A perspective on the secondary products revolution in Bulgaria

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Abstract: *I will review recent zooarchaeological work in Bulgaria for the Neolithic and Copper Age in order to investigate the Secondary Products Revolution. This is the first review of the zooarchaeology in Bulgaria focused on Secondary Products Revolution since (S. Bökönyi's 1974) seminal work in the eastern Balkans. Since then, excavations have generated a great deal of new material. Unfortunately, these data are all spread across the Balkans in different museums and institutions, making comparative work very difficult. Recently, I have been able to compile a catalogue of zooarchaeological material, by receiving reports from colleagues. These data will provide a new perspective on the changes in exploitation of domesticates that occurred between the Neolithic and Copper Age in Bulgaria.*

Rezumat: *Voi trece în revistă lucrările recente de zooarheologie din Bulgaria, pentru neolitic şi epoca cuprului, în scopul investigării revoluţiei produselor secundare. Aceasta este prima analiză a zooarheologiei din Bulgaria concentrată pe revoluţia produselor secundare de la (S. Bökönyi 1974) lucrarea embrionară pentru estul Balcanilor. De atunci, săpăturile au generat o cantitate însemnată de material nou. Din nefericire, aceste date sunt răspândite de-a lungul Balcanilor în diferite muzee şi instituţii, făcând studiile comparative foarte dificil de realizat. Recent, am putut alcătui un catalog al materialului zooarheologic, pe baza rapoartelor primite de la colegi. Aceste date vor oferi o nouă perspectivă asupra schimbărilor în exploatarea animalelor domestice care au apărut între neolitic şi epoca cuprului în Bulgaria.*

Keywords: *Bulgaria, secondary products revolution, Neolithic, Copper Age.*

Cuvinte cheie: *Bulgaria, revoluţia produselor secundare, neolitic, epoca cuprului.*

◈ Introduction

In the years 2000-2002 Copenhagen University with Bulgarian institutions, conducted a joint project, which primarily led to several seasons of excavations at the Copper Age site Liga, Karanovo culture, dated to ca. 5000 BC, at Telish in Northwest Bulgaria, Nr 1. on the map (fig. 2). The author has determined animal bones from the site. The site is synchronous with the time of Andrew Sherratt's secondary products revolution model (SPR), but unfortunately the SPR has not yet been researched in Bulgaria. This is the first review of the SPR in Bulgaria. In order to do that I go through the results from Telish and then review and compare with animal bone finds from Neolithic- and Copper Age sites in Bulgaria.

The site is situated on a hill with good view over the countryside. On a clear day you can see all the way to the Danube which runs 40 km north-of-here, and towards south another passage carved through the mountains, by the river Iskar, which connects this region with Sofia and central Bulgaria. As well as Iskar the Balkan rivers provided corridors and footpaths crisscrossing the Balkan Mountains. In the Early Neolithic, 6500 BC, rivers function as links in the network connecting settlements in the various regions. In Bulgaria and the Balkan Neolithic settlements are called tell. Tell-layers are accumulated by series of cluster-built wattle and daub-built houses. In Bulgaria tells lie on hills, banks and promontories in the inland floodplains, near water resources, and with good access to as many different natural-resources as possible. These settlements and its artifacts defines the largest and best known cultural complex of the Neolithic until the Early Bronze Age, of Bulgaria, known as the Karanovo culture, named after a large tell in the center of Bulgaria. The Karanovo culture largely covers the eastern Balkans, extending from the Iron Gates in the northwest to the isthmus immediately to the west of Istanbul in the southeast, and from the Aegean coast to the foothills of the Carpathians in southern Romania. Karanovo frames the main Neolithic chronology for Bulgaria, and partly the neighbouring regions, with a total of 7 horizons from the Early Neolithic to Early Bronze Age (fig. 1).

