injuries caused by cutting weapons is small, probably because most violence was unrelated to warfare. However, the fact that certain cuts were inflicted by special weapons and that only a few of them are healed indicates that certain periods in the histories of the Krotovo people and Early Turks were marked by increased violence.

Two other kinds of injuries differ from the above in location: they affect the parietal and the occipital bones and include healed cuts and compression fractures. The positions of the aggressors with respect to the victims were similar: all blows were inflicted from behind by right-handed individuals.

Two crania of males of various ages display elongated scars on the left parietal bones (mound 60, burial 80, V; N 341 "B"). The lengths of the scars do not exceed 1 – 2 cm, indirectly suggesting that the blows were oblique. Although having been attacked from behind, it is possible that the victim was partly able to avoid the blow. One of these individuals (N 341) is associated with Igrekov culture, while the cultural affiliation of the other one has not been determined.

Compression injuries resulting from blows inflicted by blunt weapons and located in the

occipital region were registered not only in males (N 7, mound 1, burial 7; N 394, mound 55, burial 1; N 459, mound 58, burial 60; N 607 "E"), but in a female as well (N 647). These injuries are small, and were possibly caused by light weapons. Such injuries perhaps resulted from everyday violence typical of certain social groups. The individuals in question are associated with the Krotovo (N 7, 459), Igrekov (N 607), and Podchevash (N 647) cultures, and with the Early Turkic culture (N 394).

Unhealed (perimortem) injuries are more questionable since it is difficult to separate them from postmortem lesions. However, because some are similar in shape and are located in a specific region of the skull, and because no "fresh" fractures have been detected, these injuries are apparently ancient (perimortem or resulting from ritual manipulations, see below).

Twenty one injuries (eleven on male crania and ten on female crania) are unhealed. In males, injury frequency is somewhat higher than in females (5.2 % versus 3.9 %), and male injuries are more variable.

Analysis with regard to functional parallels allows us to distinguish several varieties of injuries. In terms of location, some resemble healed fractures. They are located on the frontal bone (males: N 475, 491, 594; females: N 102, mound 15, burial 8; N 257, mound 25, burial 39; N 267, mound 25, burial 49; N 317, mound 28, burial 1; N 508, mound 60, burial 30). Most of these individuals are associated with Krotovo culture. Two females (N 102, 317) are Early Turks, and one female (N 267) is associated with the Podchevash culture.

The length of the cuts, like that of healed injuries, does not exceed 3.5 cm (Fig. 2, 3). Some crania, both male (N 62 "A", mound 6, burial 10; N 573 "eastern"), and female (burial 60; N 548; 577 "C") display oblique cuts in the parieto-occipital region. All these individuals except one, whose cultural attribution has not been established, are Krotovo people.

Another category includes compression fractures and perforations of the frontal bone. Such injuries were discovered only in males. The frontal bone of a young male (N 243 "B") exhibits a round depression no larger than 2.5 cm in diameter with no traces of healing. In the middle of the frontal bone of another male (N 554), there is an oval perforation ca 2 cm in diameter (Fig. 4). The lesion is surrounded by radial cracks; on the inside of the cranium, along the rim of the perforation, the inner table contains an 8 mm long chip. No signs of either necrosis or healing are present. The nature of the injury suggests that a sharp blow was inflicted on the frontal bone with a small object (Kustanovich, 1975). Apparently the injury was lethal. Another cranium of a young male (N 388 "B", mound 50, burial 2) exhibits an oval perforation on the frontal bone. Its length is approximately 2 cm. Again, there are no signs of either inflammation or healing.

In our view, these injuries are similar not only in terms of location, but also in terms of the weapon used to inflict the wound. The compression fracture and the perforations are similar. The only difference between them concerns the force of the blow. These injuries might have been caused by a projectile weapon launched with considerable speed (see, e.g., (Buzhilova, Maslennikov, 1999)).

Different perforations, affecting the parieto-occipital region, were found in three individuals. In a female (N 524), a perforation resulted from a blow to the parietal bone from the left (Fig. 5). The perforation is oval, and its length is ca 0.9 cm. On one side, part of the outer table is chipped, suggesting that the force of the blow was considerable. On the parietal bone of a male (N 124, mound 18, burial 9), there is an oval perforation, and here, too, part of the outer table along the rim had chipped. One more perforation was observed in a mature male (N 25). It is rectangular, 1.5 cm by 1.4 cm, and is situated in the middle of the vault near the sagittal suture (Fig. 6). None of the three injuries shows signs of inflammation or healing.

