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Formation of the Indo-European and Uralic (Finno-Ugric) language families in the light of archaeology: Revised and integrated 'total' correlations

1. Introduction

With proper methodology, linguistic data allow —to a limited extent— reconstruction of prehistoric protolanguages, charting genetic relationships between members of a language family, and discovery of prehistoric areal contacts that a given language has had with related and unrelated languages. But language units resulting from such a study cannot be precisely located and dated. Archaeological data, in turn, allow experts to define prehistoric 'cultures' that are more or less exactly datable and locatable, and to chart their genealogical and contact relationships. But the resulting units of material culture remain mute as far as the languages spoken in them are concerned, since prehistory by definition is without readable written documents. Whether linguistic and archaeological reconstructions can be successfully correlated with each other is a much-debated issue, but credible success in such an endeavour can promote understanding in both fields.

Believing that correlation of archaeology and historical linguistics is feasible, if the time depth involved is not too great, I have been doing it since the early 1970s. Starting with India and Indo-Iranian (1974), I have gradually expanded to wider spheres, revising my hypotheses when finding more satisfying solutions. Christian Carpelan, an archaeologist with a life-long specialization in North and East European cultures, has had similar interests, focused on Uralic languages. Joining forces, we attempted to trace the emergence and disintegration of Proto-Indo-European (PIE), Proto-Uralic and Proto-Aryan in a longer article published in 2001.

J. P. Mallory, in his classic book on the Indo-Europeans that came out in 1989 and in numerous papers published afterwards (1994–95; 1997; 1998; 2001; 2002), has excellently elaborated and described the methodology of properly correlating archaeology and historical linguistics, and we felt no need for extensive

repetition (cf. Carpelan & Parpola 2001: 55–58). Still, we wanted to stress a few things, and I follow suit here. The material culture and language of a people may change very little during a long time if people stay in the same place and other people do not come to their habitats — Iceland since the early Viking Age and Nuristan and Chitral from the Late Bronze Age until about 1900 are some examples of this. But people do move, and in long-continued or intensive contact situations there can be total language shifts and more or less complete adoptions of new cultures. In principle, it is better not to assume long migrations, but there are exceptional circumstances that allow people to move quickly long distances, such as the combination of open steppe and wheeled vehicles or horses (cf. Nichols 1997: 369). Nevertheless, there must be some tangible archaeological evidence for such movements. Dating is of cardinal importance for a study like this which tries to sort out the genealogical and contact relationships between archaeological cultures (cf. Carpelan & Parpola 2001: 56–57). I have done my best to extrapolate the most credible calibrated radiocarbon dates from the most recent publications. Admittedly there is no consensus on many dates, yet there are efforts to coordinate the data. I have taken into consideration the new dates given by Parzinger (2006), Anthony (2007), Svyatko & al. (2009) and Chernykh & Orlovskaya (2010), but regrettably could not yet consult the forthcoming issue of *Radiocarbon* (vol. 54 Nr 3–4, 2012), which contains the Proceedings of the 6th International symposium “Radiocarbon and Archaeology” held in April 2011 in Paphos, Cyprus: a special session there dealt with the chronology of the Eurasian steppes and forest steppes.

In any case, in building hypotheses it is necessary to respect the data and best-informed views in both disciplines, and to opt for solutions that are credible both from archaeological and linguistic points of view. Moreover, as Mallory underlines, isolated correlations between archaeological cultures and linguistic groups are not sufficient, but all available pieces of the puzzle in both fields should be used and all should fit. Only a total solution involving a complex web (like that of an entire language family) can be convincing. Accordingly, we aimed at a comprehensive archaeological model for the development of the Indo-European and the Uralic language families.

Research has progressed since 2001, and especially in Uralic linguistics old paradigms have been questioned and important new and apparently valid points of view have been presented. Our correlations need to be revised. Originally we intended to write this paper together, but Christian Carpelan had serious reservations with the new correlations I was proposing, being reluctant to abandon his own views in favour of new ones in which he could not believe. So he decided to take some more consideration time before committing himself, but encouraged me to present my views. We intend to continue working together on a publication that is more comprehensive and better documented than the present sketch, and that contains only solutions that we both can accept.

When I sent Petri Kallio the preliminary version of this paper in June 2010, Petri in response sent me the manuscript of his own latest paper (Kallio, in press) and noted that with regard to Proto-Uralic and Proto-Finnic prehistory we had

independently arrived at virtually the same conclusions. Respecting very much Carpelan's archaeological expertise, I was much troubled by his unwillingness to accept my proposal for the origins of Proto-Finnic for archaeological reasons. Therefore, searching for a different, archaeologically more credible solution that would still suit the changed linguistic framework, I proposed to Christian an alternative scenario, which he found more convincing. I thank him for a long and fruitful discussion and also for his extensive comments on the first draft of this paper. I am grateful to Jaakko Häkkinen, Petri Kallio, Riho Grünthal and Mika Lavento for their very pertinent criticism and constructive comments; and to Sergej V. Kuz'minykh for kindly keeping me abreast of recent archaeological literature published in Russia — even though at this stage I have not been able to take all of it into consideration. I am much obliged also to Jim Mallory, who kindly checked my English and gave me access to his forthcoming papers on the Afanas'ev culture.

While I have tried to keep this paper fairly concise, some major controversies on the Uralic side had to be discussed in detail. These are above all questions concerning the Proto-Finnic, Proto-Uralic and Proto-Samoyedic homelands, for which new solutions are also suggested. The last part of the paper, where the Samoyedic homeland is dealt with, has already been published separately as a contribution to a Festschrift in honour of my friend Juha Janhunen, who among many other things is a leading expert on Samoyed languages (Parpola 2012a).

Contacts with early phases of the Indo-European languages, reflected in loanwords resulting from these contacts, are crucial for dating and locating languages of the Uralic family at different stages of their development. Identification of the archaeological cultures in which the various early Uralic languages were spoken, therefore, requires recognizing, as reliably as possible, the archaeological cultures in which the relevant Indo-European languages were spoken at various stages of their development. Because archaeological cultures and languages can be correlated with more confidence on the Indo-European than the Uralic side, I first trace the formation of the Indo-European language family in the archaeological record. All main branches of the language family are dealt with, firstly, in order to demonstrate that the solution is total; secondly, because a consensus has by no means been reached, a wide variety of views being currently held; and thirdly, because my reconstruction differs on some points (notably on the Late PIE homeland) from those suggested by J. P. Mallory and David Anthony, although I largely agree with these two scholars.

For the sake of easy orientation, I mention only language groups in the section titles, and highlight the archaeological cultures correlated with the linguistic unit discussed by printing their names with *bold face italics* 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. I concentrate on the essential data, which with regard to archaeology means the temporal and areal distribution of a given culture and its genealogical and contact relationships.

2. Formation of the Indo-European language family

The problem of Proto-Indo-European (PIE) homeland: Significant and widely supported contributions for its solution

Theodor Benfey (1809–1881), one of the leading Indo-Europeanists of his time, proposed that the PIE homeland is likely to have been in South Russia (Benfey 1869: 597–600). Otto Schrader (1855–1919), author of the still valuable *Reallexikon der indogermanischen Altertumskunde* (2nd ed., revised by A. Nehring, 1917–29), in his *Sprachvergleichung und Urgeschichte* (3rd ed., Schrader 1907 I: vii & II: 506–529) and in his summary booklet *Die Indogermanen* (3rd ed., Schrader 1919: 192–193) also came to the conclusion that the North Pontic steppes provide the most likely solution to the PIE homeland problem. Schrader noted that this location between Europe and Asia could explain the differences that exist in the agricultural and environmental vocabulary between the IE languages spoken in these two parts of Eurasia. Placing the homeland between the areas of the Uralic and Semitic languages also fits their apparent contact with PIE. One of the leading archaeologist of the first half of the 20th century, V. Gordon Childe (1892–1957), likewise opted for the same solution in his book *The Aryans: A study of Indo-European origins* (1926).

Marija Gimbutas (1921–1994) correlated the PIE language with what she called the “Kurgan culture” of the South Russian steppes, and traced its impact on the archaeological cultures of Europe on a broad scale. Gimbutas’s work was insightful but her extensive and often pioneering syntheses were bound to be somewhat controversial. Her studies have been conservatively revised and carried further by her student J. P. Mallory. In his above-mentioned book *In search of the Indo-Europeans* (1989) and numerous other studies, Mallory has in many ways and in my opinion quite convincingly established that Early PIE was spoken in the Copper Age cultures of the Pontic-Caspian steppes. This conclusion has been strongly defended also by Valentin Dergachev (2007) and David Anthony (2007) in their recent books.

Early Proto-Indo-European

The key Copper Age culture *Srednij Stog II* in the steppe zone between the Dnieper and the Don is dated c. 4700–3400 BCE (cf. Parzinger 2006: 162–165; Rassamakin 2004 I: 172, 180–185, 204–209; Anthony 2007: 240–244; Chernykh & Orlovskaya 2010: 126). It seems to have been formed when people representing the *Khvalynsk culture* (c. 5000–3800 BCE) of the Volga steppes took over the local Late Neolithic *Dnieper-Donets II* culture (cf. Anthony 2007: 244–247). The Khvalynsk cemetery on the forest steppe on the Mid-Volga near Samara is dated c. 5000–4550, but the Khvalynsk culture site of Kara-Chuduk on the Lower Volga has yielded a single date c. 3800 BCE (cf. Rassamakin 2004 I: 173; Anthony 2007: 169–170, 182; Chernykh & Orlovskaya 2010: 121–129).

The Pontic-Caspian steppes count for more than 40% of the wild horse remains in Europe c. 5000 BCE. People of the Late Neolithic and Copper Age cultures of these regions not only hunted and ate the horse (at one site on the Mid-Volga 66% of the 3,602 identified bones were of horses), but also sacrificed it and made bone plaque figurines of the horse (cf. Mallory 1981; 1989: 220–221; Anthony 2007: 189–192). This is an important match with the Early PIE language, which certainly had a word for the horse. Horse is also the only animal to figure prominently in the personal names of several peoples speaking early Indo-European languages (Old Indo-Aryan, Old Iranian, ancient Greek, Gaulish Celtic, Old English), which moreover had deities associated with the horse and horse sacrifices (cf. Mallory 1981; 1989: 119, 135–137; Hänsel & Zimmer ed. 1994; Sadoski 2009). The horse was probably first kept for meat and milk and later for traction, but along with many zoologists and archaeologists I doubt that the steppe pastoralists of the Copper Age were riding domesticated horses. One reason is that pictures of riders first appear two millennia later, while the first wagons were depicted almost immediately after wheeled vehicles were invented, and the rider motif after its first introduction becomes increasingly important, especially in cultures of mounted pastoralists. Secondly, there is a clear shift from chariotry to riding c. 1500 BCE. (Cf. Parpola 2008: 27–29 with further literature; the main advocate of Copper Age riding is Anthony 2007: 193–224; cf. also, e.g., Lichardus & Lichardus-Itten 1998: 103–104.)

The Anatolian branch of Indo-European

The Khvalynsk and Srednij Stog II cultures of the Pontic-Caspian steppes belonged to pastoralists, who were in trading relations with the thriving Carpatho-Balkan agriculturalists. Together they formed the world's first great metallurgical province, where the metal production was in the hands of the agriculturalists. Closest to the steppe were the farmers of the Cucuteni-Tripolye culture (Cucuteni in Romania and Moldavia, Tripolye in Ukraine), hereafter simply *Tripolye culture* (5700–3100 BCE, cf. Chernykh & Orlovskaya 2010: 126), from which the eastern pastoralists received their metal and other prestige goods.

An early phase of the Srednij Stog II culture represented by the sites of Stril'cha Skelya, Chapli, Mariupol', Novodanilovka, and Suvorovo is called the *Skelya culture* (c. 4300–4000 BCE, cf. Parzinger 2006: 162; Anthony 2007: 225–262) by Yuriy Rassamakin (1999; 2004). During the last quarter of the fifth millennium, Skelya pastoralists invaded the Balkans. Widely distributed Skelya type burials with characteristic Skelya grave goods are intrusive in this area. Some 600 sites of the Carpatho-Balkan cultures were abandoned, many of them burnt down, and their voluminous metal production stopped almost completely.

The surviving local cultures of the eastern Balkans were transformed into the *Cernavoda culture* (c. 4000–3200 BCE) with notable steppe elements in the economy, religion and now hierarchical social system. It is likely to have kept the Early PIE language of the invaders.

About a millennium later the Cernavoda culture fused with fresh steppe invaders to form the *Ezero culture* (c. 3300–2700 BCE). The Ezero culture in turn is connected with the *Troy I culture* (c. 3000–2600 BCE) of Anatolia. The most widely accepted date for the intrusion of Indo-European speakers from Europe into Anatolia is about 2700 BCE. Then, in western and southern Anatolia, more than a hundred Early Bronze Age II (c. 2600–2250 BCE) sites were abandoned and all major sites destroyed, while Troy V (c. 2000–1800 BCE) type ceramics spread eastwards along with the megaron type architecture.

(On the Skelya invasion to the Balkans and the Anatolian connections, cf. Gimbutas 1977; Mallory 1989: 28–29, 109, 233–239; Chernykh 1992: 52; Lichardus & Lichardus-Itten 1998; Dergachev 1998; 2002: 94; 2007; Rassamakin 1999: 100–106; Carpelan & Parpola 2001: 64; Parpola 2008: 33–34; Anthony 2007: 225–262.)

This archaeological succession of cultures provides a credible trail from the North Pontic steppes to Anatolia. Indo-Europeanists are agreed that the first branch to separate from PIE is the Anatolian one: it comprizes Hittite, Luvian and Palaic—which have been recorded since the 16th century BCE—and their successors; all these IE languages of Anatolia died out in antiquity (cf., e.g., Meier-Brügger 2002: 24–26, 40–41; Fortson 2004: 154–179).

The Indo-European vehicle terminology of the Anatolian languages is partly different from most of the Late PIE vehicle terms supposed to have come into being when wheeled vehicles were invented. This may be due to their belonging to the very earliest wagon owners to leave the Pontic steppes. Thus Hittite *hurki* ‘wheel’ has a cognate only in Tokharian (A nom. sg. *wärkänt*, B obl. sg. *yerkwantai* ‘wheel’), but as they have different suffixes, both may have evolved independently from the PIE root **H₂werg-* ‘to turn (around)’ (cf. Oettinger 1994: 74; LIV 1998: 259). Hittite *zalti-* ‘chariot’ is considered a loanword from (Hieroglyphic) Luwian *zalal(a)-* ‘wagon, cart’ (cf. Oettinger 1994: 74), which Ivanov (1999: 28–30) derives from the PIE root **k^wel-* ‘to turn (around)’, from which, with or without intensifying reduplication, many Indo-European languages have derived words for ‘wheel’ and ‘wagon’ (cf. Parpola 2008: 4–5). However, Martin Kümmel (pers. comm. 2012) notes, other Anatolianists find it difficult to believe that PIE **k^w* was palatalized into Luwian *z*; the available evidence rather points to the preservation of labiovelars before front vowels (and to later palatalization in Lycian only). Many of the other Anatolian vehicle terms may be loanwords from Mitanni Proto-Indo-Aryan, as horse-drawn chariots were invented by Proto-Indo-Aryan speakers in the Ural steppes and brought by them to the Near East, and the Mitanni-Aryan Kikkuli wrote a manual for training chariot horses for the Hittites (cf. e.g. Hieroglyphic Luwian *wa-za-* ‘to drive’ and Proto-Indo-Aryan **vajhati*; Hittite *tu-u-ri-ia-* ‘harness’ and Old Indo-Aryan *dhur-* ‘that part of the yoke which is placed on the shoulder of the draught-animal’).

Late Proto-Indo-European

Instead of the most widely supported archaeological correlation of Late PIE with the *Yamnaya (Pit Grave) culture* (c. 3300–2500 BCE) (cf. Mallory 1989: 210–215; Anthony 2007: 299–339 & fig. 5.1 on p. 84), I have suggested correlating Late PIE with the *Late Tripolye culture* (Parpola 2008). By Late Tripolye, I mean the phases B2 and C1, c. 4000–3400 BCE; the Tripolye culture disintegrated in the already Post-Tripolye phase C2 c. 3400–2900 BCE. When the Skelya pastoralists invaded the Balkans (cf. above), they also subdued their western neighbours, the Tripolye people, without however destroying their culture. In this Tripolye B1 phase (c. 4300–4000 BCE), a large number of Tripolye settlements became fortified, suggesting that they were being attacked. At the Tripolye B1 site of Drutsy 1, more than a hundred steppe-type flint arrowheads were found around the walls of the three excavated houses (cf. Dergachev 2002: 105–107; Anthony 2007: 230–231).

Drutsy 1 also had “Cucuteni C type” ceramics decorated with cord impressions; it is identical with the Skelya ceramics of the steppe, and differs in every respect to the traditional beautiful Tripolye painted pottery. This intrusive ware appeared at first sporadically in a number of settlements, then with increasing frequency until it became the predominant ceramic in the final phase of the Tripolye culture (cf. Müller-Karpe 1974: I, 349; Mallory 1989: 235–236; Rassamakin 1999: 77–79; Anthony 2007: 231–234, 489; Parpola 2008: 40).

Some of the Tripolye sites first having this steppe type pottery also produced knobbed maces (a few of them representing a horse’s head), which spread from the steppe to the Balkans and the Tripolye area 4300–4000 BCE (cf. Mallory 1989: 234–235; Govedarica & Kaiser 1997; Rassamakin 1999: 79–81; Dergachev 2007: 144; Anthony 2007: 234; Parpola 2008: 38–39). These sceptre-weapons were symbols of power, very probably reflecting the spread of a new type of social organization —strongly hierarchical chieftainship— which was instrumental even in the further spread of the early IE language (cf. Anthony 1997; 2007: 118; Mallory 2002: 34–35). Effective new leadership may explain the invigoration of the Tripolye culture, which expanded towards north and east, and created ever larger towns. There were now also internal strifes between rivaling eastern and western parts of the Tripolye culture.

The most important diagnostic means for the archaeological identification of Late PIE is the vocabulary connected with wheeled vehicles (Figure 1): on the one hand this implies that the speakers of Late PIE knew wheeled vehicles, and on the other hand it dates the disintegration of Late PIE after the invention of wheeled vehicles, the date of which might be deduced from the archaeological record. Nevertheless, it has been much debated where and when the invention actually took place. The old hypothesis of origins in the Uruk culture of Mesopotamia around 3500–3300 BCE has prevailed until recently, but finds of comparable date have been made not only in West Asia but in many places in Europe as well. Josef Maran (2004b) has pointed out that the marshlands of Sumer

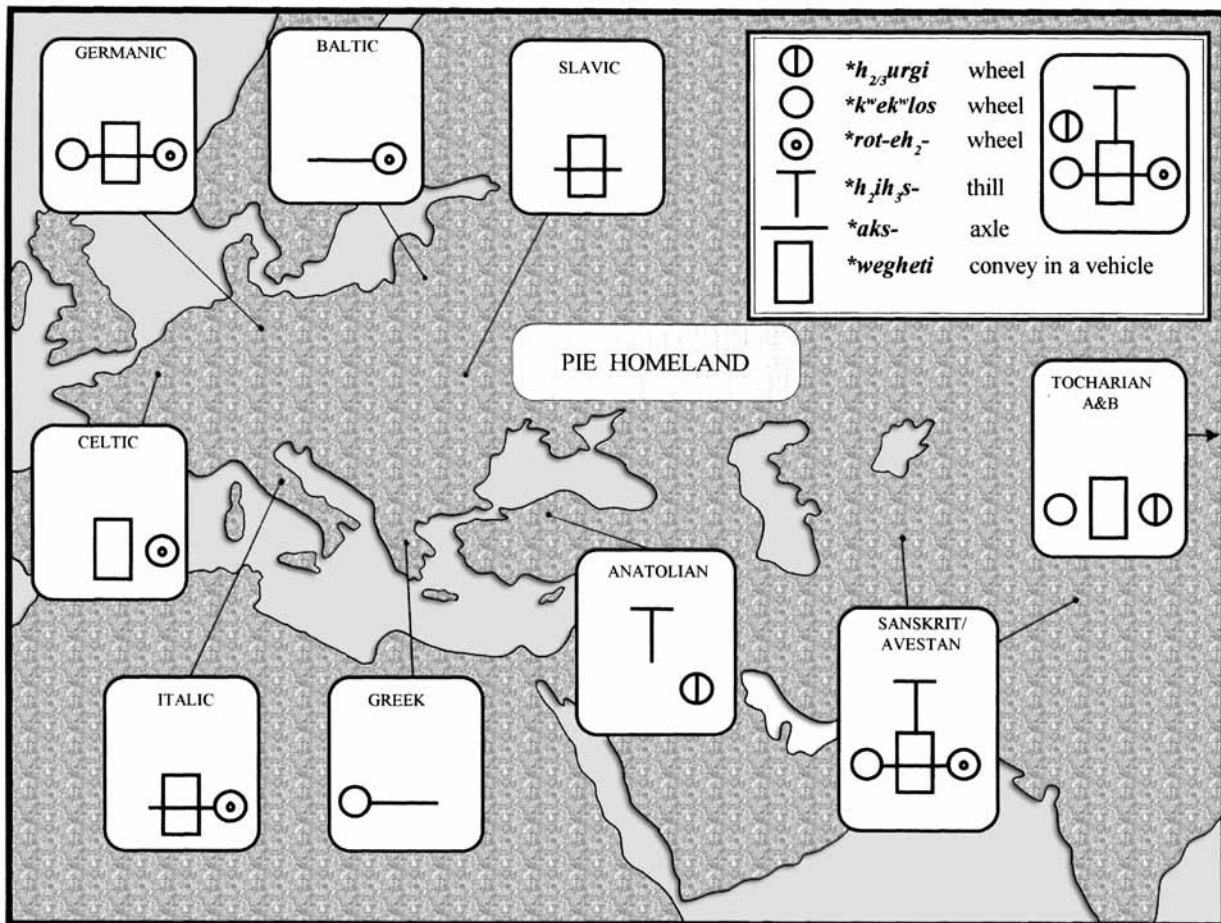


Figure 1. Vocabulary of wheeled vehicles in Indo-European languages. After Anthony 1995: 557, fig. 1. For a detailed study of this topic, see Parpola 2008.

are not a favourable terrain for wheeled vehicles; sledges, which are likely to have preceded wagons, work there much better, and did indeed long prevail in Mesopotamia.

As the most likely place of origin for wheeled vehicles Maran has suggested the Late Tripolye culture, which alone anywhere in the world has evidence (in the form of wheeled drinking cups with ox protomes) of wagons predating 3500 BCE (for drawings of the principal evidence, see Parpola 2008: 12–21). Between 4000 and 3400 BCE, the Late Tripolye culture was the most thriving and populous agricultural community in the Copper Age world, cultivating extremely fertile black soil, and having villages that measured hundreds of hectares and that housed up to 15,000 people. People needed means of transport, and in addition to the wheeled wagon models some fifty sledge models have also been recovered (cf. Balabina 2004). In addition, the local forest steppe offered both large trees for the construction of primitive solid wheels and ground suitable for traffic.

The hypothesis that the wheeled vehicles were invented in the Tripolye culture after it had been taken over by PIE speakers and then largely assimilated linguistically, gives a satisfactory explanation to the puzzling question (cf. Izbitzer 1998 and Anthony 2007: 34) where did the PIE get its vehicle terminology from. As the inventors of this new technology, they invented the terms themselves, and this is borne out by the fact that practically all the twelve different etyma are derived from native PIE verbal roots (for detailed evidence, see Parpola 2008: 4–9). There is a marked contrast with the vehicle terms of peoples who have borrowed the technology: for instance in Finnish they are practically all Indo-European loanwords (cf. Parpola 2008: 9; on ‘wheel’ in Uralic languages at large, Grünthal 2008).

Expansions of Late PIE

While there is fair agreement concerning the Anatolian branch as the first language group to separate from the PIE unity, the same cannot be said of the construction of a family tree for the other branches of the Indo-European language family (cf., e. g., Clackson 2007: 1–26; Blažek 2007). The reason seems to be that the Late PIE language disintegrated explosion-like in all directions: the best ‘family tree’ in my opinion is that proposed by Calvert Watkins (1998: 33) (Figure 2). The Late Tripolye culture situated around 30 degrees longitude and 50 degrees latitude is very nearly in the middle of the “centre of gravity” of the Indo-European languages (Figure 3).

Most importantly, when the Late Tripolye culture actually dissolved in the terminal C2 phase (c. 3400–2900 BCE), it gave way not only to local Post-Tripolye cultures but also created new cultures all around that share basic

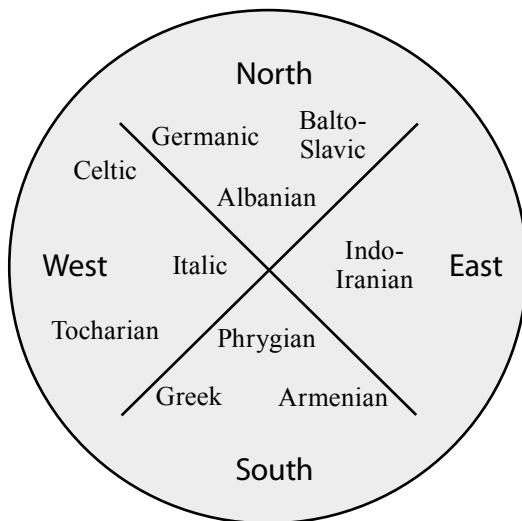


Figure 2. Relations between the main branches of Indo-European according to Calvert Watkins (1998: 33, fig. 2.1).

