

The expansion of the Indo-European languages

Two articles in *Nature* on the spread of Indo-European languages in Europe (Haak & al. 2015, Allentoft & al. 2015) have evoked a discussion between geneticists and archaeologists in the *European Journal of Archaeology* (Klejn & al. 2017). The peculiar thing about the debate is that language data play no part in it, in spite of the fact that the alleged subject of the discussion is the spread of Indo-European languages. The two studies in *Nature* offer an analysis of ancient DNA from archaeological sites and infer that massive migration in the Late Neolithic and the Early Bronze Age brought Indo-European languages from the Russian steppes to the rest of Europe. This is a *non sequitur* because it is impossible to know which language the migrants spoke on the basis of their DNA. The inference is actually based on the exemplary studies by Mallory (1989) and Anthony (2007), to which the articles in *Nature* have nothing to add except a confirmation of what we knew already.

Klejn's criticism of the two articles mainly concerns two points: the time gap of at least 1500 years between the breakup of Proto-Indo-European and the Yamnaya culture, and the origin and spread of the genetic component in the populations of northern, eastern and central Europe. He lists the dates of the breakup of Proto-Indo-European according to various authors: 6700 BC (Gray & Atkinson), 5500 BC (Boukaert & al.), 4500 BC (Chang & al.), and others between 5000 and 4500. As Kristiansen & al. point out: "The reconstructed Proto-Indo-European vocabulary concerning weaving, wool production, horse breeding, and wagon technology is incompatible with dates earlier than the fourth millennium BC." Russell Gray told me earlier this year that he was not impressed by the lexical argument. I would think that the denial of the linguistic evidence by Gray and Boukaert & al. disqualifies their methodologies in a fundamental way. Both the Yamnaya and the Corded Ware cultures can be dated to the first half of the third millennium. The separation of the Anatolians from the other Indo-Europeans can probably be dated to the second half of the fifth millennium.

Haak & al. admit that the present-day people with the greatest affinity to the Corded Ware are distributed in north-eastern Europe, which led Klejn to suggest the possibility that the alleged Yamnaya genetic component is hardly Yamnaya in origin but originated in the populations of northern Europe, from where it spread both to the steppes and to the cultures of central Europe. Haak & al. conclude: "In our study, we did not speculate about the date of Proto-Indo-European and the location of its speakers, as these questions are unresolved by our data, although we do think the genetic data impose constraints on what occurred. We are enthusiastic about the potential of genetics to contribute to a resolution of this long-standing issue, but this is likely to require DNA from multiple, as yet unsampled, ancient populations." I would rather say that they have demonstrated the inadequacy of their approach. Kristiansen & al. conclude: "We do not claim to have found a definite origin of Indo-European languages. But we have gathered genetic evidence to document a substantial human migration occurring shortly after 3000 BC showing remarkable similarities with one of the models proposed for the spread of Indo-European languages." This is correct: they have supplied another confirmation of what we knew already.

Things are different in the case of an article that appeared in *Nature Communications* (Jones & al. 2015), where the authors

“find that Caucasus hunter-gatherers (CHG) belong to a distinct ancient clade that split from western hunter-gatherers ~45 kya, shortly after the expansion of anatomically modern humans into Europe and from the ancestors of Neolithic farmers ~25 kya, around the Last Glacial Maximum. CHG genomes significantly contributed to the Yamnaya steppe herders who migrated into Europe ~3,000 BC, supporting a formative Caucasus influence on this important Early Bronze age culture. CHG left their imprint on modern populations from the Caucasus and also central and south Asia possibly marking the arrival of Indo-Aryan languages.”

Referring to an earlier study (Lazaridis & al. 2014) they state:

“Ancient genomes from Eurasia have revealed three ancestral populations that contributed to contemporary Europeans in varying degrees. Mesolithic individuals, sampled from Spain all the way to Hungary, belong to a relatively homogenous group, termed western hunter-gatherers (WHG). The expansion of early farmers (EF) out of the Levant during the Neolithic transition led to major changes in the European gene pool, with almost complete replacement in the south and increased mixing with local WHG further north. Finally, a later wave originating with the Early Bronze Age Yamnaya from the Pontic steppe, carrying partial ancestry from ancient North Eurasians (ANE) and ancestry from a second, undetermined source, arrived from the east, profoundly changing populations and leaving a cline of admixture in Eastern and Central Europe.”

