

# Proto-Indo-Europeans: The Prologue

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This study collates linguistic, genetic, and archaeological data relevant to the problem of the IE homeland and proto-IE (PIE) migrations. The idea of a proto-Anatolian (PA) migration from the steppe to Anatolia via the Balkans is refuted by linguistic, archaeological, and genetic facts, whereas the alternative scenario, postulating the Indo-Uralic homeland in the area east of the Caspian Sea, is the most plausible. The divergence between proto-Uralians and PIEs is mirrored by the cultural dichotomy between Kelteminar and the early farming societies in southern Turkmenia and northern Iran. From their first homeland the early PIEs moved to their second homeland in the Near East, where early PIE split into PA and late PIE. Three migration routes from the Near East to the steppe across the Caucasus can be tentatively reconstructed — two early (Khvalynsk and Darkvetsi-Meshoko), and one later (Maykop). The early eastern route (Khvalynsk), supported mostly by genetic data, may have been taken by Indo-Hittites. The western and the central routes (Darkvetsi-Meshoko and Maykop), while agreeing with archaeological and linguistic evidence, suggest that late PIE could have been adopted by the steppe people without biological admixture. After that, the steppe became the third and last PIE homeland, from whence all filial IE dialects except Anatolian spread in various directions, one of them being to the Balkans and eventually to Anatolia and the southern Caucasus, thus closing the circle of counterclockwise IE migrations around the Black Sea.

## 1. Introduction

The growth of knowledge about the IE homeland and the earliest stage of IE history has been quite rapid in recent years. This mostly concerns genetic data, but the body of linguistic and archaeological information has substantially increased as well. Until recently, it appeared evident to many that the steppe homeland theory had been overwhelmingly supported by the

available data, especially those concerning paleogenomics and the Yamnaya expansion (Allentoft et al. 2015; Haak et al. 2015; see Anthony & Ringe 2015 and Anthony & Brown 2017 for reviews), although serious doubts were expressed (see, e.g. Heggarty 2018).

New facts on which this study focuses disagree with an important part of the steppe scenario — one which concerns early PIEs (Sturtevant's Indo-Hittites) and Anatolians. The part concerning the late PIEs and the filial IE groups remains largely valid but the previously reconstructed picture is now seen as a fragment of a much broader panorama, in which the steppe is the last rather than the first setting of what might be termed the IE prologue. This study addresses only this prologue, namely PIE history from its beginning — the split of the hypothetical Indo-Uralic macrofamily to the moment when the steppe became the homeland of the late PIEs. In short, I will try to reconstruct the events preceding the first act of the IE prehistory proper, i.e., those before the Yamnaya expansion. In so doing, I will sometimes have to proceed in a time machine fashion, from later (and better documented) stages to earlier ones.

## 2. Linguistics

### 2.1. Lexicostatistics: cognates versus loanwords

#### 2.1.1. The position of IE among other families

In a previous publication (Kozintsev 2018) I used the pairwise similarity matrix (percentages of matching items in the preliminary 50-item wordlist) between 12 IE and 29 non-IE languages representing eight families in the STARLING lexicostatistical database compiled by George Starostin et al. (<http://starling.rinet.ru/new100/trees.htm>, accessed September 18, 2018) to explore the external ties of the Indo-European family, to examine the affinities within the Indo-Uralic macrofamily, and to test the theories concerning the non-IE adstrate in PIE.<sup>1</sup>

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<sup>1</sup>I take this opportunity to once again thank George Starostin, Alexei Kassian, and Mikhail Zhivlov for permission to use their unpublished preliminary data. Kassian's comments were very useful.

In accordance with many preceding studies, the cluster analysis showed the IE family to be a member of both the Nostratic macrofamily (Illič-Svityč 1971; Dolgopolsky 2008; Bomhard 2018) and of the Eurasian macrofamily (Greenberg 2000, 2002). Apart from the IE family, the resulting cluster included Uralic, Altaic, Eskaleut, and Chukotko-Kamchatkan. “Southern” families, which are sometimes included in Nostratic, such as Kartvelian and Semitic, fall outside this cluster or, if its boundaries are extended, take a peripheral position within it. In this regard, the cluster conforms to Eurasian as described by Greenberg rather than to Nostratic as delimited by Illič-Svityč or Dolgopolsky (see Pagel et al. 2013, for a similar result).

Moreover, another statistical technique, based on the quasi-spatial rather than genealogical approach — the nonmetric multidimensional scaling and the minimum spanning tree finding the shortest path between points in space — shows IE to be markedly intermediate. It is directly connected with four other families whereas none of the remaining families is linked with more than two. The most intriguing connection is that between IE and Eskimo. This strange link was noted long ago (Uhlenbeck 1937).<sup>2</sup> Like the membership of the Eurasian macrofamily, it highlights the eastern roots of PIE — a caveat against placing the earliest IE homeland too far west of the Urals, as, e.g., in Anatolia, in the Balkans, or on the Danube. The second family with which IE is connected is Uralic. The cluster analysis links these two families into a single macrofamily within Eurasian, in line with the widespread view (see Kassian et al. 2015 with discussion, for the recent assessment of the plausibility of Indo-Uralic).

The remaining two connections of IE, revealed by the minimum spanning tree, are with “southern” families which do not belong to Eurasian and take a peripheral position within Nostratic — Kartvelian and Semitic. The latter connection is especially noteworthy because on the quasi-spatial graph it is a link in a nearly straight chain-like succession connecting Altaic with Uralic, Uralic with IE, and IE with Semitic — a sequence

<sup>2</sup>Dolgopolsky (2008: 4, 7) and S. Starostin (1999), too, believed that Eskaleut and Chukchi-Kamchatkan likely belong to the Nostratic macrofamily.

that makes sense in terms of geography and the wave model of language change<sup>3</sup> (see Dyen et al. 1992 for a similar model applied to dialects, languages, and subfamilies within the IE family).

A similar but more detailed analysis of affinities within the presumed Indo-Uralic macrofamily demonstrates that neither the reconstructed Baltic-Finnic language nor the Finno-Permic subfamily in general, whose ties with IE languages have been especially close due to geographic proximity, are connected with the IE family. Instead, the shortest edge of the minimum spanning tree connecting the two families passes between the reconstructed Ob Ugric and Hittite. The relevance of this fact to the IE homeland problem will be discussed in section 5.3.

### *2.1.2. The Semitic adstrate in PIE*

As a next step, I used four quasi-spatial models — Northwest Caucasian, Northeast Caucasian, Kartvelian, and Semitic — to test the hypothesis that IE is an Eurasian language, probably closest to Uralic and, unlike the latter, influenced by a “southern” substrate or adstrate (Uhlenbeck 1937; S. Starostin 1988, 2000; Kortlandt 1990, 2018, 2019; Bomhard 2018: 717; 2019a,b)<sup>4</sup>. IE, Uralic, and a “southern” family were represented by a triangle in a space generated by the principal coordinate analysis. The test was based on the assumption that two sister groups (in our case, IE and Uralic) should be approximately equally distant from the outgroup unless one of the sister groups was evolutionarily more

<sup>3</sup>No such arrangement is seen in the case of Kartvelian, so in this case, strictly speaking, IE cannot be regarded as intermediate — a conclusion that is supported by lexicostatistical modeling (see below). The mean percentage of matching items with IE is 13.7 for Uralic, 10.2 for Cukchi-Kamchatkan, 8.8 for Eskaleut, 7.9 for Altaic, 6.6 for Semitic, 6.0 for Kartvelian, 3.4 for Western Caucasian, and 0.3 for Eastern Caucasian. With regard to the 50-item wordlist, this corresponds to approximately 7, 5, 4-5, 4, 3-4, 3, 1-2, and 0-1 matching items, respectively.

<sup>4</sup>Nikolai Trubetskoy (1939) claimed that proto-IE originally belonged to the “Mediterranean” Sprachbund, which included North Caucasian, Kartvelian, and Semitic, but owing to its geographically intermediate position converged toward the Uralic and Altaic dialects — a view that has been rejected by virtually all linguists.

conservative than the other or horizontal transfer had taken place. The null hypothesis would be rejected if the side connecting IE with a “southern” family was significantly shorter than that connecting this family with Uralic (significance was assessed by comparing the variation between and within the families; see Kozintsev 2018, for details).

In three models out of four (Northwest Caucasian, Northeast Caucasian, and Kartvelian), the sides differed insignificantly.<sup>5</sup> In the Semitic model, the result was highly significant: the side connecting IE with Semitic was 5.6 % shorter than that connecting Uralic and Semitic. The same result can be obtained by directly comparing frequencies of lexical matches by means of the non-parametric Mann-Whitney test (Table 1).

	IE (n=12)	Uralic (n=8)	U	p
Semitic (n=2)	6.6	3.8	7	0.0004
Northwest Caucasian (n=1)	3.4	3.8	38.5	0.46
Northeast Caucasian (n=8)	0.3	0.2	34	0.36
Kartvelian (n=2)	6.0	7.6	25	0.07

Note: numbers of languages or reconstructions are indicated in parentheses.

*Table 1. Frequencies of lexical matches (%), Mann-Whitney U values, and probabilities*

Because the supposed evolutionary conservatism of IE compared to Uralic did not show up in other models, the alternative explanation — horizontal transfer within a Sprachbund — was accepted, although the 50-item list

<sup>5</sup> As shown by Nikolai Trubetzkoy (1939) and confirmed by Ranko Matasović (2012), the “North Caucasian” areal tendency of IE manifests itself primarily in phonological and morphologival features rather than in lexical borrowings (but see Bomhard 2018, 2019). The “Kartvelian” tendency could be expected to manifest itself in all characteristics (Starostin 2007/2000: 817, 819), but my analysis based on the STARLING 50-item wordlist failed to reveal that, as in the case of both North Caucasian models. Is it because this short list includes only unborrowable lexemes and is therefore unsuitable for areal studies in principle? Results relating to the Semitic model cast doubt on this tenet.

presumably includes only words from the basic vocabulary, supposed to be the most resistant to borrowing.

Vladislav Illič-Svityč (1964) pointed to a group of IE-Semitic lexical parallels which concerned cultural terms and therefore could not be cognates. He believed them to be borrowings from proto-Semitic to PIE. This idea was supported by Gamkrelidze & Ivanov (1995: 769–773), Dolgopol'sky (1987) and Shevoroshkin (1987); see also Blažek 2013a. However, in the view of Sergei Starostin (2007/2000; 2007/2001–2002), the principal direction of borrowing was the opposite – from early IE to proto-Semitic. Gamkrelidze and Ivanov (2013) eventually agreed with that.

Igor Diakonoff (1985) rejected most of the IE-Semitic parallels cited by Gamkrelidze and Ivanov<sup>6</sup> (see Gamkrelidze & Ivanov 1995: 862, for a response). Vitaly Shevoroshkin (1987), who intervened on their behalf, claimed that the neighbors of PIEs were Semites but not Kartvelians or North Caucasians. Indeed, as the lexicostatistical modeling suggests, in the case of Semites the borrowings comprised not only culture items but basic vocabulary as well. The direction of supposed borrowing cannot be assessed on the basis of these data.

According to Sergei Starostin, judging from the phonology, the borrowing from early IE to proto-Semitic occurred very early – before the loss of laryngeals. In his view, these words had been borrowed either from PA or from an extinct branch of Indo-Hittite but hardly from common Indo-Hittite (otherwise, one might expect a comparable number of Semitic loanwords in IE dialects, which is not the case). S. Starostin (2007/1999; 2007/2000; 2007/2001–2002) found no evidence of contact between PIE and Afroasiatic languages other than Semitic<sup>7</sup> and concluded that in the early fifth millennium BC a branch of Indo-Hittites migrated from their homeland, situated north of the Fertile Crescent, southwards, where it met the Semites; another branch migrated in the northern and northeastern direction. The latter migration gave

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<sup>6</sup>Kassian (2010: 426), too, calls the proto-IE – proto-Semitic isoglosses a “mirage”, subscribing to Diakonoff's view that the IE homeland was located in the Carpatho-Balkan region.

<sup>7</sup>Disputing this, George Starostin (2007) points out that much has yet to be done to arrive at a satisfactory Afroasiatic reconstruction.

rise to all IE dialects except Anatolian (S. Starostin 2007/2001–2002).

According to the STARLING database, Hittite is somewhat closer to Semitic (average percentage of matching items is 9.0, i.e., 4–5 words in the 50-item list) than are other IE languages (the respective percentage is 6.4, that is 3, less often 4 words). This may be because Hittite is an extinct language where more cognates with Semitic are preserved. If, on the other hand, we deal with loanwords rather than cognates, the result may be in line with the view of Sergei Starostin (see above). None of this, however, accounts for the “Semitic” shift of the entire IE family (6.6 % of matching items, i.e., also 3–4 words) with regard to Uralic (3.8 % of matches, i.e., two words at most). Does this imply that contacts between PIE and proto-Semitic occurred right at the moment when Anatolian began to split off from early PIE (Indo-Hittite)? Or perhaps (more likely given the geographic proximity) Anatolian received the Semitic adstrate entirely or partly independently from the late PIE?

Apart from Hittite, Semitic loanwords are sometimes said to be especially numerous in Greek (Watson 2013). However, judging by the STARLING database, the frequency of lexical matches between Semitic and Greek is 8.5 %, which is the same as between Semitic and Sanskrit (8.5 %) and roughly the same as between Semitic and Iranic, Germanic, and Latin (8.0 % in each case). If we deal with cognates, the result is self-explanatory. But if some of the items are loanwords, then the variation could be low because borrowing concerned proto-IE rather than filial IE languages.<sup>8</sup>

At first sight, even the difference of 2.8 %, or 1–2 words in the 50-item list, is minute and, accordingly, the “Semitic” tendency of IE relative to Uralic, too, may appear random.

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<sup>8</sup>Anthony (2007: 304–305) claims that because the western Yamnaya groups lived next to the Tripolye people, who, in his views, might have spoken an Afroasiatic language, western IE languages retain more Afroasiatic borrowings than eastern IE languages do. According to the STARLING database, as far as Semitic languages are concerned, the relationship is the opposite: the mean share of Semitic isoglosses in western IE languages (Baltic, Slavic, Germanic, Latin, and Celtic) is 6.4 % whereas the occurrence in Sanskrit and Iranic is 8.3 %. Again, the result is relevant only if we deal with loanwords and not with cognates, as expected.

Moreover, members of the Starostin team believe that only one of these words, denoting ‘horn’ (IE *\*ker-*, *\*kr-no-* / Semitic *\*karn-*), may be a loanword, whereas the second parallel, referring to the nominative singular pronoun (IE *\*egoH* vs. phonetically quite dissimilar Akkadian *anāku*, Northwest Semitic *\*tanVkV*, Egyptian *jnk*, Berber *\*nakk-*), if not accidental, may be due only to a very remote common origin (see discussion at <https://www.academia.edu/s/d8be18e175/proto-ie-meets-semitic-more-details-2019pdf?source=work>, accessed March 26, 2019). Even so, why do two of these four lexemes concern the northernmost Afroasiatic languages, i.e., those geographically closest to PIE, wherever it was spoken? Can’t this be an example of what Eugene Helimski (1982: 24–25) termed “areal-genetic ties”, whereby cognates are preserved in adjacent dialects?

Of course, the evidence of areal ties between IE and Semitic in this analysis must be meager by definition because the wordlist contains only basic (i.e. supposedly unborrowable) lexemes. However, this extremely weak signal can be amplified by comparing entire families rather than separate languages or reconstructions. IE is represented by 12 languages, Uralic by 8, and Semitic by two. Each “triangle” generated by the principal coordinate analysis, then, has a swarm of points around each vertex. Because the variation within families is incomparably lower than between them, the coordinates of the vertices have very small statistical errors, so even the difference of 5.6 % between side lengths is highly significant. This, incidentally, justifies the use of IE and Uralic as sister taxa at least in the relative sense:<sup>9</sup> IE is 20.8 % closer to Uralic than to Northwest Caucasian; 18.4 % closer to Uralic than to Eastern Caucasian; 13.7 % closer to Uralic than to Kartvelian; and 16.9 % closer to Uralic than to Semitic. Needless to say, all these differences are highly significant.