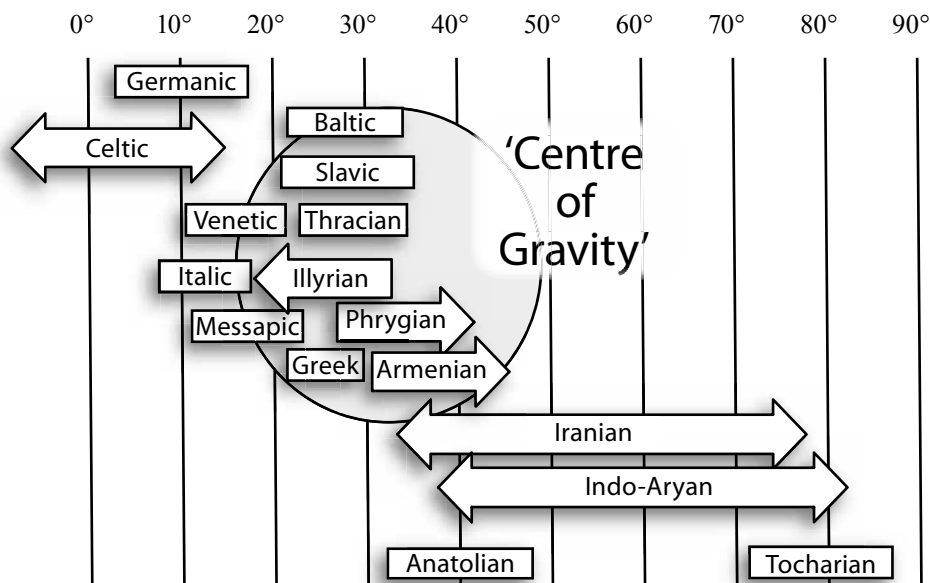


Figure 3. The 'centre of gravity' in the distribution of the Indo-European languages according to J. P. Mallory (1989: 153, fig. 83).

components of Tripolye and steppe origin. And these new cultures spread to those very regions where the various Indo-European languages first make their appearance, or, as in the case of Indo-Iranian, a good way along the route leading to those appearances. It is assumed that climatic change influenced the transformation of the Late Tripolye culture of thriving settled farmers (with significant animal husbandry) into several cultures of more mobile pastoralists. Tens of thousands of people started moving with cattle and ox-drawn wagons into all directions, becoming superstrata of various earlier local cultures and bringing about a language shift (cf. Kohl 2004; 2007: 23–54; Anthony 2007: 346–359; Parpola 2008).

In 1997, Johanna Nichols posed the question: why does Indo-European have so many branches? According to her, “[m]ultiple branching at or near the root of a [family] tree points to abrupt dispersal in a large spread” (Nichols 1997: 371). “Like many profound questions, this one is both shockingly obvious and disturbingly obscure”, observed Andrew Garrett, who found it “hard to see what single event would split one speech community into ten” (Garrett 1999: 146–7). I trust the above sketched scenario provides a satisfactory explanation for such a split. The disintegration of Late PIE was a sudden, explosion-like event, which took the language into all directions and thus prepared the ground for a split into many different branches. The validity of this view is not contradicted — rather the opposite — by Garrett’s insightful and persuasive demonstration that the spreading Late PIE probably remained relatively uniform over wide areas for some time and that the emergence of the various “branches” resulted from later local developments:

“What I am saying is this: there is no clear evidence for a historical – that is to say, in the technical linguistic sense of the term, a genetic – Celtic or Italic or Greek subgroup of Indo-European. These do not correspond to nodes on an Indo-European Stammbaum. On the contrary, sometime in the third or second millennium BCE, the Indo-European dialects of western and southern Europe formed a continuum. This contained the ancestors of Celtic, Italic, and Greek, as well as Venetic and the other ‘minor’ languages of the area, and no doubt other dialects that are now lost. But there is no reason to assume that the ancestors of the later Celtic or Italic languages, or of the Greek dialects, shared any exclusive set of innovations defining them as distinct subgroups of Indo-European. In short, according to the view I am advocating, the formation of a Celtic subgroup of Indo-European, the formation of an Italic subgroup, and even the formation of ‘Greek’ itself may have been secondary Sprachbund phenomena: local responses to areal and cultural connections that could very well have arisen in Greece, on the Italian peninsula, and in western and central Europe.” (Garrett 1999: 152–153; cf. also Garrett 2006).

Northwest Indo-European

The earliest influence of the Late Tripolye culture in northwestern Europe can be seen in the first local farming culture, the ***Funnel Beaker or (Trichterbecher =) TRB culture*** (c. 4000–2500 BCE), which originally hardly spoke an Indo-European language. In the form of drawings on pottery and cart-tracks on the floor of a long earthen barrow, there is evidence that the TRB culture had ox-wagons in both Poland and Schleswig-Holstein around 3500 BCE (cf. Bakker 2004). In Jutland and southern Sweden, the TRB burials changed from Megalithic barrows (c. 3500–3100 BCE) into cairns (c. 3100–2800 BCE) that contain remains of pairs of draught-cattle (cf. Johannsen & Laursen 2010). The TRB culture was then in Poland transformed into the ***Globular Amphora culture*** (c. 3000–2350 BCE), which expanded both westwards and southwards (cf. Mallory 1989: 243–257; Parpola 2008: 45–48).

Starting around 3200 BCE, probably from the Post-Tripolye Middle Dnieper and Sub-Carpathian cultures (cf. Carpelan & Parpola 2001: 65–66; Anthony 2007: 380–382), the ***Corded Ware (or Battle Axe) cultures*** (c. 3100–2300/2000 BCE) spread within a couple of centuries over a vast area, spanning from the Netherlands to the coasts of Finland and to the Upper Volga (cf. Mallory 1989: 243–257; Carpelan & Parpola 2001: 64–68; Cunliffe 2008: 167–169 & 203–205; Anthony 2007: 367–368). Furholt (2003) has pointed out that while the burial mode spread to western Europe and southern by 3000 BCE, the Corded Ware itself followed only about 200 years later — in 3000 BCE it was not found west of Poland. In Finland, the calibrated beginning date is 3200/3000 BCE (cf. Salo 1997: 9, based on datings by Högne Jungner). In the Upper Volga region, the ***Fat’yanovo culture*** (c. 2800–1900 BCE) (cf. Krajinov 1987b) belongs visibly to the Bronze Age from around 2300 BCE when it started having a metal-working ***Balanovo*** extension as far east as between the mouths of the Oka and Kama

rivers (cf. Chernykh 1992: 133–139; Bader & Khalikov 1987). Presumably the language of the Corded Ware people (who were mobile pastoralists) was Proto-Northwest-Indo-European, the common ancestor of the later Celtic, Italic, Germanic and Balto-Slavic branches, which was still quite close to Late PIE (cf. Oettinger 1997; 1999; 2003; in press).

On the basis of their rapid spread to the areas where various branches of Indo-European were spoken in historical times, the Corded Ware cultures have long been connected with the early expansion of IE languages, but it has been difficult to reconcile this with the assumption that Late PIE was spoken in the Yamnaya cultures (cf. Mallory 1989: 243–257). This obstacle largely vanishes with the correlation of Late PIE with the Late Tripolye culture.

The TRB culture, the Globular Amphora culture and the Corded Ware cultures all had carefully manufactured drinking vessels in their elite graves, which also contained wagons and stone battle axes. These are all symbols of power witnessing a hierarchical social order that apparently spread via the Late Tripolye culture from the Skelya pastoralists. In the *Baden culture* (c. 3500–3000 BCE) of Central Europe, several drinking cups had the shape of a wheeled wagon, which, as suggested by Maran (2004a), developed from earlier Tripolye models. It is a fair assumption that the European Early Bronze Age elites shared privileged rituals of drinking alcohol (cf. Sherratt 1987; 1996; Parpola 2008: 45–48).

Celtic branch

From about 3700 BCE, starting from the Netherlands, in a western zone that continued via Jutland to southern Sweden, the TRB people buried their dead in megalithic collective tombs. The TRB people adopted this burial type as well as navigation from the earlier Neolithic culture of the Atlantic coasts that built megalithic graves and had a maritime network that span from the British Isles to the Iberian peninsula, France and the Netherlands (cf. Cunliffe 2008: 159–167).

The immigrant Corded Ware people who came to the Netherlands by 2800 BCE, adopted and continued the local maritime traditions and therewith spread overseas. Theirs became yet another drinking-vessel complex of elite graves, that of the Bell Beakers. The *Bell Beaker culture* (c. 2800–1400 BCE), along with characteristic weapons, is widely distributed in westernmost Europe including the British Isles, France and the Iberian peninsula (cf. Cunliffe 2008: 203–213). Uniformity in various kinds of elite feasting gear (cf. Cunliffe 2008: 255 with fig. 8.15), among other things, connects these same regions during the Late Bronze Age c. 1300–800 BCE. These Bronze Age Atlantic coastal cultures, connected with the Corded Ware tradition of the Netherlands, perfectly match the Atlantic distribution of the emerging Celtic branch of Indo-European (cf. Cunliffe 2008: 254–258). Shortly before 500 BCE, Celtic speaking elites expanding eastwards from the west coast took into their control the Central European *Hallstatt culture* (c. 800–500 BCE) and transformed it into the warring *La Tène culture* (c. 500–0 BCE), with which Celtic raiders crossed Europe from west to east, eventually reaching as far as Anatolia and the Pontic steppes (cf.

Cunliffe 2008: 354–362). This scenario offered by Cunliffe explains the insular and Iberian distribution of Celtic better than the generally maintained derivation of the Celtic speakers from the Hallstatt culture (for which see Mallory 1989: 105–107).

Italic branch

The *Hallstatt culture* (c. 800–500 BCE), supposedly taken over by Celtic speakers, is descended from the extensive Central European *Urnfield cultures* (c. 1300–700 BCE), which via the *Tumulus culture* (c. 1600–1200 BCE) and the *Únětice (Aunjetitz) culture* (c. 2300–1600 BCE) go back to the *Corded Ware* and *Globular Amphora* cultures (cf. Gimbutas 1965: 245–388). The Urnfield complex included the *Villanovan culture* (c. 1100–500 BCE) of Italy. On the basis of this expansion to Italy, part of the Urnfield cultures can be assumed to have been linguistically related to the Italic branch of Indo-European. Otherwise the language(s) spoken in the Urnfield cultures seem to have vanished in the expansions of the Celtic, Germanic, Balto-Slavic and Iranian branches. This agrees with the isoglosses Italic has with Illyrian, Celtic and Germanic branches (cf. Porzig 1954: 97–134).

There are other intrusive Bronze Age cultures in Italy that have been considered as possible introducers of the Italic branch of Indo-European, but their areas do not give as good a match as the Villanovan culture: these are the *Remedello culture* (c. 3300–2500 BCE) in the Po Valley and the *Rinaldone culture* (c. 3500–2500) in Tuscany (cf. Mallory 1989: 91–94; Mallory & Adams ed. 1997: 314–319).

Illyrian and other little known branches

The poorly attested Illyrian was in antiquity an important Indo-European language in the Balkans, and it is widely believed to survive in the Albanian language (cf. Mallory 1989: 73–76; Fortson 2004: 405–406 and 390). Place names have given rise to speculations that Illyrian was once spoken wider in eastern central Europe (cf. Vasmer 1971: II, 535–578). At the site of Maliq in Albania, there is a clear cultural change from the locally rooted Chalcolithic period IIB to the Early Bronze Age period IIIa, when new cruder types of ceramics appear, followed by likewise intrusive tumulus burials. These developments are undoubtedly connected with the two invasions of steppe pastoralists into the Balkans discussed earlier that brought Early and Late PIE to these parts. Both Albanian and Yugoslav archaeologists are agreed that there is fairly direct cultural succession from the Early Bronze Age to the Iron Age and historical times in the western Balkans, though the area has a complicated history with profound influences received from many directions (cf. Mallory 1989: 75–76).

Thracian, whose speakers in the eastern Balkans once were among the most populous on earth (cf. Herodotus 5,3), and Dacian spoken in present-day Romania, have left so few testimonia that it is barely possible to recognize their

Indo-European affinity. These and other less known branches of Indo-European have vanished in the linguistic assimilations following the expansions of other linguistic groups. (Cf. Mallory 1989: 72–73; Fortson 2004: 400–411).

Germanic branch

The *Nordic Bronze Age culture* (c. 1750–600 BCE) in the Jutland peninsula up to Schleswig-Holstein and southern Scandinavia goes back to the local Corded Ware culture, which from about 2800 BCE replaced the cairns of the TRB culture in these parts. This is the generally assumed homeland of the Germanic branch of Indo-European (cf. Ramat 1998). In the Early Iron Age, the Nordic Bronze Age culture expanded southwards, to form the *Jastorf culture* (c. 600–0 BCE) of northern Germany between the Rhine and the Oder. This is close to the location of the Germanic tribes described by Tacitus in his *Germania* in 98 CE (cf. Mallory 1989: 84–87; Wikipedia s. v. Jastorf culture). The Nordic Bronze Age culture exerted a strong influence on coasts of Finland and on Estonia, especially the western island of Saaremaa c. 1500–500 BCE (cf. Salo 1997: 14–17; Kriiska & Tvauri 2007: 96–116); these areas may have been bilingual at this time, with a Proto-Germanic speaking elite. The East Germanic Goths originally came from Sweden and moved from the East Baltic to the Black Sea in the late second century CE. The Germanic loanwords have had a very important role in the study of the historical development of the Uralic languages of the Baltic region and Fennoscandia (cf. Posti 1953; Hofstra 1985; Koivulehto 1999a; 1999b; Aikio 2006; Kallio in this book).

Slavic branch

The expansion of the Slavic speakers from their late (Iron Age) homeland between the Upper Vistula, the Upper Dniester and the Upper Dnieper to eastern central Europe and to the Balkans took place as late as c. 400–700 CE (cf. Kiparsky 1963: 13–15; Gimbutas 1971: 98–132 with the map in fig. 43 p. 107; Andersen 1998: 415–423 with maps 14.1–3). The Proto-Slavic unity disintegrated with the 375 CE victory of the Huns over the Goths, who are supposed to have ruled the hybrid *Chernyakovo culture* (c. 200–400 CE). The majority of the Chernyakovo population descended from the “Scythian farmers”, who according to Herodotus (4,20) were subservient to the Iranian-speaking nomadic “Royal Scythians”; the “Scythian farmers” have been convincingly identified with Proto-Slavic speakers (cf. Pekkanen 1968 for a penetrating study of the classical sources; in addition comes the testimony of Slavic place names, on which see Vasmer 1971 and Trubachev 1985; cf. also Gimbutas 1971: 22; Mallory 1989: 80–81; Andersen 1998: 417). The habitats of the “Scythian farmers” are archaeologically equated with the *Chernoles culture* (c. 750–200 BCE) (Figure 4 no. 4). The Chernoles culture goes back to the *Komarov culture* (c. 1800–1200 BCE) of much the same regions (cf. Artemenko 1987b), and the Komarov culture has developed from the *North/Sub-Carpathian Corded Ware culture* (c. 3200–1800 BC) (cf. Artemenko

1987a; Anthony 2007: 377–380), which succeeded the Late Tripolye culture in this area (cf. Gimbutas 1971: 27–57, who speaks of *North Carpathian tumulus culture* instead of *Middle Dnieper Corded Ware*; and Mallory 1989: 76–84).

Baltic branch

Ancient Baltic hydronyms cover an area that includes the Upper Dnieper area and extends approximately from Kiev and the Dvina to Moscow (cf. Toporov & Trubachev 1962; Tret'yakov 1966: 286–300; Trubachev 1985; Mallory 1989: 81–84; Schmalstieg 1998: 456). It suggests the Baltic affinity of the *Zarubinets and Yukhnovo cultures* (c. 200 BCE – 100 CE) and the preceding *Milograd and Plain Pottery cultures* (c. 600–200 BCE), which have been considered Proto-Baltic along with such related cultures as those distinguished by the *'Face-Urn' & 'Bell-Grave'* (c. 600–300 BCE) in Pomerania, and *'Brushed Pottery'* and others in Latvia and Lithuania (c. 600–400 BCE) (cf. Gimbutas 1963: 75–108).

Sergej Kuz'minykh (2006: 82–83) sees Proto-Baltic speakers in cultures of “hatched ceramics” (*shtrikhovannaya keramika*) of the final phase of Early Iron Age (c. 400/300 BCE to 500/600 CE) between the Baltic Sea and Moscow, including the Upper Oka, Dnieper-Dvina, Yukhnovo and Milograd cultures. Kuz'minykh's map 3 includes also Estonia among the “hatched ceramic” cultures; this Ilmandu style ceramic of Estonia, which is similar to the Morby Ware of Finland, is correlated by me below with Proto-Baltic Finnic. The D'yakovo culture, which continues the Netted Ware cultures that Kuz'minykh connects with the western Finno-Ugric speakers, may at this stage in his opinion already be part of the Baltic world: “The ‘textile’ heritage was kept only on the eastern and northeastern periphery of this culture, in the Yaroslavl and Kostroma Volga regions, and to the east of Volga.”

The above Iron Age cultures go back to the *Baltic Late Bronze Age culture* and Middle Bronze Age *Trzciniec-Sosnitsa complex* (c. 1800–1200 BCE), and ultimately the Baltic and the Upper/Middle Dnieper Corded Ware complexes. The Balto-Slavic unity seems to have started to differentiate in the Middle Bronze Age: “The Trzciniec and Komarov complexes were indeed related, but each possessed individual ceramic styles and types of metalwork, and their burial rites were somewhat different. The Trzciniec people inhabited flatlands and forested areas while the Komarov people lived in the plateau area. In both regions parallel lines of development can be observed throughout the Bronze and Early Iron Ages.” (Gimbutas 1971: 35–36).

It seems likely to me that also Estonia and the coasts of Finland had a mainly Proto-Baltic speaking population until the Early Iron Age, directly descended from the people of the local Corded Ware who spoke Northwest Indo-European. I suppose that this substratum was the source of the large number of Baltic loanwords connected especially with agriculture and animal husbandry in the Finnic languages (on these, cf. Suhonen 1988; Junttila 2009, and in this book). This will be discussed in more detail below while dealing with the Uralic languages (cf. also Kallio 2007: 244–246; 2008).

Southeast Indo-European

In its final C phase, the Tripolye culture expanded to the Pontic steppe and eventually (in C2 phase) differentiated into a number of regional *Post-Tripolye cultures* (Horodistea-Foltesti, Kasperovtsy, Usatovo, Gorodsk, Sofievka) (c. 3400–2900 BCE) (cf. Anthony 2007: 346–360). In the steppe these fused with the various *Late Srednij Stog II cultures* (Stogovska, Kvitanska, Dereivka, Nizhne-Mikhailovka, c. 4000–3400 BCE) (cf. Parzinger 2006: 163–165). This resulted in the formation of the *Yamnaya (Pit Grave) cultural complex* (c. 3200–2500 BCE) (cf. Parzinger 2006: 241; Anthony 2007: 300–339, 361–368), which eventually extended from the Danube to the Urals (on the Yamnaya cultures and their formation see especially Rassamakin 1999: 113–124 and Anthony 2007: 311–321). A large number of wagon graves belonging to the Yamnaya horizon have been found, attesting to a pastoral economy based on mobility (cf. Anthony 2007: 312–322). Penetrating deep into the Danube Valley and the Balkans in the west (cf. Mallory 1989: 238–243; Anthony 2007: 361–367), it formed the “Circumpontic interaction sphere”, which can be correlated with the later emergence in these regions of various branches of the Indo-European language family. The Yamnaya cultures can be said to have spoken variants of “Southeast Indo-European”, which was still close to Late PIE, but undoubtedly soon split into a number of local dialects.

The different substrata must have contributed to a diversification, especially in the west with fewer substrata of Indo-European origin. The Yamnaya cultures of the Pontic-Caspian steppes probably remained more conservative and unified, since the substratum languages here (those of Late Srednij Stog II cultures) can be expected to have been slightly later forms of Early PIE (the assumed language of Early Srednij Stog II). The last-mentioned substrata may have had an archaizing effect (leaving traces of laryngeals which were probably lost in the assumed Late PIE of the Tripolye area).

Greek and Armenian branches

While the ancestors of the later Indo-Iranian branch are likely to have inhabited the eastern half of the Yamnaya cultures, more or less the original PIE homeland, it seems likely that the ancestors of the later Armenian and Greek branches stayed next to them on the western side, in the Post-Tripolye C2 *Usatovo culture* (c. 3300–2800 BCE) and in its Yamnaya continuation (c. 2800–2400 BCE) in the steppes between the Lower Dniester and Prut Rivers (on the Usatovo culture, which had trade links with the Balkans and the Aegean, cf. Mallory 1989: 237–238 and especially Anthony 2007: 346–360, 363). Anthony (2007: 360 and 2008) links the Usatovo culture with the origins of the Germanic branch. Yet Anthony (2007: 369) too observes that “Pre-Greek ... shared many traits with pre-Indo-Iranian. This linguistic evidence suggests that Pre-Greek should have been spoken on the eastern border of southeastern Europe...”

The Indo-European dialects later becoming Greek, Armenian and Indo-Iranian seem to have formed a linguistic area during a considerable time, for these branches share innovations in word derivation and grammatical markers (such as the augment), as well as poetic formulae (cf. Porzig 1954: 155–163; Fortson 2004: 181). The change of PIE syllabic nasals into **a* was long considered to be an isogloss uniting Greek and Indo-Iranian. It is true that in Attic and most other dialects of Greek the syllabic nasals have become *a*, but in Mycenaean Greek, as in the later Arcadian dialect of Greek, they have normally become *o* (cf. Schmitt 1977: 86 & 115); in Armenian, they have become *am* and *an* (cf. Schmitt 1981: 52–53).

The Greek speakers are supposed to have come to Greece in two or three waves. The most widely suggested conjunction for the coming of the first wave is the shift from Early Helladic II to *Early Helladic III* around 2300 BCE, when EH II sites in Corinthia and the Argolid are destroyed and abandoned, and new types of architecture (apsidal houses), burials (tumuli), weapons (perforated stone hammer axes) and pottery (Minyan Ware) are introduced (cf. Mallory 1989: 70–71; for a detailed and critical analysis of the various proposals and the evidence on which they are based, see Forsén 1992). David Anthony's candidate for Pre-Greek is the early western Catacomb culture, but he notes that it cannot be shown to have migrated westwards towards Greece. The golden death masks of the kings buried in the shaft graves of Mycenae is quite likely to have its origin in “the custom of making masks for the dead ... common on the Ingul River during the late Catacomb culture” (Anthony 2007: 369; in the Catacomb culture, the death masks were made of clay, cf. Shishlina 1989).

The horse-drawn chariot was developed in the Sintashta culture in the South Ural steppes at the end of the third millennium BCE, and it spread quickly east and west. Cheek pieces of the steppe style are known from Mycenae, too. The horse chariot, swords and status burials under a barrow mound were probably introduced via Albania by a small body of intruding warriors, who gave rise to the sudden emergence of *Mycenaean chiefdoms*, which flourished during the Late Helladic period, c. 1650–1100 BCE (Cf. Mallory 1989: 69–70; Usachuk ed. 2004; Bochkarev & al. 2010).

The last major wave is associated with the collapse of the Mycenaean civilization around 1300 BCE. The general unrest of these times, which pushed from the Balkans the Dorians to Greece and the Armenians to Anatolia, was undoubtedly connected with the large-scale adoption of riding, first in the Proto-Iranian speaking *roller pottery (valikovaya keramika) cultures* (Figure 4), which expanded towards the west, east and north from the Pontic-Caspian steppes around 1450 BCE. The Dorians seem to have introduced riding into Greece along with their cult of the divine horsemen Kastor and Poludeukes, who had their human counterparts in the dual kings of Sparta. These Dorian divinities correspond to the Indo-Aryan *Aśvins* alias *Nāsatyas*, personifications of the two-man team of the horse-drawn chariot (cf. Parpola 2005a: 6–12.). Igor D'yakonov connected Proto-Armenians with the people called Muski whom the Assyrians in 1165

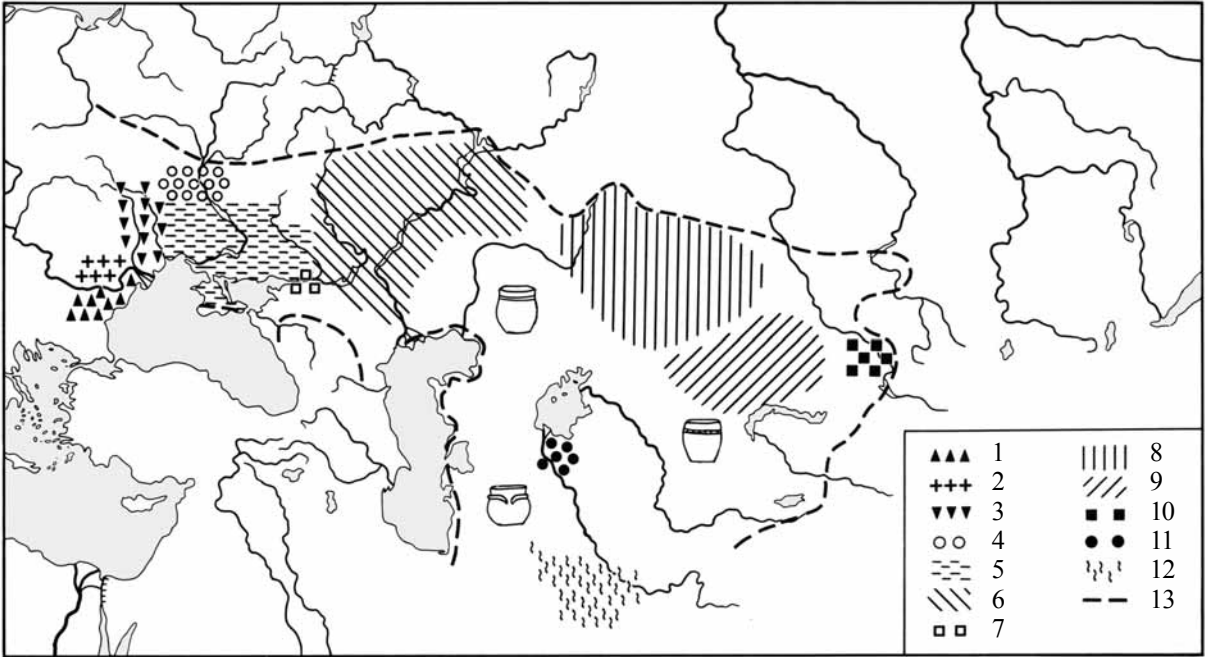


Figure 4. Distribution of the 'roller pottery' (*valikovaya keramika*) cultures. Individual cultures or types of sites: (1) Pshenichevo-Babadag; (2) Coslogeni; (3) Noua and Moldavian 'Thracian Hallstatt'; (4) Belogradovka and Chernoles; (5) Sabatinovka and Belozerka; (6) 'Srubnaya-Khvalynsk' — basins of the Don, Volga and eastern Ural region; (7) Kobyakovo; (8) Sargary culture or Sargary-Alekseevka-Zamaraevo type; (9) settlements of the Beghazy-Dandybai type; (10) sites of the Trushnikovo type; (11) Amirabad; (12) Yaz I—Tillya-tepe-type sites; (13) inferred borders of the 'rolled pottery' community. (After Chernykh 1992: 236, fig. 79.)