Notably, the injuries to both the frontal and the parieto-occipital regions have only been discovered on crania of Krotovo people. The total frequency of cranial injuries in the Krotovo sample is the highest. This includes both accidental injuries and lethal ones, apparently inflicted during warfare.

Our knowledge of the lifestyle of Krotovo people is extended by the analysis of postcranial injuries. These fall into several groups.

The first group includes injuries localized on forearm bones. In individual N 122 (mound 18, burial 7), the shaft of the right ulna close to the elbow joint is curved along the horizontal axis, possibly disfigured as a result of an injury. Also, bone growths marking places of muscle attachment on the right humerus are very pronounced. The tibia displays symptoms of secondary stagnation, possibly resulting from thrombophlebitis. These markers, including the likely injury of the right elbow, attest to hard manual labor in a standing position.

The left radius of a male (N 290, mound 25, burial 72) contains a healed fracture on the lower third of the shaft. Also, this individual is characterized by pronounced muscle attachments on both arm and leg bones. The clavicles reveal pathological changes in the attachment places of the sternoclavicular ligament and of the trapezoid muscle evidently resulting from regular physical strain. We have observed such

Fig. 1. Anterior teeth broken as a result of a blow (mature male N 400).

Fig. 2. Various types of incisions on the frontal bone caused by injury (individuals N 549, 267, 317).

Fig. 3. Cut inflicted with a sharp-bladed weapon (individual N 508).

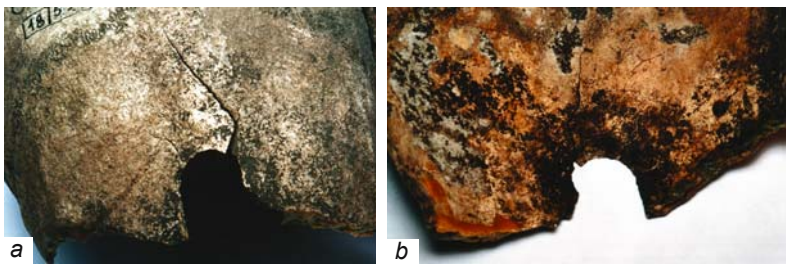

Fig. 4. Oval perforation in the middle of the frontal bone of a male (N 554).
a – exterior view; *b* – interior view.

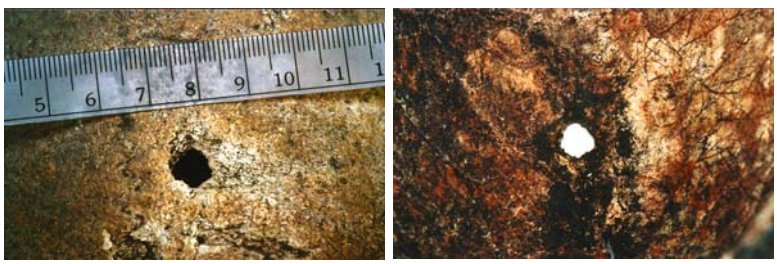

Fig. 5. Perforation on a female cranium (N 524) caused by a blow to the parietal bone from the left.

Fig. 6. Rectangular opening 1.5 cm by 1.4 cm, situated in the center of the cranial vault of a male (N 25) near the sagittal suture.

Fig. 7. Healed fracture on the left distal forearm bones (N 198).

Fig. 8. Healed injury on the lower shafts of the left forearm bones (N 196).

changes in individuals engaged in hard manual labor. The left knee joint of this male exhibits symptoms of arthrosis, including reduction of the articular table of the femur and heavy polish on the table as a result of cartilage degeneration. Apparently, this person walked with a limp.

The right proximal forearm bones of a male (N 198) from burial 52 in mound 22 demonstrate a healed fracture. The ulna shows a distinctly vicious union with minor inflammation (Fig. 7). As in the preceding male, the muscle attachments of the arm bones are very marked.

The ulna and radius of another male (N 196, mound 22, burial 50) contain a healed injury on the lower third of the shaft (Fig. 8), apparently causing arthrosis in the radiocarpal joint. As in the preceding cases, the muscle attachments of the arm bones are very pronounced.

The injuries described above along with the distributions of stress markers and the fact that all three individuals (N 290, 198, 196) are associated with the same stage of the Krotovo culture suggest that these males were engaged in similar hard manual labor. Their work possibly required special professional skills. Individual N 122, associated with the late stage of Krotovo culture, may have practiced the same activity.

The second group of injuries was discovered on fibulae of several individuals (N 3, mound 1, burial 3; N 17, mound 1, burial 17; N 132, mound 19, burial 7; N 230, mound 25, burial 12). Most of these injuries are situated almost symmetrically on the lateral sides of both fibulae. They look like shallow incisions or superficial lens-like chips situated at approximately 45° angles to the bone table and directed along the shafts. Their specificity and similarity suggest that they were caused by similar factors that did not lead to fractures.

