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**Prehistoric wagon models
in the Carpathian Basin
(3500–1500 BC)**



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Front Cover Illustration

Börzönce, Early Bronze Age wagon model (photo by Tibor Kádas)

Back Cover Illustration

Unprovenanced Early Bronze Age wagon model from the
collection of the Hungarian National Museum
(after <http://www.hnm.hu/utis/GalleryLarge.php?ItemID=2736&PicNum=0>)

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Contents

1. Introduction	7
2. Previous research	11
3. Copper Age	21
3.1. Archaeological evidence for the earliest wagons and wheels	21
3.2. How to spot a wagon model	27
3.3. Late Copper Age wagon models	29
3.4. Discussion	43
3.5. Late Copper Age zoomorphic depictions	48
4. Early and Middle Bronze Age	57
4.1. Miniature wheels	57
4.2. Wagon models	59
4.3. Discussion	71
4.4. Zoomorphic depictions	85
5. Conclusions	91
6. Catalogue	103
6.1. Late Copper Age wagon models from Hungary	103
6.2. Early and Middle Bronze Age wagon models from Hungary	107
7. References	111
Appendix	135

1. Introduction

The invention of the wheel and of wheeled vehicles was one of the major innovations with a lasting impact on human history. The place where wheels, rudimentary vehicles and, later, heavy four-wheeled carts were discovered remains a controversial, much-debated issue in prehistoric research. Most school textbooks and even conventional wisdom holds that wheeled vehicles were invented in Mesopotamia, from where it spread to the rest of the world.

The first major overview of vehicle depictions (rock carvings and wheel models) was written by Gordon Childe, the renowned English prehistorian, in 1951. His conclusions on the origins of wheeled vehicles were refuted a few years later with the discovery of the Budakalász model, a four-wheeled wagon that is cited in every textbook and in most works written for the general public. The Budakalász vehicle model was found in Central Europe, in a cultural context well before the Bronze Age and it also predated the similar finds from Mesopotamia.

Despite the proliferation of studies on early wheeled vehicles, few major advances were made in this field of research. Studies on early vehicles focused on the typological traits of the known models and depictions, on their distribution and on the probable place of invention, as well as on the role of the known models, which were believed to have been vested with a ritual function. Explanations were sought for the function and role of the clay models, usually through parallels drawn from the mythology of various ancient peoples, which served to illustrate the association between wagons and the gods or wagons and the afterlife. Although fascinating in themselves, most of these studies have by now been relegated to the bookshelf of research history.

A new approach was heralded by Andrew Sherratt's model, which broke with the earlier focus on artefacts and instead examined the economic significance of wheeled vehicles. The main point of his model, known as the Secondary Products Revolution, was that the primary exploitation of animals involved the use of their meat, fat and hide, as well as their bones and horns after they had been butchered. Sometime in the 4th millennium BC, there came the revolutionary discovery that animals could be exploited in various other ways too (milk, wool and traction). This brought the realisation that it might be more profitable to breed animals, rather than to immediately butcher them. Sherratt later elaborated on his model, which determined the course of studies in this field for several decades because it seemed to provide acceptable, although often unprovable answers to most, even if not all questions. Like most disciplines, archaeology is constantly in flux, and

thus Sherratt's ingenious model too came under critical fire, even if convincing evidence for challenging some of his claims has only become available more recently, following a series of archaeometric analyses.

Studies in the later 20th century generally focused on the ritual dimensions and the distribution of wheeled vehicles; more recently, the emphasis has shifted to the role of vehicles in trade, animal husbandry and economic changes. These themes have been explored at various conferences and in collections of thematic studies. The appearance and spread of wheeled vehicles has become an important facet of linguistic studies on the origins of the Indo-Europeans. It has recently been suggested that the wagon was an innovation inspired by economic necessity and that its extensive use can only be noted in regions, where there was a socio-economic need for wheeled vehicles.

Today, our knowledge of early wheeled vehicles is not restricted to wheel depictions appearing on vessels, rock engravings, simple clay models and miniature animal figurines. Important new evidence for the wide distribution of this important innovation comes from many different areas of Europe in the form of genuine wheels made from wood, wooden axles, wheel-ruts and wooden trackways, as well as from the possibly traction-induced pathologies on cattle bones. Meticulously excavated wooden finds can be reliably and accurately dated by dendrochronology and thus there is accumulating evidence that wheels and wheeled vehicles had been used in several regions of the world already during the earlier 4th millennium.

Wagons had an immense importance in the life of prehistoric communities, contributing to the emergence of an invisible network of contacts between centre and periphery. They played a crucial role in travel, transport, communication and contact between distant communities, in economic and cultural interaction, and in the transmission of customs, material goods and exotic commodities. In view of the rarity and uniqueness of this technical innovation, as well as its role in expressing prestige, it is hardly surprising that a symbolic meaning was often attached to vehicles, and that they were accorded a prominent role in the realm of beliefs, offering an explanation for why some individuals were wealthier and enjoyed more power and authority in their community.

The impact of wheeled vehicles on daily life is incontestable. Following their initial mystification, wagons, carts and chariots became widely used utilitarian, commercial and military crafts. Ritual symbols (miniature wheels, wagon models and the draught animals harnessed to wagons) and the genuine, real-life wagons on which they were modelled existed simultaneously.

This major and continually improved innovation has left many traces in the archaeological record, and there is a voluminous literature on various aspects of wheeled vehicles, ranging from descriptions and classifications of the artefactual material and surviving depictions to studies on their role in trade and transport. Countless studies have been devoted to the archaeozoological aspects and social dimensions of vehicles, to their relevance for interaction between various communities, their role in contact between nomads and urban communities, as well as to their origins, their significance in linguistic and mythological research, their function in funerary rites, and their uses in warfare and public entertainment.

Research during the past decades has sought to answer several questions. The different wagon depictions, the discovery of genuine wagon remains and the dating of the finds using modern archaeometric techniques (radiocarbon, dendrochronology, thermoluminescence) have significantly modified earlier chronologies and have raised a spate of new problems. It is still an open issue whether wagons spread from a single centre (Ancient Near East, Egypt, the Sahara, Central and Northern Europe, the Mediterranean, Central Asia, India, China), or whether we should assume a development from multiple origins.

In the following chapters, I shall first review previous research on wheels and wheeled vehicles during the past decades, followed by a survey of the earliest archaeological evidence on wheeled vehicles. The next two chapters focus on the Late Copper Age and Bronze Age clay wheels and wagon models, and on a new Bronze Age model decorated in a previously unencountered manner.¹ Finally, I have assembled a catalogue of the currently known wagon models from Hungary. The most important data of the sites mentioned in the text are summarized at the end of the book, alongside a map showing the location of the sites discussed here.

¹ The sites in the Carpathian Basin are quoted according to their current official name. The sites which now lie in neighbouring countries, but once lay in historical Hungary, are listed in the Appendix. The sites quoted in the text are shown in *Fig. 37* and the most important information on these sites also appears in the Appendix.

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2. Previous research

The first comprehensive overview of wagon models was written by Vere Gordon Childe, whose studies are rightly considered the classics of prehistoric research (CHILDE 1935, 1950, 1951, 1954). Childe had argued that the wagon models from Mesopotamia and the Caucasus indicated the extensive use of wheeled vehicles in the Ancient Near East during the 3rd millennium BC, while in Greece and the northern Caucasus, wheeled vehicles appeared around the mid-2nd millennium BC, and their appearance in Italy and Central and Northern Europe can be dated as late as 1100–1000 BC (CHILDE 1951, 188). In his study on wheels, Childe modified his earlier views, arguing that wagons had appeared by the late 3rd millennium BC in the Ukraine and the Lower Volga region, and that wheeled vehicles were probably known by 2200–1800 BC in the Middle Volga region and central Germany. He dated the general use of wagons on the Eastern European steppe, as well as in Austria and Italy between 1750–1250 BC (CHILDE 1954).

The publication of the first wagon model discovered in the Carpathian Basin appeared roughly simultaneously with Childe's study (SOPRONI 1954). The wagon model from Budakalász, recovered from a professionally excavated, securely datable burial gave a fresh impetus to studies in this field and modified the earlier dating of the use of wheeled transportation. It was now beyond doubt that wagons had been known well before the Bronze Age. In his study on the vessel shaped wagon models found in two graves of the Budakalász cemetery (Graves 158 and 177), the currently known largest burial ground of the Baden culture, Sándor Soproni discussed the possible function and cultural connections of the models. He postulated a possible steppe origin for these wagons since no comparable finds were known from the Balkans that would have provided a link between the Carpathian Basin and the Ancient Near East (SOPRONI 1954). Soproni's article remained largely unknown to the international archaeological community and the Budakalász wagon model only became more widely known after the publication of István Foltiny's study (FOLTINY 1959).

The pioneering study on wagon models and wheels from the Carpathian Basin was written by István Bóna, who noted that miniature wheels are in themselves ample proof for the existence of wheeled vehicles (BÓNA 1960, Fig. 3; *Fig. 1*).² Bóna focused on the Bronze Age finds because the Budakalász model was the single

² Unfortunately, there is no caption with the findspots to Bóna's map. The numbers appearing on the map and the numbers under which the sites are listed in the text cannot be correlated, and thus it is sometimes difficult to identify a site on the map.

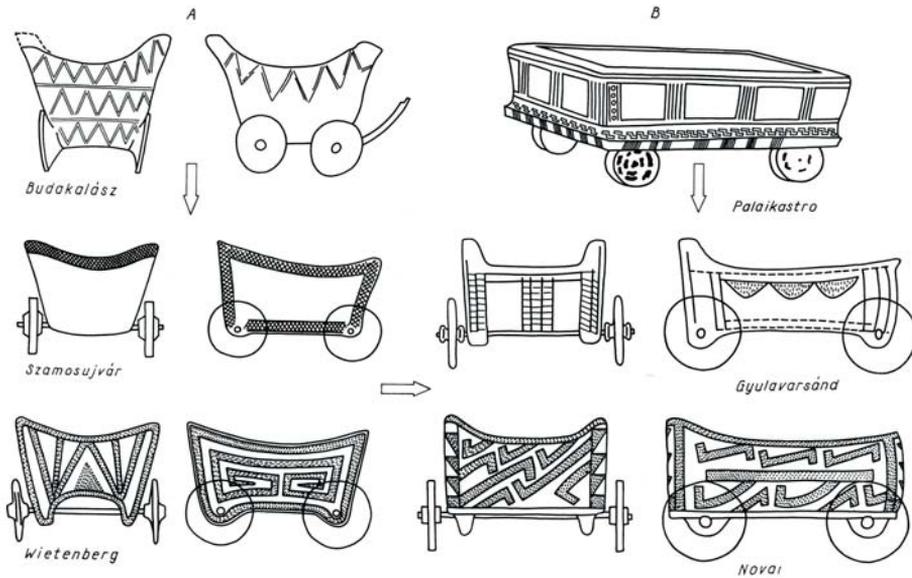


Fig. 1. Clay wagon models of the Copper and Bronze Age (after BÓNA 1960, Fig. 3).

Copper Age wagon model known from Europe at the time. Intact or fragmentary wagon models had come to light on nine of the seventy-three sites yielding finds of this type, while only miniature wheel models were reported from the other sites (BÓNA 1960, 92, 104, Fig. 7). In his evaluation of the finds, spanning the period from the Late Copper Age to the Early Iron Age, Bóna discussed the origins of wagons and their appearance in the Carpathian Basin, and he also proposed a typological sequence for them (BÓNA 1960, 87–89, Fig. 3).³ Bóna concluded that wagons had first appeared in the ancient civilisations of Mesopotamia, Syria and Anatolia, whence they spread northward to Crete and the Caucasus at the turn of the 3rd and 2nd millennia BC. He suggested that wagons had reached the Carpathian Basin from the Balkans along the route leading through the Marica and Morava river valleys, and along the route from the Pontic and the Lower Danube region (BÓNA 1960, 110). Similarly to Childe, Bóna attached a great importance to clay wheel models which, being wagon fixtures, furnished indisputable proof for the existence and use of wagons. Bóna's study was ground-breaking in another respect too. Earlier, widely different functions had been proposed for these small

³ Bóna published the models from Gyulavarsánd (Vărşand, Romania), Novaj, Szamosújvár (Gherla, Romania), Wietenberg (Segesvár/Sighişoara, Romania), Budakalász and Palaikastro (Greece).

clay discs, ranging from spindle whorls and simple discs to small vessel lids and miniature Sun discs. Following his graduation, Bóna spent several years systematically collecting and cataloguing the Bronze Age finds of Hungary, sifting through the collections in almost every rural museum and personally examining each find. He was thus able to distinguish the genuine wheel models on which the hub was indicated from the other clay discs. By assembling the corpus of the then known clay wheels from the Carpathian Basin, Bóna proved that there had been considerably more wagon models than had actually come to light.

The growing interest in the history of ancient religions during the 1960s also had a profound influence on archaeological studies. Prehistorians sought to explain the function of vessels modelled in the shape of wheeled vehicles and suggested that the wagon models had been used in various rituals, citing examples from various religious beliefs for the linkages between wheeled vehicles and the gods, and between wagons and the afterlife.

Despite the many works published after the pioneering studies written by Childe and Bóna, both classics in their own right, few major advances were made in this field of research. Most of the new articles and books concentrated on the typological traits of wagon models, on the probable place of the innovation and on the distribution of wheels and wheeled vehicles. For many decades, the general consensus was that wheeled vehicles had been invented in Mesopotamia, whence they spread to other regions. This view reflected the interpretative framework of the 1960s and later decades, characterised by a predilection for drawing elaborate routes whereby artefacts were diffused. There was very little interest in what caused social and economic changes in the life of prehistoric communities and even less in searching for possible imprints of these changes in the archaeological record.

The three roughly contemporaneous major centres of the distribution of wheeled vehicles (the Ancient Near East, the Eurasian steppe and Central Europe)⁴ were studied more intensively by several scholars. A few masterly studies appeared on the finds from a particular region and on specific aspects of early wheeled vehicles, such as Emmanuel Anati's work on the two-wheeled war chariots of Europe, which he derived from Anatolia (ANATI 1960), and Stuart Piggott's overview of wheeled vehicles (PIGGOTT 1974, 1979, 1983, 1987, 1992). Piggott was principally interested in the horse-drawn vehicles of the Ancient Near

⁴ The wheeled vehicles from India, China and Africa are not discussed here because they have little in common with the wagon models from the Carpathian Basin.

East. Similarly to Childe, he regarded wheels a major innovation. In his view, the adoption and subsequent development of wheeled vehicles could be dated earlier than the 2nd millennium in the urban civilisations familiar with writing, and he argued that wheeled vehicles were adopted from northern, non-urban population groups (PIGGOTT 1978, 42).

Exhaustive studies on the wheeled vehicles of the Ancient Near East were published by Mary A. Littauer and Joost H. Crouwel (LITTAUER – CROUWEL 1974, 1979, 2002), and by Wolfram Nagel (NAGEL 1966, 1986, 1992), while Peter Roger Stuart Moorey provided an excellent overview of light chariots (MOOREY 1986).

The wagons and chariots from the steppe were first comprehensively discussed by Alexander Häusler (HÄUSLER 1978, 1981, 1984, 1985, 1986, 1992). His work was followed by studies written by Renate Rolle (ROLLE 1991), Elena F. Kuz'mina (KUZ'MINÁ 2007) and Philip Kohl (KOHL 2009), offering an overview of major new finds and the advances in vehicle studies. In addition to the already known Copper Age vehicle models, several new finds have been published from Altyn Depe in Turkmenistan (KIRTCHO 2009). While the connection between horses and wagons has since long intrigued prehistorians, the currently available archaeological evidence for the date when horse was domesticated is still inconclusive for answering the key questions. Countless studies have addressed this issue (ANTHONY 1995; ANTHONY – VINOGRADOV 1995; RAULWING 2000; ANTHONY 2007; KUZ'MINA 2007), and the latest new findings in this field were published by the research team led by Alan Outram (OUTRAM *et al.* 2011).

A major breakthrough in the research of early wheeled vehicles came with the discovery of genuine wagons and their fixtures. In his study on the Neolithic wheel remains from Switzerland, Eugen Woytowitsch also surveyed the Bronze Age wheels and wagon models (WOYTOWITSCH 1995), offering a broad overview of wagon depictions and their significance based on the finds from that region. In a novel approach, he discussed a wide range of artefacts which could in one way or another be linked to wagons (such as wheel depictions on jewellery items and weapons). In his view, wheels were sacred symbols and attributes associated with a deity and the heavens above, an interpretation suggested by the diachronic examination of diverse archaeological finds brought to light across an extensive region. He argued that wagons had spread together with the diffusion of metalworking (WOYTOWITSCH 1995, 118). He wrote a separate study on the Late Bronze Age and Early Iron Age wagon models from Italy (WOYTOWITSCH 1978).

Several studies have been devoted to the wagon models from the Carpathian Basin. Following Bóna's seminal paper (BÓNA 1960), Nándor Fettich too published a lengthy study on the artefacts he termed *carrosserie* models, covering also the symbolic meaning and interpretation of the decoration on the wagon boxes, and defining the criteria by which wagon models and depictions could be conclusively identified (FETTICH 1969, 32). In contrast to Bóna, Fettich did not include the presence or absence of wheels among his criteria because in addition to wheeled vehicles, various sledges and travoises (slide-cars) were also used in prehistory, as shown by the Scandinavian examples cited by him (FETTICH 1969, 31). His other argument in this respect was that urns had sometimes also been set on wheels (as, for example, the urn from Kánya). Fettich thus regarded various rectangular, decorated vessels from the period spanning the Neolithic through the Copper Age to the Middle Bronze Age as wagons,⁵ claiming that these objects depicted funerary wagons on which the deceased were borne during their last journey. Fettich believed that the rectangular artefact from Szelevény bearing a depiction of a goddess and a forested landscape was a wagon (FETTICH 1969, 37, Pl. I. 1–3). However, neither the date, nor the function of this enigmatic object have yet been conclusively clarified. Gábor Rezi Kató dated the vessel to the late Bodrogkeresztúr/Hunyadi-halom transition of the Middle Copper Age (REZI KATÓ 2001, 120), noting that the exact function of the vessel remains uncertain, as does the interpretation of the symbols appearing on it. In her assessment of the depictions on the vessel's side, Tünde Horváth proposed an alternative date and interpretation for the Szelevény model, quoting the fragment of a similar rectangular vessel from Gomolava, found in a securely datable context. She believes that the vessel should be assigned to the Kostolac culture representing the transitional period between the Late Copper Age and the Early Bronze Age (HORVÁTH 2009, 133; HORVÁTH 2011a, 229). However, the function and date of this vessel remains unresolved for the time being.

The past few decades have seen a proliferation of studies on wagon models from the Carpathian Basin and Central Europe dating from the Late Copper Age (KALICZ 1976; NĚMEJCOVÁ-PAVÚKOVÁ – BÁRTA 1977; ECSEDEY 1982; BONDÁR 1990, 1992, 2004, 2006; RUTTKAY 1995, 2000) and the Bronze Age (KALICZ 1968; ORDENTLICH – CHIDIOȘAN 1975; MESTERHÁZY 1976; NEUGEBAUER 1979;

⁵ Nándor Fettich lists several rectangular altars, house models and/or vessels, which are not regarded as wheel models by most prehistorians.

OLEXA 1983, 1996; JAKAB – OLEXÁ – VLADÁR 1999; MÁTHÉ 1984; BONDÁR 1990, 1992).

In his overview of the Bronze Age tell cultures of Hungary, Bóna devoted a separate chapter to wagon models and their occurrence in various cultures (BÓNA 1992, 1994).

A full inventory of the Middle Bronze Age wagon models from Romania recently published by Nikolaus Boroffka (BOROFFKA 1994) was followed by Christian Schuster's work, which included additional pieces (SCHUSTER 1996).

The wagon models from Central Europe were covered by Markus Vosteen in several studies (VOSTEEN 1996, 1998) and a monograph (VOSTEEN 1999), in which he analysed the ritual role and dating of wagon models, supplemented by a catalogue containing a detailed description of the models from the Copper Age to the Iron Age. Vosteen quoted the evidence for the use of wagons in the Late Neolithic, principally rock engravings, dating from between 4000 and 3000 BC (VOSTEEN 1999, 42).

Recent studies on the Bronze Age wagon models of the Carpathian Basin include a concise summary by Boroffka (BOROFFKA 2004) and the publication of a new model from Nižná Myšľa (Alsómislye, Slovakia, OLEXA 2003, Fig. 11; OLEXA – PITORÁK 2004, Fig. 2).

As mentioned in the above, studies on early wheeled vehicles gained a fresh impetus during the past decades. The publication of various finds from the Carpathian Basin enlarged the corpus of these finds, and in addition to the typological analysis of the known models, new interpretations were also proposed for the function and decoration of these artefacts.

Prehistorians working in Western Europe and the US took an entirely different approach. Renewed interest in the origins and dispersal of the Indo-European peoples and in a related problem, the date and place of domestication of the horse, led to the exploration of the possible connection between horse breeding and the invention and spread of wheeled vehicles, as well as their impact on social and economic changes.

In 1981, Sherratt published his highly influential model on the Secondary Products Revolution (SPR) (SHERRATT 1981), according to which the primary exploitation of animals for their meat was eventually followed by the discovery that domestic animals could also be exploited for their milk, wool and traction power (SHERRATT 1981, 1983, 1997, 2003). This discovery had a profound effect on human economy and society. In Sherratt's view, the SPR emanated from the civilisation of the Ancient Near East to Europe and Asia during the

4th millennium BC. He argued that the SPR was a process at least as important as Childe's Neolithic Revolution in that it involved the adoption of various innovations such as the plough and transport based on animal traction, and the spread of new domestic species such as the horse, the ass and wool sheep. The population growth in the wake of the SPR led to the expansion of settlements and major changes in animal breeding strategies. It also facilitated long-distance travel. Sherratt later added two new elements to his model, the drinking revolution and the importance of domesticated horse for riding and as a pack animal (SHERRATT 1997a). The Secondary Products Scenario (SPS) was conveniently summed up as the “driving and drinking” revolution.

Sherratt's imaginative model had a stimulating effect on the research on early wheeled vehicles. Although his model came under critical fire (GREENFIELD *et al.* 1988; VOSTEEN 1996), the keen interest in prehistoric vehicles was reflected in the organisation of several thematic exhibitions and conferences exploring various dimensions of this major innovation (RAD UND WAGEN 2002; WEGZEITEN 2004; RAD UND WAGEN 2004; PREMIERS CHARIOTS, PREMIERS ARAIRES 2006; BETWEEN THE AEGEAN AND BALTIC SEAS 2007). The catalogue and the collection of studies accompanying the exhibition staged in Oldenburg in 2004 (FANSA – BURMEISTER 2004) offer a good overview of new research results, as well as of the innovative approaches in this field of research that have brought a fresh perspective on several long-standing axioms.

In addition to the already known clay models, vessels bearing vehicle depictions and the pictograms appearing in rock art, evidence on the early use of wagons was enriched by finds of genuine wooden wheels and other wooden finds confirming the use of wagons.

The radiocarbon dates for new wooden finds clearly prove the contemporaneous use of wheeled vehicles in several regions. Earlier views, according to which the wagon was invented in the early urban cultures of southern Mesopotamia, have been seriously challenged. Many scholars now suggest that wheeled vehicles were invented independently of each other in multiple centres.⁶ Andrew Sherratt (SHERRATT 2004) and Joseph Maran (MARAN 2004) have both proposed elaborate models that have several points in common, but differ regarding the route of diffusion. Both see the 4th millennium BC, and especially its later half, as a period of intensive supra-regional contacts and transformations. Both focus on the social receptiveness to the innovation rather than merely its adoption,

⁶ For a good overview, cp. BURMEISTER 2004.

examining what would today be called a “technological transfer” as part of a broader package. They regard the “Uruk expansion” as a key phenomenon in the diffusion of wheeled vehicles. Sherratt envisioned prehistoric communities as resembling industrial societies in many respects. His main argument was that the use of animal-drawn wagons was only conceivable in regions with a concentration of various resources such as livestock, goods and manpower, and thus vehicles were essentially used by the elite. He noted that a concentration of resources can only be observed in the early urban centres of southern Mesopotamia and thus the spread of the technology, including the package of animal-drawn ploughs and wheeled vehicles, proceeded from south to north on the elite level (SHERRATT 2004, 421–423).

In contrast, Maran claimed that wheeled vehicles were invented on the northern Pontic coast and were subsequently diffused from that region (MARAN 2004, 436–438). In his view, the technology of wheeled vehicles was mediated southward by the Maikop culture of the Caucasus, known to be contemporaneous with the Middle and Late Uruk period. Maran shares Sherratt’s view that this technology transfer occurred on an elite level.

Lorenz Rahmstorf came to a similar conclusion after examining the distribution of various trade commodities and innovations of the Early Bronze Age (cups of the *depas amphikypellon* type, Syrian flasks, decorated bone cylinders, cylinder seals, sinkers, spools, weights, etc.). Various Anatolian and Mesopotamian products and innovations rapidly spread to the Eastern Mediterranean at the time of the so-called second urban revolution. Rahmstorf suggested that this rapid diffusion could be explained by the fact that Aegean communities had reached a similar level of civilisation and were receptive to new cultural goods (RAHMSTORF 2006, 76). It would appear that the social transformations at the time of the first and second urban revolution stimulated the mosaic-like diffusion of various commodities, among them of wheeled vehicles.

It seems quite certain that major innovations appeared or were adopted in regions where there was a social demand for them. It has recently been suggested that the wagon was an innovation inspired by economic necessity and that its extensive use can only be observed in regions where there was a socio-economic need for wheeled vehicles. Sherratt’s SPR model has been heavily criticised (cp. GREENFIELD *et al.* 1988; VOSTEEN 1996). It was challenged, amongst others, on the grounds that milk consumption can be observed well before the 4th millennium BC (GREENFIELD *et al.* 1988; CRAIG *et al.* 2003; VIGNE – HELMER 2007; DUERR 2007; EVERSLED *et al.* 2008; GREENFIELD 2010) and

his claim that the horse was domesticated in the Ancient Near East has also been refuted (ANTHONY – BROWN 2007). His views on the place of where the invention of wheeled vehicles occurred are similarly contested.

In sum, we may say that the wheel and wheeled vehicles most likely did not arrive to Europe from Mesopotamia. It is possible that these two innovations originated from the Pontic, as Maran believes; however, the new Northern and Western European finds dating from the Late Neolithic raise the possibility that the wheel and wheeled vehicles were invented simultaneously in several places. This would explain the differences in form and style between them, and why they were accorded different roles in various societies and belief systems in Anatolia and Europe.

3. Copper Age

3.1. Archaeological evidence for the earliest wagons and wheels

The above brief survey of previous research on the appearance of the wheel and early wheeled vehicles reflects the main tendencies and the diverse array of approaches in this field of research since the publication of Childe's seminal study.