BCE said to have an army of 20,000 men on the Upper Euphrates. At this time many Anatolian sites suffered destructions, and *Muski* resembles the Georgian name for the Armenians, (*Sa*)mekhi, as well as the place names *Mysia* in Asia Minor and *Moesia* in the Balkans. (Cf. Mallory 1989: 34–35.)

Tokharian branch

The spearhead batch of the Yamnaya-related eastward movement reached as far as southern Siberia and Mongolia, founding there (chiefly between the Minusinsk Basin of the Yenisei River and the Altai mountains) the *Afanas'ev* culture, dated c. 3100–2500 BCE (cf. Parzinger 2006: 191; Anthony 2007: 314), while samples taken from human bone have yielded dates between c. 2750–2450 BCE (cf. Svyatko et al. 2009: 247). This culture is very similar to the early Yamnaya cultures in many respects: especially the supine position of the body with legs flexed (typical even of the Khvalynsk and Srednij Stog cultures), the use of ochre, pointed based vessel, copper knife and awl. The main reason why the connection has been questioned is those about 1500 km that separate Afanas'ev

from the easternmost Yamnaya groups. However, with the help of ox-wagons it would have been possible to cover the distance in a couple of years when the grass steppe was still uninhabited. The roof covering one Afanas'ev culture grave at the recently excavated site of Khurgak-Govi in Mongolia, radiocarbon-dated to c. 2900–2500 BCE, is interpreted as a wagon chassis (Kovalev n.d.; Mallory n.d.). Besides, some related intermediate sites such as Karagash near Karaganda (cf. Evdokimov & Loman 1989) have been found.

The Tokharian languages spoken in the first millennium CE in eastern Turkestan (Xinjiang) have been supposed to descend from the language of the Afanas'ev culture (cf. Mallory 1989: 223–227; Mallory & Mair 2000: 121–123, 270–318; Anthony 2007: 307–311). Tokharian has retained many very archaic features of Proto-Indo-European, and is widely considered to be the next oldest branch after Anatolian. It has been placed in the western quadrant in Calvert Watkins's diagram of the dialectal affinities (Figure 2), undoubtedly because Celtic, as the spearhead of the western periphery, also separated early from the Late PIE unity. Tokharian has not participated in the satemization that affected among others the Indo-Iranian languages before they spread widely to Kazakhstan and Siberia around 2000 BCE, so Tokharian must have come to these parts earlier.

Mallory (in press) now finds serious reasons to doubt the Afanas'ev ancestry of the Tokharian languages: for one thing, Tokharian has preserved PIE agricultural vocabulary, but the Afanas'ev people did not practise agriculture. The Afanas'ev language, therefore, was probably Para-Tokharian. The fourth phase (c. 2500–2000 BCE) at *Sarazm* in the Zeravshan Valley of Tajikistan, has notable Afanas'ev-like intrusive elements coming from the northern steppes, but there is no evidence of its connection with Xinjiang, although it is situated on one of the main gates to Xinjiang. (On Sarazm IV, cf. Parzinger 2006: 234–5, 329–332; Isakov 1993; Lyonnet 1996; Avanesova & Dzhurakulova 2008).

Indo-Iranian (Aryan) branch

The Indo-Iranian or Aryan branch of Indo-European seems to have evolved in the steppe and forest steppe cultures that succeeded the Yamnaya culture (3200–2500 BCE) east of the Dniester River. This conclusion is based on the fact that the successive cultures descend from each other being also fairly similar pastoralist cultures from the Early Bronze Age to the Early Iron Age, while both the earliest traces (in loanwords in Uralic languages) and in historical records (of Scythians) point to Indo-Iranian as having been spoken in this vast area.

After the collapse of the Carpatho-Balkan Metallurgical Province around 4000 BCE, the Caucasus became the source of an important new Circum-Pontic Metallurgical Province (CPM). Skelya people of the steppe had expanded to the northern Caucasus, and this, together with influences coming from the northwards expanding *Uruk culture* of Mesopotamia via the south Caucasian *Kuro-Araxes culture*, led to the formation of the splendid *Majkop culture* that flourished in the Kuban River valley c. 3700–3100 BCE (cf. Chernykh 1992:

54–124; Anthony 2007: 282–299). The Majkop culture including its late Novosvobodnaya-Klady phase exerted great influence upon the Yamnaya culture of the Pontic-Caspian steppes, which were transformed into the extensive *Catacomb Grave cultural complex* (c. 2500–1950 BCE) (cf. Kaiser 2003; Chernykh 1992: 124–132; for the dating cf. Parzinger 2006: 350), which apparently formed the basis of the “Iranian” branch of Indo-Iranian. “Iranian” and “Indo-Aryan”, of course, are anachronistic labels when applied to the predecessors of these language groups spoken in Eurasian steppes and forest-steppes. The terms simply reflect the fact that languages belonging of these two chief branches of Aryan languages are nowadays spoken mainly in Iran and India respectively.

“Indo-Aryan” subbranch

A dialectal differentiation eventually resulting in the formation the two subbranches of Indo-Iranian seems to have started around 2500 BCE. The “Indo-Aryan” branch seems to have its origin in the *Late Yamnaya culture* of the Upper Don and the *Late Yamnaya / Poltavka culture* of the Volga-Urals, which are synchronous with Early Catacomb Graves, c. 2500–2100 BCE (cf. Chernykh 1992: 132–133; Parzinger 2006: 241). The *Abashevo culture* (c. 2200–1850 BCE) (Figure 5), which extended along the border of the forest steppe and the forest zone from the Upper Don to the Upper Tobol river, had its origin in these eastern Late Yamnaya cultures. Its eastward expansion was motivated by the sandstone deposits with pure copper, for which the Abashevo people on the Lower Kama and Belaya rivers fought with the Balanovo people. While the Abashevo burials with their kurgans are similar to those of the Poltavka culture, the early Abashevo ceramics resemble the Fat’yanovo-Balanovo Corded Ware, which had been in these parts earlier along with the *Volosovo* and *Garino-Bor cultures*, candidates to archaeological correlates for Late Proto-Uralic. (On the Abashevo culture, cf. Pryakhin & Khalikov 1987; Chernykh 1992: 194–204; Carpelan & Parpola 2001: 93–95; Parzinger 2006: 354; Anthony 2007: 382–385; Koryakova & Epimakhov 2007: 57–66.) The *Sejma-Turbino transcultural phenomenon* (c. 2100/1900–1600 BCE), which seems to have its origin in the Abashevo culture, will be discussed below in connection with the Uralic languages.

Around the 22nd century BCE, part of the Abashevo people moved southwards to take possession of the rich metal ores and pastures until then occupied by the Poltavka culture. This resulted in the emergence of the *Potapovka culture* of the Mid-Volga (c. 2100–1700) and of the powerful *Sintashta culture* (c. 2100–1700 BCE) in the southeast Urals engaged in metallurgy and stock-breeding. The Sintashta culture developed the horse-drawn chariot, which is first known from its elite graves. (Cf. Gening & al. 1992; Parzinger 2006: 246–262; Anthony 2007: 385–411; Koryakova & Epimakhov 2007: 66–81.) The “daughter branch” of Sintashta, the *Petrovka culture* (c. 2000–1700 BCE), expanded eastwards into the Tobol-Ishim interfluvium of northern Kazakhstan (cf. Parzinger 2006: 318–323). This “Novyj Kumak horizon” (= Sintashta & Petrovka) gave rise to the extensive *Andronovo cultural community* (a basic monograph on the

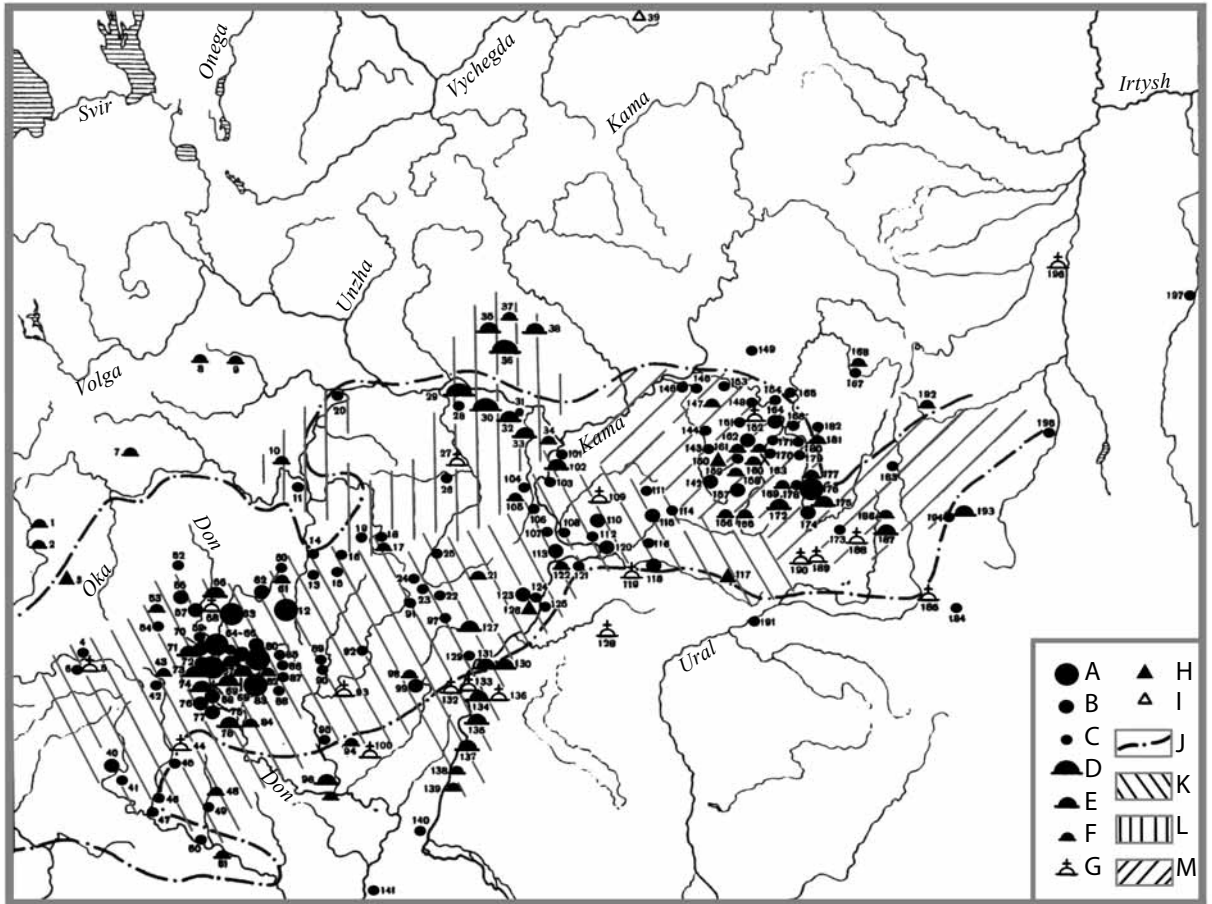


Figure 5. Sites and area of the Abashevo cultural-historical community. Explanation of the symbols: (A) a cluster of 6 to 10 habitation sites with Abashevo ceramics; (B) a cluster of 2 to 5 Abashevo sites; (C) a single Abashevo site; (D) a cluster of 6 to 10 cemeteries with kurgan burials; (E) a cluster of 2 to 5 cemeteries with kurgan burials; (F) a single cemetery with kurgan burials; (G) isolated kurgan burials and cemeteries with a few kurgans or burials of the Abashevo type; (H) cemetery without kurgan burials; with separate Abashevo barrows or burials; (I) an isolated non-kurgan burial; (J) the present border of the forest-steppe; (K) area of the Don-Volga variant of the Abashevo culture; (L) area of the Mid-Volga variant of the Abashevo culture; (M) area of the Urals variant of the Abashevo culture. (After Carpelan & Parpola 2001: 94 fig 18, copied from Pryakhin & Khalikov 1987: 126–127, map 23, where names of the 197 numbered sites are given).

Andronovo cultures is Kuz'mina 2007). The Andronovo community is divided into two main branches: the earlier *Alakul' Andronovo* (c. 2000–1700) mainly in the whole steppe and forest-steppe of the Trans-Urals and northern, western and central Kazakhstan and Chorasmia (cf. Parzinger 2006: 257–261; 323–325; 329; Koryakova & Epimakhov 2007: 126–138; 146–150; Tkachev 2007 considers Petrovka to be the early phase of Alakul' Andronovo), and the *Fëdorovo Andronovo* (c. 1850–1450 BCE) that covered practically the whole of Turkmenistan and Kazakhstan; in the north, it is connected especially with the forest steppe, from the Trans-Urals in the west to eastern Kazakhstan and the Upper Yenisei

(cf. Koryakova & Epimakhov 2007: 138–151). The symbiosis of Fëdorovo Andronovans with the probably Proto-East-Uralic speaking people the *Cherkaskul' culture* (cf. Figure 10) will be discussed below.

In the oases of southern Turkmenistan, Andronovo campsites (cf. Gubaev & al. eds. 1998; Salvatori & Tosi eds. 2008) surround the fortified settlements of the semi-urban, agriculturally based *Bactria and Margiana Archaeological Complex (BMAC)*, also called *the Oxus Civilization* (c. 2200–1450 BCE) (cf. Sarianidi 2002; 2007; Sarianidi & al. 2008; Anthony 2007: 421–435; Parzinger 2006: 432; Francfort 2005). The BMAC culture had a local and Near Eastern origin, but its rule seems to have been taken over early on by Proto-Indo-Aryan speaking steppe pastoralists. A BMAC elite grave at Zardcha Khalifa on the Zeravshan River in Tajikistan had a horse-drawn chariot with Sintashta-type bits and bone cheek-pieces, but typically BMAC ceramics (cf. Bobomulloev 1997).

The BMAC culture expanded to the Gorgan area of northern Iran, where a horse-drawn chariot is depicted on a cylinder seal from Tepe Hissar. In the wake of the tin trade between the BMAC and Anatolia, the horse-drawn chariot came to the Near East in the 20th century BCE. In 1500–1300 BCE, the powerful *Mitanni kingdom* of Syria was ruled by nobles with Proto-Indo-Aryan names associated with horses and chariot warfare (cf. Mayrhofer 1974: 11–34 and Parpola 2002: 74–78).

The BMAC expansions to the borderlands of South Asia include the *Gandhara Grave culture* (c. 1600–900 BCE) around the Swat Valley, the first local culture to have the domesticated horse (cf. Parpola 2005b). The horse and chariot have an important place in the Rigvedic hymns, which constitute the oldest literary monument of the Indo-Aryan languages, composed c. 1200–1000 BCE in the northern Indus Valley. (More on the pre- and early history of Indo-Aryan, see Parpola 2012b.)

“Iranian” (or “Irano-Aryan”) subbranch

The “Iranian” branch apparently had its origin in the above mentioned *Catacomb Grave culture* (c. 2500–1950 BCE), which west of the Don was transformed into the *culture with multi-roller ceramics (kul'tura mnogovalikovej keramiki = KMK)*, also called the *Babino III culture* (c. 2100–1850 BCE) (Cf. Parzinger 2006: 352; Anthony 2007: 437). The *Srubnaya alias Timber Grave culture* (c. 1850–1450 BCE) succeeded not only the KMK culture but also the Abashevo culture over its entire area, and expanded also to the southern Urals where it coexisted with the contemporary Andronovo culture. (Cf. Chernykh 1992: 204–210; Parzinger 2006: 439; Anthony 2007: 435–441). The *Pozdnyakovo culture* (c. 1850–1450 BCE) of the Volga-Oka interfluvium represents a Srubnaya expansion into the forest zone of central Russia (cf. Bader & Popova 1987).

In the Late Bronze Age (1450–800 BCE), the Srubnaya culture was followed by *cultures distinguished by pottery with roller application (valikovaya keramika)* (Figure 4). In the North Pontic steppes, the former KMK area, these comprised the *Sabatinovka* and *Belozërka cultures* (Figure 4 no. 5), in the Upper Don and the Lower and Mid-Volga the *Late Srubnaya culture* (Figure

4 no. 6). Roller ceramic cultures enlarged the earlier Srubnaya area westwards, northwards (to the Kama River basin) and eastwards. In the east, the roller pottery cultures came to cover the whole of Kazakhstan and Turkmenistan (previously occupied by the Andronovo cultures). In the steppe and forest steppe of northern Kazakhstan between the Tobol and Ishim rivers the roller pottery tradition is represented by the *Alekseevka* alias *Sargary culture* (c. 1500–900 BCE) (Figure 4 no. 8) (cf. Parzinger 2006: 444–448, 486–489; Koryakova & Epimakhov 2007: 162–170).

In southern Central Asia, the *valikovaya* tradition comprises the *Yaz I-related cultures* (c. 1450–1000 BCE) (Figure 4 no. 12), which replaced the *BMAC*, but continued many of its traditions, among them fortifications, as evidenced at Tillya Tepe. It is Yaz I forts that seem to be meant in the Rigvedic references to the forts of the inimical *Dāsas* and *Dasyus* encountered by the Indo-Aryan speakers in the Indo-Iranian borderlands. The tribal name *Daha* in Old Persian and Greek sources refers to Saka tribes of southern Central Asia, and appear to go back to the word *daha* < **dasa* 'man' in the Saka languages. No burials have been found in southern Central Asia between c. 1500 and 500 BCE; this has suggested that the Yaz I-related cultures there had adopted the custom of exposing their dead to vultures and other carrion animals, a practice current in Zoroastrianism, whose first texts, preserved in the *Avesta* — the oldest in any Iranian language — are supposed to have been composed in these very parts around the end of the second millennium BCE. That the Avestan language more or less represents "Old Saka" is suggested also by the fact that the Saka words for 'god' derive from *yazata*, the principal Avestan word for 'god', while the other Iranian languages mostly employ words related to Old Persian *baga*. The power and rapid spread of the roller pottery cultures and the Proto-Iranian language from the steppes of southeastern Europe in the Late Bronze Age is best explained by their large-scale adoption of horse riding. Riding now replaced chariotry in warfare, and in the Asiatic steppes, in southern Central Asia and in Iran this meant that Proto-Iranian replaced Proto-Indo-Aryan. From the site of Pirak in Pakistani Baluchistan come terracotta figurines of horse riders, dated to around 1500 BCE; these riders are anthropomorphic but their heads have bird's beaks. It seems significant that many pointed felt caps of mounted Saka warriors from frozen tombs of the Altai mountains, dated to c. 500–200 BCE, have at top the shape of a bird's head. (Cf. Parpola 2012b.)

In the Early Iron Age (c. 850–650 BCE), the roller pottery cultures of the Eurasian steppes were succeeded by the early phases of the Iranian-speaking *Scythian, Sarmatian and Saka cultures* based on mounted nomadism (cf. Parzinger 2006: 540–709).

Conclusion

Through unbroken chains of successive cultures having the same ultimate origin (the Copper Age cultures of the Pontic-Caspian steppes), the foregoing correlations have taken all the major branches of the Indo-European language family to the areas where they are first historically attested.

3. Formation of the Uralic (Finno-Ugric) language family

In accordance with his recent analyses of the phonological and lexical data, which have the approval of such leading experts as Juha Janhunen (personal communication, 2012), Jaakko Häkkinen (2009: 15–16) has suggested that Proto-Uralic was early on split into three dialectal groups: West-Uralic (later split into Saami, Finnic and Mordvin), Central Uralic (later split into Mari and Permic, or both separate from the beginning) and East Uralic (later split into Samoyed, Hungarian, Mansi, and Khanty). The western and central group may have remained united for some time after the separation of the eastern group, since several innovations can be singled out. This linguistic subgrouping is taken as the basis of the archaeological correlations I am suggesting in this paper.

On the basis of Proto-Uralic vocabulary, the present distribution of the Uralic languages, and what is known of the history of the peoples speaking Uralic languages, the original Uralic homeland has traditionally mostly been assumed to have consisted of a larger or smaller area in the forested northeastern part of European Russia. The vocabulary suggests a Mesolithic/sub-Neolithic hunter-gatherer economy, with no indication of agriculture or animal husbandry (cf. Kaisa Häkkinen 2001; Janhunen 2009: 66). The history of Uralic homeland research until the mid-1990s, with a fairly detailed description of the various views and their arguments, has been summarized in Finnish by Kaisa Häkkinen (1996) and in English by Vladimir Napol'skikh (1995), the latter recording well also the views of Soviet/Russian archaeologists. I return to some of these earlier hypotheses later on.

The archaeological correlation of Uralic languages that Christian Carpelan and I presented in 2001 took as its basis the so-called “continuity hypothesis”, which had a breakthrough at the symposium on “the Prehistoric roots of the Finnish people” at Tvärminne in January 1980 (with its proceedings published in 1984 in Finnish with the title *Suomen väestön esihistorialliset juuret*), and which has since then been widely accepted in Finland by both archaeologists and historical linguists (cf., e.g., Kaisa Häkkinen 1996 and Lehtinen 2007). I shall first present (A) our 2001 scenario and its background (putting the correlated archaeological cultures into bold face only in the introductory chapter on the vanished Mesolithic languages, as the other correlations will be revised); then (B) criticism of the “continuity hypothesis” raised on linguistic grounds, followed by my own early attempt at an adjustment of the earlier model, and finally (C) my current correlations, largely based on the recent views of Petri Kallio (2006) and Jaakko Häkkinen (2009). As the criticism and the preliminary adjustments concern just Proto- and West-Uralic, parts (A) and (B) are limited to their correlations.

A. Correlations of Proto- and West Uralic based on the hypothesis of an unbroken cultural and linguistic continuity in Finland

Vanished Palaeo-European languages of northern Europe

During the Last Glacial Maximum c. 22000 BCE, the Palaeolithic population of Europe was forced to move to two separate refugia, one in the south-west and one in the south-east (Carpelan 2001: 38). The following successive Late Paleolithic cultures came into being as people following the edge of the receding ice cover moved from southwestern Europe northwards: *Magdalenian* (c. 19000–11000 BCE in France), *Hamburg* (since c. 13000 BCE from England to East Prussia), and *Ahrensburg* (since c. 11000 from the Netherlands to the Ukraine and Lithuania). The Late Palaeolithic *Swidry* culture (since c. 10500 BCE from eastern Poland to the southern Baltic and central Russia as far as the Volga-Oka) may have originated from Moldavia, the western end of the eastern refugium, but others derive it from the Hamburg-based Bromme culture. (Cf. Carpelan 2001: 38–40; Kriiska & Tvauri 2007: 14–16).

The Early Mesolithic *Komsa culture* (c. 10000–6000 BCE) of northernmost Norway represents the pioneering hunter-fishers who, starting from the then dry North Sea area colonized the Norwegian coasts first freed of ice when the Ice Age was coming to its end. The Early Mesolithic *Suomusjärvi culture* of Finland, probably at least partly based on the Kunda culture of eastern Baltic, reached northern Lapland by c. 7300 (cf. Carpelan 2001: 41–42; Kriiska & Tvauri 2007: 35.) The descendants of these pioneers remained culturally isolated in Lapland and preserved their genes and therefore probably also their ancient unknown language(s) until they were assimilated, not without detectable traces of the substratum, by the expanding Proto-Saami language (see below).

The Early Mesolithic *Kunda culture* (c. 9000–5000 BCE) of the eastern Baltic was directly continued in the sub-Neolithic *Narva culture* (c. 5500–3600 BCE) (cf. Kriiska & Tvauri 2007: 17–54). It was mainly based on the Ahrensburg culture and strongly influenced by the Early Mesolithic *Maglemose culture* of northwestern Europe, and considered by Carpelan (2006: 84) the northeastern margin of the western block of Late Palaeolithic and Early Mesolithic cultures.

These Late Palaeolithic and Early Mesolithic populations spoke unknown lost languages generally labeled “Palaeo-European”. Some archaeologists including Milton Nuñez (1987) and Pavel M. Dolukhanov (1989) have suggested that the languages of these populations could already have been Proto-Uralic, and that the Uralic homeland extended from the Baltic to the Urals. As the early foragers covered vast territories, also some linguists have supported such views. Lars-Gunnar Larsson (1990) has compared the distribution of the Uralic languages to that of the Cree Indians of Canada; yet Mallory (2001: 348–351) has pointed out that the vast distributions of major Subarctic language families of North America have a shallow time depth, which implies that some or many earlier languages once spoken in the areas involved have all become extinct through

language shift. Kalevi Wiik (2001, 2003), basing himself partly on genetics, has even claimed that Proto-Uralic, hailing from the Ukraine refugium, extended to northwestern Europe in Mesolithic times; in support for this, Wiik (1997, 1998) has argued that Proto-Germanic has evidence of Finno-Ugric substratum influence, all of which has been shown to be totally unfounded (Kallio et al. 1997, 1998).

There is however wide agreement among linguists that protolanguages older than some 6000 years cannot be reached, and to reach even such depths is possible only in quite special circumstances, such as the case of the Indo-European language family which is documented exceptionally early and in exceptionally many branches. The Afroasiatic alias Semito-Hamitic protolanguage represents the ultimate limit with its age of perhaps 8000 years, with the very exceptional case of both of its main branches known from languages (Akkadian and ancient Egyptian) well attested 4500 years ago.

Christian Carpelan admits that “the languages spoken by Mesolithic societies cannot be reconstructed”, but continues:

“In spite of this, I have ventured to suggest that the successful spread of Postsviderian archaeological elements over the greater part of northern East Europe may have accompanied a corresponding spread of a language used as a *lingua franca*. Furthermore this language would have included elements on which a reconstructable *Proto-Uralic* later was developed in the Central Zone, or more precisely, the Volga-Oka region. In the Western Zone, i.e. the East Baltic region, the Kunda culture may again have represented the northeastern margin of an *Ancient European* block of languages due to a strong dependence on Ahrensburg and Duvensee/Maglemose. The origin of the Early Mesolithic population of the Kama-Ural region (Eastern Zone) is found in the south or southeast, without any connections to the populations of the two other populations. For this reason, I suggest that this zonal division had a lingual, hence ethnic, significance” (Carpelan 2006: 84).