Although the individuals are only associated with the Krotovo culture, they date from various stages of it. Perhaps certain traditional occupations were practiced throughout the Krotovo period. These injuries of the shank may have resulted from falling into a pitfall with sharp pales. Regrettably, no additional data that might help us to understand the situation are available.

Other kinds of lesions were apparently caused by secondary inflammation, possibly (at least in some cases) resulting from injuries. The left tibia of individual N 142 (mound 21, burial 4) exhibits symptoms of local inflammation (possibly primary) below the tibial tuberosity, and several point inflammations in places of muscle attachment, encircling the shaft below what might have been the primary inflammation area. These may be consequences of a minor injury caused by exposure to cold (myositis). Two individuals (N 490, mound 60, burial 12; and N 57, mound 6, burial 5), dating from the same stage of the Krotovo culture, reveal symptoms of myositis on the tibiae in the area where the soleus muscle attaches to bone.

Summing up the information on healed injuries of the cranium and of the postcranial bones, we regard nearly all of them as accidental. Certain injuries occur in people associated with various cultures, both early and late. However, unhealed (perimortem) injuries such as cuts and perforations are more frequent in Krotovo people. Lethal injuries, being clear indicators of violence, are more common in Krotovo males than in Krotovo females. This might be due to armed conflicts at certain stages of the Krotovo culture. Violence was evidently an inherent feature of gender relationships in Krotovo people. A number of female crania display injuries resulting from blows to the face (healed fractures of the nose and knocked-out teeth).

Injuries relevant for cultural traditions

Injuries described below have only been discovered in males. The first group comprises injuries to crania of mature males, associated with the Early Turkic culture. These are incisions, no longer than 1 – 2 cm, on the frontal and sometimes on the parietal bones as well. They are often situated in a parallel fashion, one above another at ca 45° angles to the Frankfurt plane. The crania (N 391 "A"; N 394, mound 55, burial 1) are well preserved. Such incisions usually attest to scalping. However the circular arrangement of incisions typical of scalping is only present on one of the crania (N 391 "A"); on the other one, they are situated only near the coronal suture. The latter case possibly attests to partial scalping along the upper forehead. There are no indications of healing.

If the Early Turks did practice scalping, then it is quite unlikely that they did this for medical purposes. First of all, nothing indicates that partial scalping was a surgical treatment for cranial injuries. In one case (N 394) a healed injury is situated in the occipital region, whereas incisions are situated on the frontal bone; in another (N 391), there are no injuries at all. Secondly, none of the incisions shows either inflammation or healing. Apparently, these are traces of postmortem manipulation of the head, possibly attesting to a military rite.

Regrettably, no similar cases are known from sites in adjacent regions, synchronous or otherwise. Nomads of

the Southern Russian steppes apparently practiced this rite (Mednikova, 2001: 183 – 184). Postmortem scalping was recently described in a group of Sarmatians based on cranial data (Pererva, 2005).

The tradition possibly existed in the Scythian culture as well, judging from written sources (Herodotus, History, IV: 64). The Altai tribes associated with a Scythian-type culture also practiced scalping, as evidenced by a mummy of a tribal chief from the second mound in Pazyryk. S.I. Rudenko (1953: 264, pl. XVIII) mentioned this mummy as an indication of scalping employed in a military rite. Therefore, the tradition existed in several nomadic peoples of Eurasia.

Another group of cranial injuries are trepanations. The total number of cases is five, one of them being disputable. All crania are those of young or mature males.

On the right parietal bone of individual N 66 (mound 6, burial 14, Neolithic), there is a round opening 2.2 cm by 2.1 cm in size, situated 3.4 cm away from the sagittal suture and 3 cm away from the coronal suture. No cracks or other indications of a direct blow are present on its rim (Fig. 9). Mostly the outer table is damaged. Injuries where the outer table and sometimes the diploe are damaged can result from a blow inflicted with a large blunt object. Trepanation cannot be excluded, however. If this is indeed evidence of trepanation rather than of an injury, then it might have been performed using the so-called scraping technique. The rim of the perforation bears no marks typically resulting from scraping (more or less regular lesions of the outer table). This prevents us from diagnosing the case as a trepanation. The inner table along the rim is not chipped, as would be typical of a compression fracture. This, however, is not enough to diagnose the case as a trepanation. Because the parietal bone is strong, it is possible that a blow inflicted with a blunt object failed to produce a large opening with typical chipping of the inner table.

