

ACTA MVSEI APVLENSIS

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CARPATHIAN HEARTLANDS

*Studies on the prehistory and history of Transsylvania in
European contexts, dedicated to Horia Ciugudean on his 60th
birthday*

NUCLEUL CARPATIC

*Studii privind preistoria și istoria Transilvaniei în context
european, dedicate lui Horia Ciugudean la aniversarea a 60 de
ani*

Edited by /
Volum îngrijit de:

Nikolaus Boroffka
Gabriel Tiberiu Rustoiu
Radu Ota

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LI

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Horia Ciugudean

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MOBILITY: TRANSHUMANTS OR IMMIGRANTS?

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Abstract. The kurgan investigated at Sárrétudvari-Őr-halom in the Alföld (the Hungarian Plain) was constructed in two phases, while the eight burials underneath the kurgan represent three burial phases. The 1 sigma calibrated radiocarbon dates for the kurgan span the Late Copper Age, the Copper Age/Bronze Age transition and the Early Bronze Age 1 period according to the conventional sub-division used in Hungarian prehistoric studies, which can be correlated with the local Boleráz and Baden cultures, followed by the Makó, and the immigrant Coțofeni III, pre-Yamnaya, Yamnaya and Late Yamnaya cultures. The grave goods accompanying the burials could be assigned to the Late Yamnaya, the Coțofeni III, the Makó and the Transylvanian Livezile-Bedellő groups. The archaeological assessment of the burials and the results of their stable isotope analysis were published earlier; here we seek an interpretation for the archaeologically obvious links between the local groups and the Transylvanian and Pontic cultures.

Key words: Hungary vs Romania, Sárrét Plain vs Apuseni/Torockó Mountains, Yamnaya communities vs Livezile group, Late Copper Age vs Early Bronze Age, semi-nomads vs transhumants.

Cuvinte cheie: Ungaria vs România, Câmpia Sárrét vs Munții Apuseni/Torockó, comunitățile Yamnaya vs grupul Livezile, epoca târzie a cuprului vs epoca timpurie a bronzului, seminomazi vs transhumați.

Introduction.

In Hungary, earthen mounds were first raised as part of the funerary rite by the prehistoric communities settling on the Alföld (the Hungarian Plain) east of the River Tisza in the Late Copper Age. The novel funerary rite introduced by the eastern immigrants was continued during the Early Bronze Age in the Carpathian Basin. The kurgans were initially raised over a single burial; however, the archaeological record indicates that they were often used as burial places in later ages too (but never as settlements). Following their construction, kurgans became prominent landmarks of the plain and a highly visible symbol of the cult of the Ancestors. Their continuous use suggests that later immigrant Yamnaya groups were aware of their location and their function. It is also feasible that kurgans were not only places of burial, but also places of remembrance and memory, where festivities, ceremonies and funerary feasts were held.

Although the existing kurgans were not raised higher, they continued to be used as burial places during the Late Copper Age and the Early Bronze Age, as well as in later ages, first by the Scythians and, after them, by the Sarmatians, the ancient Hungarians of the Conquest period and, finally, by the Pechenegs and the Cumanians of the Middle Ages, all peoples who are without exception regarded as nomads. Some of these peoples such as the Scythians and the Sarmatians also raised their own burial mounds. The fact that the earlier kurgans were used as burial places by peoples with expressly nomadic traits, while other, non-nomadic groups settling in the Alföld did not use the earlier burial mounds for interring their dead suggests that despite their different ethnic and linguistic affiliation and despite living in different periods, the shared original homeland and the similar lifeways engendered similar funerary customs among the population groups of eastern origin. The non-eastern prehistoric populations of the Alföld such as the Gáva culture and the Celts lacked these traditions and customs.

The separate, consecutive construction phases of the kurgans can be clearly identified in the cross-sections: very often two, but sometimes even three separate construction layers can be distinguished with which additional burials can be associated. The artificial construction layers are separated by thin, naturally deposited layers of earth (as for example at Hajdúnánás–Tedej-Lyukashalom). However, we have no way of knowing how much time elapsed between the successive construction layers and little is known about the relationship between the successive generations of the Yamnaya groups occupying the region (whether they were descended from each other, whether they were different, but related groups, or whether they were wholly unrelated and had no contact with each other). These questions cannot be answered by even the most rigorous archaeological analysis because none of the uncovered phenomena provide any clues in this respect. Given that the funerary rite of the burials associated with the successive construction layers varies and that the radiocarbon dates indicated that the burials followed one another in time, I divided the Yamnaya infiltration into Hungary from the Late Copper Age to the Early Bronze Age into four, partly overlapping and partly consecutive phases. The burial rites of the four horizons (body position, orientation and grave goods) similarly overlap to some extent, while the new, divergent funerary traits allow the separation of one group from another as well as the identification of the original homeland in the east: several regions of origin could be located and it also became clear that different groups arrived to the Carpathian Basin along diverse routes¹.

Only genetic and stable isotope analyses are suitable for answering the question of the degree of kinship, if any, between the Yamnaya groups interring

¹ Horváth 2011.

their dead in the same kurgan and of their land of origin compared to the kurgan's geographic location. Of the currently known Copper Age and Bronze Age kurgans, the burial mound found near Sárrétudvari is the single excavated archaeological site, where, in addition to the burials themselves, ceramic and metal grave goods were recovered from the graves that can be studied using traditional archaeological methods. For this reason, and in view of the fact that the burials span the Late Copper Age and the Early Bronze Age, the broader contextualisation of the Sárrétudvari kurgan can provide a good starting point for an inquiry into origins and cultural interactions.

The archaeological and interdisciplinary assessment of the kurgan investigated at Sárrétudvari-Őr-halom has already been published² and the primary strontium and oxygen isotope analyses of the kurgan's burials have also been completed³. Both studies suggested that the early primary burial(s) without grave goods in the kurgan's centre could be interpreted as the locally-born descendants of former Yamnaya immigrants (Grave 12 and perhaps Grave 8 can be assigned to this category according to the archaeological assessment, while the stable isotope analyses indicated that Graves 7a and 10 could similarly be assigned to the "local" group).

The later, richly furnished burials found farther from the kurgan's centre (principally Graves 4, 7, 9 and 11 in view of the isotope values) represent the burials of individuals engaged in transhumant pastoralism migrating to the Alföld from the Apuseni Mountains, specifically from the Torockó Mountains, who were members of the Livezile-Bedellő group. However, the isotope values of this group are also consistent with the northern Pontic region, and thus an origin in that region cannot be rejected: it is possible that a group migrating to the Alföld from the northern Pontic followed a route leading through the Apuseni Mountains.

Chronological and cultural framework.

The kurgan excavated on the outskirts of Sárrétudvari was raised in two phases. The burial rite of the graves, the grave goods deposited beside the deceased and other artefacts recovered from the grave fills and the earth of the mound itself, and finally the radiocarbon dates indicate that the burial mound and its burials can be assigned to the Late Copper Age (3600–2800 BC), specifically to its middle and late phase (from 3350 BC onward; Grave 12: 3350–3113 cal BC, 1 sigma, Deb-6869; and Grave 8: 3359–3106 cal BC, 1 sigma, Poz-39563), to the transition between the Late Copper Age and the Early Bronze Age (2800–2600 BC; Grave 4: 2866–2624 cal BC, 1 sigma, Deb-7182)

² Dani, M. Nepper 2006; Dani 2011; Dani, Horváth 2012, p. 26-33.

³ Gerling *et alii* 2012a; Gerling *et alii* 2012b.

and to the Early Bronze Age 1 (2600–2500 BC; Grave 9: 2835–2491 cal BC, 1 sigma, Deb-6871) according to the conventional sub-divisions used in Hungarian prehistoric studies. The kurgan's use-life thus spans several archaeological periods; in absolute dates, this means an 850-year-long period at the most in calibrated BC years and 460 years in BP years.

The burial rite and the grave goods accompanying the burials indicate that Grave 12 without any grave goods and perhaps Grave 8 can be assigned to the kurgan's first phase (pre-Yamnaya or Yamnaya). In contrast to Grave 12, Grave 8 was a plundered Yamnaya burial with the deceased laid on a mat. It certainly post-dated Grave 12 and it can be linked to a different Yamnaya group than the one represented by Grave 12. Grave 8 may equally well represent a burial post-dating the first construction phase or the primary burial of the second construction phase.

Grave 10 can be linked to the kurgan's second construction phase. While the burial rite exhibits pure Yamnaya traits, the lower quern stone and the cattle and horse bones deposited beside the deceased are uncommon grave goods in Hungarian kurgans and point towards an individual of the Baden culture or of the Yamnaya group who had to some extent assimilated to the local Baden population, which is also supported by the burial's date of 3000–2900 BC (3012–2910 cal BC, 1 sigma, Deb-6639).

The physical anthropological examination of the skeletal remains revealed that instead of the usual Cro-magnon type typical for kurgan burials, the buried individual represented a 44–55-year-old, highly gracile male⁴, an anthropological type accounting for over 80% of the Baden population⁵. This local anthropological type (Baden, or Yamnaya assimilated into Baden) is confirmed by the isotope values fitting into the local sequence.

