Roads versus Rivers
Two Systems of Spatial Structuring in Northern Russia and Their Effects on Local Inhabitants

KIRILL V. ISTOMIN

Abstract: In northwestern Siberia, rivers historically played an essential role in structuring economic, cultural, and administrative space. The rivers’ role in spatial perception is reflected in vocabulary of some local languages. With the recent development of roads and railroads, a new way has emerged to structure socioeconomic and political space. The two systems of spatial structuring contradict each other, and their relative importance for different local groups depends on their professional and ethnocultural affiliation. This leads to different perceptions of space, distances, and geographic directions by the members of these groups. Furthermore, since the administrative borders reflect the “river” system, but the administrative power is increasingly projected along the roads and railroads, the conflict between the two systems has a political dimension.

Keywords: environmental cognition, geographic space, Khanty, Komi, migrations, Nenets, spatial perception, Western Siberia

This article discusses 1) how elements of natural versus built environment—particularly natural (rivers) versus built transportation facilities (roads and railroads)—differently structure the perception and representation of space and spatial behavior; 2) how culture plays a role in selecting which class of elements structures spatial perception, thus causing differences in perception between individuals and groups; and 3) how these differences lead to certain social and even political consequences. Each part of the argument, taken independently, hardly represents anything new. It has been well demonstrated that paths and roads represent key elements of spatial representation and
structure spatial memory and perception (e.g., McNamara 2013; Nadel 2013; Siegel and White 1975), that people from different cultural backgrounds structure space differently (e.g., Tsai and Lo 2013). Further, the idea that the “social space” (i.e. the space as perceived and known by people) informs human action and influences decision making (often of high social and political relevance) is central for human behavioral geography (see Meusburger, Werlen, and Suarsana 2017; Montello 2018). However, these insights have been made in different disciplines, and they have rarely been combined together to inform a single coherent research study. In this article, I argue that it is necessary to combine these strands of research.

Although built infrastructure has long remained outside the scope of anthropological interest, the last twenty years have seen a rapid growth of anthropology of infrastructure as an independent research direction (Schweitzer, Povoroznyuk, and Schiesser 2017, 59–60; see also Larkin 2013). Among various objects of infrastructure, communication routes and facilities and particularly roads (including railways) have been attracting the strong interest of anthropologists. Research has been published on the social, cultural, and political role of roads (e.g., Harvey and Knox 2015; Kaschuba 2004; Snead 2009), including several studies conducted in Siberia (e.g., Argounova-Low 2012; Argounova-Low and Prisyazhnyi 2016; Kuklina, Povoroznyuk, and Saxinger 2019; Povoroznyuk 2016; Schweitzer, Povoroznyuk, and Schiesser 2017; Zuev and Habeck 2019). Chinese anthropologists even announced the birth of a new scientific discipline called “roadology” (Chinese: luxue), an interdisciplinary analysis of roads and their role in the social sphere (Zhou 2016). These publications cover topics such as the role of roads in identity, power relations, social structure, economy, as well as their role in cultural and social transformations, including those involving indigenous peoples. However, the impact of roads and other communication routes on spatial perception and representation on the level of its structure rather than its content, that is on the way spatial information is organized and spatial computations and inferences are achieved, has rarely been analyzed in any depth in these anthropological studies, notwithstanding that the special role routes play in spatial cognition has been known to cognitive psychologists for decades and given rise to some classic (but still largely considered applicable) models of mental mapping (Siegel and White 1975).

The anthropological study of spatial perception has developed separately from the infrastructure studies mentioned above. In their analysis of social, cultural, economic, and linguistic factors structur-
ing spatial perception and creating a noticeable diversity of spatial representation models between individuals and groups (e.g., Aporta and Higgs 2005; Istomin and Dwyer 2009; Levinson 2003; Tsai and Lo 2013; Widlok 1997), researchers belonging to this branch of anthropology have thus far largely ignored infrastructure and its influence on their object of study. One of the reasons could be that in anthropology, analysis of cultural and social factors determining spatial perception arose from the studies of navigation and wayfinding, particularly of the impressive abilities of some cultural groups’ members to find their way in deserts (Lewis 1976; Widlok 1997), the tundra (Carpenter 1973; Nelson 1969), or on the ocean (Gladwin 1970; Lewis 1972). From this tradition, researchers of later decades inherited an interest in studying “wild,” roadless environments, pertinent spatial representations, and modes of human action in such environments.

Therefore, cognitive functions of roads and railroads as elements structuring spatial information and, moreover, the structural change in environmental perception have rarely been a topic of anthropological research. One can do nothing but regret this because anthropology as a science of human diversity could fruitfully complement numerous researches on this topic performed in the fields of behavioral geography and cognitive psychology. The two latter disciplines aim to establish universally valid facts and build universally valid models of environmental and spatial perception, whereas anthropology is in a good position to discover and explain differences in spatial perception between individuals and groups.