Proto-Uralic, Proto-Finno-Ugric and their predecessors

Many leading Uralists have estimated the disintegration of Proto-Uralic to have taken place around 4000 BCE (cf. Kallio 2006: 2, table 1): 4000 BCE is the estimate of Kettunen & Vaula (1938), Décsy (1965), Hajdú (1975), Korhonen (1981) and Taagepera (1994); Toivonen (1953) with 3500 BCE is an exception (and based on a considerably different state-of-art in the research of prehistory and the history of the Uralic languages). Janhunen previously considered even 6000 BCE a possible date for the diffusion of Proto-Uralic (2001: 214), but now puts it around 3000 BCE (2007: 224; 2009: 68). Finland and Russian Karelia have received four major waves of archaeological influence within this time span (cf. Carpelan & Parpola 2001: 79–89; Carpelan 2002a, 2002b, 2006, and pers. comm. 2011):

- (1) The *Sperrings type of Combed Ware* (c. 5300–4500 BCE) in Finland and Russian Karelia, the very first ceramics in these parts, has as its origin the *Upper Volga Ware* (c. 5900–5000 BCE) in the Upper Volga region.
- (2) The *Comb-Pitted Ware* (= *Typical / Style2 Combed Ware*) (c. 3900–3500 BCE) in Finland, Russian Karelia and East Baltic (Estonia and Latvia, cf. Kriiska & Tvauri 2007: 55) has its origin in the Pitted Ware of the *Lyalovo culture* (c. 5000–3650 BCE) in the Upper Volga region.
- (3) The subsequent *Kierikki Ware* (c. 3600–3100) and *Pöljä/Jysmä Ware* (c. 3100–1000 BCE) variants of the *Asbestos Ware* (Comb Ceramics with crushed asbestos mixed in its clay) in Finland and Russian Karelia received some influence from the *Volosovo culture* (c. 3650–1900 BCE) in the Upper Volga region.
- (4) The *Netted Ware* (= *Textile Ceramics, Fabric Impressed Ware*) (from c. 1800 to 200 BCE or even 600 CE) in Finland, Russian Karelia and the west Russian region east of the Narva River (cf. Lavento 2001: 106–107). Its origin is in the *Netted Ware* (*Setchataya keramika*) alias *Textile Ceramics* (c. 1900–500 BCE) of the Upper Volga region.

All the above-enumerated four waves of influence, which came to Russian Karelia and Finland between 5300 and 1700 BCE, had their origin in one and the same area, the Upper Volga region, the interfluvium between the Volga and Oka rivers. The cultures of the *Upper Volga Ware* (c. 5900–5000 BCE), *Lyalovo* with its *Pitted Ware* (c. 5000–3650 BCE) and *Volosovo* (c. 3650–1900 BCE) represent successive stages of the cultural development of basically one and the same sub-Neolithic hunter-fisher population. Continuity in the flint technology indicates that the cultural developments were not brought about by the arrival of an alien male population from somewhere else to the core area in the Volga-Oka interfluvium. How the pottery production — considered to be the domain of women — spread to these parts remains unclear (cf. Carpelan 2006: 84–85).

The successive waves of influence from this area, which constantly produced a population surplus, would then have brought to Karelia and Finland successive stages of one and the same language, i.e. several early preforms of Proto-Uralic. Substrata consisting of archaic linguistic relatives might explain on the one hand why Proto-Finnic (=Proto-Saami-Finnic) did not change much after moving from the Uralic homeland to Karelia and Finland, remaining especially in phonology very close to Proto-Uralic (cf. Lehtinen 2007: 94). On the other hand such a linguistic relationship would have made communication possible and eased the integration of the newcomers and the earlier local population.

The Comb-Pitted Ware complex expanded from the Volga-Oka interfluvium not only north and west to Finland, Karelia, Estonia and Latvia, but also eastwards bringing Volga-Oka elements as far as the Vyatka and the Lower Kama, and creating a contact network that among other things brought objects of Cembra pine and copper from the Urals to Finland (cf. Carpelan & Parpola 2001: 82–83; Carpelan 2006: 85). Dating the disintegration of Proto-Uralic around 4000 BCE closely agrees with the arrival of Comb-Pitted Ware to Russian Karelia,

Finland, and northern East Baltic, the core speaking areas of Proto-Saami and the Baltic Finnic languages. Proto-Uralic was accordingly correlated with the Lyalovo culture and the next stage of development, Proto-Finno-Ugric, with the Volosovo culture. The latter would have split into the Finno-Permic and Ugric branches after the Volosovo culture, along with the Abashevo culture, expanded eastwards into the Kama-Urals area, imposing the Finno-Ugric language upon the local Garino-Bor culture (cf. Carpelan & Parpola 2001: 95).

Indo-European contacts reflected in the loanwords of Proto-Uralic, Proto-Finno-Ugric and Proto-Saami-Finnic

The influence of the Lyalovo culture extended in the south to the forest steppe between the Dnieper and the Don, to the neighbourhood of the Chalcolithic *Srednij Stog culture* (c. 4500–3500 BCE) correlated above with Early Proto-Indo-European.

Around 2800–2600 BCE, people of the *Corded Ware* or *Battle Axe culture*, correlated above with Northwest Indo-European, coming from the south and west penetrated the whole area occupied by the Volosovo culture, forming the *Fat'yanovo culture* and living in symbiosis with the Volosovo people until about 1900 BCE. From about 2200 the eastern extension of Fat'yanovo, the *Balanovo culture*, flourished between the mouths of the Oka and Kama. These immigrant cultures were eventually assimilated to the Volosovo culture, forming the culture of *Netted Ware* alias *Textile Ceramic* around 1900 BCE. The close and long-continued contact would have influenced the surviving Proto-Finno-Ugric and given it a number of early Indo-European loanwords of Pre-Proto-Balto-Slavic variety.

About 2200 BCE the *Abashevo culture*, correlated above with early Proto-Indo-Aryan, spread from the Don and Volga steppes to the southern half of the Volosovo area along the forest/forest steppe border. Like the eastern Balanovo extension of the Fat'yanovo culture, the Abashevo culture too fought for the possession of the Kama-Vyatka area rich of copper. Around 1850 BCE, the Abashevo culture was for a short period replaced by the *Early Srubnaya culture*, correlated with early Proto-Iranian, whose *Pozdnyakovo* branch (c. 1800–1500 BCE) in the Volga-Oka interfluvium exerted strong influence on the Netted Ware culture soon after its formation.

The *Corded Ware* (or *Battle Axe*) culture intruded into the Eastern Baltic and coastal Finland already around 3100 BCE. The continuity hypothesis maintains that the early Proto-Finnic speakers of the coastal regions, who had come to Finland in the 4th millennium BCE with the Comb-Pitted Ware, coexisted with the Corded Ware newcomers, gradually adopting their pastoral culture and with it a number of NW-IE loanwords, but assimilating the immigrants linguistically. The fusion of the Corded Ware and the local Comb-Pitted Ware culture resulted into the formation of the *Kiukais culture* (c. 2300–1500) of southwestern Finland, which around 2300 received some cultural impulses from Estonia, manifested in the appearance of the *Western Textile Ceramic* (which is different

from the more easterly *Textile Ceramic* or *Netted Ware*, and which is first attested in Estonia c. 2700 BCE, cf. Kriiska & Tvauri 2007: 88), and supposed to have been accompanied by an influx of loanwords coming from Proto-Baltic. At the same time, the Kiukais culture is supposed to have spread the custom of burying chiefs in stone cairns to Estonia.

The coming of the Corded Ware people and their assimilation created a cultural and supposedly also a linguistic split in Finland, which the continuity hypothesis has interpreted to mean dividing Proto-Saami-Finnic unity into its two branches. Baltic Finnic, or simply Finnic, would have emerged in the coastal regions of Finland and in the northern East Baltic, while preforms of Saami would have been spoken in the inland parts of Finland.

The *Nordic Bronze Age culture*, correlated above with early Proto-Germanic, exerted a strong influence upon coastal Finland and Estonia 1600–700 BCE. Due to this, the Kiukais culture was transformed into the culture of *Paimio ceramics* (c. 1600–700 BCE), later continued by *Morby ceramics* (c. 700 BCE – 200 CE). The assumption is that clear cultural continuity was accompanied by linguistic continuity. Having assimilated the language of the Germanic traders and relatively few settlers of the Bronze Age, the language of coastal Finland is assumed to have reached the stage of Proto-Finnish at the beginning of the Christian era. In Estonia, the Paimio ceramics have a close counterpart in the contemporaneous *Asva ceramics*.

If preforms of Saami were spoken in the whole of Finland and Karelia since the fourth millennium, Proto-Saami supposedly emerged from the merger of the original Combed Ware population and the superstratum of the Netted Ware newcomers, supposed to have brought a number of Proto-Baltic and Proto-Aryan loanwords (cf. Carpelan & Parpola 2001: 88–89). The *Netted Ware*, which formed around 1900 BCE in the Volga-Oka region, spread soon with some population movement to the eastern border of Estonia (Narva), to most of Finland (as far north as the Oulu river) excepting the coastal regions and to Russian Karelia. It brought about considerable cultural change, including modest swidden cultivation and bronze metallurgy. The Netted Ware of Finland and Karelia (on which see Lavento 2001) is divided into the older *Sarsa-Tomitsa ceramics* (with its later subgroup *Kalmistonmäki ceramics*) (c. 1700–500 BCE), and the subsequent cultures with asbestos-mixed ceramics such as *Luukonsaari* (c. 700/500 BCE to 200 BCE). In Lapland the descendants of the Mesolithic pioneers of the Komsa and Suomusjärvi cultures probably preserved their Palaeo-European language until it was assimilated by expanding Saami. This would have started happening already with the spread of the *Lovozero Ware* (c. 1900–1000 BCE) to Lapland (cf. Carpelan & Parpola 2001: 78) and brought to conclusion with the spread of the *Kjelmøy Ware* there at the beginning of the Iron Age, c. 650 BCE (cf. Carpelan 2003: 86–87).

B. Criticism of the “continuity hypothesis” and an attempt at an adjustment

The history of the “continuity hypothesis” was outlined and its assumptions were sharply criticized by Ante and Aslak Aikio in 2001; and Jaakko Häkkinen (2010) has subsequently discussed at length the methodological untenability of the hypothesis. Among other things, the Aikios found the relationship between Finnish and Estonian too close for them to have been separated from each other by sea for some 5000 years. This view has been strongly expressed also by Juha Janhunen in our personal conversations over the years, and I have become convinced that it is correct. As noted by the Aikios, the counter argument that the narrow Bay of Finland (which often freezes in winter) rather connects than separates the peoples living on its shores may be valid for shorter periods but hardly for many thousands of years. The Aikios further saw no compelling reason why the early Indo-European loanwords should have been borrowed in Finland instead of for example Estonia.

The Aikios thus claimed a much lower chronology for Proto-Finnic than was assumed in the “continuity hypothesis”. This has been supported also by Janne Saarikivi and Riho Grünthal (2005), while Jorma Koivulehto (2006) — author of numerous fine NW-IE, Proto-Aryan, Proto-Baltic, and Proto-Germanic etymologies of West Uralic words (cf. e.g. Koivulehto 1999a; 1999b; 2000; 2001) — found no essential reason to change his support to the “continuity hypothesis”. Petri Kallio already in 1998 criticized the early dating of Proto-Baltic implied by the continuity hypothesis in the alleged borrowings into Proto-Finnic spoken in the Kiukais culture. Kallio (2006, 2007) and Jaakko Häkkinen (2009) not only subscribed to the lower chronology of Proto-Finnic but extended it to Proto-Uralic, pointing out that the disintegration of Proto-Uralic is a relatively late phenomenon: the Uralic protolanguage already certainly had several Indo-Iranian loanwords that reflect both an earlier and a later phase of development.

In response to this justified criticism my first revision was to correlate Proto-Uralic with the *Volosovo culture* (c. 3650–1900 BCE), as its late disintegration would allow the presence of Indo-Iranian loanwords in Proto-Uralic. In that case the *Netted Ware*, which c. 1900 BCE succeeded the Volosovo culture in the Volga-Oka region, would be the only possible archaeological correlate for Proto-Finno-Saamic, or rather for Proto-Finno-Volgaic. By 1700 BCE the Netted Ware culture spread in the west up to the Narva river, but not to Estonia, in the north to most of Finland (as far north as the Oulu river) excepting the coastal regions, to Russian Karelia, and later, around 1000 BCE also to the Mid-Volga area.

This changed scenario fits other members of West Uralic, but the origin of (Baltic) Finnic turned out to be a knotty problem. At the outset it should be noted that the earlier assumed Finno-Saamic protolanguage is no more widely supported (cf. Itkonen 1997; Koivulehto 1999c; Saarikivi & Grünthal 2005; Grünthal 2007). In the opinion of Juha Janhunen, “the mutual ordering of the three westernmost branches, Finnic, Saamic, and Mordvinic, is open to alternative interpretations”; he himself is ready to consider (Baltic) Finnic closer to Mordvinic

than to Saamic (cf. Janhunen 2009: 65). If the Finnic and Saami branches did not become differentiated in Finland, as the “continuity hypothesis” has maintained, the Finnic homeland should have been somewhere between the Saami area, presumably the Netted Ware area covering most of Finland and Russian Karelia, and the homeland of Mordvin and those related Volga-Finnic languages that have disappeared as a result of the Russian expansion.

Proto-Mordvin and the later slaviced Muroma can be correlated with the *Gorodets culture* (800 BCE-800 CE), which continued the Netted Ware traditions (cf. Gusakov & Kuz'minykh 2007) in more or less the areas where Mordvin has been spoken, in the Mid-Volga region from the mouth of the Oka southeast down to Saratov. The *Gorodets culture* has influenced also the Mari speakers of the Mid-Volga area (cf. Fodor 1975: 68–69; Kuz'minykh 2006: 82–84).

Place name studies have indicated that the whole of Finland and Karelia including the southwestern coast were inhabited by Saami speakers in the Early Iron Age, before the spread of Finnish speakers. This is supported also by the numerous Saami loanwords in Finnish and Karelian. (Cf. Salo 1997: 22–25; Salo 2000; 2004; Aikio & Aikio 2001; Ante Aikio 2003; 2009; Saarikivi 2006; 2008.) On the other hand, there is agreement that the Finnish-speaking population was very small and limited to southwestern Finland at the beginning of the Christian era, and that it grew rather slowly, and only gradually moved further inland to Tavastia and eastwards reaching the Karelian Isthmus by 700 CE, and started spreading more widely only from the twelfth century onwards (cf. Itkonen 1984; Kivikoski 1961: 145–293; Salo 2000; 2004; Jutikkala & Pirinen 2002: 13; Aikio 2009: 7).

As the Finnic language Estonian, spoken in Estonia, is so closely related to Finnish that according to Juha Janhunen (personal communication) these two languages cannot have become separated earlier than about 2000 years ago, there is every reason to reconsider the traditional “immigration theory” that prevailed for a long time before the “continuity theory”. It was created by the Danish linguist Vilhelm Thomsen (1890) and the archaeologist Alfred Hackman (1905). The Finnic homeland had to be relatively confined, and it was situated south of the Bay of Finland, somewhat to the east. The coming of Finnish speakers to Finland was correlated with what is still accepted by archaeologists as evidence for some amount of immigration from Estonia: the appearance of *tarand-* or *yard-type* cemeteries (Finnish *tarhakalmisto*) on the south and southwestern coast of Finland during the Early Roman Iron Age in the first centuries CE. These cemeteries have counterparts in the ‘typical *tarand* cemeteries’ of Estonia and Latvia. There are also new types of iron weapons and ornaments of Estonian and Baltic origin. (Cf. Hackman 1905; Kivikoski 1961: 104–144; Salo 1968; 1984: 185–247; Huurre 2004: 125–127.)

The problem with placing the Finnic homeland in Estonia is that the Netted Ware did not come to Estonia, but spread only as far west as the Narva river. It is true that archaeological distribution maps published by Russian scholars include Estonia in the area of Netted Ware, but this is incorrect, since distinction must be made between the Netted Ware or eastern Textile ceramics, and the western Textile ceramics in Estonia and in the Kiukais culture of southern Finland.

Between the Gorodets culture (correlated with Mordvinic) and Estonia and Latvia is the *D'yakovo culture* (c. 800 BCE to 600 CE) of the Upper Volga-Oka, which continues the Netted Ware (cf. Gusakov & Kuz'minykh 2008; on the D'yakovo culture, cf. Krasnov ed. 1974; Krenke 2011). It may have had as its language the ancestor(s) of the disappeared West Uralic languages, Merya and Meshchera, spoken in this area until medieval times. But nothing points to a D'yakovo immigration to Estonia and Latvia, while on the contrary, a strong wave of influence brought elements and people from Lithuania to the D'yakovo culture during its final period c. 200–600 CE. The Baltic toponyms of the Volga-Oka area probably date from this period, and suggest that the D'yakovo culture had a Baltic-speaking elite superstratum (cf. Carpelan 2006: 87; Kuz'minykh 2006: 82; Krenke 2011).

As much as seventy percent of the ceramics in southeastern Estonia and eastern Latvia is textile impressed (cf. Kriiska & Tvauri 2007: 145). The Late Textile ceramics of Estonia (c. 500 BCE – 500 CE) differ in many ways from the Estonian Textile ceramics of the Early Bronze Age (cf. Lang 2007: 135–137). This late type has a wide distribution in Estonia and Harri Moora and Silvia Laul have seen its origin in the eastern Netted Ware tradition (cf. Lavento 2001: 34–35). When I speculated on this basis that perhaps the Proto-Finnic homeland was in the still largely unexplored area between the D'yakovo culture and the eastern border of Estonia, especially the Daugava valley, where finds of D'yakovo-like net sinkers have been reported (cf. Smirnov 1974: 89), Carpelan observed that this is just wishful thinking without much likelihood, and should be frankly acknowledged as such. In any case the Late Textile ceramics of Estonia has nothing to do with the Estonia—Finland contacts at this time.

Petri Kallio in his search for the Finnic homeland had independently arrived at the same location as my own above-described preliminary solution, which was rejected by Carpelan. South Estonian has been supposed to be the first Finnic language to separate from the Proto-Finnic language community (cf. Sammallahti 1977; Viitso 2000; Kallio 2007). In his forthcoming paper “The language contact situation in Prehistoric Northeastern Europe”, Kallio places this first dialectal split of Proto-Finnic (“Inland Finnic” > Chudic > South Estonian) in the Pskov-Novgorod region and connects it with the local *Long Barrow culture* (c. 400–1000 CE, cf. Tvauri 2006).

C. New archaeological model for the prehistory of the Uralic languages

West Uralic

I start my current correlations of the early Uralic languages and archaeology with West Uralic, because I want to present my new solution to the problem of Finnic origins immediately after the preceding discussion. First of all, I would like to confirm my conviction that West Uralic is to be connected with the *Netted Ware culture*, which formed in the Upper Volga area around 1900 BCE as

the result of the fusion of the Volosovo and Fat'yanovo cultures and with some influence of the Abashevo culture and soon afterwards with a strong influence of the (Early Proto-Iranian-correlated) *Pozdnyakovo* culture; by 1800 or 1700 BCE, the Netted Ware spread widely towards the north and northwest (Figure 6).

It was only around 1000 BCE that the Netted Ware expanded eastward into the Mid-Volga area between the mouths of the Oka and Vyatka (Figure 6c). The Mid-Volga had until then been occupied by the *Chirkovo culture* (c. 1800–700 BCE), the result of the fusion of the Volosovo culture with the Balanovo and Abashevo elites, which had vied with each other for the possession of the rich metal deposits of the area. Around the time the Netted Ware came there, the Mid-Volga area was under the strong influence of the powerful *Anan'ino culture* of the neighbouring Vyatka-Kama area, famed for its metallurgy. The end result was the formation of the *Akozino or Akhmylovo culture* (c. 800–300 BCE, on which cf. Patrushev 1989; 2000: 112–161). This culture is distinguished by three special characteristics: (1) Netted Ware ceramics, (2) socketed axes of “Akozino-Mälär” type, produced in a special metallurgical furnace different from that of the Anan'ino culture, and (3) funeral customs involving the inclusion of the Akozino-Mälär axes and other specific weapons among the grave goods (cf. Kuz'minykh & Chizhevskij 2008: 34). The Akozino people may have come to the Mid-Volga from the Mid-Oka, where the Mladshij Volosovo cemetery “is very close to the Akozino antiquities by its burial rite and grave goods” (Kuz'minykh 2006: 77). According to Christian Carpelan (personal

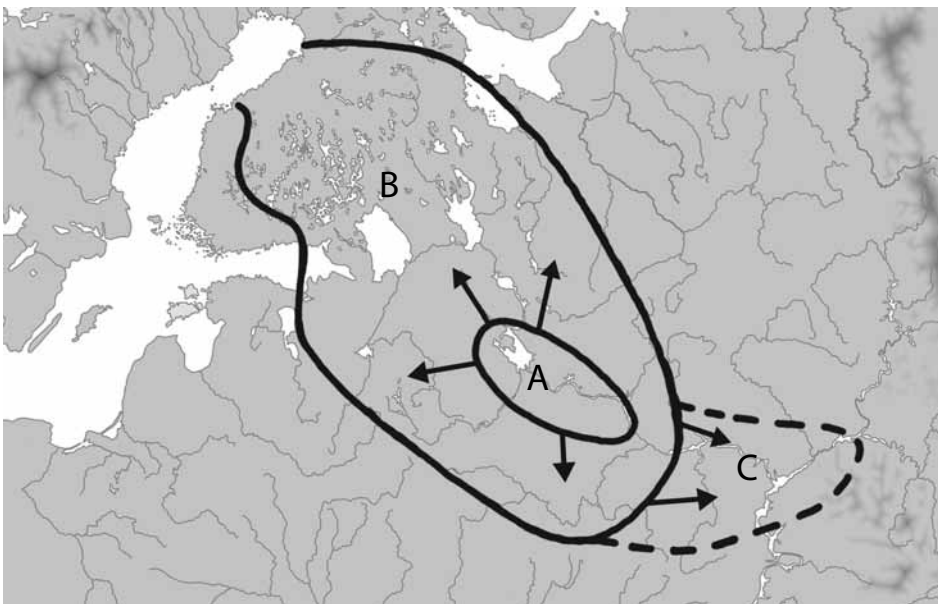


Figure 6. Distribution of the Netted Ware according to Christian Carpelan. A: Emergence of the Netted Ware on the Upper Volga c. 1900 calBC. B: Spread of Netted Ware by c. 1800 calBC. C: Early Iron Age spread of Netted Ware. After Carpelan 2002: 198; cf. Carpelan & Parpola 2001: 89, fig. 16.

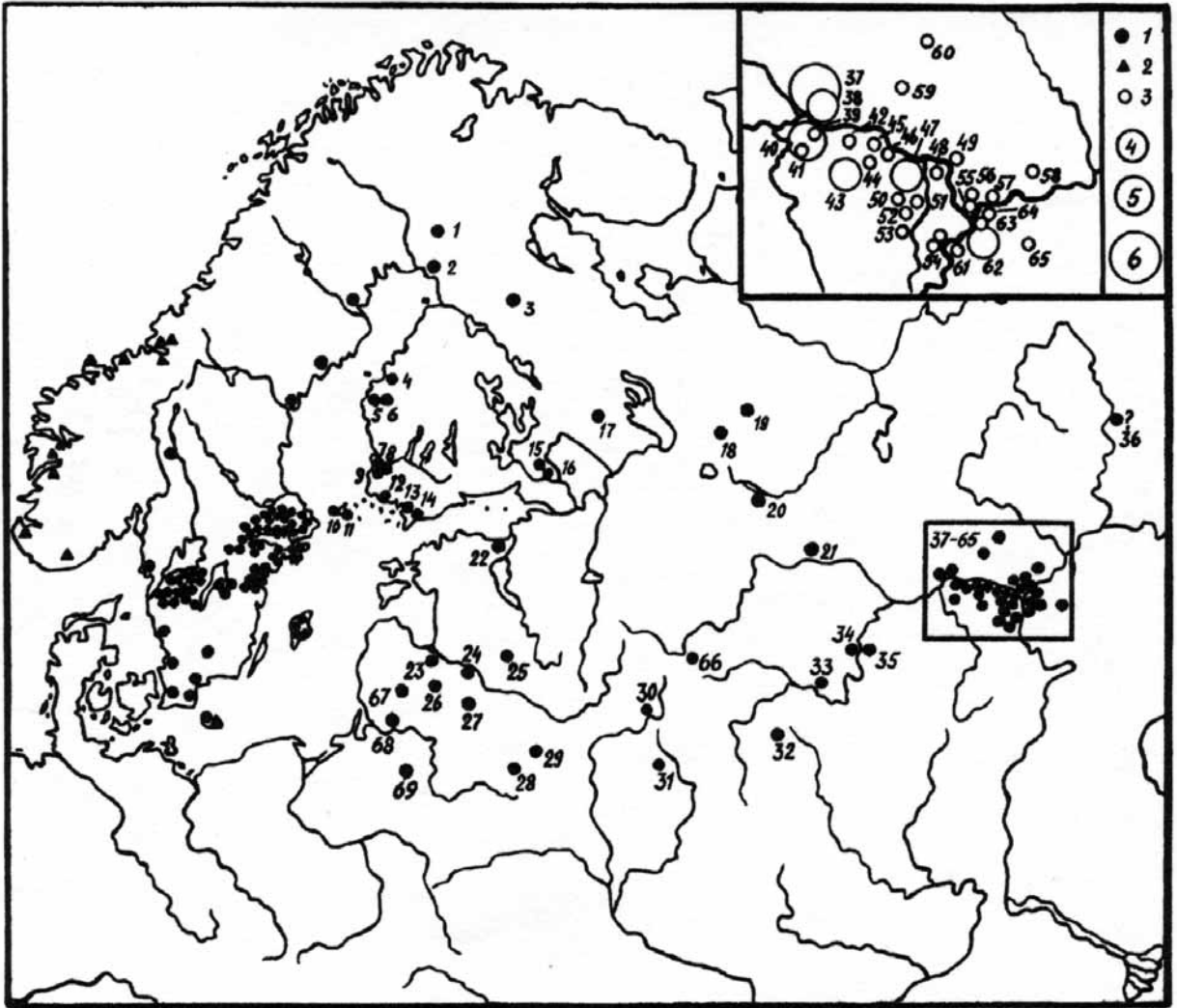


Abb. 2. Verbreitung der KAM in Nord- und Osteuropa

1 Kemi, 2 Rovaniemi, 3 Suomussalmi, 4 Jeppo, 5 Laihia, 6 Paimio, 7 Kiukainen, 8 Nakkila, 9 Harjavalta, 10 Saltvik, 11 Sund, 12 Kimito, 13 Västanfjärd, 14 Lojo, 15 Kaukola, 16 Valkjärvi, 17 Kudoma XI, 18 Kinema, 19 Palkino, 20 Veksa, 21 Vataška, 22 Vaivara, 23 Klan'gukalns, 24 Ekabpils, 25 Lielais Ludzas, 26 Vaškaj (Konstantinovo), 27 Narkunaj, 28 Minsk, 29 Kurgan bei Borisov, 30 Nekvasino, 31 Žaryn', 32 Satinskoe, 33 Rjasanland, 34 Murom, 35 Mladšij Volosovskij, 36 Perm', OM, 37 Staršij Achmylovskij, 38 Koz'modem'janskij, 39 Malachaj, 40 Akozinskij, 41 Paratmary, 42 b. Tšeboksarskij u., 43 Ubeevskij, 44 Sjurbeevo, 45 Bol'se-Jangil'dinskoe, 46 Kriuši, 47 Al'menevo, 48 b. Svijažskij u., 49 Kazanka I, 50 Mendijarovo, 51 Kuvšinovo, 52 Bol'sie Bakyrči, 53 Nižnij Bijabaš, 54 b. Tetjuškij u., 55 Taškirmen', 56 Taneevskij, 57 Soroč'i Gory, 58 Bol'sie Nyrsi, 59 Burman, 60 Jurino, 61 Aga-Bazar, 62 Novo-Mordovskij I, 63 Izmeri, 64 Semenovskij VI, 65 Biljar, Sammlung A.F. Lichačev, 66 Lesničino, 67 Litauen, 68 Raminas, 69 Tarlawka. Die Symbole bedeuten: 1 KAM, 2 die norwegische KAM-Form, 3 1-2 Funde, 4 3-25 Funde, 5 26-50 Funde, 6 mehr als 100 Funde.