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◈ The missing secondary products revolution in Bulgaria

Since World War II there have been many studies of animal bones, but the publication of this group is scattered across museums and institutions throughout the Balkans. The only overview of the Balkans have been assembled and systematized by (S. Bökönyi 1974). He was among the first who developed a method for comparing animal bone finds from several sites with known chronology, and on this basis describe a history of domesticated animals, and finally give a statement about subsistence strategies in a region. Unfortunately Bökönyi's example of describing subsistence in a region, have rarely been pursued in the eastern Balkans, typically only species lists have been provided. One of the first views of the Balkans and subsistence strategies is in articles by Andrew Sherratt from the early 1980's (A. Sherratt 1981, 1982, 1983). He introduced an explanatory model called "The Secondary Products Revolution," which sought to explain a revolution in agriculture and a wave of innovations that can be found in South East Europe around the end of the fourth millennium BC. Here he had tracked structural changes in agriculture and in the settlements (getting barns and stables), and a new exploitation of domesticated animals to deliver, the so-called secondary products. These are characterized as durable and repeatable resources from livestock, i.e. milk products from cattle, sheep/goat, wool from sheep, traction and transport with oxen and manure (A. Sherratt 1981, p. 159). In the common archaeological agenda the accepted route of innovations, including the SPR, came from the Near East through the Balkans then spread to the rest of the European continent. As such SPR has achieved great influence in various archaeological contexts and theories. Strictly following this route Bulgaria is one of the first countries, where the SPR, as well as other innovations must have appeared first. The archaeological record of Bulgaria has long time been known and available to western scholars through the work of Bulgarian archaeologist, mainly publishing in German language periodicals, monographs etc. until the 1990's. Especially, also because of the famous Varna necropolis discovered in 1972. Even the archaeological record of the region was known given the work of the British Academy in the 1970's (R. Dennell 1978). One must bear in mind that there was relatively little communication between Bulgarian and western researchers until the early 1990's due to political reasons. From then on bulgarian archaeology expanded with more publications in foreign languages. Among these are the newest overviews on zooarchaeology and the Neolithic period in Bulgaria (H. Manhart 1998) and (N. Benecke, L. Ninov 2002).

Looking Sherratts material and his literature through, it turns out his material generally comes from Late Neolithic sites in Hungary, as well as finds from Near Eastern Bronze Age cultures. An advocate of Sherratts theories is Greenfield, who from the 1980's conducted a gigantic work of systematic studies on zooarchaeological data from the central Balkan region; Macedonia, Serbia and Romania (J. Chapman 1982; H. Greenfield 1986, 1988, 1989, 2005, 2010; H. Greenfield, K. Fowler 2005; E. Kotjabopoulou 2003). The central Balkan region is much better known to western researchers and is not treated here (E.J. Reitz, E.S. Wing 1999). Sherratt and Greenfield have been criticized for the SPR, by for example J. Chapman (1982) and A. Clason (H. Greenfield 1988, p. 588 comments). Agreeing or not to their views on SPR, it appears that neither of the critics, had attention to the fact that western scholars have not yet studied Bulgaria. Surprisingly there is very little discussion of the SPR in Bulgaria. This is despite the fact that there is a network of zooarchaeologists in the Balkans, which since 1980's have studied and published animal bones. I've been lucky that colleagues from the zooarchaeological network have kindly sent me articles so that everything could be assembled. A lot has been said about archaeology in Bulgaria; but what has actually been done towards the SPR to investigate it and what the status is. This paper represents the first evaluation of the SPR model with zooarchaeological data from Bulgaria. I will show there are at least 25 newer sites, in Bulgaria (fig. 2), which have been examined since Bökönyi's work in 1974, but not included in the Secondary Products Revolution model.

◈ From The Iron Gate to Istanbul – data and sites in Bulgaria

In this paper I will describe sites beginning with Telish in Northwestern Bulgaria. First I will briefly summarize the bone finds at Telish, and then I compare to other sites in the following. Telish covers in many ways a gap of archaeological investigations for Northwestern Bulgaria, this region have not been intensely investigated. The region is also interesting from a zooarchaeological perspective because it is relatively near to the Serbian sites and to the newly investigated (multi-sites-projects) in southwestern Romania (A. Bălăşescu *et alii* 2003, 2005). The results of the animal bone determination at Telish have already been published (J. Østergaard 2005). In connection with my

dissertation in 2009, at Copenhagen University, additional results have been worked out, and the site was compared to other Copper Age sites in Bulgaria as well. The dissertation also discussed the Secondary Products Revolution in Bulgaria, a short version is published in Danish (J. Østergaard 2010).

