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The problem of Samoyed origins in the light of archaeology: On the formation and dispersal of East Uralic (Proto-Ugro-Samoyed)

Introduction

Our jubilar Juha Janhunen started his incredibly multifaceted and distinguished career as a Samoyedologist, publishing an etymological dictionary of the Samoyed languages in 1977. His doctoral dissertation, entitled *Glottal stop in Nenets* (1986), deals with the most difficult problems of Samoyed phonology. Juha remains one of the foremost experts in this field, providing an overview of “Samoyedic” in a handbook of the Uralic languages (Janhunen 1998a). But from the very beginning, Juha also worked to develop a broad base of language skills: not only has he mastered most Uralic and Altaic languages, he is proficient in Chinese, Japanese, and Tibetan, as well as Russian and other Indo-European languages. It is no exaggeration to say that he stands at the forefront of experts in the world on Uralic and Altaic languages.

Addressing some fundamental problems in Juha’s original field of specialization, this contribution attempts to resolve questions about the original homeland of Proto-Uralic speakers and the disintegration of this linguistic community. In particular, it deals with the intriguing problem of how the Samoyed branch came into being. That an outsider like myself can advance the following suggestions is due to the fact that most linguists, including Juha himself, have chosen to ignore archaeology, considering it irrelevant to the reconstruction of linguistic prehistory. Only quite recently has Juha admitted that archaeology may after all be useful for such endeavours, actually suggesting that Proto-Samoyed was spoken in the Tagar culture of southern Siberia (Janhunen 2009: 72). This is a suggestion that my proposal fully supports.

Ancient societies were often unified by a shared language and a shared material culture, even though communities with two or more languages did exist. The field of historical linguistics has charted genealogical and contact relationships between languages, while archaeology has charted genealogical and contact relationships between cultures. In principle it should be possible to correlate these linguistic and archaeological reconstructions of prehistory, which have been achieved independently of each other, with methods appropriate to the disciplines concerned. To exclude chance resemblances, however, it

is imperative to study the larger whole, such as entire language families, and to demand a “total correlation” of the patterns of genealogical and areal contact relationships revealed by the two fields. My own endeavours in this regard began in the early 1970s, first with the Indo-Iranian languages and then expanding to encompass other Indo-European languages. Finding clues in early contacts between the Indo-European and Uralic languages, I joined forces with Christian Carpelan, whose specialization is the prehistoric archaeology of northern and eastern Europe, and who has been interested in using archaeology to trace pre-history of Uralic languages. In 2001, we published a paper in which we sketched the “Emergence, contacts and dispersal of Proto-Indo-European, Proto-Uralic and Proto-Aryan in archaeological perspective.”

Over the past ten years, research has progressed on various fronts, not least in the study of the Uralic languages. Particular mention must be made of the work of Jaakko Häkkinen (2007 and 2009), which has shown that the dispersal of Proto-Uralic very likely did not start with the separation of Proto-Samoyed. According to Häkkinen, Proto-Samoyed shares several innovations with the Ugric languages; together they form the East Uralic branch. Moreover, Häkkinen has stressed on phonological grounds that Proto-Uralic already had Indo-Iranian loanwords with sound changes of the Proto-Aryan level, datable to around 2000 BCE. The present paper is an advance excerpt—the last portion—of a longer paper that offers a systematic revision of our 2001 reconstruction. As it is impossible to present this archaeological correlation of East Uralic independently, I must first sum up some of my principal conclusions about the relationship of Uralic and Indo-European. (As references are provided in the forthcoming full paper, little documentation is given here; for the time being, consult Carpelan & Parpola 2001; Mallory 1989; and Parpola 2008.)

In my view, Proto-Uralic was spoken in the *Volosovo culture* (3650–1900 BCE), which expanded eastwards from its original area in the interfluve of the Upper Volga and Oka so as to incorporate the *Garino-Bor (Turbino) culture* of the Vyatka and Lower Kama areas (Krajnov 1987a). The genetically related predecessors of the Volosovo culture, the *Lyalovo culture* (c. 5000–3650 BCE), and the *culture of the Upper Volga Ware* (c. 5900–5000 BCE) already had contacts to the east (cf. maps 7–8 in Oshibkina ed. 1996: 138–139). Moreover, four major waves of cultural influence spread from these three cultures northwards to the areas east of Estonia, to Finland and to Russian Karelia (around 5300, 3900, 3600 and 1900 BCE). Without a doubt there was movement of people, and these probably spoke successive stages of a language that developed into Late Proto-Uralic. The *culture of the Netted Ware* (also called *Textile Ceramics* or *Fabric Impressed Ware*) that succeeded the Volosovo culture in the west (c. 1900–500 BCE) matches the distribution of West Uralic. Central Uralic (comprising Mari and the Permic languages) appears to descend from the eastern Garino-Bor extension of the Volosovo culture via the *Kazan (Prikazan) culture* (c. 1900–800 BCE) of the Volga-Kama interfluve (Khalikov 1987) and its successor, the powerful *Anan'ino culture* (c. 800–200 BCE), which exerted a very strong influence on the *Akhmylovo culture* (c. 800–300 BCE) of the Mari area of the Mid-Volga.