Anthropological studies of the cognitive role of transportation infrastructure in perception and representation of space could address the following questions. How does the role of transport infrastructure (or different kinds of transport infrastructure) differ between social, cultural, or professional groups? What factors (social, cultural, political, economic, etc.) can account for these differences? How do infrastructural projects, for example newly constructed roads, differently affect spatial perception and representation? And, most important, how do differences in spatial cognition resulting from the different role of transportation infrastructure affect spatial behavior, social relations between the groups, their relative power positions, and political sentiments? It was the unique ability of anthropology to address such questions—along with its capacity to study “cognition in the wild” (Hutchins 1995), that is how human perception, thinking, decision making occurs in the web of social and material relations of the real world rather than in the purity of artificial laboratory conditions—that
once made anthropology one of the founding members of cognitive science (Gardner 1987, 223–259). And it is this ability that keeps it among the cognitive science disciplines despite the many controversies (Beller, Bender, and Medin 2012; Bender, Hutchins, and Medin 2010).

In this article, I offer answers to the above-mentioned questions by bringing in relevant ethnographic data from Western Siberia, namely the Yamal-Nenets and Khanty-Mansi Autonomous okrugs of the Russian Federation. These data relate to spatial cognition of the indigenous population of this area: Nenets nomadic reindeer herders and fishermen as well as Komi reindeer herders, who migrated to this region from northeastern Europe (from what today is the Komi Republic of the Russian Federation) but also lead a traditional way of life. The empirical material used in this article has been collected among Nenets reindeer herders of Tazovskaya Tundra (Tazovsky District, Yamal-Nenets Autonomous Okrug), Nenets and Komi reindeer herders of Nadym Tundra (Nadymsky District, Yamal-Nenets Autonomous Okrug) as well as settled Komi from two villages: Vosiakhovo and Samburg (Shuryshkar and Pur districts, Yamal-Nenets Autonomous Okrug) as well. About thirty interviews, including experiments on the topic, have been conducted with these groups. Their spatial cognition is contrasted to that of newcomers who arrived in the area after the oil and gas extracting industry started to develop there in the 1970s. These newcomers originate from various territories of the former Soviet Union, and their ethnic and cultural backgrounds are very diverse. Still, they all use the Russian language in the public sphere, and they have much in common in terms of their social attitudes and way of life. About twenty interviews have been made with newcomers, notably with inhabitants of the cities of Salekhard and Novyi Urengoi, medical and veterinary workers from Nadym and Niagan (interviewed in the Nadym Tundra) as well as a group of eight shift workers from Surgut and Nizhnevartovsk, who were interviewed at different times on the train Moscow–Tiumen’–Novyi Urengoi. As my interviews suggest, these people, despite their different occupations and cultural background, have a lot in common in terms of spatial cognition. Data for this paper have been collected in the course of numerous field trips to Western Siberia between 2006 and 2017. Some of them were made in the framework of special projects on spatial cognition of nomadic reindeer herders, while I was working at the Max Planck Institute for Social Anthropology (Halle, Germany) between 2005 and 2012. Others have been part of other projects not directly related to spatial cognition. However, as many anthropologists have experienced, it is difficult to abandon a topic once studied in the field.
Theoretical Background

The notion of spatial perception and representation being structurally flexible—and hence dependent not only in its content, but also in its very structure on social, cultural, political, and other factors—is based on the fact well established in cognitive psychology that human perception is by no means a simple reflection of the world “out there.” In the last instance, our perception is created by our brain based on our previous experience, while the signals sensed from the “outside” serve as stimuli and guidance for the brain in creating the perception but do not by themselves make up its content. The perceived image of geographic space, which includes the remembered distribution of different places and objects, different qualities of landscapes, and so on is not an exception (Denis 2018). It is widely believed that such an image is created by the brain in the form of the so-called mental or cognitive map (Kaplan 1973; Downs and Stea 1977; Nadel 2013) and that it incorporates our personal past experience of interacting with and acting in space (Tversky 1993) to increase the efficiency of such acting in the future (Nadel 2013). Of course, the manner a person acts in space and interacts with it depends on the gender, job, and cultural background. It is not surprising then that mental maps differ between individuals and groups depending on these factors (Allen 1999; Murray and Spencer 1979). These differences concern the content of the mental maps, that is the types of objects included in them. It is intuitively clear that a mental map of, for example, a nomadic reindeer herder would include spatial distribution of reindeer pastures and information of their quality. By contrast, a mental map of the same geographic space belonging to a hunter or a fisher would include suitable places for hunting traps or fishing nets but probably not reindeer pastures. However, differences in cognitive maps are not limited to their content. Much more interesting are differences in the structure of mental maps which, in contrast to differences in content, affect spatial behavior across different domains rather than in any concrete domain or type of activity (Golledge 1999). Some of these differences are also cultural (Istomin and Dwyer 2009).

