The 4th Millennium: A Watershed in European Prehistory

Svend Hansen[1]

Abstract: The radiocarbon revolution has profoundly changed the chronology in prehistory and illustrates that the 4th millenium in western Eurasia was determined by a bundle of technical and social key innovations such as wheel and wagon, the domestication of the horse and donkey, and the breeding of woolly sheep. Furthermore, new metals (silver and lead) and new copper alloys appeared, and the production of metal goods expanded. New weapons, foremost long daggers and shaft hole axes quickly became widespread and were used by a new social type of warrior sharing a similar 'language' of representation: the mound over the single tomb containing lavish grave goods and large stone steles. These elements of social and technical change were not distributed in Europe as a 'package' but followed different paths. Their distribution, combination and recombination in the 4th millenium supported a kind of homogenisation in the 3rd millenium. This picture challenges our perception regarding the political and social organisation of these societies. Until now archaeology has attempted to balance the evaluation of its material culture with anthropological schemes of the neo-evolutionist school. Prehistoric societies are generally assigned to the level of chiefdoms, somewhere in between Palaeolithic bands and ancient states. The application of this scheme to the development of the Neolithic as well as the Bronze Age, however, arouses strong doubts as to its operative value. There were many ways – not just one – in which egalitarian societies develop into stratified societies whose determining principle is social inequality. It is, therefore, advisable to loosen the strong ties between archaeology and ethnology, for it is archaeology that observes long-term developments whereas the actual temporal depth of ethnological studies is, by contrast, quite shallow. Archaeology can trace the course of mankind's development in specific spaces and time and describe discontinuities. Hence, instead of imposing presupposed universalities about forms of social and political organisation upon the past the archaeological material should be interpreted free of generalisations.

Keywords: Southeastern Europe, Neolithic, Chalcolithic, social evolution, neo-evolutionism

The radiocarbon revolution caused a deep-going change in the chronology of prehistory, particularly the complete revision of the 4th and the 3rd millennia BC chronology. This was not a superficial correction: the picture had to be drawn completely anew. To understand the dynamics between the 5th and 3rd millennia BC it seems fruitful to draw attention to the technical and social innovations that occurred during these millennia.

Technical innovations played an important role in V. G. Childe's concepts of cultural development in prehistory. Childe maintained that key technologies such as the wheel, the ox-cart, the sailing boat and metallurgy were the decisive preconditions for the emergence of complex societies (the 'urban revolution') in Egypt and the Near East.[2] Doubtlessly, metal played a major role in Childe's concepts, and this is in accordance with a much older and broader tradition in historiography: namely that metals played the decisive role in technological and economical development from the Bronze Age onwards until modern times. For Childe, the introduction of metal marked the end of the economic independence of farmers and villages. In his view, mining, smelting ores and converting metal by casting and forging it into tools, weapons, vessels and ornaments were fulltime specialisations.[3] Consequently, the division of labour was connected with social control.

The Urban Revolution was a crucial point in history, and for Childe all important technologies then spread from the Near East to the Mediterranean and temperate Europe.[4] This kind of 'ex ori-

[1] Eurasien-Abteilung des Deutschen Archäologischen Instituts; email: svend.hansen@dainst.de.

[2] Childe 1982 [1942], 97.

[3] Childe 2009 [1958], 78–79.

[4] Cf. Childe 2009 [1958], 103–104.