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<sup>9</sup>This is not tantamount to regarding Indo-Uralic as a strictly monophyletic taxon, i.e., a clade, although this does follow from the Markov-chain lexicostatistical analysis carried out by Pagel et al. (2013) on the basis of the 200-item wordlist in the same database.

### 2.1.3. Lexicostatistics: general conclusions

What is the relevance of all this to the problem of the IE homeland? Sergei Starostin (2007/2000) argued that the ties of PIE with proto-Semitic were mostly areal whereas those with proto-Uralic indicate solely kinship (see Kortlandt 1990; Oswalt 1998; Ringe 1998; Helimski 2001; Pagel et al. 2013; Kassian et al. 2015; and Bomhard 2018: 294 for arguments in favor of a genetic relationship between IE and Uralic). The position of the opponents of this relationship is evidently much weaker, see, e.g., Koivulehto 2001; see also Helimski's (2001) scathing criticism of his ideas about the alleged PIE loans in proto-Uralic. But given the plausibility of Indo-Uralic, neither Anatolia nor the Balkans can be the original home of IE, in contrast to what Illič-Svityč (1971), Diakonoff (1985), Renfrew (1989), and Kassian (2010) claimed. Predominantly or exclusively Siberian affinities of IE, which had not yet been detected in the 1970s and 1980s, make such hypotheses implausible.

The glottochronological estimate of the separation of Anatolian is 4670 BC according to Sergei Starostin and 4340 BC according to George Starostin (quoted by Blažek 2013b). The former estimate coincides with that proposed by Yanovich et al. (2015) – 4660 BC – and is somewhat earlier than the average across the 31 analyses by Chang et al. (2015) – 4244 BC. All these estimates fall within the fifth millennium BC and are much later than the date proposed by Bouckaert et al. even in the corrected version (Bouckaert et al. 2013) – 5580 BC, let alone the one from the previous study by the Auckland team – 6700 BC (Gray et al. 2011).

But even the fifth millennium BC, where the most recent glottochronological studies place the separation of the Anatolian branch of IE, is sufficiently early to indicate a very special evolutionary trajectory of this branch. An independent linguistic fact supports this conclusion: both words denoting the wheel in other IE dialects and derived from late PIE (but not Indo-Hittite), *\*kʷé-kʷl-o-s* and *\*Hrot-ó-s*, are absent in Anatolian whereas in Tocharian A and B the former word denoted the carriage (Gamkrelidze, Ivanov 1995: 622–623; Anthony, Ringe, 2015). Instead of them, a different IE word with the stem *\*h₂werg-* was used in both Hittite and Tocharian

to denote the wheel. According to Darden (2001) and Anthony & Ringe (2015), this suggests that the Anatolian branch had separated from the Indo-Hittite stem before wheel transport was invented.

In sum, linguistics reveals three seemingly contradictory facts: (1) the genetic affinities of PIE point to Siberia; (2) its areal connections point to the Near East; (3) the first group to have branched off from PIE in the fifth millennium BC is likewise Near Eastern – Anatolian.

## *2.2. Nostratic, Indo-Uralic, and PIE: linguistic evidence relevant to homelands*

Frederik Kortlandt (2002), basing his conclusions on both linguistic and archaeological evidence, located the Indo-Uralic homeland south of the Ural Mountains in the seventh millennium BC. Sergei Yakhontov (1991), utilizing words referring to snow, ice, frost, and the northern forest biota,<sup>10</sup> placed the Nostratic homeland in the same or an adjacent place like the Volga drainage or Western Siberia, several millennia earlier, i.e., in the Pleistocene. Yakhontov's estimate ("somewhat earlier than 15 thousand years ago") matches the recent estimates made by Pagel et al. (2013) — 14.5 thousand years if their Eurasian tree, which includes IE, Uralic, Altaic, Chukchi-Kamchatkan, and Eskimo as principal members, and Dravidian and Kartvelian as peripheral members, is rooted with proto-Dravidian and 15.6 thousand years if it is rooted with proto-Kartvelian.

On the other hand, the analysis of reconstructed PIE terms for topographical features and of the related attributes and beliefs suggests that at some stage of their history, the Indo-Hittites lived in a mountainous terrain, moreover, that the mountain was perceived as a "mighty cliff reaching to the sky" (Gamkrelidze, Ivanov 1995: 574–577; Dybo 2013). As the authors conclude, this eliminates the steppe as a possible

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<sup>10</sup>As Yakhontov admits, most of the reconstructed Nostratic words referring to the northern forest biota are rather unreliable with regard to the homeland location, and only the retention of the generic term for 'berry' (\**marja*), reconstructed by Illič-Svityč (1976: 43–45), unambiguously suggests, in Yakhontov's view, that Nostratic speakers had lived in the northern forest zone.

homeland. The proponents of the Steppe Theory describe the PIE word *\*h<sub>4</sub>ékmōn* ‘stone’ with reflexes rendering ‘sky’ or ‘heaven’ in the daughter IE languages as “certainly, one of the most troublesome words” (Mallory, Adams 2006: 121–122). PIE words for mountains and swift rivers, they admit, “may suggest broken topography” (*ibid.*: 130; Gamkrelidze, Ivanov 1995: 578). In addition, the PIEs knew a sea or a large lake (Gamkrelidze, Ivanov 1995: 581; Mallory, Adams 2006: 127, 130).

The skepticism that Salmons (2019) expresses in this regard is unwarranted. Citing the case of Algonquian languages, he claims that terms for landscape features refer to relative rather than absolute categories. If this were true, all languages would describe one and the same average mental landscape, where everything is measured on a local scale. What then accounts for the sharp contrast between the respective terminologies in PIE and proto-Altaic (Dybo 2013)? In the former case there are numerous terms for high cliffs, rocks, canyons, precipices, swift rivers and a sea or large lake; in the latter case, the reconstructed landscape is steppe with hillocks and large rivers with seasonal floods, but no sea.

### 3. Archaeology

#### 3.1. *The Balkan corridor*

After the incredibly early date of the first split in the IE tree, i.e., of the separation of the Anatolian branch, initially estimated at the early seventh millennium BC by the Auckland team, had been shifted to the mid-sixth millennium BC by the same authors and then to the fifth millennium BC by other experts (see 2.1.3), it was widely believed that the Early Farming Theory had been finally discredited whereas the Steppe Theory had received crucial support (see, e.g., Anthony, Ringe 2015, for non-glottochronological arguments against the early split).

As for the Early Farming Theory, the decisive blow to it has been inflicted not so much by the linguistic as by the genetic data (see 4.2). But claiming that the demise of this hypothesis automatically results in the acceptance of the Steppe Theory is a non sequitur, and in the following I will try to explain why.

The best option under the Steppe Theory is to identify the steppe people such as those associated with the Suvorovo/Novodanilovka/Skelya culture, who migrated from the steppe to the lower Danube in the late fifth millennium BC, with PAs (Mallory 1989: 233–243; Darden 2001; Carpelan, Parpola 2001; Anthony 2007: 249–262; Dergachev 2007; Anthony & Ringe 2015). As Anthony (2007: 262) puts it, “Pre-Anatolian languages probably were introduced to the lower Danube valley and perhaps to the Balkans about 4200–4000 BC by the Suvorovo migrants. We do not know when their descendants moved into Anatolia. Perhaps pre-Anatolian speakers founded Troy I in northwestern Anatolia around 3000 BC.”

However, *when* is not the only question we are unable to answer. In fact, it may not even be a proper question to ask because actually we don’t know either *what* language the Suvorovo people had spoken or *whether* their descendants had ever moved to Anatolia. To be sure, southward migration(s) from the steppe to Anatolia did occur during the fourth millennium – but when exactly and how? And who were the migrants? There’s little doubt that they belonged to filial IE groups, but it is not at all evident that any of them spoke PA. Therefore, instead of applying, as Marija Gimbutas (1977) did, sweeping expressions such as “Kurgan thrusts”, “first wave”, “second wave”, “hybrid cultures”, “turmoil of the fourth millennium BC”, etc., to the entire region from the western steppe to Troy and to the entire epoch spanning more than a millennium, one might look first at the chronology of the purported waves and then at the separate and the most reliable indicators of migration.

“A fine-grained sociolinguistic explanation of language shift,” Anthony & Ringe (2015) argue, “should be linked to the local conditions affecting each of these movements: the first that carried Pre-Anatolian into southeastern Europe about 4200–4000 BC, coinciding with the Suvorovo-to-Cernavodă I migration and the sudden end of the tell cultures of Old Europe,” etc. The same claim is repeated in Anthony’s recent article (2019).

Now for whichever reason the tell cultures collapsed, the first link in the supposed chain turns out to be broken.

Suvorovo/Novodanilovka/Skelya is indeed contemporaneous with Cucuteni A/Tripolye BI, i.e., it ended no later than 4100 BC (Rassamakin 2012; Manzura 2013), but Cernavodă I began hardly earlier than 3700 BC and was broadly contemporaneous with cultures such as Baden, Ezero, and Sitagroi, which Gimbutas (1977) believed to have resulted from the second migration wave (Wild et al. 2001; Stadler et al. 2001; Horváth et al. 2008; Furholt 2008; Ivanova 2013: 177; Manzura 2013: 138; Krauss et al. 2016; Bulatović & Vander Linden 2017). Radiocarbon dates suggest that Baden had originated in Central Europe, whence it spread in the southeastern direction (Stadler et al. 2001; Wild et al. 2001; Horváth et al. 2008). Interestingly, Lev Klejn (2010: 85–88) — one of the last and most eloquent proponents of the regrettably untenable theory placing the IE homeland in Central Europe — related Baden to PAs, whose migration from the Danube to Troy was marked by intermediate cultures such as Ezero and Sitagroi. Whatever one might think of these reconstructions, the relative chronology of migration events in this specific case is correct.

In short, the idea of the “Suvorovo-to-Cernavodă I migration” does not stand up to scrutiny. These cultures are separated by a hiatus of nearly half a millennium. This fact alone makes the entire “first movement” along the western Black Sea coast rather problematic. But there’s more. Let’s see how separate elements of the steppe culture moved southwards along the Balkan route. Owing to Aleksandar Bulatović (2014), the situation has become much clearer than it was before. At present, the movement can hardly be described as either a “thrust” or a “wave” or even a succession of two waves; in fact, even demic diffusion is questionable.

One of the principal features marking the early expansion of steppe cultures is the use of crushed shell for tempering ceramics. This practice appeared in the steppes already in the Neolithic — in the early sixth millennium BC (Kotova 2015: 58, 63). Experts in the Cucuteni-Tripolye culture call the shell-tempered pottery the “Cucuteni C type” (Schmidt 1932: 42; Movša 1961; Palaguta 1998; Manzura 2000). It was introduced to Tripolye by people of the Novodanilovka/Skelya culture (similar to Suvorovo), who migrated there from the Lower Dnieper at the Cucuteni A3-A4/Tripolye BI stage or even

earlier, at the end of the pre-Cucuteni/Tripolye A stage, in the second half of the fifth millennium BC, with a ceramic tradition that was entirely different from and more primitive than the local one (Palaguta 1998). Much later, after 3700 BC, shell-tempered ceramics appeared on the Lower Danube in the Cernavodă I culture and spread to the Balkans, perhaps not directly via Cernavodă I, in the second half of the fourth millennium BC (Bulatović 2014).

Another important marker of IE migrations is pottery decorated with cord imprints. The tradition probably originated in the Chalcolithic Dereivka culture of Ukraine (late fifth – early fourth millennia BC) (Kotova 2013: 103–104). From there it rapidly diffused to the Cucuteni–Tripolye area and further south. The early variety of the cord decoration – the so-called Wickelschnur design – occurs on vessels of the Cucuteni C type. At Balkan sites of the Bubanj–Sălcuța–Krivodol (BSK) cultural complex the cord decoration appears at about the same time as in the supposed area of origin, i.e., in the early Eneolithic, before 3500 BC and possibly even before 4000 BC, but only sporadically and on vessels of local types, becoming common only after 3500 BC (Bulatović 2014).

The third indicator of migrations from the steppes are zoomorphic stone maceheads, sometimes called scepters, dating to the second half of the fifth millennium BC and scattered across a vast territory from the southern Ural to Macedonia. Valentin Dergachev (2007: 145–148; and David Anthony (2007: 234), following Marija Gimbutas (1977) and Valentin Danilenko (1974: 92–106), believed that these symbols of power had spread from the east to the west, i.e., from Khvalynsk to Tripolye BI, then to Cernavodă I and ultimately to the Carpatho-Balkan area with the first migration wave. However, the dates of the Khvalynsk cemeteries based on animal bones, i.e., without the reservoir effect, fall within the mid-fifth millennium (Shishlina et al. 2009), coinciding with the average of Tripolye BI dates based on charcoal, animal bones, and grain samples and spanning the entire fifth millennium (Rassamakin 2012).

No wonder these chronological ambiguities give rise to diametrically opposite views. For instance, Igor Manzura (2000) claims that all cultural features which the followers of Danilenko and Gimbutas believe to be indicative of the

westward expansion of steppe herders actually mirror the eastward migration of the Tripolye farmers. Similar ideas are expressed by Blagoje Govedarica, who believes that the scepter owners, having moved from the Cucuteni-Tripolye agricultural area to the steppe, became the pastoralist elite (Govedarica & Manzura 2011: 47). In the view of Yuri Rassamakin (1999: 102), these artifacts belonged to traders related to the Novodanilovka/Skelya culture, who were intermediaries between the steppe and the agricultural groups. In line with this view, Sergei Korenevsky (2008) and Aleksandar Bulatović (2014) regard scepters as “transcultural” artifacts associated with various steppe societies.<sup>11</sup>

What matters for us, however, is the southward spread of the scepters. The evidence in favor of the “Kurgan thrust” in this case is as meager as in the case of other indicators. According to Bulatović (2014: 110), “(t)he presence of scepters in the central and southern Balkans is sporadic, as are the finds of corded ware, so it is not realistic to presume the presence of steppe communities on this territory solely on the basis of these isolated finds, even more so since elementary steppe characteristics are lacking, like typical ceramic shapes, crushed shell temper in the pottery and steppe funerary rites.” Again, what we observe instead of “thrusts” or “waves” is but a trickle.

Archaeological facts, then, suggest that filial IE groups entered Anatolia from the Balkans no earlier than 3000 BC, i.e., long after the wheeled vehicles had become common both west and east of the Black Sea. If PA speakers were indeed among these groups, why are both words denoting the wheel in other IE dialects missing in Hittite (see 2.1.3)? It does appear, in line with the consensus view, that PA speakers had been isolated from other Indo-Europeans since the fifth millennium BC. This would agree with a single, distant and rapid migration rather than a slow and gradual diffusion, as in the Balkans. Also, the Balkan scenario is at odds with linguistic facts indicating contacts between PIE and proto-Semitic groups.

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<sup>11</sup>One might recall the much later but likewise transcultural Seima-Turbino phenomenon, also caused by tumultuous events in Eurasian prehistory, distant migrations, and a chain-like transfer of tradition (Chernykh 2013: 269-287).

In short, if an early IE “thrust”, or “first wave” such as the one envisaged by Marija Gimbutas had actually occurred, the Balkans are not the right place to look for it. Where then should we look without leaving either Anatolia or the steppe – areas inseparably linked by their common IE past – out of sight? If the Balkans were the western corridor connecting these two regions, then we should turn to the alternative, eastern corridor – the Caucasus.

### *3.2. The Caucasian corridor: Pre-Maykop and Maykop*

Compared to the Balkans, the role of the Caucasian route is minor in both rival theories of IE origin, Steppe and Early Farming (the latter theory can be considered non-viable for all practical purposes). When advocates of the steppe origin mention the Caucasus, they discuss the possible movement of Indo-Europeans from the steppe to the southern Caucasus – an idea supported by Gimbutas (1963) and rejected by Mallory (1989: 231–233) – or the penetration of alleged North Caucasian speakers to the steppe (Anthony 2007: 297; 2019; Kortlandt 2018; Bomhard 2019a,b).