One of the most important structural aspects of mental maps is the hierarchy of regions (McNamara, Hardy, and Hirtle 1989). People tend to perceive space as consisting of a certain set of regions, which are subdivided into still smaller regions. The number of such levels varies among individuals and groups. Such regionalization or structuring of mental maps on each level usually follows certain principles and utilizes certain features of the environment to draw borders between
mental regions. For example, a person living in a mountainous environment can mentally represent this environment as a set of regions made up by the main mountain ranges; these big regions can consist of regions corresponding to individual valleys; these can be further subdivided into regions corresponding to the upper, middle, and lower parts of these valleys (see, e.g., Tsai and Lo 2013). For most contemporary educated people, who have a mental representation of the Earth surface, the uppermost level of its regionalization corresponds to continents divided (mostly) by oceans. These continents are then further divided into countries usually corresponding to individual states (Kitchin and Blades 2002; Murray and Spencer 1979). This shows that the structuring of mental maps can be based not only on natural objects and features physically present in the environment but also on artificial objects, features, and borders.

The regional structure of mental maps affects spatial thinking and behavior. Probably the best studied is its effect on distance judgments. People tend to perceive places inside the same region as being closer to each other than places from different regions. This rule is valid on all hierarchical levels of regions but the higher the level, the bigger is the effect (Kitchin and Blades 2002). Thus in (European) Russia, it was once popular to amuse people by asking them to compare distances between St. Petersburg and Petropavlovsk-Kamchatskii and Petropavlovsk-Kamchatskii and Quebec City in Canada. Most Russians believe that the city of Petropavlovsk-Kamchatskii is much closer to St.-Petersburg than the city of Quebec, while the opposite is true. However, St. Petersburg and Quebec are situated not only in different countries but on different continents; this leads people to believe that they are distant from each other. An even more striking example is provided by Carbon and Leder (2005). The authors demonstrated that even fifteen years after the unification of Germany, German citizens systematically overestimated distances between cities situated in different parts of Germany (East or West) compared to distances of cities located in the same parts of Germany. The authors claim that this tendency was more pronounced on the part of the people who had negative attitudes toward the unification of the country. Such findings point to a remarkable correspondence between spatial and social thinking (see Tversky 2019): judgment of physical distance is accompanied by the feeling of emotional distance. People generally feel emotionally closer, more trusting, and willing to cooperate with people belonging to the same region of their mental map in comparison to people from a different region; and the higher in the hierarchy the regions under question, the stronger is the effect. This
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affects social contacts and ties and explains why mental maps have the potential to structure social and even political landscapes up to a certain degree. This degree should not be overestimated—numerous examples exist of social, religious, ideological, and political borders being created first and then starting to affect mental maps by becoming new borders of mental regions—but it would also be wrong to underestimate it. Social sciences know numerous examples of social constructs gaining construing power.

**Rivers and Their Role in “Traditional” Spatial Cognition**

In Western Siberia, just as in many other regions of the Russian North, rivers historically were the main communication routes, and they remain so as far as the traditional economy is concerned. Thus, my observations in the taiga zone suggest that all long-distance hunting and gathering trips are performed in two stages: first, people with their cargo travel along a river using boats in summer, sleds in winter, or they just walk along the bank. This is the easy part of the trip, which allows, particularly in winter, when the river is frozen and turned into a flat ice road, to cover most of the distance in comparatively little time. It is only after arriving at their hunting or picking area that people make a camp, leave everything they can on the bank and, with minimum cargo, walk into the forest to perform the smaller though most difficult part of their journey. Indigenous taiga inhabitants thus travel from one river to another and exploit natural resources in the proximity to the rivers. Tundra nomads, as my long-term work among them suggests, are less dependent on the rivers as far as their movement and resource use are concerned. However, rivers still play an important role for them because of the rivers’ prominent influence on the distribution of natural resources and on reindeer behavior. Reindeer naturally follow rivers in their movement (see Baskin 1970), and river valleys in the tundra are rich in grass and tundra willow, the latter being used by tundra nomads as fuel. Besides that, just as in the taiga, frozen rivers represent the best roads for sleds and snowmobiles, and it is often easier and more economical in terms of time and fuel to use them rather than to go directly through the tundra.

Among the indigenous people of Western Siberia, social and cultural connections along the rivers are denser than those between the rivers, irrespective of geographic distance. People tend to maintain closer and more frequent social and economic contacts with people who
live by the same river than those by the neighboring river, and maintain stronger social ties with people living in the same river system than with those from the neighboring river system, even if the geographic distance to the latter is shorter. Particularly in the taiga, the watersheds between large river systems frequently make up borders between ethnic groups. Thus, Ob’ River, the main river of Western Siberia, has Mansi, Khany, and Tatar tributaries, the watershed between these tributaries and the Taz River basin makes up the border of the Selkup area, while the basins of Pur and Nadym are the ethnic territory of the Forest Nenets (Levin and Potapov 1961, 6–10). Finally, rivers have historically been the main channels of political influence and power, including the administrative power of the state (see Istomin and Shabaev 2015, 55–58 for a review and relevant literature). This explains why the administrative borders in Western Siberia more often than not follow watersheds between large river basins. This held true for both the tsarist and communist administrative areas, and continues to be true.

