

Establishment of large-scale reindeer herding in the European and West Siberian Tundra

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ABSTRACT

Large-scale reindeer herding, which is typically seen among the Nenets and Chukchee, was established under certain natural and social conditions during the seventeenth, eighteenth and nineteenth centuries. Based on a review of the discussions of I. I. Krupnik, and A. V. Golovnev and G. Osherenko, in this article I consider the timing, environmental factors, process, and social impact of this enlargement of reindeer herding. In addition, I incorporate my own field data gathered in the European tundra and Northern Yakutia. Fundamentally, I support Krupnik's hypothesis regarding the period in which this enlargement took place. I focus, however, on the role of reindeer as labor power, not as food material, in the process of the enlargement of the herd in the eighteenth century among the Nenets people. Under the beneficial climate conditions present during a cooling period, frequent contact with Russians and other foreigners stimulated the demand for reindeer sledge transportation in tundra areas, and the Nenets herders enlarged their herds in order to raise trained reindeer for sledge draught. I theorize that this demand for labor was one of the main factors leading to enlargement of herds. As to the final factors involved in the establishment of large-scale reindeer herding, two additional factors need consideration, namely the extinction of wild reindeer and the appearance of consumers of reindeer meat and fur living outside the herder's community. The results of this process can clearly be seen in the society of the European Nenets and Komi reindeer herders. Following the transition to large-scale herding, their society was differentiated into a set of social classes, former clan organizations were divided into numerous families and other smaller kin groups, and some former herders migrated to islands in the Arctic Sea to engage in sea mammal hunting. The establishment of large-scale reindeer herding was a complex process that involved numerous factors resulting in a variety of changes to the herders' society.

Keywords: large scale reindeer herding, wild reindeer hunting, the Nenets, the Komi, reindeer sledge, labor power of livestock, social differentiation

INTRODUCTION

Reindeer herding or breeding¹ is a particular subsistence, productive, and even com-

¹ Though I do not strictly differentiate my use of the terms, "reindeer herding" and "reindeer breeding," my use of "herding" carries a nuance of herd control, while "breeding" has a nuance of herd maintenance and reproduction. Therefore, I will often use the terms, "large-scale herding" and

mercial activity that is highly adapted to the arctic environment, both natural and social, of the Eurasian North. One aspect that differentiates this from other types of nomadism in steppes and other dry areas, is that people breed only one sort of animal, reindeer (*Rangifer tarrandus*), which are mainly used for labor and meat but also to a lesser degree for milking. The economy of reindeer herders and breeders, however, is not monocultural, but consists of many subsistence and commercial activities. Wild reindeer hunting in the tundra, moose hunting in forest-tundra, sea mammal hunting on and around islands in the Polar Sea, fishing on rivers and lakes, and berry collecting are typical subsistence activities that coexist with reindeer breeding. Reindeer herding and breeding provides support for commercial activities such as the hunting and breeding of fur bearing animals (foxes, polar foxes are often bred for fur production, while sables, martins, weasels, lynxes, ermines, squirrels are the most often hunted animals), commercial fishing, trade, and tourism, offering a form of transport through vehicles such as sledges, or by riding the animals themselves.

There are two types of reindeer herding and breeding, i.e., small-scale and large-scale. The differences between them do not only involve the size of herds or the number of animals in a herding unit, but also the position of these animals in the local economy and society. In societies where small-scale breeding was common, hunting was the primary activity and products from fishing were the main source of food materials, while reindeer breeding occupied a secondary and supplementary status to provide transportation for men and their possessions. Though it is difficult for ethnic minorities to live on traditional subsistence activities in the present globalized economic and social conditions in Siberia and European North, both hunting and reindeer breeding are often considered symbols of the ethnic culture. On the other hand, for large-scale herders, reindeer breeding and herding occupied the primary status in their economy and society. Though hunting and fishing products often played more important roles in the food supply of even the large-scale herders, reindeer and the reindeer herding had a variety of more important social functions, including the role of an ethnic symbol.

In this paper I will discuss some problems concerning the process of the establishment of the large-scale reindeer herding seen among the Nenets people in the European and West Siberian tundra in the eighteenth and nineteenth centuries (the territories of the European and Siberian Nenets in the eighteenth century are detailed in Fig. 1). When did the enlargement of the scale of herding and breeding begin? Why did the people enlarge their herds? What role did the increase of the number of tamed deer play in their economy? What happened in society of these herders during and after this change? These are the questions that at times have been discussed by anthropologists, ethnologists, and historians, who were interested in the reindeer breeding and herding culture of the Siberian indigenous people.

For example, during the 1960s, some Soviet ethnologists were already discussing the process of and reasons for the enlargement of the scale of reindeer herding by the Nenets and Chukchee people. I. S. Vdovin described how the Chukchee reindeer

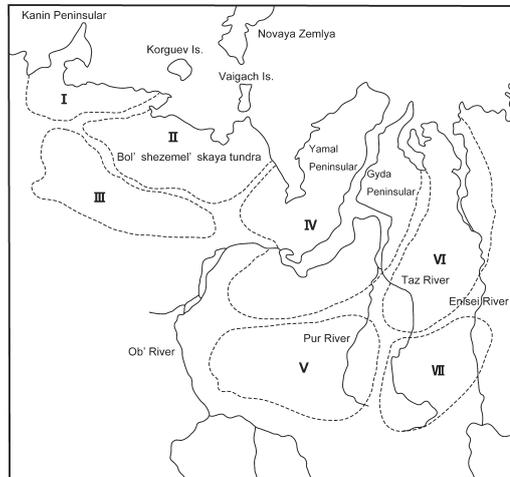
"small-scale breeding," stressing herd control in the former case and herd maintenance and reproduction in the latter. F. Stammer clearly summarized the discussion on the concept and definition of the terms like "herding," "husbandry," and "breeding." (Stammer 2001: 49-55)

herders enlarged their herds by means of plundering from their Koryak enemies (Vdovin 1965: 17–20). L. V. Khomich insisted that the shortage and extinction of wild reindeer as a resource in the West Siberian tundra had obliged the Nenets people to change their lifestyle and enlarge the scale of their reindeer herding (Khomich 1966: 51). B. O. Dolgikh paid much attention to the regularization of the movement of herds in the case of the Enets people (a neighboring ethnic group of the Nenets) (Dolgikh 1970: 134). I. I. Krupnik outlined a hypothesis stating that the enlargement of the reindeer herding had occurred under advantageous ecological and social conditions (cold climate and social stability) during the late eighteenth century

and the beginning of the nineteenth century among the European Nenets and the reindeer Chukchee (Krupnik 1976: 64). Golovnev and Osherenko raised another hypothesis suggesting the enlargement of the Nenets reindeer herding had already begun in the seventeenth century to escape from the control of the Russian Empire (Golovnev and Osherenko 1999: 18).