Amazingly, rather than exploring the possibility of a direct northward expansion of late PIEs from their presumed eastern Anatolian homeland, Gamkrelidze & Ivanov (1995: 831–844) entertained a bizarre idea that they had split already in the Near East and that their filial groups migrated in various directions, some westward, some eastward, and some taking a roundabout route to Eastern Europe via Central Asia. Only one branch of Indo-Aryans, after its incredibly early separation, was allowed to migrate directly northward via the Caucasus, and that’s where Maykop came into play (*ibid.*: 811–814). This strange scenario, where Maykop’s role was minor, resulted from the idea that PIE correlates with Halaf (*ibid.*: 787–788), then dated to the fifth and fourth millennia but later moved to 6100–5100 BC. Because both “southern” theories of an IE homeland, Renfrew’s Western Anatolian and Gamkrelidze & Ivanov’s Eastern Anatolian, posited a very early disintegration of PIE, both postulates – a southern homeland and an early split – have come to be inseparable, and disproving an early split is often believed to be tantamount to upholding the Steppe

Theory (see, e.g., Chang et al. 2015). This, as noted above, is a non sequitur.

Regardless of its relevance to the IE issue, the role of the Caucasus as a corridor connecting the Near East with the steppe is evidenced by numerous archaeological facts, and the principal migration vector was northward. The movement of the Near Eastern groups in that direction along the eastern coast of the Black Sea began in the early Neolithic, possibly even earlier (Formozov 1965: 65–68; Kotova 2015: 59; Gorelik et al. 2016).

Viktor Trifonov (2009) writes about two migration routes taken by the Near Eastern populations in the Chalcolithic. One of them led from western Iran to the eastern Caucasus (the Shulaveri–Shomutepe culture) and further west to the Black Sea coast (the Odishi culture); another, from eastern Anatolia to the northwestern Caucasus (the Darkveti-Meshoko culture, see Trifonov 2001a). Which, if any, of these routes may be relevant to the IE issue, is not clear, but in any case, the migration vectors across the Caucasus at that time were mostly westward and northward.

Of particular relevance in this respect are the pre-Maykop (late fifth – early fourth millennia BC) Chalcolithic fortified sites in the southern Kuban drainage, representing the Darkveti-Meshoko culture. Especially important is the eponymous highland fortress Meshoko, situated on a promontory, whose inland side was protected by a cyclopean stone wall that was 150 m long, 3-4 m thick, and has been preserved to the height of 2 m (Formozov 1965: 69–73; Lyonnet 2007; Stolyar et al. 2009; Cherlenok 2013: 41–43; Sagona 2018: 137–143).<sup>12</sup> The site has a detailed stratigraphy. Its lower layers, representing the culture of people who had constructed the fortress and dating to 4200–4000 BC by <sup>14</sup>C (Korenevsky 2012: 63), contained high-quality Near Eastern type burnished ceramics tempered with finely ground calcite<sup>13</sup> and suggestive

<sup>12</sup>

In Sagona's book, regrettably, there is some confusion between pre-Maykop and Maykop materials such as those reproduced on p. 140 (fig. 4.4).

<sup>13</sup>

Calcite temper was typical of pottery from Ochazhny Grot (Grotto of Hearths) in the Vorontsov Cave, Abkhazia (Solovyev : 1958: 143; Kozintsev 2017) and from Hammam et-Turkman VB, Syria (van Loon 1988: 292–293), dating to 4360–3800 BC. Also, similarities are observed with the

of migration from the south, and a scarce and inexpressive lithic industry. In the upper horizons, the combination of cultural components is the reverse: the pottery, decorated with interior-punched nodes, is coarse, tempered with amorphous limestone and grit, and apparently rooted in the local tradition whereas the lithic industry, likewise having Neolithic roots, is rich and diverse — a true Renaissance after the degradation evidenced by the earlier industry (Stolyar et al. 2009; Kozintsev 2017).

In short, the later culture of Meshoko is paradoxically more archaic, a few metal tools notwithstanding. Despite the striking contrast between the two cultural components, immigrant and autochthonous, the changes of both ceramics and lithics, which occurred strictly in parallel, were gradual and no abrupt boundary between the horizons can be traced (Kozintsev 2017). At the late stage the habitation layers spread beyond the fortification walls, evidently following the downfall of the citadel (Stolyar et al. 2009: 136–167). The top layers show some reversal of the trend — the material culture, assessed by both ceramics and lithics, becomes a little closer to that of the early stage, possibly attesting to symbiosis (Kozintsev 2017).

In the middle layers of Meshoko, several potsherds tempered with crushed shell were found. They are decorated with comb imprints, less often with interior-punched nodes, and resemble the Cucuteni C ware. In Tripolye, such a decoration appears on the Cucuteni C vessels at the BII stage in the first half of the fourth millennium (Movsha 1961). At the pre-Maykop fortress Svobodnoe, which is somewhat earlier than Meshoko and, unlike the latter, is situated on the boundary with the steppe, shell-tempered ceramics

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Chalcolithic pottery from Areni, Armenia (Areshian et al. 2012). The southern origin of people who constructed the Meshoko fortress is evidenced by this indicator as well. Yet another evidence thereof may be the obsidian found at Meshoko. The pieces analyzed by Formozov & Chernykh (1964) had been made of obsidian from Transcaucasian mines situated 600–650 km away from Meshoko whereas that from earlier (Upper Paleolithic and Mesolithic) sites in the area had been procured from north-central Caucasian mines situated only 250–300 km away. The problem is that obsidian pieces were found in both lower and upper layers of the site, and we don't know if the sources were the same or different (Sergei Ostashinsky's personal communication).

predominate. Svobodnoe hardly belongs to the Darkvetsi-Meshoko culture as its affinities are mostly with the steppe, Tripolye, and even Central Europe (Nekhajev 1992). Ties between pre-Maykop and Skelya sites had already been noted on the basis of ceramics (Nekhajev 1992; Rassamakin 1999: 78–80; Kotova 2006). Likewise indicative of such ties are an unfinished cruciform stone mace-head (unfinished means not imported) from the upper layers of Meshoko (Stolyar et al. 2009: 138, 161; cf.: Govedarica 2005–2009) and a fragment of a zoomorphic stone scepter from another pre-Maykop fortress — Yasenova Polyana (Korenevsky 2008: 147).

The gradual transition from a culture apparently introduced from the southern Caucasus to a more archaic one indicates a clash of two traditions — southern and autochthonous. The third (northern) component evidences ties with the steppe tribes. Importantly, all the pre-Maykop fortresses emerged in the northwestern Caucasus next to the steppe in the late fifth millennium BC (Korenevsky 2012: 63). They are half a millennium earlier than the allegedly PA Cernavodă I culture and were constructed soon after the Anatolian branch had split off from the Indo-Hittite stem.

To the extent that cultural contrast points to linguistic heterogeneity, the possibility that people speaking at least three very different languages met in the Northwest Caucasus in the late fifth millennium must be considered. Judging by the cyclopean fortification walls, they clashed, and judging by the steppe-type artifacts and by the gradual nature of cultural changes, they interacted. Whereas the Balkan scenario precludes contacts between Indo-Europeans and Semites, the Caucasian scenario can easily incorporate such contacts provided the Indo-Europeans were migrants from the south — those who constructed the fortresses. We know neither the exact source of their migration nor whether the travel was fast or slow. What we do know is that they had reached the borderland with the steppe in the fifth millennium BC — 1000-odd years before Troy I was founded by people whom some believe to be Anatolians (Luwians?) but whose ethnicity is actually not in the least more understandable than that of the Meshoko people (Yakubovich 2010: 128–129).

The southern tendency, evidenced by the early culture of Meshoko, reappeared even more strikingly in the Maykop culture (Munchaev 1994; Korenevsky 2004; Kohl 2007: 72–86; Lyonnet 2007; Ivanova 2012; 2013: 50–118; Sagona 2018: 143–182), which emerged shortly after 4000 BC (Trifonov 2001b; Chernykh & Orlovskaya 2008; Korenevsky 2012 101; Kohl & Trifonov 2014). Rauf Munchaev (1975: 328–329) and Marina Andreyeva (1977) pointed to Syro-Anatolian (Amuq F) and northern Mesopotamian (Gawra XII–VIII, especially XIA) parallels to Maykop, and the same tradition was later registered at Arslantepe VII in eastern Anatolia (Frangipane 1993). However, Amuq F, marked by the so-called “Chaff-Faced Ware” (CFW),<sup>14</sup> is no earlier than 3700 BC (Marro 2010; Greenberg, Palumbi 2015; Sagona 2018: 184–187) and is therefore coeval with early Maykop; the same applies to Arslantepe VII (Helwing 2000); but Gawra XIA is earlier, correlating with the Ubaid to Uruk transition of the late fifth millennium (Peasnall, Rothman 2003; Marro 2010). Catherine Marro (2010) believes that Maykop is closest to Hammam et-Turkman V in northern Syria, which is somewhat earlier than Maykop.<sup>15</sup>

Unlike their predecessors and possible ancestors in the northwestern Caucasus, the Maykop people did not build fortifications, apparently because their relations with both the natives and the steppe tribes were more peaceful. Moreover, unlike the pre-Maykop people, those of Maykop were both willing and able to colonize the steppe (Gej 1989; Korenevsky 2004: 93–96; Shishlina 2013; Trifonov 2014).

### *3.3. The Near Eastern roots of Maykop and Novosvobodnaya*

Maykop was broadly contemporaneous with the CFW tradition of the southern Caucasus and Iran, called the Leilatepe culture in Azerbaijan (Akhundov 2007; Marro 2007, 2010; Lyonnet 2007; Museibli 2014: 48; Ivanova 2012; 2013: 118–121; Sagona 2018: 153, 182–199). This tradition, in turn, correlates with Amuq F, Hammam et-Turkman V, etc. (Marro 2010). In

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<sup>14</sup>Most of the Maykop pottery, however, is not chaff-faced although the resemblance of vessel forms is indeed striking.

<sup>15</sup>The Hammam VB ware, dating to 4360–3800 BC (Akkermans 1988), is tempered with calcite (van Loon 1988: 292–293) — a feature paralleled by the contemporaneous ware from the lower layers of Meshoko (see 3.2).

northwestern Iran, it dates to 4200–3700 BC, the same as in the southern Caucasus and northern Mesopotamia (Abedi et al. 2015).

Some researchers view early Maykop as a northern extension of Leilatepe (Munchaev & Amirov 2012; Museibli 2014: 46; Rezepkin 2017), and some speak of a migration from Mesopotamia to the Caucasus — a pre-Uruk expansion (Andreyeva 1977; Akhundov 2007; Lyonnet 2007; Pitskhelauri 2012; Kohl, Trifonov 2014).

Catherine Marro (2010) argues that the CFW tradition originated, not in Mesopotamia, but “somewhere in the highlands between the Upper Euphrates and the Kura Rivers.” Specifically, its early manifestation, dating to the late fifth millennium BC, was found at Ovçular Tepesi, Nakhichevan (Marro et al. 2009, 2011, 2014). In Marro’s opinion, Ovçular Tepesi may be ancestral to both Amuq F and Leilatepe (and thereby, one might add, indirectly to Maykop). Later, CFW was discovered at another site, broadly contemporaneous with Ovçular Tepesi — Norşuntepe on the Upper Euphrates (Gülçür & Marro 2012) and at certain other early sites (Palumbi 2011). Gülçür & Marro (2012: 325) call this tradition the “standardized ware oikumene” and conclude that “the technical roots of CFW should rather be sought in the east Anatolian/Caucasian highlands.”

Whereas the southern roots of Maykop are beyond doubt, the origin of the Late Chalcolithic (early fourth millennium BC) kurgan tradition south of the Caucasus range is a contentious matter (Poulmar’h & Le Mort 2016). Barrows have been discovered in Azerbaijan (Museibli 2014: 6–48; Lyonnet et al. 2008; Sagona 2018: 199–202), Georgia (Makharadze 2007), Armenia (Muradyan 2014), and Iran (Muscarella 2013: 88–94; Ivanova 2012; 2013: 124–128). They correlate, though not intrinsically, with the Leilatepe culture. When Maykop-type tumuli were first excavated at Sé Girdan, Jean Deshayes (1973), in line with Gimbutas’ ideas, regarded this as evidence of an Indo-European migration from the northern Caucasus. Alexey Rezepkin (2000: 20–21), agreeing with him, wrote that PIEs, who, in his view, were associated with the Novosvobodnaya culture and used wheeled transport, migrated to Iran via Azerbaijan, introducing the kurgan tradition to those areas.

Without explicitly mentioning Indo-Europeans, but probably alluding to the Kurgan theory, Munchaev & Amirov (2012) regarded the spread of the kurgan tradition, which they erroneously believed to be later than Leilatepe, as evidence of the first migration wave of pastoralists from the steppes to the Near East. Anthony (2007: 294–295), too, writes about “the migration southward of a Klady-type chief” but in his view, the Novosvobodnaya/Klady people, like those of Maykop proper, spoke a North Caucasian dialect (*ibid.*: 98, 297). A similar view has been expressed by Alexei Kassian (2010: 417, 421–422, 428), who likewise regards Novosvobodnaya as just a late stage of Maykop and associates the Maykop culture in toto with North Caucasian speakers.

Now whatever language the Novosvobodnaya/Klady people spoke, they couldn’t have introduced the kurgan tradition to the southern Caucasus. First, absolute dates of Novosvobodnaya/Klady fall in the 3600–2800 BC range (Trifonov et al. 2017; Wang et al. 2019, Supplementary data 1). Maykop proper, on the other hand, is earlier and so are the Transcaucasian kurgans. Two dates for Soyuq Bulaq are in the 3900–3600 BC interval and thus no later than those for early Maykop, let alone Klady (Lyonnet et al. 2008). While no absolute dates are available for Sé Girdan, this cemetery is hardly later because the stone scepter with a feline head found there is stylistically quite similar to the one with an equine head from Soyuq Bulaq; also, most beads from both tombs are similar in shape and material (Lyonnet et al. 2008).

Second, a child burial in a jar at Klady (Rezepkin 2000 fig. 12: 12, 13) parallels earlier ones, correlating with Late Chalcolithic contexts at several sites in the southern Caucasus (Museyibli 2014: 49–59). This early agricultural practice spread from Anatolia to the Balkans in the Neolithic as part of the Neolithization package. By the Early Bronze Age it became dominant in Anatolia and the Levant, but virtually disappeared in Europe (Bacvarov 2008).

Third, in the case of Klady, genetics indicates a migration from the southern to the northern Caucasus, not vice versa (see 4.2.1). And still, all these facts, important as they are, do not cancel the possibility of a southward spread of the kurgan tradition in the first half of the fourth millennium BC, from

early Maykop to Sé Girdan (see, e.g. Kohl 2007: 85). Here, indirect evidence must be examined.

### 3.4. Who were the Maykop people?

Sergei Korenevsky (2012: 62, 68, 107–108, 114) claims that the earliest kurgans appeared on the northern Caucasian steppes in the fifth millennium BC<sup>16</sup> and may in some respects be regarded as prototypes of the Maykop tumuli. Korenevsky (2012: 109), however, takes a cautious stance, writing that Maykop and Leilatepe kurgans emerged simultaneously in the early fourth millennium BC, largely independently of the steppe tradition. Viktor Trifonov (2000), describing the Sé Girdan kurgans and calling them “Maykop type tumuli”, refrained from assessing the direction in which the tradition had spread.

Najaf Museibli (2014: 72), on the other hand, attributes Sé Girdan to the Leilatepe culture, claiming that the kurgan tradition, having originated near Lake Urmia, spread to the northern Caucasus. Philip Kohl and Viktor Trifonov (2014), too, assert that kurgans had been constructed in the southern Caucasus “well before” their appearance on the Eurasian steppes.