Considering everything just said, one can easily guess that the river system is destined to constitute the backbone of spatial perception of the local indigenous population. This is indeed so: in a direct sense of this word, the rivers represent axes along which the mental maps are structured, and the spatial information is organized in the mind of local people. In certain cases, this is reflected even in the local languages. Thus, for example in Komi language (the native language of the author of this paper) there are two basic verbs to designate movement: kainy (to move up the river or from the river inland) and lechyny (to move down the river or towards the river from inland). These verbs also have passive objective forms kaiödny (to bring something up the river and to make something move up the river) and lechödny (to bring something down the river). These verbs are used when people speak about moving somewhere or moving something. Thus a sentence like “go to the nearest shop and bring some bread and milk” would sound something like “Go up/down the river to the shop nearby and bring down/up the river some bread and milk” in Komi (cf. Istomin and Dwyer 2009: 38). Therefore, when speaking Komi, one has to keep in mind how places and objects around oneself—a shop, one’s house, and even different rooms in one’s house—are situated in relation to the river. For a Komi-speaking person, it is often difficult to speak or even think about his or her spatial actions if he or she does not know the position of the nearest river and his or her position in relation to it.

Rivers do not play such a conceptual role in all languages spoken in the area. For example, in the language of Nenets people, the biggest
group of tundra reindeer-herding nomads in Western Siberia as well as in the contemporary world in general, the spatial concepts and verbs do not include the reference to external axes and their structure is rather similar to that in English (Istomin and Dwyer 2009: 37–38). However, the study of their spatial perception and spatial navigation methods has shown that rivers still play a central role in organizing their mental maps (Istomin and Dwyer 2009: 39). Mental maps of Taz Nenets informants were studied by so-called pointing experiments: the informants were asked if they can point toward various locations behind the horizon with their finger and, in the case they said they know the direction, the correctness of their pointing gestures was assessed using a GPS (Istomin and Dwyer 2009: 34). These experiments show that their mental maps were structured into regions, which roughly correspond to river valleys. Inside these regions, the Nenets herders represented geometric relations between places and could point out, with a surprisingly little mistake, directions toward these places with their finger. They could not point out such directions towards places in other regions, however, but only the direction toward the respective region as a whole. After migrating from one such region to another, which usually means migration from one river basin to another, the herders became capable of pointing out correct directions toward different places within this region, which were sometimes situated as far as one or two dozen kilometers away.

The experiments show that they were no longer capable of pointing to places in the region they had left nor to those places that are geographically only a few kilometers away but situated across the regional border. Instead, they pointed toward the region as such (Istomin and Dwyer 2009: 39–40). This shows that the spatial cognition of the Nenets nomads is rather complex and that rivers serve an important role in managing this complexity by organizing detailed local mental maps into a hierarchical system, relating them to each other and enabling effective spatial actions. The leading role of river systems in judgments about distance, which represents the most visible effect of the mental map structure, is evident for all indigenous groups of the region. Irrespective of the physical distance between places, they judge places on the same river as closer than places situated on different rivers of the same river system. At the same time, places in the same river system, which can be reached by going down along one river and then going up along another, are judged as closer to each other in comparison to places situated in different river systems, which can be reached only by crossing a water shed.
New Routes and Means of Transport in the Twentieth Century

The special role of rivers in structuring social, economic, administrative, and cognized space of Western Siberia had been indisputable until the road infrastructure started to emerge in the Russian North in the twentieth century. The development of the transport infrastructure was connected to its industrialization and passed, roughly speaking, through three stages. The first stage took place in the 1920s and 1930s, when the newly established Soviet government made its first inroads into the North. At this stage, the plans of industrialization of the North centered around the so-called Northern Sea Route, stretching from the Arctic coast between Murmansk in the west and Petropavlovsk-Kamchatskii in the east (Belov 1959, 1969). The Soviet committee of the Northern Sea Route, established in 1920 (Belov 1959, 70–71) and reorganized into the Principal Administration of the Northern Sea Route (Glavsevmorput’) in 1932, was responsible for the whole project of industrial development of the North (Belov 1969: 94–105). The backbone of this project, the sea route itself, was navigated by a fleet of about ten icebreakers, each leading a caravan of transport ships. All the way along the route, at the mouths of large rivers, hubs were built to serve as centers of local river fleets. These commuted between the hubs and the industrial enterprises farther inland (Belov 1969: 16–93). Therefore, the route still utilized the river systems, and the principal aim was to connect the river systems via the sea. This first stage of the infrastructural development of the Russian North has left behind a set of new settlements on the Arctic coast designed to work as the route’s hubs. In Western Siberia, the most notable are the towns of Igarka, Dudinka, Tiksi, and some others, populated mostly by newcomers, who perceived the region from the seacoast inland.

The Northern Sea Route allowed the possibility to conduct geological research in Western Siberia and to establish the first industrial installations. However, it soon became obvious that the sea-and-river transportation infrastructure did not suffice to support full-scale industrial development; this infrastructure could be used only during the short annual navigation period, and it was too dependent on ice and weather conditions. The extraction of the abundant newly discovered resources demanded a more reliable mode of inland transportation. This initiated the second period of infrastructural development, which could be named “the railroad period.” This period roughly corresponded to the era of Stalin’s system of forced-labor camps (Gulag), whose prisoners
were the main working force behind this infrastructural development. The main project of this period was the Great Northern Railroad (also known as the Transpolar Mainline), which was planned to connect the town of Kotlas on Dvina River, the north-easternmost point of the existing railway system in the European part of the Soviet Union, first to the oil and coal resources of the Pechora basin and then, across the Urals, to the oil and gas areas in the Ob’, Nadym, Pur, and Taz river basins and further to the metal deposits of Igarka and Noril’sk. The railroad was to cross the whole of Western Siberia from west to east and to become the main axis of its industrial development.