Krupnik and Golovnev and Osherenko provided some answers to above-mentioned questions. They revealed the entangled relations between the ecological-environmental conditions and socio-political backgrounds surrounding the enlargement of the reindeer herding of the Nenets and the Chukchee. They did not, however, analyze deeply enough the roles and social functions of livestock in the transition process of the reindeer breeding and herding. Therefore, in this paper, I will focus on these two points.

My following discussion is based on the hypothesis that the original type of reindeer herding and breeding was small-scale breeding that played a supporting role for hunting and fishing activities, offering hunters and fishermen methods of transportation that enabled them to move quickly and to carry heavy loads. According to G. M. Vasilevich and M. G. Levin and S. Vainstein, the domestication of reindeer started in the Sayan Mountains or Baikal region during the first millennium B. C. E. under the influence of horse breeding.² In the first stage of the establishment of rein-



I Nenets in Kanin Peninsular and Timan Coast
 II Nenets in Bol' shezemel' skaya Tundra
 III Nenets in the Izhma district
 IV Siberian Tundra Nenets
 V Siberian Forest Nenets
 VI Tundra Enets
 VII Forest Enets
 I, II, and III: The European Nenets (Yurak Samoed or Yurak)
 IV and V: The Siberian Nenets (Yurak Samoed or Yurak)
 VI and VII: The Enets (Enisei Samoed)

FIG. 1. A map of territories of the Nenets and Enets in the eighteenth century (based on Sasaki 1984: 223)

² Problems concerning the start of reindeer breeding have been discussed since the beginning of the twentieth century, when the articles by G. Hatt and B. Laufer were published (Hatt 1919; Laufer 1917). During the first half of this century, many anthropologists and ethnologists participated in

deer breeding, people bred a small number of reindeer for use as packing animals. When the Samoyed speaking and Tungus speaking peoples moved north along the Ob', Enisei, and Lena Rivers, reindeer breeding also spread to Siberia to Chukotka in the east and to the European tundra in the west. When the people reached the tundra areas, they began to use their domesticated reindeer as draught animals for their sledges (Vasilevich and Levin 1951; Vainstein 1970, 1971). As long as they used reindeer mainly for labor, a small herd of reindeer was sufficient and these animals were seldom slaughtered for meat. Fundamentally their subsistence was supported by hunting and fishing.

This situation changed drastically during the eighteenth and nineteenth century. In documents written during this period, one can find that, among the Nenets and Chukchee, a small number of extremely wealthy people owned some thousands of reindeer. During this time, people and society were largely dependent on products and materials from domesticated reindeer, i.e., meat, fur, skin, bones, and antlers. Moreover, in the case of the Nenets, the reindeer products were not only for their own consumption, but also taken to markets to be sold to townspeople. In this paper I will examine the process of this change, focusing on the transformation of the role of domesticated animals and changes in social relations of the herders.

REINDEER BREEDING BY THE NENETS PEOPLE UNTIL THE EIGHTEENTH CENTURY

According to G. M. Vasilevich and M. G. Levin, who classified reindeer breeding by the typology of cultural complexes, Nenets reindeer breeding can be classified as belonging to the Samoyed type (Vasilevich and Levin 1951: 64-71). Characteristics of this type are a) usage of a sledge of the Samoyed type, which has a hard body suitable for driving on the tundra plain at high speeds, b) carrying out large-scale breeding and herding, c) usage of shepherd dogs for watching livestock, and d) castration of livestock by cutting the scrotum. Though this type of breeding can be seen among the Khanty, Mansi, Enets, Selkup, Nganasan, and a part of Saami (groups in Kola Peninsula and the Kolta Saami), the Nenets were the most typical breeders of the Samoyed type.

The Nenets reindeer breeding, however, was not originally large-scale. Some historical documents indicate that until the seventeenth century, the Nenets were tun-

this discussion (see Mirov 1945; Vasilevich and Levin 1951). As to the time of inception, there were two hypotheses. One insisted that the reindeer were one of the first domesticated animals and that reindeer breeding occurred even before the start of the Neolithic age, while the other insisted that reindeer breeding started under the influence of horse or cattle breeding and that this happened no earlier than the late Neolithic. As to the place, there were also two hypotheses; one assumed that breed had independently started and developed in different places, while the other assumed that it had originated in one limited area, from which it had spread over Siberia and Eurasian North. In Soviet anthropology, the discussion was summarized by G. M. Vasilevich and M. G. Levin in their article published in 1951 (Vasilevich and Levin 1951). They supported the second hypotheses for both time and origin and insisted that the Sayan and Baikal areas had been important candidates for the original places of the reindeer breeding. They also provided a scenario of the distribution and routes for the spread of reindeer breeding to the North. S. Vainetein fundamentally supported their hypothesis. Based on his own field data, however, he insisted that the point of origin of reindeer breeding had been in the Sayan area and that the contributor had been the ancestors of the Samoedic people (Vainstein 1970, 1971).

dra hunters whose main subsistence activity was wild reindeer hunting, and that they kept only a small number of domesticated reindeer as draught animals. For example, a Soviet ethnologist, E. I. Kolycheva reported that when a wealthy Nenets, named Topka Lisov in the Bol'shezemel'skaya tundra (a vast tundra that spreads over the European side of the Ural Mountains), had been robbed of his property by some gangsters in 1668, he had declared the following things had been taken: two mammoth tusks, thirty pieces of polar fox pelt of good quality, two sledges for luggage, fifty heads of tamed reindeer, two fishing nets, and two long dresses for men (Kolycheva 1956: 80). Kolycheva said that in those days persons who had owned more than 40 reindeer had been honored as wealthy and that owners of 100 heads had been rare millionaires (Kolycheva 1956: 79). Judging from the fact that Topka Lisov listed fifty tamed reindeer in his declaration of lost property along with mammoth tusks and polar fox pelts, it should be taken that a reindeer herd was generally considered as property in the Nenets society at that time.

In the seventeenth century, the Nenets people, especially in the European tundra, were gradually subjected to the political power of Moscow and began paying *yasak* (a tax of payment of pelts and fur) to the Tsar. At the same time, Russian products such as guns, knives, axes, hooks, needles, and fishing nets, were distributed in these areas and found their way into the daily lives of the people. Thus many Nenets were engaged in the hunting of fur bearing animals like foxes, polar foxes, squirrels, and ermines in order to earn money to buy such things. Some Nenets, like Topka Lisov, became rich through the trade with Russian and other European merchants. However, even wealthy people, who owned much property consisting of precious things such as mammoth tusks, pelts, clothes, and fishing nets, bred only some tens of heads of reindeer in order to train them as draught animals.