The archaeological correlate of Late Proto-Indo-European (PIE) can be traced on the basis of reconstructed vocabulary that identifies Late PIE speakers as the inventors of wheeled vehicles (Parpola 2008). Direct and indirect archaeological evidence strongly suggests that wheeled vehicles emerged in the largest agricultural community of the Copper Age, the *Late Tripolye culture* of southern Ukraine and Moldavia (c. 4100–3400 BCE). The *Early Tripolye culture* had been mediating copper and prestige goods from the affluent Balkano-Carpathian region to the pastoralist *Khvalynsk* and *Srednij Stog (Skelya) cultures* of the Pontic-Caspian steppes (c. 5000–3400 BCE) where Early PIE was spoken. Around 4100 BCE, the pastoralist steppe warriors invaded the Balkano-Carpathian area, where Early PIE survived in the *Cernavoda culture* (c. 4000–3200 BCE). Around 3000 BCE, mixed with Late PIE, it moved from the Balkans to Anatolia. In the 4100 BCE invasion, the Early PIE speakers assumed rule of the Tripolye culture, which came to an end around 3400 BCE in an explosion-like dispersal of Late PIE speakers in every direction.

The two principal post-PIE speaking communities were the *Corded Ware/Battle Axe cultures* of northwestern Europe (c. 3200–1900 BCE) and the *Yamnaya (Pit Grave) cultures* of southeastern Europe (c. 3300–2500 BCE). Around 2800 BCE, the area of the Volosovo culture was intruded upon from the west by Corded Ware people, who appear to have developed symbiosis with the Volosovo people. Their *Fat'yanovo culture* (c. 2800–1900 BCE) (Krajinov 1987b) is very likely the main source of the earliest IE loanwords in Proto-Uralic; they would represent the Pre-Proto-Balto-Slavic variety of IE. The Fat'yanovo people extended eastwards to the Vyatka-Lower Kama area, forming the *Balanovo culture* (c. 2300–1900 BCE) as they moved to exploit the local copper-bearing sandstone there. These metal resources became the source of conflict between the Fat'yanovo-Balanovo people and the people of the *Abashevo culture* (c. 2300–1900 BCE), who came from the south (along the northern border of the forest steppe) and took possession of most of the Volosovo-Garino-Bor area. While the Abashevo culture (on which cf. Pryakhin & Khalikov 1987) was greatly influenced by the Fat'yanovo-Balanovo culture, its burial mounds and funeral customs were similar to the Late Yamnaya/Poltavka graves of the Volga steppes.

The assumed Southeast Indo-European of the Yamnaya cultures is likely to have developed into Pre-Proto-Aryan by c. 2500 BCE. Based on the substrata derived from the Copper Age Srednij Stog and Khvalynsk cultures, it would have had two dialects, Pre-Proto-Iranian spoken in the *Catacomb Grave culture* (c. 2500–1950 BCE) of the Pontic steppes and Pre-Proto-Indo-Aryan in the *Late Yamnaya/Poltavka culture* (c. 2500–1950 BCE) of the Volga-Ural steppes. The Abashevo culture was the main source of the powerful *Sintashta culture* (c. 2100–1700 BCE) of the southern Urals. The culture of the Sintashta people, responsible for the development of the horse-drawn chariot, spread widely as the *Andronovo cultural complex* (c. 2000–1450 BCE) over Kazakhstan and to southern Turkmenistan. In southern Turkmenistan and northern Afghanistan, these Proto-Indo-Aryan speakers took over the *Bactria and Margiana Archaeological Complex* (BMAC, c. 2400–1450 BCE). In this new cultural garb, they spread

both westwards to Syria to rule the *Mitanni kingdom* (c. 1500–1300 BCE) and eastwards to South Asia (*Gandhara Grave culture*, c. 1600–900 BCE) to initiate the Old Indo-Aryan Vedic tradition there.