Along this axis, numerous resource-extracting installations—which were to be built together with the road—would provide oil, gas, and mineral resources needed for the ambitious plans of Soviet industrialization. Since the prisoners’ labor was cheap, the road was planned without much attention to the local landscape—it crossed rivers, bogs, watersheds, reindeer pastures, and areas rich in permafrost. The landscape “struck back”: even though the project took fifteen years, it brought limited success. The European part of the railroad, the so-called Pechora Railroad from Kotlas to Vorkuta was started in 1937 and finished in 1941, the year when the Soviet Union entered World War II. The war delayed the continuation of the project, and it was only in 1947 that construction of the Siberian part of the railroad started. The construction work continued for five years and was abandoned in 1953, immediately after Stalin’s death (Gritsenko and Kalinin 2010; Mote 2003). Although the railroad was mostly finished, the prisoners did not manage to build reliable bridges across Ob’ and Yenisei, while bridges across Nadym, Pur, and Taz were only temporary (Gritsenko and Kalinin 2010: 19–41). Currently, only two parts of the Transpolar Mainline are used. The first is the railroad from Chum (near Vorkuta) across the Urals to Labytnangi on the bank of Ob’, opposite of Salekhard. Farther east, trains run on the Nadym–Urengoi section (Gritsenko and Kalinin 2010, 222–23), linking up with a more recently constructed line from Tiumen’ to Urengoi. Even though the project was abandoned in the early 1950s, it has left behind a chain of settlements such as Nadym, Urengoi, Pangody, which started as key points of the railroad and later were used as bases for industrial development. These settlements, with mostly Russian-speaking newcomers, have changed the cultural and ethnic landscape of the whole area.

The third stage of infrastructural development started in the 1960s. This stage was the most natural if one can say so; it did not involve any mega-projects of the scale of the Northern Sea Route or the Great
Northern Railroad. Isolated transport networks were developed locally in order to serve the needs of particular industrial projects, usually related to gas and oil extraction. These transport networks consisted mostly of tarmac or gravel roads. For example, the development of oil drilling industries near Surgut caused the creation of a rather dense network of roads, which connected newly established drilling towns to the urban centers of Surgut and Nefteiugansk. The third period also saw the gradual completion of a railroad from the Trans-Siberian Railway northward, from Tiumen’ via Surgut to Urengoi, reaching out to the “older” but unfinished Great Northern Railroad. In the southwestern part of the area, a separate network of automobile roads developed to connect the oil drilling sites around Niagan to the nearest railroad in the Sverdlovsk region. Finally, the start of gas extraction on Yamal Peninsula has recently triggered the construction of a railroad and tarmac roads from Labytnangi northward. Again, the development of these “third-period” networks was related to the construction of new towns and the influx of permanent and temporary workers. These newcomers of the second and third stages of industrial development currently account for 85 percent of the regional population. It is also important to note here that the new automobile roads have been built mostly along watersheds; watersheds provide the driest conditions in this boggy region, allowing for relatively inexpensive road construction and maintenance. This also ensures that the road system as an axis of spatial perception becomes incompatible with the spatial perception based on rivers.

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The development of the railroad and road transportation network in the region has contributed to the emergence of new economic, social, and potentially political relations. This system is radically different from the traditional system based on rivers and catchment areas. What is probably even more important, the groups whose economic and social life are structured by these two systems live in different spaces. True, in Soviet times the “new roads” and “new means of transportation” were mentioned among the positive things the Soviet state brought to the native northerners. However, at least in Western Siberia, the older settlements—fishing villages along the rivers, trading posts, and also pre-Soviet administrative centers—have often been bypassed by the newly built infrastructure. There have been few exceptions like
Obdorsk (Salekhard) or Surgut, but the vast majority of the cities, towns, and other settlements, which are currently connected by roads and railroads in Western Siberia, have been built together with this transport infrastructure itself and their population consists of newcomers. The indigenous inhabitants, by contrast, still live in a mostly roadless space; most of the traditional settlements on the banks of the rivers still do not have any permanent road connection with the “bigger world.” Even in those cases where the roads cross hunting grounds and reindeer pasturelands, the local hunters and herders preferred to move away, retreating to the roadless areas, because it soon turned out that pasturing reindeer and living near a road is difficult and dangerous (for a somewhat similar case from eastern Siberia, see Schweitzer and Povoroznyuk 2019). It is not surprising then that the indigenous inhabitants of Western Siberia (and also Russians who settled there before the industrialization) still build their relations and perceive their space through the river system. The road system, however, structures space for the newcomers, who live a radically different economic and social life. Newcomers and indigenous inhabitants also express different senses of geographic categorizations and regional belonging. In order to understand this difference, I compare how the geographic space of Western Siberia is perceived by the local population of the river dwellers and by the newcomers.