A third phase, not involving additional construction work on the kurgan, can be distinguished based on the burials and their grave goods, represented by Graves 7, 7a, 9, and 11. The pottery in these burials has its closest counterparts among the vessels of the Makó and Livezile groups, while the pottery sherd recovered from the fill of Grave 11 is matched by the ceramics of the Coțofeni III group. The best parallels to the metal artefacts can be quoted from Late Yamnaya contexts coloured by Catacomb Graves.

Thus, the cultural attribution of the individuals buried under the kurgan shows a colourful medley (pre-Yamnaya, Yamnaya, Baden-assimilated Yamnaya, late Yamnaya, Makó- and Livezile-assimilated mixed late Yamnaya and Coțofeni). Given that in the Alföld, Yamnaya denotes immigrant groups from the east settling among local population groups, a glance at the broader

⁴ K. Zoffmann 2006, p. 51.

⁵ K. Zoffmann 2004.

cultural landscape during the kurgan's 850-year-long use-life seems in order. The Alföld was populated by the Late Copper Age Boleráz group, the Baden culture of the Late Copper Age surviving into the Early Bronze Age, the Kostolác culture, sporadic Coțofeni III groups and, from 2600 BC onward, by the Early Bronze Age Makó culture. Additionally, the continuous presence of eastern immigrants representing diverse archaeological cultures and horizons can also be demonstrated in the region⁶. The complete cultural replacement of the local population in north-eastern Hungary alongside the simultaneous decline of the Yamnaya presence can be linked to the appearance of the Nyírség culture around 2200 BC, correlated with the Early Bronze Age 2b/3 transition (Hajdúnánás–Fekete-halom: 2190–2037 cal BC, 1 sigma, 2201–2053 cal BC, 1 sigma, Poz-39462, 39463). In the Sárrét region, this meant a population of the Makó culture and of Yamnaya groups in a slightly earlier period (Berettyóújfalu–Nagy-Bócs-dűlő: until 2350 BC, Poz-31798, 31800, 31803, 31804, 31801)⁷.

Chronological models for the Sárrétudvari kurgan.

All four versions can be acceptable for the site's chronology. Accepted the archaeological data (stratigraphical layers, building phases, grave goods, etc.). I separated the five radiocarbon data from the site into three horizons (1. building phase: deb-6869; 2. building phase: poz-39563, deb-6639; 3. building phase: deb-7182, deb-6871). The A_{overall} index for the Contiguous model is acceptable but not so high, for the Sequential model is not acceptable (did not support any hiatus), for the Overlap model is very good (99.7% for the model, 100% for the individual data). It seems that among the chronological models the Overlap model is the most acceptable for the Sárrétudvari site, supporting my same chronological ideas for the Hungarian Yamnaya⁸.

Economy and society.

In addition to the burial mounds of various Yamnaya groups, the region's other possible occupants must also be discussed, given the chronological and spatial framework described above.

⁶ Horváth 2011, 2012; Horváth *et alii* 2013.

⁷ See Dani, Horváth 2012, Table 6.

⁸ Horváth 2011; Dani, Horváth 2012.

Name	Unmodelled (BC/AD)					Modelled (BC/AD)						
Amodel 95.2												
Aoverall 95%												
	1 szigma		2 szigma			1 szigma		2 szigma				
	from	to	from	to	mu	from	to	from	to	mu	A	
Sequence												
Boundary Start 1						-3460	-3150	-3940	-3085	-3405		
Phase 1												
R_Date deb-6869	-3350	3110	3365	-3095	-3220	-3240	-3095	-3360	-3035	-3190	100	
R_Date Poz-39563	-3360	3105	3495	-3020	-3225	-3340	-3090	-3370	-3020	-3185	100.1	
R_Date deb-6639	-3015	2910	3090	-2890	-2975	-3015	-2910	-3090	-2890	-2975	100.2	
R_Date deb-7182	-2870	2620	2890	-2500	-2720	-2880	-2680	-2890	-2580	-2750	102.3	
R_Date deb-6871	-2835	2490	2865	-2470	-2630	-2865	-2565	-2875	-2485	-2700	86,80	
Boundary End 1						-2820	-2430	-2855	-1970	-2500		

Table 1. Sárrétudvari: the five radiocarbon data from the site without separation and grouping.

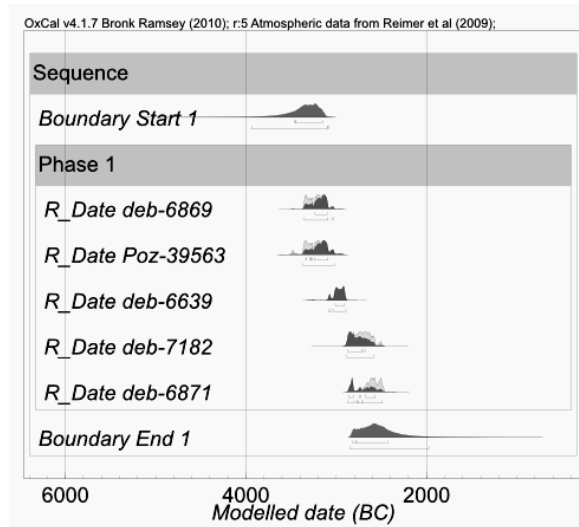


Fig. 1. Modelled date for Table 1.

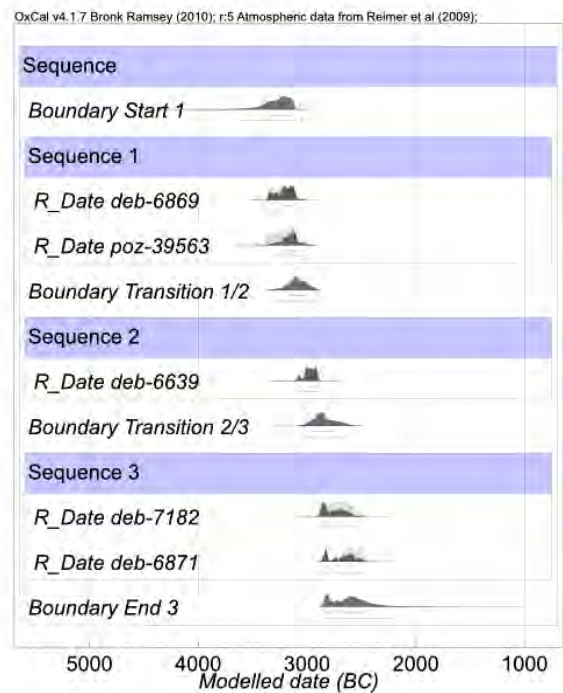


Fig. 2. Modelled date for Table 2.

Name	Unmodelled (BC/AD)			Modelled (BC/AD)		
Amodel 105.9						
Overall 105.3%						
	1 sigma			2 sigma		
	from	to	mu	from	to	mu
Phase						
Sequence						
Boundary Start 1				-3510	-4410	-3105
Sequence 1						
R_Date deb-6869	-3350	-3110	-3095	-3220	-3175	-3365
R_Date poz-39563	-3360	-3105	-3495	-3020	-3095	-3245
Boundary End 1				-3305	-2885	-2095
Sequence						
Boundary Start 2				-4085	-2920	-3425
Sequence 2						
R_Date deb-6639	-3015	-2910	-3090	-2890	-2910	-3090
Boundary End 2				-3010	-1945	-2560
Sequence						
Boundary Start 3				-3060	-2590	-3000
Sequence 3						
R_Date deb-7182	-2870	-2620	-2885	-2500	-2615	-2880
R_Date deb-6871	-2835	-2490	-2865	-2470	-2495	-2845
Boundary End 3				-2825	-2230	-2650

Table 3. The radiocarbon data are in three group. Sequential model (without hiatus).

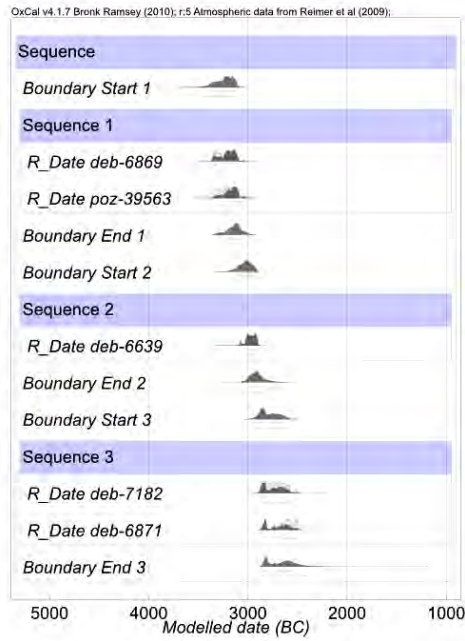


Fig. 3. Modelled date for Table 3.