The *Srubnaya (Timber Grave) culture* (c. 1850–1450 BCE) appeared in the same area as the Abashevo culture; it similarly spread quickly along the northern border of the forest steppe over the former Abashevo area (where it soon disappeared), as well as northwest to the Volga-Oka interfluve, where the Srubnaya-related *Pozdnyakovo culture* (c. 1850–1450 BCE) influenced the formation of Netted Ware culture. The main spread of the Srubnaya culture was westwards, however, where it succeeded the Catacomb Grave culture and the *KMK (or Babino) culture* (2100–1850 BCE) into which the Catacomb Grave culture had been transformed in the areas west of Don. The KMK (культура многоваликовой керамики) was distinguished by ceramics with multiple applied rollers on the surface. Pottery with such applied rollers (валиковая керамика) was the common denominator of *cultures that succeeded the Srubnaya culture in the Late Bronze Age* (c. 1450–800 BCE). With the general adoption of horse riding around 1500 BCE, these cultures spread widely from the Pontic-Caspian steppes, also to the steppes of southern Central Asia. Here suddenly starts a long period without any graves, suggesting adoption of the Zoroastrian funeral custom of exposing bodies to the elements. In the Eurasian steppes, the Valikovaya pottery cultures were followed by the Old-Iranian-speaking *Scythian, Sarmatian and Saka cultures* of the Early Iron Age.

It seems impossible to find any other archaeological constellation that would offer so good a counterpart to the linguistic contact between Proto-Aryan and Late Proto-Uralic and its immediate successors than the largely symbiotic relationship between the Volosovo-Garino-Bor / Netted Ware / Kazan / Cherkaskul' cultures on the one hand and the Abashevo / Andronovo and Srubnaya cultures on the other hand.

The Sejma-Turbino transcultural network

The copper-bearing sandstone of the Kama and Vyatka rivers was a crucial resource for the Fat'yanovo-Balanovo and Abashevo cultures which coexisted here along with the eastern branch of the Volosovo culture, the Garino-Bor culture. The Abashevo culture in particular had a highly developed metallurgy. It probably was the ultimate source of the *Sejma-Turbino transcultural network*, which transmitted high quality weapons from the Altai and Sayan mountains to the Urals. In the west, this trade network extended up to Finland, where it is believed to have operated when the Netted Ware culture came into being (c. 1900–1700 BCE).

From the Urals to the east, the chain of cultures associated with this network consisted principally of the following: the Abashevo culture (extending from the Upper Don to Mid- and South Trans-Urals, with the important cemeteries of Sejma and Turbino), the Sintashta culture (in the southeastern Urals), the

Petrovka culture (in the Tobol-Ishim steppe), the *Taskovo-Loginovo cultures* (on the Mid- and Lower Tobol and Mid-Irtysh), the *Samus' culture* (on the Upper Ob, with the important cemetery of Rostovka), the *Krotovo culture* (from the forest steppe of Mid-Irtysh to the Baraba steppe on the Upper Ob, with the important cemetery of Sopka 2), the *Elunino culture* (on the Upper Ob just west of the Altai mountains), and the *Okunevo culture* (on the Mid-Yenissei, in the Minussinsk plain, Khakassia and northern Tuva). The Okunevo culture belongs wholly to the Early Bronze Age (c. 2250–1900 BCE), but most of the other cultures apparently to its later part; they are currently dated to the pre-Andronovo horizon of c. 2100–1800 BCE (cf. Parzinger 2006: 244–312 and 336).

The formation and cultural affinity of the Sejma-Turbino network has been much debated, but it seems likely that Sejma-Turbino metallurgy originated in the Abashevo culture, with armed traders and craftsmen of Abashevo origin moving to the Altai in a quest for better metal resources. The Sayan and Altai mountains are an important source of both copper and tin: 41% of Sejma-Turbino objects are made of the better quality tin-bronze. (On the Sejma-Turbino network, see Chernykh & Kuz'minykh [who suggest an eastern origin] 1987, 1989, 1994; Chernykh 1992: 190–234; Carpelan & Parpola [who suggest Abashevo origin] 2001: 99–111; Parzinger 2006: 257, 272, 280–312, 336; Koryakova & Epimakhov 2007: 104–110). That the Sejma-Turbino network had an Abashevo origin seems to be reflected also in the distribution of objects with copper of Uralic origin: they are found in the European part of the network, and in considerable amounts also in the upper reaches of Tobol, Irtysh, Ob and Yenissei (cf. the white circles in map 14 in Chernykh & Kuz'minykh 1987: 89).

Christian Carpelan has suggested that the Samoyed branch may have separated from Proto-Uralic in connection with the Sejma-Turbino trade network (Carpelan 1999: 270; Carpelan & Parpola 2001: 109). With the current updating of the Sejma-Turbino phenomenon, it would have happened well before the Volosovo/Garino-Bor culture correlated with Proto-Uralic came to an end. Furthermore, Jaakko Häkkinen posits an evolved East Uralic as the common source of both the Ugric languages and Proto-Samoyed. For these reasons, I suggest below an alternative solution to the problem of Samoyed origins that is slightly later.

From here on, for the sake of easier orientation, I mention only linguistic units in the subtitles, and highlight the archaeological cultures correlated with the respective language(s) by printing their names with **bold face** when they are first mentioned in the sections where the correlation is made. Names of archaeological cultures that need mentioning but are not directly correlated with the language(s) concerned are printed in *italics* when they are first mentioned.