I. I. Krupnik classified and defined the lifestyle seen in the tundra area in the seventeenth centuries as "hunter-reindeer-breeders in the tundra." He pointed out following eight characteristics: i) main subsistence activities were hunting and fishing, ii) mobility was lower than that of the present Nenets and Chukchee, iii) seasonal differentiation of subsistence activities was more obvious than in the present, iv) a small number of reindeer were bred for use as vehicles, v) main food materials consisted of wild animals, birds, fish and wild plants, vi) tamed reindeer were slaughtered only in an extreme cases such as famine, vii) clothes and dresses were made of wild deer skin and fur, and viii) dwellings were conical tents covered with wild deer skin in summer and circular dugout houses covered with fur in winter. Other than the Nenets in the seventeenth century, Krupnik counted some other ethnic groups as belonging to this subsistence type, i.e., the Chukchee in the seventeenth century, the Enets in the eighteenth century, the Nganasan in the nineteenth century, and the Yukagir in the beginning of the twentieth century (Krupnik 1976: 60–61).

BEGINNING OF THE ENLARGEMENT OF NENETS REINDEER HERDING

When did reindeer breeding among the Nenets people begin to enlarge in scale? Though some researchers, like N. A. Minenko, and Golovenov and Osherenko, insisted that this had already begun in the seventeenth century (Minenko 1975: 152–

153; Golovnev and Osherenko 1995: 17), I will support the hypothesis proposed by I. I. Krupnik and others that it started as late as the mid-eighteenth century. Some historical documents also support this hypothesis. For example, as mentioned above, E. I. Kolycheva said that even people who were considered wealthy had owned less than 100 reindeer in the seventeenth century. Krupnik indicated that the European Nenets often had paid *yasak* using the fur of wild reindeer (Krupnik 1976: 58–59). J. G. Georgi, a prominent historian and geographer, who did field research among the Nenets (though it is possible he investigated the Siberian group) in the middle of the eighteenth century, reported that the each person had owned 100 to 150 heads of reindeer and these animals were used exclusively for transportation, either for driving sledges or riding, and that the main food for the community consisted of hunting and fishing products. He wrote as follows:

In general the Samoeds (Nenets) are poor, yet almost everyone has 100 to 150 tamed reindeer. They use their reindeer for riding and pulling hand sledges, and slaughter them only in cases where a reindeer is near death from advanced age or as the result of an accident. They will also sometimes kill healthy calves for sacrifice. They do not know the processes for milking and making cheese, thus the growth of their livestock is good. (Georgi 1776: 280)
[translated from German by the author]

Compared with numbers seen in the seventeenth century, the average number of deer owned by individuals increased in the eighteenth century. In Georgi's book, the Nenets people began to be represented as reindeer herders. For example, a picture that portrays a man driving on a reindeer sledge and two women processing a slaughtered reindeer is presented on the first page of the chapter of "Samojedische Nationen." (Georgi 1776: 273) The slaughtered deer may represent a calf for sacrifice. The portrait of a Nenets man, however, does not represent him as a reindeer herder. He has a bow and arrows, and thus it is implied that he is a hunter. These pictures give us an image of the Nenets in the eighteenth century as hunter-reindeer herders. (Fig. 2, Fig. 3)

In the second half of the eighteenth century, a small number of wealthier people began to own herds numbering some thousands of reindeer. For example, V. F. Zuev, who researched around the mouth of Ob River and along the Arctic Ocean in 1771–1772, reported as following:

..... they (the Nenets, note by the author) owned 10 (in the case of poorer individuals or families) to 3000 (for the wealthy) well trained reindeer, which they often used for sledge draught and of which they knew every detail, but, aside from these animals, herds of untrained reindeer, which were so numerous that the people did not know the exact number, were grazing in the tundra. (Zuev 1947: 32) [translated from Russian by the author]

The difference between the numbers of tamed reindeer noted in Georgi's and Zuev's reports indicates that a few wealthy people, who owned some thousands of



FIG. 2. A picture of Samoeds (Nenets) (Georgi 1776: 273)

reindeer, appeared in the second half of the eighteenth century in the Siberian tundra and that the gap between the rich and the poor enlarged. The same phenomena might also be seen on the European side. According to V. I. Vasil'ev, a Soviet ethnologist and a specialist in the study of Nenets society, the number of heads of tamed reindeer in the European tundra reached 160,000 in the end of eighteenth century (Vasil'ev 1979: 206). Millionaires owned 1500–2000 heads, people in the middle class – 500–700, and in the lower class – 10–20, and those in the lowest class only owned less than 10 heads (Krupnik 1976: 61). This fact, however, does not mean that the Nenets reindeer breeding changed from small-scale to large-scale suddenly during that period. Their main food materials were still wild animal meat and fish. Fish especially played an important role in the Nenets society. V. F. Zuev also discussed the situation that occurred during a famine after a period of unsuccessful fishing.



FIG. 3. A Samoed (Nenets) man (Georgi 1776: 276–277)

Reindeer breeders, who owned so many livestock that an exact count is impossible, often complained of starvation caused by unsuccessful fishing, just as the poor did. Though these breeders should have slaughtered their reindeer for meat, they never wanted to do it. They waited out the starvation, underwent the poverty, and complained of the food shortages. They, neverthe-

less, begrudged slaughtering their own reindeer. to their economic sensibilities, fish were classified as the food that comprised their main diet, while the reindeer were property. (Zuev 1947: 68) [translated from Russian by the author]

This report indicates three things. First, for the Nenets, fishing was the most important productive activity, and the shortage of fish often resulted in serious famines. Second, all the Nenets including the wealthy, who owned large herds, were reluctant to slaughter their reindeer. As of the eighteenth century, they still had not established a food system based on the consumption of the meat of their tamed deer. Though the size of the herds were enlarged, their food supply was still wholly dependent on hunting and fishing products in the same way as it was for small-scale breeders. Thirdly, tamed reindeer were recognized as property.

The reluctance to the slaughter of stock can be widely observed in all animal herders. They do not want to kill their animals, not because of their attachment to the animals, but because they recognize the value of their animals as property and a source of labor. This is not only the case for herders of cattle, horses, and other hoofed animals in the steppes and dry areas, but also the case for dog herders and reindeer herders in the Northern Eurasia. In the case of the Nenets reindeer herders, they used their reindeer as labor for sledge draught, and as property for the payment of bride price and ritual slaughter. In their society, only a man, who had enough wealth to pay a bride price, could marry. As even the poor had to pay 10-20 reindeer to the bride's family (Khomich 1966: 165),³ the payment of the bride price represented a huge burden. Therefore, people supported each other, following the rule of mutual support among relatives. At the same time, a bride's parents sometimes gave their daughter some reindeer as a dowry to help her begin her new life. Such reindeer were recognized as a wife's property, and the offspring of her does were also hers. There were some cases these animals occupied an important place in a family's herd (Brodnev 1959: 76).