Figure 7. Distribution of the Akozino-Mälars axes according to Sergej V. Kuz'minykh (1996: 8, Abb. 2).

communication), this cemetery contained an axe of the older *Lusatian (Lausitz) culture* of Poland, which he sees as the model for the distinctive Akozino-Mälär axes that are not based on any Anan'ino prototype.

I suggest that Proto-Finnic was introduced to the Baltic area by warrior-traders of the Akozino-Akhmylovo culture, who brought *Akozino-Mälär axes* to southern and southwestern Finland, the Åland islands and, in so great numbers that it must have involved the movement of a fair amount of people, to the Mälaren area of eastern Sweden around 800–500 BCE (Figure 7). This main route along which the Akozino-Mälär axes went westwards probably followed the same waterways as the Vikings later, but another trade route was through the Daugava valley mentioned earlier while speaking of South Estonian as the Finnic language that was the first to separate from the protolanguage. (On the Akozino-Mälär axes see especially Kuz'minykh 1996; cf. also Meinander 1985; Patrushev 2004; Lavento 2001: 122–123; Asplund 2008: 231. Note that still e.g. Cunliffe (2008: 263, fig. 8.24) continues to hold the outdated view that the axes have their origin in Sweden and were exported to the east.) On the basis of the associated archaeological evidence detailed below, I suggest that the “immigration of Finnic” was not from Estonia to SW Finland as has been thought, but in the opposite direction, taking the Proto-Finnic language to Estonia (Estonian) and then further to Courland (Livonian) and to Latvia (the Finnic superstratum whose assimilation to the local Baltic speakers led to the differentiation of Lithuanian and Latvian).

The Akozino-Mälär axes come to Finland at the very end (period VI) of the Late Bronze Age and the very beginning of Pre-Roman Iron Age, when the influence of the Nordic Bronze Age culture upon the coasts of Finland and Estonia has declined. At this time the *Paimio ceramics* of the Finnish coasts change into the *Morby ceramics* (c. 700 BCE – 200 CE). Significantly, Morby ceramics have very similar counterparts in the *Ilmandu style ceramics* of Estonia, also found at a few Latvian sites (cf. Asplund 2008: 225–228) as well as in the Mälaren area in Sweden (cf. Lang 2007: 130–132; Asplund 2008: 228–230). The earlier Paimio Ware (c. 1600–700 BCE) and the corresponding Asva Ware of Estonia continue side by side with the new Morby/Ilmandu pottery, and is found along with it also in the Mälaren area (cf. Lang 2007: 127–128). Technically the Morby Ware continues the Paimio Ware, but its ornamentation has been compared to that of the Early Iron Age ceramics of the Upper Volga (Salo 1984: 194; cf. Asplund 2008: 213, 216). Also other types of pottery are relevant, such as the typical Lügänuše style pottery of Estonia with counterparts that were common in southwestern Finland and in the eastern European forest belt (cf. Lang 2007: 130).

The *tarand graves* have figured prominently in the hypothesis of the immigration of Finnic speakers from Estonia around the beginning of the Christian era. Earlier only “typical *tarand* graves” of the Roman Iron Age were known, but now as many as twenty-six “early *tarand* graves” have been partially or fully excavated in Estonia, mostly in the coastal areas of northern and western Estonia and on the islands. They are dated to c. 800–400 BCE, and “similar graves occur in south-western Finland, the eastern part of central Sweden, and

in northern Latvia and Courland” (Lang 2007: 170; the early *tarands* are described 170–191). There are many types of *tarand* graves, also among the early ones, but it is quite common that they form long rows of rectangular ‘yards’ or ‘enclosures’ (*tarand* in Estonian). Silvia Laul (1990) and Marika Mägi (2005) have suggested that they are stone foundations of “mortuary houses”, corner-joined horizontal log cabins, in which ancestral bones were stored, such as characterize the burial customs of the Early Iron Age D’yakovo culture of the Upper Volga (cf. Smirnov 1990), persisting until 700 CE on the northern D’yakovo border near Vologda (cf. Bashen’kin 1996). “Houses of the Dead” were built in the Akozino-Akhmylovo culture on the Mid-Volga as well (cf. Khalikov 1977: 42–44; Patrushev 2000: 131–142), and Kuz’mynikh (2006: 81), too, thinks they are source of the Finnish and Estonian *tarand* graves. The original and most common burial mode of the early *tarand* graves of Estonia was inhumation, but cremation also occurs, often side by side. “Pottery as a grave good in *tarand*-graves is only known in the earliest contexts ... This is exclusively Ilmandu-type ceramics” (Lang 2007: 187). The early *tarand*-graves contain also some objects that are exceptional in Estonia, notably several types of ornaments originating from the Upper and Mid-Volga region (cf. Lang 2007: 184–185).

The Akozino-Mälär axes were in Finland, Estonia and Sweden copied in iron (Asplund 2008: 245–246). Iron was at that time rare and highly valued, and the technology of its production was kept a well-guarded secret. Such esoteric knowledge, along with exclusive access to prestige goods, which were symbols of rank and power, have often guaranteed the elites their position in chiefdom-level societies (which normally involve populations of thousands or tens of thousands). The chiefdom system is usually connected with warring, and the Netted Ware cultures of Early Iron Age Russia were both very well armed (cf. Khalikov 1977; Patrushev 2000) and possessed hill forts (*gorodishche*) (for a good description of the D’yakovo hill fort, the D’yakovo culture type site situated in the city of Moscow, see Krenke 2011). Southwestern Finland and Estonia also had their hill forts. Twenty early metal period hill sites are known from Finland, and 1000–400 BCE is the earliest of their main periods of utilization (cf. Asplund 2008: 111).

The Akozino-Finland-Mälaren connections have an interesting parallel in the Late Bronze Age/Early Iron Age site of Vistad in Östergötland, where a fortified settlement has Lusatian-type houses and high quality Lusatian type pottery and other artefacts proving the presence of foreigners. Vistad has been interpreted as probably due to close relations that the local Swedish chiefs had with the Lusatian chiefs in Poland, accommodating regular visits of long-distance traders (cf. Asplund 2008: 214–215). Visiting traders who wished to settle in an attractive place could establish matrimonial relationships with local chiefs who were eager to get access to coveted goods and become members of a distribution network that could guarantee them even military assistance. Introduction of the strongly hierarchical chiefdom system can quickly change the pre-existing social order and lead to major language shifts. (Cf. Earle 1987; Atkinson 1989; Mallory 2001: 360).

In the case of Finnic, one problem has been the origin of the massive amount of Proto-Baltic loanwords connected especially with agriculture and

animal husbandry. This problem is solved by assuming that the coastal population descending from the Kiukais and Paimio cultures in Finland and their Estonian counterparts with the (early western) Textile ceramics and Asva ceramics were Proto-Baltic speaking (cf. also Kallio 2007: 244–246; 2008). These areas form a continuation of the Baltic-speaking areas further south, and have been in contact with each other ever since the times of the Corded Ware.

On the other hand, derivation of Finnic from the Mid-Volga, from the neighbourhood of the Netted-Ware-derived (cf. Gusakov & Kuz'minykh 2007) **Gorodets culture** (c. 800 BCE – 800 CE) that can be correlated with Mordvin (cf. Kuz'minykh 2006: 82–84), fits a number of innovations shared by Finnic and Mordvinic protolanguages. Grünthal (2007: 123–130) gives detailed evidence of grammatical innovations shared by Mordvinic and Finnic, both in noun paradigms as a whole and the form and function of individual cases. Jaakko Häkkinen (2009: 37–40) notes other innovations common to Finnic and Mordvinic, which suggest a substratum influence. Both language groups have differently from each other adjusted the geminate **mm* that is foreign to Proto-Uralic phonotaxis, and that occurs in a lexical innovation found in Finnic and Mordvin alone: replacement of the old Uralic numeral **luka* 'ten' with **kümme* 'ten'. Häkkinen enumerates a number of loanwords in Finnic and Mordvin which have non-Uralic consonant clusters and lack a counterpart in Saamic, appear to be older than the Baltic loanwords, and relate to farming ('cow', 'mortar', possibly 'wheat') and to trees that belong to regions south of the Ladoga-Volga line ('oak', 'maple', 'hazelnut'). Häkkinen suggests that the substratum belonged to the vanished Palaeo-European languages — possibly the language of the Volosovo culture. The Finno-Mordvinic protolanguage can be expected to have received many Proto-Iranian loanwords from the neighbouring Pozdnyakovo culture of the Oka basin and later cultures of the steppes, which would have continued to influence Mordvinic.

That the substratum words of Finno-Mordvinic are lacking in the Saamic protolanguage may be due to the fact that the Netted Ware reached Finland and Karelia as early as by 1800–1700 BCE, very soon after the formation of the Netted Ware. Saami has its own substratum loanwords with non-Uralic phonotaxis that are likely to have come from the earlier cultures of these northern regions. The early and wide distribution of the Netted Ware suggests that several local variants of its language developed and may have died out in the course of time. Ante Aikio (2006: 42–47) proposes southern Finland as the homeland of Proto-Saami, which would have disintegrated around 0–500 CE, while the homeland of a now extinct Para-Saami would have been south of Lake Ladoga and Lake Onega. In Lapland, Saami was influenced by an extinct Palaeo-European substratum, but on linguistic grounds the expansion of Saami there could have taken place at the very earliest with the spread of the Kjelmøy Ware 650 BCE suggested by Carpelan, but more likely in the early centuries CE (cf. Aikio 2004; 2006: 43–47). Saami may have been in contact with Proto-Permic that was almost certainly spoken in the Anan'ino culture, because there was considerable Anan'ino influence on northern Fennoscandia in the Early Iron Age (cf. Kuz'minykh 1996).

Proto-Uralic

Proto-Finnic and Proto-Mordvinic, which share many innovations, are according to the above archaeological correlations about a millennium younger than Proto-West-Uralic, from which the ancestor of Proto-Saami branched off almost immediately. Proto-Finnic has changed in its phonemic (as well as morphemic and syntactic) structure quite a lot in comparison to what was previously thought to be the Saami-Finnic protolanguage, but which can now be labeled Proto-West-Uralic, while the latter has preserved the Proto-Uralic phonology (cf. Sammallahti 1988) virtually unchanged (cf. Itkonen 1984; Lehtinen 2007: 94; Kallio 2007).

The virtual identity of Proto-West-Uralic and Proto-Uralic suggests that Proto-Uralic has spread *fast*, in all likelihood in the same way as was above suggested for the migration of Proto-Finnic from the Mid-Volga to southern Finland (and to eastern central Sweden, where the Finnic language of the immigrants was assimilated into Proto-Germanic), namely through the elite dominance of incoming warrior traders. The northwards spread of the Netted Ware coincided with the operation of the **Sejma-Turbino intercultural trader network** (c. 1900–1600 BCE) (cf. Carpelan & Parpola 2001: 99; Carpelan 2002b: 198) (Figure 8). This means that Pre-Proto-Saami probably came to southern Finland together with the Sejma-Turbino artefacts, brought there by warrior-traders belonging to the elite of the Netted Ware culture that had formed shortly before this in the Upper Volga area. This Netted Ware elite had most likely come into being in the same way, as a result of the arrival of Sejma-Turbino traders from further east, from the Urals production centre of the Sejma-Turbino weapons.

The spread of the Uralic protolanguage with the Sejma-Turbino network is suggested by its temporal closeness to the disintegration of Proto-Uralic, which must be posterior to its adoption of Proto-(Indo-)Aryan loanwords, and has been suggested on these grounds by Petri Kallio (2006) and Jaakko Häkkinen (2009: 49–50). Kallio's (2006: 16–17) further reasonings are worth repeating *in extenso* (in my translation from his Finnish):

Tapani Salminen (1999: 20–21) has observed from the point of view of Uralic dialectology that “the chain of Uralic language groups has apparently come into being while the speaking area of the protolanguage has fairly quickly spread along a certain ecological zone both towards the east and towards the west.” It is interesting to compare this with what Christian Carpelan (1999: 270; cf. also Carpelan & Parpola 2001: 99–111) says happened soon after 2000 BCE: “Bronzes of the Sejma-Turbino type started spreading to the zone that more or less followed the southern border of the fir tree area and extended in the east to the upper reaches of the Yenisei and Ob rivers and in the west to Estonia and Finland.” Coincidence or not, the branches of the Uralic language family emerged later precisely among the same long but very narrow zone formerly occupied by the Sejma-Turbino phenomenon. Carpelan (2000: 27) has accordingly already put forward what he himself calls a ‘provocative guess’, that the preform of Samoyedic would have spread to the Sayan area with the Sejma-Turbino phenomenon. I would like to propose

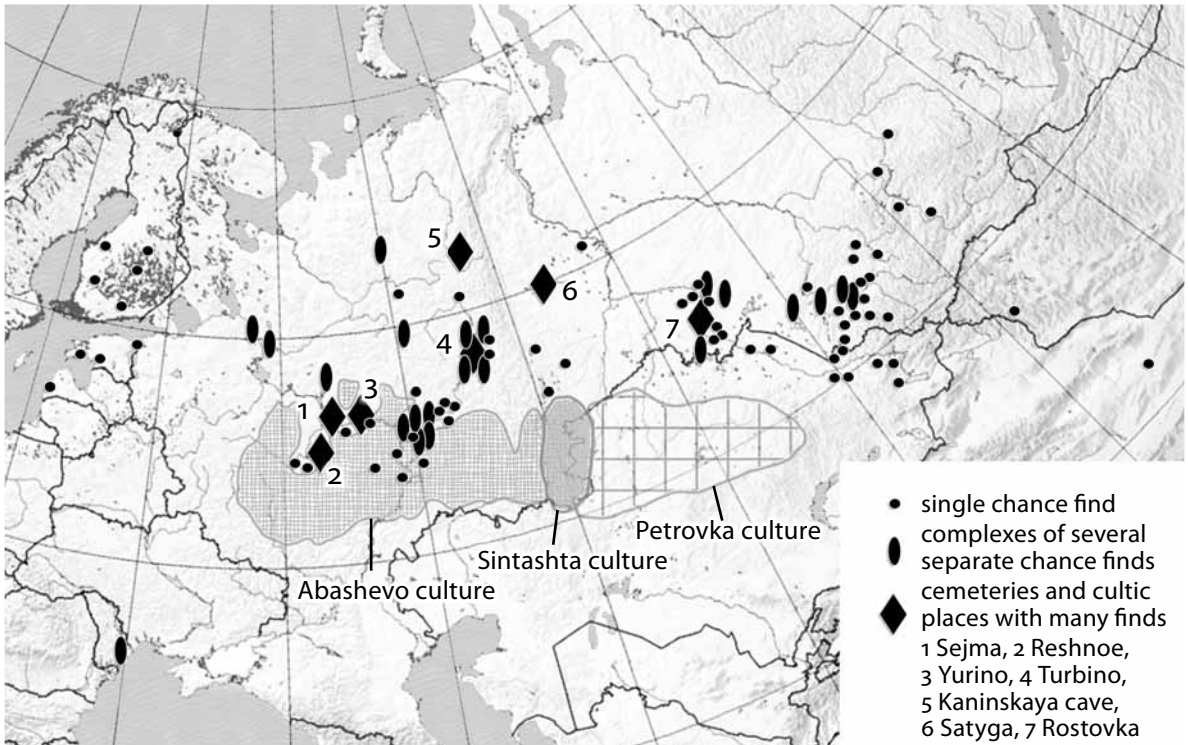


Figure 8. Find spots of artefacts distributed by the Sejma-Turbino intercultural trader network, and the areas of the most important participating cultures: Abashevo, Sintashta, Petrovka. Based on Chernykh 2007: 77.

as my own provocative guess that the preforms of Baltic Finnic and Saami spread to the sphere of the Baltic Sea as late as about 1900 BCE with the Sejma-Turbino phenomenon. This guess would be all the more motivated as the Sejma-Turbino phenomenon spread to the west at least partly hand in hand with the strong wave of Netted Ware influence. Yet, as far as I can see, the spreading of Proto-Uralic needed nothing more than ‘a production and network chain of armed traders’ (Carpelan 1999: 270; cf. also Salminen 1999: 20–23), although some archaeologists even speak of ‘Sejma-Turbino tribes’ (Chernykh 1992: 215).

Indeed, as indicated above, and suggested also by Mallory (1998; 2001: 359–364; 2002), the Proto-Indo-European language probably largely spread through language shifts that followed initial bilingualism when local leaders came to the side of smallish but powerful groups of PIE speaking immigrants with a strong hierarchical system of social order. Joining the powerful network of foreign chiefs who had good weapons and military backing plus widely appreciated luxury goods as external marks of their power would guarantee local leaders keeping their former position and other advantages. The loyalty of the new members of the network could be guaranteed by matrimonial alliances.

The formation and cultural affinity of the Sejma-Turbino network has been, and continues to be, much debated. (The principal works on Sejma-Turbino

network are Chernykh & Kuz'minykh 1987; 1989; 1994; Chernykh 1992: 190–234; 2009; and Kuz'minykh 2011, with new material; cf. also Carpelan & Parpola 2001: 99–111; Parzinger 2006: 257, 272, 280–312, 336; and Koryakova & Epimakhov 2007: 104–110.) 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 the Mid- and South Trans-Urals, including the important cemeteries of Sejma and Turbino), the *Sintashta culture* (in the southeast Urals), the *Petrovka culture* (in the Tobol-Ishim steppe), the *Taskovo-Loginovo* cultures (on the Mid- and Lower Tobol and the Mid-Irtysh), the *Samus' culture* (on the Upper Ob, with the important cemetery of Rostovka), the *Krotovo culture* (from the forest steppe of the 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 Minusinsk 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 latter part, being currently dated to the pre-Andronovo horizon of c. 2100–1800 BCE (cf. Parzinger 2006: 244–312 and 336; Koryakova & Epimakhov 2007: 104–105).

The majority of the Sejma-Turbino objects are of the better quality tin-bronze, and while tin is absent in the Urals, the Altai and Sayan mountains are an important source of both copper and tin. Tin is also available in southern Central Asia. Chernykh & Kuz'minykh have accordingly suggested an eastern origin for the Sejma-Turbino network, backing this hypothesis also by the depiction on the Sejma-Turbino knives of mountain sheep and horses characteristic of that area. However, Christian Carpelan has emphasized that the local Afanas'ev and Okunevo metallurgy of the Sayan-Altai area was initially rather primitive, and could not possibly have achieved the advanced and difficult technology of casting socketed spearheads as one piece around a blank. Carpelan points out that the first spearheads of this type appear in the Middle Bronze Age Caucasia c. 2000 BCE, diffusing early on to the Mid-Volga-Kama-southern Urals area, where “it was the experienced Abashevo craftsmen who were able to take up the new techniques and develop and distribute new types of spearheads” (Carpelan & Parpola 2001: 106, cf. 99–106, 110). The animal argument is countered by reference to a dagger from Sejma on the Oka river depicting an elk's head, with earlier north European prototypes (Carpelan & Parpola 2001: 106–109).

Also the metal analysis speaks for the Abashevo origin of the Sejma-Turbino network. Out of 353 artefacts analyzed, 47% were of tin-bronze, 36% of arsenical bronze, and 8.5% of pure copper. Both the arsenical bronze and pure copper are very clearly associated with the Abashevo metallurgy. While the tin-bronze dominates in Siberia, it covers less than 30% of the European artefacts; arsenical bronze covers 45% and pure copper 10% of the European material, but their distribution in Siberia is very small (cf. Chernykh 1992: 222–224). However, objects made of pure copper have been found in the Altai (cf. Chernykh & Kuz'minykh 1987: 94, map 20) suggesting the arrival of initial prospectors from an early phase of the Uralic Abashevans not yet mining arsenical copper.

The Abashevo metal production was based on the Volga-Kama-Belaya area sandstone ores of pure copper and on the more easterly Urals deposits of arsenical copper (Figure 9). The Abashevo people, expanding from the Don and Mid-Volga to the Urals, first reached the westerly sandstone deposits of pure copper in the Volga and Kama basins, and started developing their metallurgy in this area, before moving on to the eastern side of the Urals to produce harder weapons and tools of arsenical copper. Eventually they moved even further south, to the area richest in copper in the whole Urals region, founding there the very strong and innovative Sintashta culture. I suggest that while the majority of the Proto-(Indo-)Aryan elite moved to the eastern side of the Urals, the Aryan speakers remaining in the Volga-Kama area of pure copper, now less numerous, started speaking Proto-Uralic as their first language, but retained an ability to

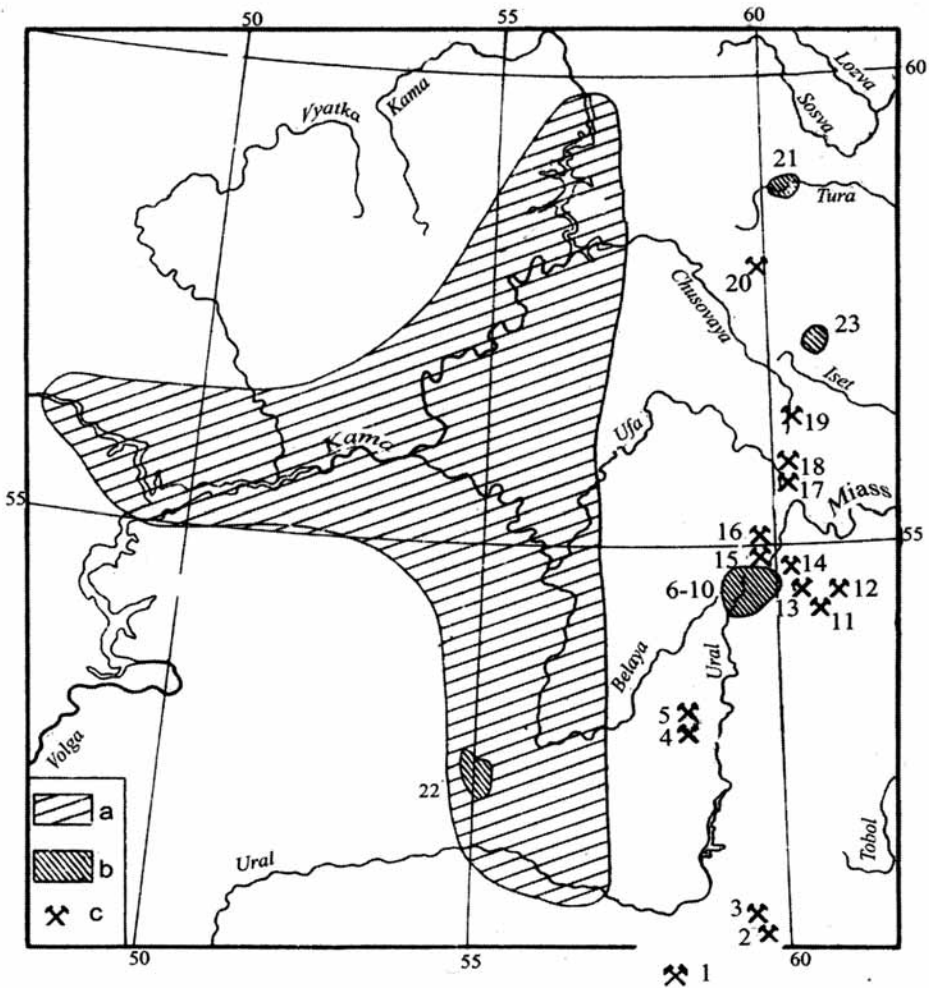


Figure 9. Distribution of the Urals copper deposits: (a) area of copper sandstone ores, (b) groups of mines, (c) copper deposit. After Koryakova & Epimakhov 2007: 29, fig. 1.1.B, where the names of the 23 numbered deposits are given; based on Chernykh 1970.

communicate in Proto-(Indo-)Aryan with the emerging eastern wing of the Sejma-Turbino network. In this way Proto-Uralic would have become the language of the European side of the Sejma-Turbino metal production and its network of warrior traders there. The Siberian side of the Sejma-Turbino network, with its tin-bronze production, undoubtedly was in the hands of the Proto-(Indo-)Aryan speakers of the very strong Sintashta and Petrovka cultures.

If these considerations hold good, the Proto-Uralic speakers would have descended from the Chalcolithic cultures of the Kama-Vyatka basins, the *Novo-I'ın, Garino-Bor, and Yurtik cultures* (cf. Nagovitsin 1987) and possibly also their neighbours in the Belaya basin. These in turn would have descended from the sub-Neolithic *Volgo-Kama and Kama cultures* (cf. Krizhevskaya 1996). In the maps of Oshibkina (1996: 138–139), the neighbouring culture of the Belaya basin is the *Dnepro-Èlb* alias *Agidel'*. Carpelan (2006: 84), in a passage already quoted above, points out that the Early Mesolithic population of the Kama-Ural region hails from the south or southeast Europe, and has no connection with the post-glacial populations coming from the western and central European refugia. The identification of the Volgo-Kama and Kama cultures as the homeland of Early Proto-Uralic places it rather close to the assumed homeland of Early Proto-Indo-European, the Khvalynsk culture of the Samara region on the Lower Volga. The very earliest recognizable loanwords of Proto-Uralic are from Early PIE (cf. Koivulehto 1991; 1999ab; 2000; 2001).