East Uralic

The Abashevo culture and the Srubnaya culture that briefly succeeded it extended as far east as the Tobol; some of the most important sources of copper for the Abashevo culture were located on the eastern side of the Urals. The copper and the pastures attracted the steppe nomads of the Andronovo community to

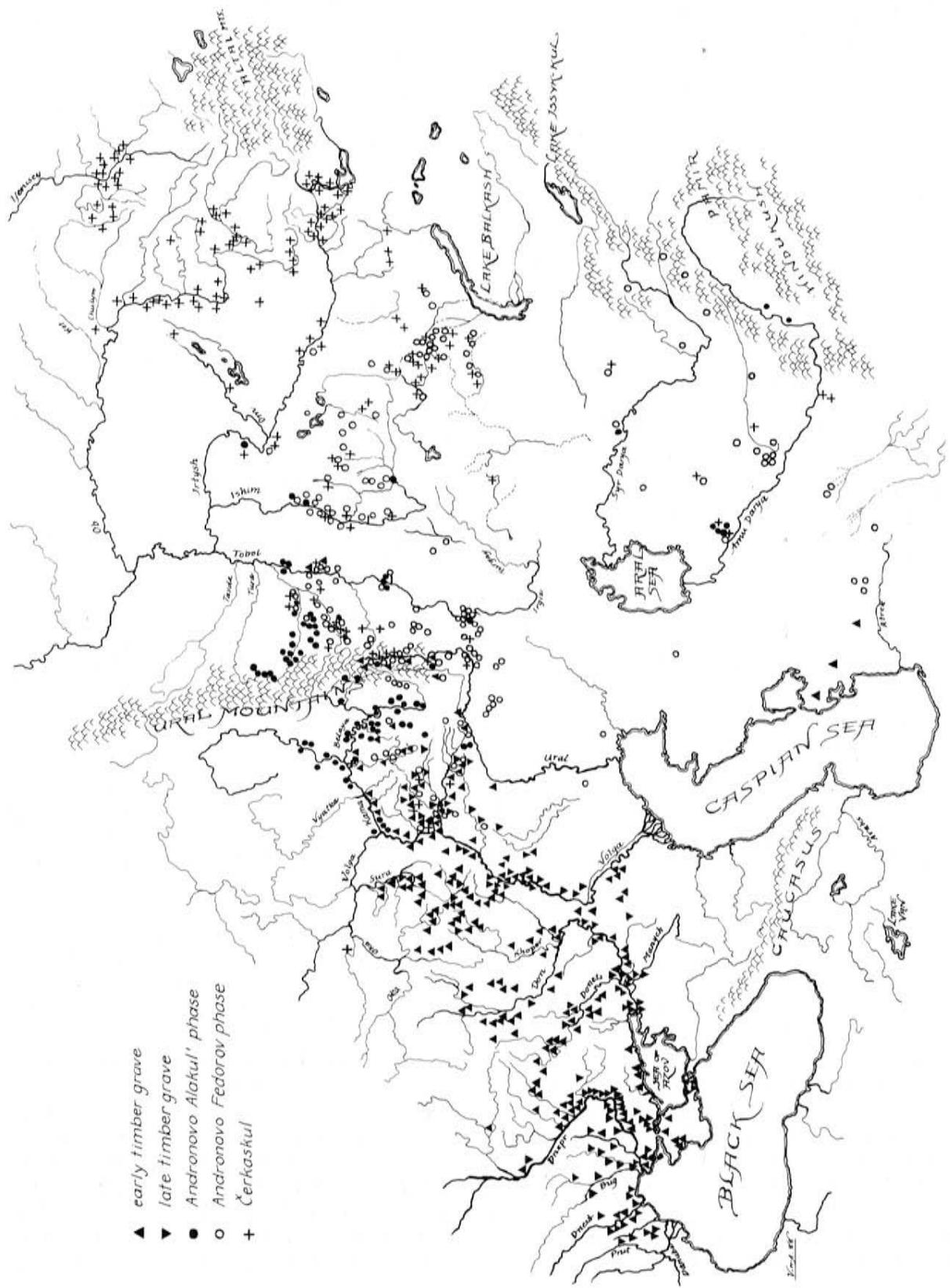
the forest steppe of the Trans-Urals, first the Alakul' (c. 2000–1800 BCE) and then the *Fëdorovo* (c. 1850–1450 BCE) (Parzinger 2006: 257–261; 357–361). The strong *Fëdorovo* influence on the Late Garino-Bor (Turbino) culture resulted in the emergence of the **Cherkaskul'** culture (c. 1850–1500 BCE) in Bashkiria (with the related Kazan culture as its western neighbour) and in the Mid- and South Trans-Urals (up to the Lower Ishim in the east); that is to say, the Cherkaskul' culture occupied the southern forest and northern forest-steppe on both sides of the Ural mountains. About half of the bone finds come from hunted animals, attesting to a predominantly hunter-fisher local population (Sal'nikov 1967: 353–391; Kosarev 1981: 132–141; Kosarev 1987: 276–277, 282–283; Parzinger 2006: 361–364; Koryakova & Epimakhov 2007: 151–154). Cherkaskul' pottery is mostly found at settlements and in the forest zone, quite often together with *Fëdorovo* pottery. Many sites have also preserved pottery mixing the characteristics of Cherkaskul' & *Fëdorovo* types (Chlenova 1981).