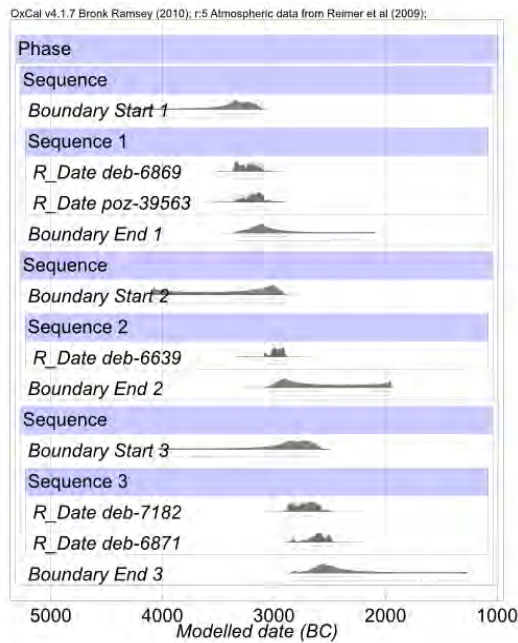


Fig. 4. Modelled date for Table 4.

Name	Unmodelled (BC/AD)					Modelled (BC/AD)						
Amodel 105.9												
Aoverall 105.8%												
	1 szigma		2 szigma			1 szigma		2 szigma				
	from	to	from	to	mu	from	to	from	to	mu	A	
Phase												
Sequence												
Boundary Start 1						-3510	-3125	-4410	-3105	-3480		
Sequence 1												
R_Date deb-6869	-3350	-3110	-3365	-3095	-3220	-3355	-3175	-3365	-3115	-3245	101.2	
R_Date poz-39563	-3360	-3105	-3495	-3020	-3225	-3240	-3095	-3350	-3025	-3180	104.7	
Boundary End 1						-3305	-2885	-3350	-2095	-2955		
Sequence												
Boundary Start 2						-4085	-2920	-4085	-2920	-3425		
Sequence 2												
R_Date deb-6639	-3015	-2910	-3090	-2890	-2975	-3015	-2910	-3090	-2890	-2975	99.90	
Boundary End 2						-3010	-1945	-3010	-1945	-2560		
Sequence												
Boundary Start 3						-3060	-2590	-4030	-2570	-3000		
Sequence 3												
R_Date deb-7182	-2870	-2620	-2885	-2500	-2720	-2870	-2615	-2880	-2575	-2720	102.7	
R_Date deb-6871	-2835	-2490	-2865	-2470	-2630	-2670	-2495	-2845	-2470	-2615	104.3	
Boundary End 3						-2825	-2230	-2850	-1270	-2325		

Table 4. The radiocarbon data are in three group. Overlap model.

The greater part of the Alföld was sparsely populated by Baden, Kostolác and Makó communities, although a denser occupation can be noted in certain areas, especially in places with fertile soils and abundant water such as the Hajdúság region, the Tiszazug area and along the Körös rivers in County Békés⁹. It seems likely that the immigrant Yamnaya groups first settled in areas

⁹ Honti, Horváth 2013, Late Copper Age/Tables/Late Copper Age sites in Hungary.

that were either uninhabited or were but sparsely occupied by these native cultures¹⁰.

How large was the undoubtedly immigrant Yamnaya population which infiltrated the Alföld from the eastern steppe between 3350 and 2400 BC? Estimating population sizes is always a risky business because the proportion of the uncovered burials to the size of the one-time population is not known; what seems certain, however, is that there is no direct relation between the two and that we always uncover far fewer graves than the one-time number of a bygone period's burials. Additionally, any estimate is made more difficult by the fact that we are probably dealing with several groups, each with a different identity, which did not arrive simultaneously, but settled in the region continuously. In the lack of settlements, the figures calculated from the burials cannot be weighted. To make matters worse, it has been estimated that there were once forty thousand kurgans, of which no more four thousand still survive, meaning that about 90% were destroyed over time (this estimate is based on the comparison of the mounds and toponyms appearing on the maps of the First Military Ordnance Survey made in the late 18th century and on modern cadastral maps). Neither do we know which part of the one-time population is represented by the Yamnaya burials under the kurgans. Was everyone accorded a burial of this type or only a smaller, chosen elite? What was the basis of the selection in the case of the latter? The equation contains a higher than average number of unknowns. We can equally well calculate with four thousand burials representing the entire population or with four thousand elite burials for a roughly thousand-year-long period, or with forty thousand burials representing the entire population or forty thousand elite burials for the same period. Insofar as we assume several burials per kurgan (taking the Sárrétudvari kurgan as a starting point), these figures can be multiplied by various multipliers. It is clear from the above that we are currently unable to make realistic population estimates.

The two thousand years between 4200/4000 and 2200/2000 BC spanned a strongly variable and unpredictable period that was less suited to arable farming, which eventually forced the late Middle Copper Age, Late Copper Age and Early Bronze Age cultures to adopt a more mobile, less sedentary life-style and a more specialised subsistence strategy based on stockbreeding, a sharp contrast with the preceding (Neolithic) and subsequent (Middle Bronze Age) periods characterised by sedentary populations engaged principally in arable farming, who lived on long-occupied, often tell-like settlements. The shift to a new subsistence took diverse forms among the different cultures¹¹.

¹⁰ For the “no man’s land” regarding Boleráz-Baden, see Horváth 2011, Figure 23.

¹¹ Horváth 2011, p. 82.

The remains of Boleráz, Baden, Kostolác, Coțofeni and Makó settlements have been identified in the broader region and most have yielded finds (such as pottery and animal bones) that provide some indication of subsistence practices. The settlement remains of these cultures suggest less intensively and certainly not permanently occupied locations, even if the intermittent occupation could span a relatively long period of time. The settlements formed a chain along a watercourse and in addition to evidence for various types of stockbreeding (extensive pasturing, lateral/vertical transhumance, intensive animal husbandry in and around the village/hamlet/camp), they also yielded finds reflecting modest arable farming.

In contrast, the different chronological and cultural groups of the Yamnaya culture are only known to Hungarian archaeologists from their burials. No settlements or campsites of this intrusive population have yet been identified, and even though animal bones and pottery have been occasionally found in the immediate area of the kurgans¹², these cannot be directly associated with the kurgan population, but are rather a reflection of interaction with local groups. In the case of the animal bones, there is always a lingering doubt that they had been redeposited from an earlier or later period. In sum, there is no direct local evidence for the subsistence practices of the Yamnaya population.

In its primary homeland on the Russia steppe, early Yamnaya can be divided into two regional branches: the western, traditionally cattle-breeding group along the Lower Don and the southern Bug, and the eastern group along the Volga–Ural and the Caspian Sea specialising in sheep breeding, with a more mobile life-style than their western brethren¹³. This divide is rooted both in historical tradition (a greater impact of traditional peasant cultures in the western region, as shown by the few settlements and plant remains) and in environmental conditions (the forest steppe in western Ukraine is most suited to stockbreeding). The nomads of Eastern Europe were never forced to roam as extensive an area as the nomads of the Asian plains because pastures were lush and regenerated more swiftly, and because unlike sheep and goat, cattle do not crop pastures as closely as the former species. Given the proximity of farming cultures and civilisations as well as the less harsh conditions, the Eastern European steppe is sometimes described as a nomad-welcoming grassland¹⁴. Y. Rassamakin regarded the western Yamnaya group as a semi-nomadic population¹⁵.

The above cultures were engaged in sheep and cattle raising complemented to different extents with pig breeding and dog, and they were,

¹² Usually stray finds of cord-impressed vessels, although grave pottery reflecting Makó/Livezile influence was exceptionally recovered at Sárretudvari, see Dani, Horváth 2012, p. 101-107.

¹³ Anthony 2007, p. 304, 326.

¹⁴ Matolesi 1983, p. 286-296.

¹⁵ Rassamakin 1999, p. 154.

with the exception of Yamnaya, sedentary cultures. The dating of the appearance of the horse (perhaps also of domesticated varieties) is highly controversial owing to the uncertain Hungarian data. The horse bone finds from the sites and cultures defined as Early, Middle and Late Copper Age and Early Bronze Age by S. Bökönyi need to be thoroughly revised because similarly to Dereivka, there is ample reason to believe that they date from later ages and cultures in the case of sites occupied during successive periods¹⁶. Obviously, exact dates can only be obtained by submitting samples of these horse bones for radiocarbon measurements.

The radiocarbon dates for the cattle bones from Hajdúnánás–Tedej-Lyukas-halom gave values falling into the Mesolithic and the Early Neolithic¹⁷, while the animal bone finds from Grave 10 of the Sárrétudvari kurgan could have been redeposited from the burials of the Hungarian Conquest period, insofar as they do not date from the Baden period¹⁸ because the radiocarbon measurement was performed on a sample taken from the human skeleton.

As a positive example, we may quote the case of Hajdúszoboszló–Árkos-halom: the radiocarbon dates for the cattle and aurochs bone found *in situ* under the kurgan used as a brickyard during the early Árpadian Age indicated that the faunal remains could be linked to the population raising the mound¹⁹. No horse bones or, for that matter, any other animal bones have been recovered from secure contexts from Hungarian kurgans, and thus we can hardly speak of mounted nomads or even of riders or horse-users. At the same time, horse bones came to light at Balatonőszöd²⁰, the single meticulously excavated and fully published Boleráz-Baden settlement, reflecting some form of the exploitation of horse. The current record indicates that the exploitation and breeding of horse began during the Late Copper Age, and that the horses domesticated by local Central European cultures were probably wild species native to Central Europe – in other words, the horse was not introduced by immigrant groups from the steppe.