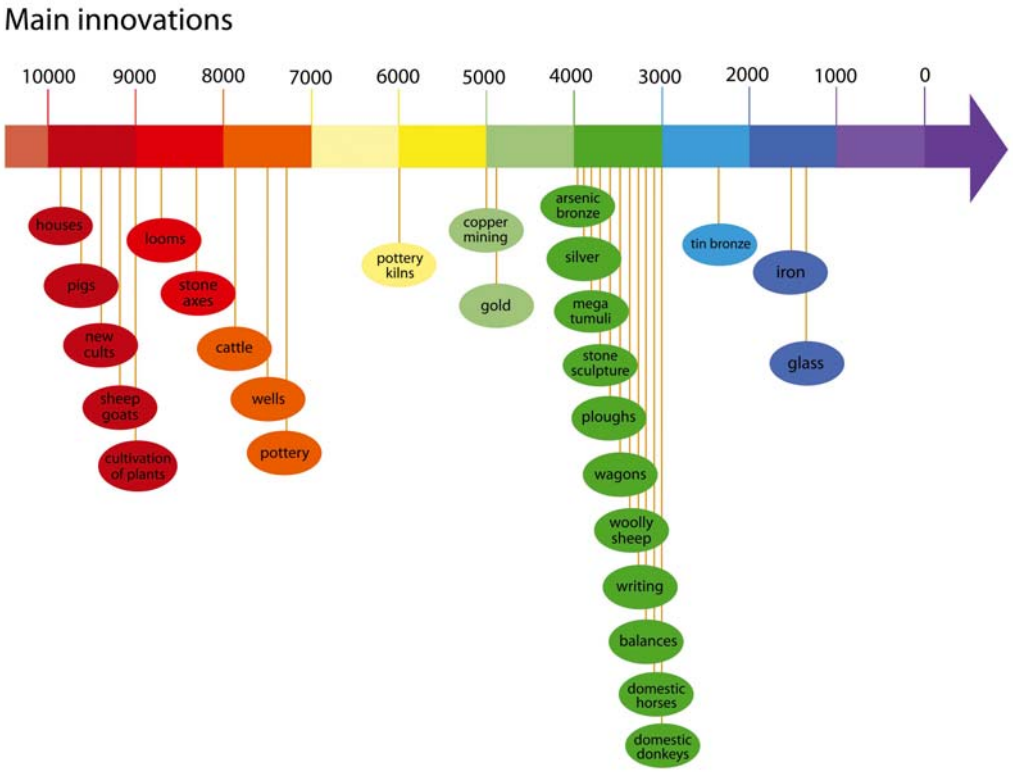

Fig. 1 Scheme of innovations. The diagram does not contain single inventions like Pre-Pottery Neolithic sculpture, but instead the large scale distribution. Datings are not precise (graphics: S. Hansen – A. Reuter).

ente lux' diffusionism was criticised by C. Renfrew,[5] when he claimed an independent invention of metallurgy in the Balkans in view of early radiocarbon dates from the cemetery of Varna. Yet, A. Sherratt sustained Childe's considerations by introducing the concept of the 'secondary products revolution', which became quite influential in European prehistory.[6]

For the last 20 years, technical innovations can be dated much more precisely thanks to calibrated radiocarbon dates, which have changed chronology, particularly that of the older periods between the 10th and the 2nd millennia BC (Fig. 1**).**

The first innovation complex is connected with the 'Neolithic Revolution'. The emergence of the domestication of sheep and goat, pig and cattle took place between the 9th and the 7th millennia. During this time span several other major Neolithic technologies such as wheat cultivation, pottery-making, weaving, house-building, etc. were introduced. The first innovation horizon is also referred to as the 'Neolithic package'. Certain inventions of the Early Neolithic in the Near East co-occurred, for example, pottery, figurines, houses, polished axes, domesticated animals and – starting in the 7th millennium – transferred to other regions in the west and east of the Fertile Crescent. In the case of the Neolithic period, it seems clear that in many instances the Neolithic mode of production was introduced by settlers seeking new land.

The development of copper and gold metallurgy during the 5th millennium BC is especially noteworthy.[7] From a technical point of view, copper axes were not more effective than simple stone axes. People with copper axes could not cut trees in less time than people using stone axes. Hence, the question arises as to how the spectacular start of copper mining, production and con-

5 Renfrew 1969.
6 Sherratt 1997.
7 Pernicka – Anthony 2010; Hansen 2011.

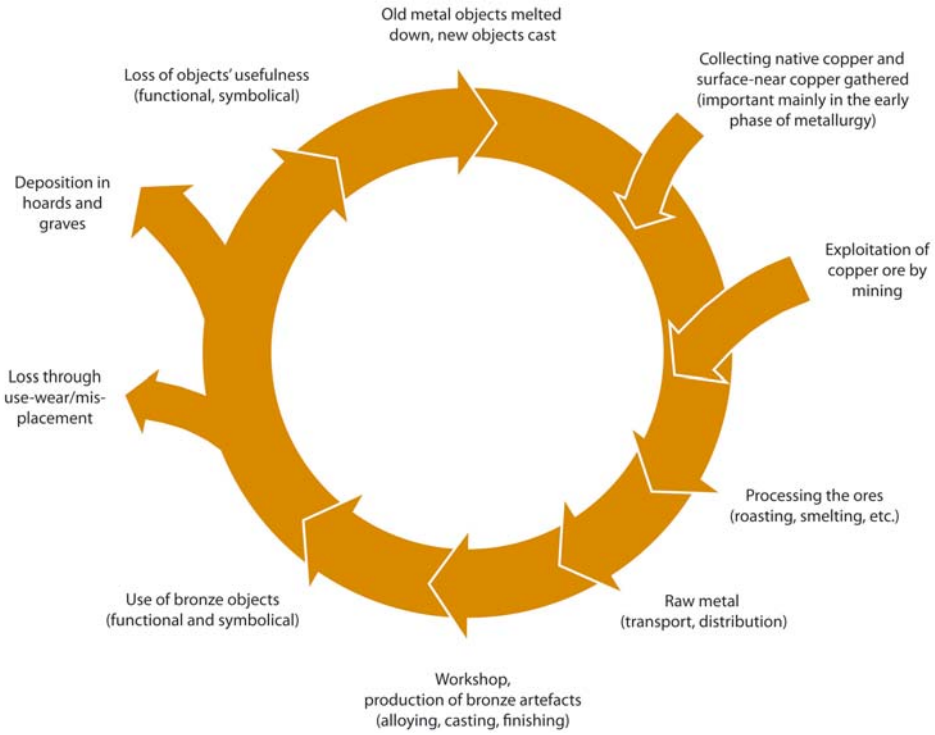

Fig. 2 Metallurgical cycle (graphics S. Hansen – A. Reuter).

sumption at the beginning of the 5th millennium BC can be explained. What was the motivation for these activities?