As was indicated in the quotation from Georgi's report, calves were at times killed for sacrifice in some rituals. It is possible to see the evidence of these sacrifices, such as reindeer antlers and bones, at sacred places where people carried out rituals to bring luck and prosperity to their family (Khomich 1966: 201; Golovnev and Osherenko 1999: photos). As reindeers were property, they could be both a sacrifice and a present to gods and spirits.

FACTORS FOR THE ENLARGEMENT OF REINDEER HERDS

What conditions enabled the Nenets breeders to enlarge the size of their reindeer herds?

³ According to L. Khomich, in the middle of the nineteenth century the bride price paid by wealthy people consisted of 100-200 heads of reindeer, 100-200 pieces of polar fox pelts, 1-2 pieces of silver fox and 10 pieces of red fox fur, a piece of expensive cloth of more than 6 meters long, and a copper pot, and that by members of the middle class consisted of 25-60 heads of reindeer, 25-50 pieces of polar fox fur, 1-2 pieces of red fox fur, a piece of cheap cloth of 6 meters long, and a copper pot, while that by the poor consisted of 10-20 reindeer or 7-15 Rubles of silver coins, a piece of cloth of some meters long, and a copper pot (Khomich 1966: 165).

I. I. Krupnik insisted that two factors needed to be taken into consideration: one environmental, and the other social. Reindeer so well adapted themselves to the cold arctic climate that it was advantageous for reindeer breeders to grow their herds in cold climate epochs. According to a study on the history of climate change, there have been two cold epochs in Siberia during the second millennium C.E. One was from the 1570s to 1650s, and the other from 1720s to 1830s (Krupnik 1976: 64). The enlargement of reindeer herds during the time of this second cold epoch has been well documented. Why did this not occur during the first epoch? Krupnik answered this question by looking at social factors.

Siberia was in a state of chaos during the first of these cold epochs, as it was the subject of conquest by Russia at this time. Frequent wars, battles, rebellions, and plundering created instability throughout many Siberian societies. It would have been quite difficult for reindeer breeders to enlarge their herds during such a chaotic period. On the contrary, social conditions were stable during the second epoch, as Russian rule had already been established and, except in Chukotka, the military campaigns were largely over. Breeders were able to expand their activities without the threat of social disorder created by military action. Krupnik wrote;

The rapid growth of large-scale reindeer breeding in this epoch was a result of effective and appropriate social and ecological change, which was in line with similar processes of economic development in different places throughout the tundra zones of Northern Eurasia. (Krupnik 1976: 64) [translated from Russian by the author]

Golovnev and Osherenko discussed in this change a different way. As mentioned above, they insisted that the enlargement of herds had started in the seventeenth century, i.e., during a period of chaos. They said the following:

The natives' desire for autonomy from newly established Russian power raised the importance of mobility to retire to remote tundra areas, and this in turn required larger herds. Simultaneously overhunting and consequent scarcity of wild reindeer led to reorientation of the native economy from foraging toward pastoralism. The core transition occurred in the 1600s (Golovnev and Osherenko 1999: 17).

In contrast to Krupnik's hypothesis, Golovnev and Osherenko insisted that disadvantageous or adverse conditions, i.e., the warm climate in the second half of the seventeenth century and the military and political pressure of the Russian Empire, had pushed the Nenets to change their economic strategy.

An important result of Golovnev and Osherenko's research was to reveal that the Nenets people in both the European and Siberian tundra never willingly submitted to Russian power and that they often rebelled against it or escaped from areas in which they would be subject to Russian control, and that the power and energy the Nenets exerted against the Russians played an important role in the change of their economic structure. It is difficult, however, to assume that breeders could safely



FIG. 4. A herd of castrated reindeer (in Bol'shezemel'sklaia tundra, taken by the author in 1988)

grow newly born calves and swiftly and smoothly enlarge their herds during the chaotic period in the warmer epoch.

Though there is a fundamental difference between the research of Krupnik, and that of Golovenov and Osherenko, both of them assumed that the factors involved in the enlargement of reindeer herds could be found in the natural and socio-political conditions surrounding the people. They did not, however, address concrete factors. In this paper, I will focus on one particular concrete factor: the increase in demand for reindeer as a source of labor. When the people had more opportunity for contact with Russians and other foreigners, regardless of whether this contact was antagonistic or friendly, the demand for the reindeer sledge increased. In wartime, the reindeer sledge was the military equipment best suited to quickly approach and attack an enemy in the tundra and, in peacetime, it was the best vehicle to carry men and commodities for trade. The reindeer's hooves allow them to walk easily on the soft and wet ground of the tundra in summer and reindeer can eat moss and grasses by digging the frozen ground in winter. A sledge is a more advantageous method of transportation in the tundra than a carriage with wheels. A Nenets reindeer sledge is designed for driving on the tundra plain at high speeds. These sledges are usually drawn by two to seven reindeer (Khomich 1966: 91).

Castrated male deer (*habt* in Nenets language) are the best draught animals, though does and even stags can be used (Khomich 1966:91). Castrated deer are powerful and, at the same time, are easily controlled. Castration is done on a calf at the age of three years. This is a significant operation for livestock farmers and nomads who have to control animal herds and use these animals as labor. In order to grow herds of castrated males for labor, it is necessary to breed a certain size of herd. Based on my own field research in Khalp kolkhoz in the Bol'shezemel'skaia tundra on the European side in October 1988, about 180 castrated deer bred for sledge draught were separately grazing near the herders' camp, (Fig. 4) while the mother herd of about 3500 deer was overseen by seven herders in the pasture far from the camp. I think that the size of the mother herd was too large in comparison to that of

the castrated one. The mother herd contained many reindeer to be used for meat, but these animals did not have to contribute the reproduction of draught animals. In my observation in Northern Yakutia in 1998, a private reindeer breeding farm that owned 250 heads as a whole had about 50 castrated mails for riding and sledge draught. In this case, the mother herd did not contain deer to be used for meat (Sasaki 2000: 112). It seems reasonable that a herd of castrated deer for labor should be 15–20% of the number of deer in the mother herd, if the latter does not contain the deer for meat.