A detailed elaboration of such ideas with regard not only to the kurgan tradition, but to the entire material culture, has been proposed by Mariya Ivanova (2012; 2013: 108–118; 121–129). Her most provocative conclusion is that the key foreign elements in the fourth millennium BC cultures of the northern Caucasus point neither to the upper Euphrates and Tigris nor to the alluvial plains of Mesopotamia, but to High Asia – the Iranian Plateau and the mountainous regions of southwestern Central Asia. These elements include colorful ornamental stones such as lapis lazuli and turquoise, which at that time were rare in southwest Asia but had been abundant in Iran and Central Asia at least since the sixth millennium BC. Other indicators, unique but pointing, as Ivanova argues, in the same

<sup>16</sup> A Chalcolithic kurgan at Tipki in the Stavropol steppe has a very early calibrated <sup>14</sup>C date of 4891–4692 BC (Korenevsky 2012: 64) whereas others allegedly date to the Tripolye BI and BI-BII stages (second half of the fifth millennium). Igor Manzura (2017) believes that most if not all these cases are doubtful.

direction, are precious fabric and exotic red pigment from Klady, an unusual bone pin with a flat triangular head from Ust-Dzheguta, and a carnelian cylinder seal from Krasnogvardeyskoe, very similar to that from Tepe Sialk IV (see, however, Kohl 2007: 75, for Mesopotamian and Anatolian parallels to these artifacts).

According to Mariya Ivanova (2013: 113), the only area where *all* the animals portrayed on the Maykop silver vessels were native in the fourth millennium BC is northwestern Iran, Armenia, and Azerbaijan. Especially noteworthy are stylistic parallels between these vessels and gold ones from Fullol, Afghanistan (Ivanova 2013: 110–114), some of which she dates to the fourth millennium BC. Moreover, the geometric motifs of those vessels closely parallel the Geoksyur-type painted pottery of southwestern Central Asia. Vadim Masson (2006: 58–59), too, regarded these motifs as direct replicas of the Late Chalcolithic Kara-depe and Geoksyur prototypes, though attempts were made to link the Fullol style to the 13<sup>th</sup> century BC Assyrian glyptics (see, e.g., Olijdam 2000).

Also suggestive are late fifth and fourth millennia BC Iranian and Turkmenian rather than Syro-Anatolian prototypes of Maykop copper tools (Ivanova 2016). Based on all these facts, Ivanova (2012; 2013: 123–124) points to the well-trodden path coinciding with the Great Khorasan Road of later epochs and connecting Khorasan with Iranian Azerbaijan. A northern branch of the route leads along the western Caspian coast to the Kura valley and further north, to the passes in the Caucasus Range.

As to the CFW, Ivanova notes that its distribution area included northwestern Iran and the Plain of Urmia, where the Sé Girdan tumuli are located. But the distribution area of tumuli is smaller than that of the CFW. Fourth millennium BC mounds resembling those at Sé Girdan have been excavated in Transcaucasia but not in Anatolia or Mesopotamia. Ivanova (2013: 129) concludes: “Thus, the funerary evidence adds further credibility to the hypothesis that the foreign elements in the northern Caucasus originated from the Iranian plateau and its borderlands, and not from Greater Mesopotamia or the Anatolian highland, two regions which lie far outside the area of distribution of early tumuli.”

Indeed, there are indications that the kurgan tradition in Transcaucasia is more ancient than Leilatepe. The calibrated date based on a human tooth from kurgan 5 at Aknalich, Armenia, is 4340–4050 BC, suggesting that the burial is contemporaneous with the Middle Chalcolithic Sioni horizon (Muradyan 2014). While the reservoir effect is possible, the date, according to Firdus Muradyan, is substantiated by typological parallels between Aknalich and Sioni sites in Armenia.

Before Ivanova, Leonid Sverčkov (2011:172) argued that Maykop had originated in the southeastern Caspian region, whence it migrated first to the area near Lake Urmia and then to the northern Caucasus. He pointed to the close similarity between the asymmetrical flint arrowheads in the Maykop and Kelteminar cultures (*ibid.*: 74–75; see 5.4).

According to Gimbutas (1963), the Maykop people were PAs; according to Kristiansen (2012), they were early PIEs (Indo-Hittites) — common ancestors of all IE groups including PAs; whereas Heggarty (2018) claims that Maykop was associated with a minority of late PIE branches, marked by the high amount of the CHG component (see 4.2), primarily Germanic and Balto-Slavic. The problem with the first hypothesis is that the Maykop people used wheeled vehicles (Trifonov 2004), which had apparently been introduced from the Near East (Izbitser 2013), whereas, as noted above, Hittite had neither of the two common IE words for ‘wheel’. The problem with the second hypothesis is that the Maykop culture, like Leilatepe, emerged hardly before 3900–3800 BC (Trifonov 2001b; Chernykh & Orlovskaya 2008; Shishlina et al. 2009; Korenevsky 2012: 101; Museibli 2014: 48) — several centuries after the Anatolian branch had split off from the Indo-Hittite stem. The third hypothesis, postulating a dispersal of most IE groups directly from the Near East, is implausible given the facts pointing to the steppe origin of the second earliest branch of IE — Tocharian (see 5.6), let alone the later branches.

What language did the pre-Maykop people speak? We don’t know that, of course. What we do know are three things: (a) they had migrated from the south (see 3.2); (b) they reached the northwestern Caucasus shortly after the separation of the Anatolian branch; and (c) there are no indications of the use of

wheeled vehicles at that time. Therefore the pre-Maykop people could have spoken either PA or late PIE (the language ancestral to all IE branches except Anatolian). The former possibility is more likely because late PIE was, to all appearances, spoken by the Maykop people, who, like those of Leilatepe, used both wheeled transport and the pottery wheel (Museibli 2014: 67).<sup>17</sup> Theoretically, the pre-Maykop people could be their ancestors, but this disagrees with the fact that they did not build kurgans. So rather than being autochthonous, the Maykop people could represent the second wave of migrants from the south – those who introduced the kurgan tradition to the northern Caucasus.

### *3.5. Khvalynsk: southern roots?*

Igor Goraščuk (2003) claims that the blade industries of the Khvalynsk sites in the Middle and Lower Volga drainage, Kair-Shak VI, Kara-Khuduk, and Gundorovskoe, are identical to that of the Shebir sites on the Mangyshlak Peninsula. The latter, in turn, reveal parallels with early farming cultures of southern Turkmenia and Iran, implying a northward migration route along the eastern Caspian coast. Moreover, Goraščuk points to Near Eastern parallels of the Khvalynsk stone maces and bracelets.

Sergei Bogdanov, on the other hand, uses the same parallels, which he supplements by those relating to the pre-Maykop culture of Northern Caucasus, to hypothesize a Caucasian route of the IE migration from the Near East to the Volga (Bogdanov 2004: 231, 235).

David Anthony (2019), too, believes that Khvalynsk ancestors migrated from northwestern Iran or Azerbaijan along the western Caspian coast sometime before 5000 BC. Because his conclusion is based mostly on genetic facts, I will discuss it in section 4.2.4.

One must admit that the cultural evidence of the southern roots of Khvalynsk is much weaker than that demonstrating the southern origin of pre-Maykop, let alone Maykop. This is not only because archaeological facts in the former case are

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<sup>17</sup>On the basis of her experimental studies, Galina Poplevko (2017), however, rejects the idea that Maykop pottery was wheel thrown.

scantier, but also because the route from the Near East in the latter case is shorter.

#### 4. Genetics

##### 4.1. *The Balkan corridor, yet again*

Before the emergence of paleogenetics, physical anthropology was sometimes employed to tackle the IE problem (Gimbutas 1977; Menk 1980; Schwidetzky 1980; Gamkrelidze & Ivanov 1995: 847–849; Day 2001; Kozintsev 2008, 2009). The results of some of these publications, specifically those by Menk and Kozintsev, foreshadowed later genetic studies, but most of the work concerned comparatively late stages of IE history, beginning with the Yamnaya expansion. Human remains from territories relevant to PIE history are, with few exceptions, too scarce to warrant statistical treatment, which was often substituted by obsolete racial labels attached to individual crania.

Early attempts to use phenotypic genetic markers such as blood groups, plasma proteins, enzymes, etc., for solving the IE problem were rather disappointing (Sokal et al. 1992), but later studies, using synthetic maps based on the integration of gene frequencies across various systems were very illustrative, showing both the “early farming cline” and the later “steppe expansion” (Piazza et al. 1995; Cavalli-Sforza 2001: 117–119, 161–163). Certain important conclusions made by Cavalli-Sforza and his team, specifically that the cline connecting the steppe with the Near East is quite pronounced in the Caucasus and eastern Anatolia while attenuating toward the Balkans and western Anatolia (Piazza et al. 1995: 5839, fig. 3), are supported both by archaeological data (see 3.1 and 3.2) and by recent genomic studies.

The birth of genomics and especially paleogenomics marked a new era. Not only were Cavalli-Sforza’s findings upheld, but so were those of the recent archaeological research cited above. As to the Balkan route, the conclusion of a recent study (Mathieson et al. 2018: 5) is unequivocal: “No steppe migration to Anatolia via southeast Europe.” The authors go on: “Although we find sporadic steppe-related ancestry in

Balkan Copper and Bronze Age individuals,<sup>18</sup> this ancestry is rare until the Late Bronze Age.” But even in genomes of the Mycenaean Greeks, the share of the steppe ancestry is estimated at only 4–16 %, and the predominant Y-chromosome haplogroup is the “southern” J, not subclades of R1 that supposedly mark the steppe IEs (Lazaridis et al. 2017).

In other words, both the first and even the second wave of the alleged Indo-European advance toward Anatolia via the Balkans turn out to be illusory not only in archaeological terms, but in terms of genetics as well. Why the tell cultures collapsed is a different question, but whatever the reason might be, the facts unambiguously suggests that PA speakers did not migrate to Anatolia from the steppe along the Balkan route. Had they ever lived on the steppe, after all?

#### *4.2. CHG, AF, and Y-chromosome haplogroups: their role in tracing PIE migrations*

##### *4.2.1. Pre-Maykop, Maykop, and Novosvobodnaya*

The feature that has gained greatest importance for the IE problem in the recent years is the autosomal component CHG (Caucasus Hunter-Gatherers). It is especially marked in Upper Paleolithic and Mesolithic bone samples from Georgia (Jones et al. 2015) and in Neolithic and, to a lesser extent, in Chalcolithic samples from northern Iran (Lazaridis et al. 2016). However, CHG was not detected in the Chalcolithic (Namazga III, ~3300 BC) sample from Turkmenia despite the presence of a Neolithic Iranian ancestry in that population (Damgaard et al. 2018).

Having been introduced to the northern Caucasus from the south, CHG was first registered in the pre-Maykop people of the southern Kuban drainage, in the Chalcolithic people of the north-central Caucasian steppes and Ukraine, and in the Khvalynsk group (Damgaard et al. 2018; Wang et al. 2019). Later, it became very prominent (over 40 %) in the Yamnaya people and, after their westward expansion, also in those of the Corded Ware culture and in other supposedly Indo-European

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<sup>18</sup>Two individuals with steppe ancestry buried at mid-fifth millennium cemeteries Varna I and Smyadovo in Bulgaria hardly suffice to speak of a “wave”.

groups of Central and Western Europe (Haak 2015; Allentoft 2015).

The pre-Maykop samples were taken from bones of three children buried in Unakozovskaya Cave, Adygei, in the mid-fifth millennium BC. Their southern ancestry is demonstrated by two components that are predominant in their autosomal genomes — western Anatolian, introduced to Europe by the early farmers (AF) and CHG, as well as by the “southern” Y-chromosome haplogroup J (Wang et al. 2019). The latter is coupled with the CHG component in the Upper Paleolithic and Mesolithic people of the western Caucasus (Jones et al. 2015); it was also detected in a Mesolithic man from Hotu, Iran (Lazaridis et al. 2016) and in one of the two Kura-Araxes (Early Transcaucasian Culture) males (Wang et al. 2008). The gracility of the male cranium from Unakozovskaya points in the same direction. Inna Potekhina (1995) attributed it to the Eastern Mediterranean type. The Maykop cranial series, too, shows a southern (Mediterranean) tendency (Kazarnitsky 2012: 36).

The Maykop genomes contain mostly the same two southern autosomal components as the genomes of their predecessors and possibly ancestors — western (AF) and eastern (CHG). As in the pre-Maykop and Kura-Araxes genomes, the CHG to AF ratio is about 6:4 (Wang et al. 2019: 4, fig. 2a). Most Maykop Y-chromosome haplogroups (four out of six) are markedly “southern” — L and J. The L1a subclade was found in a Chalcolithic sample from Arpa, Azerbaijan (Lazaridis et al. 2016; see above on the J haplogroup).

Apart from the two autosomal constituents present in Maykop people proper, the Novosvobodnaya people buried at Klady are marked by the third component, also southern, specific to the Chalcolithic of Iran.<sup>19</sup> In this respect, they resemble the Kura-Araxes people. The share of this component is 37 % in Novosvobodnaya and 25 % in Kura-Araxes (Wang et al. 2019: 6, fig. 4b). The Y-chromosome haplogroups of the three

<sup>19</sup>Whether or not this has anything to do with archaeological parallels between Maykop or Novosvobodnaya and the Sé Girdan tumuli near Lake Urmia (see 3.3) is hard to say because Sé Girdan has no absolute date and Leilatepe genomics is a blank spot. Nevertheless, genetic data suggest that the migration vector was directed northwards, from Iran to the northern Caucasus.

Novosvobodnaya males (J2a1 and G2a2a) are likewise “southern”. The G2 subclade was found in a very early (eighth millennium BC) Neolithic sample from Central Zagros, Iran (Broushaki et al. 2016) and in one half of the Neolithic (seventh millennium BC) samples from northwestern Anatolia — the place whence this haplogroup spread to the Balkans with the “Neolithization package” including AF (Mathieson et al. 2015). G2 is also present in a Kura-Araxes male whereas the second one carried the J haplogroup (Wang et al. 2019).

In sum, genetic data lend no support whatever to the idea that Novosvobodnaya is “less southern” or “more European” than Maykop. On the contrary, ties with Iran and Kura-Araxes are even more salient here. Despite certain Central European cultural traits mentioned by proponents of the cultural distinctness of Novosvobodnaya (Nikolaeva, Safronov 1974; Rezepkin 2000; Klejn 2010: 308–322), these people are genetically quite far from those associated with Central European cultures such as Baalberge and Globular Amphorae (Wang et al. 2019: 4, fig. 2c). The principal difference consists in the virtually complete absence of CHG in Central Europe before the Yamnaya migration.<sup>20</sup>

#### 4.2.2. CHG versus AF

CHG was likewise absent in Neolithic Anatolia, where only the AF component was present; but from the Chalcolithic onward, Anatolian autosomal genomes consist of AF and CHG in an approximately equal proportion (Damgaard et al. 2018: 16, fig. 3). The influx of CHG to central and western Anatolia and eventually to southeastern Europe — areas with the highest concentration of AF — began in the Late Neolithic or

<sup>20</sup>One might add that the Baden samples are virtually indistinguishable from those relating to the Neolithic cultures of Hungary such as LBK and Lengyel (Gamba et al. 2014; Lipson et al. 2017) and likewise include no CHG component (Jones and al. 2015), implying that Baden had nothing to do with the Indo-Europeanization of Anatolia, its striking archaeological parallels with Troy notwithstanding. Were it otherwise, the high content of CHG in Hittites, the Yamnaya people, and Central and Western European groups after the Yamnaya expansion would be hard to interpret. In other words, genetic facts are at odds not only with those parts of the Kurgan theory that concern PAs, but also with the Central European homeland theory.

Chalcolithic, however not from the steppe (because it is unaccompanied by the steppe component EHG) but from eastern Anatolia, the southern Caucasus or Iran, where its share was very high (Hofmanová et al. 2016; Lazaridis et al. 2017; Mathieson et al. 2018; Raveane et al. 2018). The Late Chalcolithic (fourth millennium BC) sample from Arslantepe, evidently correlating with the Amuq F (CFW) horizon, differs from other Anatolian samples by having a higher amount of CHG (Skourtanioti & Selim 2018). The Late Chalcolithic (4500–3900 BC) population from Israel differs from Neolithic populations of the same area by the presence of an Iranian autosomal component (close to CHG), whose amount is estimated at 17 % (Harney et al. 2018).

Interestingly, the frequency of the allele associated with blue eye color is quite high (49 %) in this population (*ibid.*), although the source of gene flow was Iran. In modern Iranians, the blue-eyed phenotype is usually attributed to a Late Bronze Age (Andronovo) migration from the steppe. Had the Late Chalcolithic people from the Levant (and, respectively, from Iran) retained the genetic memory of a much earlier migration by the same route?