Bones from the Late Copper Age site Telish was severely fragmented. Animal bones were determined and analyzed according to standard zooarchaeological methods and procedures. Originally I tried to borrow animal bones to study them in the comparative collection at the Zoological Museum Copenhagen, but lending was denied from the Bulgarian side. Studies and comparisons with animal bones in the comparative collection would otherwise have secured the best possible determination of animal bone finds. The bones were analyzed synchronously with the excavations in order to monitor and record their findings relative, conservation and context. The location of every bone location was measured, and registered in the field plans, and it can be demonstrated that the majority of animal bones have been deposited in two main waste pits between two of the houses. By working at the site, it was also easier to detect and monitor recent damage from digging tools, drying and transport. At excavations, I have experienced that it is common that you deposit bones in a pile on the ground, where they unfortunately dry and multi-fragment. To avoid this I instructed the excavators to immediately store animal bones in bags and kept in shade. Early in the project excavators and students were taught in animal bones, this resulted in a multiplication of the finds. Animal bone finds were coded into an Access database that forms the basis for presenting the results in the form of tables, statistics, etc. over the finds. The possibility of age determination on teeth and jaws were excluded, as I could not borrow animal bones to a comparative collection. It was only possible to do age determination using post-cranial age. Age determination are therefore tentative and with precaution. Each bone is determined and measured when possible using standard methods (A. Driesch 1976). There could be not made enough measurements, due to the high fragmentation, to make signical statements about the size and gender differences. It must be noted that generally on a site, the size of Telish only up to 600 bones are normally retrieved, if one follows the standard procedures. This stands in contrast to the 4820 fragments retrieved at Telish.

Of the 4820 fragments, a portion 2796 was damaged in varying degrees during the excavation. 2024 is preserved. 1382 bones are fragmented in prehistoric times, to this must also be added 129 bone fragments coming from various types of activity at the site. It is, for example fragments of bone-tools, parts of bone-figurines, burnt bone (from cooking) and copper-patinated. These bone fragments, with activity traces, represents 2.7% of the 4820 animal bone fragments, and it contributes to the total activity picture. These traces were also used as clues during the excavation. Animal bones function, in this case, as environmental indicators of the surrounding soil. Bones absorbs color from the surrounding soil and were yellowish-brown all over the place. Except 3 animal bone fragments that had copper-patina; it made us aware, it could come from nearby copper objects. They were found near grave 1, a burial of a child, on the "nasal"-bone there were also traces of copper patina (I. Merkyte *et alii* 2005, p. 140). Animal bone fragments were counted to give a relative estimate of how many species and individuals, the bones represent. In the absence of a comparative collection I've basically tried to follow the counting methods and discussions of these in (P. Halstead 1981; D. Grayson 1981). Of the 4820 fragments it was possible to determine 716 to species, using Number of Identified Specimens (NISP). This gives only the number of fragments that could be determined for bone types and species. To get the most probable minimum number of individuals (MNI), I have sorted the fragments, using the database. And I want to emphasize that the figures are given with caution, especially because I could not get access to a comparative collection. Using this it gives a total of 164 individuals; 36 cattle, 94 sheep/goat, 17 pig, 7 dog and 24 wild/hunted animals. This corresponds to a distribution of domesticated animals and hunted animals around 87:13%. This result is consistent with what is typical for Copper Age. Out of these bones only very few remain to estimate age distribution. Based on the very little sum, I suggest with precaution, that the site had an economy with a little group of domesticated animals, cattle, sheep/goat, yielding secondary products. The remaining domesticated animals have been providers of meat.

This leads us to compare with other sites in Bulgaria and the Balkans. It is interesting to go beyond the horizon by Telish and compare animal bone finds from other sites. The newliest investigated site, Redutite, a neighbor of Telish, also dated to Copper Age, excavated in the 1990's, had 6000 animal bone fragments, but they were shortly surveyed, and unfortunately the animal bones were discarded so there is no possibility of a revisit. G. Ribarov and S. Boev were offered little time to investigate around 6000 fragments of animal bones (G. Ribarov, S. Boev 1997). They describe the finds, and due to the limitations of the investigation it was not possible to produce tables or statistics.