As mentioned above, V. F. Zuev witnessed in 1770s that each family had owned 10 to 3000 well trained reindeer for sledges and that huge number of untamed deer had been wandering in tundra. This means that he possibly viewed the well trained deer as those used for labor (sledge draught) and other deer for breeding (not for meat). He also stated that even the wealthy had suffered from starvation in times of famine caused by periods of unsuccessful fishing, and that, nevertheless, they had never wanted to slaughter their tamed deer for meat, even if this meant they had to undergo food shortages. It can be interpreted that the people were not averse to consuming the meat of their own deer, but that they were afraid of losing labor power and property.

Zuev's report indicates that the Nenets people were still at the level of "hunter-reindeer-breeders in tundra zones" in the 1770s, though the enlargement of their reindeer herds had already begun. Therefore, I hypothesize that the increase in demand for teams of reindeer sledges, which was a consequence of the intimate relations (both antagonistic and commercial) to Russians, was one of the factors (social factors determined by I. I. Krupnik) leading to the enlargement of the scale of the Nenets reindeer herding.

If this was, however, a factor in the process of the enlargement of the Nenets' reindeer herds, one question may arise; why did this become a factor in the epoch from the 1720s to 1830s, and not during the period from 1570 to 1650, though the climatic conditions in both epochs were equally cold and suitable for the breeding of reindeer?

According to Golovnev and Osherenko, ancestors of the Nenets people had maintained contact with Russians, especially traders from Novgorod, long before Ermak's conquest of Siberia, and they did not have good relations with the powers in Moscow that destroyed the Novgorod Republic (Golovnev and Osherenko 1999: 48–49). Battles between the Nenets and troops from Moscow had begun in the early 1600s, and they often fought fiercely in the late seventeenth century. Their antagonism to the delegations from Moscow became more pronounced in the eighteenth century, because the latter began to register and baptize the tundra people by force. Golovnev and Osherenko wrote as follows:

The end of Ermak's epoch was not the end of warfare for Samoyeds. In the early 1700s they remained nominally registered under Russian sovereignty. Undefeated, tundra Samoyeds had used the time to adapt their culture for new conditions. Their adaptation took the form of a transition to pastoralism. (Golovnev and Osherenko 1999: 52)

Though they insisted that “their preparedness for this quick transition in some respect had been developed during the long period of contacts between Samoyeds and Northern (Novgorod) Russians,” (Golovnev and Osherenko 1999: 52) I do not think that this transition occurred in the seventeenth century. If the demand for the draught animals increased because of the frequent wars, the climate condition was not advantageous for the breeding during the second half of the seventeenth century and the beginning of the eighteenth century, as the first cold epoch was already over. On the contrary, during the eighteenth century (aside from the first twenty years), the climatic condition was beneficial for reindeer breeding in the second cold epoch, and the demand for reindeer sledges was still growing, because contact with the Russians (both antagonistic and peaceful) became more common and intimate. The synchronization of these two factors (climatic and social) enabled some people to rapidly enlarge their herds, and, as a result, the property gap between owners of larger herds and smaller herds became more considerable.

THE TRANSITION PROCESS AND ESTABLISHMENT OF THE LARGE-SCALE HERDING

In contrast to the assumption of Gorovnev and Osherenko, I do not think that the transition process from foraging to pastoralism advanced in such a rapid manner. I. I. Krupnik insisted that the establishment of large-scale reindeer breeding had consisted of a series of changes in the process of the local economic system and that it had consisted of four steps; an increase in the number of heads of domesticated reindeer, the extinction of wild reindeer, a change in staple food, and the establishment of a productive economy (Krupnik 1976: 64). The extinction of wild reindeer was the most important factor leading to the fundamental change in economic strategy and structure.

Wild reindeer had been one of the principally hunted animals and one of the staple foods of the tundra dwellers. Their fur was used for clothes, tent covers, and cushions, as well for the payment of tax to the Russians. Not only the Nenets in the sixteenth and seventeenth century, but also the Chukchee in the seventeenth century, Nganasan in the nineteenth and early twentieth century, and the Tundra Yukagir in the early twentieth century were known as wild reindeer hunters (Krupnik 1976: 60–61). Even today, wild reindeer are actively hunted in some areas. For example, the Evens and Evenks (both Tungus speaking ethnic groups) in the northern part of Yakutia (Republic of Sakha) often engage in wild reindeer hunting (Sasaki 2003; Ventsel 2006; Takakura 2008). According to the reindeer herders and hunters, wild deer are pest animals that disrupt reindeer breeding, because they often attract the tamed deer and cause them to leave the herd, thus incurring serious economic damage on the herders (Sasaki 2003: 114; Takakura 2008: 12). Especially in the mating season, wild bucks often attract does.

Biologically, there is little difference between tamed and wild deer, but the latter are independently active, while the former are accustomed to being controlled. Therefore, when a group of wild deer comes across a herd of tamed deer, the two groups mingle together and many times the tamed deer wander off, led away by the

wild deer. Reindeer herders often make every effort to avoid this situation and hunt wild deer when they see them near the herd. Though some herders are excellent hunters, in many cases herders hire professional hunters to hunt the wild deer. Of course, wild deer hunting is done with an economic purpose to protect their food supply and monetary income (Sasaki 2000: 108; 2003: 113).⁴

Factors involved in the extinction of wild reindeer have also often been discussed by ethnologists. As mentioned above, L. Khomich and Golovnev and Osherenko insisted that the overhunting of these animals had been the main factor (Khomich 1966: 51; Golovnev and Osherenko 1999: 17). I. I. Krupnik, pointing out the importance of the rivalry between tamed and wild deer for good pastures, insisted that tamed deer took advantage of human support to drive the latter away (Krupnik 1976: 65). Taking into consideration, however, that many reindeer herders considered the wild deer harmful to their herds, we should reevaluate the significance of the hunting. Unlike Khomich, Golovnev, and Osherenko, I think that the extinction of wild reindeer was not a mere result of overhunting, but, possibly, a result of active extermination by humans for the protection of their herds. This especially is more possibly the case in the European tundra, where wild reindeer were swiftly eradicated during the late eighteenth century and the early nineteenth century.

The "hunter-herder continuum" in the northern tundra is a subject of discussion. Opposing the strict hunting/gathering vs. herding distinction outlined by T. Ingold (Ingold 1986: 11), A. Ventsel, based on his own field research in the Anabarskii ulus (district) in northern Yakutia, insisted that, "the combination of herding and hunting is not necessarily contradictory, but the two should be seen as separate economies within one economic setting." (Ventsel 2006: 71) I agree with Ventsel's view, as I witnessed this continuum in my field research on the Alazeya River basin in the Cherskii ulus (district) and on Omoloi River basin in the Eveno-Bytantai ulus in northern Yakutia. In the former case, a private reindeer-herding farm employed both herders and hunters who were specialists in each of their fields; the hunters could not lasso animals, while herders were not good marksmen. In the latter case, a foreman on a reindeer herding farm was an excellent hunter as well, and he always led the workers at his farm in both herding and hunting (Sasaki 1996; 2000). H. Takakura also witnessed the hunter-herder continuum in Olenek ulus in the north-western Yakutia. After the failure of many reindeer herding farms during the economic crisis following the collapse of the Soviet Union, the people switched their main productive activities from herding to wild reindeer hunting (Takakura 2008: 12).