The western part of the southern ancestry, AF, which had been predominant in Central, Western and Southeastern Europe including Tripolye before the Yamnaya people migrated westwards, was introduced there by the early Neolithic farmers from western Anatolia (Lazaridis et al. 2014; Haak et al. 2015; Mathieson et al. 2015, 2018; Hofmanová et al. 2016; Lipson et al. 2017). AF is abundant in the Kura-Araxes, pre-Maykop, and Maykop people but generally rare in the steppe, even in the steppe Maykop (Wang et al. 2019, fig. 2a; see <http://eurogenes.blogspot.com/2019/02/the-steppe-maykop-enigma.html>, accessed June 3, 2019). One striking exception is an early 5<sup>th</sup> millennium BC male from Dereivka on the Dnieper, whose ancestry is entirely composed of AF (Mathieson et al. 2018, fig. 1d), evidencing ties with one of the farming cultures of Southeastern or Central Europe.<sup>21</sup> The other 29 Neolithic

<sup>21</sup>His Y-chromosome haplogroup is the “southern” H1 rather than a subclade of U4 and U5 as in other Neolithic Dereivka males and in those from Khvalynsk (<https://amtdb.org/records/>, accessed April 13, 2019).

individuals from Ukraine show a predominantly EHG ancestry with a small share of WHG (Western Hunter-Gatherers), but none has any CHG.

The four Eneolithic (Sredni Stog and later) individuals from Ukraine (Dereivka and Aleksandriya, 4<sup>th</sup> – early 3d millennia BC) are genetically quite different, showing a mixture of CHG, EHG, WHG, and AF; in two of these males, the Y-chromosome haplogroups belong to subclades of R1a and R1b (Mathieson et al. 2018, fig. 1d; Wang et al. 2019, fig. 2c; Anthony 2019; <https://amtdb.org/records/>, accessed April 13, 2019).

If Central European Neolithic or Chalcolithic groups such as that associated with the Globular Amphorae culture rather than the standard AF samples from Anatolia are used as proxies in admixture models, the fit is better, and the amount of AF in Yamnaya groups rises to 13–17 % (Wang et al. 2019).<sup>22</sup> The share of AF is even higher in Middle to Late Bronze Age steppe populations such as Sintashta, Andronovo, and Srubnaya (Mathieson et al. 2015), evidently marking the presence of a Central European component in those cultures. In other words, in the steppe belt, AF appears to mark migrations from the west, not from the south. These migrations occurred mostly at the later stages of the IE dispersal, not at the PIE stage.

Can the eastern part of the southern ancestry – CHG – provide a gauge of PIE dispersal? To some extent, yes, but the connection is not intrinsic: having emerged no later than the Upper Paleolithic, CHG is way older than PIE. They became coupled only by migration. But non-PIE migrants from the southern Caucasus, too, might have carried this component. By

<sup>22</sup>In one of Davidski's analyses, the best surrogate donor of the AF component was a Neolithic sample from Blätterhöhle, Germany, dating to the fourth millennium BC (<http://eurogenes.blogspot.com/2018/01/another-look-at-genetic-structure-of.html>, accessed September 18, 2018). In this regard I should mention very close craniometric parallels between a Funnel Beaker (specifically Tiefstichkeramik) sample from Ostorf, Germany, and those from a Yamnaya cemetery on the Ingulets, Ukraine, and, amazingly, from an Okunevo (Chaa-Khol') cemetery at Aimyrlyg, Tuva (Kozintsev 2008, 2009). Interesting as they are, such parallels in no way support the obsolete theory locating the IE homeland in Central Europe because in that case the massive influx of CHG to Europe from the steppe following the Yamnaya expansion would remain unexplained.

collating genetic and archaeological data we may hope to disentangle the evidence.

This is how David Reich interprets the facts: “Ancient DNA available from this time in Anatolia shows no evidence of steppe ancestry similar to that in the Yamnaya (although the evidence here is circumstantial as no ancient DNA from the Hittites themselves has yet been published). This suggests to me that the most likely location of the population that first spoke an Indo-European language was south of the Caucasus Mountains, perhaps in present-day Iran or Armenia, because ancient DNA from people who lived there matches what we would expect for a source population both for the Yamnaya and for ancient Anatolians. If this scenario is right, the population sent one branch up into the steppe — mixing with steppe hunter-gatherers in a one-to-one ratio (Reich implies two autosomal components — local steppe EHG, from Eastern Hunter-Gatherers, and CHG — A.K.) to become the Yamnaya as described earlier — and another to Anatolia to found the ancestors of people there who spoke languages such as Hittite” (Reich 2018: 120; see also Mathieson et al. 2018). This is precisely what I had written before these two publications appeared (Kozintsev 2016).

Moreover, the evidence about the Hittites is no longer circumstantial. After Reich’s book had been published, Eske Willerslev’s team made us familiar with the results of their recent study (Damgaard et al. 2018). They have demonstrated that the autosomal genomes of five individuals from central Anatolian cemeteries dating to the Old Kingdom period (those buried were apparently Hittites) contained no steppe component (EHG). Instead, like the Maykop and pre-Maykop genomes, they revealed a mix of CHG and AF in an approximately one-to-one proportion.

But while Hittite (and Balkan) genetics is the thorn in the flesh for those advocating the Steppe Theory, their opponents have to deal with their own stumbling block — the absence of the southern variety of the AF component in Yamnaya.

#### *4.2.3. What was the source of CHG in the Yamnaya gene pool?*

The idea that CHG had been carried from the Caucasus to the steppe by PIEs met severe criticism from David Wesolowski

alias Davidski, who uncompromisingly disagrees with how Reich and Willerslev interpret their findings. Based on his own calculations, he claims that southern groups such as Maykop and pre-Maykop had not contributed to the Yamnaya gene pool whereas the steppe ancestry in Anatolians is possible (see, e.g., <https://eurogenes.blogspot.com/2018/11/big-deal-of-2018-yamnaya-not-related-to.html>; accessed November 5, 2018; <http://eurogenes.blogspot.com/2019/02/on-maykop-ancestry-in-yamnaya.html>, assessed May 29, 2019). In his words, “Yamnaya gets its CHG from an earlier population still, that was living in the steppe during the Meshoko period and probably much earlier. It does look like the CHG in Yamnaya is native to the steppe, and was present there since the Mesolithic” (Wesolowski, pers. comm.).

Another, though milder, critic of Reich and Willerslev is David Anthony (2019), who points to the fact that CHG is heavily admixed with the Anatolian version of AF in all Caucasian samples discussed above, in strong contrast to Yamnaya, where only the European variety of AF is found. The sole exception are three individuals from the Eneolithic kurgans in the north-central Caucasian piedmont, dating to the second half of the fifth millennium — two males from Progress 2, situated between Pyatigorsk and Nalčik, and a female from Vonyuchka 1 near Pyatigorsk (Korenevsky 2012: 43; Greski & Berezina 2012). All three show a mixture of CHG and EHG in an approximately 7:3 proportion, but no AF, at least not in its Anatolian version (Wang et al. 2019, fig.2a). In this respect they are similar to the Yamnaya samples. The Y-chromosome haplogroups of the males belong to the R1b haplogroup, typical of Yamnaya, but to its extremely rare subtype, namely R-V1636, also registered in a Kura-Araxes male from Armenia (in Davidski’s view, this may be a signal of proto-Hittites migrating southwards from the steppe to Anatolia via Caucasus, see <http://eurogenes.blogspot.com/2018/>, accessed May 28, 2019).

An anonymous comment in the Supplementary Information to Wang et al. 2019:36 reads, “Complementary to the southern Eneolithic component, a northern component started to expand between 4300 and 4100 calBCE manifested in low burial mounds with inhumations densely packed in bright

red ochre. Burial sites of this type, like the investigated sites of Progress and Vonyuchka, are found in the Don-Caspian steppe, but they are related to a much larger supra-regional network linking elites of the steppe zone between the Balkans and the Caspian Sea. These groups introduced the so-called kurgan, a specific type of burial monument, which soon spread across the entire steppe zone.” Given the very early appearance of the kurgan tradition in Transcaucasia, specifically in Armenia (see 3.4), and the fact that very little is known about the culture of Progress and Vonyuchka, caution must be applied.

Notably, very little AF is found in the genomes of the steppe Maykop people. Amazingly, according to Davidski, their makeup can be modeled as a nearly equal mix of two components — Piedmont Eneolithic (Progress and Vonyuchka) and Western Siberian Upper Paleolithic such as Ust'-Ishim — plus a small share of a Southwestern Asian Eneolithic component akin to Geoksyur and Sarazm (<http://eurogenes.blogspot.com/2019/02/the-steppe-maykop-enigma.html>, accessed June 6, 2019). Unlike Maykop proper, then, the steppe Maykop reveals a distinctly eastern rather than southern ancestry (see <http://eurogenes.blogspot.com/2018/10/steppe-maykop-buffer-zone.html>, accessed June 6, 2019). It could hardly be the source of CHG in the Yamnaya gene pool.

#### 4.2.4. *Khvalynsk comes into play*

Another sample showing a blend of EHG with CHG with little or no AF consists of three males from Khvalynsk, whose Y-chromosome haplogroups are the “Indo-European” R1a and R1b as well as U4, as in Neolithic Dereivka (Wang et al. 2019, fig. 2c). Regrettably, the genetic makeup of these three individuals is not clear because in another study by Reich’s team, Narasimhan et al. (2018, Supplementary Online Materials: 144) write: “On the ADMIXTURE plot, we note that the Khvalynsk samples show additional components that are maximized in Anatolian and Iranian agriculturalists” (see *ibid.*: 145, fig. S3.21, right).<sup>23</sup> Whether present or not, the share of AF

<sup>23</sup>The discrepancy between the two studies from the same lab apparently stems from the fact that Wang et al. assess the proportion of CHG whereas Narasimhan et al. speak of a component related to the “Iranian

in Khvalynsk is much smaller than in Maykop or Darkveti-Meshoko.

In the words of David Anthony (2019), “Without any doubt, a CHG population that was not admixed with Anatolian Farmers mated with EHG populations in the Volga steppes and in the North Caucasus steppes before 4500 BC. We can refer to this admixture as pre-Yamnaya, because it makes the best currently known genetic ancestor for EHG/CHG R1b Yamnaya genomes.” As Anthony believes, the admixture could have begun as early as 6200 BC, when the first hunter-fisher camps appeared on the Lower Volga. Davidski, too, believes that Khvalynsk is ancestral to Yamnaya (<https://eurogenes.blogspot.com/search?q=Khvalynsk>, accessed June 5, 2019). Unlike him, however, Anthony doesn’t claim that CHG was native to the steppe (indeed, its distribution range prevents us from believing this because Khvalynsk is situated on the remote periphery of that range). Instead, in Anthony’s opinion, CHG was introduced to the steppe by migrants from northwestern Iran or Azerbaijan, and the migration route passed along the western Caspian coast.

According to Anthony, the pre-Maykop (Darkveti-Meshoko) people spoke Northwest Caucasian languages and did not mix with the steppe population whereas those who introduced CHG to Khvalynsk spoke “very archaic eastern Caucasian languages.” Alan Bomhard (2019b) subscribed to this view although it is inconsistent with the idea that the North Caucasian component is a substrate, as he claims following Uhlenbeck and Kortlandt. If Anthony’s scenario holds, then the substrate is the Eurasian (“pre-Uralic”, as he calls it) component associated with EHG whereas the southern component, associated with CHG, is a superstrate.

After these very important concessions, and despite the fact that Anthony, the mounting evidence to the contrary notwithstanding, still insists on the Balkan route of the proto-Anatolian migration from the steppe,<sup>24</sup> the Steppe Theory is no

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agriculturalists from the Zagros”. Components evaluated that way are not the same. *Note added in proof:* In the final version (*Science* 365 (6457), 2019), only the Iranian component is mentioned, but not AF.

<sup>24</sup>So does Davidski (<https://eurogenes.blogspot.com/search?q=Anatolians>, accessed May 30, 2019).

longer what it used to be: now it incorporates the Caucasian prologue.

Nonetheless, problems immediately arise. First, the Caucasian component is supposed to be Northwest Caucasian, not Northeast Caucasian. Second, none of them seemed to exist at that time — judging by S. Starostin's glottochronological estimate, common North Caucasian split only in the mid-fourth millennium BC. And third, most importantly, it is logical to assume that the EHG/CHG ratio mirrors the proportion of Eurasian-speaking natives versus Caucasian-speaking immigrants. Now the share of CHG in Yamnaya samples nearly equals that of EHG, which Anthony attributes to “pre-Uralians” (Wang et al. 2019, fig. 4a). Should one conclude that migrants from the south, who evidently introduced pastoralism to the region, adopted the language of the local foragers *en masse*? This is hard to believe. But if not, then why has the IE family remained an undeniable member of the Eurasian stock rather than becoming a hybrid situated halfway between the Eurasian and the North Caucasian macrofamilies or even a member of the Caucasian macrofamily with some Eurasian tendency (see the two-dimensional projection of relationships between families in Kozintsev 2018, fig. 11, showing nothing of the kind)? Pace Trubetzkoy, such views can hardly be revived at present. In sum, the PIE attribution of people who carried CHG is much more probable, and the Western Caucasian substrate couldn't have been received that way.

#### 4.2.5. *Autosomal components versus Y-chromosome haplogroups*

One must agree with the critics of Reich, who dispute a direct link between Maykop and Yamnaya. Oleg Balanovsky (2019), without mentioning the CHG/AF controversy, writes that the link was indirect — the recipient was, not Yamnaya, but some earlier steppe population. He believes that this component was introduced in the mid-5<sup>th</sup> millennium BC or somewhat earlier by late PIEs, who had migrated to northwestern Caucasus along the eastern coast of the Black Sea. If so, pre-Maykop would, theoretically, be the best candidate as a donor. The recipient remains unknown, and the mysterious disappearance of AF remains unexplained unless we invoke some bizarre explanation such as natural selection.

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against the Anatolian variety of AF in the steppe. The Eneolithic sample from Ukraine, which does contain AF (see 4.2.2), may be a candidate (Anthony 2019), but the provenance of AF in this group is unknown.

To this one must add that Y-chromosome data contradict those relating to the autosomal genome. Whereas the latter unambiguously suggest that the “southern” CHG component was introduced to the steppe from the Caucasus on a large scale, none of the likewise “southern” Y-haplogroups J and L, registered in the pre-Maykop and Maykop people (Wang et al. 2018), followed suit — most haplogroups of the later IEs of the steppe belonged to the R1 subclades.

Which of the R1 variants present in Khvalynsk, whether R1a or R1b, showing very different distribution patterns and very dissimilar evolutionary histories, should be regarded as the IE marker, is not clear. R1a was thought to be preferable for tracing IE migrations (Zerjal et al. 1999). If so, why is it rare in Western Europe? And why are the Yamnaya people, whose expansion is said to have been crucial for the formation of the Bronze Age gene pool of Europe, and their close relatives, the Afanasievo people of eastern Central Asia, marked by R1b rather than R1a (Haak et al. 2015; Allentoft et al. 2015)?

The situation with the Y-chromosome haplogroups in Iran is disappointing for advocates of the R1a primacy since the most frequent haplogroup there is J2a. As to R1a, “in spite of the recent dissection of this haplogroup, none of the identified sub-branches support a patrilineal gene flow from western Eurasia through southern Asia ascribable to the diffusion of Indo-European languages. Accordingly, the present analysis of the Iranian R1a Y-chromosomes does not provide useful information to disentangle this issue” (Grugni et al. 2012: 11). Recently it was claimed that R1a is a reliable indicator of the IE migration to India (Silva et al. 2017). But the estimated age of the South Asian subclades of this haplogroup is relatively young and indicates Andronovo migration rather than PIE dispersal (*ibid.*; see also Narasimhan et al. 2018).<sup>25</sup>

<sup>25</sup> However small the amount of steppe ancestry in Iran and India may be, the close linguistic affinity of Indo-Iranian with other filial branches of late PIE disproves the idea that proto-Aryans migrated eastwards directly from the

Should one conclude that R1b, carried by the Yamnaya and Afanasievo males, was an inherently PIE trait? Its predominance in the Bell Beaker people (Olalde et al. 2018) might suggest that, but what role should be ascribed to R1a in that case? Also, variants of R1b in Central and Western Europe differ from those in Yamnaya (Kivisild 2017; Balanovsky 2019).