Such lesions, then, can result from compression fractures that damage the outer table and partly damage the diploe. Intense inflammation caused by such an injury enlarges the affected zone, the outline of which normally follows that of the original lesion. Even if the latter is small, inflammation can spread into the cranial cavity. The absence of the extension of the diploe under the outer table, the fragmentary disruption of the inner table producing an irregular opening, and the partial connection of both tables in this part of the opening attest to an intense necrotic process. No chipping or traces of inflammation are visible on the outer table around the perforation.

Apparently, the individual died shortly after the injury, and his death was probably caused by general sepsis accompanying necrosis and the penetration of the infection inside the cranial cavity. However, a surgical operation is possible as well. More sophisticated methods are needed for a more accurate diagnosis.

Postmortem treatment is evidenced by a fragment of the cranial vault, 7.5 cm by 7.0 cm in size, showing traces of drilling. The individual (N 622 “A”, Chalcolithic, Igrekov culture) was a young male. On the left parietal bone, close to the bregma and near the sagittal suture, there is a drilled perforation. Its margins are smooth and unchipped. Drilling was performed from both sides. The outer opening is funnel-shaped, and its outer diameter is no more than 1 cm (Fig. 10, *a*). A similar funnel-shaped opening of the same size is present on the inner table (Fig. 10, *b*). The entire trepanation has the shape of an hourglass in section. When the inner table was being drilled, a narrow furrow emerged around the opening, and the margins of the inner opening on the frontal and parietal bones are chipped. No traces of inflammation or healing are present.

Two more cases probably resulted from drilling. Both individuals in question are associated with Igrekov culture. The lesions are situated on the left parietal bones, approximately in the same place as on the fragment described above. The first of these individuals is a young male (N 340, mound 31 burial 10). The size of the opening is less than 1 cm. Its edges are smooth and bear no traces of inflammation or healing. Drilling caused a crack and the adjoining bone partly broke (Fig. 11). The second individual is a mature male (N 611 “A”). The opening is 0.7 cm in size, like those described above. No reactive changes are seen around the perforation. Evidently all the three cases resulted from postmortem operations with the head.

Another cranium of a mature male (N 658 “I”) also bears a perforation, no larger than 1 cm in size, on the left parietal bone near the sagittal suture. The operation was performed with the same technique and in the same area of the parietal bone as in other individuals. However, because four more attempts at drilling were made, the case deserves a special discussion. Incomplete perforations are situated in the same place of the parietal bone, but lower, and are arranged in a row (Fig. 12, *a*). They are situated pairwise at regular distances from one another; however, the depth of drilling varies (Fig. 12, *b*, *c*).

No parallels to this case are known to us. The cranium differs from others by the presence of two large openings without any reactive symptoms. The first one, 4 cm in size, is situated on the frontal bone. Unfortunately, its margins are poorly preserved, and only recent chipping is present, especially on the left

Fig. 9. Perforation on the parietal bone of a male (N 66).

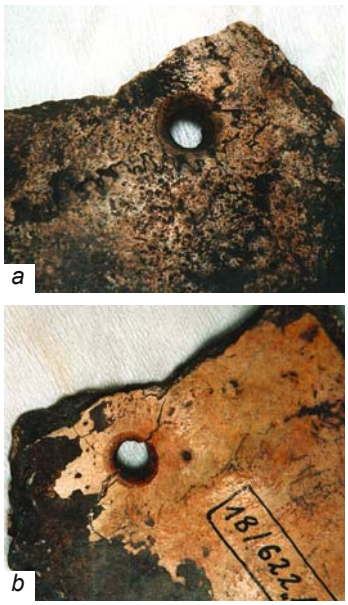

Fig. 10. Traces of drilling 7.5 cm by 7.0 cm on a fragment of the cranial vault (N 622 "A"). *a* – exterior view; *b* – interior view.

Fig. 11. Perforation on a cranium of a young male (N 340, mound 31, burial 10).