The expansion and distribution of large-scale reindeer herding, however, creates a situation that is adverse to the perpetuation of wild reindeer habitats. This opposition can be defined as a struggle between pressures from human activity and natural habitats, if one assumes that the establishment of large-scale herding, especially the

⁴ During the severe economic conditions after the collapse of the former Soviet Union, sales of the wild reindeer products such as meat and fur no longer yielded monetary income and profit. The factors that have created this situation are the dysfunction of the state monetary system and an increase in the cost of fuel and transportation, but not in the prices of products hunted in the wild, caused by hyperinflation. Since that time, wild reindeer meat has often been distributed through nonmonetary exchanges within a kin group or a small local community (see Ventsel 2006, Ziker 2006).

commercialized herding in the European tundra and the industrial herding under the socialist economy in the former Soviet Union, plays a role in the economic development of the tundra. In other words, the pressure from development as a result of human activity encroaches on the habitats of wild reindeer, and this will happen in any area where large-scale herding is successfully managed and readily accepted by the people. Herders will actively hunt wild deer to protect their herds and to support their food supply, while the domesticated deer will dominate the pastures that the wild deer need for food. As a result of this dual pressure from both humans and domesticated reindeer, wild reindeer will be wiped out, and this will lead to the full establishment of pure large-scale reindeer herding not dependent on wild reindeer hunting. As was pointed out by E. E. Syroechkovskii, inevitably "the period of development of domestic reindeer breeding was accompanied by a reduction in the population of wild reindeer." (Syroechkovskii 1995: 42) Though the number of wild reindeer increased in Siberia and the European tundra during the 1960s, 70s and 80s, according to the list shown in his study (Syroechkovskii 1995: 9-10), this was a result of the policy for protection of wild deer and the regulation of hunting and herding.

On the contrary, however, when the management of reindeer farming breaks down and many people begin to give up large-scale herding, the wild deer push back against human encroachment and enlarge their habitats. Though some hunters will stay in these areas to continue hunting, many herders will lose their reindeer and their jobs and leave the pastures along with their families. Such a phenomenon was often seen on reindeer herding farms in Siberia and the Russian Far East after the collapse of the Soviet Union. This can also explain the increase in the wild deer population and the recovery or enlargement of their territories in 1990s.

The situation of the European Nenets and the Komi herders in the eighteenth and nineteenth centuries is an example of what occurs when large-scale herding is successful. When the wild reindeer were purged from the European tundra as a result of pressure from human development, pure large-scale reindeer herding was finally established. In the Siberian tundra, this pressure was blocked, however, by the strength of the wild deer at the mouth of the Enisei River. The same pressure on wild reindeer from human development began to build in Chukotka and Kamchatka during this time. However, this development was also blocked by the strength of the wild deer in northern Yakutia. This process can be clearly seen in the extinction of the wild deer in northern Europe and Siberia. According to Krupnik's research, the earliest cases were seen in the European tundra and Kamchatka Peninsula. It was in the early nineteenth century. In Chukotka wild deer were wiped out in the middle of the nineteenth century and in Kola Peninsula and northern Yakutia in the early twentieth century (Krupnik 1976: 65). As a result, until the early twentieth century, the only place where many wild deer survived was the Taimyr Peninsula and its surrounding areas. The recovery of the wild deer population in other areas was seen only after the 1950s, when the protection policy began to take effect.

The hunting-herding continuum, proposed by A. Ventsel, can be maintained, when the pressure from human development and the counter-pressure exerted by the wild reindeer compete with other and keep a balance. In other words, the process of establishing large-scale herding is still continuing at this stage. When the bal-

ance collapses and human activities overpower the wild deer, people will succeed in the establishment of pure large-scale reindeer herding. When the pressure exerted by the wild deer overpowers development, however, this will allow the deer to expand their habitats. In this case the people will have to give up large-scale herding, and some will live on hunting wild reindeer, while the others will have to relocate or find other employment.

When large-scale reindeer herding was completely established, two different economies appeared, i.e., self-consumption oriented (or traditional distribution oriented) and commercial oriented. The reindeer herding of the European Nenets was typical of the latter. Their huge numbers of reindeer were bred not only to provide food for their own consumption, but also to sell meat to markets in towns. Some materials shown by V. G. Bogoraz and I. I. Krupnik indicate this fact. For example, Bogoraz presents a list indicating areas of productivity of reindeer herding in Siberia, which he reevaluated into rubles on the basis of results from the first census of the Soviet Union in 1926–27. In this list, he proved that sales of reindeer products had occupied an important position in all the production from the reindeer herding of the Nenets (22.9%), Komi (42.4%), and Saami (28.6%), while it had been less significant for the Chukchee (13.8%), Koryaks (3.3%), and Evenki (3.0%) (Bogoraz 1932: 42; Sasaki 1999: 528) (see Table).

Krupnik reconstructed the balance of the food supply of the European Nenets in the 1920s and compared it with that of different groups of the Chukchee. According to his table, reindeer meat comprised only 35.1% of necessary caloric intake in the case of the European Nenets, while it occupied 57–80% for the Chukchi groups. On the contrary, purchased food materials (bread, flour, liquor, and other high calorie food) comprised more than 50% of the caloric intake for the Nenets, while it occupied only 1–4% for the Chukchee (Krupnik 1989: 106). This record indicates that the food supply of the Nenets people was largely dependent on purchased materials and that their life was deeply integrated into the local market economy. Sources indicated that there were many older immigrants, who were not reluctant to con-

TABLE: Ratio of the sales of reindeer products in all the production of reindeer breeding in 1926

| | All the production (a) (in Rubles) | Sales of products (b) (in Rubles) | Ratio b/a (%) |
|--------------------------|---------------------------------------|--------------------------------------|------------------|
| All the Siberian herders | 3,587,481 | 633,168 | 17.6 |
| Non-nomadic peoples | 285,655 | 44,490 | 15.6 |
| Nomadic peoples | 3,301,826 | 588,678 | 17.8 |
| Chukchee | 650,212 | 89,636 | 13.8 |
| Koryaks | 136,469 | 4,518 | 3.3 |
| Nenets | 998,687 | 228,228 | 22.9 |
| Evenki | 451,291 | 13,421 | 3.0 |
| Komi | 477,253 | 202,273 | 42.4 |
| Saami | 55,234 | 15,810 | 28.6 |
| Others | 532,680 | 34,792 | 6.5 |

Source: Bogoraz 1932: 42; Sasaki 1999: 528

sume the reindeer meat and skin, on the European side and neighboring areas in Siberia.