To a certain extent the answer is quite simple. The career of metal is built upon its practical advantages, which were evident from the very beginning when this material was used. It was possible to recast the metal, one of the two main practical benefits. It can be considered the first 'recycled' material. Every broken axe could be melted down and a new one could be cast (Fig. 2). With the recasting and production of a new object, a new technological property entered the world, and this is the second reason for the success of metals. Metal was the first material that could never be exhausted. It could be used and reused again and again for recasting without any serious loss of substance. This property had enormous economical and social consequences. Unlike stone, metal could be amassed in a useful way. It could be utilised for different purposes, and it was adaptable. According to necessity, ornaments could be melted down to make swords or axes for bracelets. Everything could be reused, and normally it was reused.

In a wider geographical perspective it is true that, in general, metal was neither the precondition for the rise of complex societies nor was metal production always linked to control by ruling institutions. However, in western Eurasia metal played an important role in the emergence of hierarchical societies. We may identify aspects or fields, in which this new material played an important role from the beginning. Each of them had many consequences.

I would like to emphasise the mental, intellectual or even philosophical consequences. Nevertheless, exploring the enormous technical and social opportunities offered by metal technology can be seen as a challenge to the thinking process. Nothing is known about how people in the Neolithic period perceived their world. The widespread attempt to enter the Neolithic world of ideas mostly projects the modern way of thinking onto the past. Nonetheless, I would assume that a new material with so many outstanding properties had consequences in nearly every sphere of perception.

The reality of recycling a substance that could never be exhausted was probably connected with the idea of partaking in these qualities. Copper could be infinitely amassed. As the owner of

the metal, one could benefit from these properties. The immortality of the powerful person was an obsessive idea in Bronze Age Egypt and perhaps prior to that time as well. Excess and immoderateness (*Maßlosigkeit und Unmäßigkeit*), which K. Marx[8] connected with money is already visible in grave 43 in Varna with more than one kilogram of gold.

In the 5th millennium the stone and antler weapons were quickly replaced by metal forms, which had a lot of practical advantages (Fig. 3). It was possible to increase the size of weapons, an attribute that was restricted in stone. This is true especially for all dagger varieties. This revolution in weapon technology was one of the crucial advantages of the new material. At the end of the 4th millennium metal workers were able to produce swords with sharp cutting edges; this technology was in use until the introduction of the gunpowder 5500 years later. I shall return to this point below.

A second complex of innovations (Fig. 1) can be dated to the 4th millennium, specifically the second half of the 4th millennium, an innovative period with new metals, new weapons, as well as the woolly sheep, the wheel and the wagon, and the domestication of the horse. In the Near East writing and urbanisation changed the way of life.

Perhaps the most interesting transformation in Europe took place in the centuries between 3500 and 2900 BC. After the basic technologies, pottery production, house building, etc. of the Neolithic, in the second half of the 4th millennium further key technologies were introduced. This is primarily the period of Childe's 'urban revolution', and partly overlaps with Sherratt's 'secondary products revolution'.

The transfer of knowledge and how these innovations were integrated into the old system is not so easy to elucidate. Each innovation had its own problem. For example, in the case of technical innovation we should reconstruct the process of production (*la chaîne opératoire*), and ask whether certain innovations require special skills and knowledge. Who is using the innovation? Who is profiting from the innovation, and how and by whom was it introduced? Which social or ideological implications were related to a certain innovation?

Fig. 3 Tools and weapons made of copper and bone/antler. Copper items from Varna on the left side, bone and antler items from Pietrele on the right side (drawings after Todorova 1982, photos: S. Hansen).

[8] Marx 1964, 255.

Fig. 4 Ur, grave 779 (photo: S. Hansen).

All of these innovations spread over Europe in an idiosyncratic way, which means that they were not part of a 'package', but could be composed in different ways. The wheel and the wagon were introduced around 3500 BC in the area between Mesopotamia and the Atlantic. The domestication of horse and donkey in the late 4th and early 3rd millennia essentially transformed the perception of space and time. This form of domestication led to a revolution in warfare in the 3rd millennium, as can be seen in Ur (Fig. 4). The appearance of the woolly sheep was the starting point for the textile revolution of the 4th millennium: woollen textiles were one of the economic foundations of Mesopotamia.[9]

It was a truly significant technical innovation, indeed, when at the end of the 5th millennium BC at the latest and in the first half of the 4th millennium BC daggers were produced by casting. Thereby, arsenical copper (as much as 10% arsenic) was likely an essential element for this process,[10] through which the formation of bubbles during casting and, thus, flaws in the blade could be diminished. Flaws in massive axes could be disregarded, but they were quite a problem when present in daggers with thin blades. Namely, when a blade is sharpened, the bubbles are exposed, and show that the blade is still pitted and notched rather than smooth and sharp.