Rock engravings, the handful of wagon models and the wagon depictions incised onto clay vessels are no longer our only proof for the use of wagons. The archaeological record has been enriched by new categories of evidence.

Research on early vehicles has expanded to include many different categories of finds ranging from miniature wagon and wheel models to the remains of genuine wagons, wheels and axles, as well as various other phenomena indicating the use of vehicles such as wheel-ruts, wooden trackways and morphological alterations on cattle bones caused by harnessing. New, more accurate dating methods (radiocarbon, dendrochronology and thermoluminescence) and archaeometric analyses provide a reliable framework for the spatial and temporal co-ordinates of early vehicle finds. One of the key issues remains the place and date of this important innovation, and the route or routes whereby it was diffused. New evidence on the use of four-wheeled vehicles has significantly modified the assumed date of the appearance of wheels and wheeled vehicles, as well as the suggested route of the spread of this invention. Archaeometric analyses have proved useful not only for the more accurate dating of the finds, but also regarding other evidence related to early vehicles. For example, the possible traction-induced pathologies on cattle bone have been the subject of archaeozoological research for at least forty years (GHETIE – MATEESCO 1971; BARTOSIEWICZ *et al.* 1997). We thus have an increasingly complex picture of the appearance of wheeled transportation, its economic impact and the distribution of wheeled vehicles.

Interdisciplinary studies have conclusively proven that wheels (whether genuine pieces made from wood or small miniatures in clay) are not in themselves proof that they were accessories of wheeled vehicles – they may equally well have been part of other wheeled conveyances too.

In the following, I shall briefly recapitulate the data that have enriched our knowledge of when wheeled vehicles first began to be used, with a focus on the

wagon models from the Copper Age of the Carpathian Basin and the depictions of the draught animals harnessed to these miniature vehicles.

The first comprehensive overview of Copper Age wheel models was written by Marin Dinu in his study on the wheel finds of the Cucuteni, Gumelnița and Petrești cultures, all dating from before the 4th millennium (DINU 1981). Dinu pointed out that the use of wheeled vehicles could thus be dated much earlier than previously assumed, but his opinion was not widely accepted. However, the radiocarbon dates for the miniature wheels from Jebel Aruda in Syria and Arslantepe in Turkey confirmed Dinu's views because these wheel models were roughly contemporaneous with the wheels incised on the renowned Bronocice vessel, and thus they predated the earliest wagon models (BAKKER *et al.* 1999, 781). Jan Bakker and his colleagues re-published a number of all-but-forgotten Copper Age wheel models from the Carpathian Basin such as the pieces from Ózd-Kőaljatető, Ţebea and Vučedol-Várhegy (BAKKER *et al.* 1999, 781).

In 2001, Gábor Ilon published a fragmentary clay wheel model brought to light at Szombathely-Metro áruház, a settlement of the late Lengyel–Balaton–Lasinja culture, yet another find predating the generally accepted earliest appearance of wagons (ILON 2001, 476, Pl. I), a date which was at the time received with disbelief.

Aside from the vessels with wagon depictions found on the steppe, the perhaps best known depiction of a wheeled vehicle incised on a clay pot comes from Bronocice in Poland (KRUK – MILISAUSKAS 1991, Fig. 3). Its discovery opened a new chapter in the research of European wheeled vehicles. The vessel could be reliably dated: the radiocarbon dates indicated that the pit of the Funnel Beaker culture in which it was found predated the Baden culture. The incised pictograph shows a four-wheeled wagon with a rectangular box. The central draught-pole is also depicted. Another wheel can be seen in the centre which, in Albert Lanting's view, was a spare wheel, or a sacred image or object (BAKKER *et al.* 1999, 784). The mode of harnessing could also be reconstructed (KRUK – MILISAUSKAS 1991, Fig. 2). We know that cattle, probably oxen, were harnessed to heavy carts on which the axle rotated with the wheel, as on the vehicle appearing on the Bronocice vessel. Other symbols also appear (perhaps denoting water, trees or buildings). The Bronocice vessel furnished conclusive evidence that four-wheeled vehicles had appeared well before the rise of the Baden culture in Europe (KRUK – MILISAUSKAS 1978, 1981, 1982, 1991, Fig. 3; BAKKER *et al.* 1999, Fig. 7).

Other evidence for the use of wagons was unearthed at Flintbek near Kiel in 1989 (ZICH 1992, 1993, 2006), where a 20 m long section of a cart-track consisting of parallel wheel-ruts was discovered under a megalithic barrow, from which the gauge of the wagons could be estimated at 1.1–1.2 m. The barrow represented a funerary monument of the Funnel Beaker culture dating from between 3650–3400 BC, a date corresponding to the age of the Bronocice site (BAKKER *et al.* 1999, 784). The recently published calibrated AMS dates gained from charcoal, bone and other organic samples gave a date of 3460–3385 cal BC for the wheel-ruts uncovered at Flintbek (MISCHKA 2010, Fig. 52). Doris Mischka claims that the Flintbek site thus provides the most reliable evidence for the early use of wheels and wagons.

Remains of a wooden wheel and an axle were discovered near Ljubljana in 2002. The finds were dated to the 4th millennium BC, to the period between the Retz–Gajary and the Baden cultures. Unfortunately, radiocarbon and dendrochronological dates were not available at the time the finds were published (VELUŠČEK 2002). The associated pottery suggested a date in the early Baden period (VELUŠČEK 2006, 44). The dendrochronological and radiocarbon dates obtained from over 2500 wood samples suggested that the site could be dated between 3600 and 3332 BC, while the wheel dated from the “second half of the 32nd century or earlier” (ČUFAR *et al.* 2010, 2031, 2034).

Four wooden wheels were brought to light during the investigation of the Olzreuter Ried site in Baden-Württemberg, Germany, of which the largest had a diameter of 58 cm. According to the excavator, the wheels came from an A frame vehicle used for transporting hay. The samples submitted for dendrochronological analyses indicated a date around 2897 BC, suggesting that these finds represent the earliest wooden wheels north of the Alps. The finds from the site included the fragment of a miniature clay wheel of the type known from the four-wheeled clay wagon models of the Carpathian Basin. The date for the wooden wheels harmonizes with the dating of the miniature clay vehicles which are generally assigned to the Baden culture (SCHLICHTERLE 2010). The discovery of the clay wheel model indicated that the miniature counterparts of genuine wheels were also made.

Another recent find too confirmed the familiarity with wheeled vehicles before the Boleráz period: a stylised cattle figurine set on wheels, a curious combination of a wagon rolling on four solid wheels and the oxen yoked to the

wagon (*Fig. 2. 1*).⁷ Very little is known about this intriguing model save for the fact that it was found somewhere in the Ukraine and that it can probably be dated to the period between 3950 and 3650 BC (CUCUTENI TRYPILLIA, Cat. no. U-102, 263). Similar depictions are known from other regions too, and their use continued for a fairly long time, as shown by the four-wheeled vehicles dating from the turn of the 4th and 3rd millennia reported from Turkmenistan (BOROFFKA 2004, Abb. 11; *Fig. 2. 2*) and a two-wheeled cart made around the turn of the 3rd and 2nd millennium BC from Pakistan (BOROFFKA 2004, Abb. 1; *Fig. 2. 3*). It would appear that the earliest variant of wagon models is represented by a combination of wheels and the draught animal.

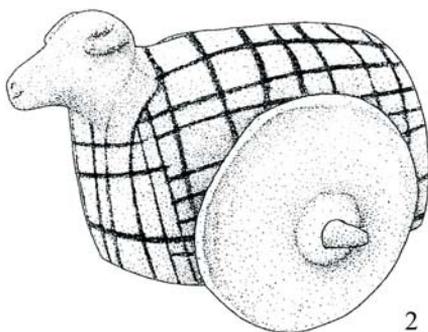
Regarding the animal depictions associated with wheeled vehicles, mention must be made of vessels which were previously interpreted as boat models (MATUSCHIK 2006, 279), but are now seen as wagon depictions. Most of the small artefacts in this category are finds of the Tripolye culture (MATUSCHIK 2006, Fig. 2; *Fig. 3*). These vessels have an oval body with an animal torso applied to the vessel's front. The axles passed through perforations on the front limbs, while the perforation under the mouth apparently indicated the mode of harnessing. Three vessels of this type found at Karolina, Nemirov and Rakovec in the Ukraine have been assigned to the Tripolye B2–C1 period which, according to the most recent radiocarbon measurements, can be dated to the earlier 4th millennium (MATUSCHIK 2006, 280). A comparable vessel from the earlier Precucuteni period has recently been published from Târgu Frumos in Romania (URSULESCU – BOGHIAN – COTIUGĂ 2005, Fig. 12. 1). The interpretation of the oval, flat-bottomed object with a cattle head applied to the rim has been left open (URSULESCU – BOGHIAN – COTIUGĂ 2005, 238). The calibrated radiocarbon dates for the settlement were 4940–4470 BC and 3700–3600 bc [sic] (2σ). In a later study, Dumitru Boghian rejected an interpretation as a boat model and proposed another reconstruction with the two cattle heads applied to the vessel, which thus represented some sort of vehicle (BOGHIAN 2008–2009, Fig. 3. 2). In his view, the vessel furnishes early evidence for the secondary exploitation of domesticates (BOGHIAN 2008–2009, 170).

The date of the appearance and use of wheeled vehicles can thus be pushed back to ever earlier periods. Evidence for wagons leads as far north as the Northern Sea and the archaeological record clearly shows that two- and four-

⁷ The figurine was displayed at the exhibition “Cucuteni–Tripolye: A Great Civilisation of Old Europe” in the Vatican in 2008. Cp. <http://scribalterror.blogspot.com/2008/09/a-cucuteni-tryp.html>



1



2



3

Fig. 2. Stylised wagon models of the Copper Age. 1. Cucuteni–Tripolye culture (after <http://scribalterror.blogspot.com/2008/09/a-cucuteni-tryp.html>),
 2. Chanudaro, Pakistan (after BOROFFKA 2004, Fig. 1),
 3. Altyn Depe, Turkmenistan (after <http://www.hermitagemuseum.org/fcgi-bin/db2www/quickSearch.mac/gallery?selLang=English&tmCond=waggon&Go.x=0&Go.y=0>).

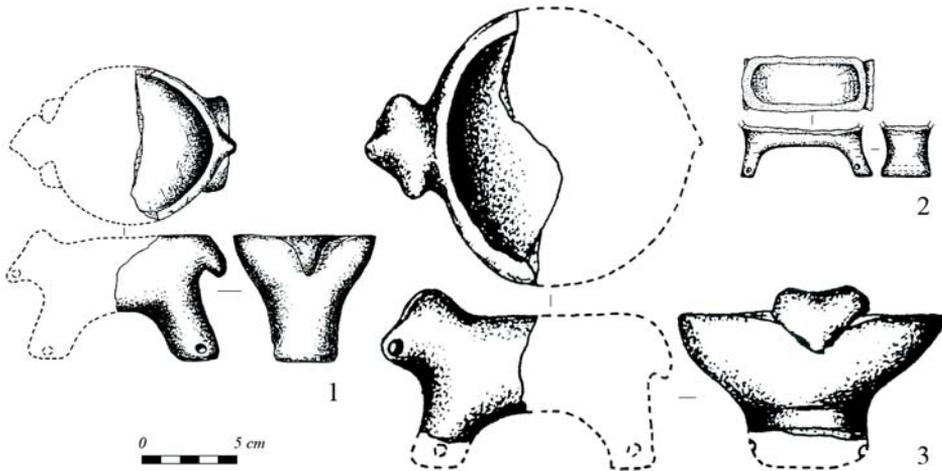


Fig. 3. Stylised wagon models of the Tripolye culture from the Ukraine.
1. Karolina, 2. Nemirov, 3. Rakovec (after MATUSCHIK 2006, Fig. 2).

wheeled conveyances for transporting goods and four-wheeled wagons were known across the greater part of Europe from the mid-4th millennium onward.

The wheeled vehicles appearing among the rock engravings in Switzerland, Germany and Italy, the wooden wheels found in Denmark, Germany, Holland and Switzerland (WOYTOWITSCH 1995; FEDELE 2006; PÉTREQUIN *et al.* 2006, Fig. 3, Fig. 7. 1; LOUWE KOOLJMAN 2006, Figs 4–5; RUOFF 2006, Fig. 1, Fig. 4; SCHLICHTERLE 2006, Fig. 1), the wooden wheel and axle discovered in Slovenia (VELUŠČEK 2002, 2006), a road paved with tree trunks excavated in Holland (PÉTREQUIN *et al.* 2006, Fig. 6; LOUWE KOOLJMAN 2006, Figs 7–8), the clay wheel and wagon models, and the small figurines portraying the animals yoked to a wagon conclusively prove the early use and diffusion of this major innovation across Europe. An excellent discussion of the importance of wagons and their role in communication between prehistoric communities written by Stefan Burmeister appeared recently (BURMEISTER 2011, with an excellent overview of the relevant archaeological evidence).⁸

The archaeological record thus provides undisputable evidence that wheels were known across the greater part of Europe and Anatolia from the earlier 4th millennium BC onward. The combination of wheels and simple conveyances for transporting goods led to the appearance of A or Y framed transport vehicles,

⁸ Stefan Burmeister's study appeared after the closing of my manuscript.

suitable for covering smaller distances. The current state of our knowledge thus indicates that the birth of wheeled vehicles suitable for longer journeys and for transporting humans can be dated to the mid-4th millennium BC.

3.2. How to spot a wagon model

Archaeological finds of wheeled conveyances can be divided into two main groups: two- and four-wheeled vehicles. A classification according to wheel types is also possible (solid or spoked wheels), as is a categorisation based on draught animals: heavy four-wheeled wagons drawn by one or two oxen or perhaps donkeys, and two-wheeled carts or rigs and chariots drawn by horses.

Carts, wagons and chariots are inconceivable without wheels; at the same time, wheels can be accessories of other objects too, not merely of wagons or carts. While this might seem like stating the obvious, it must certainly be borne in mind, given the depictions and finds of wheeled ploughs, wheeled sledges and other wheeled conveyances whose use has survived to this day (NADLER 2002, Fig. 1; PÉTREQUIN *et al.* 2006, Fig. 4; *Fig. 4*). In Summer 1991, Martin



Fig. 4. Modern-day two-wheeled transport vehicle used in Anatolia (after NADLER 2002, Fig. 1).

Nadler photographed two-wheeled, A-framed carts drawn by oxen used for the transportation of hay in eastern Turkey, as well as the successive phases of how these vehicles were made. These two-wheeled carts were only useful for carting harvested crops or some other produce over short distances. Four-wheeled vehicles enabled travel and transportation across greater distances, being suitable for the transportation of people, crops and commodities alike.

While the definition of carts and wagons seems straightforward enough, the correlation with the archaeological evidence is less so. Finds of genuine wagons and their remains are rarely problematic, but miniature rectangular artefacts and clay wheel models are an entirely different matter. If one or more wheels are found in themselves, we are inclined to immediately associate them with wagons, even though we should, at the most, conceptualise a wheeled conveyance of some sort. Both genuine wooden wheels and their miniature counterparts in clay could have been accessories of wagons, ploughs, hay carts or some other wheeled vehicle.

Fettich correctly pointed out that wheels are not the singular attributes of vehicles because although virtually anything can be set on rollers, contraptions of this kind do not automatically qualify as vehicles. For example, wheeled urns can hardly be regarded as vehicles (FETTICH 1969, 31).

The identification of clay wagon models is not as simple as it might seem. Wheels, as we have seen, are not as obvious accessories as they might appear at first glance, and neither is a rectangular wagon box. Many rectangular vessels known from several archaeological cultures flourishing from the Neolithic to the Bronze Age have never been regarded as vehicle models. Even though Fettich regarded quite a few Neolithic and Bronze Age vessels as representing wagons (FETTICH 1969, 33–37, 43–48, 51–55, 57–65), his views were never widely accepted.

What, then, are the criteria for unambiguously identifying a particular artefact as a wagon model? In my view, the joint occurrence of several technical elements and a resemblance to genuine wagons offer secure criteria for claiming that a particular artefact can be interpreted as a wagon model. These elements include a rectangular wagon box and perforations for the axles, or a rectangular wagon box and a knob or other protuberance on the underside marking the place of the axles, or a rectangular wagon box and a symbolic indication of the draught animals, or any combination of the above elements. Depictions of the wagon box's wooden planks, the draught-pole and the yoke and/or harness too can be seen as indicating wagons.

3.3. Late Copper Age wagon models

For a fairly long time, the wagon model from Palaikastro in Greece, the well-known four-wheeled vehicle from Budakalász (BÓNA 1960, Fig. 3; *Fig. 1*) and the rock engraving from Züschen in Germany (BÓNA 1960, 84) represented the sole evidence for the use of wagons in prehistoric Europe. The two models and the rock engraving were believed to be roughly contemporaneous or, to be more precise, the Budakalász model, recovered from a chronologically secure context, was used for dating the other two finds. All three were dated between 2200 and 1800 BC, the generally accepted absolute dates for the Baden culture at the time.

The advances made in archaeological dating techniques have called for a serious re-assessment and refinement of the conventional archaeological chronologies. The so-called short chronology, constructed from correlations with Egyptian king lists and Mesopotamian written sources, as well as typological similarities between vessel forms occurring both in the Carpathian Basin and in the Ancient Near East, was replaced by the radiocarbon-based long chronology which, however, gave consistently earlier dates by about a millennium. The gap between the two systems has still not been reassuringly bridged and remains the subject of heated debates. While not going into the details of this debate, suffice it here to mention that the currently accepted date for the Late Copper Age in the Carpathian Basin and the neighbouring regions is between 3600/3500 and 3000/2800 BC, a period marked by the flourishing of the Baden culture or the Baden complex in this region. Let us now review the wagon models of this 500–700 years long period from the region.

The largest, virtually fully excavated cemetery of the Baden culture at Budakalász yielded two wagon models: the well-known piece from Grave 177 (SOPRONI 1954, Pl. 7; BONDÁR 2009, Pl. LXXIX, 177/3; *Fig. 5*) and an all but forgotten specimen from Grave 158 (SOPRONI 1954, Pl. 6. 5; BONDÁR 2009, Pl. LXVI. 158/2; *Fig. 6*). Although Soproni had published the latter piece (SOPRONI 1954, Pl. 6. 5), his study was rarely quoted (the few exceptions being BÓNA 1960; FOLTINY 1959; FETTICH 1969; KOREK 1973).⁹ Similarly to the wagon model from Grave 177, this piece was also a handled vessel painted red on the

⁹ Gábor Ilon can be credited with rediscovering and thus rescuing Fettich's study from oblivion (ILON 2001).



Fig. 5. Copper Age wagon model from Grave 177 of the Budakalász cemetery (drawing by László Gucsi).

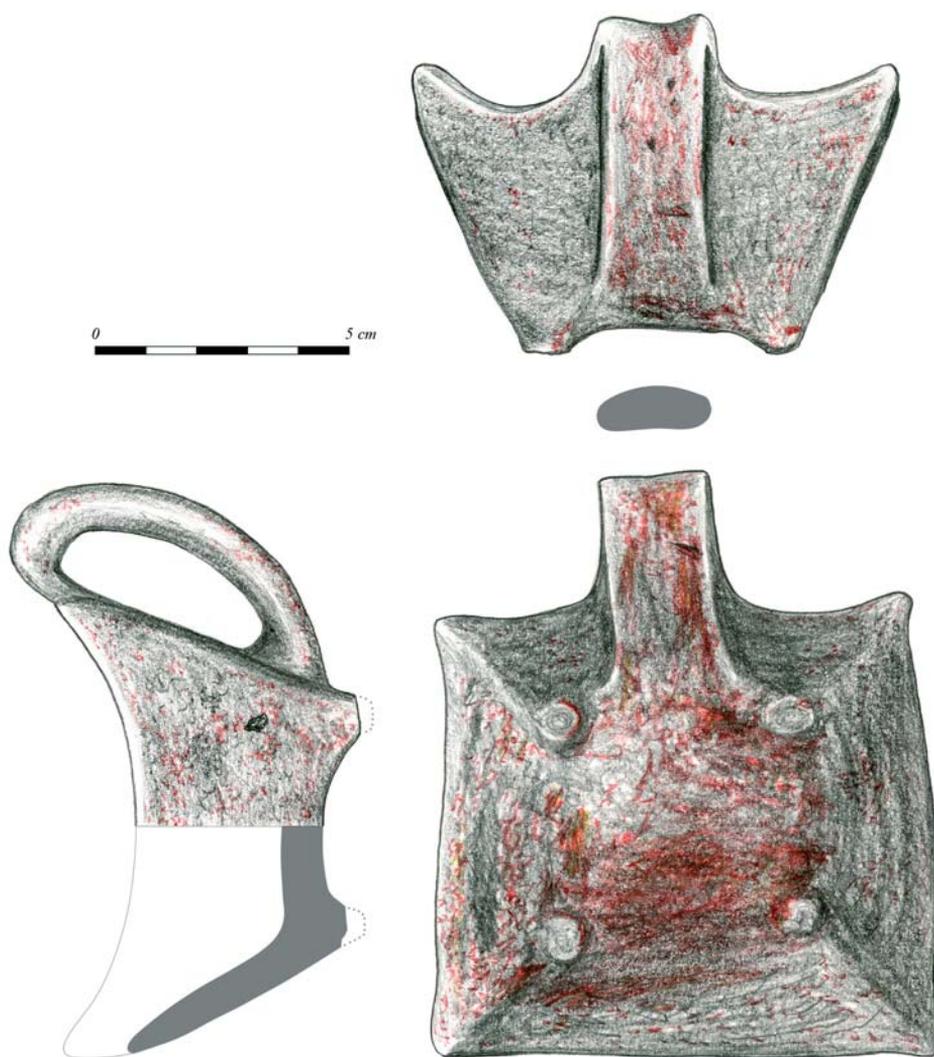


Fig. 6. Copper Age wagon model from Grave 158 of the Budakalász cemetery (drawing by László Gucsi).

exterior and interior. However, in contrast to the model from Grave 177, the latter is plain, lacks wheels and has four small knobs on the underside for the axles.

The next Late Copper Age miniature wagon came to light in 1972, twenty years after the discovery of the Budakalász model, from a grave of the Baden culture in Szigetszentmárton (KALICZ 1976, Fig. 3; KALICZ 1976a, Abb. 2; *Fig. 15. 2*).

A model with animal head protomes from Radošina in Slovakia was the next major find (NĚMEJCOVÁ-PAVÚKOVÁ – BÁRTA 1977, Abb. 7; *Fig. 7, Fig. 8. 1a–b*).¹⁰ The Radošina model furnished evidence that the use of wheeled vehicles in Europe pre-dated the Baden culture: the finds from the settlement could be assigned to the Boleráz group, indicating that these communities were familiar with wagons. The importance of the Radošina model lies not only in that it pushed the back the date for the early use of wagons, but also in its divergence from the earlier models: the draught animals were also depicted on the model's front side. According to Viera Němejcová-Pavúková and Juráj Bárta, however, the protomes on the wagon portray dogs, rams or bears (NĚMEJCOVÁ-PAVÚKOVÁ – BÁRTA 1977, 443).

The next wagon model came to light in 1982 at Boglárlelle (ECSÉDY 1982, Fig. 8; HONTI – KÖLTŐ – NÉMETH 1988, Pl. II. 1–2; *Fig. 8. 2a–b*). Dating from the Boleráz period, this wagon model too portrays the draught animals (BONDÁR 2004, Fig. 3; *Fig. 9*).¹¹ Yet another wagon model is known from Pilismarót-Basaharc, a burial ground of the Boleráz group (BONDÁR 1990, Fig. 7. 3; *Fig. 8. 3a–c*). It must here be noted that István Torma, who excavated the site, does not regard this artefact as a wagon model.

The inventory of Boleráz wagon models was enriched by two specimens from Austria: one came to light at Mödling-Jennyberg (RUTTKAY 1995, Abb. 7. 3, BONDÁR 2004, Fig. 4. 1; *Fig. 10. 1*), the other at Plessing-Holzfeld (RUTTKAY 2000, Taf. 5. 63; BONDÁR 2004, Fig. 4. 2; *Fig. 10. 2*).

I have discussed the wagon models of the Late Copper Age and the Early Bronze Age in several studies (BONDÁR 1990, 1992, 2004, 2006; BONDÁR – SZÉKELY 2011; BONDÁR 2012), with a broader overview of the wagon models of the Late Copper Age in the publication of a find from Balatonberény (BONDÁR 2004, Fig. 6; *Fig. 11*). Recent finds of wagon models include a Late Copper

¹⁰ Němejcová-Pavúková first published the wagon model in the conference volume on the Baden culture. It was described as a “wagenförmiges Gefäß, vierkantig, mit zwei plastischen Tierfiguren” in the section on unusual finds (NĚMEJCOVÁ-PAVÚKOVÁ 1973, 299, Abb. 3).

¹¹ I would here like to thank Sándor Ősi (Archaeological Institute of the Hungarian Academy of Sciences) for the excellent drawing.

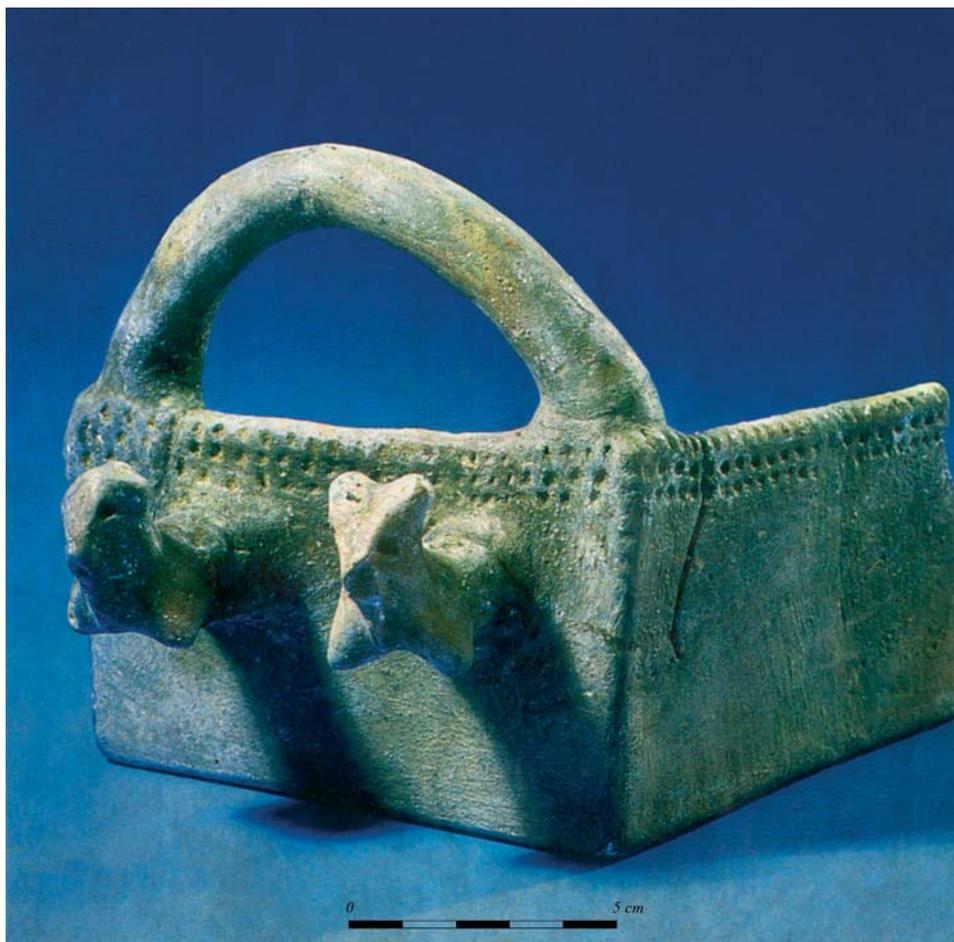


Fig. 7. Copper Age wagon model from Radošina (after the cover photo of the volume “Symposium über die Entstehung und Chronologie der Badener Kultur”. Ed. B. Chropovský. Bratislava 1973).