More importantly, regarding any of the R1 clades as a PIE marker is tantamount to postulating that PIE originated in the steppe – an idea contradicted by all the available evidence. The distribution of these clades in modern Europe does not warrant the use of any of them as an IE marker (Balanovsky 2015: 71–72, 80–94, 107). According to Balanovsky et al. (2013: 30) “the ‘Indo-European marker’ does not exist, simply because the first population to speak Proto-Indo-European must have possessed a spectrum of haplogroups which were shared (or identical) with its sister and neighbor populations that spoke other languages.”

## 5. Putting bits and pieces together

### *5.1. The Balkan corridor: the final assessment*

Facts from three independent disciplines speak decisively against the Balkan scenario envisaged by Marija Gimbutas and her followers at least in its strong version (migration of PAs). What about the weak version (diffusion of PA)? Why not assume that this language was a remote forerunner of Greek, which spread to the Balkans from the north with minor population replacement (Lazaridis et al. 2017), or Armenian, which was transmitted virtually without gene flow?<sup>26</sup>

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primary IE homeland in the Near East, as Gamkrelidze and Ivanov believed (see also Heggarty 2018). If this were true, Indo-Iranian would have split from other descendants of late (steppe) PIE already in the early 4<sup>th</sup> millennium BC, which is quite unlikely, especially in view of the facts indicating the steppe origin of an earlier branch – Tocharian (see 5.6). Contra Heggarty (2018), the presence of “farming” cognates in Indo-Iranian and Tocharian (Mallory 2018; Peyrot 2018) does not rule out the steppe as the secondary (late PIE) homeland. Rather, it points to an earlier homeland in or adjacent to the agricultural zone of the Near East.

<sup>26</sup>To all appearances, Armenian was adopted mostly by Hurrians of the Upper Euphrates after 1200 BC from speakers of a Paleo-Balkan IE language belonging to the Thraco-Phrygian branch, who had migrated to Anatolia from

The answer is that, firstly, not only the genetic but also the archaeological evidence of the southward spread via the Balkans is virtually lacking until the Late Bronze Age. Secondly, the lexicon referring to cliffs, rocks, precipices, swift rivers, etc. (see 2.2) could emerge neither on the steppe nor on the western Black Sea coast. And finally, Indo-Hittite was likely spoken by people who, at some stage of their history, were neighbors of Semites. Such people could have lived neither on the steppe nor on the Danube nor in the Balkans unless we invent ad hoc possibilities such as, for instance, that Tripolye people spoke an Afroasiatic language (Anthony 2007: 304–395) or that borrowing occurred through intermediaries like pre-Kartvelian or North Caucasian (*ibid.*: 98) or that contacts occurred along distant trade routes, some of them by sea (S. Starostin 2007 (2000): 819). Or, by way of brushing these isoglosses aside, one may stigmatize them as chance coincidences, relics of the common Nostratic–Afroasiatic stage or *Wanderwörter* (Kassian 2010: 426). Such explanations appear problematic because it was statistically demonstrated using the latest version of the STARLING database, from which all the false coincidences had been purged, that proto-IE had maintained contact primarily with Semitic rather than with any of the three Caucasian families (Kozintsev 2018). Clearly, this in no way disproves the Western Caucasian substrate hypothesis, which is based on entirely different data. In my view, the most natural explanation of my own results is that at least one of the two groups, either the PIEs or the Semites, took a direct route from the Near East to the northern Caucasus. Which of the two did that?

### 5.2. *PIEs, Semites, North Caucasians*

According to Nadezhda Nikolaeva and Vladimir Safronov (1974, 1982), the migrants were Semites, whom they associated with the Maykop people proper. The Novosvobodnaya people, in their view, were PIEs, who had moved to the Caucasus from their presumed Central European homeland. There are two grains of truth in this scenario. One is that the Maykop culture

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the Balkans (Diakonoff 1984). According to Haber et al. (2016), no population mixture occurred in Armenia after 1200 BC.

is so manifestly “southern” that even if it wasn’t related to Semites, then, perhaps, to their neighbors. The second is that Novosvobodnaya, as Nikolaeva and Safronov have convincingly demonstrated, cannot be regarded as merely the late stage of Maykop. Rather, these are two distinct cultures differing by origin. Genetic facts suggest, however, that Novosvobodnaya had likewise southern, albeit somewhat different roots (see 4.2.1).

If the genetic specificity of Novosvobodnaya vis-à-vis Maykop and its affinity with Kura-Araxes receive support (see, e.g. Lyonnet 2007: 149, and Courcier 2014, for archaeological parallels), it would be tempting to explore the possibility that the Novosvobodnaya people, unlike those of Maykop, spoke a Northwest Caucasian language. Interestingly, the applied bosses, decorating the Novosvobodnaya ceramics, resemble the interior-punched nodes, with which the coarse pottery, typical of the upper strata of the Kuban fortresses and apparently evidencing the local component (see 3.2), was decorated (Lyonnet 2007: 149). Could this attest to continuity between proto-North Caucasian and Northwest Caucasian speakers?

Novosvobodnaya is too late (no earlier than 3600 BC and thus mostly contemporaneous with Kura-Araxes) to be attributed to PIEs. The Hurro-Urartian, resp. East Caucasian (Diakonoff & Starostin 1986) attribution of Kura-Araxes (Burney 1978: 132; Diakonoff 1990: 62–63; Kassian 2010: 423) is plausible given its expansion to Daghestan (Kohl & Magomedov 2014). According to Sergei Starostin (2007/1995: 546), the glottochronological estimate of the disintegration of common North Caucasian is mid-fourth millennium BC – precisely when Novosvobodnaya and Kura-Araxes originated.<sup>27</sup>

<sup>27</sup>Marro et al. (2014), however, claim that Kura-Araxes is earlier than previously thought. Indeed, at Ovçular Tepesi, the Kura-Araxes ware was found in the same late fifth millennium BC context as the CFW, and the same is true of the early fourth millennium strata at Berikldeebi. These findings, as they believe, indicate a prolonged coexistence of two culturally distinct populations. The coexistence, however, is questioned by Palumbi & Chataigner (2015), who adhere to the traditional idea that Kura-Araxes originated around 3500 BC. In any case, the cultural distinctness of Kura-Araxes vis-à-vis CFW is no less evident than that of Novosvobodnaya vis-à-vis Maykop proper.

Anthony (2007: 98) proposed that the Kura-Araxes people had spoken pre-proto-Kartvelian, and that their contact with the presumed PIEs of the steppe was maintained through the North Caucasian speaking Maykop people including those of Novosvobodnaya. This complex construction, based on the remark by Johanna Nichols and postulating at least two non-IE intermediaries between PIE and proto-Semitic, viz., Maykop (including Novosvobodnaya) and Kura-Araxes, appears to have been invented solely to avoid a simple but inconvenient possibility of a direct contact between PIEs and Semites. My lexicostatistical analysis has not revealed the slightest trace of a proto-Kartvelian influence on PIE.

According to Anthony (2019), both the Darkveti-Meshoko and the Maykop people spoke Northwest Caucasian languages (see Kassian 2010 for the same view). But if the Darkveti-Meshoko people, who had migrated from the south and built the fortresses like Meshoko south of the Kuban were Northwest Caucasians, then who were those against whom these fortresses were meant to protect and who lived there during the late stages (Stolyar et al. 2009; Kozintsev 2017)? They were not steppe dwellers because the third component, traced in the middle layers of the fortresses, is reliably associated with the steppe cultures like Sredny Stog and Skelya/Novodanilovka (*ibid.*).

If, on the other hand, Northwest Caucasian speakers were the Novosvobodnya people (likely descendants of those who manufactured the punched-node pottery at the late stages of Darkveti-Meshoko) whereas Maykop proper is late PIE, the respective substrate in PIE (if real) would have a much more realistic explanation than that suggested by Kortland (2018), Bomhard (2019) and Anthony (2019), who link the CHG autosomal component exclusively with North Caucasian speakers. As mentioned above, the proportion of CHG in Yamnaya, indisputably associated with late PIEs, is much too high to ascribe it to Caucasian speakers, whether eastern or western.

What about the possible association between CHG and PIEs? Judging by archaeological data, the pre-Maykop population, from which a yet unknown Chalcolithic steppe group might theoretically have received CHG (Balanovsky

2019),<sup>28</sup> did not spread to the steppe on a large scale. Are the cultural parallels with the steppe at pre-Maykop fortresses a sufficient testimony of incipient contacts? The Maykop-Yamnaya link is doubtful on genetic grounds (see 4.2). Were the ties between Maykop and the steppe people largely cultural (and possibly linguistic) rather than genetic (Anthony 2019)? Should we focus on ties between northwestern Iran and Khvalynsk, as Anthony and his predecessors suggest? Hardly so. Language spread can occur without gene flow, and cultural evidence of contact is no less informative than genetic evidence.

### 5.3. *The PIE migrations: tracking the routes*

As I see it, the simplest and the most natural option is to assume that the migrants to the northern Caucasus were PIEs, whose routes passed through the Near East whereas the primary source of migration was located somewhere closer to the place where proto-Uralic was spoken in the fifth millennium BC immediately before its disintegration (Hajdú 1964; Helimski 2001; Napoliskikh 1997: 135; Janhunen 2003; Blažek 2013b). While the Indo-Uralic macrofamily cannot yet be considered a clade in the strict taxonomic sense, though the lexicostatistical data do suggest that, the predominantly Siberian ties of PIE can hardly be doubted (see 2.1.1). If so, the source of migration should be located in some intermediate place — southern Ural or eastern Caspian.

The lexicostatistical analysis using the minimum spanning tree method has revealed an amazing fact — the shortest path between IE and Uralic connects Hittite with Ugric (Kozintsev 2018). According to a nearly consensus view, Hittite is the most archaic IE language (see, e.g. Ringe et al. 2002). The Ob Ugric languages, on the other hand, are closest to the center of the Uralic distribution area and, therefore, to the presumed Uralic

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<sup>28</sup>This possibility was discussed in Davidski's Eurogenes Blog with regard to my article about Meshoko (Kozintsev 2017) (<http://eurogenes.blogspot.com/2018/01/the-case-of-chalcolithic-fortresses-in.html>, accessed 18 September 2018).

and possibly Indo-Uralic homeland<sup>29</sup> (see Kloekhorst 2008 on the supposedly Indo-Uralic aspects of Hittite).

Yakhontov (1991), based on climatic and biotic terms, concluded that the Nostratic homeland could be located anywhere from the Volga drainage to Western Siberia “somewhat earlier than 15 thousand years ago”. Pagel et al. (2013) arrived at broadly the same estimate (see 2.2). Kortlandt (2002) placed the Indo-Uralic homeland south of the Ural Mountains in the seventh millennium BC.

On the other hand, the analysis of reconstructed PIE terms for topographical features and related attributes and beliefs suggests that at some stage of their history, the Indo-Hittites lived in a mountainous terrain, where the mountain was a “mighty cliff reaching to the sky”, and there were precipices, swift rivers and a sea or large lake nearby (Gamkrelidze, Ivanov 1995: 574–577; Dybo 2013), excluding the steppe as a possible homeland (see 2.2).

Provided that all these geographic features must be found in broadly the same area, this leaves us, in essence, with two possibilities. We must discard the southern Urals, where the most salient mountain, Yamantau, 1640 m high, is situated 900 km north of the Caspian Sea. One of the remaining options is the area with three large lakes, Sevan, Van, and Urmia, two of which are saline and thus similar to seas, and Mount Ararat, 5137 m high, towering 120 km southwest of Lake Sevan (freshwater) and at about the same distance northeast of Lake Van (saline). But an even better option is northern Iran, where the majestic dome of Damavand, 5610 m high – the second highest dormant volcano in Asia – can be viewed directly from the Caspian shore,<sup>30</sup> and tumultuous rivers, most notably Safidrud, break through the Elburz range. It appears likely, then, that the Indo-Hittites migrated to the southern Caucasus and further west along the Elburz and Zagros ranges by the

<sup>29</sup>This conclusion is supported by the evidence of physical anthropology. The combination of highly diagnostic cranial traits distinguishing Uralic groups from all others is expressed most strongly in Ob Ugrians (Kozintsev 2004)

<sup>30</sup>The Caspian Sea meets not only the weak condition of just “body of water” but also the strong, though possibly not sufficiently convincing condition of “heaving surf, raging watery element” (Gamkrelidze, Ivanov 1995: 581). Lake Sevan and Lake Van, however, can be stormy too.

route that, several millennia later, was known as the Great Khorasan Road (Majidzadeh 1982; Ivanova 2012; 2013: 121–129).

Interestingly, Vyacheslav Ivanov did not always advocate the Near Eastern theory of IE origin. In the 1960s he claimed that certain Anatolian texts retain reminiscences of a migration from the north. This, as he believed, is exemplified by Hittite and Palaian prayers to the sun god Sius, who is said to rise from the sea or large lake, *aruna-* (Ivanov 2001/1963: 10–11). In his words, such texts might refer to the western coasts of the Black Sea, of the Caspian Sea, or of Lake Van. He notes that in Hittite annals of the New Kingdom period, the word *aruna-* evidently referred to a large lake situated east of the original territory of the Hittites and possibly of the Anatolians in general (because the same myth is found in Palaic). In a later study, Gamkrelidze & Ivanov (1995: 792) did not mention the Black Sea but added Lake Urmia. Anthony (2007: 262), on the contrary, mentions only the Black Sea — the sole possibility reconcilable with the Steppe Theory except that the highest mountain of the Balkans, Musala, just 2925 m high, is 350 km away from the Black Sea coast.

#### 5.4. *The first homeland*

Johanna Nichols (1997, 1998) suggested that the IE homeland was situated east of the Caspian Sea, from whence the PIE language spread in the western direction in two streams — northern (toward the western steppe) and southern (toward Anatolia). If so, then the southwestern mountainous coast of the Caspian Sea is one of the places which the PAs passed on their way to Asia Minor. This hypothesis accounts for the early separation of the Anatolian branch but not for the “Semitic” tendency of the entire IE family, revealed by the lexicostatistical analysis. Nor does it explain why common IE words referring to high mountains and swift rivers are found in languages originating from the presumed northern (steppe) stream.

Nichols eventually retracted her theory. In her words, she did that with much regret because “(i)t's a beautiful theory that accounts elegantly for a great deal of the dynamic and linguistic geography of the IE spread, but it conflicts with essential archaeological and etymological facts”

([https://www.academia.edu/28869625/The\\_epicenter\\_of\\_the\\_Indo-European\\_linguistic\\_spread](https://www.academia.edu/28869625/The_epicenter_of_the_Indo-European_linguistic_spread), accessed September 18, 2018; see also Nichols 2019). The reason for this “partial retraction” was the article by Bill Darden (2001), who had advocated his version of the Kurgan theory — the hypothesis of a PA migration from the steppe along the western Black Sea coast.

However, as seen today, it is precisely Nichols’s initial idea of the east Caspian center and, respectively, of the eastern origin of PA that appears worth being preserved. Other parts of the theory, stemming from the questionable postulate that the number of migrations accounting for the language spread must be minimized, are hardly tenable. This concerns, for instance, the idea that “(t)he PIE ecological and cultural world (...) included the forested mountains southeast of the Kazakh steppe, the dry eastern steppes, the Central Asian deserts, the urbanized oases of southern Turkmenistan and Bactria-Sogdiana, the eastern extension of the urban Near East, the rich grasslands of the Black Sea steppe, the southern edge zone and the Siberian taiga, fresh-water lakes, and salt seas (the Aral and Caspian)” (Nichols 1998: 233).<sup>31</sup> Beautiful or otherwise, this is but a fantasy engendered in a vacuum and supported by a strange claim that language spread should not correlate with specific archaeological cultures.