It is generally assumed that naturally occurring copper and arsenic ores originally derived from sulphidic ores. However, another proposal based on substantial arguments suggests that supplementary elements were intentionally added to copper for the purpose of changing the qualities of the material.[11] In several cases attention has been drawn to alloys or metal compositions that are specific to certain object types. For example, the halberd found in the cemetery at Sabbione (Italy) consists of copper with 4.5% arsenic. Two flanged axes, oppositely, are made of pure copper.[12] Hence, one is tempted to conclude that the metal craftsmen knowledgeably sought out different kinds of copper, and further, that the silvery sheen of arsenic bronze was chosen for daggers. In the meanwhile, it has been possible to analyse *Arsenspeiss*.[13] This enabled the reconstruction of the technical procedure used to regulate the amount of arsenic to be added to copper. Arsenical and antimony bronzes opened new paths in metal production, especially for weapons. Nevertheless, important technical advances were also made in other fields of metal technology. Large vessels made of copper or bronze were part of the grave goods in richly furnished Maikop kurgans (Fig. 5) in the 4th millennium BC already. The existence of such high quality products implies that they were in great demand; therefore, enabling the existence of craft specialisation, which was necessary for the production of such cauldrons.

Beside these technical innovations there is a bundle of social innovations, which belong to a new type of ruler, whom I shall call the 'hero', but whom one can also refer to as the 'king'. The idea of such a king is offered in the Gilgamesh epic, which leads us back to the beginning of the

9 Liverani 2006.
10 Vajsov 1993, 141 fig. 36
11 Lechtman 1996, 509.
12 Pearce 2007, 84–85.
13 Rehren et al. 2012.

Fig. 5 Nal'čik. Copper or bronze cauldron (photo: S. Hansen).

3rd millennium BC.[14] Before Gilgamesh and his friend Enkidu departed for the cedar forest they went to the smiths and amourers: "Great celts they cast and axes each weighing one-hundred and eighty pounds; great daggers they cast, one hundred and twenty pounds each blade weighed; thirty pounds the guard at the grip; thirty pounds of gold to decorate them. Gilgamesh and Enkidu each carried six hundred pounds".[15] With their new weapons Gilgamesh and Enkidu set off for the cedar forest in the west. There they slew the guardian of the forest, Humbaba, and cut down the valuable cedar trees, which they subsequently sent down the Euphrates River to Southern Mesopotamia: a striking example for the violent usurpation of valuable raw materials.

Such heroes are probably represented in the large steles, which were erected and distributed since the 4th millennium from the Caucasus Mountains to the Atlantic Ocean. They display weapons, sometimes in larger numbers, identical to those we can find in the rich graves (Fig. 6). It is astonishing that these steles extended from the Caucasus to the Atlantic.[16] A. Vierzig has prepared her PhD on these steles at the Free University in Berlin and gathered information about more than thousand steles from the literature. In the last years, a surprisingly great number of these steles could be identified in new excavations and in museum depositories.[17] These monuments continue to impressively stand out in the landscape (Fig. 7).

For the first time in history individuals were buried beneath large grave monuments (Fig. 8). It is astonishing to see similarities not only in the grave monument, the tumulus, but also in details related to burial rituals between the Adriatic coast and eastern Anatolia.[18]

At the end of the 4th millennium a new dispositive, both technical and social, was established for a few centuries or perhaps for millennia, like the states in the Near East. Viewed against this backdrop, it is an enigma that the role of western Anatolia in this process is not yet clear. It is simply not plausible that Anatolia merely stood on the margins during these dynamic centuries.

The excavations in Çukuriçi Höyük have offered an important contribution to our knowledge of metal work in the early 3rd millennium.[19] The finds show the incorporation in a wide-ranging network, which has been analysed in detail by B. Horejs, M. Mehofer and E. Pernicka. Likewise, recent excavations in Çamlıbel Tarlası have also shown that metallurgy was practised in small-

14 George 1999.
15 George 2003, 201.
16 Casini 1994; Philippon 2002; Pedrotti 2007.
17 E.g. Ciugudean 2011; Martínez Rodriguez 2011; Nadler 2011.
18 Primas 1996.
19 Horejs et al. 2010.

Fig. 6 Arco, Italy. Stele with representations of weapons (photo S. Hansen).

Fig. 7 Ginestous, France. Stele in the landscape (photo: S. Hansen).

Fig. 8 Nal'čik. The large kurgan and newly built houses (photo: I. M. Čečenov).

scale settlements as well.[20] Two awls with pyramidal shafts are interesting, because the shafting principle is well known in the second half of the 4th millennium around the Black Sea. A dagger fits well into the picture of dagger production in southeast Europe. Of special interest is a mould for casting ring-shaped idols, which are common in the Balkans during the 5th and early 4th millennia. A wire made of lead is remarkable, for it might indicate silver production. A lead fragment from a late Chalcolithic context in Pekmez Höyük near Aphrodisias was mentioned by T. Zimmermann in a 2005 publication.[21] In another paper, he argues for dating the small hoard from Beycesultan from layer 34 to the time span between 3500 and 3300 BC.[22]