The Redutite results are published in a natural history periodical, not in the archaeological periodicals. They conclude that pig was the main provider of meat, and sheep/goat were exploited for milk and perhaps meat. Cattle are not mentioned. Interestingly, some bones are believed to be from horse, but only one of them was taken to a comparative collection in Russia and determined to horse. The problem of early horse is not treated here, but they are known from late Copper Age and certainly early Bronze Age (H. Manhart 1998). In northwestern Bulgaria only few other sites have been examined and published with zooarchaeological investigations. The four of them were investigated in the 1970's by Vasilev (1978): Gradeshnitza-Malo Pole (N=number of fragments) (N=540), Gradeshnitza-Lukanovo-Durvo (N=146), Brenitza-Lukata (N=213), Krivodol (N=485). All of them have fewer than 600 animal bone finds, Vasilev examined them briefly in the 1970's, and he gives little information about methods and chronology.

Karanovo is among the biggest and most examined tells in the Balkans and has a long and unique sequence of horizons, but so far only three systematic investigations of animal bone finds. The newest by Lazar Ninov, who determined (N=2656) bones, from "kvadrant 19 O", dated Karanovo III-IV (L. Ninov 2002). In a chronological perspective Ninov's determinations supplements the determinations on elder horizons, Karanovo I and II, (N= 4688 and 4091), by (S. Bökönyi, L. Bartosiewicz 1992). Ninov's work on Karanovo is one of the first examples of description of methods, including age determination (L. Ninov 2002). Similar long sequences of horizons can also be found at the main Drama tell, and several smaller tells nearby. These settlements are in the same river rich environment, as at Karanovo, also in the Thracian plain. Animal bones from Drama tell were determined by S. (Bökönyi 1989) and (N. Benecke 2003). In Southeastern Bulgaria, the Early Neolithic, Karanovo I-II, Okracna Bolnitsa tell, was excavated in 1975. Luckily the bones (N=2200), were stored, and recently analyzed by (N. Benecke 2005). Okracna Bolnitsa bones are highly fragmented, coming from waste connected to kitchen and slaughtering. Bones have been determined on age-classes as well, using teeth-and-jaws and also post-cranial methods. N. Benecke says it is primarily meat-strategy but doesn't exclude the possibility of milking.

The Early Neolithic Kovacevo (N=945) is near the Struma river in Southwestern Bulgaria, has a high content of sheep/goat bones 53%, thereby resembling the Greek sites (L. Ninov 1990). In the same valley many smaller sites have been detected by reconnaissance. The Struma river valley ends up in the floodplain near Thessaloniki, a region that has many Neolithic sites. I think that Kovacevo material demonstrates that the shepherds stayed with their sheep/goat herds here, traded animals, and followed the river valleys as corridors where animals were driven. I consider this livestock imports as part of a network that may be viewed on equal footing with the other proven networks like exchange and importation of flint, pottery and other artifacts. In several areas of Bulgaria one can today see herders drive their sheep/goats- and herds of cattle from pasture to pasture.

Goljamo-Delchevo and Ovcharovo, in central Bulgaria, are examples of bigger and more systematic examinations of animal bones, made by I. Ivanov, V. Vasilev (1975) and V. Vasilev (1978). These were in connection with large-scale projects on Neolithic and Copper Age settlements in the early 1970's lead by Henrieta Todorova (H. Todorova 1978). The main focus of Todorova's investigations here was to clarify the formation and expansion of tells in this region that increased by the Copper Age. Despite the potential of the sites for investigating subsistence strategies, and good preservation of animal bones, only species determinations have been done. Ovcharovo (N=28946) has been investigated by V. Vasilev a couple of times (V. Vasilev 1978, 1983) and L. Ninov (1985) and is dated Copper Age, 4400-4000 B.C. I have received a summary by L. Ninov, and personal comments, which covers the unavailable publication by (V. Vasilev 1985). Ovcharovo animal bones are in fact from the entire Copper Age, among those, 2936 could be determined to species and number of individuals, making 27 species. Unfortunately there are no mentions of subsistence. Near Ovcharovo is Ovcharovo-Gorata, dated Early Neolithic, Karanovo II. Excavated in 1971-74 under leadership of Henrieta Todorova, animal bones determined by G. Nobis (N=2191). The animal bones come mainly from pits, profiles and also from the 3-horizons excavated on the entire tell. Of the 2191 fragments around the half, 1251 was determined to species level. In the publication G. Nobis claims that milking and traction could have occurred (G. Nobis 1986, p. 3). He argues this based on, age determinations using postcranial and teeth-ageing methods, on 41 cattle samples of which 12 individuals should be older than 8 years. I think it is unlikely, because such a find is sensational for the early Neolithic. He had only few determinations on age classes. Also, considering the high fragmentation and retrieval methods, the number of bones remaining for any age determination is rather few.