To understand why the PIE lexicon had absorbed so many vastly incompatible geographic and cultural realities, we needn’t imagine a boundless and infinitely diverse territory inhabited by numerous groups speaking one and the same

<sup>31</sup>Commenting on the draft of my next article, Allan Bomhard wrote, “Perhaps we (all of us, not just those involved in this session) have been too narrow-minded. What if the Indo-European tribes were more widely dispersed than previously thought?.... What if the original homeland of PIE, or better, pre-PIE (“Proto-Indo-Hittite”) was actually “circum Pontic”? And, what if there were cultural, linguistic, and genetic interactions between these various Indo-Hittite tribes themselves and between neighboring peoples — North Caucasian, Hurrian-Urartean, Semitic, etc.” (<https://www.academia.edu/s/d8be18e175/proto-ie-meets-semitic-more-details-2019pdf?source=work>, accessed March 24, 2019). Similar ideas about small PIE groups widely scattered across the “Circum-Pontic province” were long ago voiced by Evgeny Chernykh (1987). The tacit assumption of such explanations is that for some inconceivable reason such a dispersal pattern did not result in the breakup of PIE.

proto-language. How could PIE possibly remain undivided, as it did, under such conditions? If, however, the demand to minimize the number of migrations is abandoned in favor of the idea of multiple PIE homelands,<sup>32</sup> then the connection between the primary (Indo-Uralic) homeland and the secondary PIE locus in northern Iran becomes a necessity — the first link in the reconstructed chain.

Can we try and project this theoretical construct onto archaeological reality? To do that, we must examine the area between the southern Ural and Iran, i.e., the Transcaspian region. The reason why we focus on the eastern rather than the western Caspian coast is that during the period spanning the Mesolithic and the Chalcolithic, the Urals had stronger cultural ties with western Central Asia than with the Caucasus. Also, the eastern route is shorter and straighter than the western one. It can become even shorter if the sources and directions of migrations are reconstructed from archaeological data.

One of the most important Transcaspian cultures is Kelteminar — a Neolithic community southeast of the Aral Sea with a foraging economy that was eventually supplemented by animal breeding. The early stage of Kelteminar dates to 6200–5400 BC, its middle stage, to 4000–3000 BC, and its late stage to 3000–2100 BC (Szymczak & Khudzhanazarov 2011; see also Vinogradov 1981: 132; Korobkova 1996: 108). The hiatus between the early and the middle stage was supposedly caused by aridification.

The discoverer of Kelteminar, Sergei Tolstov (1941; 1948: 64–65) pointed to striking similarities between the Kelteminar artifacts, especially pottery, and those of the Neolithic cultures of the southern Urals and Western Siberia. The ties reach as far as the Lower Ob, and the data suggest that Kelteminar was the donor whereas Uralian and Siberian cultures were the recipients of cultural innovations.

Tolstov's conclusions were elaborated by Valery Chernetsov (1953, 1960, 1968), who suggested that the Kelteminar people were the ancestors of Finno-Ugrians or even

<sup>32</sup>Obviously, the acceptance of this idea, manifested in the title of Vladimir Safronov's 1989 book, does not force us to accept the specific migration trajectory he proposed.

undifferentiated Uralians. Chernetsov's ideas or rather their overstatements by his supporters were challenged by Alexander Formozov (1972),<sup>33</sup> but several Russian archaeologists including Vadim Masson (1999) agreed with them (see Kovaleva & Zyrianova 2009, for a recent, positive assessment of the archaeological evidence, suggesting that contacts with the eastern Ural began during the early stage of Kelteminar).

On the other hand, Tolstov (1941; 1948: 66) mentioned certain traits linking Kelteminar with the cultures of southern Turkmenia and northern Iran. This concerns, for instance, thin-walled well-fired bowls, on some of which traces of red paint are preserved. The same applies to vessels with spouts. Tolstov regarded those traits as evidence of ties with Anau.

Southern ties of the early Kelteminar were discussed in more detail by Alexander Vinogradov (1957), who noted the parallels between the decorative motifs of Kelteminar ceramics and those of the western group of painted pottery sites of the Namazga I horizon (fifth millennium BC). Ties are also observed with more advanced early farming cultures of southern Turkmenia such as Anau IA (fifth millennium) and even late Jeitun (sixth millennium). Similar decorative motifs include parallel wavy lines, "ladders", zigzags, and hatched figures. These motifs are common in the early Neolithic Kozlov culture of the eastern Urals and western Siberia as well (Kovaleva & Zyrianova 2009), the obvious difference being that the pottery decoration in early Kelteminar and more northerly cultures was incised whereas in southern Turkmenia and Iran it was painted. At the middle Kelteminar stage, contemporaneous with the Namazga II horizon, parallels with the south are no longer traceable (Parzinger 2006: 151–152).

Pointing to even more southerly parallels, Tolstov (1948: 65–66) subscribed to the old hypothesis of affinities between Dravidian and Uralic languages and regarded Kelteminar as a

<sup>33</sup>Without touching upon ethnogenetic issues, Formozov conceded that the impact of Kelteminar on the Uralian and Siberian Neolithic cultures was a fact that could not be brushed aside. Alfred Khalikov (1969: 384–385), who likewise disagreed with Tolstov and Chernetsov, erroneously believed that parallels between Kelteminar and the eastern Urals were late and thus relevant only to Ugrian origins.

possible proof of such affinities. This idea, too, was supported by Masson (1981: 115–118), who cited the views of the linguist Mikhail Andronov (1965: 99–104).<sup>34</sup> Masson's key argument was the discovery of two Harappan-type seals in the Namazga V (late third – early second millennia BC) context at Altyn-Depe. On one of them, there were two signs matching those of the Indus script (later, a Harappan seal was found at another Bronze Age site in Turkmenia -- Gonur Depe). Pointing to connections between Dravidian and Elamite, Masson asked if Brahui — a Dravidian isolate in Balochistan — could be a remnant of an ancient population associated with the painted pottery culture of that region.<sup>35</sup>

However, even if we agree with Andronov and others that Uralic had had areal relationships with Dravidian, and even if Yuri Knorozov and Asko Parpola were right when they claimed that the Indus script was related to a Dravidian language, even so, three late and possibly imported seals are not enough to convince us that Dravidian had always been the native language of the early farmers of southern Turkmenia. In fact, the sharp discontinuity between the cultures of the Central Plateau of Iran, specifically between those closest to Altyn-Depe — Sialk III and IV, indicating an intrusion of a Proto-Elamite culture around 3400 BC (Seresti & Tashvigh 2016), prevents us from regarding all earlier painted pottery cultures as an Elamo-Dravidian legacy. Could some of them be associated with PIEs, as Colin Renfrew (1987: 192; 1991) and Peter Bellwood (2012) have suggested?

The positive answer to this question follows from much of the evidence outlined above — primarily from the fact that the IE homeland must be located south of the Uralic homeland, but

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<sup>34</sup>See Pudas Marlow 1974, for a later version of this hypothesis.

<sup>35</sup>

George Debets (1980: 263), who carried out an anthropometric study of numerous groups in Afghanistan, was certain that the Brahui were a remnant of a pre-IE population. Having a somewhat darker pigmentation compared to the neighboring IE groups of Balochistan, the Brahui are indistinguishable from them both anthropometrically (*ibid.*) and genetically (Pagani et al. 2017). While certain linguists regarded Brahui as the earliest branch of the Dravidian family (Andronov 2003:23), others claimed that the Brahui had migrated to Balochistan from central India less than 1500 years ago (Elfenbein 1987).

also from the Iranian and southern Turkmenian parallels to Maykop (Ivanova (2012; 2013: 108–118; 121–129).<sup>36</sup> Despite the apparent contrast between Maykop and the painted pottery cultures of Turkmenia and Iran, the important fact is that the transition between one of the painted pottery cultures in northwestern Iran — –the Late Chalcolithic 1 (LC1) Pisdeli culture and the CFW culture of LC2 and LC3 (the likely forerunner of Maykop) — occurs without interruption around 4200 BC, as in certain areas of Mesopotamia (Abedi et al. 2015), prompting certain experts to look for economic rather than ethnic factors behind this change (Palumbi 2011; Marro 2012). Undocumented and undated as it is, the Fullol vessel (see 3.4) provides yet another link between Maykop and the painted pottery cultures of southern Turkmenia.

Leonid Sverčkov (2011: 171) has attributed all eastern Caspian Neolithic cultures such as Jeitun, Kelteminar, and related Aidabol to filial IE groups, implying a much too early disintegration of PIE. But given the northern Siberian affinities of Kelteminar, one should agree with Tolstov and Chernetsov, who related it to the Uralians. If so, then Jeitun, situated south of Kelteminar and contemporaneous with its early stage, and the fifth millennium BC horizons in the same area — Anau IA and Namazga I — can be associated with the Indo-Hittites. Interestingly, Davidski, who has detected a component relating to the early Southwestern Central Asian farmers (Geoksyur-Sarazm) in the steppe Maykop gene pool, suggested that the Western Siberian component, which is also present there, may stem from Kelteminar, whose genomics is yet unknown

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<sup>36</sup>Mariya Ivanova (2013: 123–124) writes about the westward extension of the Central Asian network into north and west Iran during the Namazga II-III period. This, in her view, marked the beginning of the route that led to the Urmia Plain and from there, along the Kura basin, to northern Caucasus. The idea is appealing in principle, but one must keep in mind that the radiocarbon dates for Namazga II and III used by Western experts (Ivanova 2013: XVII, Table 2) are 300–400 years earlier than those generated at the Saint-Petersburg laboratory (Alekshin et al. 2005: 530, 539). If the former are correct, then Namazga II (but not III) can theoretically be indirectly ancestral to Maykop. If the latter are correct, then one should address underlying horizons such as Namazga I, which undeniably dates to the fifth millennium. Given the cultural continuity in southern Turkmenia, the issue isn't critical.

(<http://eurogenes.blogspot.com/2019/02/the-steppe-maykop-enigma.html>, accessed June 6, 2019).

Vadim Masson (1971: 62–64) and Galina Korobkova (1996: 97) pointed to the affinity between the lithic industry of Jeitun and the southern and southeastern Caspian Mesolithic industries such as Jebel 6-5 and Kamarband 11-10. Kelteminar, on the other hand, may have originated from the local Mesolithic cultures with microlithic industries (Korobkova 1996: 110). It follows that certain Mesolithic cultures of western Central Asia could be associated with Indo-Uralic speakers. Before the relatively recent desertification, the climate of this region was much more humid, and large areas of what are now the Karakum and Kyzylkum deserts were occupied by steppes. The 550-km-long and currently dry channel of the Uzboy (the western extension of Amu-Darya) was a wide and deep river. Judging by the number of sites, dozens and possibly hundreds of human populations thrived on its banks (Korobkova 1996).

How can we reconcile this unexpectedly southern location of the presumed Indo-Uralic homeland and an even more southerly placement of the PIE locus with the exclusively Siberian ties of PIE within Greenberg's Eurasian macrofamily? Do these Siberian ties imply that the Nostratic homeland must be sought near the southern Urals, as Yakhontov (1991) proposed? Not necessarily! Yakhontov pointed to common Nostratic lexemes denoting snow and ice. But even the present climate of Turkmenia is extremely continental with winter temperatures dropping below –20 °C. In the mountains of northern Iran, too, the winters are cold and snowy. In addition, common Nostratic was spoken during the final Pleistocene, when the climate was considerably colder. In the early Holocene, judging by the similarity of microlithic industries, periods of aridification forced the Mesolithic inhabitants of southwestern Turkmenia and northern Iran to migrate northwards, and these migrations produced a profound impact on the cultures of the Urals (Matyushin 2003).

Aharon Dolgopolsky (1994: 2838) placed the Nostratic homeland “somewhere in southwest Asia” whereas Allan Bomhard & John Kerns (1994: 155) pointed to the area “in or near the Fertile Crescent,” which disagrees with the environmental realities mentioned by Yakhontov. Colin

Renfrew (1991) wrote of the area, “from the Levant northwards to Kurdistan and eastern Anatolia, and then south to the southern Zagros.”

Because the boundary separating two climatic zones, western (Mediterranean, with mild winters) and eastern (continental, with cold winters) passes through northern Iran, I would look for the Nostratic homeland, provided it ever existed, immediately east of this border, near the presumed filial homelands – Indo-Uralic, Uralic, and IE. This placement would agree with most of the available facts – linguistic, archaeological, genetic, and climatic. If so, then not only the Uralic homeland would be very close to the Nostratic homeland (in agreement with Yakhontov), but so would the IE homeland. Their ethno-linguistic divergence was caused not so much by the geographic distance as by the economic gap: the farming cultures of southern Turkmenia were a peripheral part of the Near Eastern proto-civilization, whereas Kelteminar was outside it.

In northern Iran, the Indo-Hittite concepts relating to the mountains, swift rivers, and the sea originated and were embodied in respective lexemes. Apart from the archaeological facts pointing to this area (Ivanova 2012, 2013), genetics, too, seems to provide a clue since the autosomal CHG component is predominant in the Neolithic and Chalcolithic samples from northern Iran. It is also present in the Khvalynsk samples; and the Khvalynsk people may have received CHG, possibly through an intermediary, from a Caucasian population (Anthony 2019). Southern archaeological parallels to Khvalynsk, meager as they are, have prompted certain experts to look for its Near Eastern roots, suggesting that the northward migration passed either along the eastern Caspian coast or through the Caucasus during the pre-Maykop period (Bogdanov 2004: 231, 235; Anthony 2019). Given the lexicon related to geographic features, the Caucasian route should be preferred to the Transcaspian. However, the archaeological evidence documenting either route is tenuous, and neither scenario accounts for the Semitic adstrate in PIE.

### 5.5. *The second homeland*

After the appearance of genetic facts indicating the transfer of CHG from northwestern Iran or Azerbaijan to the Volga along the eastern Caucasian route (Anthony 2019), and after Mariya Ivanova adduced arguments in favor of the Iranian homeland of cultures such as CFW/Leilatepe and Maykop, it is hardly possible to doubt that not only PAs but all Indo-Hittites had migrated from southwestern Central Asia along the southern Caspian mountainous route postulated by Nichols – the future Great Khorasan Road.

If so, where and when did the paths taken by PAs and by the late PIEs diverge? Any theory addressing these questions must account for the Semitic adstrate in both Hittite and late PIE. It appears that one must consider the possibility of three migration waves from the Near East to the steppe. For geographical reasons, the eastern wave, that had supposedly brought the CHG component to Khvalynsk, could hardly be involved in the spread of the Semitic adstrate. Was this adstrate absorbed before or after the dissociation of Indo-Hittite? In other words, did PA and late PIE receive this adstrate independently (or maybe additionally in the case of the former)?

Attempting to link linguistic facts with those furnished by archaeology, we must focus on two things: (a) the Amuq F (CFW) tradition and (b) the early kurgan tradition. In her important publications mentioned above, Catherine Marro (2010, 2012) argues that the CFW oikumene, which existed from ~4300 BC onward and included Upper Mesopotamia, eastern Anatolia, the southern Caucasus, and possibly Maykop as a remote and aberrant northern member, cannot be regarded as a result of migrations from the Fertile Crescent. Instead, as the Ovcular Tepesi and Norşuntepe materials demonstrate, the CFW tradition might have originated in the highlands of eastern Anatolia and Transcaucasia.

On the other hand, the Bayesian phylogenetic analysis of Semitic languages has shown that proto-Semitic was spoken in the northeast Levant in the fifth millennium BC, and that the earliest split occurred when Akkadian branched off by way of an eastward migration from the Levant to Mesopotamia in the early fourth millennium BC (Kitchen et al. 2009). In my bird's-

eye lexicostatistical analysis dealing with virtually unrelated families, only two Semitic languages were used — Akkadian and a Northwest Semitic reconstruction. Both turned out to be indistinguishable at that level, so the adstrate in PIE could have been received either from proto-Semites in the late fifth millennium or from Akkadians in the early fourth millennium. In any case, the core area of Semitic dispersal, specifically of the proto-Akkadian migration to Mesopotamia, was close to the western part of the CFW distribution range. This could mean that the two oppositely directed dispersal waves, one eastward, carrying the Semitic speech to Mesopotamia, the other westward, carrying the CFW tradition to the Levant<sup>37</sup> mixed, resulting in what Marro (2010: 52) describes as a “dimorphic economic system” marked by the coexistence of two contrasting communities — the sedentary agriculturalists of the Upper Euphrates Valley and Upper Mesopotamia, some of whom evidently spoke Semitic, on the one hand, and the nomadic herders of the Transcaucasian and eastern Anatolian highlands, who possibly spoke PIE, on the other. The westward spread of CFW was evidently paralleled by the westward diffusion of the CHG autosomal component (see 4.2.2). Although the direct connection between the two has yet to be ascertained, genetic data suggest that the population movement in the Late Chalcolithic spanned the regions as widely separated as Iran and the Levant, and that the gene flow was directed westwards (Harney et al. 2018).