20 Schoop 2011.
21 Zimmermann 2005, 194.
22 Zimmermann 2005, 256.

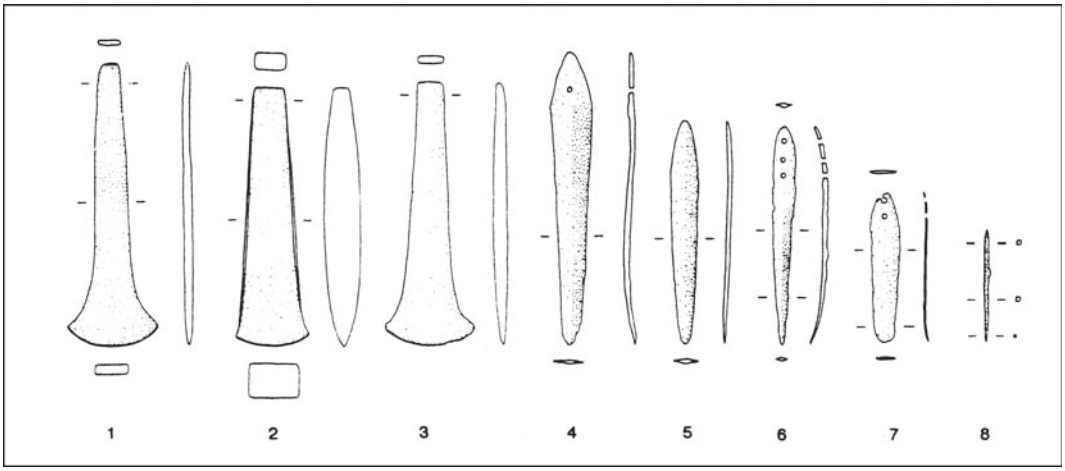

Fig. 9 Axes and daggers from Ilıpınar (after Roodenberg 2001).

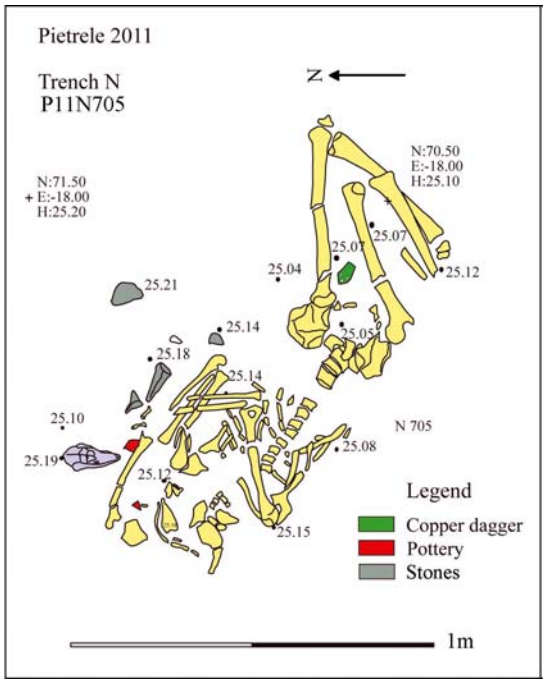

Fig. 10 Pietrele, inhumation grave (plan: M. Toderas).

Fig. 11 Pietrele, dagger (photo: S. Hansen).

The most impressive collection of late Chalcolithic metal objects (Fig. 9) was recovered from the cemetery of Ilıpınar.[23] Two of the flat axes fit well into an axe group that was distributed in the western Carpathian Basin and Italy. The daggers belong to a widespread type. In Pietrele on the Lower Danube (Romania), a grave with skeletal remains was uncovered in 2011 (Figs. 10–11). In addition to the human skull, a dog skull was also found. The dagger was twice folded and placed between the legs of the deceased. Typologically, the grave should be dated to the late 4th or early 3rd millennium BC.

[23] Roodenberg 2001, 354, fig 3.

In all adjacent areas metallurgy played a prominent role: in the Balkans and Greece, in the Caucasus and the Near East. Considering the lack of evidence of the wheel and wagon in Anatolia, A. Sherratt wrote: "*Ihr Kleingläubigen, warum seid Ihr so furchtsam*? It is still one of the characteristics which distinguishes British from Germanic thinking in archaeology that a *Forschungslücke* is for them an obstacle, for us an opportunity. A gap in evidence is something a German archaeologist cannot cross. It is an insuperable barrier. For the British prehistorian, however, it is a challenge to the imagination, to extrapolate a plausible reconstruction from the nearest kind of evidence available, and by the application of general principles".[24]

Fig. 12 Weapon and tools from the Marinskaya kurgan (after Kantorovič – Maslov 2008).

There is one geographic region, in which all the above mentioned innovations can be observed in the second half of the 4th millennium: the northern Caucasus. The famous grave in Maikop has been dated to the middle of the 4th millennium. Nearly all of the grave goods are without analogy. The comparative objects that have been quoted in previous literature are all much younger. In addition to the precious vessels and beads, a set of bronze tools was part of the funerary furnishings. One piece is quite significant: a hoe. Only a few comparisons from sites in the Caucasus, but also from Eridu and Susa are known. Indeed, even tools were widely distributed through trade networks.[25]

The younger phase of the Maikop culture, the Novosvobodnaia phase, is assigned to the second half of the 4th millennium. A number of 'elite'-burials is known from that time. A tool and weapon set (Fig. 12) is present in all of them, similar to those in the grave at Marinskaya.[26] Large vessels, golden ornaments and beads made of precious stones could also follow the deceased into the grave. Daggers were important and 60 cm long swords were now produced (Figs. 13–14), comparable to the sword from Klady.[27] It is worth mentioning that swords were also already used in Arslantepe during the last quarter of the 4th millennium.[28]

On the other hand, the shaft-hole axe played an important role, as well. Two such axes (Fig. 15) were found in the big kurgan at Nalčik.[29] It was an innovative weapon that was used until the Late Bronze Age. In the 2nd millennium BC, shaft-hole axes were distributed over a vast area, between the Near East and northern Italy. A small shaft-hole axe (Fig. 16) was deposited as an offering in the Sile River near Treviso in the Veneto.[30] Elsewhere I have argued that the archaeological

24 Sherratt 2003, 419.
25 Hansen 2009a; Hansen 2010.
26 Kantorovič – Maslov 2008.
27 Rezepkin 2000.
28 Frangipane 2004.
29 Čečenov 1973.
30 Carancini 1984, 197.