Age piece from Moha, dating from the Boleráz period (KOVÁCS 2006, Abb. 1; Fig. 12), and the fragments of three wagon models and a wheel from Esztergom-Szentkirály, dating from the classical Baden period (KÖVECSÉS VARGA 2010; Fig. 13).¹²

¹² Only a single copy of the volume has been published to date. An electronic copy of the article was kindly provided by Edit Tari, who edited the volume. I would here like to thank her for her kind permission to use the illustration.

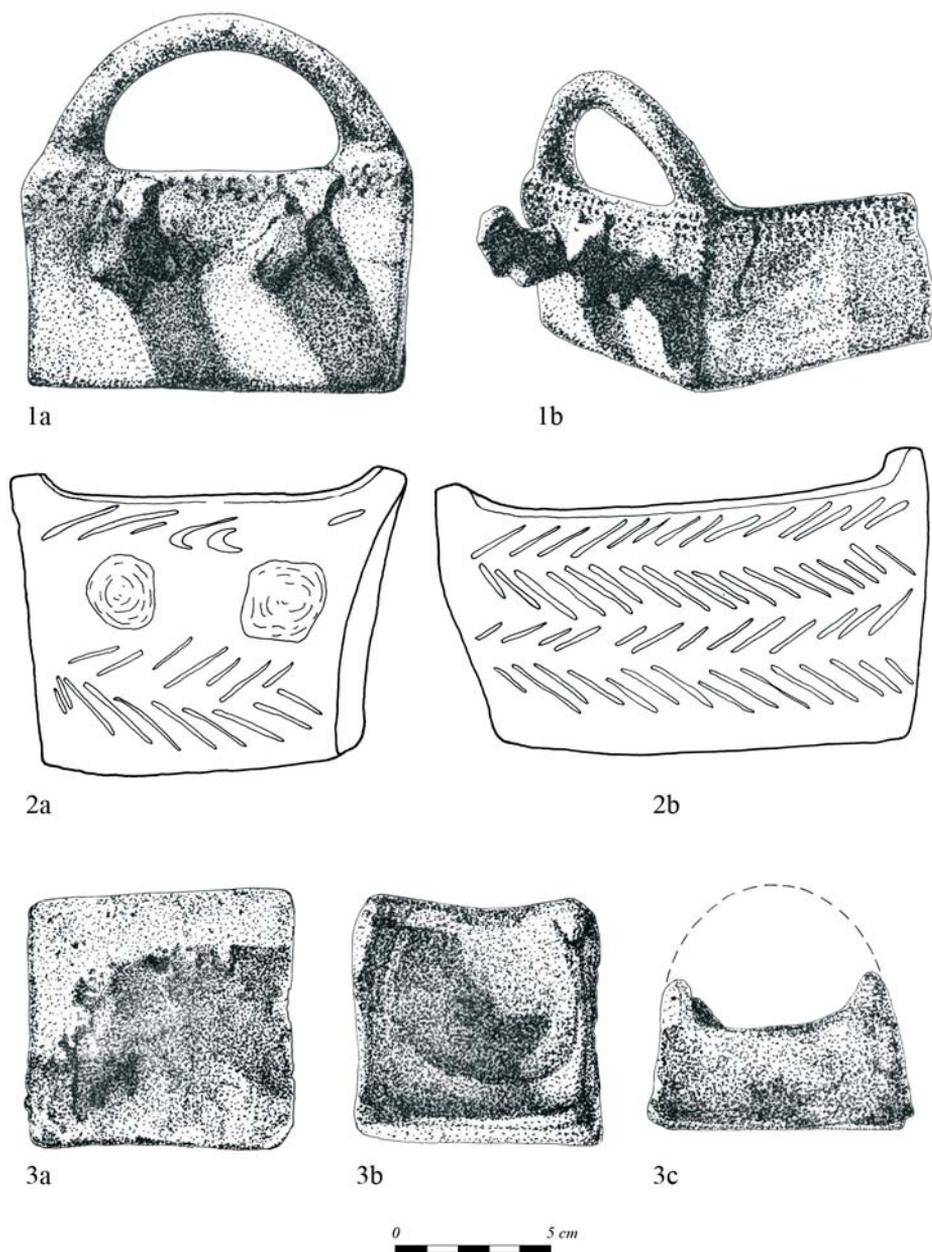
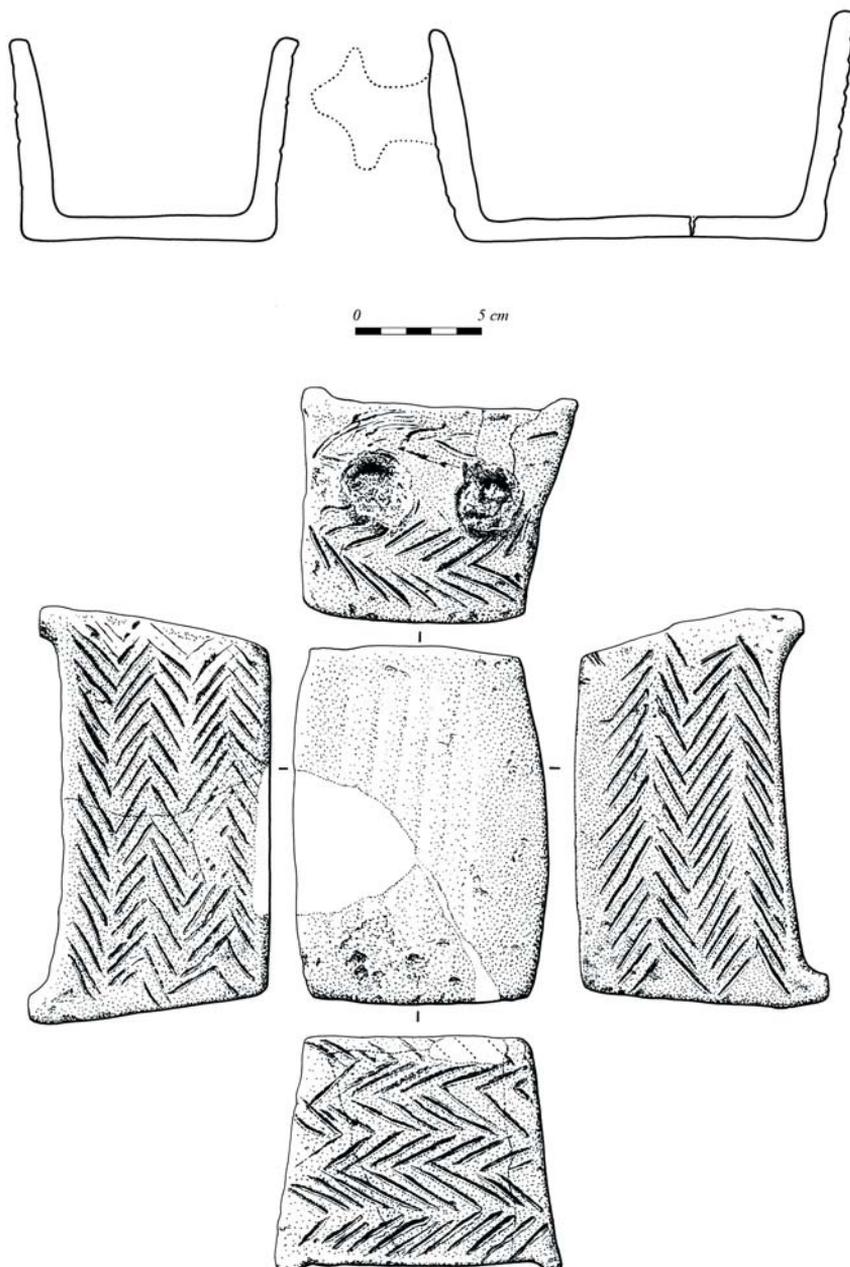


Fig. 8. Copper Age wagon models. 1a-b. Radošina (after NĚMEJCOVÁ-PAVÚKOVÁ – BÁRTA 1977, Abb. 7), 2a-b. Boglárlelle (after ECSEDY 1982, Fig. 8. 9a–b), 3a–c. Pilismarót, Grave 445 (after BONDÁR 1990. Fig. 7. 3a–c).



*Fig. 9. Copper Age wagon model from Boglárlelle
(after BONDÁR 2004, Fig. 3, drawing by Sándor Ósi).*

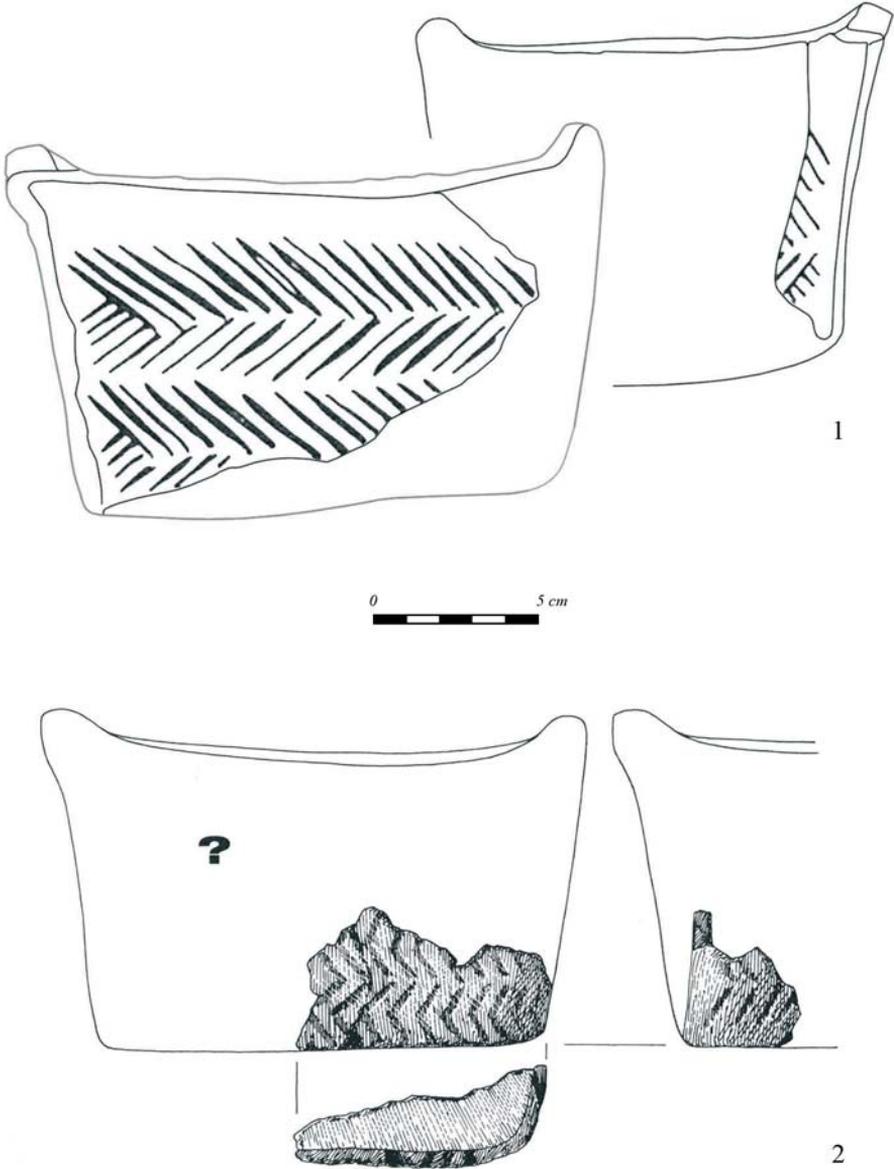
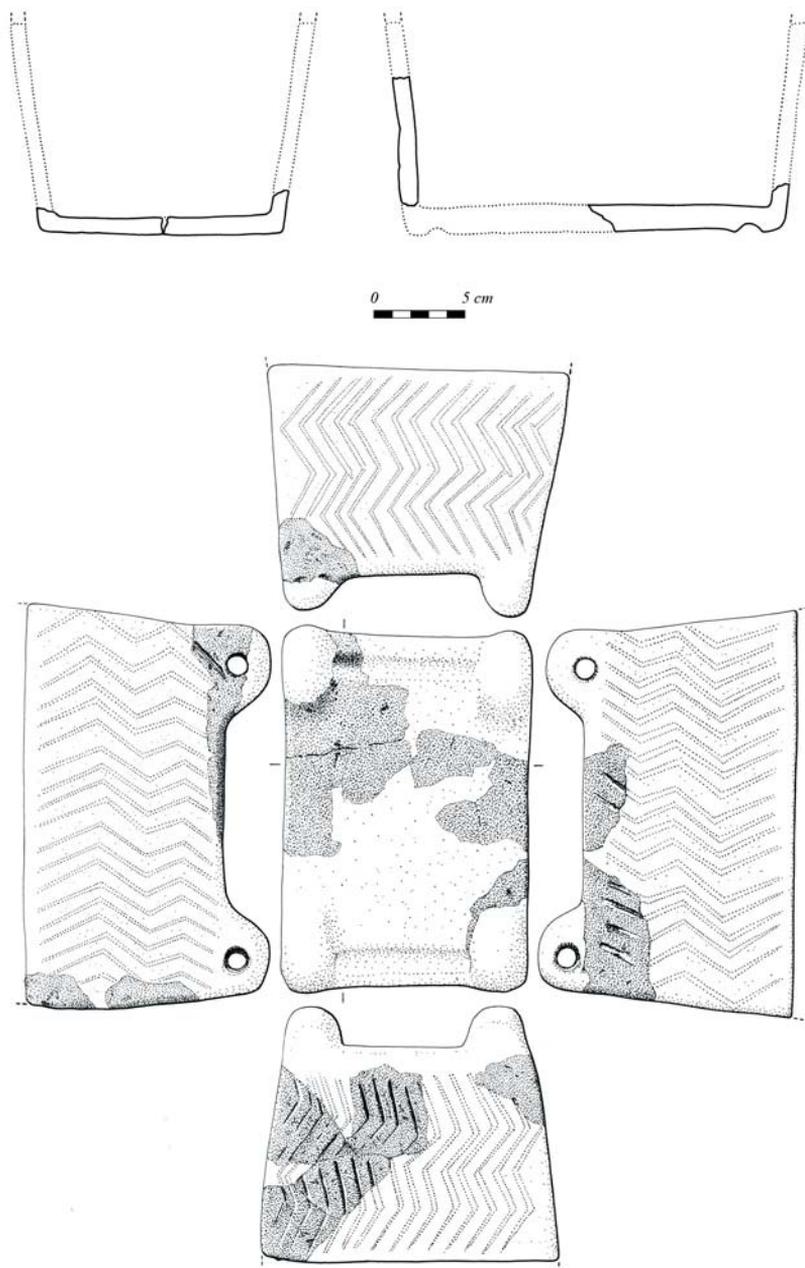


Fig. 10. Copper Age wagon models. 1. Mödling (after RUTKAY 1995, Abb. 7. 3),
2. Pleissing (after RUTKAY 2000, Taf. 5. 63).



*Fig. 11. Copper Age wagon model from Balatonberény
(after BONDÁR 2004, Fig. 6, drawing by Sándor Ósi).*

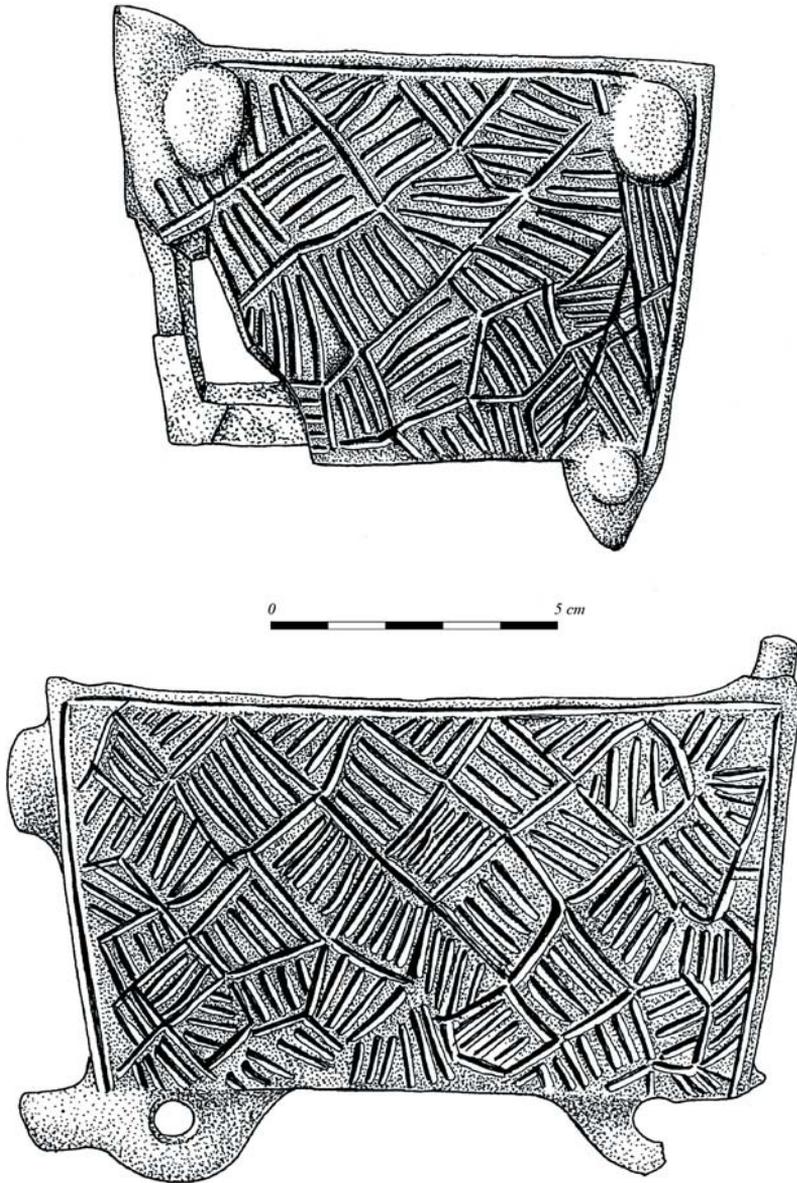
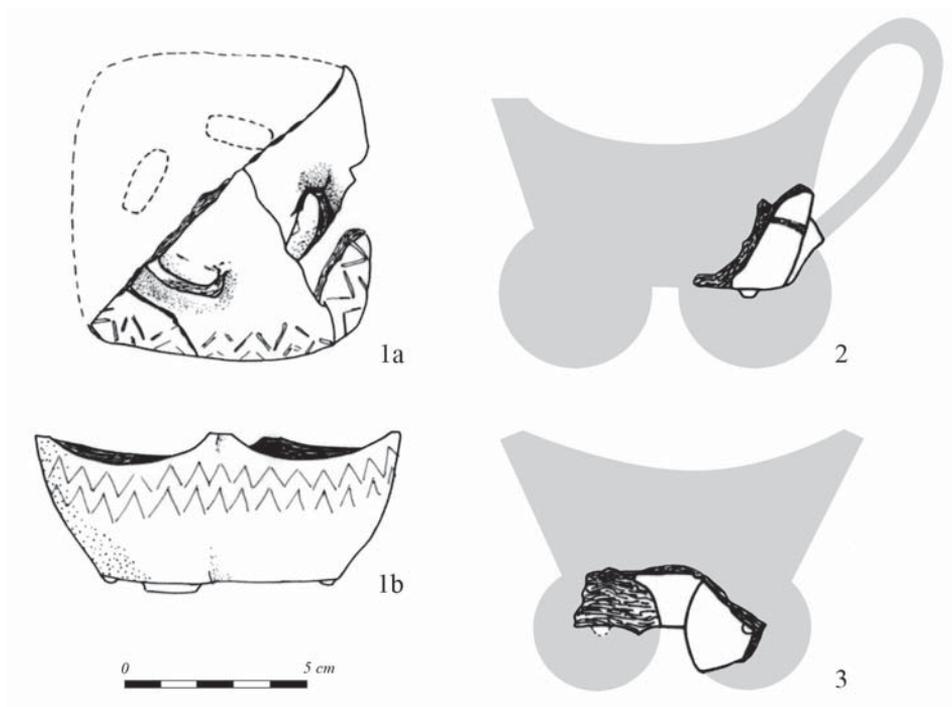


Fig. 12. Copper Age wagon model from Moha (after KOVÁCS 2006, Abb. 1).



*Fig. 13. Copper Age wagon models from Esztergom
(after KÖVECSES VARGA 2010, Figs 14–15).*

Three new wagon models were discovered during field surveys conducted in Slovakia. One came to light at Chorvátsky Grob (Magyargurab, Slovakia, FARKAŠ 2010, Fig. 4; *Fig. 16. 1*), while two were found at Pezinok (Bazin, Slovakia, FARKAŠ 2010, Figs 2–3; *Fig. 16. 2–3*).

A new wagon model (*Fig. 14*) was found recently during the investigation of an extensive site near Kaposvár-Toponár in County Somogy. It has been dated to the Boleráz period in view of the associated pottery (BONDÁR 2012, Fig. 1; cp. *Figs 2–3* for the finds recovered together with the wagon model).¹³ The model brought to light from a settlement pit is one of the earliest of its kind from the Carpathian Basin.¹⁴ The wagon model from Kaposvár can be dated to the Boleráz period, to the type on which wheels do not appear, although the draught animals

¹³ I would here like to thank Edith Bárdos for kindly permitting the publication of the wagon model.

¹⁴ Although the clay wheel model from Szombathely predates the wagon models, there is no way of establishing whether it was part of a wagon model or a wheeled plough.



Fig. 14. Copper Age wagon model from Kaposvár (photo by Sándor Ósi).

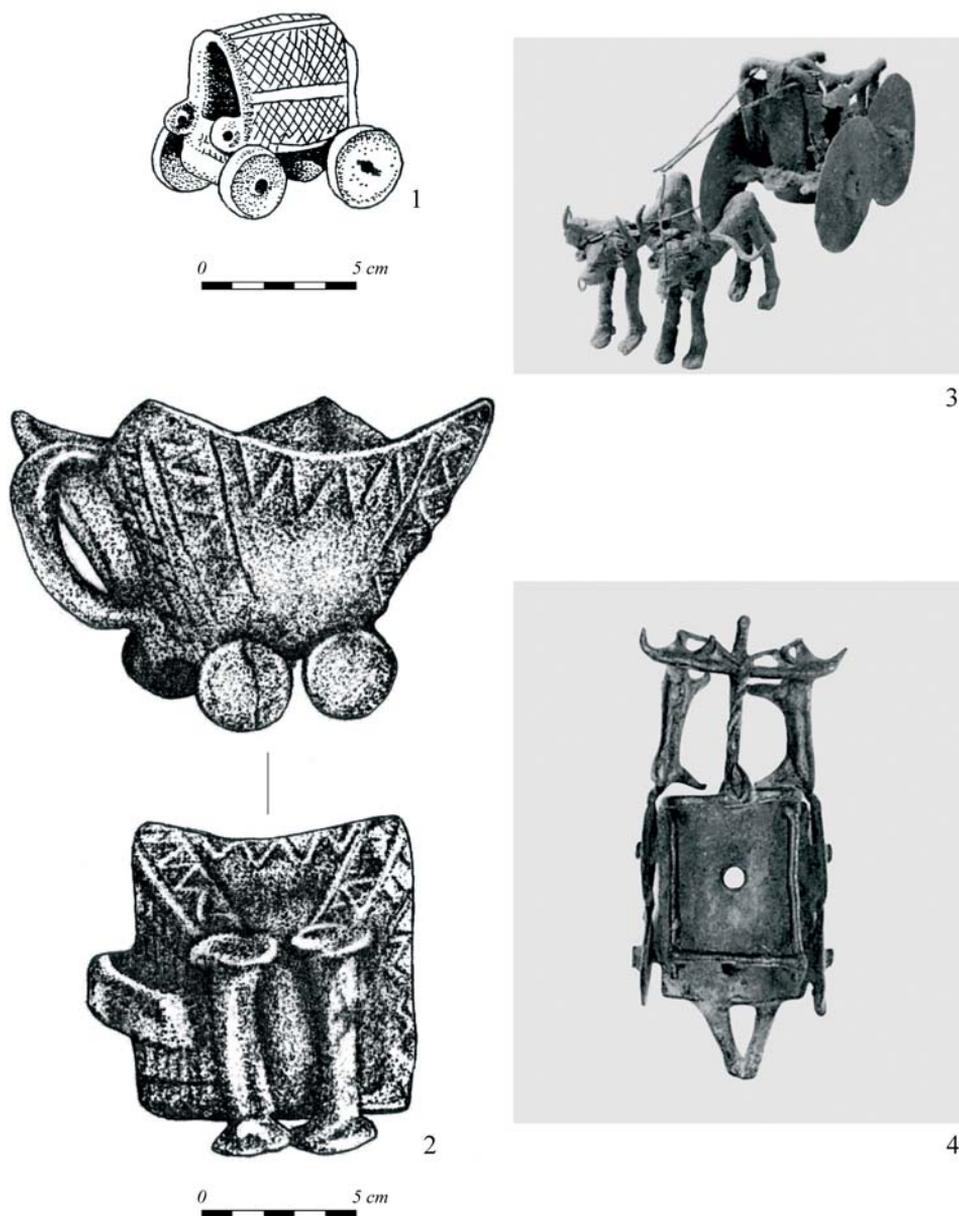


Fig. 15. Copper Age wagon models. 1. Tepe Gawra (after LITTAUER – CROUWEL 1974, Fig. 2), 2. Szigetszentmárton (after KALICZ 1976, Abb. 3), 3. unprovenanced, from Anatolia (after LITTAUER – CROUWEL 2002, Pl. 165b), 4. unprovenanced, from Anatolia (after LITTAUER – CROUWEL 2002, Pl. 159c).