We know even less about social organisation than we do about subsistence practices. It is generally assumed that the period's autochthonous cultures (Boleráz, Baden, Makó, etc.) were transegalitarian societies (neither tribes, nor chiefdoms) in which a certain level of social and craft specialisation had already begun and the strict lineage-based organisation of tribal societies had become looser²¹.

¹⁶ Bökönyi 1979, p. 104-108; Levine 1999.

¹⁷ 6620–6480 cal BC, 1 sigma, Deb-12788: Horváth 2011, p. 93, Table 1.

¹⁸ Dani, M. Nepper 2006, p. 32.

¹⁹ 3079–2926 cal BC, 1 sigma, Poz-39464: Dani, Horváth 2012, p. 35, 80, Table 6.

²⁰ Vörös 2014.

²¹ Horváth 2008.

The intrusive Yamnaya communities appear to have differed from the other native, partly contemporaneous cultures in that they had a stronger patrilineal organisation, leading to the emergence of a more aggressive elite, although yet without an armed aristocracy²².

Despite their strict tribal organisation, nomads were open societies²³, who easily assimilated to new, sedentary societies as conquerors. Owing to their political organisation and lineage-based society, they excelled in creating states, but were much less adept at maintaining their empires. The price for organising the empire was the renouncement of their own tribal world. If assimilation was successful and they built an empire, they eventually felt the need to return to their former steppean world for “regeneration”, and the whole cycle began anew²⁴. Several historical examples can be quoted, one being the disintegration of the Hunnic Empire after Attila’s death and the Huns’ return to their former “homeland”, to the Lower Danube–Olt region and, later, to the Pontic marshlands, which lay far from their original cradle by China, but was sufficiently distant from the Roman provinces²⁵.

D. W. Anthony believes that the Usatovo culture possibly represents a re-migration of this type during the period and cultural milieu in question²⁶.

Geographical framework.

Geographic features conducive to migration have been called potential natural routes. In this context, the following can be regarded as major environmental factors: a river network including both waterways and related overland routes following river valleys or lake chains, land relief, soil types and the related vegetation cover. Beside cultural factors, the ecological potentials of the landscape have also been recognised as crucial elements determining the geography of human migrations, as well as of goods and ideas, which take the form of penetration, migration, infiltration, conquest or lasting trade ties. When tracing migration routes, it has been accepted as a possibility that specific human groups chose and consciously used communication courses forming a kind of ecological corridors. One of the most important divisions of the European continent extends along the line running between the Baltic and Black Sea, namely the physiographic border between western and eastern Europe. Several historical migration routes can be associated with this boundary along the Baltic–Vistula–Bug/Wieperz–southern Bug rivers–Black Sea²⁷.

²² Perhaps representing a pre-tribal stage; see Ivanova 2001, 2003; Anthony 2007, p. 137-138.

²³ I. Ecsedy 1983, p. 32.

²⁴ Vásáry 1983, p. 206-207.

²⁵ Bóna 1993, p. 192-193.

²⁶ Anthony 2007, p. 362-364.

²⁷ Koško, Kločko 2009.

The steppean communities of the early (II) and late Yamnaya (III) periods settling in the Carpathian Basin can be identified with mixed cultural communities of the Yamnaya culture in its primary homeland in the Pontic and with the strongly Tripolye C2–Usatovo-based Kvityana and Lower Mikhailovka pre-Yamnaya groups arriving from the Pontic area to the territory of the Alföld. The migration routes led from Moldavia through the passes of the Carpathian Mountains and also along major waterways such as the valleys of the Berettyó, the Maros/Mureş and the Szamos/Someş rivers, and halted at the former line of the River Tisza²⁸. In Period IV/V, the cultural interaction with the local cultures in the Carpathian Basin became more dynamic and more extensive, leading to the dilution of the cultural identity of the originally Catacomb-influenced late Yamnaya groups. This wave can probably be traced to the Maikop-inspired Zhivotilovo-Volchanskoe group, originally settling in the Prut–Don interfluvium. The direct route probably changed compared to the previous periods and the new road led along the River Danube.

The geobotanical conditions of Europe indicate that the steppe vegetation zones and the connecting forest steppe zones²⁹ coincided with the distribution of Yamnaya communities (comp. **Plate 1** and **Plate 2.2**). The geobotanical division of Europe reflecting the affinity of floras and giving special prominence: Pontic–Pannonian Province for this phenomenon. The climatic conditions in these regions are dry continental climate and moderately warm³⁰. The steppe vegetation reflects a zonal arrangement of soils. The steppe and the forest steppe are dominated by chernozem soils and a continental climate³¹. These coincidences suggest that the intrusive Yamnaya groups in the Carpathian Basin were small specialist communities, who filled a specific economic or/and social niche³². Their lifeways were principally based and dependent on external factors (vegetation, flora, soil type, climate, etc.). The most likely form of contact (ranging from folk migration, demic diffusion, élite dominance and infiltration to leapfrog colonisation, frontier mobility and contact) between the pioneer Yamnaya livestock herders and the native Boleráz, Baden, Makó/Livezile farmers appears to have been infiltration (involving a gradual penetration by small, usually specialist groups of a region, who fill a specific economic or social niche, i.e. livestock herders: this may be undetectable genetically if there is no inter-group gene flow; if gene flow occurs, then small-scale genetic signature as an élite dominance can be expected) or perhaps leapfrog colonisation (selective colonisation of an area by small groups,

²⁸ Dani, Horváth, 2012, p. 149.

²⁹ Makohonienko 2009, p. 21-31.

³⁰ Makohonienko 2009, p. 31-32.

³¹ Makohonienko 2009, p. 32-34.

³² Zvelebil 2000, p. 58.

who target optimal areas for settlement, thus forming an enclave, or a colony, among native habitants).

The settlement territory of the Livezile group in the Apuseni Mountains is characterised by the following geographic conditions: the vegetation is dominated by the deciduous (oak-hornbeam) forests of Central and Eastern Europe, its flora province is part of the Illyrian Province. Unlike steppes, forest/mountain areas enjoy moderately humid conditions throughout the year with a surplus of moisture over evaporation. Seasonal thermal contrasts between summer and winter are less strongly marked. The typical soil types are montane soils. Livezile was a native population of this mountain region, with its own traditional livestock and customs, mixed with other neighbouring native cultures and affected by intrusive Yamnaya. The form of these contacts could be frontier mobility³³. Moreover, the small, stone-packed burial mounds of the Livezile communities formed clusters in the higher mountain zone (on plateaus and terraces), while the solitary earthen Yamnaya kurgans on the lowland without stone are sited close to river valleys and form chains along the river. This would imply that while the two archaeological units (Livezile and Yamnaya) may well have co-existed and overlapped with each other in time and space in the Apuseni Mountains and in the Middle Maros Valley³⁴, they exploited several geographical and ecological niches, and perhaps were different, but similar animal stocker, and had similar, although not identical funerary practices.

Stable isotope analyses.

Some of the individuals in the Hungarian kurgan graves identified as isotopic outliers showed archaeological affinities with the Transylvanian Livezile group, thus in order to verify this potential association, six humans and two animals from four Transylvanian sites (Ampoița–Peret, Ampoița–Doștior, Livezile and Meteș–La Meteșel) were selected for further $^{87}\text{Sr}/^{86}\text{Sr}$ and $\delta^{18}\text{O}$ isotope analyses³⁵.

The six human individuals from Ampoița–Doștior, Ampoița–Peret, Meteș–La Meteșel and Livezile share similar $^{87}\text{Sr}/^{86}\text{Sr}$ values, with a strontium isotope range of 0.7091 to 0.7105 and a mean equal to 0.7097 ± 0.0005 , 1 sigma. Considering that four different sites were sampled, the human individuals form a relatively tight cluster. One individual, Burial 3 in Burial Mound 1 at Meteș–La

³³ Denoting the small-scale movement of populations within contact zones, occurring along established social networks, such as trading partnerships, kinship lines, marriage alliances, causing gene mixing marked by graded or discontinuous patterning in gene frequencies between genetically distinct populations, but if populations were genetically similar, this would be undetectable; Zvelebil 2000, p. 59.

³⁴ Ciugudean 2011.

³⁵ Gerling, Ciugudean 2013.

Meteseşel, has a strontium isotope value higher than the majority of the others, but still within the limits of what can be considered the "local" bioavailable strontium range. The only exceptions are the very low strontium isotope enamel values of the Coşofeni cattle, which is far off this range.

The oxygen stable isotope composition of meteoric or rain water varies according to geographic location.

The combination of $\delta^{18}\text{O}$ and $^{87}\text{Sr}/^{86}\text{Sr}$ values creates a relatively clustered data set, and all oxygen isotope ratios are more or less consistent with the estimated "regional" $\delta^{18}\text{O}$ range. However, since strontium isotope ratios can be more informative than oxygen isotopes for tracing mobility on a small spatial scale, the cattle from the Ampoiţa Coşofeni settlement can be considered a true outlier due to their distinct $^{87}\text{Sr}/^{86}\text{Sr}$ signature. Furthermore, the skeleton Meteseş 1/3 is a potential human outlier, although it does plot at the margin of the "local" bioavailable Sr range.