Chavdar (N=389) and Kazanluk (N=753), in central Bulgaria, near Stara Planina mountains, with Neolithic material determined by (R. Dennell 1978). However it was the only detailed publication

of zooarchaeological Bulgarian material available before the 1990's. R. Dennell investigates the problem of the SPR, but he says there are only few indications for it in the scarce bone samples. Though he says "we shall ignore for the present the roles of secondary animal products,…" (R. Dennell 1978, p. 110). He concludes that SPR can not be rejected, and discusses indirect evidence for SPR, using calculations that demonstrate ample supplies of winter food.

Durankulak in northeastern Bulgaria has been investigated several times, but the (first)wave of zooarchaeological investigations by G. Nobis and L. Ninov in the 1980's are unpublished (N. Benecke, L. Ninov 2002, p. 560). Newer investigations are published by H. Manhart, who worked on the site in early 1990's (H. Manhart 1998, p. 27-48, 253).

Jasatepe, near Plovdiv (N = 2869) is one of the earliest known examples of published zooarchaeology in Bulgaria, worked and published by Ivanov in 1959; the publication is inaccessible and information is from (H. Manhart 1998, p. 11 and Benecke, Ninov 2002, p. 563f.) the site is dated Karanovo II-III early Neolithic to middle Neolithic, excavated in the 1950's.

Poljanitsa at Targoviste, Northeast Bulgaria. The site has the highest number of animal bones in the region, (N=40593) dated Copper Age. The animal bone analyses are made by Bökönyi in 1988 and published in Hungarian, the publication is unavailable and information is from (H. Manhart 1998) who gives information on number of finds and chronology. Benecke argues that the increasing age and number of cattle is related to milking (N. Benecke 1994, p. 133). There is two Podgoritsa sites, near Targoviste, Northeast Bulgaria, both named after the nearby village Podgoritsa. Podgoritsa 1 (N=3489) is dated middle Neolithic, Karanovo III. Examined by Nobis but unpublished, excavations led by Henrieta Todorova in the 1970's. (H. Manhart 1998; N. Benecke, L. Ninov 2002). Podgoritsa 2 (N=unknown number of bones) a Copper Age site investigated by a team of Ruth Tringham and Douglas Bailey (D.W. Bailey *et alii* 1998). Podgoritsa 2 is a relatively smaller tell, compared to the giant tells in middle Bulgaria. Tringham and Bailey's teams had initiated a long time project, but were unfortunately forced to stop after one season of work, because of disagreements with local authorities. Despite the termination of the project, the site has some interesting notes and potentials. In the vicinity of the site were made systematic sondages, revealing traces of structures, which according to R. Tringham and D.W. Bailey can be interpreted as related to keeping domesticated animals in pens. The site is the only one excavated in recent time, compared to the grand scale projects in the region in the 1970's run by Henrieta Todorova. In these grand scale projects sites are only excavated and examined "inside the site", there are no surveys or probing in the vicinity of the sites. Another feature is also interesting for the region, if one combines the "nearest" investigations at Ovcarovo-gorata and Poljanitsa by different zooarchaeologists. The smaller sites in the region might reflect a subsistence strategy adapted to the drier environment with fewer water resources focused on mobile animals, sheep and goat, as suggested for similar regions in northern Greece.