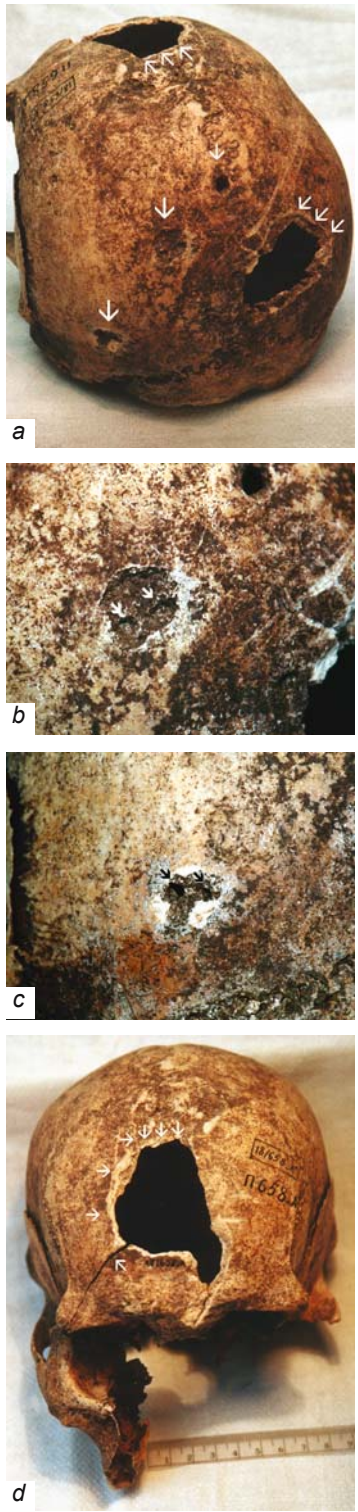

Fig. 12. Injuries on a male cranium (N 658 "I"). *a* – round pairwise lesions arranged in a line on the parietal bone; *b*, *c* – pairwise lesions, enlarged; *d* – recent chips partly disrupting the injury (possibly triggered by cracks caused by the blow).

and lower parts of the opening, possibly caused by cracks resulting from a sharp, apparently lethal blow (Fig. 12, *d*).

The second opening is better preserved. It is located at the junction between the occipital bone and the right parietal bone. Its shape is roughly triangular, with one short side (no more than 2 cm) and nearly equal long sides (see Fig. 12, *a*). The opening possibly resulted from a blow inflicted with a weapon having a sharp blade no more than 2 cm long. The weapon became stuck in the bone and was extracted with such force that a large piece of the bone, roughly triangular in shape, was detached.

The opening on the frontal bone is rather similar. The resemblance is based on its shape and the length of its upper part (see Fig. 12, *d*), which does not exceed 2 cm and forms a straight line, suggesting that the weapon had a sharp blade. The frontal bone was possibly more affected than the parietal, since it is less strong and the force of the blow was greater. On the frontal bone, as mentioned above, there are radial cracks that widened the initial lesion. Evidently the man died as a result of two blows inflicted with a weapon having a sharp blade, the length of which did not exceed 2 cm. Later, as part of the funerary rite, certain manipulations were performed.

The analysis of trepanations indicates that this practice, both medical and ritual, may have been common among the Igrekov people. The specimen described by us displays evidence of considerable skill in bone surgery. All perforations are situated on the left parietal bone near the bregma. A surgical operation on this part of the cranium, if performed on a living person, entails a high risk of damaging the venous sinus and causing intense bleeding and death.

Apparently the risk was taken into account, and the place for operation was not selected at random. If performed postmortem, such trepanations were part of a funerary ritual. Indeed, their location is uniform, pointing to a stable tradition practiced by Igrekov people.

Although no direct parallels are available for the same period and territory, a broader comparison indicates that people of the Middle Bronze Age

Catacomb culture in the steppe and forest-steppe regions of Eastern Europe also used the left side of the cranial vault for trepanations. While the Pit Grave (Yamnaya) culture people used this side in no more than 3 % of cases, no less that 10 % of people buried in Catacomb graves display perforations on the left side of their craniums, usually on the parietal and/or occipital bone. S.I. Kruts (1984) describes multiple trepanations in crania from Krasnoye and Ispanovy Mogily in the Ukraine.

The suggestion that trepanations had a symbolic significance to members of the Igrekov culture is evidenced by their sex distribution: all crania with trepanations derive from males. If trepanations were indeed a means of "transformation" or initiation, then this fact appears logical. According to A.D. Avdeyev, the origin of theatre is related to male labor. Hunting mimicry eventually evolved into hunting dance. Hunting magic gave rise to totemic rituals and to those of secret male unions, where a masked man represented a new entity: a dead person, a spirit, or an animal (Mirovaya khudozhestvennaya kultura, 1994: 354 – 377). This trajectory of psychological and behavioral evolution is later evidenced by the emergence of warriors as a distinct social category.