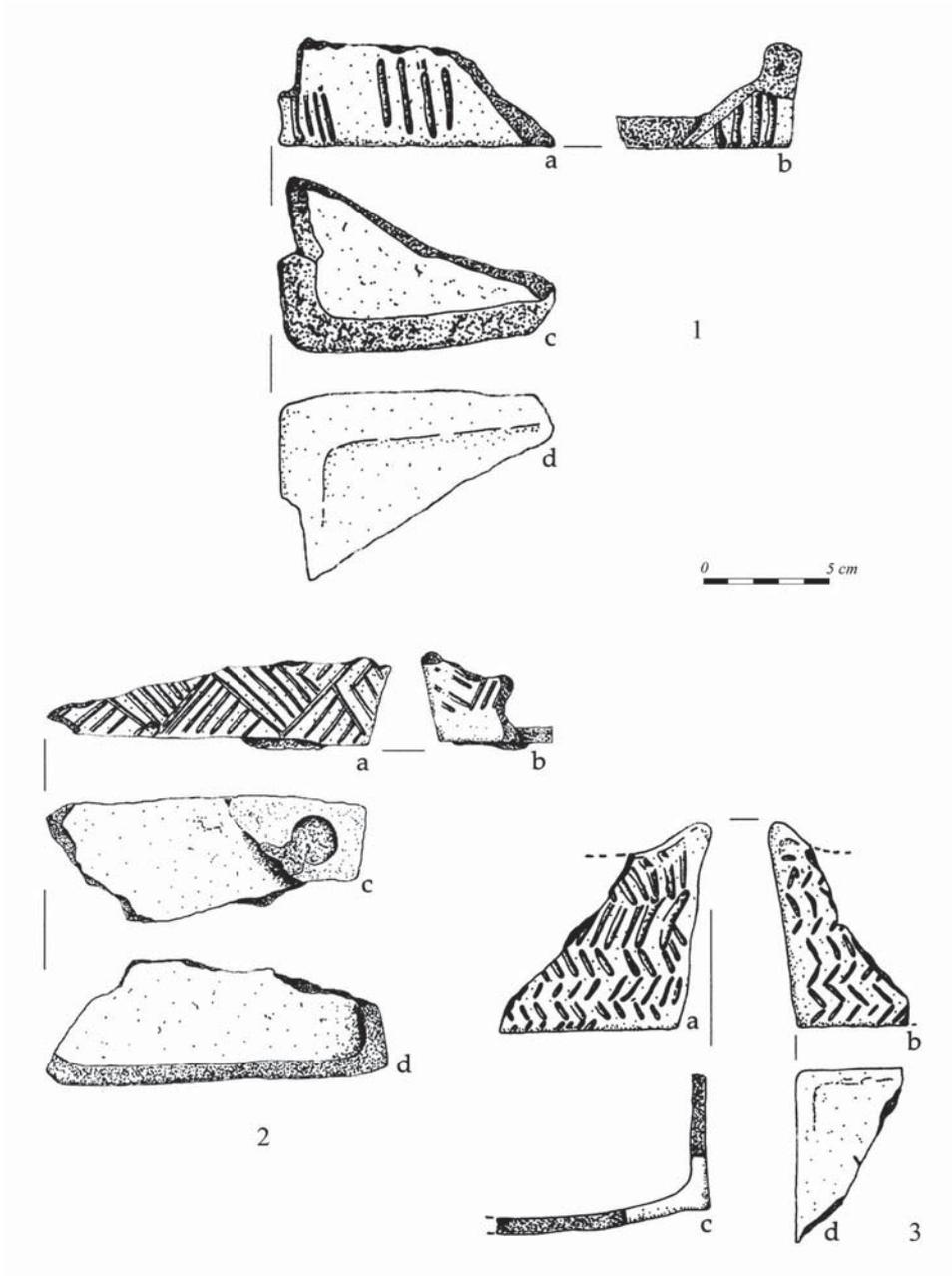


Fig. 16. Copper Age wagon models. 1. Chorvátsky grob (after FARKAŠ 2010, Fig. 4), 2–3. Pezinok (after FARKAŠ 2010, Figs 2–3).

putatively yoked to the wagon are symbolically portrayed on the front side. Unfortunately, the animal heads broke off and have not survived.

3.4. Discussion

The currently known Copper Age wagon models can be dated to the early (Boleráz) and classical period of the Baden culture. No finds of this type are known from the culture's late period, although a miniature clay wheel found at Ózd-Kőaljatető, a site of the Piliny group (BANNER 1956, Taf. 75. 8), reflects the continued use of wagons.¹⁵ A clay wheel has been published from Țebea (Cebe, Romania), a site of the Late Copper Age Coțofeni culture, dated to the Coțofeni III period (ROMAN 1977, Pl. 52. 40). More recently, the fragment of a wagon model came to light at Bădăcin (Szilágybadacsony, Romania, BĂCUEȚ 1998, Pl. 1). No wagon models are known from the Kostolac culture, although there has been a recent proposal to date the vehicle model from Szelevény to the Kostolac culture in view of an analogous find from the same period found at Gomolava (HORVÁTH 2009, 133; HORVÁTH 2011a, 229). However, the date and function of this model remains uncertain for the time being. A clay wagon model has been reported from the eponymous site of the Vučedol culture in Croatia, which according to some prehistorians should be assigned to the Copper Age (DURMAN 1988, 19, 47, Cat. no. 24, sadly, without a photo). Quoting Durman's personal communication, Lanting mentions another wagon model of the Vučedol culture from Borinci in Croatia (BAKKER *et al.* 1999, 788). Clay wheels were allegedly also found at the Vučedol-Várhegy site (BÓNA 1960, 90, quoting SCHMIDT 1945, 103).

It has already been demonstrated that the distribution of the known Late Copper Age wagon models shows a concentration in the central regions of the Carpathian Basin (BONDÁR 2004, Fig. 15; *Fig. 19*). Several pieces are known from Counties Pest, Komárom-Esztergom and Somogy, while not a single piece has yet been published from the Great Hungarian Plain or northern Hungary. Most of the clay wagon models can be assigned to the Boleráz period (BONDÁR 2004, 15). Eleven of the eighteen currently known models date from the Boleráz period, namely the pieces from Balatonberény (*Fig. 11*), Boglárlelle (*Fig. 8. 2a–b*,

¹⁵ Bóna mentioned the miniature wheel from Ózd-Kőaljatető among the finds of the Hatvan culture (BÓNA 1960, 92). Its dating to the Late Copper Age (based on Banner's study) was proposed again in 1999 when Professor Albert Lanting enquired about new wagon models (such as the one from Börzönce) while collecting data for the study to be published in *Antiquity* (BAKKER *et al.* 1999).

Fig. 9), Kaposvár (*Fig. 14*), Moha (*Fig. 12*), Mödling (*Fig. 10. 1*), Pilismarót (*Fig. 8. 3a–c*), Plessing (*Fig. 10. 2*), Radošina (*Fig. 7, Fig. 8, 1a–b*), Chorvátsky Grob (*Fig. 16. 1*) and Pezinok (*Fig. 16. 2–3*), while six from the classical Baden period: the specimens from Budakalász (Grave 158: *Fig. 6*, Grave 177: *Fig. 5*), Szigetszentmárton (*Fig. 15. 2*) and Esztergom (*Fig. 13. 1–3*). The fragment from Bădăcin can be assigned to the Coțofeni culture.

Two main groups can be distinguished among the wagon models listed above: the first comprises the pieces on which wheels/axles are marked (Balatonberény, Budakalász, Graves 158 and 177, Esztergom, Kaposvár, Moha, Szigetszentmárton and Pezinok), the second, the rectangular vessels resembling wagons (Radošina, Boglárlelle, Pilismarót, Mödling, Plessing, Chorvátsky Grob and Pezinok).

Let us first examine the clay wagon models with flattish disc wheels/axles, on which wheels and axles were depicted in two different ways. The wheels of the wagon model from Grave 177 of the Budakalász cemetery were flat discs which survived in a fragmentary condition (*Fig. 5*). The miniature wagon was set on its wheels when it was deposited in the symbolic burial. The two wagon models from Esztergom-Szentkirály (*Fig. 13. 2–3*) resemble the piece from Grave 177 of the Budakalász burial ground. The use of separate wheels is indicated by the rounded handle-like knobs for the axles on the Balatonberény model (*Fig. 11*) and the wagon model from Moha has similar handle-like loops for the axles (*Fig. 12*).

The Kaposvár wagon is set on four small knobs (*Fig. 14*), similarly to the vessel from Grave 158 of the Budakalász cemetery (*Fig. 6*) and one of the pieces from Esztergom (*Fig. 13. 1*).

Instead of disc shaped wheels, the wagon model from Szigetszentmárton has flat wheels drawn out from the two ends of the roller-like cylindrical axles on which the attachment of the wheel is indicated with a flattened knob in the centre (*Fig. 15. 2*), as on the piece from Budakalász. The wheels of the Szigetszentmárton model differ from those of the miniature wagons from Esztergom and from Grave 177 of the Budakalász cemetery. It is quite obvious that instead of the solid, independent wheels encountered on other models, the rectangular wagon box was set on two longish rollers whose ends terminated in wheels.

The combination of wheels and axles resulted in the creation of rollers onto which a rectangular wagon box was set. A conveyance of this type would not have been too practical or particularly durable in the case of real-life wagons. However, there is a general consensus among prehistorians that the wagon models of the Late Copper Age were part of the paraphernalia used in various rituals and thus the separate wagon box and the combination of axles and wheels underneath was

no more than a simple and ingenious way of indicating the elements embodied by the model.

A similar technical solution appears on a wagon model from Tepe Gawra depicting a covered wagon box set on an axle provided with wheels (BONDÁR 2004, Fig. 13. 4; *Fig. 15. 1*) and on an unprovenanced bronze wagon model from Anatolia (BONDÁR 2004, Fig. 14. 2b; *Fig. 15. 3*) which likewise has the wagon box set on two axles with wheels. A similar technical solution appears on the underside of another unprovenanced Anatolian wagon model (BONDÁR 2004, Fig. 14. 3b; *Fig. 15. 4*). Two bronze wagon models from Abamor in south-eastern Anatolia can be assigned to the same type, on which the wagon box is set on the axles (KULAKOĞLU 2003, Fig. 2, Fig. 7). These large, 54–55 cm long models shed much-needed light on the structure of prehistoric wagons, on how the draught-pole and the axles were fixed, and how the wheels were attached to the axles. A third model from the site depicts a covered wagon (KULAKOĞLU 2003, Fig. 1).

The above-quoted models shed light on why axles are not indicated on the wagon models lacking wheels and they perhaps also illuminate the function of small, spool-like clay artefacts brought to light on sites of the Boleráz group. These small artefacts were either simply neglected in the site reports or described as accessories of spinning and weaving. More recently, a possible connection has been proposed between wagon models and these spool-like artefacts, namely that these small artefact perhaps represented roller-like wheels for wagon models.¹⁶ The joint occurrence of wagon models and spools has been reported from several sites, for example from the burial grounds excavated at Pilismarót-Basaharc and Budakalász in Hungary, and the sites at Mödling-Jennyberg and Plessing in Austria, again suggesting that an association between wagon models and spools should be considered. Assuming that the wagon models from Szigetszentmárton and Anatolia depict one possible manner in which wheels were attached to wagons, the possible function of the hitherto neglected spools can be set in a new perspective. Obviously, this calls for a rigorous re-examination of these finds in order to determine whether they had indeed been roller-like wheels.

It is also possible that some clay wagon models had been fitted with wooden axles and wooden wheels, or that the clay wagon box had been set into a wooden frame with wheels.

¹⁶ For a detailed study on the possible function of spools, cp. BONDÁR in print. The possible functions of these spool-like artefacts have been recently reviewed by Tünde Horváth (HORVÁTH 2011, 40).

In the case of some models, such as pieces from Radošina (*Fig. 7, Fig. 8. 1a–b*), Boglárlelle (*Fig. 8. 2a–b, Fig. 9*), Kaposvár (*Fig. 14*) and Moha (*Fig. 12*), the portrayal of the draught animals is the sole indication that the artefact depicted a wagon. Although neither the wheels, nor the draught animals appear on the specimens from Austria (*Fig. 10*), Pilismarót (*Fig. 8. 3*) and Slovakia (*Fig. 16. 1–3*), their size and the analogies to the rectangular vessels suggest that they too can be regarded as wagon models. Assuming that several traditions existed for depicting wheels, these pieces may perhaps also be regarded as miniature vehicles.

The Late Copper Age wagon models have a rectangular wagon box with trapezoidal sides (the top being longer than the bottom) and an open top. The differences in their ornamentations and their rim forms suggest that genuine wagons too were made from different materials using diverse techniques. At first, the clay models and practical considerations both aided the reconstruction of the materials and techniques used for making real wagons. The many wooden finds discovered in the meantime have furnished incontestable proof that the various components such as the wagon box, the axles and the wheels had been made from wood. While the axle and the wheels rotating with the axle had been made from planks, a much wider range of materials were probably employed for the wagon box such as wood (planks of varying length), wickerwork reinforced by rods, or a combination of the two. It is also possible that the sides of the wagon box had been assembled from smaller mud bricks and a combination of wood and wickerwork.

A closer look at the wagon boxes of the Boleráz and Baden period reveals several differences between them. Most wagon models of the Boleráz period have a wagon box with a straight floor without any indication of axles or wheels (Boglárlelle: *Fig. 8. 2a–b, Fig. 9*, Mödling: *Fig. 10. 1*, Pilismarót: *Fig. 8. 3a–c*, Plessing: *Fig. 10. 2*, and Radošina: *Fig. 7, Fig. 8. 1a–b*). The structural elements holding the axles are marked on two pieces (Balatonberény: *Fig. 11*, and Moha: *Fig. 12*). It seems likely that the piece from Kaposvár (*Fig. 14*) and one of the Pezinok (*Fig. 16. 2*) models can be assigned to this type too, judging from the broken knobs on the underside. The wagon models from the classical Baden period all have the axles and the wheels marked in some manner. The handled wagon model from Grave 177 of the Budakalász cemetery (*Fig. 5*) depicts a wagon whose lower part had been constructed from planks, indicated by the incised lines. The axles for the wheels are marked by incised lines. The pieces from Esztergom are similar (*Fig. 13. 1–2*), the only difference being that the axles are

represented by small ribs. The wagon model from Grave 158 of the Budakalász cemetery is set on four small knobs (*Fig. 6*), perhaps a symbolic indication of the axles. One of the wagon models from Esztergom can be assigned to this type too (*Fig. 13. 3*). The axles are represented by two small cylinders with separately applied wheels on the Szigetszentmárton model (*Fig. 15. 2*). Evidence for how the axles and the wheels were fitted to genuine wagons is provided by the wooden wheel and axle discovered near Ljubljana (VELUŠČEK 2006, *Fig. 3, Fig. 5*).

The decoration of the wagon boxes on the models from the Boleráz period varies. Most bear an incised zig-zag pattern arranged in several rows: Boglárlelle (*Fig. 8. 2a–b, Fig. 9*), Mödling (*Fig. 10. 1*), Pleissing (*Fig. 10. 2*), Balatonberény (*Fig. 11*) and Pezinok (*Fig. 16. 3*). The piece from Kaposvár (*Fig. 14*) has short lines arranged in three rows, similarly to the fragment from Chorvátsky Grob (*Fig. 16. 1*), while the wagon model from Moha is adorned with an elaborate design of square, triangular and trapezoidal fields filled with hatching (*Fig. 12*), as is the fragment from Pezinok (*Fig. 16. 2*). The protome from Radošina is decorated with three rows of punctates under the rim (*Fig. 7, Fig. 8. 1a–b*). The wagon model from Pilismarót-Basaharc is plain (*Fig. 8. 3a–c*). The wagon models of the classical Baden period too are decorated in the most diverse manner, the only plain piece being the wagon model set on four knobs from Grave 158 of the Budakalász cemetery (*Fig. 6*). An incised zig-zag pattern adorns the piece from Grave 177 (*Fig. 5*) and the model from Szigetszentmárton under its rim (*Fig. 15. 2*). The latter has a zig-zag pattern and incised ladder motifs at the junction of the sides, and a similar pattern can be seen on one of the pieces from Esztergom (*Fig. 13. 2*). The other wagon model from Esztergom bears an incised zig-zag pattern (*Fig. 13. 1a–b*).

The structure of the Radošina model differs from that of the other miniature wagons in that its front is curved (*Fig. 7, Fig. 8. 1a–b*), it lacks wheels and it has two animal heads applied to the front. An unprovenanced copper wagon model of the Alacahüyük culture depicting a wagon box with a similar front side resting on the axles (NAGEL 1992, *Abb. 8; Fig. 18. 1*) provides details for the better understanding of the structure of the Radošina model.

The rim of the wagon boxes on the models of the Boleráz period varies significantly. The wagon models from Boglárlelle, Mödling, Pleissing and Moha have peaked rims, resembling the one from Kaposvár, while the wagon box of the model from Balatonberény has a straight rim. The wagon models of the period have curved sides rising into peaked corners (Budakalász, Szigetszentmárton, and the fragments from Esztergom were reconstructed as having similar sides).

The draught animals yoked to the wagon appear as applied ornaments on four miniature wagons of the Boleráz period: Radošina (*Fig. 7, Fig. 8. 1a–b*), Boglárlelle (*Fig. 8. 2a–b, Fig. 9*), Moha (*Fig. 12*) and Kaposvár (*Fig. 14*). Unfortunately, the fragments from Mödling (*Fig. 10. 1*), Pleissing (*Fig. 10. 2*), Balatonberény (*Fig. 11*), Pilismarót (*Fig. 8. 3a–c*), Pezinok (*Fig. 16. 2–3*) and Chorvátsky Grob (*Fig. 16. 1*) are unsuitable for establishing whether their front side had been adorned with protomes.

One shared trait of the wagon models of the classical Baden period is the large handle rising above the rim on the short side, which perhaps symbolises the way in which the draught animals were harnessed to the wagon (LITTAUER – CROUWEL 1996, *Fig. 2; Fig. 18. 2*). This interpretation is based on a chariot depiction from Kültepe in central Anatolia, dating from the early 2nd millennium BC. The cylinder seal bears a depiction of a rectangular chariot with two spoked wheels and its driver. The two horses were harnessed to the draught pole attached to the base of the box, with the halters attached to the horses' mouth curving back into the hands of the charioteer. The handled vessels are perhaps a stylised rendering of this mode of harnessing.

3.5. Late Copper Age zoomorphic depictions

The new chronological data on the early use of wheeled vehicles shed fresh light on certain animal depictions. The fragment of two animals joined by a bar across their neck found at Krežnica-Jara near Lublin in Poland (*Fig. 17. 6*) has since long been known (FILIP 1966, 643). Although Marin Dinu had noted already in 1981 that the figurine could be perhaps be linked to wagon models, this proposal received little attention at the time (DINU 1981, *Fig. 9. 1; VOSTEEN 1999, Taf. CVII. 62; BONDÁR 2004, Fig. 8. 2*). A closer look at the figurines makes it quite obvious that the two animals had been used for traction: laid across their neck is a withers yoke necessary for harnessing. Similarly to the renowned pot with the wagon engraving from Bronocice, the figurines can be assigned to the Funnel Beaker culture. Comparable metal figurines came to light at Bytyn near Poznań, also in Poland, in the late 19th century (ŠTURMS 1955, 23. *Abb. 1. 4; VOSTEEN 1999, Taf. CVII. 61; BONDÁR 2004, Fig. 8. 4; Fig. 17. 8*). The animals have a collar around their neck and the yoke to which they were harnessed is laid across their napes. One of the figurines has a perforation on the body, probably an indication that the two animals had been joined to each other. Another pair of joined animals cast from copper came to light at Dieburg in Germany (MATUSCHIK 2006, *Fig.*

8. 1; *Fig. 17. 4*), while a copper figurine portraying an ox with the yoke laid across its neck, whose body was similarly perforated, was discovered in Lisková Cave in northern Slovakia (STRUHÁR 1999, Tab. II. 10; BONDÁR 2004, Fig. 8. 5; STRUHÁR – SOJÁK 2009, Fig. 7; *Fig. 17. 7*). The perforation of the body most likely marks the place of the bar whereby the yoked animals were attached to the draught-pole.

Cattle could be yoked in one of three ways, by a yoke placed on the forehead, the horns or the neck (GANDERT 1966; RUOFF 2006, Fig. 8; PÉTREQUIN – PÉTREQUIN – BAILLY 2006, Fig. 3; *Fig. 17. 1–3*). These variations appear on Copper Age animal figurines: the pair of animals from Kreznica (*Fig. 17. 6*) and the pair from Lisková Cave (*Fig. 17. 7*) were harnessed by a yoke placed on their horns, while the Bytýn figurines have a neck yoke (*Fig. 17. 8*) as shown by the double ring around their neck. Yet another variant is illustrated by the bronze animal figurines from Abamor in south-eastern Anatolia which were harnessed by means of a yoke placed on their back behind the forelegs (KULAKOĞLU 2003, Fig. 9; *Fig. 17. 5*).

One obvious question is whether the animal team was perhaps harnessed to a plough in view of the visual representations of ploughing performed with animals (BALASSA 1973, Fig. 17; BASSI – FORNI 1988, 8–11; GIMBUTAS 1991, 10–14; FORNI 2002). The figurines from Poland and Slovakia do not provide a conclusive answer. The figurines from Abamor, however, clearly depict a pair of oxen harnessed to a wagon (KULAKOĞLU 2003, Fig. 9; *Fig. 17. 5*), suggesting that similar figurines can perhaps likewise be associated with wagons.

A fragment resembling the animal heads on the Boglárlelle wagon model has been published from Balatonőszöd (HORVÁTH 2010, 19, Abb. 7. 1; HORVÁTH 2010a, Fig. 10. 3). In Horváth's interpretation, the animal head was a protome, either from a miniature wagon or from an amphora. However, actual animal heads have only survived on the Radošina wagon and it is therefore uncertain whether the Balatonőszöd fragment had once adorned a clay wagon or an amphora – the latter seems more likely to me. A similar vessel is known from Straubing-Lerchenhaid in Austria, a site of the Stroke Ornamented Pottery culture dating from an earlier period (EIBL 2009, Taf. 4. 5).

The relevant zoomorphic depictions include animal figures attached to the wagon box and small, free-standing figurines, the latter including also draught animals. The first group is made up of wagon models adorned with two animal heads (Radošina, Boglárlelle, Moha and Kaposvár). Unfortunately, the animal protomes generally broke off, only the ones on the Radošina model have survived

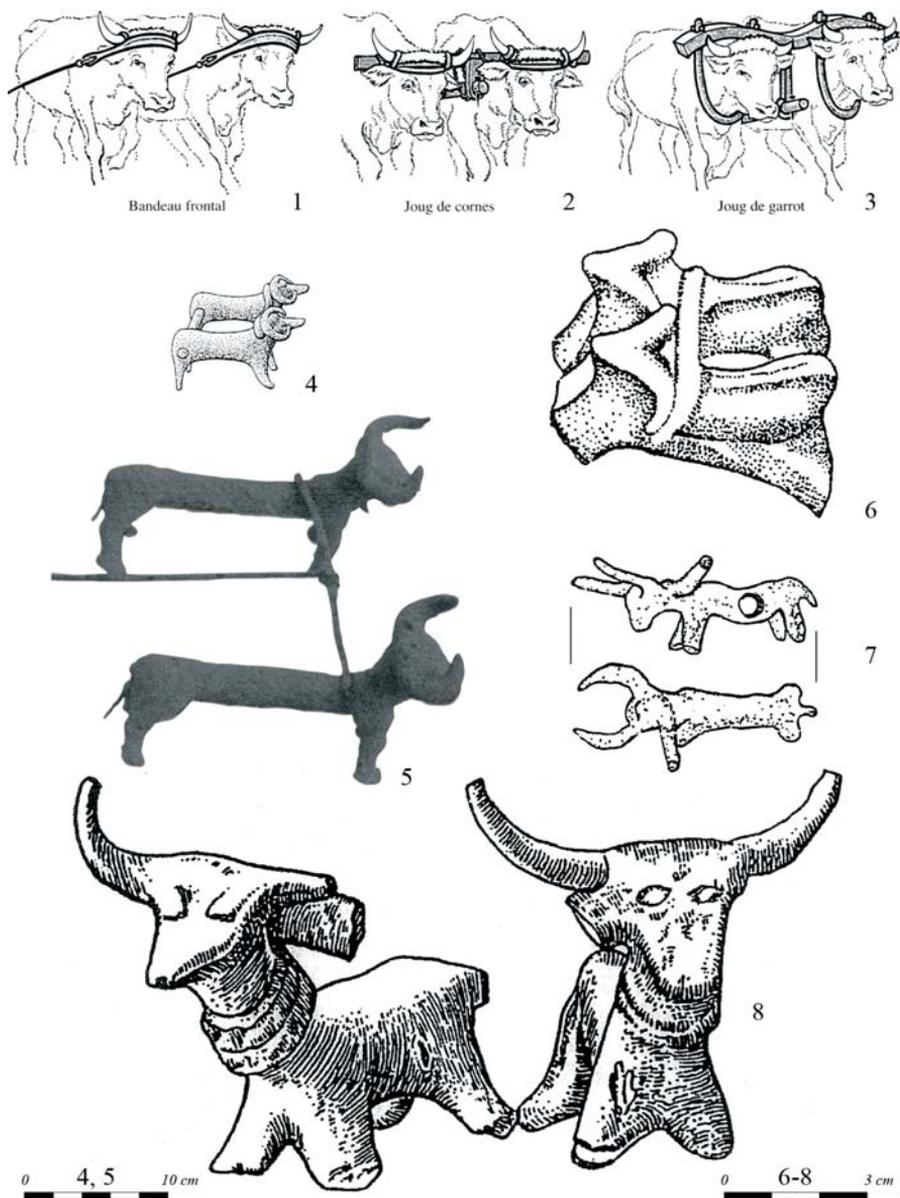


Fig. 17. Animal figurines showing modes of harnessing. 1–3. Reconstruction of harnessing modes (after PÉTREQUIN – PÉTREQUIN – BAILLY 2006, Fig. 3), 4. Dieburg (after MATUSCHIK 2006, Fig. 8. 1), 5. Abamor (after KULAKOĞLU 2003, Fig. 9), 6. Krežnica (after DINU 1981), 7. Lisková Cave (after STRUHÁR 1999, Tab. 2. 10), 8. Bytyn (after ŠTURMS 1955, Abb. 1. 4).