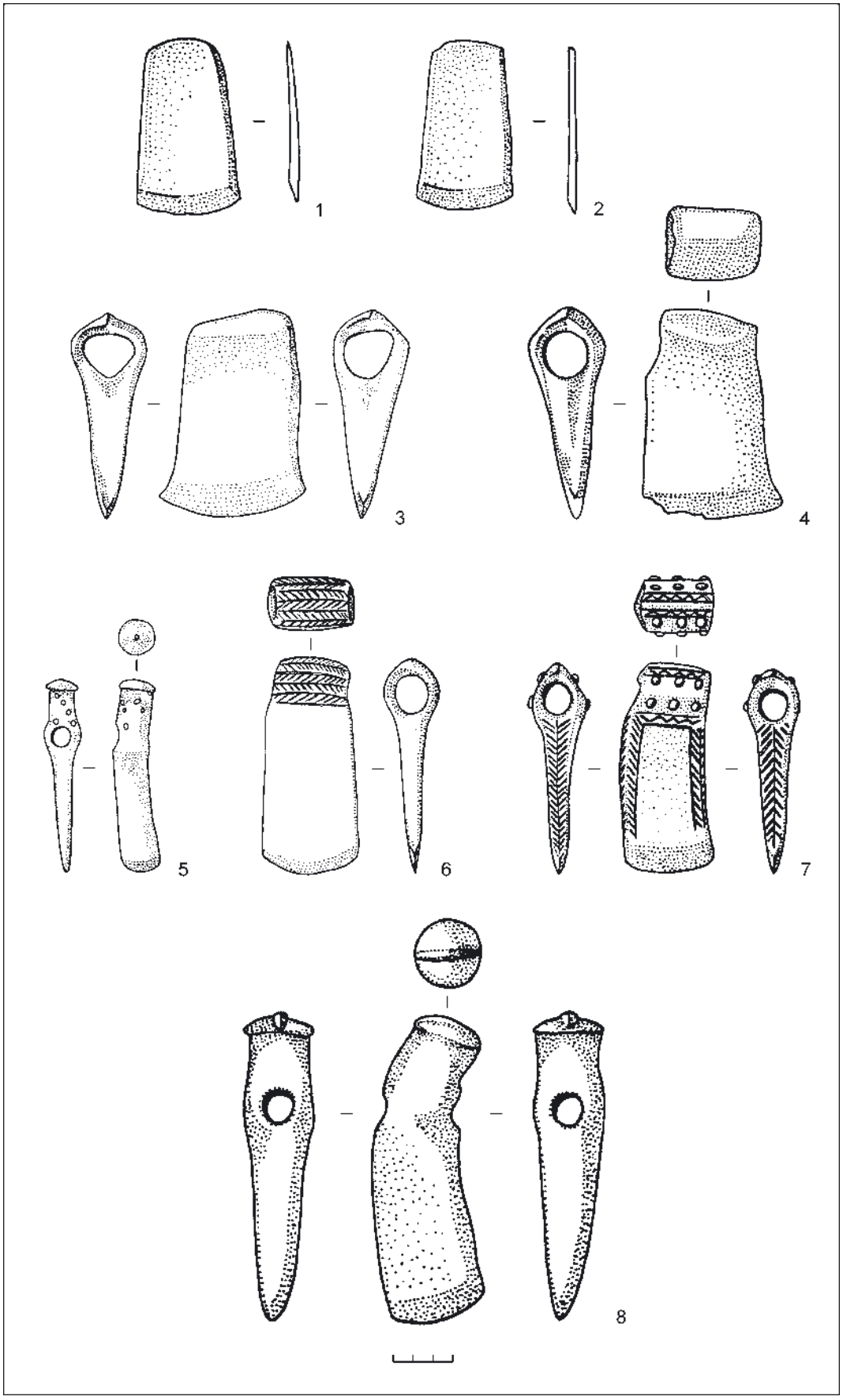

Fig. 13 Klady (after Rezepkin 2000).