They show that CHG belong to a distinct ancient clade that represents the previously undetermined source of ancestry to the Yamnaya and contributed directly to modern populations from the Caucasus all the way to Central Asia. Furthermore,

“The separation between CHG and both EF and WHG ended during the Early Bronze Age when a major ancestral component linked to CHG was carried west by migrating herders from the Eurasian Steppe. The foundation group for this seismic change was the Yamnaya, who we estimate to owe half of their ancestry to CHG-linked sources. These sources may be linked to the Maikop culture, which predated the Yamnaya and was located further south, closer to the southern Caucasus. Through the Yamnaya, the CHG ancestral strand contributed to most modern European populations, especially in the northern part of the continent.”

It now turns out that this study provides unexpected strong support for the theory that Indo-European originated as a branch of Indo-Uralic with an extensive North Caucasian substratum (Kortlandt 2010: 31-36 and 387-403). The correlation is perfect. It is clear that the arrival of early farmers from the Levant and the arrival of the Indo-Europeans from the steppe represent separate migrations of genetically distinct peoples with completely different cultural backgrounds. The Indo-Europeans did not introduce agriculture and did not come from Anatolia.

“EF share greater genetic affinity to populations from southern Europe than to those from northern Europe with an inverted pattern for WHG. Surprisingly, we find that CHG influence is stronger in northern than southern Europe (...) despite the closer relationship between CHG and EF compared with WHG, suggesting an increase of CHG ancestry in Western Europeans subsequent to the early Neolithic period.”

Thus, the early farmers almost completely replaced the WHG in the south and increasingly mixed with local WHG further north, leading to greater genetic affinity of the populations in northern Europe to the cultures of central Europe than to the Yamnaya. The latter penetrated central and northern Europe from the lower Danube through the Carpathian basin, not from the east. The Carpathian basin was evidently

the cradle of the Corded Ware cultures, where the descendants of the Yamnaya mixed with the local early farmers before proceeding to the north. The development has a clear parallel in the Middle Ages, when the Hungarians mixed with the local Slavic populations in the same territory (cf. Kushniarevich & al. 2015).

In a more recent article in *Current Biology* (Jones & al. 2017), the authors analyze the Neolithic transition in the Baltic region:

“The Neolithic transitions in the Baltic and Dnieper Rapids region of Ukraine show very different archaeological and genetic dynamics to those observed in Central and Western Europe. Although in Central Europe pottery and agriculture arrive as a package, in the Baltic and Dnieper Rapids the onset of the Neolithic is characterized by the appearance of ceramics, with a definitive shift to an agropastoralist economy only occurring during the Late Neolithic/Bronze Age. Although the prolonged and piecemeal uptake of Neolithic characteristics in these regions makes it challenging to attribute a definitive shift in ideology or lifestyle, it does, along with evidence for continuities in material culture and settlement patterns, suggest that Neolithic features were predominantly adopted by indigenous hunter-gatherers in this region.”

It appears that the Corded Ware horizon spread to southern Scandinavia (cf. Iversen & Kroonen 2017) but not to the Baltic region during the Neolithic.

“However, we also find indications of genetic impact from exogenous populations during the Neolithic, most likely from northern Eurasia and the Pontic Steppe. These influences are distinct from the Anatolian-farmer-related gene flow found in Central Europe during this period.”

It follows that the Indo-Europeans did not reach the Baltic region before the Late Neolithic. The influx of non-local people from northern Eurasia may be identified with the expansion of the Finno-Ugrians, who came into contact with the Indo-Europeans as a result of the eastward expansion of the latter in the fourth millennium. This was long before the split between Balto-Slavic and Indo-Iranian.