In the establishment of this type of reindeer herding and economy, the Komi people played an important role. The Komi are one of the groups who speak the Uralic language and their main subgroups live in the Komi Republic. Some of them, however, extended the areas in which they settled to the European tundra, which was the homeland of the European Nenets, and began to engage in large-scale reindeer breeding at the end of the eighteenth century. As they were wealthy and commercially savvy people who were adept at the management skills required for stock farming, they soon bought large numbers of the tamed deer found in the European tundra and thus became extremely wealthy owners of great herds. According to the study of V. I. Vasil'ev, though 150,000 heads were owned by the Nenets herders and 10,000 by the Komi at the end of the eighteenth century, only 30,000 heads were left in the ownership of the Nenets herders, while 124,000 heads were under the control of the Komi owners by the middle of the nineteenth century. At the end of that century, the Nenets herders owned 47,000 reindeer as a whole, while the Komi owned 229,300 (Vasil'ev 1979: 206–207). According to V. G. Bogoraz, at the end of 1926, 410 households of Komi herders owned 167,964 heads (average number of reindeer owned by a household was 409), while 2,194 households of Nenets herders (including both European and Siberian Nenets) owned 439,842 heads (average number was 200) (Bogoraz 1932: 42).

At the same time as large-scale herding was being established, the gap in the level of livestock ownership between the rich and poor grew wider. Some documents indicate that a few wealthy families (including the Komi owners) that comprised only 17.2% of the population owned 75.4% of all the reindeer in the Bol'shezemel'skaya Tundra (Prokof'eva 1956: 562). Wealthy owners employed impoverished herdsmen to oversee their herds and manage their farms. Especially, Komi owners, who were not familiar with techniques for breeding and herding reindeer, often turned over the control of their reindeer to experienced Nenets herders (Vasil'ev 1979: 206). As the Komi people played a leading role in the establishment and development of large-scale herding on the European side, we can see that even now some local leaders come from this ethnic group.

SOCIAL AND DEMOGRAPHIC IMPACT OF THE ESTABLISHMENT OF LARGE-SCALE REINDEER BREEDING

The establishment of large-scale breeding and the changes in the economic structure had a strong impact on the Nenets society. Some of the more notable results of these changes in the European Nenets society are as follows.

- a) Rapid increase in population.
- b) Segmentation of large clans into lineages and families, and division of clan territories.
- c) Promotion of social differentiation and the widening gap between rich herd owners and others.
- d) Population movements toward towns in the south and islands in the Arctic

Sea in the north.

The change of the economic structure (foraging to pastoralism) resulted in a population explosion. The commercial oriented pastoral economy improved the availability of foodstuffs and allowed the feeding of a greater population. According to I. I. Krupnik, the population of the European Nenets enlarged from about 1400–1500 in the seventeenth century to 5500–6000 in the nineteenth century (Krupnik 1976: 68–69; Krupnik 1989: 158–159). The same phenomenon can be seen among the Chukchee people. Though such a drastic change could not be seen on the Siberian side, the population of Nenets in the Yamal and Gyda Peninsulas increased two to threefold when they transformed their economy from a foraging structure to pastoralist one.⁵

The appearance of a few owners who possessed extremely large numbers of livestock changed the social relationships in this region. Until the eighteenth century, when there were only 10 to 150 reindeer to a person or family, the people were roughly integrated into clans (*yerkar*), in which their members were considered to share common ancestors that could be found in their genealogy, ascending along paternal lines. As a rule, members had equal status and were expected to support each other without any qualifications. A clan had its own hunting territory and pastures, which its members could equally and exclusively use for hunting and reindeer herding (Brodnev 1950: 93; 1959: 70; Dolgikh 1970: 93).

The enlargement of reindeer herds created gaps in the social status between even members of the same clan. Though, at first, wealthier people supported poorer clan members, observing the rule of mutual support, the former gradually changed their attitude regarding the latter and employed them as laborers. According to documents written at the beginning of the twentieth century, some of the poor were obliged to work for wealthy owners receiving very little salary in compensation (M. M. Brodnev showed us the case in Yamal Peninsula (Brodnev 1950: 98). The poor also lost equal rights to share the clan's territories and pastures. Wealthy owners of large herds often occupied good pastures, excluding other members of the clan, and this resulted in the division of the former clan territories. On the other hand, middle class herdsmen, who owned some tens or hundreds of reindeer, often integrated several families together regardless of their clan membership in order to establish cooperatives to manage their herds and protect their pastures from being taken over by rich herders (Vasil'ev 1979: 149; Brodnev 1959: 72).

Unequal distribution of wealth and property, division of the former clan territories and pastures, and the establishment of new herding and management units transformed the clan organization. Some large clans lost their bonds of membership and were divided into various regional subgroups, which would later become independent groups. For example, on the European side, the Lehe clan, which had been one of the largest clans since the seventeenth century, bore four subgroups like Syadyei-Lehe, Wylka-Lehe, Pyrelka-Lehe, and Unakan-Lehe in the nineteenth century. These later gave up the bond to mother clan and dropped “-Lehe” designation from

⁵ According to materials detailing the population of the Siberian Nenets, their population changed as follows: 5,731 in 1897, 7,057 in 1911, and 13,454 in 1939 (Turchaninov 1914: 80; Khomich 1980: 72).



FIG. 5. Varnek: A Nenets village of sea mammal hunters (in Vaigach Island, taken by the author in 1988)

their names. The small clans split further and bore some kin groups that carried their own family names. By the end of the nineteenth century, the European Nenets were not registered under clan names but rather under family names in administrative documents (Vasil'ev 1979: 145–146).

The social differentiation encouraged movements of the population. The wealthy herd owners and cooperatives of middle class herdsmen occupied vast pastures and engaged in the regular seasonal movements of their herds. Small herd owners and members of the proletariat had two alternatives: to relinquish their lives on the tundra, or to stay. In the latter case, the people made every effort to acquire reindeer and enlarge their herds, earning money by engaging in hunting and fishing or working on other herder's farms. In the former case, people either went to towns to search for new work or immigrated to islands in the Arctic Sea to begin new lives as sea mammal hunters. Though the Nenets sea mammal hunters were not as prominent as the maritime Chukchee, they have played significant roles in the Nenets society on the European side since the middle of the nineteenth century. According to V. I. Vasil'ev, the Nenets sea mammal hunters began to live on Kolguev Island in the 1840s and in Vaigach and Novaya Zemlya Islands in 1870s (Vasil'ev 1979: 151–152). Though they had no reindeer, they had no trouble with transportation, as they could breed dogs using seal meat as feed. Moreover, they could even support reindeer herders, offering them sea mammal products such as seal meat, fur, and lassos of seal skin.