Proto-Samoyed

N. L. Chlenova, who published a detailed study of Cherkaskul' pottery 1981, has in her carefully prepared maps (1981 and 1984) plotted Cherkaskul' monuments not only in Bashkiria and Trans-Urals, but also in thick concentrations on the Upper Irtysh, Upper Ob and Upper Yenissei (close to the Altai and Sayan mountains, precisely where Janhunen has placed the homeland of Proto-Samoyed). Some distance further west, on the Ishim river and north of the Baikal Sea, Chlenova's maps record further groups of Cherkashkul' monuments along with *Fëdorovo* monuments. (See map on page 293, redrawn on the basis of Chlenova 1984 by Virpi Hämeen-Anttila for Parpola 1994: 146 fig. 8.15.)¹

Hermann Parzinger (2001) has discussed the *Fëdorovo* graves of southern Siberia (Minusinsk basin), dated to c. 1850–1450 BCE (Parzinger 2006: 381 and 357), concluding that they clearly represent a migration from the west. The graves and their goods (including pottery) have no local precedent; on the contrary, they differ in all respects from those of the earlier local Okunevo culture. The shape and ornamentation of the *Fëdorovo* pottery developed from the Petrovka pottery of the southern Urals and northwest Kazakhstan which has a local Copper Age background. The target of this long migration to southern Siberia is likely to have been the local copper and tin resources, very important for the

1. Nataliya L'vovna Chlenova (1929–2009) was a highly reputed archaeologist who herself carefully studied the material on which the maps are based. Yet her conclusions have been manipulated and called into question. In a map published by S. A. Griyor'ev in 2000 and reproduced by Koryakova & Epimakhov (2007: 113 fig. 3.1), obviously based on Chlenova's 1984 map, the label "Cherkaskul'" is replaced with "Cherkaskul'-Fëdorovo". Cf. also Chernykh (1992: 215): "In the Middle Volga region, Kama and Belaya basin, and the western Ural region, hundreds of settlements and burial grounds of the Kazan historico-cultural community are now known (Khalikov 1969: 240–328). Scattered sites of the possibly even more populous Cherkaskul culture are interspersed with them in the western Ural region, as well as in the Southern Urals and the eastern Ural region (Salnikov 1967). There has recently been a tendency to attribute to this culture a number of steppe zone settlements, stretching to southern Soviet Central Asia (Chlenova 1981: 22–6, map 2). It is difficult to say how justified this is. It may be a simple reflection of the extreme complexity of cultural differentiation within this constellation of generally similar sites." Koryakova and Epimakhov (2007: 345 n. 9.2) state: "Despite many unsolved problems in the study of the Cherkaskul culture itself, its southward spread is well documented archaeologically and cannot be doubted."



production of high quality weapons (Parzinger 2006: 357). Parzinger also refers to southern Turkmenistan, whose Fëdorovo pottery likewise testifies to a long distance migration. Chlenova (1981) has observed that in south Turkmenistan as well, Fëdorovo pottery has been found together with the Cherkaskul' ware.

Juha Janhunen (2009: 72) places the homeland of Proto-Samoyed in the Minusinsk basin on the Upper Yenissei. Estimating that Proto-Samoyed started to differentiate into the subsequent six to nine languages “perhaps slightly more than 2000 years ago” (Janhunen 2009: 63), Janhunen (2009: 72) posits that the language of the **Tagar culture** (c. 1000–200 BCE, according to Parzinger 2001: 80; 2006: 619–631) must have been Proto-Samoyed. Tagar culture largely continues the traditions of the **Karasuk culture** (c. 1500–1000 BCE) which is generally held to be the result of a migration of different people from the southeast (from the periphery of Shang period China). The beginning of the Karasuk period also marked the return of some Okunevo traditions that were not manifest during the Fëdorovo period (Parzinger 2001: 78). The intervention and subsequent assimilation of foreign people speaking a wholly different language can be expected to have had considerable influence on Proto-Samoyed. In view of the Tokharian loanwords identified in Proto-Samoyed it is significant that in the Minusinsk basin, the Okunevo culture was preceded by the *Afanas'evo culture* (c. 3100–2500 BCE), which in many respects is closely similar to the Early Yamnaya culture and where a predecessor of Proto-Tocharian was very probably spoken (Mallory & Mair 2000: 121–123, 270–318).