The type site Turbino of the Sejma-Turbino network is situated on the Kama river, and the Garino-Bor culture was originally called the *Turbino culture* (cf. Bader 1961; Gimbutas 1965: 611–647); the name was later changed so as not to confuse the Garino-Bor culture with the Sejma-Turbino network. From the 1950s to 1970s, the leading Russian archaeologists specializing in the Kama region (Otto N. Bader, P. N. Tret'yakov, his son V. P. Tret'yakov and A. Kh. Khalikov) thought that the Volosovo culture resulted from a massive westward expansion of the Garino-Bor culture, and they placed the original homeland of the Uralic languages in the Kama-Vyatka area. Later archaeological research has however suggested that the similarities between these two cultures do not date from the beginning of the Volosovo culture but are due to a later expansion of the Volosovo culture into the Kama-Vyatka area (cf. Krajnov 1987a: 25–26). Yet “all the Volosovo metalwork is made from chemically extremely pure copper, fully comparable with the copper-bearing sandstones of the western Ural region (Chernykh and Kuzminykh 1977). A very similar picture emerges from the numerous settlements of the Garin[o]-Bor culture. The metal forms are also very limited...” (Chernykh 1992: 187). Jaakko Häkkinen (2012: 95) has pointed out that the people of the Garino-Bor culture, who possessed the metal sources, have a much greater possibility to be correlated with Proto-Uralic speakers than the Volosovo people who until the late phase of their culture lacked metal sources.

Kallio (2004: 131–133; 2006: 7) and Häkkinen (2009: 25–28, 50; 2012: 95) have added a weighty argument supporting these considerations. Proto-Uralic had native terms connected with metallurgy, as well as terms connected with trade involving precious artifacts and social elite borrowed from Proto-(Indo-)

Aryan. The most important native term is **wäska* ‘copper/bronze’, which has become **wesä* in Proto-Samoyedic. In addition Proto-Uralic had two terms for ‘tin’ or ‘lead’, **äsa* and **olna/*olni*, of which the former occurs in the compound **äsa-wäska* and thus clearly denotes an alloy of copper (cf. also Napol’skikh 2009). Uralic **weŋci* ‘knife’ may have been borrowed into Early Proto-Aryan to become Late Proto-Aryan **wāci* ‘knife, awl, axe’. Proto-(Indo-)Aryan loanwords in Proto-Uralic include the numerals 100 (**šata/*šeta* < **čata-/*šata-*) and 1000 (**šosra* < **žhasra-*) and **asera/*asira* ‘prince, lord’ < **asura-* ‘lord’. The metal term **sērña* ‘gold’ is from Proto-Iranian **zaranya-* and probably slightly later (possibly from the short period when the Abashevo area was taken over by the early Srubnaya or Timber Grave culture).

It seems clear that **wäska* harks back to the primitive native metallurgy, while **äsa-wäska* denotes the tin-bronze produced in, and imported from, the eastern wing of the Sejma-Turbino network. To the above words I would like to add Proto-Uralic **ora* ‘awl’ from Proto-Indo-Aryan **ārā* ‘awl’ (cf. Koivulehto 2001: 248; note that the word is not attested in Iranian). Yet another word for a metal object is probably Proto-West-Uralic **wašara* ‘hammer, axe’, from Proto-(Indo-)Aryan **waj’ra-* ‘weapon of the war-god’ (cf. Parpola 2005a: 25) originally denoting the axe or mace of the Sejma-Turbino warriors. The Proto-Indo-Aryan compound **madhu-šišta-*, preserved in Sanskrit *madhu-šišṭa-* ‘beeswax’, literally ‘what is left over of honey’, survives in Komi *mašis* ‘beeswax’, and the latter part of the compound is found also in Mordvin Mari and Udmurt with the meaning ‘beeswax’. This word denotes material important for metal casting, and this word (or even the verb *šis-* ‘to leave’ from which it is derived) has no cognate in any of the Iranian languages. (Cf. Carpelan & Parpola 2001: 123–126; for the absence of an Iranian counterpart to Proto-Indo-Aryan **šiš-* ‘to leave’, cf. Cheung 2006: 328.) The word for ‘honey’ has been borrowed into Proto-Uralic already from Early Proto-Aryan **medhu-* as **mete-*; it was used to prepare alcoholic drinks, which played an important role in the life of the early Indo-European and Aryan elites and were part of their chiefdom rituals (cf. Carpelan & Parpola 2001: 115–122; Parpola 2005a: 39–41; 2008: 45–48; Sherratt 1987; 1997: 376–402). Proto-Uralic **arva-* ‘price, value’ comes from Proto-Aryan **argha-* ‘price, value’ (Koivulehto 1999a: 216). Also several central Proto-Aryan religious terms have become part of Proto-Uralic, including **juma-* ‘god, highest god, heaven’ < **dyuma(n)t-* ‘heavenly, shining, epithet of Indra, the god of thunder and war’ (cf. Koivulehto 1999a: 228), Proto-Finnic **sampas* ‘pillar, world pillar’ < Proto-Indo-Aryan **stambha-s* ‘pillar, world-pillar’ (cf. Koivulehto 1999: 230; Parpola 2005a: 36–54).

After Paasonen (1923: 17), many Uralists, especially Péter Hajdú (1964; 1969; 1975; 1987), have placed the Uralic homeland in the neighbourhood of the Ural mountains, because Proto-Uralic had words for the Cembra pine, **siksi*, and the Siberian fir, **nulka*, and these trees do not grow west of the Kama and Pechora rivers. Jaakko Häkkinen (2009: 34–37 and 43–44; cf. also Janhunen 2009: 71) emphasizes that these words cannot have entered the Uralic protolanguage or its preforms in a region where these trees were unknown.

Häkkinen (2009: 33–34) also repeats the old argument (cf. Napol'skikh 1995: 3) that the original homeland of a language family is likely to be where its earliest branching has taken place, and this principle points to the Kama-Vyatka area. This agrees also with the idea of “centre of gravity” employed in determining homeland areas (cf. Mallory 1989: 152–153 and Figure 3 above), whereas the earlier assumed Volosovo homeland is on the western side of the language continuum. According to Häkkinen’s novel analysis (2007, 2009), the disintegration of Proto-Uralic did not start with the separation of the Samoyedic branch, but with the division of Proto-Uralic into a western, central and eastern group. Until recently, “Finno-Ugric” has denoted the other main branch of the Uralic language family as opposed to “Samoyedic”. With the inclusion of Samoyedic in the Ugric branch, as in this paper, this early node of the family tree disappears and “Finno-Ugric” becomes synonymous with “Uralic”.

If the above considerations are right, the early Indo-Iranian loanwords in Proto-Uralic should date from between c. 2250 and 1600 BCE. These loanwords attest to an earlier and a later stage of development, the former represented by such Proto-Uralic words as **mekše* ‘bee’, **kekrä* ‘circular thing, cycle’, **kesträ* ‘spindle’, the latter by **ćata/*śata* ‘hundred’ (cf. Koivulehto 2001). The earliest contact with Early Proto-Indo-Aryan seems to have taken place between the mid-Volga and the Urals (Abashevo and related cultures), while the earliest contact with Early Proto-Iranian (and West Uralic) seems to have taken place in the Upper Volga region (Pozdnyakovo culture).

Central Uralic: Mari (Cheremish) branch

The Mid-Volga *Chirkovo culture* (c. 1800–800 BCE) resulted from the fusion of the cultures which had during the Early Bronze Age occupied the area between the mouth of Oka and Vyatka: Volosovo, Balanovo and Abashevo. Its early phase includes the cemetery of Sejma on the Lower Oka, one of the type sites of the Sejma-Turbino network. It is significant that there is evidence also of the presence of people belonging to the Krotovo culture, one of the participants of the Sejma-Turbino network far away in Siberia (from the forest steppe of the Mid-Irtysh to the Baraba steppe on the Upper Ob, with the important cemetery of Sopka 2) (on the Chirkovo culture, cf. Khalikov 1987a). I have already discussed the transformation of the Chirkovo culture into the *Akozino-Akhmylovo culture* (c. 800–300 BCE) as a result of the Netted Ware expansion around 1000 BCE, and suggested that part of the immigrant Netted Ware elite traded Akozino-Mälär axes to Finland and eastern central Sweden around 800–500 BCE and introduced the Finnic language there. This language of the Netted Ware elite, along with the later influence of Mordvin-correlated Gorodets culture, should have given some West Uralic tinge to the future Mari language, which in the sequel developed in close contact with the Proto-Permic language of the neighbouring Anan’ino culture. Both Akhmylovo and Anan’ino were important centres of metallurgy that had close relations with the Iranian-speaking cultures of the steppe.

Central Uralic: Permic branch

The *Kazan (Prikazan) culture* (c. 1900–800 BCE) in the Vetluga-Volga-Vyatka interfluvium came into being on the basis of the immediately preceding eastern Volosovo/Garino-Bor culture (from which it inherited all principal elements of its culture), but with a strong and clear influence from the local Abashevo and Early Srubnaya (Pokrovo) cultures (cf. Khalikov 1980: 52a; 1987b). The bronzes of the first phase are of the Sejma-Turbino type. The Kazan culture eventually comprized the Kama and Belaya basins as well as areas of the Mid-Volga nearly up to Samara in the south.

Via its final *Maklasheevka* phase (c. 1000–800 BCE), the Kazan culture was succeeded by the powerful *Anan'ino culture* (c. 800–200 BCE).

With its flourishing metal industry the Anan'ino culture exerted much influence both east and west, to the Urals as well as to northern Fennoscandia (cf. Patrushev 2000: 89–99; Koryakova & Epimakhov 2007: 252–261; Lavento 2001: 38; Kuz'minykh 2006). “It is commonly accepted by archaeology, ethnography, and linguistics that the ancestors of the Permian peoples (the Udmurts, Komi-Permians, and Komi-Zyryans) left the sites of Ananyino cultural intercommunity” (Koryakova & Epimakhov 2007: 260). The sudden upsurge of the Anan'ino and Akhmylovo cultures around 800 BCE is associated with the connections that from the beginning they had with the Iranian-speaking cultures of the southern steppes (cf. Koryakova & Epimakhov 2007: 194; Smirnov 1998).

The Anan'ino culture eventually split into two cultures connected with Proto-Udmurt and Proto-Komi respectively, namely the *P'yanobor culture* (c. 300 BCE – 200 CE) on the Vyatka, Mid- and Lower Kama, and Lower Belaya rivers (cf. Koryakova & Epimakhov 2007: 261–273; Patrushev 2000: 162–171; Ageev 1992), and the *Glyadenovo culture* (c. 200 BCE – 500 CE) on the Upper Kama (cf. Koryakova & Epimakhov 2007: 273–276; Kuz'minykh 2006). Continuing the Anan'ino tradition, the P'yanobor culture exerted some influence as far west as Finland (cf. Carpelan 2006: 87). Even in the 7th and 8th centuries CE, Finland received Permian imports coming from the *Lomovatovo culture* on the Kama (cf. Hirviluoto 1986).

East Uralic (Proto-Ugro-Samoyedic)

East Uralic is posited by Jaakko Häkkinen (2009: 11–16) on the basis of several phonological innovations that the Samoyed languages share with the Ugric languages. This implies some period of separate East Uralic existence before the Samoyed languages moved far to east.

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 of the Abashevo culture were on the eastern side of the Urals (cf. Figure 7). 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), then the Fëdorovo (c. 1850–1450 BCE) (cf. Parzinger 2006: 257–261; 357–361).

The strong Fëdorovo influence on the Late Garino-Bor culture resulted in the emergence of the ***Cherkaskul' culture*** (c. 1850–1500 BCE) in Bashkiria (where it had the related Kazan culture as its western neighbour) and the Mid- and South Trans-Urals (up to the Lower Ishim in the east), that is, 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 local hunter-fisher population (cf. Kosarev 1981; 1987; 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, and many sites have produced also pottery mixing the characteristics of Cherkaskul' & Fëdorovo types (cf. Chlenova 1981 and Figure 10).

Proto-Samoyedic

Christian Carpelan suggested that the Samoyed branch may have separated from Proto-Uralic in connection with the Sejma-Turbino trade network (cf. Carpelan 1999: 270; Carpelan & Parpola 2001: 109). With the Sejma-Turbino phenomenon now correlated with the disintegration of Proto-Uralic, I suggest a slightly later alternative solution that is in agreement with Jaakko Häkkinen's East Uralic as the source of both Proto-Ugric and Proto-Samoyedic.

Nataliya L'vovna Chlenova (1929–2009; cf. Korenyako & Ku'zminykh 2011) published in 1981 a detailed study of the Cherkaskul' pottery. In her carefully prepared maps of 1981 and 1984 (Figure 10), she plotted ***Cherkaskul' monuments*** not only in Bashkiria and the 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 the best experts suppose the homeland of Proto-Samoyed to be (cf. below). Some distance further west, on the Ishim river and north of the Baikal Sea, Chlenova's maps record concentrations of Cherkaskul' monuments along with Fëdorovo monuments.

Hermann Parzinger (2001) has discussed the Fëdorovo graves of southern Siberia (Minusinsk basin), concluding that they clearly represent a migration from the west. This is supported by their dating, c. 1850–1450 BCE according to Parzinger (2006: 381 and 357), but now more accurately dated from samples of human bone to c. 1680–1500 BCE (Svyatko et al. 2009: 251). The Fëdorovo graves and their goods including pottery have no local precedent, on the contrary they differ in all respects from the earlier local Okunevo culture (2400–1950 BCE in Minusinsk according to Svyatko et al. 2009: 249). The shape and ornamentation of the Fëdorovo pottery have developed from the Petrovka pottery of the southern Urals and northwest Kazakhstan, where they have a local Copper Age background. The target of this long migration may have been the local copper and tin resources, very important for the production of high quality weapons (cf. Parzinger 2006: 357). Parzinger also refers to southern Turkmenistan, where Fëdorovo pottery also testifies to a long distance migration. According to Chlenova (1981), Fëdorovo pottery occurs in the company of Cherkaskul' Ware in south Turkmenistan as well. Proto-Samoyed has a number of Aryan loanwords,

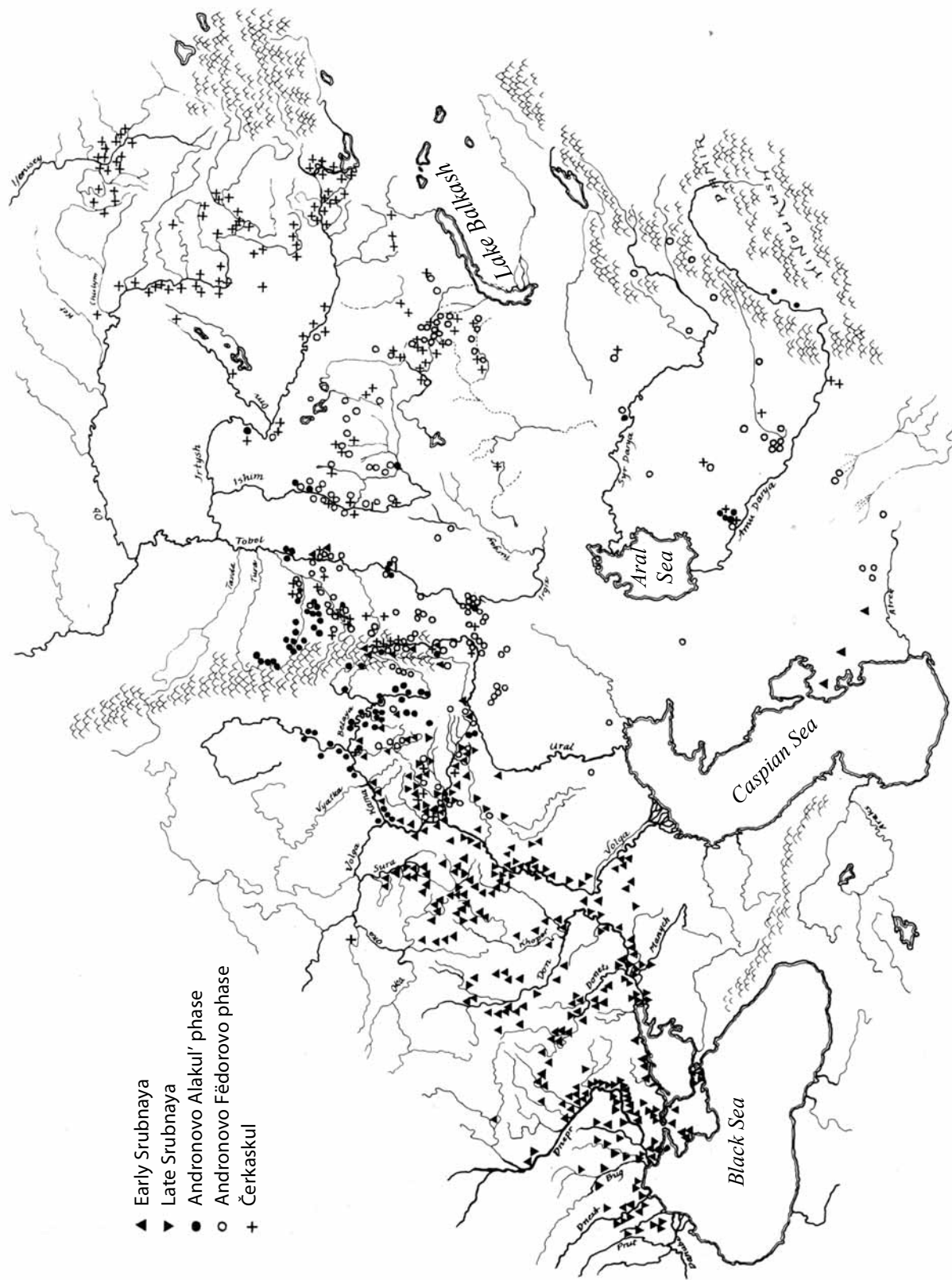


Figure 10. Distribution of Srubnaya (Timber Grave, early and late), Andronovo (Alakul' and Fedorovo variants) and Čerkaskul' monuments. After Parpola 1994: 146, fig. 8:15, based on the work of N. L. Chlenova (1984: map facing page 100).

though in some cases clearly from the Iranian branch (cf. Lehtisalo 1924; Janhunen 1983); however, there are at least three examples of Aryan loanwords borrowed into Pre-Proto-Samoyed corresponding to the Proto-Uralic level (cf. Kallio, in press, footnote 4; cf. also Aikio 2002: 52; J. Häkkinen 2009: 25).

Juha Janhunen, author of the etymological dictionary of the Samoyed languages (1977), places the homeland of Proto-Samoyedic in the Minusinsk basin on the Upper Yenissei (cf. Janhunen 2009: 72). Mainly on the basis of Bulghar Turkic loanwords, Janhunen (2007: 224; 2009: 63) dates Proto-Samoyedic to the last centuries BCE. Janhunen thinks that the language of the *Tagar culture* (c. 800–100 BCE) ought to have been Proto-Samoyedic (cf. Janhunen 1983: 117–118; 2009: 72; Parzinger 2001: 80 and 2006: 619–631 dates the Tagar culture c. 1000–200 BCE; Svyatko et al. 2009: 256, based on human bone samples, c. 900 BCE to 50 CE). The Tagar culture largely continues the traditions of the *Karasuk culture* (c. 1400–900 BCE), which according to a widely accepted view came into being as a result of a migration of different people from the southeast, from the periphery of Shang period China. The beginning of the Karasuk period marked also the return of some Okunevo traditions that did not manifest themselves during the Fëdorovo period (cf. Parzinger 2001: 78). This intervention and subsequent assimilation of foreign people speaking a wholly different language can be expected to have had considerable influence on Proto-Samoyedic. In view of the Tokharian-like loanwords identified in Proto-Samoyedic (cf. Janhunen 1983) and vice versa (cf. Kallio's 2004), it is significant that in the Minusinsk basin, the Okunevo culture was preceded by the *Afanas'ëvo culture* (c. 2750–2450 BCE, cf. Svyatko et al. 2009: 247), in which an Indo-European language related to Proto-Tokharian was very probably spoken (cf. above on the Tokharian branch of Indo-European).

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 (cf. 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 (Figure 4 no. 8) that had a Fëdorovo and Cherkaskul' substratum and a roller pottery superstratum (cf. Parzinger 2006: 443–448; Koryakova & Epimakhov 2007: 161–170). Both the Cherkaskul' and the Mezhovka cultures are thought to have been Proto-Ugric linguistically, on the basis of the agreement

of their area with that of Mansi and Khanty speakers, who moreover in their Fëdorovo-like ornamentation have preserved evidence of continuity in material culture (cf. Chlenova 1984; Koryakova & Epimakhov 2007: 159, 175).

Proto-Mansi (Proto-Vogul)

The Mezhovka culture was succeeded by the genetically related *Gamayun culture* (c. 1000–700 BCE) (cf. Parzinger 2006: 446; 542–545). From Gamayunskoe descends the *Itkul' culture* (c. 700–200 BCE) distributed along the eastern slope of the Ural Mountains (cf. Parzinger 2006: 552–556). Known from 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-Ostyak)

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 Irmen', and Krasnozero cultures* (c. 900–500 BCE). Some were in contact with the Akhmylovo on the Mid-Volga. All these cultures of the forest steppe were later absorbed into the Sargat culture discussed below (cf. Parzinger 2006: 545–564, 679–681).

Proto-Hungarian

Hungarian belongs to the Mansic branch of the Ugric languages (cf. Janhunen 2009: 74). The Gamayunskoe culture also gave rise, via the *Vorob'evo Group* (c. 700–550 BCE) (cf. Parzinger 2006: 546–549), to the *Gorokhovo culture* (c. 550–400 BCE) of the Trans-Uralian forest steppe (cf. Parzinger 2006: 549–552). For various reasons the local Gorokhovo people started mobile pastoral herding and became part of the multicomponent pastoralist *Sargat culture* (c. 500 BCE to 300 CE), which in a broader sense comprized all cultural groups between the Tobol and Irtysh rivers, succeeding here the Sargary culture. The Sargat inter-community 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 is happy with the following correlation of 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 (cf. Fodor 1975: 72).

That the Ugric speakers were horsemen in ancient times is suggested by a number of equestrian terms in the Ugric languages (cf. Hajdú 1987: 331–333). Particularly interesting is the word for ‘horse’, Hungarian *ló*, Mansi *lū*, Khanty *law* < Proto-Ugric **lox*, which is neither of Uralic nor Indo-European origin, nor does it agree with any of the other Eurasian words for ‘horse’: Proto-Yeniseic had **kuqs* and Proto-Turkic **(x)at*, while all East Asian terms (Mongolic, Tungusic, Korean, Chinese, Japanese, Burmese, etc.) go back to Pre-Proto-Mongolic **mori* (cf. Janhunen 1998: 415–416). I suggest that the Ugric word comes from the language of the *Botaj culture* (c. 3700–3000 BCE) of northern Kazakhstan, 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, 99.9% of them horse (cf. Anthony 2007: 216–217; Parzinger 2006: 213–220).

4. Conclusion

As in the case of the Indo-European languages, it is thus possible to derive all the main Uralic languages from a common homeland to their later speaking areas through a chain of genetically connected archaeological cultures. The sketched correlations also seem to fit well the evidence of areal contacts given by loanwords, confirming Häkkinen’s new branching of the language family as well as suggesting dates for the nodes (Figure 11).

References

- Ageev, B. B. 1992: *P'yanoborskaya kul'tura*. Ufa: Bashkirskij nauchnyj tsentr.
- Aikio, Ante 2002: New and old Samoyed etymologies. – *Finnisch-Ugrische Forschungen* 57: 9–57.
- 2003: Suomen saamelaisperäisistä paikannimistä. – *Virittäjä* 107: 99–106.
- 2004: An essay on substrate studies and the origin of Saami. – Hyvärinen & al. (eds), 5–34.
- 2006: On Germanic-Saami contacts and Saami prehistory. – *Journal de la Société Finno-Ougrienne* 91: 9–55.
- 2009: *The Saami loanwords in Finnish and Karelian*. (Ph.D. thesis.) Oulu: Oulun yliopisto. <<http://cc.oulu.fi/~anaikio/slw.pdf>>
- Aikio, Ante & Aslak Aikio 2001: Heimovaelluksista jatkuvuuteen: Suomalaisen väestöhistorian tutkimuksen pirstoutuminen. – *Muinaistutkija* 2001 (4): 2–21. <http://cc.oulu.fi/~anaikio/Heimovaelluksista_jatkuvuuteen.pdf>
- Andersen, Henning 1998: Slavic. – Ramat & Ramat (eds), 415–453.
- Anthony, David W. 1995: Horse, wagon and chariot: Indo-European languages and archaeology. – *Antiquity* 69: 554–565.
- 1997: Migration as social process: Material and ideological constraints. – John Chapman & Helena Hamerow (eds), *Migrations and invasions in archaeological explanation*. BAR International Series 664. Oxford: Archaeopress, 21–32.
- 2007: *The horse, the wheel, and language: How Bronze-Age riders from the Eurasian steppes shaped the modern world*. Princeton: Princeton University Press.
- 2008: A new approach to language and archaeology: The Usatovo culture and the separation of Pre-Germanic. – *Journal of Indo-European Studies* 36 (1): 1–51.
- Artemenko, I. I. 1987a: Kul'tury shnurovoj keramiki (srednedneprovskaya, podkarpat-skaya, gorodoksko-dolbitskaya, stzhizhovskaya). – Bader & al. (eds), 35–51.
- 1987b: Komarovskaya kul'tura. – Bader & al. (eds), 113–115.
- Asplund, Henrik 2008: *Kymittae: Sites, centrality and long-term settlement change in the Kemiönsaari region in SW Finland*. Annales Universitatis Turkuensis, B: Humaniora 312. Turku: Turun yliopisto.
- Atkinson, Ronald 1989: The evolution of ethnicity among the Acholi of Uganda: The precolonial phase. – *Ethnohistory* 36: 19–43.
- Avanesova, N. A. & D. M. Dzhurakulova 2008: Drevnejshie nomady Zeravshana. – Sh. R. Pidaev (ed.), *Kul'tura nomadov Tsentral'noj Azii: Materialy mezhdunarodnoj konferentsii, Samarkand, 22–24 Noyabrya 2007*. Samarkand, Uzbekistan: Mezhdunarodnyj Institut Tsentral'noaziatskikh Issledovani. 13–33.
- Bader, O. N. 1961: *Poseleniya Turbinskogo tipa v srednem Prikam'e*. Materialy i Issledovaniya po Arkeologii SSSR 99. Moskva: Izdatel'stvo Akademii Nauk SSSR.
- Bader, O. N. & A. Kh. Khalikov 1987: Balanovskaya kul'tura. – Bader & al. (eds), 76–84.
- Bader, O. N., D. A. Krajnov & M. F. Kosarev (eds) 1987: *Èpokha bronzy lesnoj polosy SSSR*. Arkheologiya SSSR (ed. by B. A. Rybakov & al.). Moskva: Izdatel'stvo "Nauka".
- Bader, O. N. & T. B. Popova 1987: Pozdnyakovskaya kul'tura. – Bader & al. (eds), 131–135.
- Bakker, Jan Albert 2004: Die neolithischen Wagen im nördlichen Mitteleuropa. – Fansa & Burmeister (eds), 283–294.