Such communities can be still seen on Vaigach Island. When I conducted field research on this island in 1988, about 20 households of sea mammal hunters lived in a village named Varnek located at the southern edge of the island (Fig. 5). They drove dog sledges instead of reindeer sledges and exchanged sea mammal and reindeer products with reindeer herders on the island. Though the reindeer herders (there were 3 households) and sea mammal hunters lived separately, engaged in different work, and produced different kinds of products, they were tied through kinship, supported each other, and organized and managed one collective farm (kolk-

hoz).

Compared to the drastic change in society of the European Nenets, that of the Siberian Nenets was gradual. The transition process took 100–150 years and during this time the population growth was not as extreme as that of the European Nenets. The population expanded to two to three times its level before the transition (Krupnik 1976: 67). The change in the clan system was not as drastic as the one in case of their European neighbors either. While the system itself collapsed on the European side, not only clans but also two exogamic clan groups (Kharyuchi group and Vanuita group) were maintained after the transition in Siberia, though some huge clans such as the Kharyuchi and Vanuita broke apart into some smaller clans (Vasil'ev 1979; Sasaki 1984). The population movement was also less obvious. Though both the European and Siberian Nenets experienced the same changes in their reindeer herding and breeding, the social impact was different for these two groups.

CONCLUSION

Based on the above discussion, the process of the establishment of large-scale reindeer herding of the Nenets can be summarized as bellow.

(a) Until the seventeenth century, the Nenets people on both the European and Siberian sides can be defined as hunter-reindeer herders in tundra areas, who lived by wild reindeer hunting, fishing on rivers and lakes, and small-scale reindeer breeding with herds of less than 100 head per household. They bred reindeer for labor, as draught animals for sledges, and owned them as property. The main productive activities during this period were wild reindeer hunting, fishing, and gathering, while reindeer breeding occupied a secondary position and functioned as support for the other activities. Though the Nenets people already had contact with Russians (e.g., from Novgorod and other northern areas of Russia), the relations remained at the commercial level, and no country was subordinated to the power of another.

(b) In the seventeenth century, with the start of the expansion of Moscow's power into the Arctic tundra, the relationship between the Nenets and the Russians began to shift from a peaceful and commercial one to political and military one. When conflicts escalated and battles began to occur in the tundra in the second half of the century, reindeer transportation gained appeal for its strategic use in battles with the Russian forces. It was not easy, however, for herders to enlarge their herds to strengthen reindeer breeding during that period, because the first cold climate epoch (1570–1650) had ended.

(c) In the eighteenth century, contact between the Nenets and Russians became much more intimate and frequent, as the Russian government began to send governors and missionaries to the North to rule and baptize the Nenets. The people often reacted fiercely to such activities. By the end of that century, however, many people had been subjected to Russian rule and were baptized, though only formally and superficially, as Christians. The intimate and frequent contact (both antagonistic and commercial) increased the demand for reindeer transportation, for which a certain number of well-tamed deer had to be bred and trained. At the same time, the cli-

matic conditions were advantageous for reindeer breeding during that century, as the second cold epoch began in the 1720s. This synchronization of natural and social conditions enabled the people to enlarge their herds.

(d) The gap between the sizes of the herds of wealthy owners and poor herders also enlarged. A few very wealthy people began to keep some thousands heads of reindeer for labor and as property, while poor people, who comprised most of the population, owned only around 10 animals. Though the number of tamed reindeer increased, the Nenets people were not yet complete pastoralists, because their subsistence and economy were still wholly dependent on fishing and wild reindeer hunting. When fishing was poor, even wealthy people faced starvation, as they were reluctant to slaughter their tamed deer for meat.

(e) While the primary factor leading to the beginning of the enlargement of the reindeer herds was the increase in demand for reindeer transportation (sledge draught animals), the factor that enabled the establishment and success of pure large-scale reindeer herding was the extinction or eradication of the wild reindeer. As the wild deer died out or were wiped out, the Nenets main (both real and conceptual) source for food and materials for daily use changed from the meat and fur of wild deer to that of tamed deer. As a result, reindeer breeding and herding began to take the place of the wild reindeer hunting, i.e., the primary productive activities. If it can be assumed that the establishment of large-scale herding played a role in economic development, the complete conversion to large-scale herding implies that the pressure from this development finally destroyed the wilderness habitats of wild reindeer.

(f) The establishment of complete large-scale reindeer breeding can be defined as the transition from foraging to pastoralism from the point of view of the form of production. This change was especially drastic among the European Nenets, who experienced the earliest extinction of wild reindeer (in the beginning of the nineteenth century). Moreover, the Komi people, who began to engage in reindeer breeding at the end of the eighteenth century, played an important role in the establishment and development of commercial oriented large-scale herding, in which reindeer were bred for the production and sale of meat and skin. This movement increased the pressure on wilderness areas caused by development.

(g) The establishment of commercial oriented large-scale reindeer herding and the rapid transition to pastoralism resulted in serious social changes in the European tundra. First, the population grew to four to five times the size it was before the transition. Secondly, the people were differentiated into various classes such as wealthy large herd owners, independent herders with middle-size herds, employed herders with small herds or no herds, urban proletariats, and sea mammal hunters. Thirdly, former clans were divided into sub-clans and small kin groups that shared only a family name, and subsequently, the system of land use regulated by the former clan system was transformed. Fourthly, there were large movements of segments of the population. People who lost their reindeer often quit reindeer breeding, and either went to towns to look for other work or moved to coastal areas and islands on the Arctic Sea to engage in sea mammal hunting. The immigration to the islands of Korguev, Vaigachi, and Novaia Zemlia was seen in the mid nineteenth century dur-

ing the process of this transition.

(h) On the contrary, the transition process occurred more slowly on the Siberian side, because the extinction of the wild reindeer happened much later and the spread of commercial oriented large-scale herding took more time than it did on the European side. The process was accomplished during the last years of the nineteenth century or the beginning of the twentieth century among the Siberian Nenets. In other words, the pressure of development from human activity exerted by the Siberian Nenets was weaker than that of the European Nenets and Komi, while the pressure against development from the wild reindeer was much stronger. The former was often blocked by the latter, and the hunter-herder continuum was sometimes seen in places where both of these forces competed and established a balance.

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