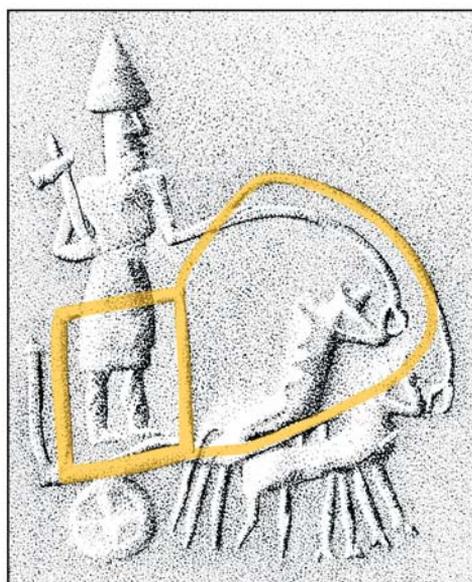


Fig. 18. Depictions of harnessing modes. 1. Unprovenanced (after NAGEL 1992, Abb. 8),
2. Kültepe, Karum II (after LITTAUER – CROUWEL 1996, Fig. 2).

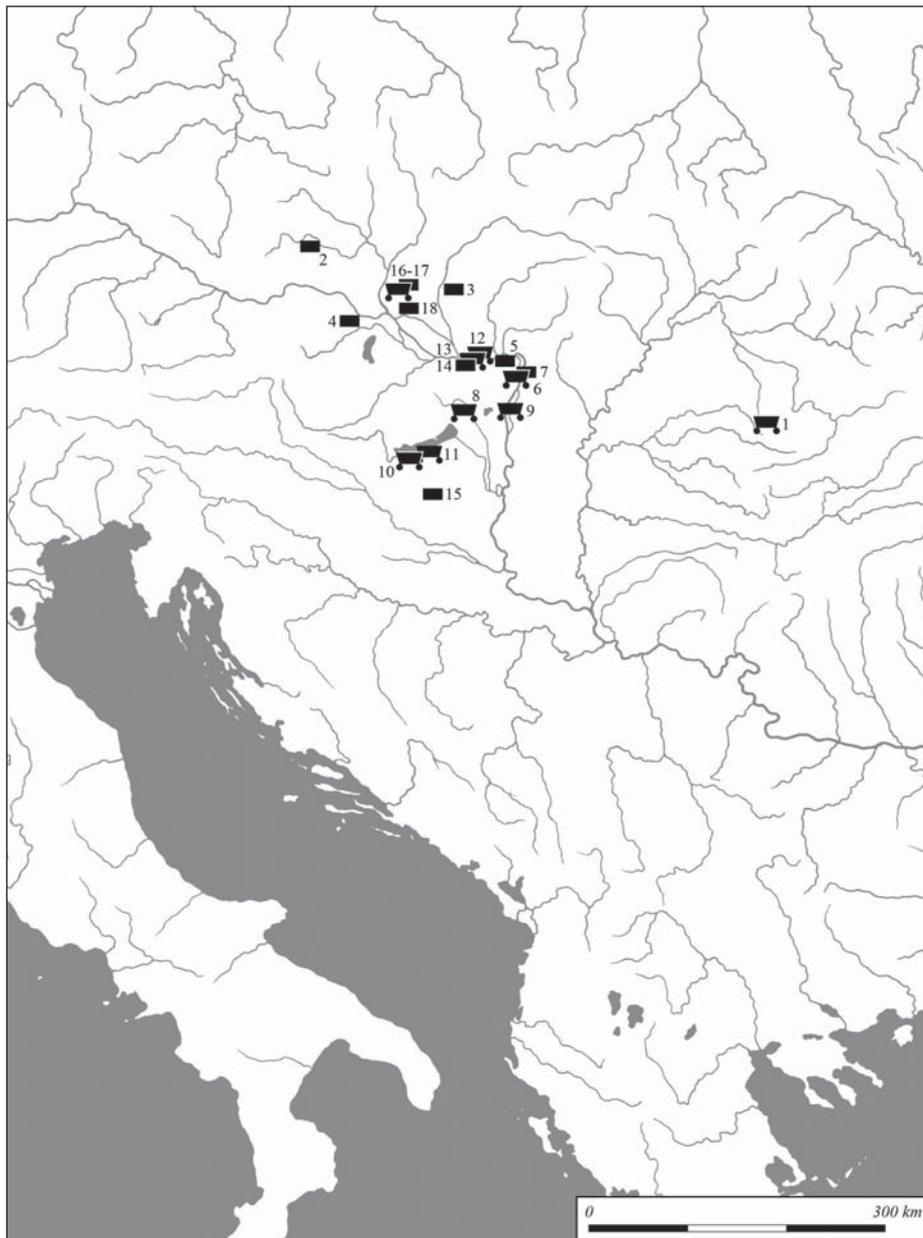


Fig. 19. Distribution of Copper Age wagon models in the Carpathian Basin (drawing by Sándor Ősi). 1. Bădăcin, 2. Plessing, 3. Radošina, 4. Mödling, 5. Pilismarót, 6–7. Budakalász, 8. Moha, 9. Szigetszentmárton, 10. Balatonberény, 11. Boglárlelle, 12–14. Esztergom, 15. Kaposvár; 16–17. Pezinok, 18. Chorvátsky Grob.

intact. These depict hornless creatures which best resemble sheep (*Fig. 7*). The second group falls into the category of circumstantial evidence and comprises free-standing statuettes cast from copper and bronze, the latter more widespread in Anatolia and the Ancient Near East. Most of these figurines depict finely modelled oxen (e.g. NĚMEJCOVÁ-PAVÚKOVÁ – BĀRTA 1977, Abb. 8; LITTAUER – CROUWEL 2002, Pl. 159a; BONDÁR 2004, Fig. 14; KULAKOĞLU 2003, Figs 1, 4–5, 8–9, 12).

Few animal figurines are known from the Baden culture. Most of these small, highly stylised statuettes created from clay coils depict sheep (Ózd: BANNER 1956, Taf. 68. 3–6; Salgótarján-Pécskő: KOREK 1968. 57, Taf. XII. 4, Taf. XIII. 1–7; Piliny: PATAY 1999, 53, Fig. 7; Stránska: NEVIZÁNSKY 2009; Lieskovec: MALČEK 2010, Tab. 1–2) or pig (Kánya: BANNER 1956, Taf. 21. 15). The five animal figurines brought to light in the Boleráz cemetery investigated at Pilismarót-Basaharc stand out from among the other zoomorphic depictions by their larger size and realistic modelling. One portrays a sheep, while two others are perhaps depictions of dogs (TORMA 1972, Abb. 11; TORMA 1973, Abb. 5. 2; KALICZ – RACZKY 2002, Fig. 21). In her study on the animal burials of the Baden culture, Horváth examined various dimensions of the relationship between prehistoric man and animals (HORVÁTH 2006), with a discussion of the period's animal depictions. In her view, the animal figurines from Pilismarót portrayed pig (Grave 364), dog (Grave 359) and sheep (Graves 416 and 418) (HORVÁTH 2006, 126, 128, 129).

Knowing that cattle played an important role in the rituals of the Baden culture – suffice it here to quote the graves containing both human and cattle burials from Alsónémedi (KOREK 1951, Abb. 1), the cattle burials uncovered on Baden settlements (KOREK 1984, 24; BONDÁR 2002, 12. note 30; AARHUS – LAURSEN 2010) and the cattle corpses thrown into pits and wells, the remains of elaborate rituals (HORVÁTH 2006; 2010; 2010a) – we would expect a rich cattle imagery. However, the culture's finds belie the assumption made from our present logic. While the evidence clearly shows that cattle played a remarkably important role in the life of Late Copper Age communities, interestingly enough, only one single cattle portrayal has been found to date: an elegant vessel with a bovine head brought to light at Vác-Liliom Street, which has been interpreted as part of the paraphernalia associated with the cult of the Great Goddess (KÖVÁRI 2010, 397, Figs 3–7). The beautifully crafted, realistic cattle portrayal is yet another indication of the cattle cult practiced by the Baden communities, although in this case, the relic was not associated with death or butchery, but with life. In my

view, the vessel was perhaps used during initiation rites and rituals celebrating rebirth, a ceremony of the type still practiced in India in the 19th century. The initiate was led into a cow shaped golden receptacle and after re-emerging from the receptacle, the initiate was regarded as having been reborn. The cow was one epiphany of the Great Goddess, with the cow symbolising the womb shaped receptacle, an expression of mythical rebirth (ELIADE 1999, 111–112). Obviously, this interpretation is no more than speculation, which can be neither proved, nor disproved for the time being.

Surprisingly enough, cattle were not portrayed either in the form of free-standing figurines or as protomes applied to wagon models by the Late Copper Age communities.

The few zoomorphic depictions and other surviving relics of animal cults suggest that different animal species such as sheep, cattle, pig, dogs and even molluscs were accorded widely differing roles in the daily life, the economy and the rituals of Late Copper Age communities.

It seems to me that the Late Copper Age wagon models are eloquent testimonies to how wool sheep, originally domesticated in Mesopotamia, and wagon models were symbolically linked. Maran has pointed out that wool sheep represented one of the new trade commodities appearing in the Carpathian Basin during the 4th millennium BC (MARAN 1998, 516). I have already noted the surprising fact that despite the reverence accorded to cattle by Baden communities, this species never appears among the draught animals harnessed to wagons. The Radošina model is the only miniature wagon on which draught animals also appear. According to Němejcová-Pavúková and Bárta, the creature was a dog, a ram or a bear (NĚMEJCOVÁ-PAVÚKOVÁ – BÁRTA 1977, 443). It seems unlikely that the authors had seriously considered either of these three species to have been a draught animal. To me, the highly stylised protomes on the Radošina model bear a striking resemblance to wool sheep. A comparison between the head of modern wool sheep and the portrayal on the Radošina vehicle reveals many similarities, despite the stylisation of the portrayed creatures. We know that in the case of simplified depictions, the emphasis was not on a realistic portrayal or the rendering of finer details, but rather on accentuating the most essential traits which conveyed a clear meaning to the community, leaving no doubt as to what the clay figure embodied. Obviously, the association between wagons and wool sheep is no more than speculation for the time being, and further studies are necessary for confirming or rejecting this suggestion. The examination of animal bones, wool remains and similar depictions will no doubt furnish further clues. The separation

of sheep and goat bones in animal bone samples is difficult, and the identification of the bones of wool sheep is even more difficult, if not downright impossible. The possible survival of wool from the Late Copper Age and the determination of its place of origin is no more than wishful thinking at present. However, there is hope that similar animal depictions and wagons will be discovered in the future, which can perhaps add some substance to this bold idea.¹⁷

Mention has been made of the surprising difference between the few known Late Copper Age animal depictions and the sheep figurines from Pilismarót-Basaharc, which are larger, rather whimsically modelled, clumsy pieces, a far cry from their real-life counterparts. It seems to me that the reason for this divergence can be sought in the novelty of the sheep introduced into the Carpathian Basin in the 4th millennium (MARAN 1998, 516). Originally a new breed appearing in Mesopotamia, it seems likely that in addition to its wool, a few animals were also traded to this distant region and it is possible that the potter sculpting the clumsy figurines had reproduced the likeness of the creatures providing the previously unknown commodity from memory. The legend of the golden fleece perhaps preserves reminiscences of how valuable this sheep species was and of the mystique surrounding it in prehistoric societies. The Radošina protome and the animal figurines from Pilismarót-Basaharc perhaps had a similar meaning, explaining the association between wagons and an unusual, rare and valuable commodity such as wool and the species providing this commodity. They may also shed light on why this association still carried a mystical dimension in the mid-4th millennium BC. Cattle, a species long known to and exploited by Baden communities, had an entirely different significance. The slaughtering of cattle seems to have been part of events associated with more frequent community gatherings, while miniature vehicles and sheep portrayals, the latter with an added mythical dimension in my view, were more likely part of the paraphernalia used during more rarely conducted rituals.

A combination of a wagon and separately modelled, free-standing draught animals has not yet been brought to light in the Carpathian Basin or in neighbouring regions. The finely crafted copper and bronze animal figurines from the Ancient Near East and Anatolia usually portray oxen. On many sites, these figurines were found together with a wagon model.

Advances in archaeological dating indicate that a familiarity with wheels and wheeled vehicles can be dated to the earlier 4th millennium in Europe and in

¹⁷ It must in all fairness be added that László Bartosiewicz does not agree with my idea.

Anatolia. Wheels were not necessarily fixtures of wagons, but may have been parts of other wheeled conveyances. The earliest clay vehicle models were probably the pieces portraying animals combined with wheels, with some variants taking the form of vessels modelled in the shape of wagons. The clay wagon models of the Late Copper Age show a concentration in the Carpathian Basin. Major differences can be noted between the wagon models from the Carpathian Basin and the miniature vehicles of Mesopotamia and Anatolia.

4. Early and Middle Bronze Age

4.1. Miniature wheels

The invention of the wheel was crucial to the use and spread of wheeled vehicles. However, this ingenious artefact could be attached not only to wagons used for transporting humans and various commodities, but also to other vehicle types such as carts used for transporting harvested crops or other produce. At their simplest, carts were made by mounting a sledge on rollers or wheels, whose counterparts are still used today owing to their versatility. Wheels may equally well have been fixtures of sledges and ploughs, and thus the clay wheel models found in archaeological contexts do not in themselves imply that they should be solely associated with wagons.

Miniature wheels were initially believed to have been the fixtures of wagon models. While this supposition is doubtless logical, it must be borne in mind that wheels could have been the accessories of a considerably wider range of artefacts.

The miniature wheels include decorated pieces from the Copper Age onward and the corpus of Bronze Age clay wheels too comprises several finely ornamented specimens. The miniature discs/wheels come in different forms and sizes, and it is often impossible to define their function from a cursory glance. Flat spindle whorls and genuine wheel models with a hub in their centre for attachment to the axle are often quite similar. Some prehistorians have claimed that these wheels/discs were symbols of the Sun, an interpretation that can hardly be dismissed out of hand. Extreme caution needs to be exercised when determining the one-time function of miniature wheels/discs because it is often quite uncertain whether a small artefact identified as a wheel had indeed been one. It seems quite certain that not all flat discs had been wheels and that even the pieces which were indeed modelled after wheels were not always accessories of wagon models. I have not assembled a list of the known Bronze Age miniature wheels, partly because it would greatly exceed the scope of a study on wagon models, and partly because of the uncertainties in their interpretation.

In contrast to the miniature wheels of the Copper Age that have a relevance for dating the appearance of this innovation and the earliest use of wagons, little chronological importance can be attached to the wheel finds of the Bronze Age because heavy wagons rolling on four solid wheels had been known and used for

over a thousand years by that time. The appearance of spoked wheels signalled another major advance in vehicle technology, leading to the construction of lighter wagons.

The corpus of miniature Bronze Age wheels eclipses by far the number of Copper Age pieces, a reliable indication that wheels were known and used across an extensive area, and that the symbolism and meaning of their miniature counterparts probably differed from those of genuine wheels. When assembling the list of the known Bronze Age wagon models I found that small clay wheels were produced by virtually each and every Early and Middle Bronze Age culture.

Table 1 shows the incidence of wagon models and wheels in the Early and Middle Bronze Age cultures of the Carpathian Basin.

Table 1. Wagon models and miniature wheels in Early and Middle Bronze Age cultures.

Culture	Number of wagon models	Miniature wheels
Vučedol	2	+
Makó	–	+
Somogyvár–Vinkovci/Glina III	3	+
Nyírség/Nir	1	?
Bell Beaker	–	+
Hatvan	6	+
Füzesabony	4	+
Nagyrév	2	+
Kisapostag	–	?
Encrusted Pottery	–	+
Vatya	–	?
Ottomány/Otomani	16	+
Gyulavarsánd/Vărşand	5	+
Wietenberg	43	?
Magyarád/Madarovce	–	+
Veteřov	1	+
Monteoru	1	?
Tei	1	?
Felsőszőcs/Suciu de Sus	1	?

4.2. Wagon models

I have already reviewed the major milestones in the research of Bronze Age wagon models in the above, and I shall here only concentrate on the major advances in the study of the miniature wagons from the Carpathian Basin.

In his seminal study on prehistoric wagons, Bóna set up a typological sequence in which he derived the Gherla/Szamosújvár, Varşand/Gyulavarsánd, Wietenberg and Novaj models from the Budakalász and Palaikastro models (BÓNA 1960, Fig. 3; *Fig. 1*). Bóna's study was followed by a spate of articles in which the new wagon models from the Carpathian Basin and the broader region were published and discussed: Alsóvadász-Várdomb (KALICZ 1968, 154. Taf. 113. 8; *Fig. 20. 5*), Sălacea (Szalacs, Romania, ORDENTLICH – CHIDIOŞAN 1975), Pocsaj-Leányvár (MESTERHÁZY 1976; *Fig. 22. 2*), Böheimkirchen (Austria, NEUGEBAUER 1979, Abb. 8. 2; *Fig. 31. 1*), Nižná Myšľa (Alsómislye, Slovakia, OLEXA 1983, Fig. 1. 7; OLEXA 1996; JAKAB – OLEXÁ – VLADÁR 1999, Abb. 27. 2; OLEXA 2003, Fig. 11; OLEXA – PITORÁK 2004, Fig. 2; *Fig. 31. 2*), Berettyóújfalu-Herpály (MÁTHÉ 1984, Pl. 6. 1a–c; *Fig. 21. 1*) and Börzönce (BONDÁR 1990; 1992; *Fig. 20. 1*). In my discussion of the Börzönce fragment, I focused on the missing links between the Late Copper Age and the Early Bronze Age, and I also assembled a catalogue of the Late Copper Age and Bronze Age wagon models known at the time.

In his overview of the Bronze Age tell cultures of Hungary, Bóna devoted a separate chapter to wagon models and their occurrences in various cultures (BÓNA 1992, 1994).¹⁸ He perceived a hiatus between the Late Copper Age and the Bronze Age regarding the use of wagon models because no models were known at the time from the late Baden, the Vučedol and the Makó cultures (BÓNA 1994, 73). The situation has changed since then (BONDÁR 2004, 15): a fragment dating from the Coţofeni III period was discovered at Bădăcin (Szilágybadacsony, Romania, BĂCUEŢ 1998, Pl. 1), another has been published from the eponymous site of the Vučedol culture in Croatia (DURMAN 1988, 19. Cat. no. 24), and the discovery of another wagon model from the same period has been reported from Borinci (BAKKER *et al.* 1999, 788). Bóna noted that undecorated, two-axled wagon models of the Somogyvár period had been brought to light at two sites only, from the eastern (Cuciulata/Kucsuláta, Romania) and western (Börzönce, Hungary)

¹⁸ Two new wagon models were published in the catalogue, one from Berettyószentmárton (BRONZEZEIT IN UNGARN Cat. no. 330; LE BEL AGE Cat. no. 330), the other from Vésztő-Mágor (BRONZEZEIT IN UNGARN Cat. no. 425; KOVÁCS 1994, 38; LE BEL AGE Cat. no. 425).

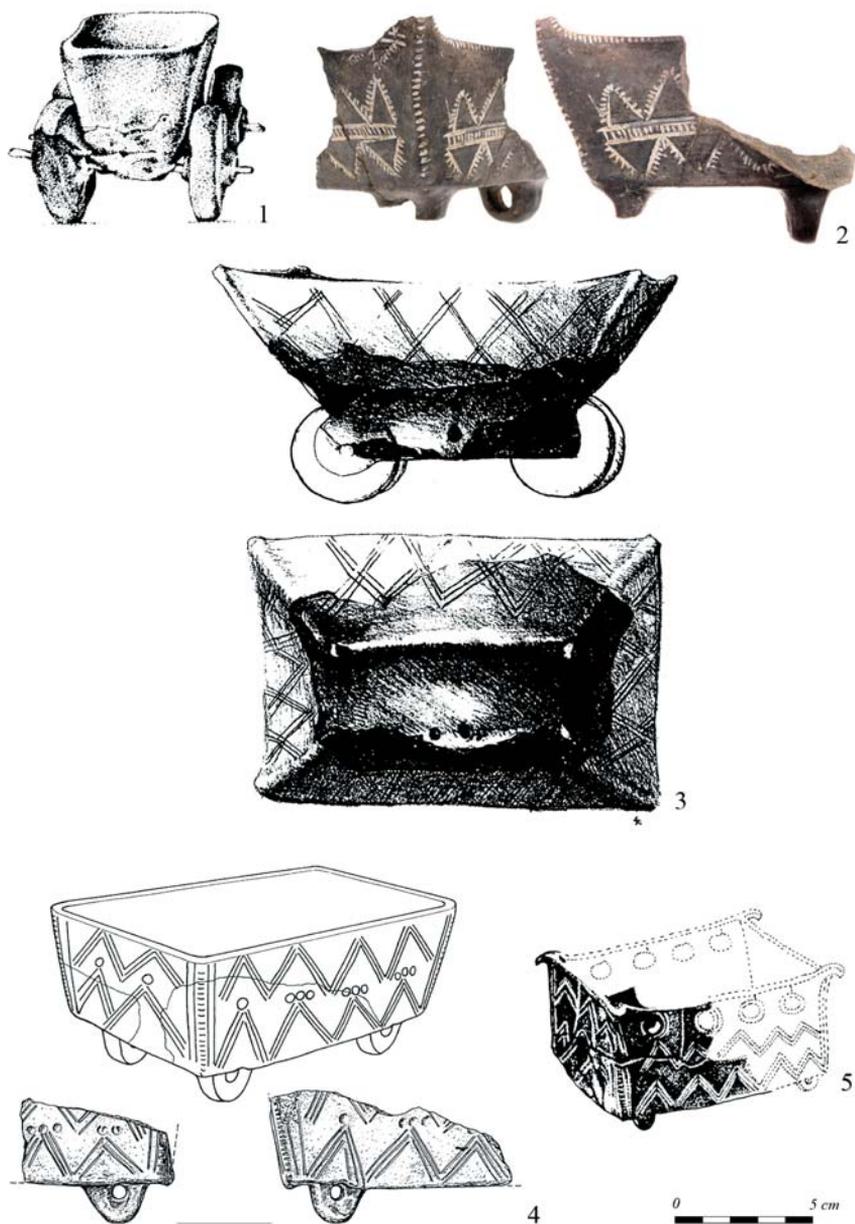


Fig. 20. Bronze Age wagon models. 1. Börzönce (after BONDÁR 1990, Fig. 5. 6),
 2. Polgár (photo by Ákos Jurás), 3. Törökszentmiklós (after TÁRNOKI 1999, Pl. 2),
 4. unprovenanced (after KOVÁCS 2006, Abb. 4),
 5. Alsóvadász (after KALICZ 1968, Taf. CXIII. 2).

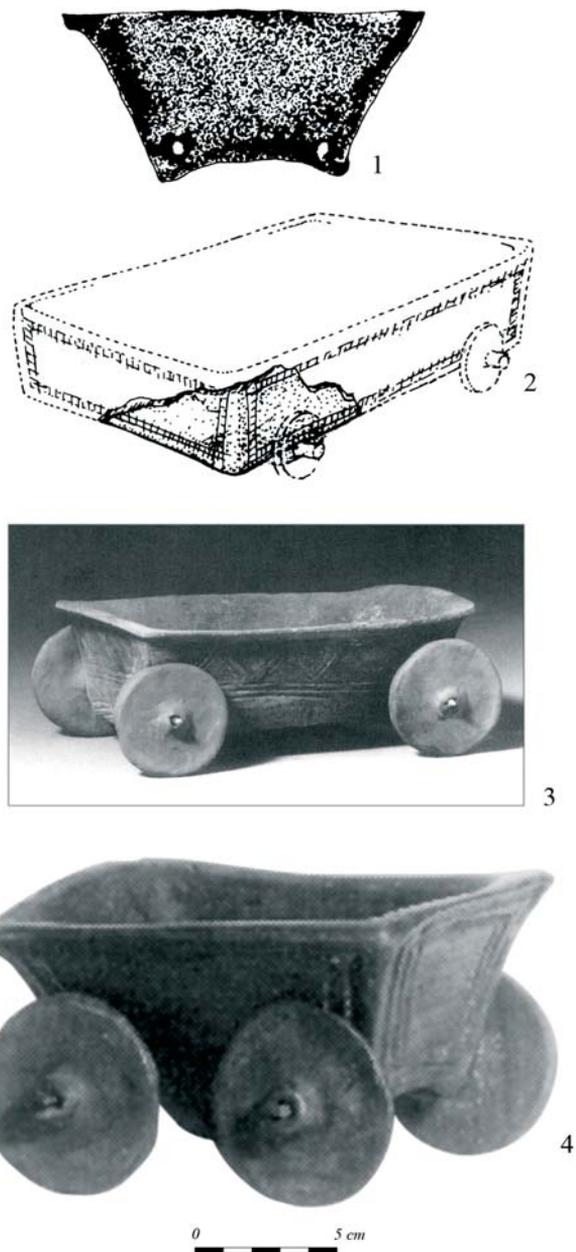


Fig. 21. Bronze Age wagon models. 1. Berettyóújfalu (after MÁTHÉ 1984, Pl. 6. 1), 2. Füzesabony (after KOVÁCS 2006, Abb. 3), 3. Vésztő (after KOVÁCS 1994, Fig. 38), 4. Berettyószentmárton (after LE BEL AGE Cat. no. 330).