◈ Conclusion

Multiple artifacts can be related to secondary products, but they have not been studied systematically in the Balkans. Weaving weights and spindle-whorls occur in the Middle Neolithic contexts, but increases in the Late Neolithic. They occur all over the Balkans and can be seen in several excavation publications. On some of the sites in Bulgaria there have been found figurines depicting animals. Some are abstract while others clearly shows a deer, and others show various domesticated animals. Bone tools come mostly from livestock in the Neolithic. Many of them come from animals whose age entitles them to be placed in the category of secondary products. This can also be seen in several excavation publications. Another object type that is related to secondary products is straining vessels. Bogucki has investigated sites from the loess belt (P. Bogucki 1988, p. 16, fig. 1.5). He and several others have proposed a refinement of the milk to cheese, through straining vessels, which is widely increasing in numbers in the Copper Age. But P. Bogucki also presents the same straining vessel-type from the early Neolithic of sites in the loess belt (P. Bogucki 1988, p. 89-90), and he believes that dairy products also occurs in early Neolithic. Trace studies on organic residues on ceramics found, mainly in England and France, has shown milk substances from Early Neolithic contexts (O. Craig 2002; O. Craig *et alii* 2003; D. Helmer, J.-D. Vigne 2007). Milky substances are demonstrated both in Near East and Europe, yet they are not detected until the sixth millennium.

Surveys in the heights have for Greece produced various sites, as well as along the Adriatic coast; these are caves and shelters, and smaller sites located near water resources and grazing land

for animals (M. Johnson 1996; S. Forenbaher, P.T. Miracle 2005). The caves contained animal bones, most of who are from sheep/goat (P. Rowley-Conwy 2000). The phenomenon of the caves as shelter for livestock is an otherwise ignored phenomenon that first emerged in recent time surveys. In the past decade, plant remnants in the Balkans, have also been studied, the results demonstrate transhumance from Copper Age (W.J. Eastwood 2004). There is some evidence in Northeastern Bulgaria, from the Koprivec site, dated Copper Age and examined by H. Manhart. This showed that pigs are rarer than usual, and H. Manhart assumes it is due to practical reasons: you could easily move around, with sheep and goats. The site H. Manhart investigated is one of many Copper Age sites in the area. This part of Bulgaria was first settled intensively in the Copper Age, and many of the sites are small. Unfortunately, there are few recent studies from the region. I also think it is worth examining whether the animal bones from these sites actually reflects a strategy that fits this dry landscape, comparable to the Greek composition, mostly sheep/goat.

Hunting proves to have a more complex picture than previously assumed; especially in southern Romania. Along the banks of the Danube have been demonstrated very large differences due to the large variation in environments. In the Copper Age and Early Bronze Age hunting pressure increases dramatically, and in certain parts of the Balkans, it is especially deer, which is the most common game animals. In Hungary and parts of Serbia it was the aurochs, which was the most hunted. To the northeast of Bulgaria (and Redutite) wild horse is a favorite prey.

Telish has a good location with regard to water resources. Site is near a source, as well as wetlands, and has good grazing, which also exploited by today's shepherds who daily drive their sheep and goats on a nearby pasture. Basically, it is tempting to assume that such was the case in Copper Ages Telish. But when one looks at animal bone composition and landscape, a different picture emerge. There is actually a mosaic of different landscapes around Telish. For example, close to Telish are good opportunities for grazing in the lowlands. The ample water resources and meadow environment can provide more fodder for cattle and pigs, which is also reflected in the animal bones. Telish is also located on the route of the modern shepherds, but this is not reflected in animal bones. Telish is a small site but it have not the character of mobility, as seen in the other Copper Age (small) sites in northeastern Bulgaria. With mobility, mobile animals such as sheep and goats would have made the majority in the livestock composition. Although Telish is a small site, and should be assumed mobile in nature, it imitated the large sites, because of ample water resources. Compared to central and northern Europe, the Balkans, have the potential to exploit several more different habitats because of the climate. In the mild winters in the southern Balkans domesticated animals didn’t had to be kept in stables. Stables are an important structural ingredient in SPR, but they are not found in the archaeological record in the southern Balkans. Such structures are not appearing until Hungary. Animal bone studies, new methods and results over the past 20 years shows that the Balkans can be divided into regions and that there are different potentials in landscapes that were utilized for livestock. By comparing the many sites it can be seen that there is a great similarity in the composition of livestock over large areas in the Balkans, both in the early Neolithic and Copper Age. I am of the opinion that the SPR can be traced back in time prior to the Copper Age. I hope I have give an idea of what possibilities lie in reviewing sites for animal bones, and have demonstrated the potential of such sites have to show the differences in landscape use, and differences between regions.