Claudia Gerling and her colleagues applied strontium and oxygen isotope analyses on 20 Copper Age and Early Bronze Age human skeletons from eastern Hungarian kurgan burial mounds³⁶.

A comparison between the Transylvanian $^{87}\text{Sr}/^{86}\text{Sr}$ data and the sample set obtained from Neolithic and earlier Copper Age burial sites in eastern Hungary³⁷ reveals a considerably good correlation. Comparing the data to the burial mounds in eastern Hungary in the studies of C. Gerling and her colleagues, it is found that the Transylvanian data sit approximately in the middle of what can be reconstructed a triangle of the $^{87}\text{Sr}/^{86}\text{Sr}$ samples from Sárretudvari-Őr-halom and Kétegyháza-Kétegyházi-tanyák³⁸. Furthermore, they take an intermediate position between the much depleted $\delta^{18}\text{O}$ values from Sárretudvari-Őr-halom and the less depleted ones from the same site and from Kétegyháza-Kétegyházi-tanyák. In the light of this complemented data set, it can be assumed that the isotopic outliers from Sárretudvari-Őr-halom do not agree with the results from the selected Transylvanian sample sites. They exhibit much more radiogenic $^{87}\text{Sr}/^{86}\text{Sr}$ and marginally more depleted $\delta^{18}\text{O}$ values.

The two animals, one cattle from a Petreşti settlement and one cattle from a Coşofeni settlement, resulted in highly variable $^{87}\text{Sr}/^{86}\text{Sr}$ and $\delta^{18}\text{O}$ values. In addition, the Coşofeni cattle differed from the calculated "local" biologically available $^{87}\text{Sr}/^{86}\text{Sr}$ and "regional" $\delta^{18}\text{O}$ ranges. The question of why the cattle is an isotopic outlier can be approached by considering various aspects of the economy of the Coşofeni cultural communities, whose cultural remains are distributed in Transylvania and adjacent regions. The diversity of site locations,

³⁶ Pilot studies: Gerling *et alii* 2012a; Gerling *et alii* 2012b.

³⁷ Giblin 2009.

³⁸ Gerling, Ciugudean 2013, Figure 11.

the lowland, altitudes up to 1000 m and even rock shelters and caves, can be understood as hints to the presence of transhumant pastoralism.

In total, the data set is relatively consistent without large variability. The geographic locations of this investigated series suggest that most of the samples are the result of mixed signals from variations in the local geology and between water sources from the mountain watersheds and the mid-uplands or lowlands. The isotopic results point to small-range movements including the exploitation of different water and food sources within a specific distance from the sites. A human skeleton, Burial 3 in Burial Mound 1 from Meteş–La Meteşel, and the cattle from the Coțofeni settlement in Ampoița–La pietri, can be considered the only isotopic outliers. A hint at the use of various pastures and/or different herding practices is given by the clear variation between the two animals analysed from Ampoița–La pietri, despite both animals belonging to two different cultural settlements.

Furthermore, the isotopic outlier samples from Sárretudvari–Őr-halom on the eastern Alföld are in no clear accordance with the Transylvanian Livezile sample set. The data suggests that there was restricted or small-range mobility in the highlands of western Transylvania during the Early Bronze Age, and that different pastures or herding practices were used by chronologically similar cultural groups.

Discussion.

One of the crucial issues is the subsistence economy of the archaeological cultures that can be potentially associated with the Sárretudvari kurgan. In which cases can we speak of nomadism, semi-nomadism and transhumance³⁹?

A brief discussion of the original meaning of these terms seems in order at this point, together with an attempt to project the geographic, historic, ethnographic and anthropological record of the regions that can be regarded as the cradle or homeland of the period's archaeological cultures back to the respective period. Given that Yamnaya was an eastern, steppean culture, we shall proceed from the Eurasian steppe, but with a view to conditions in the Carpathian Basin because Yamnaya infiltration underwent a transformation during its assimilation to the local cultural milieu, until it was finally absorbed and disappeared. When constructing a model for the local cultures, I focused on the European archaeological record and, in particular, on the evidence from Hungary and Romania.

The Baden complex was engaged in arable farming to a moderate extent and in sheep and cattle raising, pursued extensively and intensively in wetland

³⁹ Koško, Kločko 1994.

areas, calling for mobility. The two leading animal species played an extraordinarily important role in rituals. The frequencies, the sexual and age groups, and the ritual functions of the animal species differed in Baden and Boleráz⁴⁰. The subsistence of the Coțofeni III and Makó cultures was similar in many respects, but in the lack of meticulously excavated and fully published sites, it is impossible to accurately pinpoint finer differences⁴¹.

Pastoralist stockbreeding is not an aimless roaming, but a regulated movement or an exchange of pastures between two populations with possibly different cultural orientations and lifeways, perhaps also speaking different tongues, of which mobility is an important element: in O. Lattimore's words, a "frontier history"⁴². The word nomad comes from Greek *νομή* meaning pasture and denoted peoples whose principal characteristic was the possession of pasturelands⁴³. The etymological relationship between *νομός*, "pasture", and *νόμος*, "law", is that they share the same root: both can be derived from the verb *νέμειν*, denoting the apportioning of pasturelands according to consensual agreement and law⁴⁴.

However, mobility is not the single, nor is it the most salient trait. Nomadism can involve different types of migratory movements: pasturing, migrating, fleeing, raiding and hunting. Hunter-gatherer groups and communities engaged in swidden farming are also mobile. Migration usually denotes the regular change of residence. In this sense, hunters, foragers, transhumants, merchants and itinerant craftsmen all pursue a mobile life-style. Migration can be cyclical, radiating or linear. Only the regular and periodic movement of communities practicing extensive stockbreeding can be regarded as nomadism⁴⁵. The pack animal of nomads is invariably the horse or the camel.

The distance between encampments varies according to environmental conditions, the composition of the herds, the degree of social organisation and the relative military strength of a given group⁴⁶. These are the very aspects that we are unable to examine in the case of the Yamnaya communities in Hungary, given the lack of assemblages with a secure context and other reliable data. The distances covered by mobile groups can range from 20–30 km to as much as 1500 km, depending on the environment, the composition of herds, the pack animals, the quality of the pastures and the nature of the social order. Large distances are usually covered by well-organised, warrior/merchant societies with

⁴⁰ Horváth 2012.

⁴¹ Ciugudean 2000; Dani 2005; Tóth 2003.

⁴² Lattimore 1951.

⁴³ Vass 1983.

⁴⁴ Benveniste 1969, I, p. 85.

⁴⁵ I. Ecsedy 1976, p. 136.

⁴⁶ Róna-Tas 1983, p. 53.

recourse to good pack animals (camels/horses) under poor climatic conditions, if powerful local societies impose strong constraints and/or if only poor pastures are available.

Neither of the above criteria can be demonstrated in the western Yamnaya branch. Significant differences can be noted between Yamnaya and the partially contemporaneous Catacomb population, and even within the same group occupying the same territory in Kalmykia, the secondary core territory of the eastern steppe that was vastly inferior to the primary core. While Yamnaya groups migrated along rivers, covering 40 to 50 km on the average, Catacomb communities moved along a north-west axis, travelling as much as 100–300 km between their winter and summer camps, and exploited the uplands, the high plateaus and dry grassy areas. Their long-distance trade networks were more substantial, they had larger herds, they pursued a more mobile life-style and had a much more differentiated society than the Yamnaya groups⁴⁷.

Five major types of nomadic economy can be distinguished in the Old World⁴⁸. Yamnaya more or less conforms to the third type, termed Eurasian nomadism, principally involving the raising of sheep flocks, with horse or cattle used as pack and transport animals, the latter especially in early times. As we have seen, Rassamakin regarded the label “nomadic” inadequate for the Yamnaya heartland and preferred to use “semi-nomadic” instead.

However, the term semi-nomadic is interpreted variously. S. I. Rudenko termed nomads without a permanent settlement as camping nomads and he distinguished two basic forms of semi-nomadism, which he called cyclical nomadism⁴⁹.

Most scholars regard semi-nomadism as pastoralism combined with arable farming, with herding performed by specialist herders instead of the entire community⁵⁰. Even when used accurately, the expression “semi-nomadic” tends to suggest a social and economic developmental phase, which represents a transition between migratory nomadic stockbreeding and food-producing economies practiced by sedentary communities.

Transhumance is often used as a synonym or to denote roughly similar subsistence practices, although in some cases, it is employed inaccurately. In the 19th century Latin usage, *transhumatio* denoted passage through fertile regions. In ethnographic studies, it originally designated vertical migration and herding in the coastal mountainous regions of Spain and, later, of Wales and Scotland; later still, it was generally used to describe relatively brief seasonal movement

⁴⁷ Shishlina 2001.

⁴⁸ Khazanov 1984.

⁴⁹ Rudenko 1969, p. 16-17.

⁵⁰ Matolcsi 1983, p. 302.

between lowland and upland pastures⁵¹. With time, ethnographers further refined the diverse types of the degenerate European migratory forms of pastoralism (e.g. *Alpwirtschaft*). One characteristic trait of late medieval transhumance in Europe was that the flocks and herds were accompanied by adult men only, while their families remained at home on the permanent settlement and cultivated the fields⁵². In Africa, for example, transhumance is practiced not only between lowlands and uplands, but also involves lateral movement: the abandonment of boggy areas infested with tsetse flies during the rainy season and migration to areas providing water and pastures in the dry season.