It appears, then, that the ancestors of the Proto-Samoyeds hailed from a large group of East Uralic speaking people of the Cherkaskul' culture. After adopting pastoralism, they became culturally assimilated within the Fëdorovo people who spoke Proto-Indo-Aryan. Keeping together as a group, however, they retained their Uralic language. The whole process has a good parallel in the Proto-Hungarians (see below).

Proto-Ugric

The Cherkaskul' culture was transformed into the genetically related **Mezhovka culture** (c. 1500–1000 BCE), which occupied approximately the same area from the Mid-Kama and Belaya rivers to the Tobol river in western Siberia (Parzinger 2006: 444–448; Koryakova & Epimakhov 2007: 170–175). The Mezhovka culture was in close contact with the neighbouring and probably Proto-Iranian speaking *Alekseevka* alias *Sargary culture* (c. 1500–900 BCE) of northern Kazakhstan, which had a Fëdorovo and Cherkaskul' substratum and a roller pottery superstratum (Parzinger 2006: 443–448; Koryakova & Epimakhov 2007: 161–170). Both the Cherkaskul' and the Mezhovka cultures are thought to have linguistically been Proto-Ugric, on the basis of the agreement of their area with that of Mansi and Khanty speakers (whose Fëdorovo-like ornamentation suggest evidence of continuity in material culture as well) (Chlenova 1984; Koryakova & Epimakhov 2007: 159, 175).

Proto-Mansi

The Mezhovka culture was succeeded by the genetically related **Gamayunskoe culture** (c. 1000–700 BCE) (Parzinger 2006: 446; 542–545). From Gamayunskoe descended the **Itkul' culture** (c. 700–200 BCE), which was distributed along the eastern slope of the Ural Mountains (Parzinger 2006: 552–556). Known for its walled forts, it constituted the principal Trans-Uralian centre of metallurgy in the Iron Age, and was in contact with both the Anan'ino and Akhmylovo cultures (the metallurgical centres of the Mid-Volga and Kama-Belaya region) and the neighbouring Gorokhovo culture.

Proto-Khanty

Proto-Khanty may have been spoken in the Late Bronze Age and Early Iron Age cultures related to the Gamayunskoe and Itkul' cultures that extended up to the Ob: the **Nosilovo, Baitovo, Late Irmens'**, and **Krasnozero cultures** (c. 900–500 BCE). Some of these were in contact with the Akhmylovo of the Mid-Volga. All these cultures of the forest steppe were later absorbed into the Sargat culture discussed below (Parzinger 2006: 545–564, 679–681).

Proto-Hungarian

According to Janhunen (2009: 74), Hungarian belongs to the Mansic branch of Ugric languages. The Gamayunskoe culture also gave rise, via the **Vorob'evo Group** (c. 700–550 BCE) (Parzinger 2006: 546–549), to the **Gorokhovo culture** (c. 550–400 BCE) of the Trans-Uralian forest steppe (Parzinger 2006: 549–552). For various reasons the local Gorokhovo people began the practice of mobile pastoral herding and then became part of the multicomponent pastoralist **Sargat culture** (c. 500 BCE to 300 CE), which in a broader sense comprised all cultural groups between the Tobol and Irtysh rivers, succeeding here the Sargary culture. The Sargat intercommunity was dominated by steppe nomads belonging to the Iranian-speaking Saka confederation, who in the summer migrated northwards to the forest steppe. (On the Gorokhovo and Sargat cultures, see Koryakova & Epimakhov 2007: 287–312.) A leading Hungarian archaeologist happily supports the following correlation with Proto-Hungarian: “Most scholars of western Siberian archaeology agree that the Sargatka culture ... can be plausibly identified with the proto-Hungarians... Around the 5th century BC the proto-Hungarians were caught up in a wave of migrations that swept the steppe ... Migrating westwards, they settled between the Urals and the Middle Volga region.” (Fodor 1996: 13–14) Until about 600 CE, the Hungarians stayed in Bashkiria, called Hungaria Magna in medieval sources (Fodor 1975: 72).

That the Ugric speakers were horsemen in ancient times is suggested by the presence of a number of equestrian terms in the Ugric languages (Hajdú 1987: 331–333). Particularly interesting is the word for ‘horse’, Hungarian *ló*, Mansi

lū, Khanty *law* < Proto-Ugric **lox*. As pointed out by Juha Janhunen (1989: 415–416), this word is of neither Uralic nor Indo-European origin, nor does it agree with any of the other Eurasian words for ‘horse’: Proto-Yeniseic **kuqs* or Proto-Turkic *(x)*at*. All East Asian terms (Mongolic, Tungusic, Korean, Chinese, Japanese, Burmese, etc.) go back to Pre-Proto-Mongolic **mori*. I suggest that the Ugric word comes from the language of the *Botaj culture* (c. 3700–3000 BCE) of northern Kazakhstan, which is to say the steppe and forest steppe between Tobol and Ishim, the very region of the Sargat culture. This Copper Age culture was focused on horse-hunting: at the type site Botaj (which had more than 150 house pits), about 300,000 animal bones were found, of which 99.9% were horse bones (Anthony 2007: 216–217; Parzinger 2006: 213–220).