Southern Siberia has long been known as an important center of the postmortem trepanation rite, but new materials suggest that the practice was variable and was part of both medical treatment and postmortem rituals. The geographic distribution of antemortem and postmortem trepanations includes regions from northwestern Mongolia via Tuva to the Minusinsk Basin. Finds from the Altai, including its Kazakh portion, and from Western Siberia suggest that the trepanation rite was practiced by a number of nomadic peoples dispersed over vast territories in the middle and final Early Iron Age (Mednikova, 2001). Their cultural and biological affinities have been discussed in detail. Possibly, the distribution of various trepanation techniques evidences contacts and migrations of steppe peoples. Sporadic cases from eastern Central Asia, northwestern China, and Siberia demonstrate that the rite was practiced as early as the Chalcolithic and Bronze Age (postmortem trepanation in Igrekov and Okunev people, surgical treatment in Karasuk and possibly Xinjiang people).

In one of the present authors' view (Ibid.), the principal aspect of the trepanation practice was magical. The social and psychological background of this custom was related to archetypical beliefs reflected in the cranium cult, as well as in initiation and funerary ritualism. Antemortem and postmortem trepanations were possibly aimed at changing a man's essence, and this idea is indirectly supported by the fact that trepanation frequently combines with masks, which had the same functions.

Regarding the origin and distribution of the trepanation rite in Eurasia, there is no doubt that the earliest trepanations are associated with the Mesolithic culture of the Dnieper area. Later, antemortem and postmortem manipulations with the head were widely distributed, and eventually became common in several regions. The scarcity of evidence from the Asian continent has long prompted researchers to believe that the practice was introduced there from outside. However, archaeological studies in the Near East, evidencing a complex funerary ritualism that included postmortem manipulations of the head, along with Chalcolithic and Bronze Age cases of antemortem and postmortem trepanation from Northern China and Southern Siberia demonstrate that the tradition was quite ancient in Asia.

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INTERNATIONAL CONFERENCE "FROZEN TOMBS IN THE ALTAI MOUNTAINS: STRATEGIES AND PERSPECTIVES"

Gorno-Altaisk State University and Ghent University (Belgium) organized a conference, supported by UNESCO, on March 28 – 31, 2006, in the city of Gorno-Altaisk. Its theme was "Frozen Tombs in the Altai Mountains: Strategies and Perspectives." The Conference was held in commemoration of the "Year of the Altai" (2005), announced by UNESCO. Its sponsorship of this scholarly forum addressing the preservation of the cultural legacy of Siberia underscores the importance and significance of the Altai region.

The Conference was attended by archaeologists and specialists in related areas such as geography, cryopedology, satellite cartography, and geophysics. Natural and cultural factors of Gorny Altai, such as burial mounds with ice, were discussed in depth.

One day of the Conference was devoted to the archaeological aspects of the phenomenon; on another day, the natural context of archaeological sites was discussed in detail. In addition, the results of the multidisciplinary projects were presented. Ten papers touched upon issues of ancient art.

The Conference was opened with welcoming speeches by the Altai Republic authorities: Deputy President Y.V. Antaradonov, and Deputy Minister of Education, Science, and Youth Politics, B.V. Pakhaev. The next event was a ritual show in which the shamans demonstrated their skills in pantomime and Central Asian laryngeal singing. The UNESCO project of studying Pazyryk frozen burials was presented. In his emotional talk, Yu.P. Badenkov (Institute of Geography RAN, Moscow) stressed a need for matching strategies of economic development with those aimed at the preservation of the Altai environment in the context of global climatic, economic, and infrastructural changes. The speaker also presented a scientific prognosis relative to the global environmental changes at both the regional and local levels and the importance of science in addressing these changes. He proposed to grant the Altai the status of a borderland territory where the combined efforts of environmentalists from Russia, China, Mongolia, and Kazakhstan would be implemented.

T.V. Yashina (Katun Biospheric Reserve) focused her presentation on UNESCO research projects, particularly, on environmental monitoring in the Katun Biospheric Reserve. J. Bourgeois (Ghent University) emphasized global climatic warming that produces an adverse effect on frozen burial mounds of the Pazyryk culture. He also acquainted the audience with a long-term project implemented by Ghent University which aimed at the study and the elaboration of measures for protection of frozen tombs in Gorny Altai. S.S. Marchenko (University of Alaska, Fairbanks, USA) traced the process of thawing of glaciers in the northern Tien Shan and in the Altai. The speaker touched upon tendencies in climatic changes entailing rapid melting of glaciers, and reconstructed the origin and degradation of frozen sediments at the Berel burial ground.

V.I. Molodin (Institute of Archaeology and Ethnography SB RAS, Novosibirsk) presented main results of investigations carried out on the Ukok Plateau and placed a special emphasis on Pazyryk frozen graves. The speaker described a wide circle of problems emerging in the course of field studies and subsequent conservation and restoration of materials preserved in ice. Molodin also concentrated on analyses of artifacts conducted at various research institutions of SB RAS, as well as results of some multidisciplinary projects.