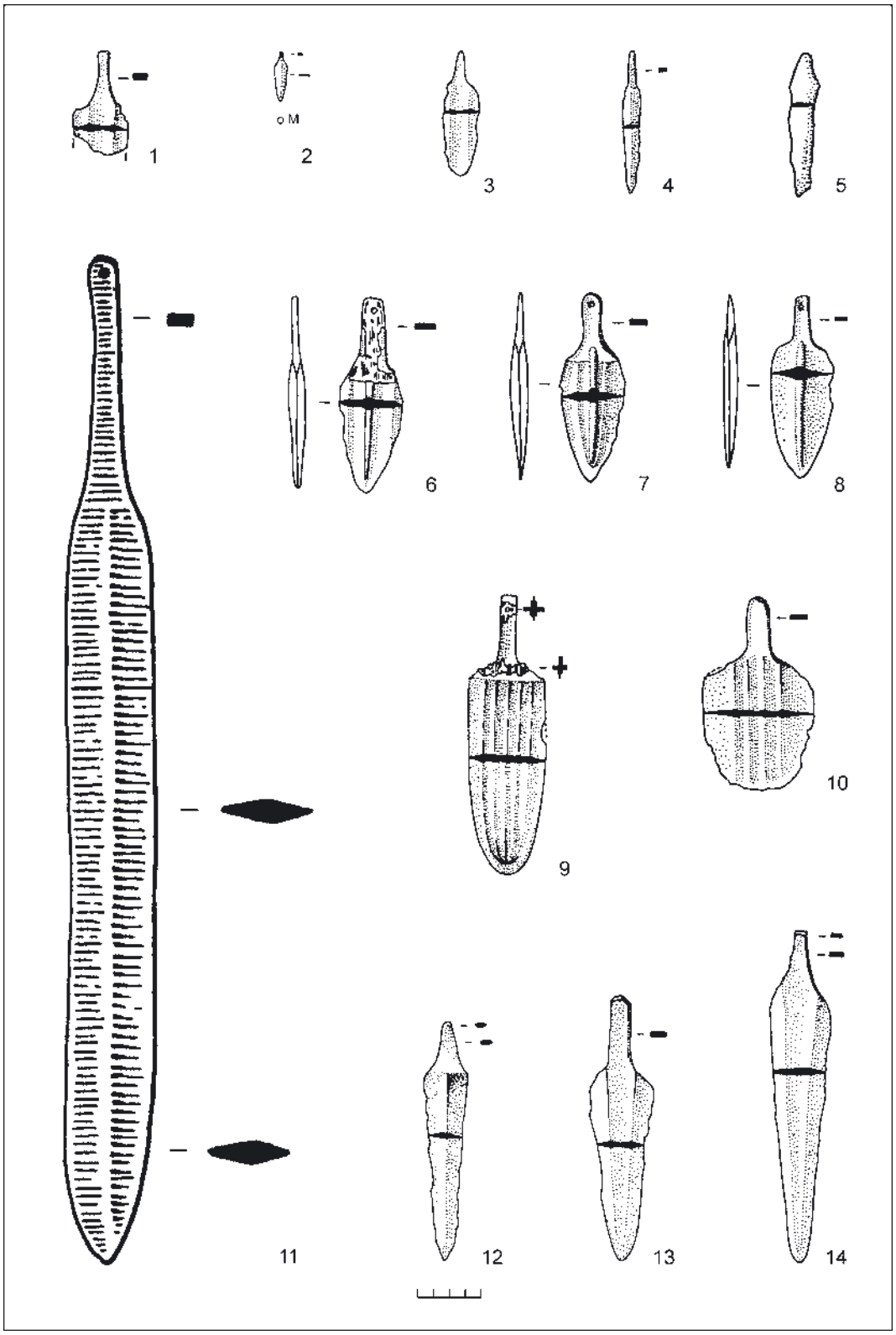

Fig. 14 Klady (after Rezepkin 2000).

Fig. 15 Nal'čik. Shafthole axes from the large kurgan (photo: S. Hansen).

Fig. 16 River Sile near Treviso (Museum Venice; photo: S. Hansen).