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Bulgarian Periodization/BC cal		**Western Bulgaria**	**Central Balkans (Serbia)**	**Thrace (Bulgaria)**	**Thessaly (Greece)**	**Middle Danube Basin**
BRONZE AGE	EARLY 2600/2500	Măgura-Coţofeni Orlea-Sadovec	Vucedol Coţofeni-Kostolac Cernavoda III	Ezero	Early Thessalian	Mako Baden
TRANSITIONAL PERIOD	3300/3200	Galatin	Bubanj-Hum Ib	?	Rachmani (FN 5)	Boleraz Baleton Bodrog-kereztur
COPPER AGE	LATE 4000/2900	KSB Ia	KSB Ib Vinca D	KGK VI (Karanovo VI)	?	Tiszapolgar / Lengyel
	MIDDLE 4550/4400	Dyakovo	Vinca C Vinca B2/C	Marica IV		Lengyel / Tisza
	EARLY 4900/4850 4600/4550	Gradeshnica / Dikili Tash-Slationo		Marica I-III (Karanovo V)	Classical Dimini	

(4500 - 4000 BC) Karanovo VI = Middle to Late Copper Age
(5000 - 4500 BC) Karanovo V = Early Copper Age
(5200 - 5000 BC) Karanovo IV = Late Neolithic
(5500 – 5200 BC) Karanovo III = Middle Neolithic
(6500 - 5500 BC) Karanovo I-II = Early Neolithic

Fig. 1. Comparative chronology for Bulgaria and eastern Balkans. Acronyms: KSB – the Krivodol-Salcutsa-Bubanj Hum cultural complex, KGK – Kodjadermen-Gumelnitsa-Karanovo cultural complex (redrawn after I. Merkyte *et alii* 2005, fig. I.6., p. 16 and fig XII, 2, p. 157; text below table added by author).
Cronologie relativă a Bulgariei şi a Balcanilor de est. Legendă: KSB – complexul cultural Krivodol-Salcuţa-Bubanj Hum, KGK – complexul cultural Kodjadermen-Gumelniţa-Karanovo (după I. Merkyte *et alii* 2005, fig. I.6., p. 16 şi fig XII, 2, p. 157; textul de sub tabel adăugat de autor).