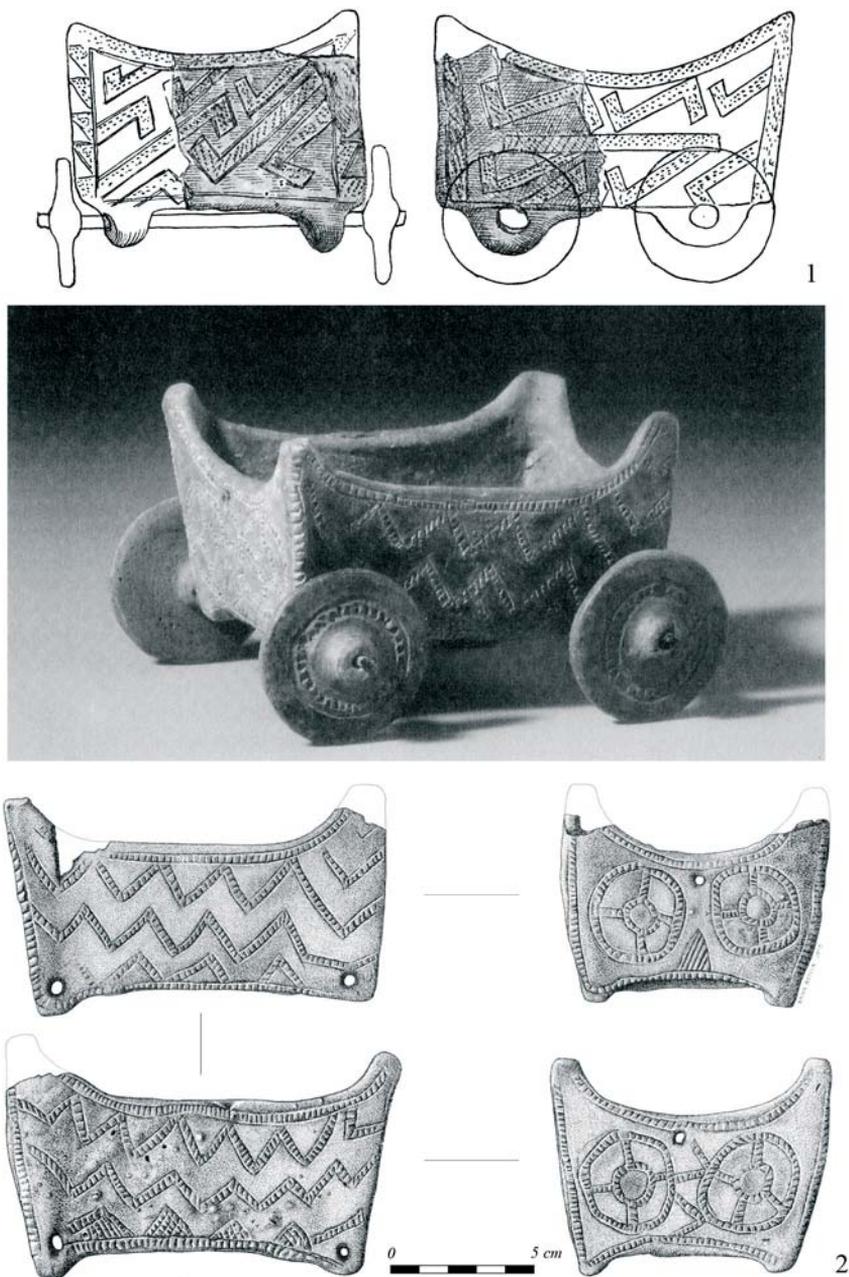


Fig. 22. Bronze Age wagon models. 1. Novaj (after FETICH 1969, Pl. V. 1),
2. Pocsaj (after DANI 2005, Fig. 3).

boundary of the culture's distribution, despite the fact that finds of miniature clay wheels would suggest a much higher number of wagon models (BÓNA 1994, 73). Miniature vehicle models disappeared from Transdanubia with the decline of the Somogyvár culture; in contrast, the wagons of the Schneckenberg culture were revived in the Wietenberg culture in Transylvania. The use of miniature wagons is assumed in the Gyula–Roşia culture of the Hungarian Plain based on the model dating from the Nyírség II period found at Sanislău/Szaniszló in Romania (BADER 1978, Pl. VII. 15). Bóna regarded this piece as the undecorated prototype of the wagons known from the Ottomány (Berettyóújfalu-Földvár, Otomani/Ottomány-Várhegy) and Gyulavarsánd cultures (Várşand/Gyulavarsánd-Várdomb, Békés, Vésztő, Pocsaj, Săcuieni/Székelyhíd, Tíream/Terem, Pir/Pér and Sălcea/Szalacs-Várdomb, the latter site yielding a total of ten wagon models from the Gyulavarsánd deposits: BÓNA 1994, 74). Bóna believed that clay wagon models were solely used east of the River Tisza, arguing that the piece from Alsóvadász, a settlement of the Hatvan culture, had reached the site from the Ottomány distribution area, similarly to the specimen from Nižná Myšľa in Slovakia, found in a child burial of the Füzesabony culture.¹⁹ Bóna noted that even though several wheel models had come to light at Füzesabony-Öregdomb, wagon models were lacking, and he therefore regarded the model from Novaj, a site occupied during the classical Füzesabony culture, as an import from the late Wietenberg culture of Transylvania (BÓNA 1994, 74).²⁰ Bóna believed that the high number of wheel models recovered from Hatvan contexts came from wagon models with a wooden or wickerwork wagon box, this being the reason for the lack of clay models in the Hatvan material (BÓNA 1994, 74).²¹ Bóna also discussed the possible relation between wagon models and genuine vehicles, noting that the simplified models provide few clues regarding axle types (fixed or rotating with the wheel) and the materials used for constructing wagons (most of which were probably assembled from planks, although the lattice-like patterns on some models could be interpreted as wickerwork). None of the known wagon models have a draught pole, and thus

¹⁹ This view is no longer tenable because clay wheel models have been found in the Encrusted Pottery culture cemetery at Bonyhád in Transdanubia (SZABÓ 2009, 48, KISS 2009, 161, Fig. 2. 1: Type E1).

²⁰ The recently published wagon model from Füzesabony-Öregdomb (KOVÁCS 2006, Abb. 3; Fig. 21. 2) has convincingly refuted this argument.

²¹ The publication of the wagon model from Törökszentmiklós-Terehalom has remedied this lack (TÁRNOKI 1999, Fig. 20. 3).

virtually nothing is known about how the draught animals were harnessed (BÓNA 1994, 74).

The corpus of Hungarian wagon models was enriched by a specimen from Törökszentmiklós-Terehalom (TÁRNOKI 1999, *Fig. 20. 3*), Polgár-Kenderföldek-Kiscsőszhalom (RACZKY – ANDERS 2000, *Fig. 13; Fig. 20. 2*),²² an unprovenanced piece “from Hungary” (KOVÁCS 2006, *Abb. 4*; SZATHMÁRI 2007, 22: colour photo; *Fig. 20. 4*)²³ and a model from Füzesabony-Öregdomb (KOVÁCS 2006, *Abb. 3; Fig. 21. 2*).

An inventory of the Middle Bronze Age wheeled vehicle models from Romania was recently published by Nikolaus Boroffka (BOROFFKA 1994), soon followed by Christian Schuster’s work, which included additional pieces (SCHUSTER 1996).

The wagon models from Central Europe were treated by Markus Vosteen in several studies (VOSTEEN 1996; 1998) and a monograph (VOSTEEN 1999), in which he covered the ritual role and dating of wagon models, together with a catalogue containing a detailed description of the models from the Copper Age to the Iron Age. Vosteen quoted the evidence for the use of wagons in the Late Neolithic, principally the pictorial evidence provided by rock engravings dating from between 4000 and 3000 BC (VOSTEEN 1999, 42).

Recent studies on the Bronze Age wagon models of the Carpathian Basin include a concise summary by Boroffka (BOROFFKA 2004) and the publication of a new model from Nižná Myšľa (OLEXA – PITORÁK 2004).

The wagon model from Nemesnádudvar

A new type of wagon model made in an entirely different style came to light from one of the Bronze Age pits excavated at Nemesnádudvar (County Bács-Kiskun)

²² RACZKY – ANDERS 2001, *Fig. 13*. The wagon model was briefly mentioned by Márta Máthé in her excavation report (MÁTHÉ 1991, 13). I am greatly indebted to my colleague János Dani and to photographer Ákos Jurás for providing an excellent photograph of the model for this publication.

²³ The findspot of the two wagon models was mixed up in Tibor Kovács’s article. The decorated piece is unprovenanced, while the model with the axle fragment comes from Füzesabony. I would here like to thank Ildikó Szathmári for her help in clarifying the provenance of the two models.

in 2009 during the excavation conducted by György V. Székely (SZÉKELY 2010, 36).²⁴

The pits of the Early Bronze Age settlement lay scattered among the Sarmatian pits in the northern part of the excavated area (BONDÁR – SZÉKELY 2011, Fig. 2). The small oval pit containing the wagon model lay in the northern part of the investigated area. The clayey brown fill of the pit yielded various pottery fragments and animal bones, as well as the joining fragments of a clay wagon model. Broken into several pieces, the wagon model lay near the floor of the pit, tilted against the south-western wall (BONDÁR – SZÉKELY 2011, Figs 3–4).

There was nothing to indicate that the pit had a special function or that it had been a sacrificial pit. Smaller pits containing no more than a handful of finds or no finds at all, and a few post-holes were found in its immediate vicinity.

The wagon model (*Figs 23–25*) made from clay tempered with crushed ceramics was fired to a brownish-grey colour. The short sides are straight, the long sides terminate in two handle-like rounded projections. The top of the long sides is curved; both have a neck-like raised projection in the centre and an onion-head shaped knob at each end. The model is set on four small cylindrical feet. The decoration of the two long sides is similar: a pattern of incised parallel chevrons under the neck-like projection in the middle and a design of parallelly incised oblique lines on the curved end. Three dotted circles adorn the triangular field between these two main patterns. One of the short sides has a vertical rib flanked by two pairs of three curved ribs, the other short side is divided into eight panels by vertical and horizontal ribs arranged in a lattice pattern. The ends of the long sides and the feet had originally been perforated. L. 26.3 cm, greatest W. 14.9 cm, H. 8.8 cm (with feet), 6.6 cm (without feet). The wheels, the axles and the top of the neck-like projections did not come to light during the excavation (BONDÁR – SZÉKELY 2011, Figs 5, 7).

Seeing that the design and the symbolism of the wagon model from Nemesnádudvar represent an entirely new type among the currently known miniature vehicles, two main questions had to be addressed in the case of this model, differing so greatly from the other miniature vehicles: its date and the possible meaning of its adornment. I first turned to typology (the comparison of formal and stylistic traits) for determining the date of the wagon model. While none of the known European, Near Eastern or Asian vehicle models match exactly the miniature wagon from Nemesnádudvar, the few details shared with

²⁴ For a more detailed discussion of the wagon model, cp. BONDÁR – SZÉKELY 2011.

other wagon models indicated that it best resembles the pieces of the Middle Bronze Age Wietenberg culture.

Similarly to other hand-modelled ritual artefacts, the wagon model from Nemesnádudvar is a unique creation. While lacking exactly identical parallels, certain elements do have their counterparts on other wagon models. Unfortunately, the published wagon models, whether intact or restored, are rarely shown from all sides in the publications and thus there are few published examples of pieces whose decoration varies on different sides. Certain decorative elements of the Nemesnádudvar wagon box are paralleled by the models of the Wietenberg culture from Derşida and Lechința. Analogies to the onion-head shaped projections on the rim can be quoted from Derşida (*Fig. 30. 3*), while another wagon model from the same site has a peaked rim terminating in a bird's head (*Fig. 30. 4*). It is unclear from the published drawing of the latter whether the bird head was set on the corner or on top of the side. The original position of the animal head on the fragment from Lechința is clear: the short front side was peaked and topped by two cattle heads (*Fig. 30. 1*). The rounded "handles" of the Nemesnádudvar model have their counterparts among the fragments from Derşida (*Fig. 28. 5–6*), one of which has similar perforated knobs for the axles (*Fig. 28. 3*). The side of the virtually intact piece from Otomani (Ottomány) also has handle-like projections (*Fig. 26. 4*). The differing ornamentation of the short sides can be noted on the wagon model from Pocsaj (*Fig. 22. 2*), assigned to the Gyulavarsánd culture, and on a piece from the culture's eponymous site (*Fig. 20. 4*).

The analogies to certain elements of the wagon model from Nemesnádudvar would suggest a date in the Middle Bronze Age. However, the pottery fragments found together with the wagon model (BONDÁR – SZÉKELY 2011, *Fig. 6*) and the interior decorated bowl brought to light from another pit assign the pit and its finds to the Early Bronze Age. The thermoluminescence dating of the wagon model gave a calendar date of 2420 ± 620 BC, while the dates for two vessel fragments found in the same pit were 2010 ± 560 and 1670 ± 520 BC respectively. The TL measurements yielded a date between 2190 and 1450 BC which is consistent with the TL dates for the other finds from the pit (BONDÁR – SZÉKELY 2011, *Fig. 8*). This date would correspond to the Ada or Nagyrév cultures in this region during the Early Bronze Age II–III. However, no wagon models have yet been found in an Ada context. The corner fragment of a miniature wagon was found in 2005 at Cegléd during the investigation of a Nagyrév settlement (RAJNA 2005, 219), suggesting that the wagon model from Nemesnádudvar can also be assigned to the Nagyrév culture.

Interpretation of the wagon's ornamental design

Drapery

Each side of the model bears a different design (*Figs 23–25*). Although the patterns on the two long sides appear to be identical at first glance, a closer look reveals subtle differences in the minor details of the two compositions. The four corners of the rectangular wagon body end in flat, perforated “handles” whose ornamentation is part of the wagon's overall design. The V shaped incised pattern resembling a necklace and its continuation on the handles can perhaps be interpreted as the depiction of a textile drapery swathed over the wagon which was fastened in the four spots marked by the onion shaped tops. We may assume that the wagon model covered with the ornate drapery was an important ritual accessory of ceremonies performed on special occasions.

Combination of human imagery and wagons

The top of the neck-like projections in the middle of the long sides has broken off and it can no longer be determined whether they ended in human or animal heads, or were perhaps just simply rounded. The necklace-like pattern recalls the decoration of Middle Bronze Age figurines, such as the ones from Dalj (KOVÁCS 1972, 49, Fig. 4), Cîrna (KOVÁCS 1972, 48, Fig. 2; KALOGEROPOULOS 2007, Pl. LXVII. a–b), Vattina (PRAISTORIJA JUGOSLAVENSKIH ZEMALJA IV. Pl. 82. 1), Vinča (KOVÁCS 1972, 48, Fig. 1), Vršac (PRAISTORIJA JUGOSLAVENSKIH ZEMALJA IV, Pl. 84. 2, 2a), as well as an unprovenanced piece from the Lower Danube region (KOVÁCS 1972, 49, Fig. 3) and Satulung-Finteuşul Mic (DUMITRESCU 1974, Fig. 402. 1; DIETRICH 2010, Taf. 2. 1). The lavishly ornamented collar-like garment (?) appears slightly earlier. The human figurines of the Early Bronze Age Hatvan culture have rounded shoulders and a bent-back or slightly peaked head. These figurines are portrayed wearing a necklace-like adornment and their body is covered with some sort of clothing, usually depicted in a highly stylised manner, as on the piece from Szurdokpüspöki (KOVÁCS 1977, Figs 8–9). The figurine of the Nir (Nyírség) culture from Berea in Romania bears a similar decoration (BADER 1978, Pl. 8. 7).

There is a striking difference in the decoration of the two short sides. These sides are adorned with impressed patterns whose style contrasts noticeably with the delicate, lime-encrusted design on the two long sides. The decorative motifs adorning the wagon model had most likely been vested with some obvious meaning

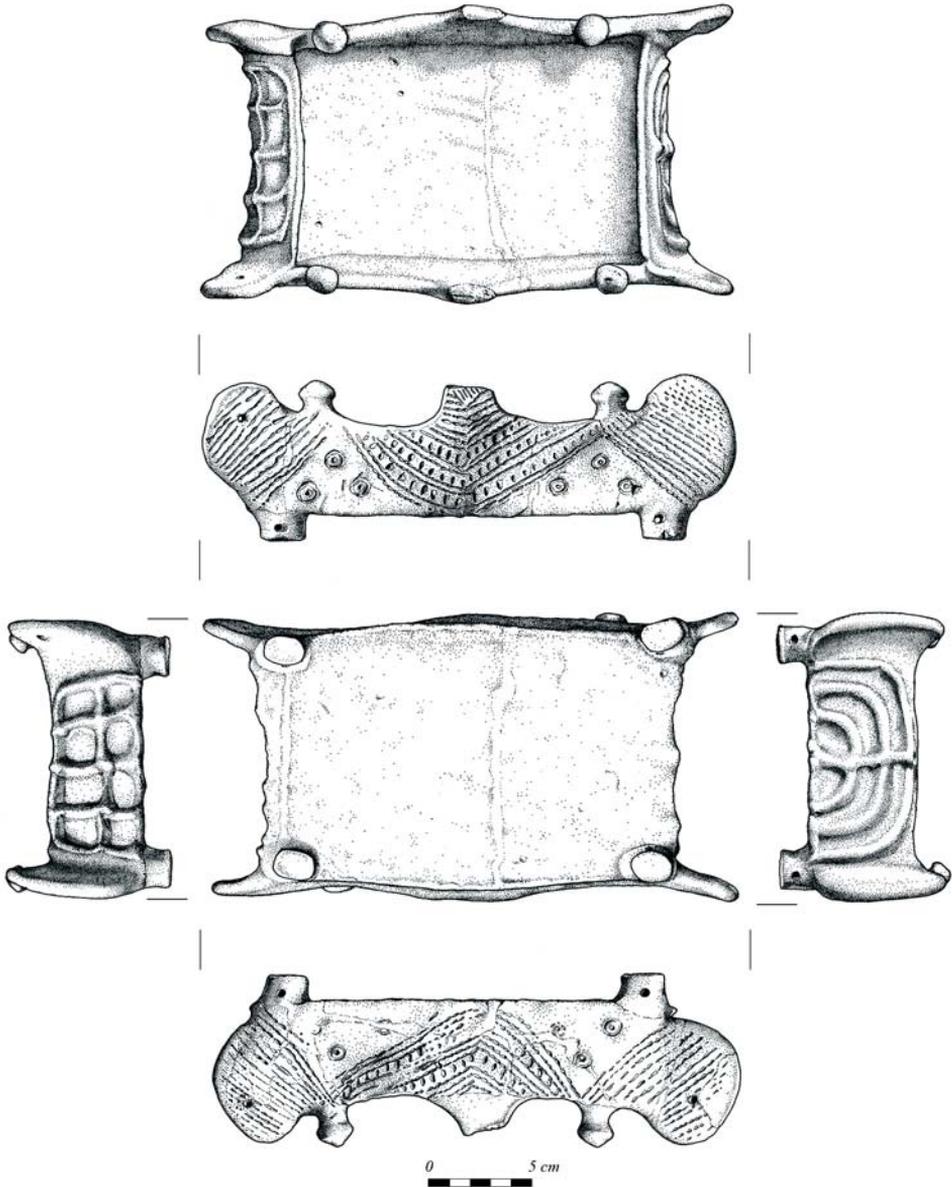


Fig. 23. Bronze Age wagon model from Nemesnádudvar (drawing by Ágnes Vida).



Fig. 24. Bronze Age wagon model from Nemesnáduvvar (photo by Béla Kiss, computer graphics by Sándor Ósi).



Fig. 25. Bronze Age wagon model from Nemesnáduvvar (photo by Béla Kiss).

for the community which had made and used the model. The axles passed through the small perforated knobs on the underside of the wagon box. The “handles” at the four corners are likewise perforated, suggesting that the wagon had perhaps been suspended (in which case the emphasis was not on the artefact’s function as a wagon). Another possible interpretation is that the perforations indicated how the draught animals were harnessed to the wagon.

It seems to me that the wagon model from Nemesnádudvar blends the symbolism of wagons and figurines. The possible meaning of this symbolism is all the more difficult to understand because the top of the neck-like projections broke off and we do not know whether they had been surmounted by a human or animal head, or whether they had a plain rounded tip. In my view, an anthropomorphic top seems more likely in view of the necklace-like design underneath. The depiction of a human figure on the wagon can be likened to the charioteer on the war chariot depictions of later ages, or to a human or divine passenger riding in the wagon, as portrayed on Egyptian, Mesopotamian, Hittite and Greek pieces (CASKEY 1978, Fig. 23; HAYDEN 1991, Fig. 11. 36; NASHEF 1992, Fig. 18; CAUBET 2000, 219). The possible depiction of a charioteer or, in this case, of a wagoner can probably be discarded because the “anthropomorphic” sides are represented by the wagon’s long sides, while the wheels were fitted to the axles passing under the short sides, meaning that the wagon was driven with the short side forward and thus the possible portrayal of a wagoner would only make sense on the short side. In this case, the anthropomorphic topping on the projections may have indicated the human or divine person riding in the wagon.

4.3. Discussion

The absolute chronology of Early and Middle Bronze Age cultures is perhaps even more complicated than the dating of the Copper Age. The periodisation introduced by Paul Reinecke is the perhaps best-known and most widely used framework in the Carpathian Basin, even though its main divisions can no longer be correlated with the entire span of the Bronze Age. Reinecke’s scheme was refined by the chronology based on the layer sequence of the Tószeg tell settlement, and by the subdivisions proposed Amália Mozsolics, István Bóna and later generations of prehistorians. Another problem stems from the many diverse correlations between the accepted time-scale of the Hungarian Bronze Age and the chronological schemes used in the neighbouring countries. The reader is

referred to the chronological chart (*Fig. 36*) originally published in the volume *Hungarian Archaeology at the Turn of the Millennium*.

The number of clay wagon models from the Early and Middle Bronze Age cultures of the Carpathian Basin and its broader environment is 89 (without the miniature wheels). Most come from Romania (63) and Hungary (19), with a few pieces from Slovakia (2) and former Yugoslavia (4), and a bird shaped, four-wheeled model from Austria (*Diagram 1*). This number seems sufficient for an examination of whether there is an association between a particular type and a culture. The distribution of wagon models by archaeological cultures is shown in *Diagram 2*.

Two fragments are mentioned from the Vučedol culture, dated to the Late Copper Age/Early Bronze Age transition. One came to light at Vučedol in 1984, and according to its description, it is decorated with a herringbone pattern and short incisions (DURMAN 1988, Cat. no. 24). The other piece, discovered at Borinci, is known from a brief mention only (BAKKER *et al.* 1999, 788).

Three models came to light on sites of the Early Bronze Age Somogyvár–Vinkovci culture and the roughly contemporaneous Glina III culture: the pieces from Cuciulata (Kucsuláta, Romania, BICHIR 1964, Fig. 1–2; BONDÁR 1990, Fig. 9. 1a–b; *Fig. 26. 5*) and Börzönce (BONDÁR 1990, Fig. 5; *Fig. 20. 1*) are both small, undecorated models, while nothing is known about the piece from Crivăt (SCHUSTER 1996, 118, note 57).

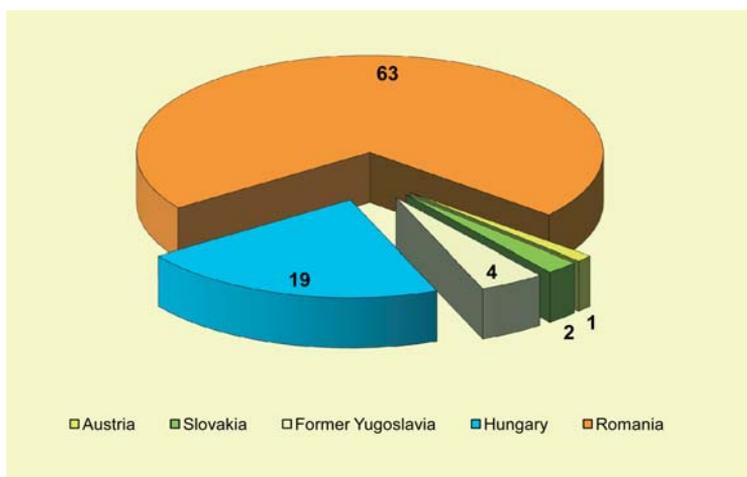


Diagram 1. Distribution of Bronze Age wagon models in the Carpathian Basin.

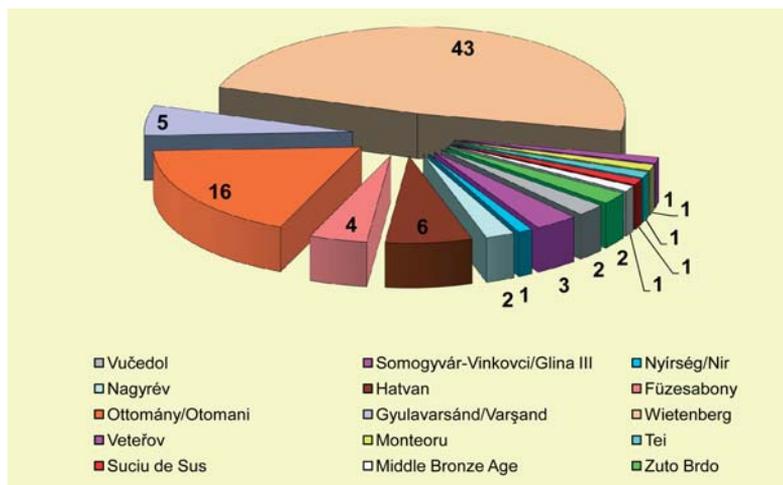


Diagram 2. Distribution of Bronze Age wagon models according to archaeological cultures.

The only wagon model of the Nir (Nyírség) culture was found at Sanislău in Romania. The rectangular wagon box is decorated with a design of hatched bands, while the axles resemble rounded handles (BADER 1978, Pl. 7. 15; SCHUSTER 1996. Pl. 6. 3; *Fig. 26. 2*).

The six wagon models of the Hatvan culture have different shapes. The piece from Alsóvadász (KALICZ 1968, Taf. 113. 2; *Fig. 20. 5*) and an unprovenanced piece (KOVÁCS 2006, Abb. 4; *Fig. 20. 4*) have a rectangular wagon box, while the ones from Polgár (RACZKY – ANDERS 2000, Fig. 13; *Fig. 20. 2*) and Törökszentmiklós (TÁRNOKI 1999, Fig. 2, *Fig. 20. 3*) are conical. A wagon model from Tószeg is only known from a brief mention (BÓNA 1960, 17), without any closer details. The models from Alsóvadász and Polgár, as well as the unprovenanced piece are decorated with bundles of zig-zag lines and incisions along the edges. The peaked corners broke off and thus their exact form cannot be reconstructed. The axles passed through the handle-like, perforated knobs on the underside of the wagon box on the model from Alsóvadász and the unprovenanced piece, while the perforations are at the ends of two longitudinal ribs on the specimen from Törökszentmiklós. A plain wagon model came to light in 2009 at Vatta-Testhalom (known also as Vatta-Dobogó; KOÓS 2009, 379).²⁵

²⁵ I would here like to thank Judit Koós for kindly sending me the photos of the wagon model and for kindly allowing me to quote this find here.

Two wagon models are known from the Füzesabony culture: one fragmentary piece comes from Novaj (BÓNA 1960, Abb. 3; FETTICH 1969, Pl. 5. 1; *Fig. 22. 1*), the other is the recently published piece from Füzesabony (KOVÁCS 2006, Abb. 3;²⁶ *Fig. 21. 2*). The fragment from Novaj represents the corner of the wagon box with peaked corners. An oblique meander runs across the side combined with two triangles along the corners. The long side is divided by a horizontal band. The axles passed through rounded knobs on the underside of the wagon box. The Füzesabony model depicts a rectangular, flattish wagon whose sides and edges are framed with hatched bands.

The two wagon models from Nižná Myšľa in Slovakia were assigned to the late Füzesabony culture. The piece recovered from a child burial has a conical wagon box bearing a hatched band under the rim, a hatched zig-zag band across the side and five impressed dots underneath. The rounded corners are similarly decorated with hatched bands. The base has a zig-zag line on the short side and incisions on the long side. The axles are represented by perforated ribs with rounded ends extending beyond the wagon box (OLEXA 1983, Fig. 1. 7; JAKAB – OLEXÁ – VLADÁR 1999, Abb. 27. 2; *Fig. 31. 2*). The other wagon, found on the settlement, is rectangular with rounded sides. The long sides are decorated with oblique lines. The axles are indicated by ribs with perforated, rounded ends. A perforated lug handle is set on one corner (OLEXA 2003, Fig. 11; OLEXÁ – PITORÁK 2004, Fig. 2; *Fig. 31. 3*).