From the viewpoint of Komi and Nenets herders and Komi village settlers, which is approximately represented by the fig. 1, this huge territory is divided into three main regions, which feature highly on their mental maps. The first is the vast region of the Ob’ River, which dominates the taiga part of the region. This country stretches from Obdorsk/Salekhard to Surgut (the two main traditional trading posts and administrative centers) and, at least for the Komi informants from Samburg and Saranpaul’, consists of second-order regions situated on the Ob’ tributaries. These smaller regions are situated one after the other, each with its own capital and population: Suryshkar, Sos’va, Konda, Agan or Surgut, Yagun. The social ties and economic relations spread up and down the river, toward Obdorsk/Salekhard or toward Surgut, which are the places where the contacts with the “outside” world are maintained. The second large region is the tundra part of the area, the country of reindeer herding nomads. For the reindeer herders, it is divided into four subregions: the Baidarashka or Ural Tundra, the Great Yamal Tundra, the Small Yamal or Nadym Tundra, and the Gydan Tundra. The subregions are made up by the Arctic coastline and by the mouths of the large rivers. These subregions are closely connected to
Figure 1. Sketch map of the mental regional layout of Western Siberia from the viewpoint of the traditional river-based spatial perception. The author is grateful to ms. Anelya Lyantsevich for her help in producing this map.
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Each other in cultural, economic and social terms: the numerous Yamal nomads go to the northernmost part of Yamal Peninsula in summer, but in winter about half of them migrates to the lower reaches of the Ob’, where they meet and keep social contacts with the Baidarashka nomads. The other half crosses the Ob’ Bay and comes to the Nadym Tundra, where they meet the Nadym reindeer herders. The latter systematically meet and trade with the Gydan reindeer herders, many of whom spend winter in the Evai-Sale Tundra, the place between the mouths of Pur and Taz rivers. Finally, the third large region consists of two river systems: Pur, the land of the Forest Nenets, and Taz, the land of Selkups. This region is least integrated; it is rather distant and wild, but it is still accessible as a single entity through the focal point of the Evai-Sale Tundra with the villages of Tazovskii and Samburg.

The interviews with the newcomers indicate that from their viewpoint represented by the figure 2, Western Siberia is also divided into three large regions, but these are radically different. One of them includes the whole eastern part of the area, which includes the settlements and places along the railroad Tiumen’–Novyi Urengoi and the network of tarmac and gravel roads stretching out both sides from it. This region includes the Nadym and Gydan tundras as well as the catchment areas of Pur and Taz and the upper part of the Ob’ River basin. Interestingly, this region is believed by the newcomers to be “close” to Tiumen’ and the southern part of Tumen Oblast. Informants point out, for example, that food one can buy in shops throughout this region is mostly produced in Tiumen’ and children from this region usually choose universities in Tiumen’ and Novosibirsk to obtain higher education because they assume that these universities are “closer” to them. The second region includes the western part of the Yamal-Nenets Autonomous Okrug. This region comprises what nowadays is the western appendix of the Great Northern Railroad (the section from Chum to Labytnangi), the newly built Yamal Peninsula railroad and the network of permanent and seasonal automobile roads built in the proximity of these railroads. It includes the lower part of the Ob’ River basin with the city of Salekhard, the tundras on the eastern slopes of the Urals and Yamal Peninsula. This region is believed to be closer to the European part of Russia—that is, the Komi Republic and the territories to the south of it. Thus, “food there is mostly from Kirov and Perm’ and young people often go to Kirov and Archangel’sk to study.” The third region covers the southwestern corner of the area, that is the western part of the Khanty-Mansi Autonomous Okrug. This region comprises the Niagan railroad and pertinent automobile roads and is believed to be
Figure 2. Sketch map of the mental regional layout of Western Siberia from the viewpoint of the newcomers’ road-based spatial perception. The author is grateful to ms. Anelya Lyantsevich for her help in producing this map.
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closer to the industrial regions of the middle and southern Urals: “the food there is mostly from Udmurtia and youth study in Yekaterinburg.”

The newcomers’ perception of the three regions of Western Siberia being closer to different areas of Russia is particularly interesting here. It contains some distance misjudgments: the belief that Novyi Urengoy and Nadym are close to Tiumen’ and Novosibirsk is simply not true. Nor is the perception that Salekhard is close to Kirov (or Archangel’sk) and Niagan is close to Yekaterinburg.3 The way these misjudgments are reported by the informants shows their relation to the mental map structure. This suggests that the three regions represent for these informants something much bigger and more important than just the regions of the Western Siberia. It would probably be more accurate to conclude that Western Siberia as a separate region simply does not exist for these informants, while different parts of this region are included by them into regions of a higher order. This becomes particularly clear when one asks the newcomers about distances inside Western Siberia, which inform their spatial behavior. Many of the newcomers living in the eastern part of the Yamal-Nenets Autonomous Okrug, in such towns as Novyi Urengoi and Nadym, have not been to Salekhard, the capital of the okrug. Furthermore, informants from Nadym believe that Surgut and, in the opinion of some, even Tiumen’ are situated closer to their place than Salekhard. What is even more interesting, Nadym informants almost invariably stated that the town of Yar-Sale, the capital of the Yamal Peninsula, is situated farther away from their city than Salekhard.