Mention must be made of another important circumstance: irrespective of whether war is regarded as a normal state of affairs in human societies, catastrophe situations caused by wars and nature are hardly positive in terms of human and animal survival. Stress can lead to tensions even in normal, peaceful nomadic societies, which, after a period of transhumance or transhumant drifting, precipitates what can best be described as an “organised berserkness” such as the several hundred years long Migration period in Eurasia, the jihad in the Arab world and the so-called charismatic movements in Africa⁵³. The tension caused by external stress – natural catastrophes, epidemics, drought or pressure from a stronger nomadic or agrarian society – threatening generally peaceful nomadic societies can lead to transhumant drifting, i.e. the lengthening or distortion of, or even a digression from the usual transhumance routes, or a shift in winter/summer or dry/wet season campsites.

It seems to me that the sporadic presence of the Coțofeni III culture in the Ér region in north-eastern Hungary was stress-induced: the few known pottery sherds of this culture were recovered from the earth of the kurgans⁵⁴. These cannot be associated with a specific archaeological feature or a particular individual/burial, but they certainly date from this period (most likely from the Copper Age/Bronze Age transition between 2800 and 2600 BC) and are usually recovered from these types of contexts (the earth of Yamnaya kurgans). The Coțofeni foray into Hungary did not involve the genuine extension of cultural boundaries or of permanent campsites, nor the arrival of larger Coțofeni groups; it can rather be conceptualised as a scanty presence, perhaps involving no more than a handful of pasturing events. It can perhaps be interpreted as a transhumant drift sparked by some stress factor that disrupted the normal course of life.

⁵¹ Forde 1934, p. 396.

⁵² Cs. Ecsedy 1983, p. 160.

⁵³ Cs. Ecsedy 1983, p. 163-166.

⁵⁴ From Level 6, a naturally formed soil layer between construction phases 2 and 3 at Hajdúnánás–Tedej-Lyukas-halom and from the fill of Grave 11 at Sárrétudvari–Ór-halom: Dani, Horváth 2012, p. 28, 44, Figure 14.3; Figure 31.2, see also Roman, Némethi 1978, p. 49-53.

The description of medieval Vlach herdsmen is very instructive in this respect. Only the information regarding the creation of permanent settlements of the Wallachian culture in the northern Carpathians and the sub-Carpathian regions is historically confirmed⁵⁵. One good complement to the historical record is the map showing the seasonal migratory routes of pastoralists and their range in the eastern and southern Carpathians and in the Bihar region, compiled by E. Petrovici (**Plates 3–5**). Two major patterns can be distinguished, which probably also affected the northern arc of the Carpathians, not shown on the map:

- (1) Shepherd seasonal migration routes always penetrate the Carpathian massif along river valleys as shown by the comparison of the routes linking the eastern Beskid Mountains with Moldavia and the Pontic Lowland, and the routes connecting the southern Carpathians with the Romanian Plain;
- (2) There is no route running along the entire massif or even along a specific section.

The longest routes shown on the map extend from the southern and eastern Carpathians to the Romanian Plain and the Black Sea coast, illustrating the movement of pastoralists and their flocks, a form of pastoralism known as transhumance. This involved an annual cycle of grazing: sheep spent the summer in the high mountains, "in the huts", and they were driven to the lowlands for wintering, where they moved from one pasture to the next. This type of pasturing requires virtually no storage fodder for sheep, but it can only be practiced in warm climates. Unlike in the case of genuine nomadism, flocks remained under the care of hired shepherds throughout the year, while the owners led sedentary lives, often without seeing their sheep for several years, as the shepherds organised pasturing in different regions of the Carpathian Mountains. The different forms of transhumance were adapted to existing conditions: in the towns, for example, which had clearings located below the summer pastures, the sheep were driven to these clearings in mid-September and driven to the lowlands in late October, when winter began in the mountains. They grazed there until January, and when snow fell in the lowlands, they returned to the clearings near the village. In April, they again moved to the lowlands to return to the "huts" in the mountains around mid-May. Transhumance was practiced mainly in the Balkans and in the eastern and southern Carpathians, whence shepherds and their flocks moved to the south, to the Romanian Plain and the Black Sea Lowland. Only from the Sibiu/Nagyszeben area in the southern Carpathians were sheep flocks driven to the northern side, across the Transylvanian Upland to the Someş/Szamos Valley and to the northern Alföld along the Someş, where the Someş flows into the

⁵⁵ Szantner 1997, p. 186.

Tisza at Vásárosnamény. A simple calculation shows that during the transhumance cycle lasting roughly three years, herders moved from the Balkan Peninsula to the northern part of the Carpathians, descending to the plains in winter and moving to the next mountain massif the next summer⁵⁶.

The nature of semi-nomadism and transhumance can thus be seen to share many similarities. In my view, the difference between the two is that semi-nomadism best describes groups that once pursued a genuine nomadic or near-nomadic life-style, but had abandoned nomadism and assimilated to sedentary life (such as Yamnaya in Hungary), while transhumance denotes a contrary process, the shift to non-intensive stockbreeding conducted on settlements by an originally sedentary population, which in addition to arable farming was also engaged in animal husbandry (such as the Boleráz, Baden, Kostolác, Coțofeni and Makó cultures). Another major difference between the two is that a semi-nomadic life-style affected the entire community, while transhumance was only practiced by adult males, perhaps the specialised herders of their society. Abundant evidence for prehistoric transhumance⁵⁷ has been reported from the lakeside settlements of the Circum-Alpine region. Interestingly enough, isotope analyses have furnished proof for transhumance in the case of Neolithic settlements that were earlier believed to represent textbook examples of classical arable farming, with intensive stockbreeding playing a subordinate role⁵⁸.

Conclusion.

It is virtually impossible to determine using a traditional archaeological approach whether the individuals buried under the Sárrétudvari kurgan (whose use-life spans several chronological and cultural horizons) were engaged in semi-nomadic subsistence, and were thus closer to early Yamnaya, or whether they practiced transhumance, representing a more sedentary, locally assimilated Yamnaya. The early burials lacking grave goods can perhaps be assigned to the former, while the graves with a rich array of grave goods to the latter.

At the same time, a regular, recurrent semi-nomadic or transhumant migration between Sárrétudvari and Livezile, and between the Sárrét region and the Apuseni Mountains can be excluded on the following grounds:

- The distance between the two regions is too great (roughly 200 km) and the period's Yamnaya communities in question were not engaged in horse breeding and did not pursue a mounted nomadic life-style;
- The age and sex of the individuals laid to rest under the Sárrétudvari kurgan (Grave 12: a 15–17-year-old female, considered already a woman in that age,

⁵⁶ Szantner 1997, p. 188.

⁵⁷ Called “shifting agriculture” by Pétrequin *et alii* 1998.

⁵⁸ cp. Bentley 2007; Price *et alii* 2006; Knipper 2009.

Grave 7a: a 5–7-year-old child) indicate that the entire community had participated in the migration, which is hardly typical for transhumants;

– The isotope values indicate that the child interred in Grave 7a was born locally, which again excludes a seasonal, annual or several years' long cycle of migration between the Sárret region and the Transylvanian mountains because the child had been born locally 5–7 years earlier and had lived there, even though he/she was the offspring of a population that had migrated there from the Transylvanian mountains (cp. the different isotope values of Grave 7);

– Finally, the geographic conditions in the Apuseni Mountains (the impassability between the two regions, the over 1800 m high peaks and the fact that none of the river valleys led to the Sárret region) exclude the possibility that the third burial horizon of Sárretudvari would represent a late Yamnaya population assimilated to the local Makó/Livezile culture that practiced transhumance according to a fixed pattern (perhaps seasonal or annual) between the Apuseni Mountains and the Sárret region in the Alföld (**Plates 4–5**). These individuals, identified as isotopic outliers, showed archaeological affinities with the Transylvanian Livezile group, thus in order to verify this potential association, six humans and two animals from four Transylvanian sites were selected for further isotope analyses⁵⁹. The isotopic outlier samples from Sárretudvari are in no clear accordance with the Transylvanian sample set.

Given the chronological, cultural, social, economic and geographic framework, the single realistic scenario is the immigration of a Yamnaya population from the Apuseni Mountains and its settlement in the Alföld. This population, already mixed with Catacomb elements in the Pontic, the original homeland, had assimilated to the Livezile groups and was further diluted by the local Makó population. If there was nomadic mobility in the Alföld, the western secondary Yamnaya homeland/distribution, it most likely followed the pattern in the eastern secondary homeland, a seasonal tethered mobility along watercourses with a range of no more than 50 km. The archaeological record indicates that a pattern of this type can be assumed between the kurgans of the Hajdúság and the Hortobágy regions, and between the Sárret and the Nagykunság regions⁶⁰, which is also supported by the palaeobotanical evidence.