W. Gheyle (Ghent University) focused on methods implied for mapping archaeological sites in Sebistey, Elangash, Kalanegir, Yustyd, and Dzhazator (Kosh-Agach Region of the Altai Republic). Maps of these loci were demonstrated to the audience. R. Goossens and A. de Wulf from the same university described in detail methods for processing satellite cartography data and techniques used for the formation of relevant databases. A.V. Ebel (Gorno-Altaisk State University) discussed the implementation of projects (co-sponsored by researchers from Ghent) focusing on compiling archaeological maps of the Kosh-Agach Region of the Altai.

The presentation by I.Y. Sljusarenko (Institute of Archaeology and Ethnography SB RAS, Novosibirsk), E.P. Krupochkin and N.T. Bykov (Altai State University, Barnaul) dealt with modern approaches to the cartography of sites in the Yustyd archaeological microregion (eastern Altai). Yang Lin (National Museum of China, Beijing) presented a review of archaeological sites in the Chinese Altai and exhibited artifacts from the Museum

collections, such as steles, and materials recovered from burial mounds and settlements in the southern Altai. G. Dzhumabekova (Margulan Institute of Archaeology, Almaty, Republic of Kazakhstan) concentrated on recent excavations of a Pazyryk burial mound in Berel. D. Tseveendorj (Mongolian Academy of Sciences, Ulaanbaatar) examined petroglyphs in the Gobi Altai. E. Jacobson-Tepfer (Oregon University, USA) shared her ideas about natural and cultural landscapes of the Mongolian Altai. Yu.F. Kiryushin and N.V. Stepanova (Altai State University, Barnaul) focused on sites of the Scythian period located in the middle Katun River basin. In particular, they discussed characteristic features of burial rites as well as the social status of populations inhabiting the northern Altai and the Ukok Plateau.

The presentation by D.V. Cheremisin (Institute of Archaeology and Ethnography SB RAS, Novosibirsk) focused on the possibilities of analyzing the content of unlooted frozen burials for the purpose of reconstructing the semantics of Pazyryk animal style. A.A. Tishkin (Altai State University, Barnaul) concentrated on the tachometric survival of archaeological loci in the Bolshoi Yaloman River mouth. He also presented results of excavations conducted at sites of various chronological periods and described unique samples of Bulan-Koba toreutics. V.D. Kubarev (Institute of Archaeology and Ethnography SB RAS, Novosibirsk) categorized the sites of the Karakol and Pazyryk culture (including petroglyphs and funerary complexes) in the Ursul River basin. The speaker noted some evidence of frozen sediments in large Pazyryk kurgans of the central Altai.

N.A. Kocheeva and M.G. Sukhova (Gorno-Altaisk State University) discussed the problem of permafrost disappearing in the Altai because of climatic changes. A.V. Shitov from the same university discussed the potential of a geo-information system that could be applied to the research of permafrost in the region. A.N. Dmitriev (Institute of Geology SB RAS, Novosibirsk) focused on risks and threats associated with climatic changes. L.M. Chevalkov (S.S. Surazakov Institute for Altaic Studies, Gorno-Altaisk) described the major stages of climatic changes during the Holocene. The speaker also touched upon the attitude of the modern Altai population toward archaeological sites. The presentation by N.N. Mikhailov (Altai State University, Barnaul) was devoted to regional specifics of climatic changes in the Altai. O.V. Ostanin and N.N. Mikhailov discussed the possibilities of using the features of the cryogenic landscape of the Altai for reconstructing prehistoric environments.

H.-P. Francfort (CNRS, France) presented the major results of excavations of kurgan 11 at the Berel burial ground, Eastern Kazakhstan. The speaker described excavation techniques and methods of preservation of artifacts made from organic substances in the course of field and laboratory studies. He also persuasively demonstrated the relationship between Berel artistic imagery and art of Achaemenidian Iran.

After the talks, a heated and fruitful discussion ensued for the purpose of elaborating recommendations for a research program for the study and preservation of frozen tombs in the Altai. V.I. Molodin suggested that the work for the preservation of the Pazyryk frozen kurgans should be divided in two stages. In the first stage, it would be necessary to register all archaeological sites located in the Altai Republic and to catalogue them. The task of the second stage would be to organize geographical monitoring of the Pazyryk kurgans similar to that conducted by research experts from the Siberian Branch of the Russian Academy of Sciences on the Ukok Plateau and in the Mongolian Altai. Molodin also stressed the point that the excavations of frozen burial mounds are in danger and should be conducted by highly qualified professionals, using a multidisciplinary approach. The speaker noted the high cost of such a project including also the restoration of archaeological objects and construction of museums. Molodin emphasized the necessity of taking into consideration the negative attitude of the local population towards the archaeological research conducted in the Altai Republic. Such an attitude was formed mostly due to mass media. The latter, especially the makers of the film *Vengeance of the Altai Princess*, laid the blame for alleged "natural and social cataclysms" on Novosibirsk archaeologists, calling for the reburial of the mummified woman from Ak-Alakha and disseminating jingoist myths as an alternative to science.