This probably reflects their understanding of the transportation system in which, in order to get from Nadym to the Yamal Peninsula, one should first go to Salekhard and then travel to Yar-Sale by car along a seasonal road. Interestingly, this understanding is shared by the settled, predominantly Russian-speaking population of Yar-Sale. My colleague Elena Liarskaya, who has worked in the latter community for a long time, reports that the local sedentary inhabitants of Yar-Sale believe that Salekhard is much closer to their place than Nadym and become sincerely surprised when they see the relative physical distance between the places on the map (personal communication). By contrast, Nenets reindeer herding nomads living in the Yamal Peninsula believe (more correctly) that Nadym and Yar-Sale are quite close to each other; they even tend to underestimate the physical distance between the two places. As has been mentioned above, many Yamal Peninsula nomads cross the Ob’ Bay as a part of their yearly migration and spend the winter in the area close to Nadym; and even those nomads who stay
with their herds on the peninsula prefer to travel to Nadym rather than to Yar-Sale for trade because prices for reindeer meat and for fish are higher there. These travels are done in winter, when the Ob’ Bay is frozen and makes for an excellent road for sleds and snowmobiles; much better than the tundra, which is full of small cliffs and slopes. It is particularly interesting, therefore, that only reindeer herders use it. According to Liarskaya, the sedentary population of Yar-Sale, which consists mostly of newcomers, does not travel to Nadym, despite having technical means (snowmobiles) to do so. Instead, they prefer to travel to more distant Salekhard to buy the necessary goods and services they cannot obtain at home. This is a good example of how spatial cognition based on roads causes different spatial behavior in comparison to that based on rivers.

The social consequences of the mental map difference are not limited to such spatial behaviors as those just described. As I have already said above, the administrative division of the area still reflects the traditional spatial perception structure based on rivers. Western Siberia is divided into two autonomous okrugs: the Khanty-Mansi, which generally coincides with the Ob’ basin, and Yamal-Nenets, which comprises the tundra regions and the Taz and Pur region. The latter also includes the lowermost part of the Ob’ basin with the city of Salekhard (Obdorsk), the okrug’s administrative center. Traditionally, this town was the Russian political gate to the tundra regions and the place where tundra nomads paid their tributes to the Russian state and bought Russian products. Therefore, it was logical to use it as the center from which the administrative power would be propelled to the tundra, although the place belongs more to the Ob’ basin region than to the tundra region. From the viewpoint of the river-based spatial perception, this administrative delineation of the territory makes much sense and reflects well the perceived spatial structure of social relations. From the viewpoint of the road-based spatial perception, however, it does not. Thus, many informants—newcomers from Nadym and Novyi Urengoi—told me in interviews that they felt it was rather strange and utterly stupid that they had to apply to authorities in far-away Salekhard to deal with local issues. Furthermore, many of them said that the border between the Yamal-Nenets and the Khanty-Mansi okrugs represents a problem for them. For example, quitting employment with one territorial department (territorial’noe otdelenie) and taking up a position at a nearby one causes significant trouble and involves moving one’s place of residence from one town to another across the border. This requires much paperwork related to the changes in taxation payment and medical insurance,
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which would not occur if the movement had happened inside a single administrative unit. Therefore, many of the informants advocated the idea of an administrative rearrangement of the region.

This restructuring, as one informant described it in detail, should create a single administrative region in what are the eastern parts of the Khanty-Mansi and the Yamal-Nenets autonomous Okrugs, and Surgut or Novyi Urengoi should become the administrative center. It is critical that this would-be administrative area coincides with the eastern region of their road-based spatial perception. This informant wanted to abandon the river-based administrative structure and to replace it by the road-based one. Although I have not observed similarly radical political ideas in the western part of the Yamal-Nenets Autonomous Okrug, some informants there did state that the city of Vorkuta and the Komi Republic, in general, are economically and socially closer to them than the eastern part of their okrug. One of them even told me that it would be better to include Salekhard and the Yamal Peninsula into the same time zone as Vorkuta: currently, the local time in Salekhard is two hours ahead of the local time on the European side of the Urals so that people have to adjust their watches every time they cross the border and must schedule their activities taking into account the time difference. The informant reasoned that since people from the western part of the Okrug actively commute across the border for trade, it would be better to include this area into the European time zone and to move the time zone border to somewhere between Salekhard and Nadym. This shows that the roads as the space-structuring factor are gaining strength and even attain some degree of political influence. What is more important, they create cognitive differences between the newcomers, who currently represent the majority region’s inhabitants, and the indigenous and local population. This renders the territory even more divided into social and cultural terms.