The transition from the elaborately painted Ubaid ceramics to the standardized low-cost CFW could have been caused by economic factors such as the urge to cut costs (Palumbi 2011). But if the CFW tradition originated in the highlands, as Marro claims, then the ultimate reason behind this urge could be the nomadic lifestyle. Why the farmers should have adopted a cultural tradition introduced by the nomads is harder to grasp than why the latter could have borrowed certain words from the former; see Zvelebil (1995) and Darden (2001) on the relationships between nomadic pastoralists and farmers with reference to PIEs.

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<sup>37</sup>It should be reminded that Amuq F — the horizon eponymous to the CFW tradition, is comparatively late.

Moreover, even in the eastern highlands, the situation was that of “cultural duality and probably even multiculturality” (Marro 2010). Was cultural duality accompanied by linguistic diversity? Could at least some groups involved in the westward diffusion of the CFW tradition have spoken early PIE or PA? If so, this might account for the Semitic adstrate in Indo-Hittite and especially in the first branch to have separated from it — PA.

Initially, PAs were but one of dozens of Near Eastern groups speaking unrelated languages such as Semitic, Sumerian, Hattic, Hurro-Urartian, and many others of which nothing is known. The initial “invisibility” of Anatolian speakers (but see Whittaker 2012), traditionally referred to by advocates of the idea of their late appearance in the Near East, is easy to understand in the context of this ethnic mosaic. For that matter, they were likewise “invisible” not only in the Balkans, but even in the Troad.

According to Ilya Yakubovich (2010: 129), “(n)ow that various views on the ethnicity of the Trojans have been clearly stated and their limitations have been made obvious, the lesson to be learned from this discussion is probably that of Wittgenstein: whereof one cannot speak, thereof one must be silent.” Even the staunchest proponents of the Steppe Theory concede that the first appearance of IEs in Anatolia is shrouded in mystery: “Nothing definitive can be said about the route by which the Indo-European entry took place” (Melchert 2011: 713). Linguistic, archaeological, and genetic facts known today prompt us to take a more optimistic stance.

### *5.6. The third homeland and the end of the prologue*

What happened after PA had branched off? One of the likely cultural correlates of the first split of PIE is the kurgan tradition, whose advance toward the northern Caucasus can be traced from Lake Urmia via the Kura valley to the passes in the Caucasus Range and eventually to Maykop. There is every reason to view the people related to this tradition as late PIEs. Before them, however, two earlier group of migrants — the proto-Khvalynsk people (apparently, undifferentiated Indo-Hittites) and the Darkveti-Meshoko people, who probably

spoke PA — took the eastern and the western coastal routes to the northern Caucasus, respectively.

How was PIE adopted by the steppe people? How many of them adopted it? How did PIE spread across the steppe? Studies addressing the southern roots of Khvalynsk, the Khvalynsk roots of Yamnaya and the ecology of the Maykop dispersal to the steppe (see, e.g., Shishlina 2013) offer many helpful clues. Thus far, it appears that only in the case of Khvalynsk was language spread accompanied by biological admixture (Anthony 2019), but, ironically, this migration is poorly documented by archaeological data. In the case of the two more westerly migrations, pre-Maykop and Maykop, on the contrary, the archaeological evidence is much weightier but given the genetic data, admixture, at least with known steppe groups, appears unlikely.

The easiest way of brushing these difficulties aside is to assume that the first and only homeland of PIEs was a huge territory of the steppe from the Ural Mountains to the Dniester and that they expanded in an amoeba-like fashion by stretching out pseudopodia in various directions (see, e.g., Anthony & Ringe 2015: 209, fig. 2). Then the problem of the first split in PIE would be easily solved by drawing a pseudopodium stretching towards the Balkans and Anatolia. It is hardly necessary to enumerate once again all the difficulties this simplistic solution entails.

If, however, we admit that the steppe was not the first but the last PIE homeland, then it can be seen as the setting of the first act of the play, which had a prologue with an entirely different setting — a prologue that has been overlooked by proponents of all the past theories, possibly except Anthony (2019). From the first act onward, the amoeba model is generally acceptable because the daughter IE languages indeed spread from the steppe in all directions, one of them being to the Balkans and eventually to Anatolia. Unlike the imaginary “first wave” of the IE expansion in the fifth millennium BC, supported by few if any facts<sup>38</sup>, later migrations of proto-

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<sup>38</sup>The idea of the Anatolian substrate in the Balkans is largely rejected (see, e.g., Otkupčikov 1988: 52–53), and those who accepted it proceeded, like Diakonoff (1985), from the assumption that the Balkans were the IE homeland

Greeks and Paleo-Balkan peoples along that route are reconstructed with greater reliability. Some of these groups, such as Thraco-Phrygians and others entered Asia Minor (Gindin 1993) and some, including Proto-Armenians, transmitted their language to the natives of the southern Caucasus (Diakonoff 1984). As a result of this “counterclockwise” motion around the Black Sea, IE came full circle and returned to the place from which some of its speakers had moved northwards to the steppe 2500 or even 3000 years earlier.

The movement around the Caspian Sea, on the other hand, was “clockwise” because in the Late Bronze Age the Iranian languages, spoken by the Srubnaya and Andronovo people, returned from the steppe to Iran, from where, if the theory holds, the Indo-Hittites had moved to the southern Caucasus – the starting point of the late PIE migration to the steppe. Although the genetic evidence of the migration from the steppe to Iran is weak (Grugni et al. 2012), archaeological facts speak in its favor (Kuz'mina 2007).

One of the most difficult questions concerns the Tocharians. As Leonid Sverčkov (2011: 162) aptly remarked, “both hypotheses, Anatolian and Ponto-Caspian (like all others) are quite logical and consistent, but each of them would be even better if the Tocharian languages had never existed.” While from the geographical standpoint it is indeed tempting to postulate a direct and relatively short route from the first PIE homeland in western Central Asia, indirect evidence suggests otherwise. Males buried at Xiaohe, one of the early cemeteries in the Tarim Basin, dating to the early second millennium BC, were marked by the Y-chromosome haplogroup R1a1a (M17), the same as in the Andronovo males (Li 2010). Craniometrically, the series from another early second millennium BC cemetery in the same region, Gumugou, is close to the Andronovo groups from eastern Kazakhstan and Rudny

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or at least part of it, like the northern Pontic region (Gindin 1993: 165). Earlier, however, Gindin (1967: 169) believed that Anatolians had migrated from the Caucasus to Asia Minor and then to the Aegean, hence becoming the earliest Indo-European stratum there. At present, Kristiansen, too, claims that the Hittites had migrated from the Caucasus (see 3.4). None of the two versions is supported by the available facts.

Altai (Kozintsev 2009). The third craniometric parallel of Gumugou is with a later series from Dashti-Qazi in the Zerafshan Valley, Uzbekistan, dating to 1200–1000 BC and associated with the intrusive Bronze Age culture from the steppe (Kozintsev 2012). If at least one of these five groups represents proto-Tocharians, this would mean that the source of migration was the steppe, not southwestern Central Asia.

We don't know what language(s) the steppe people had spoken before adopting late PIE. Disappointing as it may sound, the situation is much the same as with the Uralic languages in the forest belt of Eastern Europe. In the past they appeared as autochthonous there as the IE languages have until recently appeared to be in the steppe belt. At present it can hardly be doubted that the Uralic dialects were introduced to northeastern Europe from western Siberia much later than the steppe dialect of late PIE had emerged (Napolskikh 1997: 135, 137; Janhunen 2003; Saag et al. 2019) whereas before that, northeastern Europe was inhabited by speakers of "Paleo-European languages", about which as little is known as about the predecessors of the late PIE in the steppe.

### *5.7. The horse, the ass, and language*

The final question concerns the horse. What role did it play in the IE prologue? The answer is simple: none whatever until the setting of the play moved to the steppe. Attempts to regard single economic factors such as agriculture or horse breeding as key drivers of early IE dispersal have proved futile. Migrations from highland Iran to the southern Caucasus and then to Anatolia and the northern Caucasus were apparently caused by a shift from a sedentary to a nomadic or seminomadic lifestyle, which required pack animals. But donkeys would serve this purpose no worse than horses. Judging by the iconographic evidence, donkeys were domesticated in Iran no later than the first half of the fifth millennium BC, and their remains are found at fourth millennium BC sites in highland Iran (Potts 2011). Modest as it is, this animal rather than its celebrated congener might have been vital for the earliest PIE migrations.

Admittedly no PIE term for donkey is known (Beekes 1995: 37); however, the Armenian word for 'donkey', *ēš*, is a

reflex of the reconstructed proto-IE word for horse, *\*h<sub>1</sub>ekwo-*, implying that the latter word could refer to the onager rather than the horse (Pereltsvaig & Lewis 2015: 177), and it has no convincing IE etymologies. Vaclav Blažek (1998) agrees with Pierre Naert (1958: 137–138), who pointed to the parallel with the Yeniseian compound word ‘male’+‘horse’=‘stallion’ (proto-Yeniseian *\*iχ-ku’s*, according to Starostin; see also Gamkrelidze & Ivanov 1995: 479, fn. 22; 2013) and suggests that the word was borrowed from a Yeniseian language. Gamkrelidze & Ivanov (2013) hypothesize that such a language was spoken by the Botai people of northern Kazakhstan. J. P. Mallory (1982) noted that PIEs used only one name for ‘horse’ making no distinction between the domesticated and the wild horse. In Blažek’s view, the word *\*h<sub>1</sub>ekwo-* referred to the domesticated horse, suggesting that the IE homeland must be localized in a place where the wild horse did not live. Clearly, such a place is easier to find in the Near East, where the domestic horse was evidently introduced from the steppe, than in the steppe itself (Shev 2016). All this lends support to Anthony’s (2019) idea of a migration from northwestern Iran or Azerbaijan to the Volga, the obvious correction being that, to all appearances, the migrants were PIEs rather than Northeast Caucasian speakers. After this migration, the Yeniseian term for ‘horse’ could have been borrowed by PIEs — the late Khvalynsk or early Yamnaya people in the eastern part of their distribution range.<sup>39</sup>

The problem with this explanation is that, as Don Ringe tells us, the PA word for horse, *\*ákkwos*, cannot be a late borrowing. It was either inherited from Indo-Hittite or borrowed “into or out of pre-PA during the relatively short time when pre-PA was still in contact with related languages—and that time must have been some centuries before 3500 BCE” (<https://languagelog.ldc.upenn.edu/nll/?p=994>, accessed June 4, 2019). If so, there are two possibilities. If the Yeniseian version holds, then the Darkveti-Meshoko people could have borrowed the word from a late (steppe) PIE dialect and passed it on to their linguistic relatives in Anatolia. After all, this is a shorter

<sup>39</sup>The proportion of equids in the livestock of both the pre-Maykop and the Maykop people was negligible.

route than the one connecting Ural with Anatolia via the Balkans; also, it has been reliably traced in one direction and doesn't presuppose a migration. If, on the other hand, the PA word has nothing to do with Yeniseian and was inherited from Indo-Hittite, then, as the Armenian reflex suggests, it might have initially denoted the donkey.

## 6. Conclusions

As every specialist in PIE reconstruction is well aware, PA is the cornerstone, on which the entire reconstruction is based. But to everybody's chagrin, precisely this element of the building, being the earliest, is the most problematic. Its position, more than that of any other block, depends on our theoretical views regarding the factors behind language dispersal. If one ascribes the critical role to farming, the cornerstone is inevitably placed in Neolithic Anatolia. If horse breeding is in the foreground, the preferred locus shifts to the steppe Eneolithic.

I began this study without any preconceptions regarding the PIE economy. The idea that the economic gap between Jeitun and Kelteminar might be equally, if not more relevant to the disintegration of Indo-Uralic than the geographic distance between them was an ad hoc invention. It occurred to me at the final stage of the study, and none of my preceding conclusions were based on it. The same is true of nomadism or semi-nomadism. Here, too, the reasoning was *a posteriori*, not *a priori*. To be sure, in reality PIEs moved from one place to another without splitting into filial groups *because* they were a relatively small group of nomadic or semi-nomadic herders. In the reconstruction, however, it was the other way around: PIEs must have been a small group of nomadic or semi-nomadic herders *because* they appear to have undertaken a long journey without splitting into filial groups.

There is mounting evidence that the most probable location of both the IE and the Uralic homelands is the area east of the Caspian Sea. The former can be associated with the early farming cultures of southern Turkmenia and northern Iran, the latter, with the Kelteminar culture. The Mesolithic inhabitants of the Transcaspian area, therefore, probably spoke Indo-Uralic. While the placement of the IE homeland is in line with the

theory of Johanna Nichols, her idea of two parallel westward streams of PIE dispersal disagrees with available facts. Judging by the Iranian and southern Caucasian autosomal component (CHG) and by the lexicon relating to high mountains and swift rivers, the southern route along the Elburz range was taken by all Indo-Hittites. Their earliest branch headed north toward the Volga forest-steppe and eventually gave rise to the Khvalynsk culture.

Other PIEs moved on toward Anatolia and on their way absorbed a small Semitic adstrate. The northern branch of PAs may correlate with the Darkvetti-Meshoko culture. The late PIEs' migration to the northern Caucasus, marked by the kurgan tradition, culminated in the Maykop culture, which had retained its ties with southern Turkmenia and northern Iran. The expansion of Maykop led to the further Indo-Europeanization of the steppe, apparently with little or no gene flow. The transmitter of the Semitic adstrate to the late (steppe) PIE could be either Darkvetti-Meshoko or Maykop.

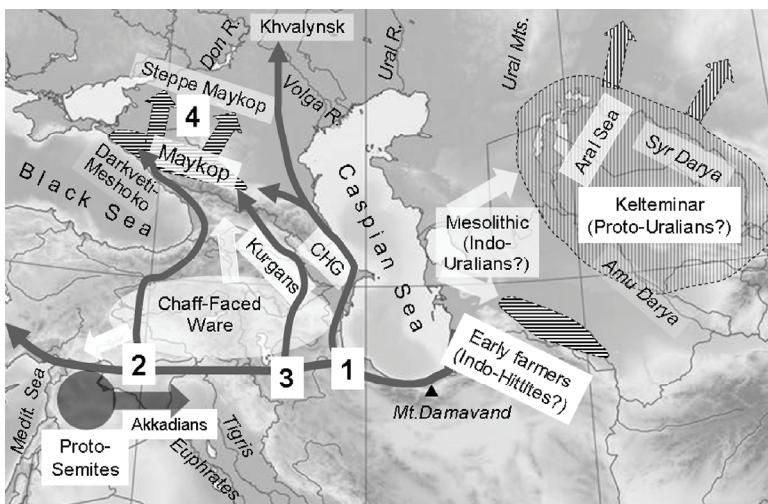


Figure 1. The reconstructed dispersal of proto-Uralians (Tolstov 1941, 1948; Chernetsov 1953, 1960, 1968), proto-Semites (Kitchen et al. 2009), and proto-IEs. Numbers show the order of proto-IE migrations.

The amount of CHG, which the steppe people had received from the Caucasus (apparently during the earliest PIE migration from northern Iran or Azerbaijan to the Volga) and

which the Yamnaya people later passed on to Central and Western European populations, is much too high to be associated with North Caucasian speakers. Northwest and Northeast Caucasian were evidently spoken by the Novosvobodnya and the Kura-Araxes people, respectively. The time when these cultures emerged matches the glottochronological estimate of the split of common North Caucasian. The probable ancestors of the Novosvobodnaya people were those who lived in the Kuban fortresses at their late stage. Contacts between the Maykop and Novosvobodnaya people may account for the Northwest Caucasian adstrate in PIE.

The principal conclusions of this study are illustrated by the map (Figure 1).

\* \* \*

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