- Balabina, Vera Igorevna 2004: Glinyanye modeli sanej kul'tury Kukuten'-Tripol'e i tema puty. – A. N. Gej (ed.), *Pamyatniki arkheologii i drevnego iskusstva: Sbornik statej pamyati Vitaliya Vasil'evicha Volkova*. Moskva: Rossijskaya Akademiya Nauk, Institut Arkheologii. 180–213.
- Bashen'kin, A. N. 1996: “Domik mertvykh” Kurevaniya-XX na r. Mologe. – A. N. Bashen'kin & V. Ya. Shumkin (eds), *Drevnosti russkogo severa*, 1. Vologda: Vologodskij pedagogicheskij universitet. 141–150.
- Benfey, Theodor 1869: *Geschichte der Sprachwissenschaft und orientalischen Philologie in Deutschland seit dem Anfange des 19. Jahrhunderts, mit einem Rückblick auf die früheren Zeiten*. Geschichte der Wissenschaften in Deutschland, 8. München: J. G. Cotta.
- Blažek, Václav 2007: From August Schleicher to Sergei Starostin: On the development of the tree-diagram models of the Indo-European languages. – *Journal of Indo-European Studies* 35 (1–2): 82–110.
<http://www.phil.muni.cz/jazyk/files/jazsveta_ieclass.pdf>
- Bobomulloev, Saïdmurâd 1997: Ein bronzezeitliches Grab aus Zardča Chalifa bei Pendžikent (Zeravšan-Tal). – *Archäologische Mitteilungen aus Iran und Turan* 29: 121–134.
- Bochkarev, V. S. & al. 2010. *Koni, kolesnitsy i kolesnichie stepej Evrazii / Horses, chariots and chariot's drivers of Eurasian steppes*. Yekaterinburg, Samara, Donetsk: Russian Academy of Sciences, Ural Branch, Institute of Plants and Animals Ecology.
- Carpelan, Christian 1999: Käännekohtia Suomen esihistoriassa aikavälillä 5100 ... 1000 eKr. – Fogelberg (ed.). 249–280.
- 2000: Essay on archaeology and languages in the western end of the Uralic zone. – Nurk & al. (eds). 7–38.
- 2001: Late Palaeolithic and Mesolithic settlement of the European north – possible linguistic implications. – Carpelan & al. (eds) 2001. 37–53.
- 2002a: Esihistorian vuosiluvut, ajoitukset ja kronologia. – Grünthal (ed.) 2002. 18–27.
- 2002b: Arkeologiset löydöt aikaportaina. – Grünthal (ed.) 2002. 188–212.
- 2003: Inarilaisten arkeologiset vaiheet. – Veli-Pekka Lehtola (ed.), *Inari – Aanaar: Inarin historia jääkaudelta nykypäivään*. Oulu: Inarin kunta. 28–95.
- 2006: On archaeological aspects of Uralic, Finno-Ugric and Finnic societies before AD 800. – Nuorluoto (ed.) 2006. 78–92.
- Carpelan, Christian & Asko Parpola 2001: Emergence, contacts and dispersal of Proto-Indo-European, Proto-Uralic and Proto-Aryan in archaeological perspective. – Carpelan & al. (eds). 55–150.
- Carpelan, Christian, Asko Parpola & Petteri Koskikallio (eds) 2001: *Early contacts between Uralic and Indo-European: Linguistic and archaeological considerations*. Mémoires de la Société Finno-Ougrienne 242. Helsinki: Société Finno-Ougrienne.
- Chernykh, E. N. 1970: *Drevnejshaya metallurgiya Urala i Povolzh'ya*. Moskva: “Nauka”.
- 1992: *Ancient metallurgy in the USSR: The early metal age*. Translated by Sarah Wright. New Studies in Archaeology. Cambridge: Cambridge University Press.

- 2007: *Kargaly: Fenomen i paradoksy razvitiya. Kargaly v sisteme metallurgicheskikh provintsij. Potaennaya (sakral'naya) zhizn' arkhainnykh gornjakov i metallurgov*. Kargaly, 5. Moskva: Yazyki slavyanskoj kul'tury.
- 2009: Formation of the Eurasian steppe belt cultures, viewed through the lens of archaeometallurgy and radiocarbon dating. – Bryan K. Hanks & Katheryn M. Linduff (eds), *Social complexity in prehistoric Eurasia: Monuments, metals, and mobility*. Cambridge: Cambridge University Press. 115–145.
- Chernykh, E. N. & S. V. Kuz'minykh 1977: O khimicheskom sostave metalla s volosovskikh poselenii verkhnego i srednego Povolzh'ya. – *Arkheologiya i ètnografiya Marijskogo kraya* 2: 88–95.
- 1987: Pamyatniki sejminsko-turbinskogo tipa v Evrazii. – Bader & al. (eds). 84–105.
- 1989: *Drevnyaya metallurgiya severnoj Evrasii (Sejminsko-Turbinskij fenomen)*. Moskva: Izdatel'stvo "Nauka".
- 1994: Die älteste Metallurgie Nordeuropas: Probleme der Wechselbeziehungen zwischen den erzeugenden Zentren. – *Journal de la Société Finno-Ougrienne* 85: 21–39.
- Chernykh, E. N. & L. B. Orlovskaya 2010: Radiouglerodnaya khronologiya Khvalynskikh nekropolej. – S. A. Agapov (ed.), *Khvalynskie èneoliticheskie mogil'niki i khvalynskaya èneoliticheskaya kul'tura*. Samara: Samarskaya regional'naya obshchestvennaya organizatsiya istoriko-èko-kul'turnaya assotsiatsiya "Povolzh'ye". 121–129.
- Cheung, Johnny 2006: *Etymological dictionary of the Iranian verb*. Leiden Indo-European Etymological Dictionary Series 2. Leiden: Brill.
- Childe, V. Gordon 1926: *The Aryans: A study of Indo-European origins*. The History of Civilization series. London: Kegan Paul, Trench and Trubner.
- Chlenova, N. L. 1981: Rasprostranenie i puti svyazej 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 sredneverkov'e: Istorija 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.
- Clackson, James 2007: *Indo-European linguistics: An introduction*. Cambridge: Cambridge University Press.
- Cunliffe, Barry 2008: *Europe between the oceans, 9000 BC – AD 1000*. New Haven & London: Yale University Press.
- Décsy, Gyula 1965: *Einführung in die finnisch-ugrische Sprachwissenschaft*. Wiesbaden: Otto Harrassowitz.
- Dergachev, Valentin A. 1998: Kulturelle und historische Entwicklungen im Raum zwischen Karpaten und Dnepr: Zu den Beziehungen zwischen frühen Gesellschaften im nördlichen Südost- und Osteuropa. – Hänsel & Machnik (eds). 27–64.
- 2002: *Die äneolithischen und neolithischen Metallfunde aus Moldavien*. Stuttgart: Franz Steiner Verlag.
- 2007: *O skipetrakh, o loshadyakh, o vojne: ètyudy v zashchitu migratsionnoj kontseptsii M. Gimbutas*. Sankt-Peterburg: Nestor.
- Dolukhanov, P. M. 1989: Prehistoric ethnicity in the north-east of Europe. – *Fennoscandia Archaeologica* 6: 81–84.

- Evdokimov, V. V. & V. G. Loman 1989: Raskopki yamnogo kurgana v Karagandinskoi oblasti. – V. V. Evdokimov (ed.), *Voprosy arkheologii tsentral'nogo i severnogo Kazakhstana: Sbornik nauchnykh trudov*. Karaganda: Karagandinskij gosudarstvennyj universitet. 34–46.
- Fansa, Mamoun & Stefan Burmeister (eds) 2004: *Rad und Wagen: Der Ursprung einer Innovation. Wagen im Vorderen Orient und Europa*. Archäologische Mitteilungen aus Nordwestdeutschland, Beiheft 40. Mainz am Rhein: Verlag Philipp von Zabern.
- Fodor, István 1975: Suomalais-ugrilaisen arkeologian pääongelmia. – Hajdú (ed.). 52–77.
— 1996: The Hungarian conquest. – István Fodor & al. (eds), *The ancient Hungarians*. Budapest: Hungarian National Museum. 13–18.
- Fogelberg, Paul (ed.) 1999: *Pohjan poluilla: Suomalaisten juuret nykytutkimuksen mukaan*. Bidrag till kännedom av Finland's natur och folk 153. Helsinki: Societas Scientiarum Fennica.
- Forsén, Jeannette 1992: *The twilight of the Early Helladics: A study of the disturbances in east-central and southern Greece towards the end of the Early Bronze Age*. Studies in Mediterranean archaeology and literature 116. Jonsered: Paul Åströms Förlag.
- Fortson, Benjamin W., IV 2004: *Indo-European language and culture: An introduction*. Blackwell textbooks in linguistics. Oxford: Blackwell Publishing.
- Francfort, Henri-Paul 2005: La Civilisation de l'Oxus et les Indo-Iraniens et Indo-Aryens en Asie centrale. – Gérard Fussman, Jean Kellens, Henri-Paul Francfort & Xavier Tremblay, *Āryas, Aryens et Iraniens en Asie centrale*. Publications de l'Institut de Civilisation Indienne, Fasc. 72. Paris: Diffusion De Boccard. 253–328 & ill. 1–29.
- Furholt, Martin 2003: Absolutchronologie und die Entstehung der Schnurkeramik. <http://www.jungsteinsite.uni-kiel.de/pdf/2003_furholt.pdf>
- Garrett, Andrew 1999: A new model of Indo-European subgrouping and dispersal. – S. S. Chang, L. Liaw & J. Ruppenhofer (eds), *Proceedings of the Twenty-Fifth Annual Meeting of the Berkeley Linguistics Society, February 12–15, 1999*. Berkeley: Berkeley Linguistics Society. 146–156.
— 2006: Convergence in the formation of the Indo-European subgroups: Phylogeny and chronology. – Peter Forster & Colin Renfrew (eds), *Phylogenetic methods and the prehistory of languages*. Cambridge: McDonald Institute for Archaeological Research. 139–151.
- Gening, V. F., G. B. Zdanovich & V. V. Gening 1992: *Sintashta: Arkheologicheskie pamyatniki arijskikh plemen Uralo-Kazakhstanskikh stepej I*. Chelyabinsk: Yuzhno-Ural'skoe knizhnoe izdatel'stvo.
- Gimbutas, Marija 1963: *The Balts*. Ancient Peoples and Places 33. London: Thames and Hudson.
— 1965: *Bronze Age cultures in central and eastern Europe*. The Hague: Mouton & Co.
— 1971: *The Slavs*. Ancient Peoples and Places 74. London: Thames and Hudson.
— 1977: The first wave of Eurasian steppe pastoralists into Copper Age Europe. – *Journal of Indo-European Studies* 5 (4): 277–337.
- Govedarica, Blagoje & Elke Kaiser 1997: Äneolithische abstrakte und zoomorphe Steinzepter Südost- und Osteuropas. – *Eurasia Antiqua* 2 (1996): 59–103.

- Grünthal, Riho (ed.) 2002: *Ennen, muinoin: Miten menneisyyttämme tutkitaan*. Tietolipas 180. Helsinki: Suomalaisen Kirjallisuuden Seura.
- 2007: The Mordvinic languages between bush and tree: A historical reappraisal. – Ylikoski & Aikio (eds). 115–135.
- 2008: Uralic ‘wheel’. – András Berczki, Márta Csepregi & László Klima (eds), *Ünnepi írások Berczki Gábor tiszteletére*. Urálsztikai Tanulmányok, 19. Szerk. Budapest: ELTE. 232–243.
- Grünthal, Riho & Petri Kallio (eds) 2012: *A Linguistic Map of Prehistoric Northern Europe*. Mémoires de la Société Finno-Ougrienne 266. Helsinki: Société Finno-Ougrienne.
- Gubaev, A., G. Koshelenko & M. Tosi (eds) 1998: *The archaeological map of the Murghab Delta: Preliminary reports 1990–95*. Istituto Italiano per l’Africa e l’Oriente, Centro scavi e ricerche archaeologiche, Reports and Memoirs, Series Minor, volume 3. Roma: ISIAO.
- Gusakov, M. G. & S. V. Kuz’minykh 2008: K voprosu o roli nositelej “setchatoj” i “strikhovannoj” keramiki v formirovanii kul’tur lesnoj polosy vostochnoj Evropy v rannem zheleznom veke. – *Kratkie Soobshcheniya Instituta Arkheologii RAN*, vypusk 222. 105–117.
- Hackman, Alfred 1905: *Die ältere Eisenzeit in Finnland, I: Die Funde aus den fünf ersten Jahrhunderten n. Chr.* Helsingfors: Finnische Altertumsgesellschaft.
- Hajdú, Péter 1964: Über die alten Siedlungsräume der uralischen Sprachfamilie. – *Acta Linguistica* 14: 47–83.
- 1969: Finnougrische Urheimatforschung. – *Ural-Altäische Jahrbücher* 41: 252–264.
- 1975: Sukulaisuuden kielellistä taustaa. – Hajdú (ed.). 11–51.
- (ed.) 1975: *Suomalais-ugrilaiset*. Helsinki: Suomalaisen Kirjallisuuden Seura.
- 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 murteutumisen vokaalivastaavuuksien valossa. Helsingin yliopisto: Suomalais-ugrilaisen kielentutkimuksen pro gradu -työ. <<http://urn.fi/URN:NBN:fi-fe20071746>>.
- 2009: Kantauralin ajoitus ja paikannus: perustelut puntarissa. – *Journal de la Société Finno-Ougrienne* 92: 9–56. <<http://www.sgr.fi/susa/92/hakkinen.pdf>>
- 2010: Jatkuvuusperustelut ja saamelaisen kielen leviäminen, 1–2. – *Muinaistutkija* 2010 (1) & (2). <<http://www.mv.helsinki.fi/home/jphakkin/jatkuvuus1.pdf>> <<http://www.mv.helsinki.fi/home/jphakkin/jatkuvuus2.pdf>>
- 2012: Early contacts between Uralic and Yukaghir. – Hyytiäinen & al. (eds). 91–101.
- Häkkinen, Kaisa 1996: *Suomalaisten esihistoria kielitieteen valossa*. Tietolipas 147. Helsinki: Suomalaisen Kirjallisuuden Seura.
- 2001: Prehistoric Finno-Ugric culture in the light of historical lexicology. – Carpelan & al. (eds) 2001. 169–186.

- Hänsel, Bernhard & Jan Machnik (eds) 1998: *Das Karpatenbecken und die osteuropäische Steppe*. Südosteuropa-Schriften 20. Prähistorische Archäologie in Südosteuropa 12. München: Südosteuropa-Gesellschaft & Rahden (Westfalen): Verlag Marie Leidorf GmbH.
- Hänsel, Bernhard & Stefan Zimmer (eds) 1994: *Die Indogermanen und das Pferd*. Archaeolingua 4. Budapest: Archaeolingua.
- Hirviluoto, Anna-Liisa 1986. Finland's cultural ties with the Kama region in the Late Iron Age especially in the light of pottery finds. – Ildikó Lehtinen (ed.), *Traces of the Central Asian culture in the north*. Mémoires de la Société Finno-Ougrienne 194. Helsinki: Société Finno-Ougrienne. 71–80.
- Hofstra, Tette 1985: *Ostseefinnisch und Germanisch: Frühe Lehnbeziehungen im nördlichen Ostseeraum im Lichte der Forschung seit 1961*. Groningen: [T. Hofstra].
- Huurte, Matti 2004: *9000 vuotta Suomen historiaa*. 8. painos. Helsinki: Otava.
- Hyvärinen, Irma, Petri Kallio & Jarmo Korhonen (eds) 2004: *Etymologie, Entlehnungen und Entwicklungen: Festschrift für Jorma Koivulehto zum 70. Geburtstag*. Mémoires de la Société Néophilologique de Helsinki 63. Helsinki: Société Néophilologique.
- Hyytiäinen, Tiina, Lotta Jalava, Janne Saarikivi & Erika Sandman (eds) 2012: *Per Urales ad Orientem. Iter polyphonicum multilingue. Festschrift tillägnad Juha Janhunen på hans sextioårsdag den 12 februari 2012*. Mémoires de la Société Finno-Ougrienne 264. Helsinki: Société Finno-Ougrienne.
- Isakov, A. I. 1993: Sarazm et la civilisation de l'Asie centrale. – *Dossiers d'Archéologie* 185: 28–35.
- Itkonen, Terho 1984: Suomessa puhutun suomen kantasuomalaiset juuret. – Jarl Gallén (ed.), *Suomen väestön esihistorialliset juuret. Tvärminnen symposiumi 17.–19.1.1980*. Bidrag till kännedom av Finlands natur och folk 131. Helsinki: Societas Scientiarum Fennica. 347–363.
- 1997: Reflections on the Pre-Uralic and the “Saami-Finnic protolanguage”. – *Finnisch-Ugrische Forschungen* 54: 229–266.
- Ivanov, Vyacheslav V. 1999: Palatalization and labiovelars in Luwian. – Karlene Jones-Bley, Martin E. Huld, Angela Della Volpe & Miriam Robbins Dexter (eds), *Proceedings of the Tenth Annual UCLA Indo-European Conference*. Journal of Indo-European Studies Monograph series 32. Washington, D. C.: Institute for the Study of Man. 29–48.
- Izbitser, Yelena 1998. Wheeled vehicles and the home of the Indo-Europeans. – Angela della Volpe in collaboration with Edgar C. Polomé (ed.), *Proceedings of the Seventh Annual UCLA Indo-European Conference, Los Angeles, 1995*. Journal of Indo-European Studies Monograph 27. Washington D.C.: Institute for the Study of Man. 144–149.
- Janhunen, Juha 1977: *Samojedischer Wortschatz: Gemeinsamojedische Etymologien*. Castrenianumin toimitteita 17. Helsinki: Helsingin yliopisto, Castrenianum.
- 1983: On early Indo-European–Samoyed contacts. – *Symposium saeculare Societatis Fenno-Ugricae*. Mémoires de la Société Finno-Ougrienne 185. Helsinki: Société Finno-Ougrienne. 115–127.
- 1998: The horse in East Asia: Reviewing the linguistic evidence. – Mair (ed.). I. 415–430.
- 2001: Indo-Uralic and Ural-Altaiic: On the diachronic implications of areal typology. – Carpelan & al. (eds) 2001. 207–220.

- 2007: The primary laryngeal in Uralic and beyond. – Ylikoski & Aikio (eds). 203–227.
- 2009: Proto-Uralic: What, where, and when? – Jussi Ylikoski (ed.), *The Quasquicentennial of the Finno-Ugrian Society*. Mémoires de la Société Finno-Ougrienne 258. Helsinki: Société Finno-Ougrienne. 57–78.
- Johannsen, Niels & Steffen Laursen 2010: Routes and wheeled transport in late 4th–early 3rd millennium funerary customs of the Jutland peninsula: Regional evidence and European context. – *Praehistorische Zeitschrift* 85: 15–58.
- Junttila, Santeri 2009: Kantasuomalais-balttilaisten kontaktien tutkimuksen alkuvaiheita. – *Journal de la Société Finno-Ougrienne* 92: 57–78.
- 2012: The prehistoric context of the oldest contacts between Baltic and Finnic languages. – Grünthal & Kallio (eds). 261–296.
- Jutikkala, Eino & Kauko Pirinen 2002: *Suomen historia*. Kuudes, uudistettu painos. Helsinki: WSOY.
- Kaiser, Elke 2003: *Studien zur Katakombengrabkultur zwischen Dnepr und Prut*. Archäologie in Eurasien, Band 14. Mainz: Verlag Philipp von Zabern.
- Kallio, Petri 1998: Vanhojen balttilaisten lainasanojen ajoittamisesta. – Riho Grünthal & Johanna Laakso (eds), *Oekeeta asijoo: Commentationes Fenno-Ugricae in honorem Seppo Suhonen sexagenarii 16.V.1998*. Mémoires de la Société Finno-Ougrienne 228. Helsinki: Société Finno-Ougrienne. 209–217.
- 2004: Tocharian loanwords in Samoyed? – Hyvärinen & al. (eds). 129–137.
- 2006: Suomen kantakielten absoluuttista kronologiaa. – *Virittäjä* 110 (1): 2–25. <http://www.kotikielenseura.fi/virittaja/hakemistot/jutut/2006_2.pdf>
- 2007: Kantasuomen konsonanttihistoriaa. – Ylikoski & Aikio (eds). 229–249.
- 2008: On the “Early Baltic” Loanwords in Common Finnic. – Alexander Lubotsky, Jos Schaeken & Jeroen Wiedenhof (eds), *Evidence and Counter-Evidence: Essays in Honour of Frederik Kortlandt, I: Balto-Slavic and Indo-European Linguistics*. Studies in Slavic and General Linguistics 32. Amsterdam & New York: Rodopi. 265–277.
- 2012: The Prehistoric Germanic Loanward Strata in Finnic. – Grünthal & Kallio (eds). 225–238.
- in press: The language contact situation in prehistoric northeastern Europe. – Robert Mailhammer and Theo Venneman (eds), *Linguistic roots of Europe*. Copenhagen: Museum Tusulanum Press.
- Kallio, Petri, Jorma Koivulehto & Asko Parpola 1997: “Kantagermaanin suomalais-ugrilainen substraatti”: perusteeton hypoteesi. – *Tieteessä tapahtuu* 1997 (8): 47–51. <http://helsinki.academia.edu/PetriKallio/Papers/1159605/Kantagermaanin_suomalais-ugrilainen_substraatti_perusteeton_hypoteesi>
- 1998: “Kantagermaanin suomalais-ugrilainen substraatti”: edelleen perusteeton hypoteesi. – *Tieteessä tapahtuu* 1998 (3): 45–48. <<http://www.tieteessatapahtuu.fi/983/kallioym.html>>
- Kettunen, Lauri & Martti Vaula 1938: *Suomen kielioppi sekä tyyl- ja runo-opin alkeet oppikouluille ja seminaareille*. Porvoo & Helsinki: Werner Söderström Osakeyhtiö.
- Khalikov, A. Kh. 1977: *Volgo-Kam'e v nachale èpokhi rannego zheleza (VIII–VI v.v. do n.è.)*. Moskva: Izdatel'stvo “Nauka”.

- 1980: *Prikazanskaya kul'tura*. Arkheologiya SSSR: Svod arkheologicheskikh istochnikov, B1–24. Moskva: Izdatel'stvo "Nauka".
- 1987a: Chirkovskaya kul'tura. – Bader & al. (eds). 136–139.
- 1987b: Prikazanskaya kul'tura. – Bader & al. (eds). 139–146.
- Kiparsky, Valentin 1963: *Russische historische Grammatik, I: Die Entwicklung des Lautsystems*. Slavica, Neue Folge. Heidelberg: Carl Winter – Universitätsverlag.
- Kivikoski, Ella 1961: *Suomen esihistoria*. Suomen historia, 1. Porvoo ja Helsinki: Werner Söderström Osakeyhtiö.
- Kohl, Philip L. 2004: Modeli transformatsii kul'tury: Ot osedlykh zemledel'tsev k skotovodam. (Tripol'e i kurgannye kul'tury.) – *Rossijskaya Arkheologiya* 2004 (4): 95–103.
- 2007: *The making of Bronze Age Eurasia*. Cambridge World Archaeology. Cambridge: Cambridge University Press.
- Koivulehto, Jorma 1991: *Uralische Evidenz für die Laryngaltheorie*. Österreichische Akademie der Wissenschaften, Philosophisch-historische Klasse, Sitzungsberichte, Band 566. Wien: Verlag der Österreichischen Akademie der Wissenschaften.
- 1999a: Varhaiset indoeurooppalaisyhteistyön aika ja paikka lainasanojen valossa. – Fogelberg (ed.). 207–236.
- 1999b: *Verba mutuata: Quae vestigia antiquissimi cum Germanis aliisque Indo-Europaeis contactus in linguis Fennicis reliquerint*. Edidit Klaas Ph. Ruppel. Mémoires de la Société Finno-Ougrienne 237. Helsinki: Société Finno-Ougrienne.
- 1999c: Das Verhältnis des Ostseefinnischen und Lappischen im Lichte der älteren Lehnwörter: Die Substitution des fremden Wortausgangs *CVz im Lappischen. – Pekka Lehtimäki (ed.), *Sprachen in Finnland und Estland*. Wiesbaden. 7–22.
- 2000: Finno-Ugric reflexes of North-West Indo-European and early stages of Indo-Iranian. – Karlene Jones-Bley, Martin E. Huld & Angela Della Volpe (eds), *Proceedings of the Eleventh Annual UCLA Indo-European Conference, Los Angeles, June 4–5, 1999*. Journal of Indo-European Studies Monograph Series 35. Washington, D.C.: Institute for the Study of Man, Inc. 21–43.
- 2001: The earliest contacts between Indo-European and Uralic speakers in the light of lexical loans. – Carpelan & al. (eds). 235–263.
- 2006: Arkeologia, kielihistoria ja jatkuvuusteoria. – Mervi Suhonen (ed.). 153–165.
- Korenyako, V. A. & S. V. Kuz'minykh 2011: Nataliya L'vovna Chlenova: Ocherk nauchnoj biografii. – *Vestnik arkheologii, antropologii i ètnografii* 2011 (2): 36–46.
- Korhonen, Mikko 1981: *Johdatus lapin kielen historiaan*. Suomalaisen Kirjallisuuden Seuran Toimituksia 370. Helsinki: Suomalaisen Kirjallisuuden Seura.
- Koryakova, Ludmila & Andrej Epimakhov 2007: *The Urals and Western Siberia in the Bronze and Iron Ages*. Cambridge World Archaeology. Cambridge: Cambridge University Press.
- Kosarev, M. F. 1981: *Bronzovyj vek Zapadnoj Sibiri*. Moskva: Izdatel'stvo "Nauka".
- 1987: Vtoroj period razvitogo bronzovogo veka Zapadnoj Sibiri (andronovskaya èpokha). – Bader & al. 276–288.
- Kovalev, A. A., n.d.: Discovery of new cultures of the Bronze Age in Mongolia (according to the data obtained by the International Central Asiatic Archaeological Expedition). Cited from Mallory n. d.