In the Late Neolithic there was “a further population movement into the regions surrounding the Baltic Sea” that was “accompanied by the first evidence of extensive animal husbandry in the Eastern Baltic”, which “suggests import of the new economy by an incoming steppe-like population independent of the agricultural societies that were already established to the south and west of the Baltic Sea.” (Mittnik & al. 2018). These may have been the ancestors of Balto-Slavic speakers. At a later stage, the Corded Ware horizon spread eastward, giving rise to farming ancestry in Eastern Baltic individuals and to a female gene-flow from the Eastern Baltic into Central Europe (*ibidem*).

It is generally assumed that Germanic and Baltic developed from contiguous Indo-European dialects. Reconsidering the chronological relationships, I have come to the conclusion that this view cannot be correct because Balto-Slavic had not yet diverged from Indo-Iranian at the time when the ancestors of the Germanic tribes separated from their eastern neighbors. I now think that the order in which the attested branches of Indo-European left the original homeland in the Russian steppe was the following (cf. Kortlandt 2010: 1-6 and 47-50):

1. Anatolian,
2. Tocharian,
3. Italo-Celtic (cf. Kortlandt 2007: 149-157),
4. Germanic,
5. “Temematic” (cf. Holzer 1989, Kortlandt 2010: 73-80),

6. Balkan languages (Greek, Phrygian, Armenian, Thracian, Albanian, in this order),
7. Balto-Slavic,
8. Indo-Iranian (cf. Kuz'mina 2007: 220-223).

The earliest contacts between Germanic and Balto-Slavic speakers can be dated to the early Middle Ages.

Saskia Pronk-Tiethoff has made clear that there are no Proto-Germanic loanwords in Proto-Slavic because “the two homelands were at best about 900 kilometres removed from each other” (2013: 72). The Proto-Germanic homeland can be identified with the area between the Erzgebirge, the Thuringian Forest, the Harz and the river Elbe (cf. Udolph 1994: 925f.) and the Proto-Slavic homeland with historical Galicia (cf. Udolph 1979: 619-623). There were two waves of early Germanic loanwords into Slavic, one from the Goths in the south and the other from the Germans in the west (cf. Pronk-Tiethoff 2013: 217-273). These can be identified with the early Slavic expansions to the south and to the west, respectively (cf. Kortlandt 2011: 149). There is no evidence for earlier contact between Germanic and Slavic speakers and there are no traces of an earlier Germanic presence east of the river Elbe. It appears that the Balts never came into direct contact with Germanic tribes because the Lechitic (Polish + Pomoranic + Polabian) migration to the northwest intervened (cf. Udolph 1979: 626, 638, also 1994: 918-920). Since the Goths never lived on the Baltic coast (cf. Kortlandt 2010: 27-30), it follows that early Germanic loanwords in Baltic always passed through a Slavic intermediary.

In the “Temematic” branch of Indo-European discovered by Georg Holzer (1989), the original tenuis **p*, **t*, **k* became voiced *b*, *d*, *g* while the mediae aspiratae **b^h*, **d^h*, **g^h* became voiceless *p*, *t*, *k*. Holzer lists 45 Slavic etyma borrowed from Temematic (1989: 50), of which 11 are also found in Baltic. Matasović does not dismiss Holzer’s theory out of hand but considers it unproven and points out that most of the Baltic and Slavic reflexes do not go back to a single prototype (2013: 78-81). This suggests that Baltic and Slavic borrowed independently from a language that was spoken to the west of the Slavic homeland, probably in the area between the rivers San and Vistula. At that time, the Balts occupied the territory north of the Pripet marshes up to the lower Vistula. This leaves the area between the Elbe and the Vistula unaccounted for. Here may have been the territory of the *Venedi* (*Venethi*, *Οὐενέδαι*) mentioned by Plinius, Tacitus and Ptolemaeus, later known as *Wenden* or *Winden* after the Lechitic expansion (cf. Porzig 1974: 128). They were probably related to their namesakes in Slovenia and to the *Veneti* in northern Italy. The voiced obstruent in *Venedi* and *Οὐενέδαι* is reminiscent of the Temematic development. This opens the possibility that the reflexes of **b^h*, **d^h*, **g^h* were fricatives in Temematic, as they were in the Italic languages including Venetic, and that they became devoiced and either shortened to stops or borrowed as stops in Baltic and Slavic, which did not have the corresponding fricatives.