Until recently, no miniature wagons were known from the Nagyrév culture. The first find of this type, a small fragment, came to light at Cegléd in 2005 (RAJNA 2005, 219).²⁷ The other piece is represented by the Nemesnáduvvar model (*Figs 23–25*), which can probably be assigned to this culture.

The sixteen wagon models of the Ottomány culture include both decorated pieces and plain ones, the latter often found on the same site as the patterned ones. The wagon model from Otomani (Ottomány, Romania. BICHR 1964, Fig. 2. 1; BONDÁR 1990, Fig. 9. 2a–b; SCHUSTER 1996, Pl. 7. 7; *Fig. 26. 4*) is rectangular, the corners are peaked and the sides end in handle-like projections. A rib-like moulding marks the position of the axles. The piece from Sălacea (ORDENTLICH – CHIDIOŞAN 1975, Pl. 3. 1–4; BONDÁR 1990, Fig. 9. 3a–b; SCHUSTER 1996, Pl.

²⁶ The caption is erroneous because the wagon model was in fact found at Füzesabony-Öregdomb.

²⁷ I am greatly indebted to András Rajna for showing me the wagon model and for kindly allowing me to quote it. Thanks are due to Róbert Patay for the photos of this fragment.

7. 9; *Fig. 26. 1*) is rectangular, the lower corners are curved and perforated, the axles passed through these handle-like terminals. An undecorated model from Berettyóújfalu (MÁTHÉ 1984, Pl. 6. 1a–c; *Fig. 21. 1*) is conical and the axles too passed through handle-like projections as on the piece from Sălăcea. The decorated models from the site bear diverse patterns. Two unpublished fragments with perforated upper corners from Berettyóújfalu are described as bearing incised motifs resembling the Pocsaj model (MÁTHÉ 1984, 148). The specimen from Otomani is adorned with patterns arranged into bands (ROSKA 1925, *Fig. 3. 4*; *Fig. 26. 7*). Nine of the wagon model fragments from Sălăcea are decorated. The ornamental patterns on these pieces differ, illustrating the extent to which contemporaneous artefacts from the same site can differ from each other. One wagon model is adorned with smoothed-in chevron motifs on the long and short sides, and – as far as can be made out on the published photo – with incised concentric circles in the interior (ORDENTLICH – CHIDIOŞAN 1975, Pl. 5. 1–4; SCHUSTER 1996, Pl. 7. 5; *Fig. 27. 7*). Several wagon models have a rectangular wagon box with prominently modelled corners (ORDENTLICH – CHIDIOŞAN 1975, Pl. II. 1–2, Pl. I. 1–3, Pl. II. 3–6, Pl. VI. 1, Pl. VI.2, Pl. VIII.1–2), and some are decorated with incisions along the rim (ORDENTLICH – CHIDIOŞAN 1975, Pl. II. 1–2, Pl. II. 3–5, Pl. VIII. 1). One specimen is adorned with zig-zag lines separated by a straight line on the long sides, and with a triple zig-zag line on the short sides, with the designs enclosed within an incised frame on the sides (ORDENTLICH – CHIDIOŞAN 1975, Pl. II. 1–2; SCHUSTER 1996, Pl. 7. 6; *Fig. 27. 4*). Another piece bears a design of hatched triangles arranged in two rows on the long and short sides (ORDENTLICH – CHIDIOŞAN 1975, Pl. I. 1–2; SCHUSTER 1996, Pl. 7. 4; *Fig. 27. 3*), while one specimen is decorated with a bundle of wavy lines recalling running dog motifs (ORDENTLICH – CHIDIOŞAN 1975, Pl. II. 3–5; SCHUSTER 1996, Pl. 7. 8; *Fig. 27. 5*). Resembling the undecorated wagon model, a rather sparsely ornamented piece has a circle of impressed dots on the long sides and one corner, and an elongated ellipse of dots with two perforations on the short sides (ORDENTLICH – CHIDIOŞAN 1975, Pl. IV. 1–2; SCHUSTER 1996, Pl. 7. 10; *Fig. 26. 3*). The base of the wagon box bears a similar pattern of impressed dots arranged in an ellipse combined with an arc created from impressed dots (ORDENTLICH – CHIDIOŞAN 1975, Pl. IV. 4). Another specimen has a decoration of vertical bands combined with incisions on the sides and along the edges of the wagon box (ORDENTLICH – CHIDIOŞAN 1975, Pl. VI. 1). Judging from the blurred photo, one fragment appears to have been decorated with a dense lattice pattern (ORDENTLICH – CHIDIOŞAN 1975, Pl. VI. 2). Only the peaked upper part

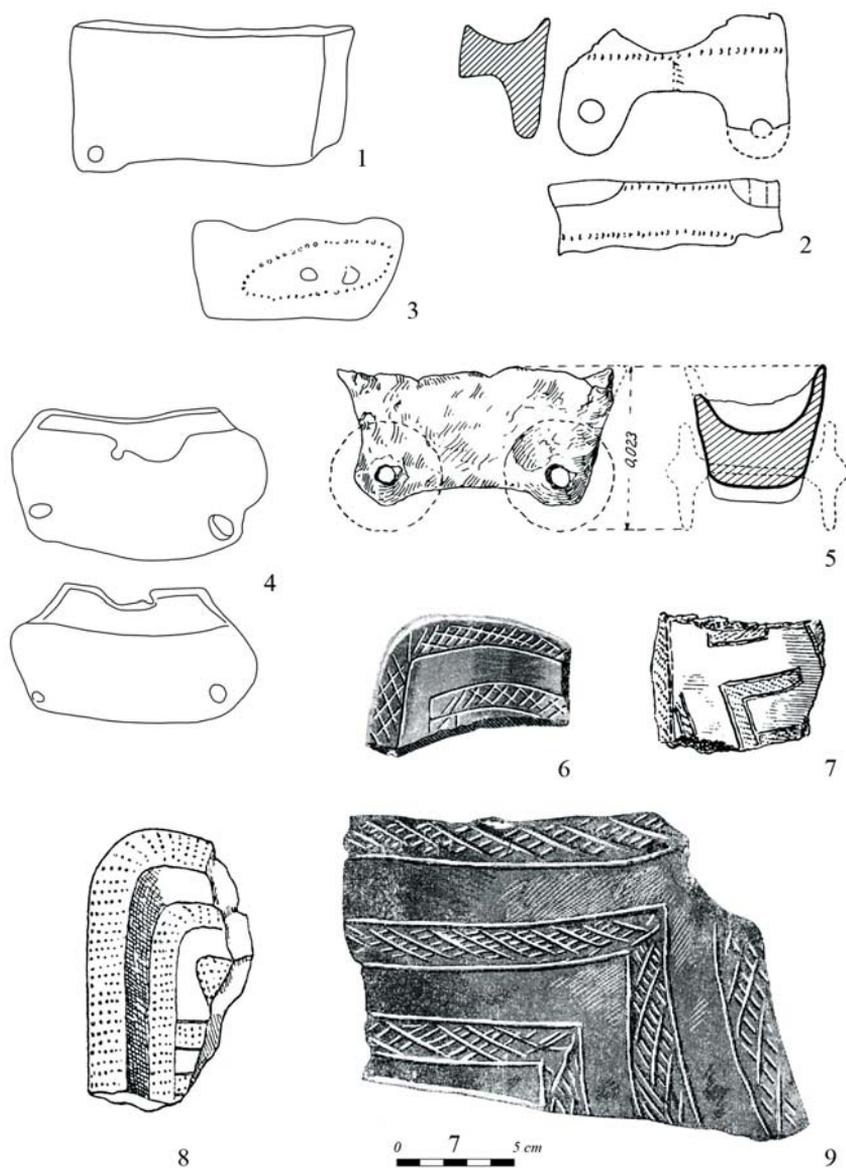


Fig. 26. Bronze Age wagon models. 1. Sălacea (after SCHUSTER 1996, Pl. 7. 9), 2. Sanislău (after SCHUSTER 1996, Pl. 6. 3), 3. Sălacea (after SCHUSTER 1996, Pl. 7. 10), 4. Otomani (after SCHUSTER 1996, Pl. 7. 7), 5. Cuciulata (after BICHR 1964, Figs 1–2), 6, 9. Szamosújvár (after OROSZ 1901, Fig. III, OROSZ 1904, Fig. 9), 7. Ottomány (after ROSKA 1925, Fig. 3. 4), 8. Algyógy (after ROSKA 1942, Abb. 4. 7).

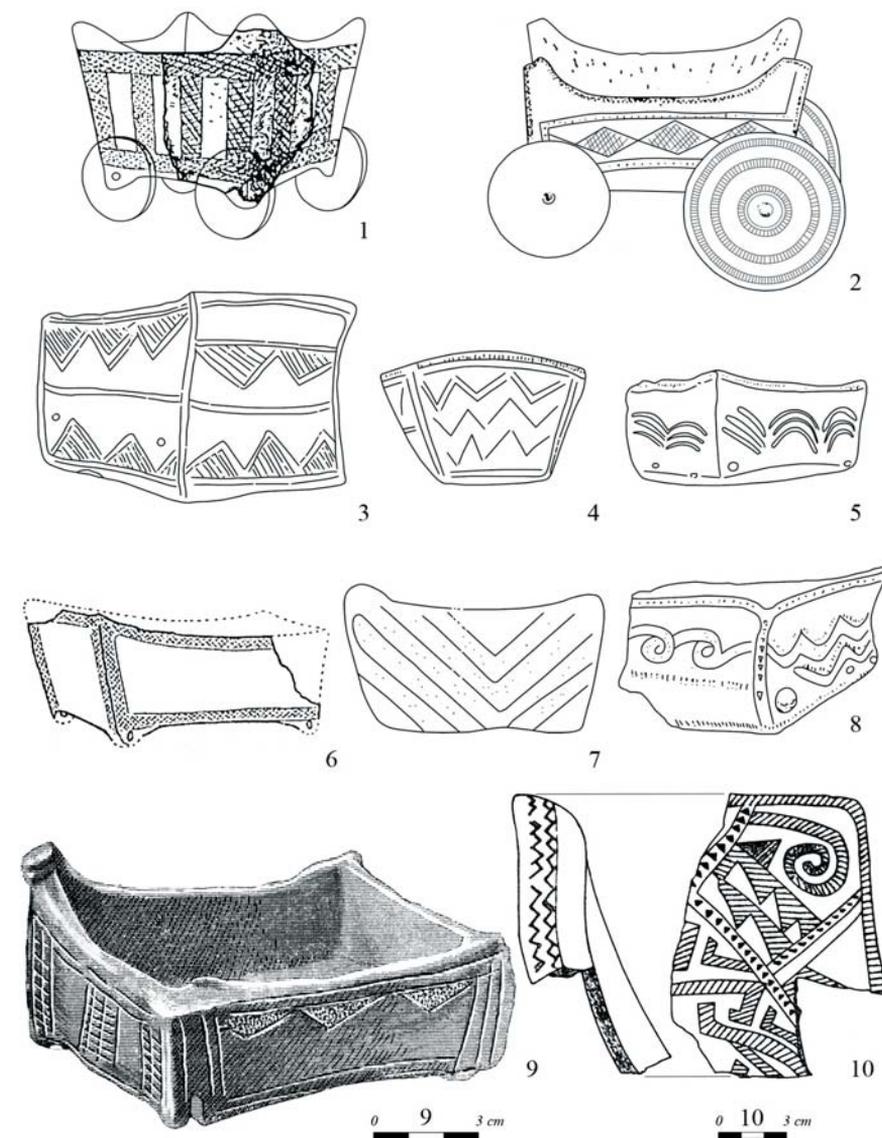


Fig. 27. Bronze Age wagon models. 1. Baraoltŷ (after SCHUSTER 1996, Pl. 3. 1), 2. Tiream (after SCHUSTER 1996, Pl. 7. 2), 3. Sălăcea (after SCHUSTER 1996, Pl. 7. 4), 4. Sălăcea (after SCHUSTER 1996, Pl. 7. 6), 5. Sălăcea (after SCHUSTER 1996, Pl. 7. 8), 6. Szamosújvár (after SCHUSTER 1996, Pl. 3. 6), 7. Sălăcea (after SCHUSTER 1996, Pl. 7. 5), 8. Săcueni (after SCHUSTER 1996, Pl. 7. 3), 9. Gyulavarsánd (after DOMONKOS 1908, Pl. II. 6), 10. Voivodeni (after PETICĂ 1981, Abb. 8. 3).

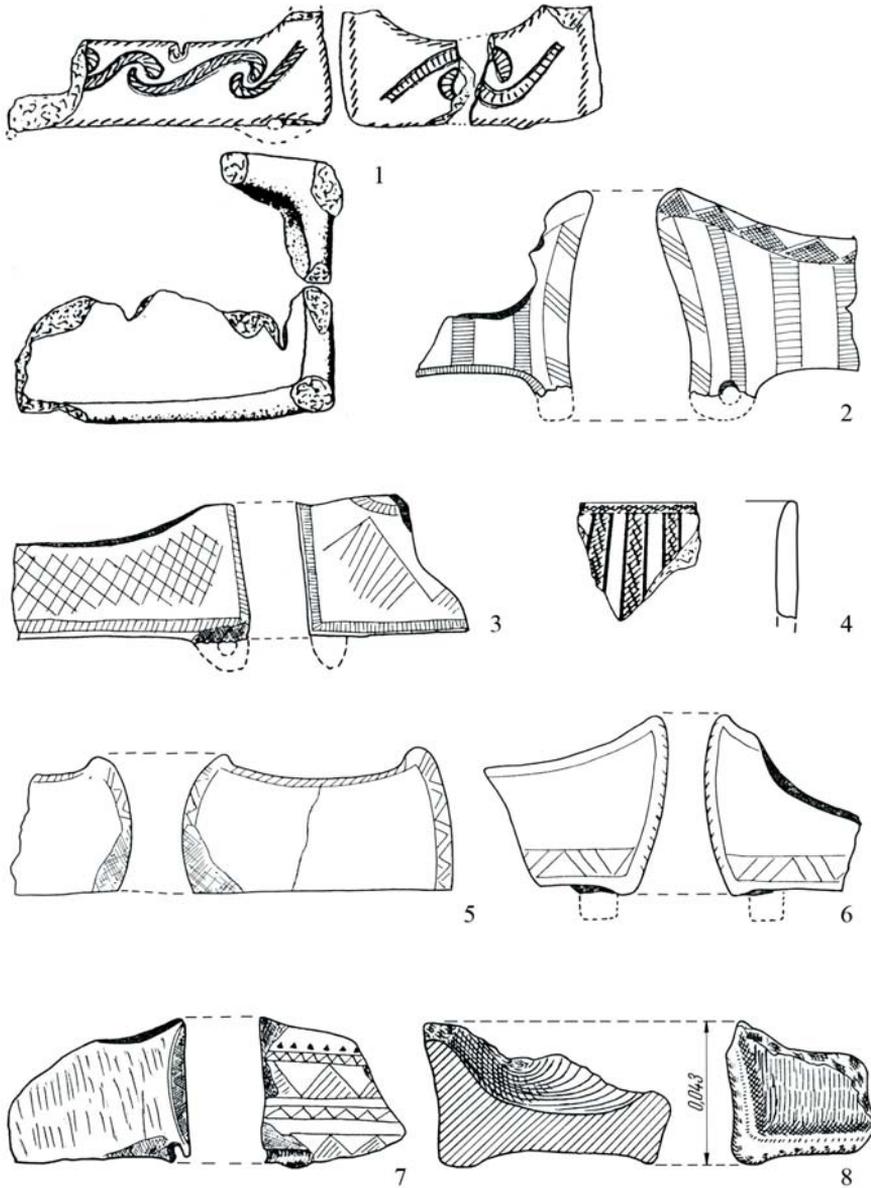


Fig. 28. Bronze Age wagon models. 1. Feldioara (after BOROFFKA 1994, Taf. 76. 1), 2. Derșida (after CHIDIOȘAN 1980, Taf. 25. 1), 3. Derșida (after CHIDIOȘAN 1980, Taf. 25. 3), 4. Feldioara (after BOROFFKA 1994, Taf. 76. 2), 5. Derșida (after CHIDIOȘAN 1980, Taf. 25. 2), 6. Derșida (after CHIDIOȘAN 1980, Taf. 25. 4), 7. Derșida (after CHIDIOȘAN 1980, Taf. 25. 5), 8. Bistrița (after DĂNILĂ 1971, Abb. 2. 3).

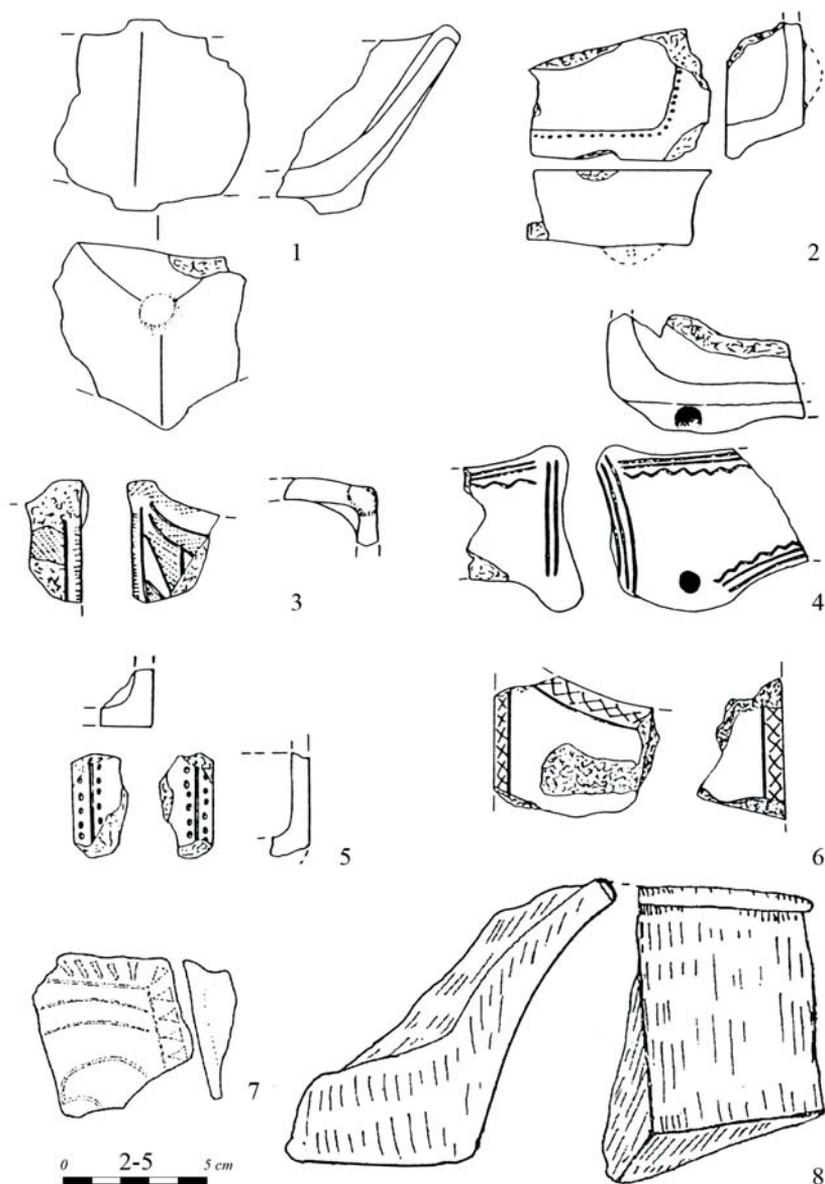


Fig. 29. Bronze Age wagon models. 1. Ciceu Corabia (after BOROFFKA 1994, 168. Taf. 56. 5), 2. Corpadea (after BOROFFKA 1994, Taf. 63. 9), 3. Cluj (after BOROFFKA 1994, Taf. 62. 7), 4. Braşov (after BOROFFKA 1994, Taf. 19. 5), 5. Aiton (after BOROFFKA 1994, Taf. 1. 5), 6. Sieu (after BOROFFKA 1994, Taf. 127. 4), 7. Boinesti (after SCHUSTER 1996, Pl. 6. 5), 8. Bărboasa (after SCHUSTER 1996, Pl. 5. 1).

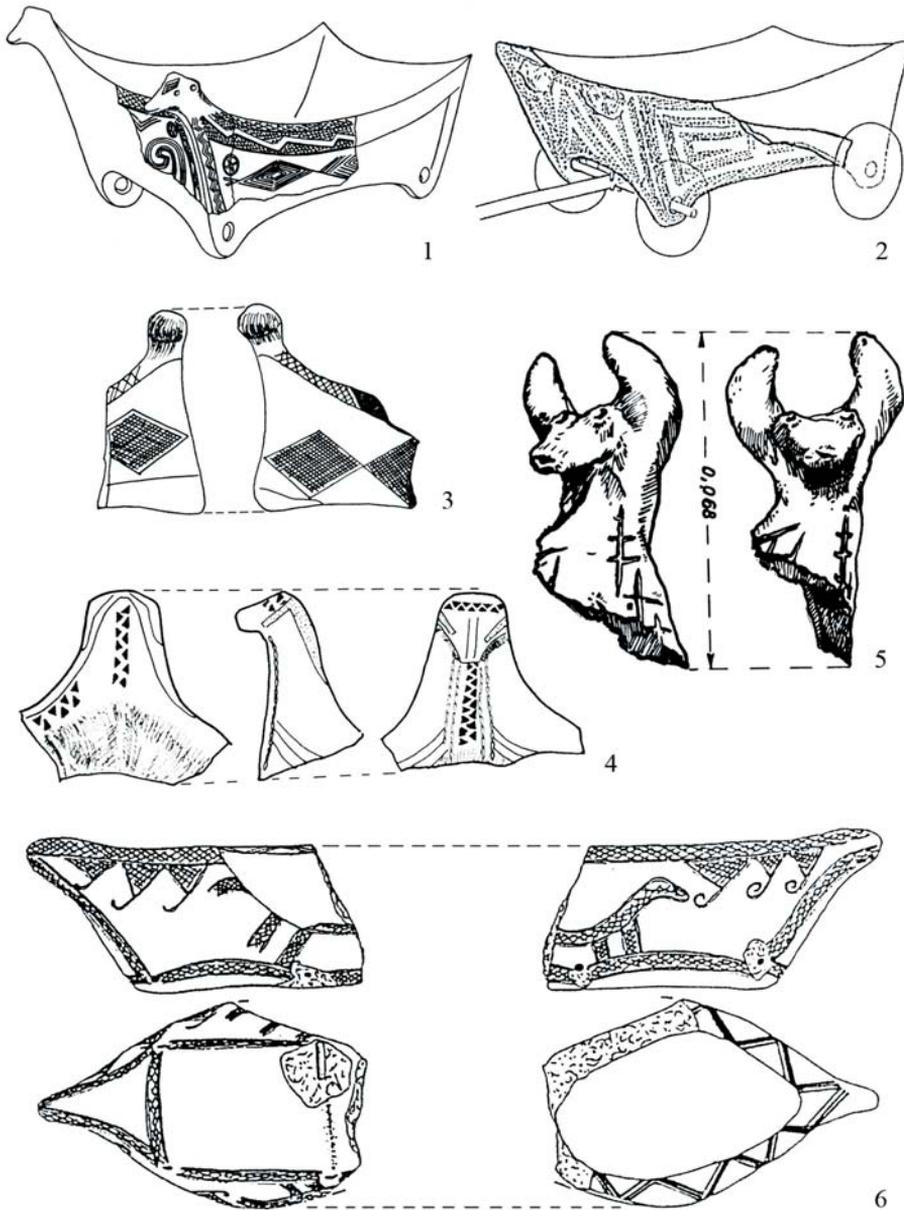
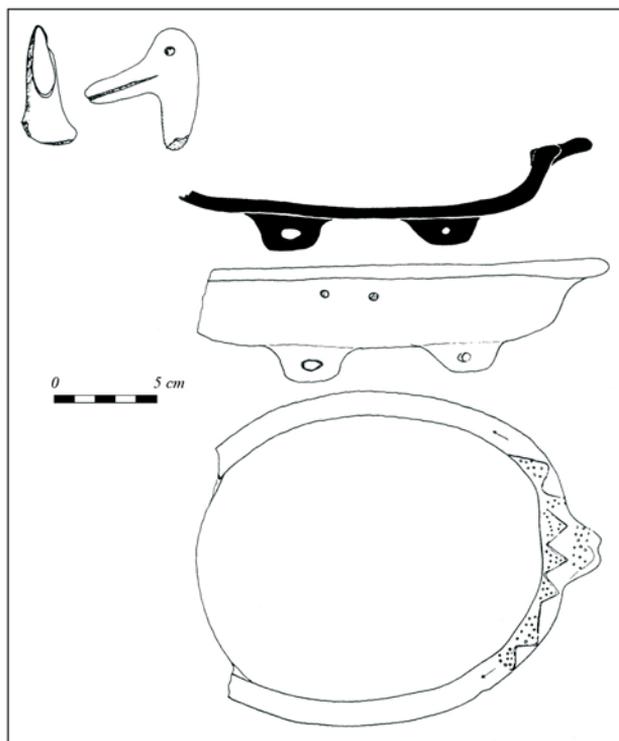


Fig. 30. Bronze Age wagon models. 1. Lechința (after SCHUSTER 1996, Pl. 3. 7), 2. Sighișoara (after SCHUSTER 1996, Pl. 3. 2), 3. Derșida (after CHIDIOȘAN 1980, Taf. 25. 7), 4. Derșida (after CHIDIOȘAN 1980, Taf. 25. 9), 5. Jigodin (after SZÉKELY 1959, Fig. 2), 6. Ciceu Corabia (after BOROFFKA 1994, Taf. 59. 5).



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Fig. 31. Bronze Age wagon models. 1. Böheimkirchen
 (after SCHAUER 1988–1989, Abb. 5), 2–3. Nižna Myšľa (after OLEXA 2003, Fig. 11).

survived of another model, from which it is impossible to reconstruct the form of the wagon box (ORDENTLICH – CHIDIOȘAN 1975, Pl. VI. 3). On several models, the axles did not pass through handle-like perforated knobs; instead, the corners of the wagon box had four perforations, meaning that the axles extended across the box instead of the box being set on the axles (ORDENTLICH – CHIDIOȘAN 1975, Pl. I. 3, Pl. II. 1–2, Pl. IV. 1).²⁸

The wagon model from Săcuieni (Székelyhíd, Romania) has rounded edges and bears a design of hatched bands under the rim, along the edges, in the centre and on the underside of the wagon box, combined with a running spiral on one side. The short sides have two bundles of zig-zag lines (ORDENTLICH – CHIDIOȘAN 1975, Pl. VIII. 1–2; SCHUSTER 1996, Pl. 7. 3; *Fig. 27. 8*).