- Krajnov, D. A. 1987a: Volosovskaya kul'tura. – Bader & al. (eds). 10–28.
 ——— 1987b: Fat'yanovskaya kul'tura. – Bader & al. (eds). 58–76.
- Krasnov, Yu. A. (ed.) 1974: *D'yakovskaya kul'tura*. Moskva: Izdatel'stvo "Nauka".
- Krenke, N. A. 2011: *D'yakovo gorodishche: Kul'tura naseleniya bassejna Moskvyy-reki v I. tys. do n. è – I tys. n. è*. Moskva: Institut Arkheologii, Rossijskaya Akademiya Nauk.
- Kriiska, Aivar & Andres Tvauri 2007: *Viron esihistoria*. Suomentaneet Hannu Oittinen & Andres Tvauri. Suomalaisen Kirjallisuuden Seuran Toimituksia 1105. Helsinki: Suomalaisen Kirjallisuuden Seura.
- Krizhevskaya, L. Ya. 1996: Srednee Povolzh'e, Volgo-Kam'e, Priural'e. – Oshibkina (ed.). 243–252.
- Kuz'mina, Elena E. 2007: *The origin of the Indo-Iranians*. Edited by J. P. Mallory. Leiden Indo-European Etymological Dictionary series 3. Leiden: Brill.
- Kuz'minykh, S. V. 1996: Osteuropäische und fennoskandische Tüllenbeile des Mälartyps: Ein Rätsel der Archäologie. – *Fennoscandia Archaeologica* 13: 3–27.
 ——— 2006: Final Bronze Age and Early Iron Age in the north of eastern Europe. – Mervi Suhonen (ed.). 75–84.
 ——— 2011: Sejminko-turbinskaya problema: Novye materialy. – *Kratkie soobshcheniya Instituta Arkheologii RAN*, vyp. 225: 240–263.
- Kuz'minykh, S. V. & A. A. Chizhevskij 2009: Anan'inskij mir: Vzgljad na sovremennoe sostoyanie problemi. – S. V. Kuz'minykh, A. A. Chizhevskij & G. R. Rudenko (eds), *U istokov arkheologii Volgo-Kam'ya: K 150-letiyu otkrytiya Anan'inskogo mogil'nika*. Arkheologiya Evrazijskikh stepej, vypusk 8. Elabuga: Institut Arkheologii AN RT. 29–55.
- Lang, Valter 2007: *The Bronze and Early Iron Ages in Estonia*. Estonian Archaeology 3. Tartu: Tartu University Press.
- Larsson, Lars-Gunnar 1990: Zum Problem der uralischen Urheimat. – *Linguistica Uralica* 26: 230–238.
- Laul, Silvia 1990: Die Ostseefinnen und ihre Nachbarvölker (im Licht des Vergleichs ihrer vorgeschichtlichen Gräberformen). – *Congressus septimus Fenno-Ugristarum, Debrecen 27.VIII–2.IX.1990. Sessiones sectionum. Dissertationes historicae, archaeologicae et anthropologicae*. Debrecen. 314–319.
- Lavento, Mika 2001: *Textile Ceramics in Finland and on the Karelian Isthmus. Nine variations and fugue on a theme of C. F. Meinander*. Suomen Muinaismuistoyhdistyksen Aikakauskirja 109. Helsinki: Suomen Muinaismuistoyhdistys.
- Lehtinen, Tapani 2007: *Kielen vuosituhannet: Suomen kielen kehitys kantaauralista varhaisuomeen*. Tietolipas 215. Helsinki: Suomalaisen Kirjallisuuden Seura.
- Lehtisalo, Toivo 1924: Zu den samojedisch-arischen Beziehungen. – *Kieli- ja kansatieteellisiä tutkielmia. Juhlakirja professori E. N. Setälän kuusikymmenvuotispäiväksi 27.II.1924*. Mémoires de la Société Finno-Ougrienne LII. Helsinki: Société Finno-Ougrienne. 156–159.
- Lichardus, Jan & Marion Lichardus-Itten 1998: Nordpontische Gruppen und ihre westlichen Nachbarn: Ein Beitrag zur Entstehung der frühen Kupferzeit Alteuropas. – Hänsel & Machnik (eds). 99–122.
- LIV 1998 = *Lexicon der indogermanischen Verben: Die Wurzeln und ihre Primärstammbildungen*. Unter Leitung von Helmut Rix und der Mitarbeit vieler anderer bearbeitet von Martin Kümmel, Thomas Zehnder, Reiner Lipp, Brigitte Schirmer. Wiesbaden: Dr Ludwig Reichert Verlag.

- Lyonnet, Bertille (avec la collaboration de A. Isakov et la participation de N. Avanesova) 1996: *Sarazm (Tadjikistan): Céramiques (Chalcolithique et Bronze Ancien)*. Mémoires de la Mission Française Archéologique en Asie Centrale, tome 7. Paris: Diffusion De Boccard.
- Mägi, Marika 2005: Mortuary houses in Iron Age Estonia. – *Estonian Journal of Archaeology* 9 (2): 93–131.
- Mair, Victor H. (ed.) 1998: *The Bronze Age and Early Iron Age peoples of Eastern Central Asia I–II*. Journal of Indo-European Studies Monograph 26. Washington, D.C.: Institute for the Study of Man.
- Mallory, J. P. 1981: The ritual treatment of the horse in the Early Kurgan tradition. – *Journal of Indo-European Studies* 9: 205–226.
- 1989: *In search of the Indo-Europeans: Language, archaeology and myth*. London: Thames and Hudson.
- 1994–95: The Indo-European homeland: An Asian perspective. – *Bulletin of the Deccan College Post-Graduate and Research Institute* 54–55: 237–254.
- 1997: The homelands of the Indo-Europeans. – Roger Blench & Matthew Spriggs (eds), *Archaeology and language* I. London: Routledge. 93–121.
- 1998: A European perspective on Indo-Europeans in Asia. – Mair (ed.). I. 175–201.
- 2001: Uralics and Indo-Europeans: Problems of time and space. – Carpelan & al. (eds). 345–366.
- 2002: Archaeological models and Asian Indo-Europeans. – Sims-Williams (ed.). 19–42.
- in press: The problem of Tokharian origins: An archaeological perspective.
- n. d.: Comments on Michael Frachetti. Intended for *Current Anthropology* 53 (1), 2012, but to be published elsewhere.
- Mallory, J. P. & D. Q. Adams (eds) 1997: *Encyclopedia of Indo-European culture*. London and Chicago: Fitzroy Dearborn Publishers.
- Mallory, J. P. & Victor H. Mair 2000: *The Tarim mummies: Ancient China and the mystery of the earliest peoples from the west*. London: Thames and Hudson.
- Maran, Joseph 2004a: Die Badener Kultur und ihre Räderfahrzeuge. – Fansa & Burmeister (eds). 265–282.
- 2004b: Kulturkontakte und Wege der Ausbreitung der Wagentechnologie im 4. Jahrtausend v. Chr. – Fansa & Burmeister (eds) 2004. 429–442.
- Mayrhofer, Manfred 1974: *Die Arier im Vorderen Orient – ein Mythos? Mit einem bibliographischen Supplement*. Österreichische Akademie der Wissenschaften, Philos.-hist. Klasse, Sitzungsberichte 294:3. Wien: Verlag der Österreichischen Akademie der Wissenschaften.
- Meier-Brügger, Michael 2002: *Indogermanische Sprachwissenschaft*. Achte, überarbeitete und ergänzte Auflage der früheren Darstellung von Hans Krahe, unter Mitarbeit von Matthias Fritz und Manfred Mayrhofer. Berlin & New York: Walter de Gruyter.
- Meinander, C. F. 1985: Akozino, Achmylovo och mäларыxorna. – *Finskt Museum* 1985: 15–34.
- Müller-Karpe, Hermann 1974: *Handbuch der Vorgeschichte*, Dritter Band: *Kupferzeit*, I–III. München: C. H. Beck'sche Verlagsbuchhandlung.
- Nagovitsin, L. A. 1987: Novoi'inskaya, Garinsko-Borskaya i Yurtikovskaya kul'tury. – Bader & al. (eds). 28–34.

- Napol'skikh, Vladimir V. 1995: *Uralic original home: History of studies. A preliminary review*. Udmurt Institute for history, language and literature, Ural Department of the Russian Academy of Sciences, Preprint series "Scientific reports", 1. Izhevsk: Udmurt Institute for history, language and culture.
- 2009: Über die Herkunft der Benennungen 'Silber' und 'Blei/Zinn' in den permischen Sprachen. – *Finnisch-Ugrische Mitteilungen* 32/33: 409–422.
- Nichols, Johanna 1997: Modeling ancient population structures and movement in linguistics. – *Annual Review of Anthropology* 26: 359–384.
- Nuñez, Milton G. 1987: A model for the early settlement of Finland. – *Fennoscandia Archaeologica* 4: 3–18.
- Nuorluoto, Juhani (ed.) 2006: *The Slavicization of the Russian North: Mechanisms and chronology*. Slavica Helsingiensia 27. Helsinki: [University of Helsinki, Department of Slavic and Baltic Studies.]
- Nurk, Anu, Triinu Palo & Tõnu Seilenthal (eds) 2000: *Congressus nonus internationalis Fenno-Ugristarum 7.–18.8.2000 Tartu, I: Orationes plenariae et orationes publicae*. Tartu: Tartu Ülikool & Eesti fennougristide komitee.
- Oettinger, Norbert 1994: Pferd und Wagen im Altiranischen und Anatolischen. – Hänssel & Zimmer (eds) 1994. 67–76.
- 1997: Grundsätzliche Überlegungen zum Nordwest-Indogermanischen. – *Incontri Linguistici* 20: 93–111.
- 1999: Zum nordwest-indogermanischen Lexikon (mit einer Bemerkung zum hethitischen Genetiv auf -l). – Peter Anreiter & Erzsebet Jerem (eds), *Studia Celtica et Indogermanica: Festschrift für Wolfgang Meid zum 70. Geburtstag*. Archaeolingua 10. Budapest: Archaeolingua. 261–267.
- 2003: Neuerungen in Lexikon und Wortbildung des Nordwest-Indogermanischen. – A. Bammesberger & Theo Vennemann (eds), *Languages in Prehistoric Europe*. Indogermanische Bibliothek, Dritte Reihe. Heidelberg: Carl Winter – Universitätsverlag. 183–193.
- in press: Zur Frage der Rekonstruktion des Urgriechischen und anderer Protosprachen. – Roman Sukac and Václav Blazek (eds), Acts of the second conference on "the sound of Indo-European" held in Opava (Troppau, Tschechien) in November 2010.
- Oshibkina, S. V. (ed.) 1996: *Neolit severnoj Evrazii*. Arkheologiya. Moskva: "Nauka".
- Paasonen, Heikki 1923. *Beiträge zur Aufhellung der Frage nach der Urheimat der finnisch-ugrischen Völker: Antrittsvorlesung*. Turun suomalaisen yliopiston julkaisu, Sarja B, 1:5. Turku: Turun yliopisto.
- Parpola, Asko 1974: On the protohistory of the Indian languages in the light of archaeological, linguistic and religious evidence: An attempt at integration. – J. E. van Lohuizen-de Leeuw & J. M. M. Ubaghs (eds), *South Asian Archaeology 1973*. Leiden: E. J. Brill. 90–100.
- 1994: *Deciphering the Indus script*. Cambridge: Cambridge University Press.
- 2002: From the dialects of Old Indo-Aryan to Proto-Indo-Aryan and Proto-Iranian. – Sims-Williams (ed.). 43–102.
- 2005a: The Nāsatyas, the chariot and Proto-Aryan religion. – *Journal of Indological Studies* 16 & 17 (2004–2005): 1–63.
- 2005b: Gandhara Graves and the Gharma pot, the Nasatyas and the Nose: In pursuit of the Chariot Twins. – *Ancient Pakistan* 16: 73–107.

- 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.
- 2012a: The problem of Samoyed origins in the light of archaeology: On the formation and dispersal of East Uralic (Proto-Ugro-Samoyedic). – Hyytiäinen & al. (eds). 287–298.
- 2012b: The Dāsas of the *Ṛgveda* as Proto-Sakas of the Yaz I -related cultures. With a revised model for the protohistory of Indo-Iranian speakers. – Martin E. Huld, Karlene Jones-Bley & Dean Miller (eds), *Archaeology and Language: Indo-European Studies presented to James P. Mallory*. Journal of Indo-European Studies Monograph no. 60. Washington, D. C.: Institute for the Study of Man. 221–264.
- 2012c: Indus Civilization (–1750 BCE). – Knut A. Jacobsen (ed.-in-chief), *Brill's Encyclopedia of Hinduism*, Vol. IV. Handbook of Oriental Studies, Section two: India, vol. 22/4. Leiden: Brill. 3–18.
- Parzinger, Hermann 2001: Südsibirien in der Spätbronze- und Früheisenzeit. – Ricardo Eichmann & Hermann Parzinger (eds), *Migration und Kulturtransfer: 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.
- Patrushev, Valerij S. 1989: *U istokov Volzhskikh finnov*. Joshkar-Ola: Marijskoe knizhnoe izdatel'stvo.
- 2000: *The early history of the Finno-Ugrian peoples of European Russia*. Studia Archaeologica Fenno-Ugrica 1. Oulu: Societas Historiae Fenno-Ugricae.
- 2004: The chronology of the Early Iron Age of the Middle Volga region. – Pirjo Uino (ed.), *Fenno-Ugri et Slavi 2002: Dating and chronology*. Museoviraston arkeologian osaston julkaisu 10. Helsinki: Museovirasto. 75–86.
- Pekkanen, Tuomo 1968: *The ethnic origin of the Doulosporoi*. Arctos: Acta Philologica Fennica, Supplementum 1. Helsinki: Klassillis-filologinen yhdistys.
- Porzig, Walter 1954: *Die Gliederung des indogermanischen Sprachgebiets*. Indogermanische Bibliothek, III: Untersuchungen. Heidelberg: Carl Winter Universitätsverlag.
- Posti, Lauri 1953: From Pre-Finnic to Late Proto-Finnic: Studies on the development of the consonant system. – *Finnisch-Ugrische Forschungen* 31: 1–91.
- Pryakhin, A. D. & A. Kh. Khalikov 1987: Abashevskaya kul'tura. – Bader & al. (eds). 124–131.
- Ramat, Anna Giacalone & Paolo Ramat (eds) 1998: *The Indo-European languages*. Routledge Language Family Descriptions. London: Routledge
- Ramat, Paolo 1998: The Germanic languages. – Ramat & Ramat (eds). 380–414.
- Rassamakin, Yurij Ya. 1999: The Eneolithic of the Black Sea Steppe: Dynamics of cultural and economic development 4500–2300 BC. – Marsha Levine, Yuri Rassamakin, Aleksandr Kislenko & Nataliya Tatarintseva (eds), *Late Prehistoric exploitation of the Eurasian steppe*. Cambridge: McDonald Institute for Archaeological Research. 59–182.

- 2004: *Die nordpontische Steppe in der Kupferzeit: Gräber aus der Mitte des 5. Jts. bis Ende des 4. Jts. v. Chr.* I–II. Archäologie in Eurasien 17. Mainz: Verlag Philipp von Zabern.
- Saarikivi, Janne 2006: *Substrata Uralica: Studies on Finno-Ugrian substrate in northern Russian dialects.* (Ph. D. thesis Helsinki.) Tartu: Tartu University Press.
<<http://ethesis.helsinki.fi/julkaisut/hum/suoma/vk/saarikivi/substrat.pdf>>
- 2008: On the Uralic substrate toponymy of Arkhangelsk region: Problems of research methodology and ethnohistorical interpretation. – *Onomastica Uralica* 4: 45–109.
<<http://onomaural.klte.hu/onomural/kotetek/ou4/04saariki.pdf>>
- Saarikivi, Janne & Riho Grünthal 2005: Itämerensuomalaisten kielten uralilainen tausta. – Johanna Vaattovaara, Toni Suutari, Hanna Lappalainen & Riho Grünthal (eds), *Muuttuva muoto: Kirjoituksia Tapani Lehtisen 60-vuotispäivän kunniaksi.* Kieli 16. Helsinki: Helsingin yliopiston suomen kielen laitos. 111–146.
- Sadovski, Velizar 2009: On horses and chariots in ancient Indian and Iranian personal names. – Bert G. Fagner, Ralph Kauz, Roderich Ptak & Angela Schottenhammer (eds), *Pferde in Asien: Geschichte, Handel und Kultur.* Österreichische Akademie der Wissenschaften, Philosophisch-historische Klasse, Denkschriften 378, Veröffentlichungen zur Iranistik 46. Wien: Verlag der Österreichischen Akademie der Wissenschaften. 111–127.
- Salo, Unto 1968: *Die frühromische Zeit in Finnland.* Suomen Muinaismuistoyhdistyksen Aikakauskirja 67. Helsinki: Suomen Muinaismuistoyhdistys.
- 1984: Pronssikausi ja rautakauden alku. – Yrjö Blomstedt & al. (ed.), *Suomen historia*, 1. Espoo: Weilin & Göös. 99–247.
- 1997: *Ihmisen jäljet Satakunnan maisemassa: Kulttuurimaiseman vuosituhanne.* Suomalaisen Kirjallisuuden Seuran Toimituksia 677. Helsinki: Suomalaisen Kirjallisuuden Seura.
- 2000: Suomi ja Häme, Häme ja Satakunta. – Jukka Peltovirta (ed.), *Hämeen käräjät*, I. Hämeenlinna: Hämeen heimoliitto ry & Harjavalta: Emil Cedercreutzin säätiö. 18–231.
- 2004: Suomen ja Hämeen synty. (Summary: The origins of Finland and Häme.) – *Suomen Museo* 110: 5–58.
- Salminen, Tapani 1999: Euroopan kielet muinoin ja nykyisin. – Fogelberg (ed.). 13–26.
- Salvatori, Sandro & Maurizio Tosi (eds) 2008: *The Archaeological map of the Murghab Delta*, Vol. 2: *The Bronze Age and early Iron Age in the Margiana lowlands.* British Archaeological Reports, International series 1806. Oxford: Archaeopress.
- Sammallahti, Pekka 1977: Suomalaisten esihistorian kysymyksiä. – *Virittäjä* 81: 119–136.
- 1988: Historical phonology of the Uralic languages, with special reference to Samoyed, Ugric, and Permic. – Sinor (ed.). 478–554.
- Sarianidi, Viktor I. 2002: *Marguş: Ancient Oriental kingdom in the old delta of Murghab river.* Aşgabat: Türkmenölwehbarlary.
- 2007: *Necropolis of Gonur.* English translation by Inna Sarianidi. Athens: Kapon Editions.
- Sarianidi, V. I., P. M. Kozhin, M. F. Kosarev & N. A. Dubova (eds) 2008: *Trudy Margianskoj arkheologicheskoy èkspeditsii*, Tom 2. Moskva: Institut ètnologii i antropologii RAN.
- Schmalstieg, William R. 1998: The Baltic languages. – Ramat & Ramat (eds). 454–479.

- Schmitt, Rüdiger 1977: *Einführung in die griechischen Dialekte*. Darmstadt: Wissenschaftliche Buchgesellschaft.
- 1981: *Grammatik des Klassisch-Armenischen mit sprachvergleichenden Erläuterungen*. Innsbrucker Beiträge zur Sprachwissenschaft 32. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck.
- Schrader, Otto 1907–06: *Sprachvergleichung und Urgeschichte: Linguistisch-historische Beiträge zur Erforschung des indogermanischen Altertums I–II*. Dritte neubearbeitete Auflage. Jena: Hermann Costenoble.
- 1917–1929: *Reallexikon der indogermanischen Altertumskunde: Grundzüge einer Kultur- und Völkergeschichte Alteuropas*. Zweite vermehrte und umgearbeitete Auflage von Alfons Nehring. I–II. Berlin und Leipzig: Walter de Gruyter.
- 1919: *Die Indogermanen*. Dritte verbesserte Auflage. Wissenschaft und Bildung 77. Leipzig: Verlag von Quelle & Meyer.
- Sherratt, Andrew 1987: Cups that cheered: The introduction of alcohol to prehistoric Europe. – W. Waldren & R. C. Kennard (eds), *Bell Beakers of the western Mediterranean*. BAR International series 287. Oxford: British Archaeological Reports. (Reprinted with additions in Sherratt 1997: 376–402.) 81–114.
- 1997: *Economy and society in prehistoric Europe: Changing perspectives*. Edinburgh: Edinburgh University Press & Princeton: Princeton University Press.
- Shishlina, Nataliya Ivanovna 1989: Pogrebenie èpokhi bronzy s glinyanoj maskoj iz Kalmykii. – *Sovetskaya Arkheologiya* 1989 (3): 231–236.
- Sims-Williams, Nicholas (ed.) 2002: *Indo-Iranian languages and peoples*. Proceedings of the British Academy 116. Oxford: Oxford University Press for The British Academy.
- Sinor, Denis (ed.) 1988: *The Uralic languages: Description, history, and foreign influences*. Handbuch der Orientalistik, Abt. 8: 1. Leiden: E. J. Brill.
- Smirnov, K. A. 1974: D'yakovskaya kul'tura (material'naya kul'tura gorodishch mezhdurech'ya Oki i Volgi). – Krasnov (ed.). 7–89.
- 1990: Pogrebal'nyj obryad D'yakovskoj kul'tury. – *Sovetskaya Arkheologiya* 1990 (2): 51–61.
- 1998: Verkhovaya ezda u plemen D'yakovskoj, Gorodetskoj i Anan'inskoj kul'tur. – *Rossijskaya Arkheologiya* 1993 (3): 48–56.
- Suhonen, Mervi (ed.) 2006: *Arkeologian lumoa synkkyteen: Artikkeleita Christian Carpelanin juhlapäiväksi*. Helsinki: Kulttuurien tutkimuksen laitos / Arkeologia, Helsingin yliopisto.
- Suhonen, Seppo 1988: Die baltischen Lehnwörter der finnisch-ugrischen Sprachen. – Sinor (ed.). 596–615.
- Suomen väestön esihistorialliset juuret: Tvärminnen symposiumi 17.–19.1.1980*. Bidrag till kännedom av Finlands natur och folk 131. Helsinki: Societas Scientiarum Fennica, 1984.
- Svyatko, Svetlana V., James P. Mallory, Eileen M. Murphy, Andrey V. Polyakov, Paula J. Reimer & Rick J. Schulting 2009: New Radiocarbon dates and a review of the chronology of prehistoric populations from the Minusinsk Basin, southern Siberia, Russia. – *Radiocarbon* 51 (1): 243–273.
- Taagepera, Rein 1994: The linguistic distances between Uralic languages. – *Linguistica Uralica* 30: 161–167.

- Thomsen, Vilhelm 1890: *Beröringer mellem de finske og de baltiske (litauisk-lettiske) sprog: En sproghistorisk undersøgelse*. Det Kongelige Danske Videnskabernes Selskab, Historisk og Filosofisk Afdeling, Række 6: 1, 1. København: Bianco Luno.
- Tkachev, V. V. 2007: *Stepi yuzhnogo Priural'ya i zapadnogo Kazakhstana na rubezhe èpokh srednej i pozdnej bronzy*. Aktope: Aktyubinskij oblastnoj tsentr istorii, ètnografii i arkeologii.
- Toivonen, Y. H. 1953: Suomalais-ugrilaisesta alkukodista. – *Virittäjä* 57: 5–35.
- Toporov, V. N. & O. N. Trubachev 1962: *Lingvisticheskij analiz gidronimov verkhnego Podneprov'ya*. Moskva: Akademiya Nauk SSSR, Institut Slavyanovedeniya.
- Tret'yakov, P. N. 1966: *Finno-ugry, balty i slavyane na Dnepre i Volge*. Moskva & Leningrad: Izdatel'stvo "Nauka".
- Trubachev, Oleg 1985: Linguistics and ethnogenesis of the Slavs. – *Journal of Indo-European Studies* 13: 203–256.
- Tvauri, Andres 2006: Migrants or natives? The research history of Long Barrows in Russia and Estonia in the 5th–10th centuries. – Nuorluoto (ed.). 247–284.
- Usachuk, A. N. (ed.) 2004: *Psalii: Èlementy upryazhi i konskogo snaryazheniya v drevnosti. Sbornik statej*. Arkheologicheskij al'manakh 15. Donetsk: Institut arkheologii NAN Ukrainy.
- Vasmer, Max 1971: *Schriften zur slavischen Altertumskunde und Namenskunde*, herausgegeben von Herbert Bräuer, I–II. Veröffentlichungen der Abteilung für slavische Sprachen und Literaturen des Osteuropa-Instituts an der Freien Universität Berlin 38. Wiesbaden: In Kommission bei Otto Harrassowitz.
- Viitso, Tiit-Rein 2000: Finnic affinity. – Nurk & al. (eds). 153–178.
- Watkins, Calvert 1998: Proto-Indo-European: Comparison and reconstruction. – Ramat & Ramat (eds). 25–73.
- Wiik, Kalevi 1997: Suomalais-ugrilaista ääntämistä germaanisissa kielissä. – *Tieteessä tapahtuu* 1997 (4). <http://www.tieteessatapahtuu.fi/497/wiiktt4_97.pdf>
- 1998: Olisiko kantagermaanissa sittenkin suomalais-ugrilaista ääntämistä? – *Tieteessä tapahtuu* 1998 (1). <<http://www.tieteessatapahtuu.fi/981/wiik.html>>
- 2001: *Eurooppalaisten juuret*. Jyväskylä: Atena.
- 2003: *A new atlas on the origins and early history of the Europeans*. Turku: Kalevi Wiik. CD-rom.
- Ylikoski, Jussi & Ante Aikio (eds) 2007: *Sámit, sánit, sátnehámit. Riepmočála Pekka Sammallahtii miessemánu 21. beaivve 2007*. Mémoires de la Société Finno-Ougrienne 253. Helsinki: Société Finno-Ougrienne.