When considering the way the Indo-Europeans took to the west, it is important to realize that mountains, forests and marshlands were prohibitive impediments. Moreover, people need fresh water, all the more so when traveling with horses. The natural way from the Russian steppe to the west is therefore along the northern bank of the river Danube. This leads to the hypothesis that the western Indo-Europeans represent successive waves of migration along the Danube and its tributaries. The Celts evidently followed the Danube all the way into southern Germany. The ancestors of the Italic tribes, including the Veneti, may have followed

the river Sava towards northern Italy. The ancestors of Germanic speakers apparently moved into Moravia and Bohemia and followed the Elbe into Saxony. A part of the Veneti may have followed them into Moravia and moved along the Oder through the Moravian Gate into Silesia. The hypothetical speakers of Temematic probably moved through Slovakia along the river Orava into western Galicia. The ancestors of speakers of Balkan languages crossed the lower Danube and moved to the south. This scenario is in agreement with the generally accepted view of the earliest relations between these branches of Indo-European (cf. Holzer 1989: 165 on Temematic).

If the theory advanced here is correct, Stang's "Lexikalische Sonderübereinstimmungen" between Slavic, Baltic and Germanic (1972) cannot be the result of common innovations but must be dated after the separation of Baltic and Slavic from Indo-Iranian and the movement of their speakers to the northwest, where they came into contact with the Corded Ware horizon. Matasović has argued that there are no early Uralic loanwords in Balto-Slavic (2013: 82, cf. Kallio 2005) and that there are hardly any loanwords from the Balkan peninsula (2013: 87f.). He counts 26 words in Baltic and Slavic (of which 12 are attested in both) that are shared with western Indo-European (Germanic, Celtic, Italic) and may be of non-Indo-European origin, mostly nouns referring to cultural items, flora and fauna (2013: 83-87). Oettinger (2003) lists 64 innovations common to at least Celtic or Italic and Baltic or Slavic, of which 23 do not have a root attested elsewhere in Indo-European. Stang (1972) lists 188 words limited to Baltic, Slavic and Germanic, of which 54 are found in Slavic and Germanic, 66 in Baltic and Germanic, and 68 in all three branches.

Thus, I think that the western Indo-European vocabulary in Baltic and Slavic is the result of an Indo-European substratum which contained an older non-Indo-European layer and was part of the Corded Ware horizon. The numbers show that a considerable part of the vocabulary was borrowed after the split between Baltic and Slavic, which came about when their speakers moved westwards north and south of the Pripet marshes. These events are older than the westward movement of the Slavs which brought them into contact with Temematic speakers. One may conjecture that the Venedi occupied the Oder basin and then expanded eastwards over the larger part of present-day Poland before the western Balts came down the river Niemen and moved onwards to the lower Vistula. We may then identify the Venedic expansion with the spread of the Corded Ware horizon and the westward migration of the Balts and the Slavs with their integration into the larger cultural complex. The theory that the Venedi separated from the Veneti in the upper Sava region and moved through Moravia and Silesia to the Baltic Sea explains the "im Namenmaterial auffällige Übereinstimmung zwischen dem Baltikum und den Gebieten um den Nordteil der Adria" (Udolph 1981: 61). The Balts probably moved in two stages because the differences between West and East Baltic are considerable (cf. Kortlandt 2009 *passim*). Stang notes the presence of eight words that are limited to Prussian and Germanic (1972: 78).