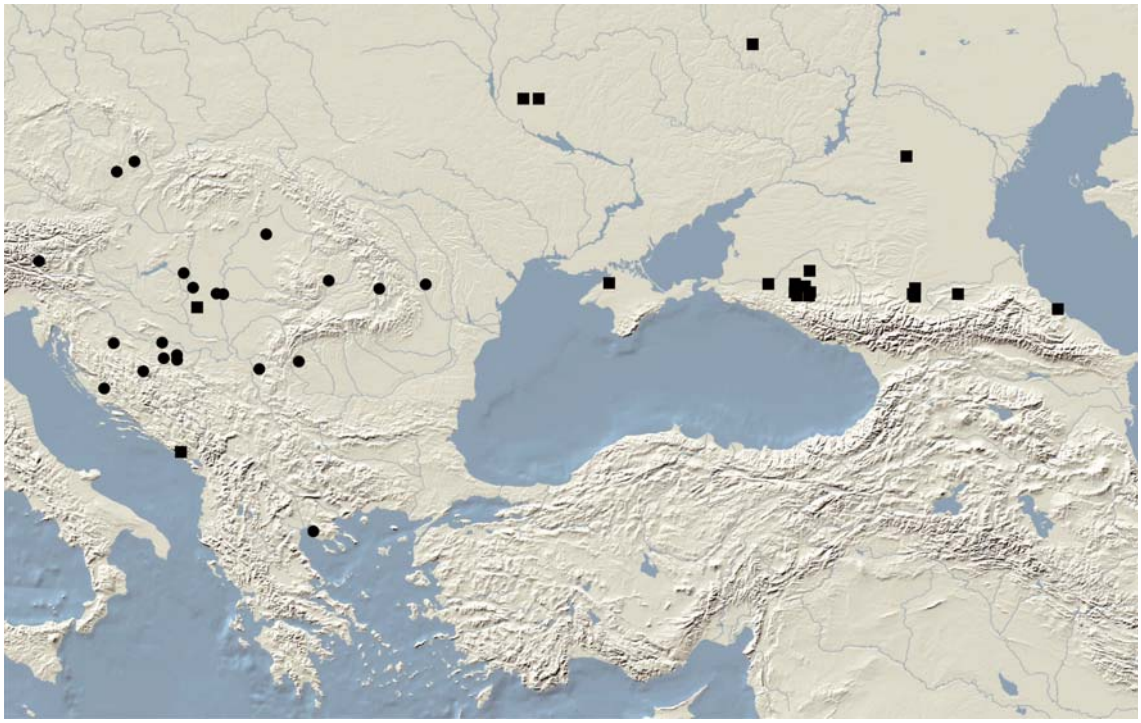

Fig. 17 Distribution of shafthole axes (modified after Bátora; published in Hansen 2009b).

detectability depends upon deposition practices.[31] Shaft-hole axes were used in the Caucasus and they are also known in the Carpathian basin since the late 4th or the early 3rd millennium BC. Yet, the deposition practice was different in both regions. In the Caucasus the axes were a component of the grave whereas in the Carpathians they became part of a hoard (Fig. 17). The largest hoard found in Vâlcele in Transylvania contained more than 40 axes, or perhaps as many as 55.[32] In regions that did not have comparable deposition practices, broken shaft-hole axes were melted down and the metal was reused for other objects. Moreover, the distribution map of clay moulds for shaft-hole axes also shows that their presence in the archaeological record depends upon depositional practices.[33]

Consequences

New weapons, foremost long, well cast daggers and shaft-hole axes rapidly became widespread. They were used by a new type of figure in society: the warrior, who shared a similar 'language' of representation, i.e. the mound over the single tomb containing lavish grave goods and the large stone stele. Sometimes even children and adolescents had to follow the dead potentate into the grave; thusly power was exerted upon the living.

The second half of the 4th millennium is one of the most earnest chapters in the history of mankind in the Near East and western Eurasia, a time characterised by an expansion of power unknown until then. The new forms of power were not simply the result of technological developments. New technical procedures were implemented by new positions of authority, and the

31 Hansen 2009b.
32 Soroceanu 2012, 109–111; Szeverényi 2013.
33 Chernykh 1992, 54–60; Primas 2007, 14, fig. 24.

support and selection of new technical procedures were in the interest of power and remained connected with it.

This picture differs to some extent from the one that has been drawn until now based on ethnographic analogies. It is a tradition going back to the 19th century, which conceives that native societies of the 19th century in Africa, the South Pacific or South America illustrated the life and organisation of the Neolithic societies that existed 8000 years ago. Claude Lévi-Strauss speaks of 'Neolithic societies' when he describes the type of native societies without written language and mechanical assistance. For Lévi-Strauss, this master of differentiation indeed, these societies were the common denominator of humanity.[34]

Are native people really an illustration of our distant past? Since J. Lubbock and E. B. Tylor up to E. Service[35] and others, evolutionists were interested in the cultural development of societies. Moreover, they arrange societies into a certain order from 'primitive' to 'developed', from 'egalitarian' to 'ranked', etc. However, in actuality these 'developments' are not observable anywhere, because ethnological observations essentially only refer to the last couple of centuries. Therefore, considerations about the development of prehistoric political systems are based exclusively upon contemplations on plausibility, that is, how a development might have been. And therein lies their weakness, for they cannot explicate the transition from one to the other system. Thus, they argue with the alleged advantages of the respective 'more developed' systems, such as stability, which supposedly impelled a necessary development. Drawing from ethnological observations of different, but 'contemporary' types of social organisation on all five continents, evolutionists set up a seemingly logical sequence, which was altered to temporal succession (for example, the Melanesian 'big man' and the Polynesian 'chief').

Until now archaeology has attempted to balance the evaluation of its source material with anthropological schemes of the neo-evolutionist school (e.g. Service and others). Inevitably this has mostly led to the same result: prehistoric societies are generally assigned to the level of big man societies or chiefdoms, somewhere between Palaeolithic bands and ancient states. The seemingly plausible and unambiguous application of this scheme to the development of the Neolithic as well as the Bronze Age, however, arouses strong doubts as to its operative value. Obviously, societies developed in many and different ways during the 12,000 years after the end of the last Ice Age. Early forms of the state emerged in western Eurasia and in Egypt as early as the 4th millennium BC, while the population in Australia long maintained 'egalitarian' societies, well into the 20th century.

A way of looking at archaeological material should be developed that is free of cultural universalities. Namely, there are many ways – not just one – in which egalitarian societies develop into stratified societies. It is, therefore, advisable, at least when describing the formation of a ruling authority, to loosen the strong ties between archaeology and ethnology; for it is archaeology that observes long-term developments, whereas the actual temporal depth of ethnological studies is, by contrast, quite shallow.

Archaeology can trace the course of mankind's development in specific spaces and times and thereby name the discontinuities in history.

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[34] Lévi-Strauss 2012, 14.
[35] E.g. Service 1975.

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