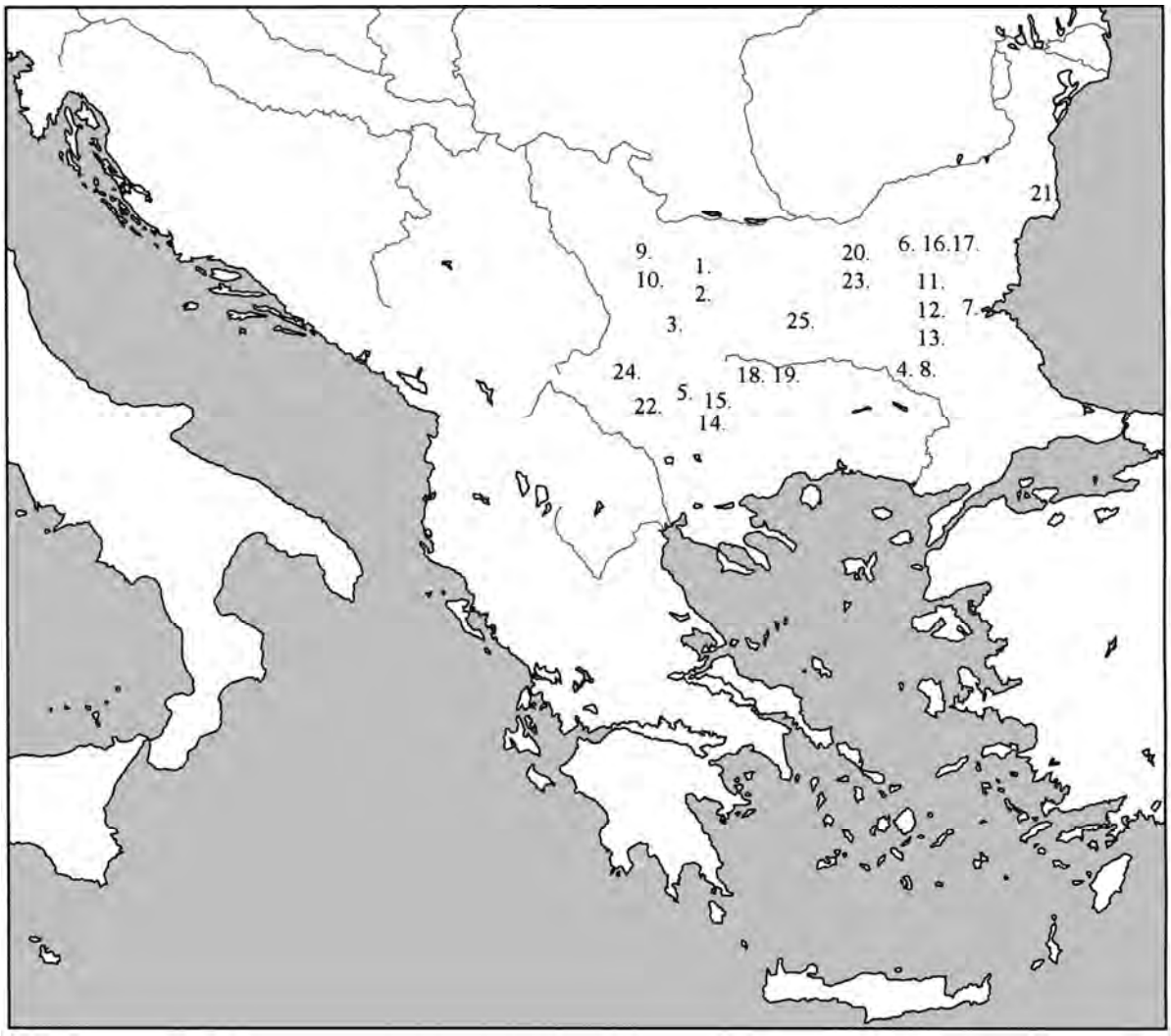

Fig. 2. Sites mentioned in the article. 1 Telish, 2 Redutite, 3 Sofia-Slatina, 4 Karanovo, 5 Vaksevo, 6 Ovcarovo Gorata, 7 Goljamo Delcevo, 8 Drama, 9 Gradeshnitsa , 10 Krivodol, 11 Ovcarovo, 12 Vinitsa, 13 Ezero, 14 Kovacevo, 15 Rakitovo, 16 Poljanitsa, 17 Podgoritsa, 18 Jasatepe, 19 Okracna Bolnitsa, 20 Koprivec, 21 Durankulak, 22 Kremenik, 23 Samovodene, 24 Chavdar, 25 Kazanluk (redrawn map from http://d-maps.com/pays.php?lib=balkans_maps&num_pay=181&lang=en).
Siturile menţionate în text. 1 Telish, 2 Redutite, 3 Sofia-Slatina, 4 Karanovo, 5 Vaksevo, 6 Ovcarovo Gorata, 7 Goljamo Delcevo, 8 Drama, 9 Gradeshnitsa, 10 Krivodol, 11 Ovcarovo, 12 Vinitsa, 13 Ezero, 14 Kovacevo, 15 Rakitovo, 16 Poljanitsa, 17 Podgoritsa, 18 Jasatepe, 19 Okracna Bolnitsa, 20 Koprivec, 21 Durankulak, 22 Kremenik, 23 Samovodene, 24 Chavdar, 25 Kazanluk (hartă redesenată după http://d-maps.com/pays.php?lib=balkans_maps&num_pay=181&lang=en).