The radiocarbon dates indicate that the three groups interring their deceased used the burial mound for some 850/460 years, although this use was not continuous (Grave 12/Grave 8; Grave 10; Graves 7, 7a, 9, 11). Only additional genetic analyses can clarify the relationship between the burials of the three construction phases. The stable isotope analyses have so far only indicated that the values of Graves 12, 8 and 10 as well as of the child burial (Grave 7a) of

⁵⁹ Gerling, Ciugudean 2013.

⁶⁰ Horváth 2011, p. 79-81; Dani, Horváth 2012, p. 61.

Phase III are quite close to each other, suggesting that they had lived their lives in the kurgan's broader area, while the isotope signatures of the other burials differ, although it remains unclear with which geographic region they can be associated (with Transylvania or with the Pontic). The possible kinship or direct or indirect relationship between them cannot be modelled from the currently available data: the association seems stronger between the first two phases, even if it cannot be securely confirmed, while any kinship-genetic relation with the third phase seems most unlikely. The several hundred years long use should thus be conceptualised as follows: the kurgan in the Sárrét region of the Alföld acted as the burial place of successive Yamnaya groups, although it is unclear whether they were locally descended from one another or whether they had different backgrounds.

Finally, a word of caution. The various archaeometric analytical procedures, in this case stable isotope analyses, must always be integrated into the archaeological record and assessed in combination with the archaeological evidence. No novel analytical procedure can be a substitute for the already existing corpus of knowledge accumulated by a given discipline, in this case, archaeology. And last, but certainly not least, we should have a good command of the basic analytical procedures of our own discipline and its published research findings.

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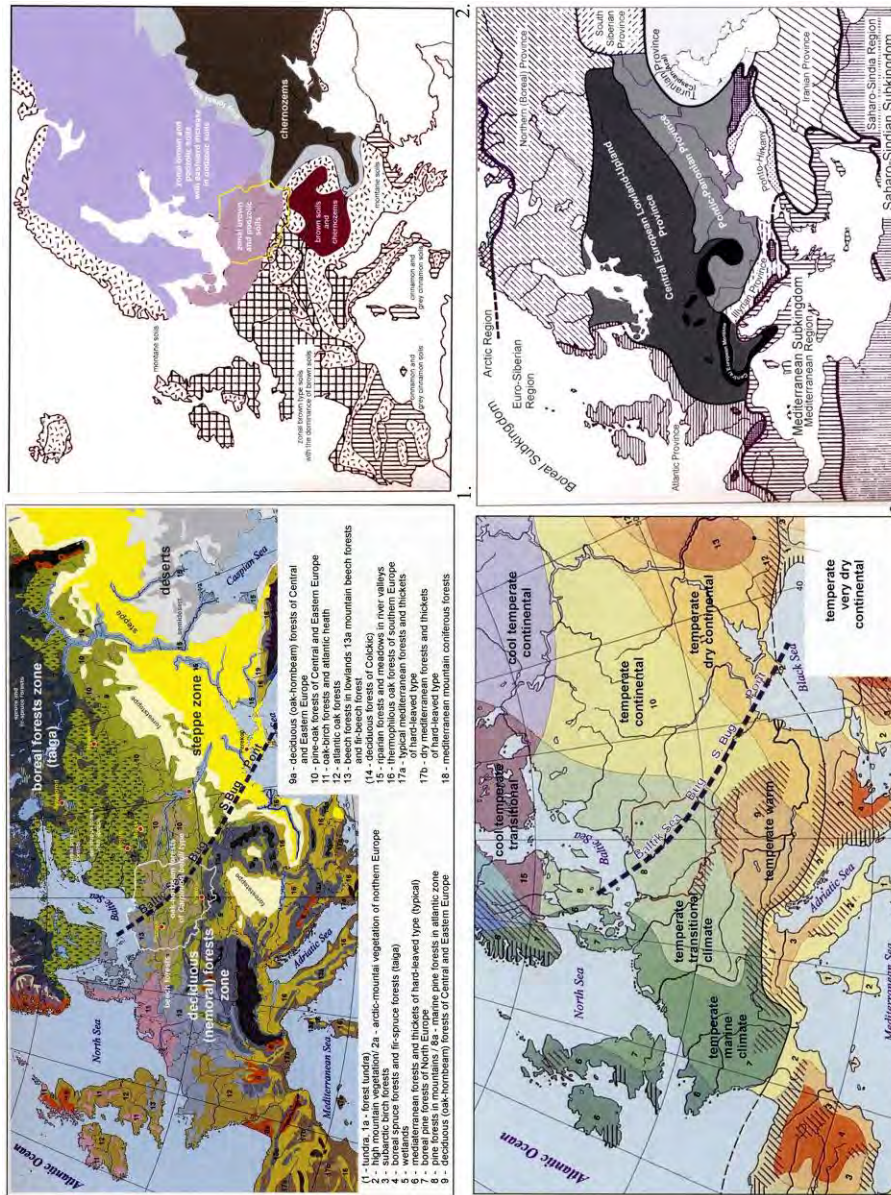
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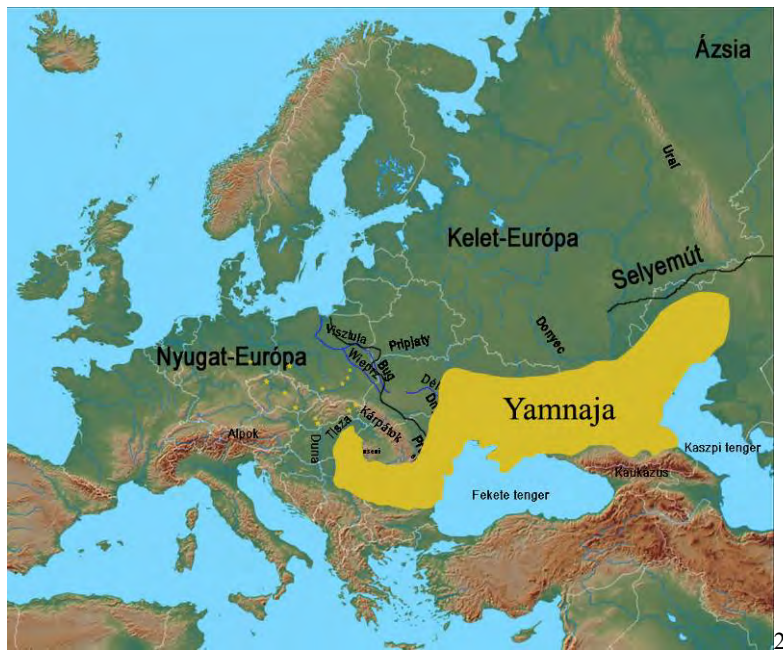
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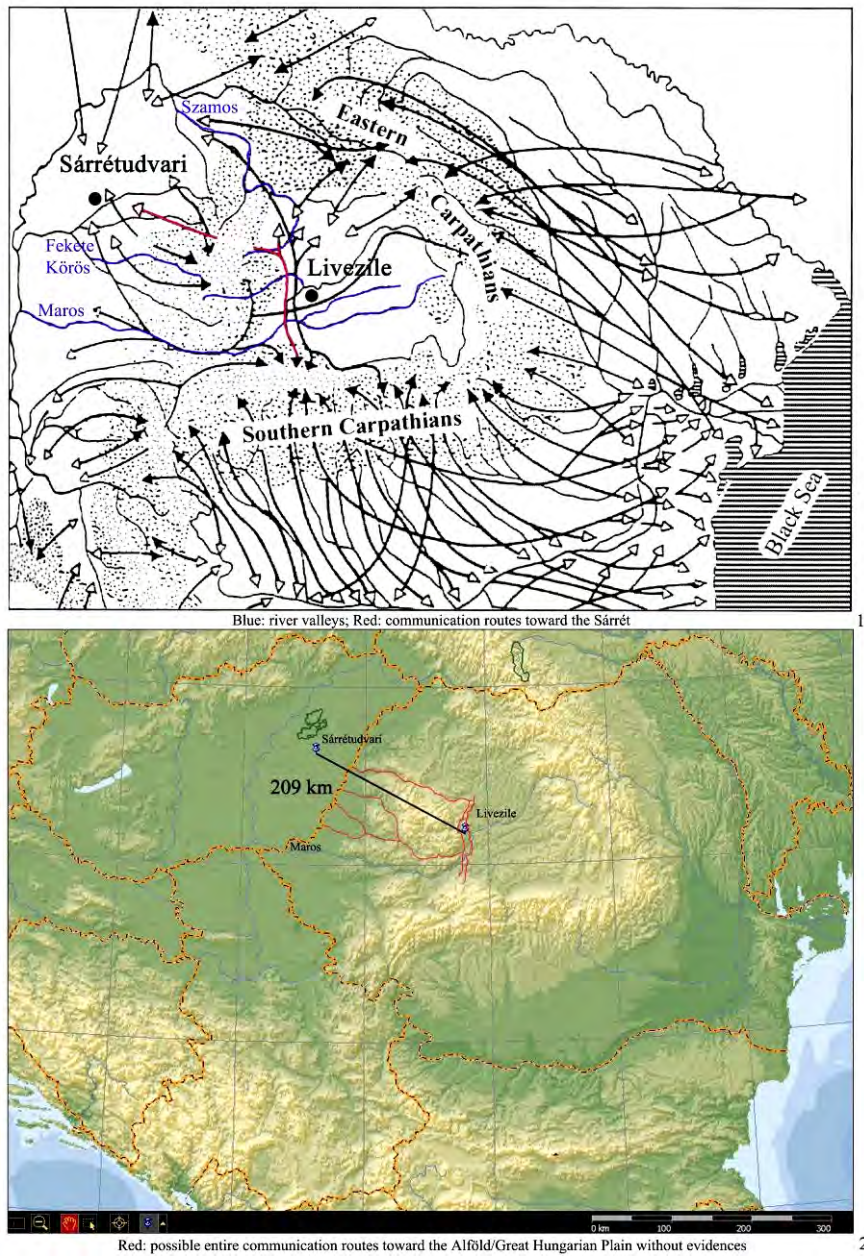
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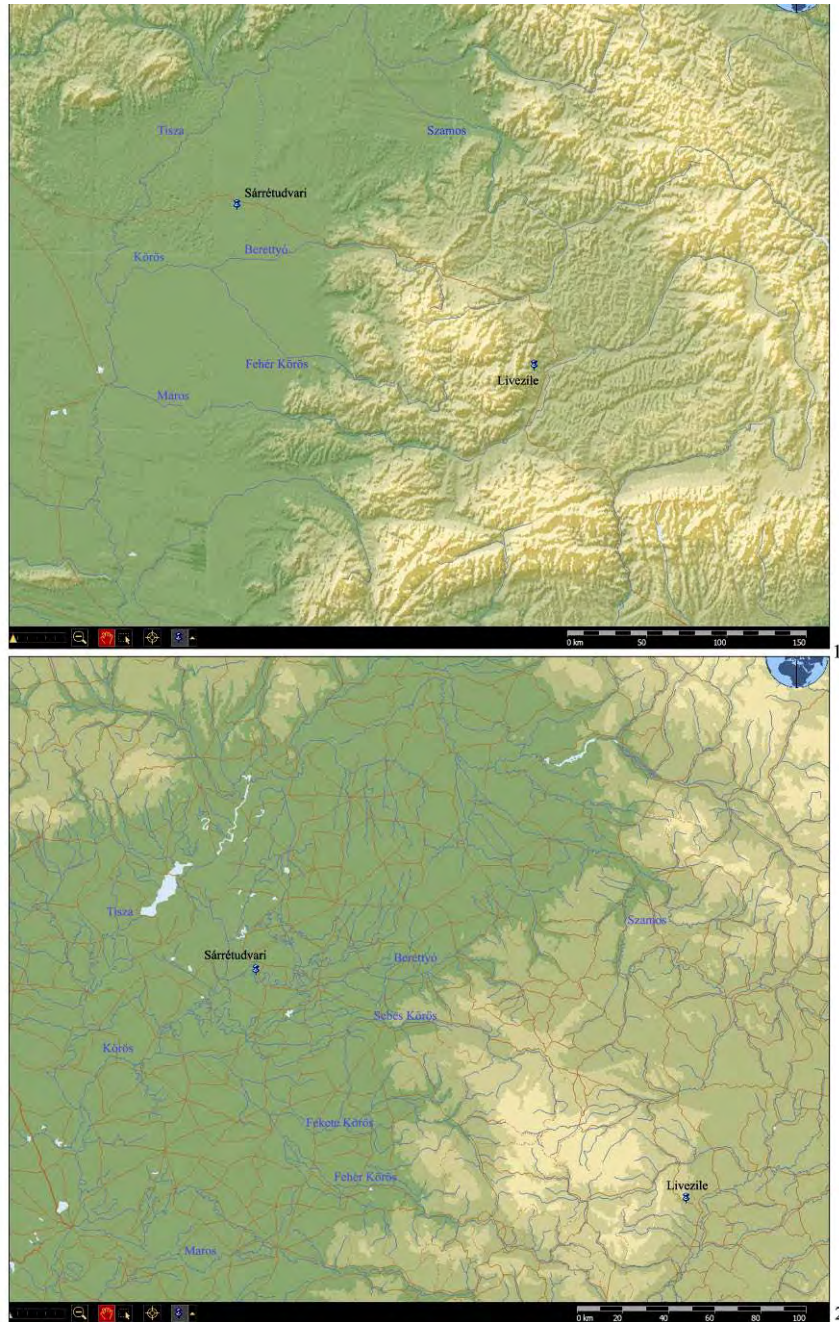
Pl. 1.1. Europe’s natural vegetation (after Makohonienko 2009, Fig. 2). 2. Bioclimatic and soil zones of Europe (after Makohonienko 2009, Fig. 11). 3. Climatic zones of Europe (after Makohonienko 2009, Fig. 9). 4. Geobotanical division of Europe, reflecting the affinity of floras (after Makohonienko 2009, Fig. 6).