Conclusion

As is the case of the Indo-European languages and the Uralic languages overall, it is thus possible to trace the genealogy of all the East Uralic languages from a common homeland to their respective zones of parlance through a sequence of genetically connected archaeological cultures. The sketched correlation, which provides more precise dating and locations of dispersal, also accords with the evidence of areal contacts given by loanwords.

References

- Anthony, David W. 2007: *The horse, the wheel, and language. How Bronze-Age riders from the Eurasian steppes shaped the modern world*. Princeton: Princeton University Press.
- Carpelan, Christian 1999: Käännekohtia Suomen esihistoriassa aikavälillä 5100 ... 1000 eKr. – Paul Fogelberg (ed.): *Pohjan poluilla. Suomalaisten juuret nykytutkimuksen mukaan*. Bidrag till kännedom av Finland’s natur och folk 153. Helsinki: Societas Scientiarum Fennica. 249–280.
- Carpelan, Christian & Parpola, Asko 2001: Emergence, contacts and dispersal of Proto-Indo-European, Proto-Uralic and Proto-Aryan in archaeological perspective. – Christian Carpelan, Asko Parpola & Petteri Koskikallio (eds.): *Early contacts between Uralic and Indo-European. Linguistic and archaeological considerations*. MSFOU 242. Helsinki: Suomalais-Ugrilainen Seura. 55–150.
- Chernykh, E. N. 1992: *Ancient metallurgy in the USSR. The early metal age*. Translated by Sarah Wright. New Studies in Archaeology. Cambridge: Cambridge University Press.
- Chernykh, E. N. & Kuz’minykh, S. V. 1987: Pamyatniki sejminsko-turbinskogo tipa v Evrazii. – O. N. Bader, D. A. Krajinov & M. F. Kosarev (eds.): Èpokha bronzy lesnoj polosy SSSR. Arkheologiya SSSR. Moskva: Izdatel’stvo «Nauka». 84–105.

- 1989: *Drevnyaya metallurgiya severnoj Evrasi (Sejminsko-Turbinskij fenomen)*. Moskva: Izdatel'stvo "Nauka".
- 1994: Die älteste Metallurgie Nordeurasiens. Probleme der Wechselbeziehungen zwischen den erzeugenden Zentren. JSFOu 85: 21–39.
- Chlenova, N. L. 1981: Rasprostranenie i puti svyazey drevnikh kul'tur Vostochnoj Evropy, Kazakhstana i Srednej Azii v èpokhu pozdnej bronzy. – B. A. Litvinskij (ed.): *Srednyaya Aziya i ee sosedi v drevnosti i srednevekov'e. Istoryya i kul'tura*. Moskva: Izdatel'stvo "Nauka": 22–32 & maps 1–2.
- 1984: Arkheologicheskie materialy k voprosu ob irantsakh doskifskoj èpokhi i indo-irantsakh. *Sovetskaya Arkheologiya* 1984(1): 88–103.
- Fodor, István 1975: Suomalais-ugrilaisen arkeologian pääongelmia. – Péter Hajdú (ed.): *Suomalais-ugrilaiset*. Helsinki: Suomalaisen Kirjallisuuden Seura. 52–77.
- 1996: The Hungarian conquest. – István Fodor et al. (eds.): *The ancient Hungarians*. Budapest: Hungarian National Museum. 13–18.
- Hajdú, Péter 1987: Die uralischen Sprachen. – Péter Hajdú & Péter Domokos: *Die uralischen Sprachen und Literaturen*. Übersetzung aus dem Ungarischen von Lea Haader. Bibliotheca Uralica 8. Budapest: Akadémiai Kiadó & Hamburg: Helmut Buske Verlag. 21–450.
- Häkkinen, Jaakko 2007: Kantauralin murteutuminen vokaalivastaavuuksien valossa. Helsingin yliopisto: Suomalais-ugrilaisen kielentutkimuksen *pro gradu*-työ. <<http://urn.fi/URN:NBN:fi-fe20071746>>
- 2009: Kantauralin ajoitus ja paikannus – perustelut puntarissa. JSFOu 92: 9–56.
- Janhunen, Juha 1977: *Samojedic Wortschatz. Gemeinsamojedische Etymologien*. Castrenianumin toimitteita 17. Helsinki: Helsingin yliopisto, Castrenianum.
- 1986: *Glottal stop in Nenets*. MSFOu 196. Helsinki: Suomalais-Ugrilainen Seura.
- 1998a: Samoyedic. – Daniel Abondolo (ed.): *The Uralic languages*. Routledge language family descriptions. London: Routledge: 457–479.
- 1998b: The horse in East Asia. Reviewing the linguistic evidence. – Victor H. Mair (ed.): *The Bronze Age and Early Iron Age peoples of Eastern Central Asia*. Journal of Indo-European Studies Monograph 26, I. Washington, D.C.: Institute for the Study of Man. 415–430.
- 2009: Proto-Uralic — What, where, and when? – *Quasquicentennial of the Finno-Ugrian Society*. MSFOu 258. Helsinki: Société Finno-Ougrienne. 57–78.
- Khalikov, A. Kh. 1987: Prikazanskaya kul'tura. – O. N. Bader, D. A. Krajinov & M. F. Kosarev (eds.): Èpokha bronzy lesnoj polosy SSSR. Arkheologiya SSSR. Moskva: Izdatel'stvo «Nauka». 139–146.
- Koryakova, Ludmila & Epimakhov, Andrej 2007: *The Urals and Western Siberia in the Bronze and Iron Ages*. Cambridge world archaeology. Cambridge: Cambridge University Press.