Conclusion

The main purpose of a road is to connect: to connect places and to connect people. However, many researches have pointed out that roads can be a rather strong dividing factor as well. Usually, economic and social differentials between places and people, between those that have access to roads and those who do not, are mentioned in this respect. Roads can create economic and social inequality (Harvey and Knox 2015). Russia, in general, and Siberia in particular, although this has not
been specifically explored in this article, provide a number of examples of such inequality (see Schweitzer and Povoroznyuk 2019; Schweitzer, Povoroznyuk, and Schiesser 2017). This article demonstrates that roads can also have a psychological dividing effect.

I started this article by stating that anthropology is in a good position to document how communication facilities (or particular sorts of communication facilities) play out differently on human spatial representations and to explain this difference and show its social, cultural, and political effects. The ethnographic material presented here demonstrates that the perception and representation of the same geographic area by representatives of different groups can structurally differ and that in the particular case described, this difference consists of the role played by different kinds of transportation infrastructure, namely roads and railroads versus rivers.

The transportation infrastructure plays a special role in structuring spatial cognition because this infrastructure is different to other elements of the environment to be cognized and represented by the human mind. The difference is that elements of this infrastructure have a large potential impact on human spatial behavior: they are “affordances” as James Gibson (1986), the renowned researcher of human perception and its relation to action, calls them. Conversely, human perception is not just a reflection of the world; it is created by the human mind in order to inform an effective action, and its structure is subordinate to this aim. Transport infrastructure can take different forms. Roads are one class of objects that potentially represent affordances for human spatial action. There are other classes of such objects, natural as well as artificial, although the exact nature of these classes differs from one environment to another. Thus, in Western Siberia and northern Russia in general, rivers can serve as important affordance objects for spatial action, while in other environments this role may be played by mountain valleys, water channels, and so on. Human spatial perception can be structured around any such class of objects depending on the exact set of spatial actions it serves to support, the spatial distribution of social networks for these actions as well as habitualized forms of resource use. In Western Siberia, tarmac roads and railroads did not exist in many places until 20th century, and they still do not exist in many places, most notably those constituting the main space for action for the indigenous inhabitants of the region. Therefore, rivers have been the most important affordance and structuring factor informing all sorts of spatial activity: economic, social, and even political (as can be seen in the boundaries of administrative units). Yet the majority of
today’s population of the area have arrived along roads and railroads and contributed to their spreading; their spatial perception is, therefore, structured by roads and railroads. This makes it radically different from that of the indigenous inhabitants.

In other words, when a road or railroad is built, it does not only create a difference between those who have and those who do not have access to it. It also creates a difference between those who think with roads and those who do not; in other words, those who use roads to organize spatial information and those who do not rely on roads for this purpose. This latter difference is likely to be explained by the degree by which the new road represents an affordance for action, and this degree can differ, owing to different access to the road, but also because of the specific nature of the activity itself as suggested by social and cultural differences (one does not need a road to graze reindeer) and finally, owing to the presence of other suitable affordances.

Differences in spatial perception are reflected in the differences in spatial actions. This latter difference is not limited to traveling along different trajectories and using different means of transportation. Rather, the spatial aspect is inherent in almost all sorts of human activity: economic, social, cultural, and political. We travel to do work and to have a rest, to establish and support social connections, to perform social and cultural obligations, to engage in political actions. The manner in which we travel is greatly affected by our spatial cognition, which informs us about what and who are close to us and what and who are distant, as well as how we can reach them and if it is affordable and sensible to reach them. The differences in spatial perception affect all these considerations, creating not only different trajectories in space but also different trajectories in life as well as in social and political affiliations. The situation in Western Siberia shows how the divergence of those perceiving space through rivers and those perceiving space through roads and railroads starts to spread into social and political realms. This is yet another way how roads acquire social and political force.
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Kirill V. Istomin is a senior researcher at the Institute of Language, Literature and History, Komi Science Center, Ural Division of the Russian Academy of Science (Syktyvkar, Russia). Prior to that, he was a senior researcher at the Siberian Studies Center, Max Planck Institute for Social Anthropology (Halle, Germany). His sphere of scientific interests includes ecology and techniques of traditional reindeer herding and cognitive anthropology, particularly the study of specific cognitive skills of reindeer herding nomads. He published extensively on the history of reindeer herding groups and their complicated relations with the wider society. Email: kistomin@naver.com.

Notes

1. An exception may be seen in the analysis of snowmobile trails and their role in spatial perception and wayfinding of Inuit by Claudio Aporta (2003, 2009). However, even in this case, the kind of objects focused on differ from those analyzed by the anthropology of infrastructure scholars; it is doubtful if many of them would be willing to include semipermanent snowmobile trails into their definitions of infrastructure.

2. These observations have been performed among Komi of the Komi Republic, which is in the European part of Russia. However, the interviews with informants in Western Siberia suggest that the practices of travel are more or less similar there.

3. The distance between Salekhard and Tiumen’ (1,147 kilometers) is a bit smaller than between Salekhard and Kirov (1,231 kilometers) or Salekhard and Archangel’sk (1,212 kilometers), while the distance between Niagan and Tiumen’ (557 kilometers) is smaller than between Niagan and Yekaterinburg (650 kilometers).
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