The hypothesis of an Indo-European substratum in Baltic and Slavic is actually supported by the semantics of the shared vocabulary of Baltic, Slavic and Germanic (cf. Stang 1972: 79-82). There are no pronouns and particles (except Lith. *jaũ* 'already', Slavic (*j*)*u*(*že*), Gothic *ju*), almost no religious or abstract concepts, no words for relatives, many words for plants, animals, natural phenomena, and agriculture, few but important words for social phenomena (Lith. *draũgas* 'friend', *kiẽmas* 'court(yard)', *káimas* 'village', *liáudis* 'people', *valdýti* 'to rule'), and especially many

technical terms for wooden tools and utensils. There is no discernible formal or semantic difference between the Indo-European and the non-Indo-European parts of the substratum vocabulary. Half of the technical terms are common to Baltic, Slavic and Germanic while the large majority of the other half are found in Baltic but not in Slavic. There is no reason to assume earlier contacts between Balto-Slavic and western Indo-European or other languages of the Corded Ware horizon. The dat.pl. ending **-mus* which is common to Germanic and Balto-Slavic is an archaism that was replaced by the ablative ending **-b^hos* in Italo-Celtic and **-b^hios* in Indo-Iranian (cf. Kortlandt 2014: 8). Germanic and Balto-Slavic were never contiguous Indo-European dialects at any stage of their prehistory.

The methodological point to be emphasized here is that the linguistic evidence takes precedence over archaeological and genetic data, which give no information about the languages spoken and can only support the linguistic evidence. The relative chronology of developments must be established on the basis of the comparative method and internal reconstruction. The location of a reconstructed language can only be established on the basis of lexical and onomastic material. On the other hand, archaeological or genetic data may supply the corresponding absolute chronology. It is therefore incorrect to attribute cultural influences in southern Scandinavia and the Baltic region in the third millennium to Germanic or Baltic speakers because these languages did not yet exist. While the Italo-Celtic branch may have separated from its Indo-European neighbors in the first half of the third millennium, Proto-Balto-Slavic and Proto-Indo-Iranian can be dated to the second millennium and Proto-Germanic to the end of the first millennium BC (cf. Kortlandt 2010: 173f., 197f., 249f.). The Indo-Europeans who moved to southern Scandinavia as part of the Corded Ware horizon were not the ancestors of Germanic speakers, who lived farther to the south, but belonged to an unknown branch that was eventually replaced by Germanic. I have suggested that this western Indo-European substratum language may have preserved the Proto-Indo-European laryngeals as velar obstruents, e.g. in Gothic *bagms* ‘tree’ < **b^heH₃u-* ‘grow’, Old Swedish *bagn* ‘trunk’, the Gothic name of the *s*-rune *sugil* < **suH₂l*, with laryngeal metathesis in the zero grade of **seH₂ul* ‘sun’, Old English *brycg* ‘bridge’ if it is cognate with *brū* ‘eyebrow’ < **H₃b^hruH₂-*, Gothic *gazds* ‘sting’ < **H₃esd-* beside *asts* ‘branch’ (cf. Kortlandt 2010: 179f.). This may have been the first branch of Indo-European that split off from the proto-language and moved to the west. It may also have been the source of Latin *faba* ‘bean’ < **b^heH₃u-*, *hasta* ‘spear’, Middle Irish *gat* ‘withe’ < **H₃esd-* (cf. de Vaan 2008: 197, 280).

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Summary

When considering the way the Indo-Europeans took to the west, it is important to realize that mountains, forests and marshlands were prohibitive impediments. Moreover, people need fresh water, all the more so when traveling with horses. The natural way from the Russian steppe to the west is therefore along the northern bank of the river Danube. This leads to the hypothesis that the western Indo-Europeans represent successive waves of migration along the Danube and its tributaries. The Celts evidently followed the Danube all the way into southern Germany. The ancestors of the Italic tribes, including the Veneti, may have followed the river Sava towards northern Italy. The ancestors of Germanic speakers apparently moved into Moravia and Bohemia and followed the Elbe into Saxony. A part of the Veneti may have followed them into Moravia and moved along the Oder through the Moravian Gate into Silesia. The hypothetical speakers of Temematic probably moved through Slovakia along the river Orava into western Galicia. The ancestors of speakers of Balkan languages crossed the lower Danube and moved to the south. This scenario is in agreement with the generally accepted view of the earliest relations between these branches of Indo-European.

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