- Krajnov, D. A. 1987: Volosovskaya kul'tura. – O. N. Bader, D. A. Krajnov & M. F. Kosarev (eds.): Èpokha bronzy lesnoj polosy SSSR. Arkeologiya SSSR. Moskva: Izdatel'stvo "Nauka". 10–28.
- 1987: Fat'yanovskaya kul'tura. – O. N. Bader, D. A. Krajnov & M. F. Kosarev (eds.): Èpokha bronzy lesnoj polosy SSSR. Arkeologiya SSSR. Moskva: Izdatel'stvo «Nauka». 58–76.
- Kosarev, M. F. 1981: *Bronzovyj vek Zapadnoj Sibiri*. Moskva: Izdatel'stvo "Nauka".
- 1987: Vtoroj period razvitetogo bronzovogo veka Zapadnoj Sibiri (andronovskaya èpokha). – O. N. Bader, D. A. Krajnov & M. F. Kosarev (eds.): Èpokha bronzy lesnoj polosy SSSR. Arkheologiya SSSR. Moskva: Izdatel'stvo «Nauka». 276–288.
- Mallory, J. P. 1989: *In search of the Indo-Europeans. Language, archaeology and myth*. London: Thames and Hudson.
- Mallory, J. P. & Mair, Victor H. 2000: *The Tarim mummies. Ancient China and the mystery of the earliest peoples from the west*. London: Thames and Hudson.
- Oshibkina, S. V. (ed.) 1996: *Neolit severnoj Evrazii*. Arkheologiya. Moskva: "Nauka".
- Parpola, Asko 1994: *Deciphering the Indus script*. Cambridge: Cambridge University Press.
- 2008: Proto-Indo-European Speakers of the Late Tripolye Culture as the Inventors of Wheeled Vehicles. Linguistic and archaeological considerations of the PIE homeland problem. – Karlene Jones-Bley, Martin E. Huld, Angela Della Volpe & Miriam Robbins Dexter (eds.): *Proceedings of the Nineteenth Annual UCLA Indo-European Conference, November 2–3, 2007*. Journal of Indo-European Studies Monograph 54. Washington, D.C.: Institute for the Study of Man. 1–59.
- forthcoming: Formation of the Indo-European and Uralic (Finno-Ugric) language families in the light of archaeology. Revised and integrated 'total' correlations. – Riho Grünthal & Petri Kallio (eds.), *Linguistic Map of Prehistoric North Europe*. MSFOU. Helsinki: Société Finno-Ougrienne.
- Parzinger, Hermann 2001: Südsibirien in der Spätbronze- und Früheisenzeit. – Ricardo Eichmann & Hermann Parzinger (eds.): *Migration und Kultustransfer. Der Wandel vorder- und zentralasiatischer Kulturen im Umbruch vom 2. zum 1. vorchristlichen Jahrtausend*. Kolloquien zur Vor- und Frühgeschichte 6. Bonn: Dr. Rudolf Habelt GmbH. 71–83.
- 2006: *Die frühen Völker Eurasiens. Vom Neolithikum bis zum Mittelalter*. München: Verlag C. H. Beck.
- Pryakhin, A. D. & Khalikov, A. Kh. 1987: Abashevskaya kul'tura. – O. N. Bader, D. A. Krajnov & M. F. Kosarev (eds.): Èpokha bronzy lesnoj polosy SSSR. Arkeologiya SSSR. Moskva: Izdatel'stvo "Nauka". 124–131.
- Sal'nikov, K. V. 1967: *Ocherki drevnej istorii Yuzhnogo Urala*. Moskva: Izdatel'stvo "Nauka".