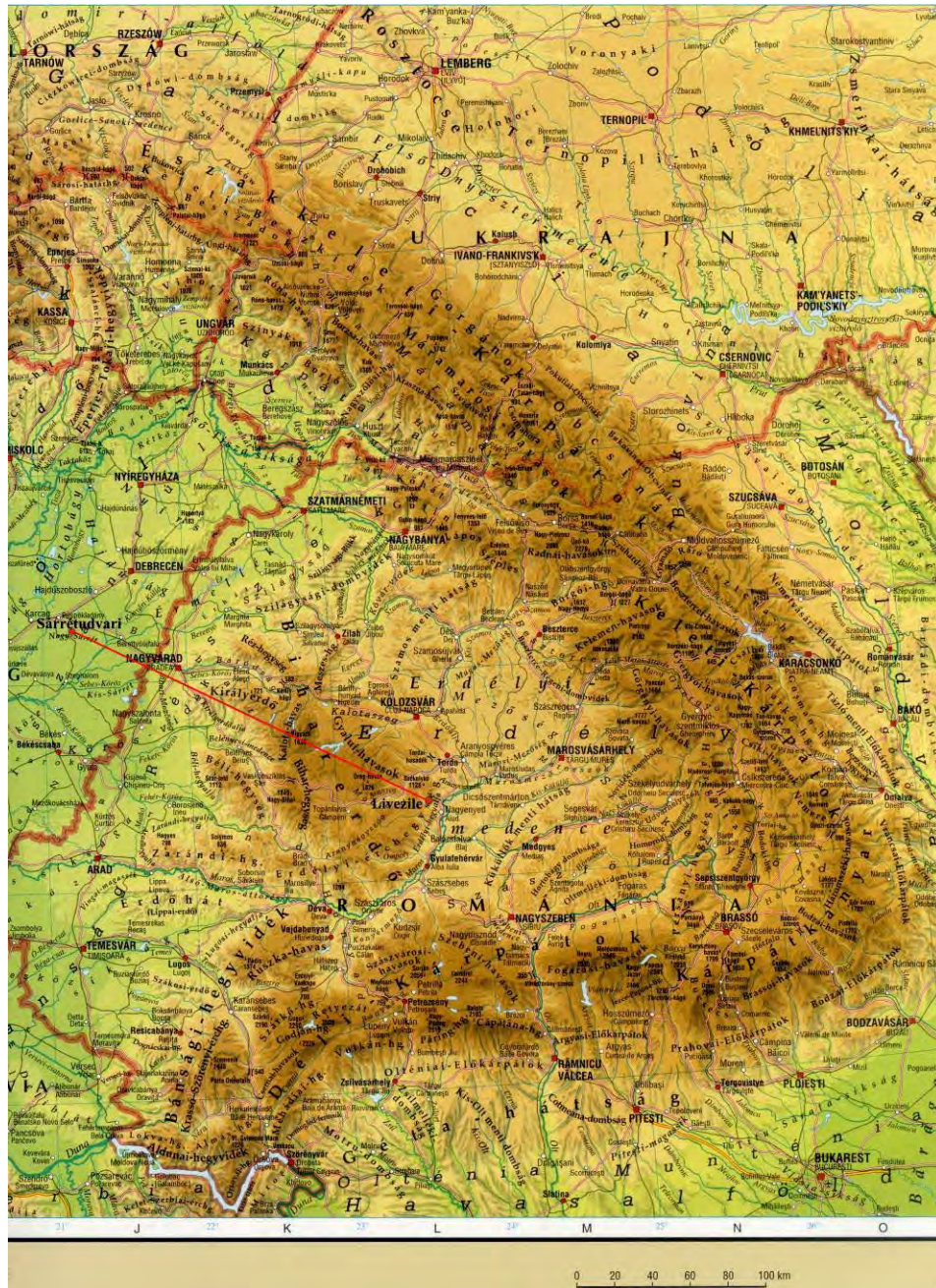
Pl. 2. 1. Europe. Major geographic regions mentioned in the text. 2. 2. Distribution of the Yamnaya communities.



Pl. 3. Transhumance routes between the two regions. 3.1. Routes used by Vlach shepherds (after Szantner 1997), with the rivers and the major communication routes highlighted with blue and red). 3.2. Possible, but unverified communication routes between the two regions, projected onto Szantner's map.



Pl. 4. Modern communication routes between the two regions (blue: rivers, brown: railway lines). Map 2 is at a higher resolution.



Pl. 5. Map showing the geographic regions discussed in the text.

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