In the course of the discussion, Yu.F. Kiryushin noted that no archaeological map of the Altai Republic was available and that the Pazyryk kurgans had not yet been registered. E. Jacobson-Tepfer questioned the necessity of further excavations. J. Bourgeois proposed to develop an integrated archaeological map of the Altai on the basis of regional cartographic systems used in Russia, Mongolia, China, and Kazakhstan. Yang Lin noted that issues of the "frozen kurgans" had not yet been raised with respect to the Chinese Altai. He promised to use his colleagues' expertise and to inform the Chinese government of the preservation of southern Altai sites.

With regard to the Russian President's idea to launch the construction of a pipeline from Russia to China across the Altaic portion of the border, L. Levy-Strauss (UNESCO, Paris) reminded the symposium participants that the Ukok Plateau was included among the territories protected by UNESCO. The discussants raised the issue of nominating Ukok as part of a natural and cultural legacy, and informing the public of potential threats that the construction of a pipeline might pose to both the environment and archaeological sites in the area. In V.I. Molodin's words, none of the projects related to the pipeline have been submitted to archaeologists so far, although before they are launched, salvage excavations

must be conducted in the construction area. The Altai government has passed legislation declaring the Ukok Plateau a protected area where all commercial activities, except the winter pasturage by residents of the nearby village of Dzhazator, are banned. Illegal activities include making fires, helicopter flights, archaeological excavations, etc. V.I. Molodin suggested that the primary object of salvage excavations should probably be the large Pazyryk mounds of the central Altai (Kulada, Sooru, etc.) rather than those of the southern Altai highlands. A.V. Ebel endorsed this idea. It should be noted that such a conclusion agrees with data presented by N.A. Kocheeva. According to her, winter temperatures in the Kosh-Agach Region demonstrate the highest rise (by 0.3 °C). Given the average annual temperature of –30 °C, such a rise can have no impact on the degradation of frozen sediments in highland areas. Yu.P. Badenkov stressed the necessity of flexible responses to the changing situation around the Ukok, as well as the comprehensive consideration of the multiple risks that may result in the efforts to preserve both the natural environment and the archaeological legacy of the Altai. H.-P. Francfort expressed confidence that abiding by the preservation and conservation laws of each country of the Altai region, as well the World Cultural Legacy Preservation Treaty would help resolve many issues related to endangered sites. After a prolonged discussion, amendments were introduced, and the final recommendations of the project were supported by the majority of conference participants.

Several members of the Altai government took part in the debates, as did the Gorno-Altaisk University Rector Yu.V. Tabakayev and Deputy Director of the UNESCO Department for Cultural Legacy Preservation, L. Levy-Strauss.

In the concluding document, the participants called for broader international cooperation in archaeological research in Gorny Altai. It was proposed that the region be regarded as a cultural and natural borderland, and that all the sites be registered and an archaeological map compiled on the basis of international standards with regard to norms of each country. The experts recommended that measures be taken to preserve protected sites, which, in the near future, must include frozen Pazyryk burials, in adherence to the laws of Russia, China, Mongolia, and Kazakhstan and the World Cultural Legacy Preservation Treaty. Global warming should prompt researchers to initiate a comprehensive study of all archaeological sites within the future reservation zone around the construction area.

The conference participants were also granted the opportunity to observe the complete solar eclipse from the Maima hills. An improvised observatory was set up on the highway traversing the Altai from north to south, and many were able to obtain quality photographs of this phenomenon.

On the final working day, an excursion to the Karakol River valley was organized by Gorno-Altaisk University. Areas visited included the Bashadar burial mounds and other sites, as well as the ethnographic collections housed at Karakol Natural Reserve, where a presentation was arranged.

The conference, attended by numerous specialists in both historical and natural disciplines, was clearly a major event, and hopefully its decisions will be implemented in the near future. The papers were quite important and demonstrated that holding an interdisciplinary symposium on these topics will be likely to yield promising results.

Hopefully, the strategies developed at this meeting will be accepted by all the countries involved. The conference organizers deserve a warm expression of gratitude and appreciation.

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