The piece from Tiream (Terem, Romania) has a conical wagon box adorned with a row of hatched lozenges on the long sides. It is unclear from the published illustration whether the reconstruction was based on an intact or a fragmentary wagon model. The wheels are asymmetrical; the larger wheel is decorated with concentric circles (BADER 1978, Pl. 36. 26; SCHUSTER 1996, Pl. 7. 2; *Fig. 27.2*).

Four almost intact models are known from the Gyulavarsánd culture, each of which is decorated. The wagon boxes are conical, the axles passed through lug handle-like perforated knobs set on the underside of the wagon box. The best known among the culture's models is the piece from Pocsaj (MESTERHÁZY 1976, Figs 1–5; DANI 2005, Fig. 3; *Fig. 22. 2*), decorated with three hatched zig-zag bands on the long sides and a spoked wheel on the short sides. The wheels are likewise decorated. The designs on the two long and two short sides differ slightly regarding minor details, perhaps because of the meaning conveyed by the pattern. The wagon model from Vésztő (KOVÁCS 1994, Fig. 38; *Fig. 21. 3*) has a long, flattish wagon box adorned with parallel zig-zag motifs and bundles of incised lines. The specimen from Berettyószentmárton (BRONZEZEIT IN UNGARN Cat. no. 330; *Fig. 21. 4*) has a wagon box framed with incised lines. The sides of the wagon box are framed with incised lines, combined with hatched hanging triangles on the long sides on the model from the eponymous site at Gyulavarsánd (Vársánd, Romania). The rim is peaked on one of the long sides; however, the tip broke off and thus it is uncertain whether there was a protome on top or whether it was simply rounded (DOMONKOS 1908, Pl. II. 6; BÓNA 1960, Abb. 3; ORDENTLICH – CHIDIOȘAN 1975, Pl. 7, *Fig. 27. 9*). The short sides bear vertical hatched bands, whose number differs (FETTICH 1969, Pl. 3. 2b, 2c; ORDENTLICH – CHIDIOȘAN

²⁸ In the lack of a profile drawing, more precise observation is not possible.

1975, Pl. 7. 3). The groove for the axles can be clearly seen on the underside (FETTICH 1969, Pl. 3. 2e). Bóna mentions a model from Békés among the finds of the Gyulavarsánd culture (BÓNA 1994, 74; this piece appears to have been lost).

The highest number of wagon models, forty-three in all, comes from the Wietenberg culture. Similarly to the wagon models of the Ottomány culture, the pieces of the Wietenberg culture represent differing types. Virtually nothing is known about two unpublished fragments from Oarta de Sus (Felsővárca, Romania, BOROFFKA 1994, 167). The model found at Bistrița (Beszterce, Romania) is mentioned briefly (BOROFFKA 1994, 167; for a drawing, cp. DĂNILĂ 1971, Abb. 2. 3; *Fig. 28. 8*). Decorated and plain varieties have both been found, the latter outnumbering the former. Some sites yielded several models of different types.²⁹ The plain pieces usually have a rectangular wagon box, as the specimens from Ciceu Corabia (Csicsóújfalu, Romania, BOROFFKA 1994, 168. Taf. 56. 5; *Fig. 29. 1*) and Sighișoara (Segesvár, Romania, HOREDTE – SERAPHIN 1971, Abb. 17. 27, Abb. 39. 1–2, 5, 7, 10), while the wagon box of the decorated specimens ranges from square and rectangular to conical with trapezoidal sides. Judging from the published drawings and photos, the model from Derșida (Romania, CHIDIOȘAN 1980, Taf. 25. 2; *Fig. 28. 5*) and four pieces from Sighișoara (HOREDTE – SERAPHIN 1971, Abb. 39. 6, 9, 13–14) were decorated along the edges only. The wagon box was framed on the models from Aiton (Ajton, Romania, BOROFFKA 1994, Taf. 1. 5; *Fig. 29. 5*), Brașov (Brassó, Romania, BOROFFKA 1994, Taf. 19. 5; *Fig. 29. 4*), Corpadea (Kolozskorpád, Romania, BOROFFKA 1994, Taf. 63. 9; *Fig. 29. 2*), Derșida (CHIDIOȘAN 1980, Taf. 25. 4; *Fig. 28. 6*), Gherla (Szamosújvár, Romania, OROSZ 1901, Fig. 123, BÓNA 1960, Fig. 3, SCHUSTER 1996, Pl. 3. 6; *Fig. 27. 6*), Șieu (Árokalja, Romania, BOROFFKA 1994, Taf. 127. 4; *Fig. 29. 6*) and a fragment from Sighișoara (HOREDTE – SERAPHIN 1971, Abb. 39. 16). The sides of the wagon box were sometimes framed with impressed dots (Aiton, Corpadea), a lattice pattern (Gherla, Șieu) or a zig-zag line (Brașov, Derșida, Sighișoara). A lattice pattern arranged in vertical bands adorns the sides of the pieces from Baraolt (Barót, Romania, SZÉKELY 1988, Fig. 1. 1; SCHUSTER 1996, Pl. 3. 1; *Fig. 27. 1*), Derșida (CHIDIOȘAN 1980, Taf. 25; 1, BOROFFKA 1994, 167; *Fig. 28. 2*), Feldioara (Földvár, Romania, BOROFFKA 1994, Taf. 76. 2; *Fig. 28. 4*), the two models from Gherla (OROSZ 1901, Fig. 111; OROSZ 1904,

²⁹ Two pieces from Ciceu Corabia/Csicsóújfalu, seven from Derșida/Kisderzsida, two from Feldioara/Földvár, three from Gherla/Szamosújvár, two from Oarta de Sus/Felsővárca and fifteen from Sighișoara/Segesvár.

Fig. 9; *Fig. 26. 6, 9*)³⁰ and a fragment from Sighișoara (HOREDT – SERAPHIN 1971, Abb. 39. 4). A model from Geoagiu (Algyógy, Romania) has bands filled with impressed dots (ROSKA 1942, Abb. 4. 7; BOROFFKA 1994, 167; *Fig. 26. 8*). Some pieces have an elaborate design incorporating spirals (Sighișoara, HOREDT – SERAPHIN 1971, Abb. 39. 12) and running dog motifs (Feldioara, BOROFFKA 1994, Taf. 76. 1; *Fig. 28. 1*), and in a few cases, the entire wagon box is covered with geometric patterns, as on the pieces from Cluj (Kolozsvár, Romania, BOROFFKA 1994, Taf. 62. 7; *Fig. 29. 3*), Derșida (CHIDIOȘAN 1980, Taf. 25. 3, 5; *Fig. 28. 3, 7*), Sighișoara (HOREDT – SERAPHIN 1971, Abb. 39. 15) and Voivodeni (Vajdaszentivány, Romania, PETICĂ 1981, Abb. 8. 3; *Fig. 27. 10*). The axles on the wagon models of the Wietenberg culture passed through a perforated knob or lug handle-like rounded terminals on the underside of the wagon box; unlike on the models of the Ottomány culture, the axles did not pierce the wagon box.

Following a long hiatus from the Copper Age, the portrayal of the animals yoked to the wagon appears again in the Wietenberg culture.

The only wagon model of the Věteřov culture, a bird shaped decorated piece, came to light at Böhleimkirchen in Austria (NEUGEBAUER 1979, Abb. 8. 2; SCHAUER 1988–1989, Abb. 5, *Fig. 31. 1*).

One wagon model is known from the Monteoru culture: the fragment of the lower corner of the rectangular wagon box came to light at Bărboasa in Romania (CĂPITANU – FLORESCU 1969, Fig. 7; SCHUSTER 1996, Pl. 5. 1; *Fig. 29. 8*).

The only wagon model of the Tei culture was found in București (SCHUSTER 1996, 118, note 59). The corpus of Middle Bronze Age wagon models includes also a fragment from Boinești (Bujánháza, Romania, SCHUSTER 1996, Pl. 6. 5; *Fig. 29. 7*), assigned to the Suci de Sus culture, and an unpublished piece from Adunații Copăceni, mentioned by Schuster (SCHUSTER 1996, 127).³¹

The above overview of the clay wagon models indicates that some traits, such as the position of the axles placed under or through the wagon box, the ornamental motifs echoing pottery ornamentation, decorative techniques, fabric and manufacturing techniques, are specific to a particular culture. At the same time, it is also quite obvious that the cultural attribution of most wagon models, each a singular piece, would run into difficulties if found without a secure context and associated finds. The wagon models of certain cultures include both plain and

³⁰ These two fragments are not identical with the oft-quoted reconstructed wagon model from Gherla/Szamosújvár.

³¹ The text contains a reference to an illustration of the piece in Pl. 10, but there is no such illustration accompanying the article.

decorated pieces, and thus we can hardly claim that only plain pieces were used by some cultures. The current corpus of wagon models would suggest that some Bronze Age cultures lacked wagon models (the Makó, Bell Beaker, Kisapostag, Encrusted Pottery, Vatyá and Magyarád cultures), while other are characterised by a scarcity or, conversely, an abundance of vehicle depictions (Ottomány and Wietenberg cultures). There may be a deeper underlying reason for this, or it may be mere chance. It must be borne in mind that unusual, remarkable artefacts such as wheels and wagon models fashioned from clay and metal, and the animal figures attached as protomes, as well as wooden wheels, genuine wagons, wagon burials, wheel-ruts, paved road remains and the like are most often chance finds, discovered through pure archaeological luck, and thus our knowledge is patchy to say the least: often, we are dealing with little more than a blurred imprint of the past from which we attempt to reconstruct the colourful reality that once was. Thus, instead of sweeping conclusions, we should concentrate on the facts.

4.4. Zoomorphic depictions

Animal depictions which can directly or indirectly be associated with miniature ceramic vehicle models have already been covered in the section on the wagon models of the Copper Age. Two main depiction types could be distinguished, the first made up of stylised animal heads applied to the wagon box, the second of free-standing animal figurines. The pieces from the Carpathian Basin were highly schematised creatures modelled from clay coils whose species could rarely be determined, while the figurines from the Ancient Near East and Anatolia usually portrayed cattle, possibly oxen.

A definite change occurred in animal cults during the Early Bronze Age in the Carpathian Basin, marked by the perceptible prominence of birds. Only in the Middle Bronze Age are depictions of draught animals again encountered among the known finds. The same duality can be noted among these portrayals as in the Copper Age: the finds include both animal heads applied to the wagon box or its corners, and free-standing figurines, principally of birds (SCHAUER 1988–1989; GUBA – SZEVEÉNYI 2007, covering the relevant finds from the Carpathian Basin).

Following a long hiatus from the Copper Age, the portrayal of the animals yoked to the wagon appears again in the Wietenberg culture.

A cattle head was applied to the rim of one of the elaborately ornamented short sides on the fragment from Lechința-Mureș (BICHIR 1964, Fig. 4. 3; SCHUSTER

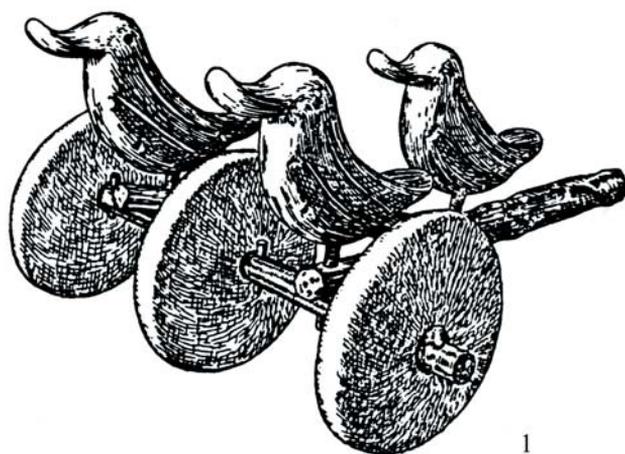
1996, Pl. 3. 7; *Fig. 30. 1*). The stub of two animal heads can be made out on the short side of the perhaps best-known fragment from Sighișoara (BICHIR 1964, *Fig. 4. 2*, SCHUSTER 1996, Pl. 3. 2; *Fig. 30. 2*).³² An animal head protome, broken off from the artefact which it had originally adorned, has been published from Racoș-Piatra-Detunată in Romania (COSTEA – SZÉKELY 2011, Pl. 3. 6). Two zoomorphic fragments, one from Jigodin (Zsögöd, Romania. BICHIR 1964, 82, note 86; SZÉKELY 1959, *Fig. 2; Fig. 30. 5*),³³ the other from Derșida (CHIDIOȘAN 1980; *Taf. 25. 9*, BOROFFKA 1994, 168; *Fig. 30. 4*), had probably been similar protomes judging from their style. The original form of another fragment from the latter site is uncertain: it is impossible to determine from the published drawing whether it is a corner with an animal head from a wagon box or simply a small sphere set on it (CHIDIOȘAN 1980, *Taf. 25. 7; Fig. 30. 3*).

Relics of the bird cult appear in a rich variety during the Middle Bronze Age, ranging from bird shaped rattles to bird shaped and bird-drawn vehicles, as well as bird-headed humans and the like. Bird shaped wagons first appeared in the Wietenberg culture, as shown by the elaborately decorated model found at Ciceu Corabia (BOROFFKA 1994, *Taf. 59. 5; Fig. 30. 6*).

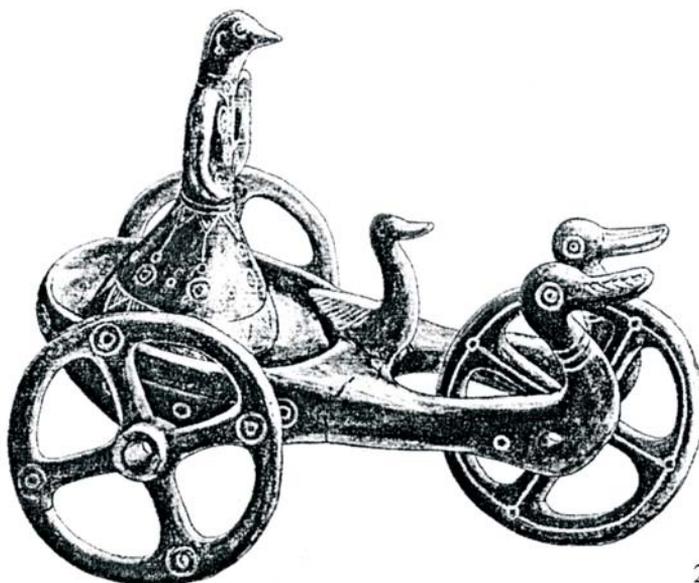
Vehicles are sometimes depicted as drawn or borne by waterfowl in the Middle Bronze Age. The eventful story of the two remarkable chariot models found at Dupljaja near Belgrade and the many controversial issues surrounding the two pieces have been recently discussed by Rastko Vasić. One of the models from Dupljaja is two-wheeled (VASIĆ 2004, *Fig. 1*), the other is three-wheeled and is drawn by three birds (VASIĆ 2004, *Fig. 2; Fig. 32. 2*). A bird-headed figure (VASIĆ 2004, *Fig. 1*) dressed in a long skirt rides both chariots. The authenticity, dating and interpretation of the two chariot models have been the subject of lively debates. Vasić assigned the finds to the Middle Bronze Age Žuto Brdo–Dubovac group. The chariot models from Dupljaja represent the first instance of the combination of vehicle, bird and human in the archaeological material. A comparable three-wheeled model drawn by three winged creatures is known from Brzeźniak in Poland (VOSTEEN 1998, *Taf. 132. 226–1 and 226–2; Fig. 32. 1*). It would appear that the number three and the group of three birds had a symbolic meaning.

³² The stubs of missing animal heads are not shown on Bóna's illustration (BÓNA 1960, *Fig. 3*, with the findspot specified as Wietenberg).

³³ It must be pointed out here that a mistaken citation has become firmly established in the archaeological literature, according to which this model was published in Volume II of *Materiale*, even though it appears in Volume V.



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Fig. 32. Bronze Age wagon models. 1. Brzeźniak (after VOSTEEN 1998, Taf. 132, 226),
2. Dupljaja (after VASIĆ 2004, Fig. 2).

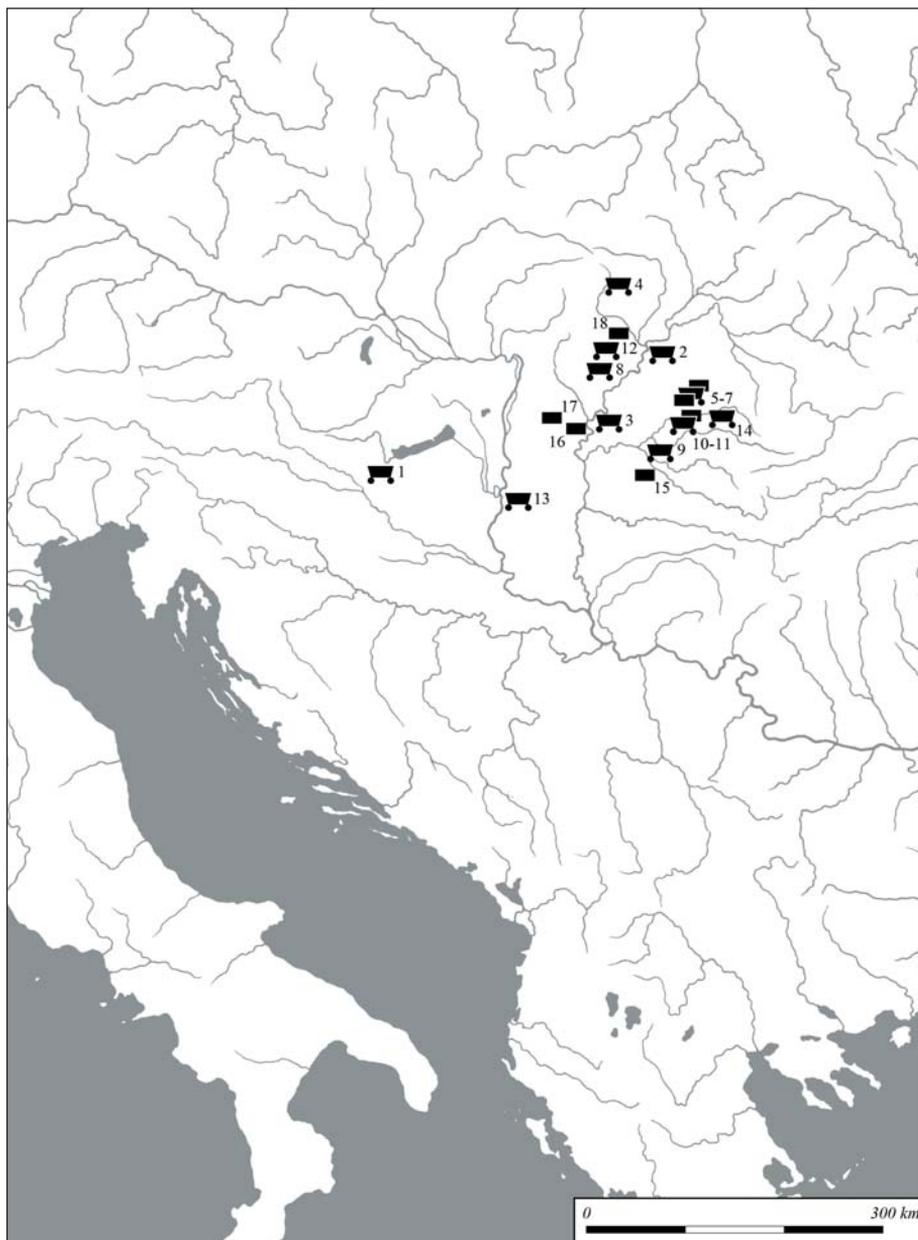


Fig. 33. Distribution of Bronze Age wagon models in Hungary (drawing by Sándor Ősi).
 1. Börzönce, 2. Polgár, 3. Törökszentmiklós, 4. Alsóvadász, 5–7. Berettyóújfalu,
 8. Füzesabony, 9. Vésztő, 10–11. Berettyószentmárton, 12. Novaj,
 13. Nemesnádudvar, 14. Pocsaj, 15. Békés, 16. Tószeg, 17. Cegléd, 18. Vatta.

The only wagon model of the Věteřov culture, a bird shaped decorated piece, came to light at Böheimkirchen in Austria (NEUGEBAUER 1979, Abb. 8. 2; SCHAUER 1988–1989, Abb. 5; *Fig. 31. 1*).

One striking feature compared to the preceding period is a perceptible richness in the meaning of wagon models, leading into the realm of myths and beliefs. There are few clues to the possible symbolic meaning of the simple, undecorated wagon models from the Late Copper Age and the Early Bronze Age. Although their probable meaning can be deciphered to some extent from the myths and legends of later ages (the wagon/cart/chariot as a symbol of the heavens, the vehicle of the deceased, a symbol of the Sun, the link between the Earth and the Sky, the military chariot of war, and the like), these are, more often than not, fairly uncertain interpretations conferred onto the artefact from hindsight. The symbolic meaning of animal-drawn wagons is similar in many respects: in early prehistory, they perhaps represented no more than the image of an unusual, rare spectacle, and a permanent ritual meaning was only attached to this imagery at a later date. Bird-drawn vehicles can probably be assigned to the latter, “canonised” types and can perhaps be seen as early variants of the attributes linked to later mythological heroes. In Greek mythology, for example, Apollo, the god of light, mounted his swan-drawn chariot when he flew to the land of the Hyperboreans to spend the months of darkness among his beloved people living on a mythical island. Swans played a prominent role in the love affair between Zeus and the goddess of fate (Nemesis or Leda). Countless other examples can be quoted from the mythologies of various peoples. The common element in these myths and legends is that winged creatures are invariably associated with the sky and the heavens. We know from historical sources and the major religions that birds played an important role in divination and in the presentation of sacrifices. In Hinduism, for example, the priests presenting the sacrifice and the ritual dancers are called birds, while in Christianity, winged angels are the mediums of communication between the heavens and the earth, and the Holy Spirit is symbolised by a dove. The joint depiction of birds, vehicles and humans in prehistory was most likely linked to this abstraction.

5. Conclusions

Several hypotheses have been put forward for the area where wagons were first invented and for the routes whereby this innovation was diffused. It was initially believed that the wagon had been invented in one specific region, whence it spread to the rest of the world. The favourite candidate was Asia Minor, the region with the earliest wagon finds and the highest number of wagon models. Three potential regions were considered for the spread of wagons to Europe: the steppe north of the Pontic, the Balkan peninsula and the eastern Mediterranean.

Piggott devoted several studies to the invention and diffusion of wagons. He argued for Mesopotamian origins and their spread to Europe from the Russian steppe, claiming that the diffusion of wagons could be correlated with the migration of the Indo-European tribes (PIGGOTT 1979, 1983, 1987). It was for a long time an axiom of vehicle studies that the cradle of wheeled conveyances lay somewhere in the Ancient Near East and that they were diffused to Europe from there. A re-assessment of this generally accepted view came in the early 1980s, following the discovery of genuine wagons in the burials found under the kurgans raised by the Yamna communities of the northern Pontic. Häusler argued that the Yamna wagons could not be derived from the Mesopotamian and Transcaucasian vehicles, and he also rejected a steppe ancestry for the Central and Western European wagons. Instead of invoking migrations for explaining the appearance of wagons in Europe, he argued that European wagons were local innovations (HÄUSLER 1978, 1981, 1984, 1985, 1986, 1992).

A comparison of the European wagon models with other contemporaneous pieces from Anatolia and the Ancient Near East reveals that they differ significantly regarding their form and ornamentation. The Anatolian and Near Eastern wagons are characterised by the clear-cut depiction of the four wheels, with the wheels set on prominent axles. They are generally adorned with an incised design, often a herringbone or zig-zag pattern. In contrast to the European wagon models, these pieces were either forerunners of the later battle chariots or were miniatures of covered wagons.

The miniature vehicle models from Europe usually depict an open, rectangular wagon. The Pilismarót model is the only one which was perhaps the miniature counterpart of a covered wagon, although it is also possible that it had been fitted with a curved handle resembling the one on the Radošina wagon.

In view of the many dissimilarities, one may reasonably ask whether a genetic link can be assumed between the European and Ancient Near Eastern wheeled

vehicles. It must also be borne in mind that wagon finds outlining possible routes of diffusion are lacking from the vast region between Anatolia, Syria and Mesopotamia on the one hand, and the Carpathian Basin on the other.

Maran recently proposed a new model for the origins and diffusion of wheeled vehicles. He devoted several studies to Bratislava type bowls, a curious vessel type distributed over an extensive area. He attributed the appearance of this vessel type in distant regions to trade contacts, arguing for a spread from north to south (from Central Europe towards Greece and the Balkans) (MARAN 1998, 509, 512; MARAN 1998a). Maran claimed that wagons played a crucial role in trade. Reviewing the possible commodities exchanged between various regions, he excludes a trade in metals because the earlier, flourishing metallurgy had declined visibly during the Baden period, probably owing to the exhaustion of easily accessible ore deposits and the lack of a more sophisticated mining technology. He suggested two new commodities that may have been traded: obsidian and wool. Archaeometric studies have revealed that the obsidian found on Late Neolithic and Chalcolithic sites in Greece bear a striking resemblance to northern Hungarian and Slovakian obsidian varieties, suggesting that it originated from these regions; the examination of two samples recovered from Early Bronze Age contexts yielded similar results. The exchange contacts existing already in the 5th millennium and still active during the 3rd millennium thus probably survived into the Baden period too (MARAN 1998, 515–516). Sheep played a perhaps even more important role. A new variety of sheep known as wool sheep appeared in the Near East during the 7th–5th millennia, whose presence can be demonstrated in Central and South-East Europe too from the later 4th millennium onward. This led Maran to suggest a possible trade in sheep and, more importantly, in wool (MARAN 1998, 516). The use of wagons in the Baden culture is one of the key arguments for dating the Baden culture to the same period in Maran's model. Wagons were demonstrably known in Northern and Central Europe, the Pontic region and Mesopotamia by the later 4th millennium. Their economic usefulness made wagons indispensable conveyances used in day to day life, explaining their rapid diffusion over extensive territories. Maran questioned the Mesopotamian origin of wagons, suggesting that wheeled vehicles may in fact have been diffused southward from the Carpathian Basin. However, conclusive proof for this possibility can only be gained from an accurate dating of the wagon models and wagon depictions from Greece and the Ancient Near East. Maran noted that the use of wagons spread like wildfire after their invention (MARAN 1998, 521). Bakker and his colleagues proposed a similar date for the earliest

wagons: from their overview of the evidence provided by miniature wheels, the wagon depiction on the Bronocice vessel, the wheel-ruts under the megalithic barrow at Flintbek, the pictograms from Uruk and the available radiocarbon dates, they concluded that wheeled vehicles had either developed more or less simultaneously in Europe and Mesopotamia, or that they had been diffused very rapidly from Mesopotamia (BAKKER *et al.* 1999, 778). They believe the latter scenario was the more probable of the two.

Many prehistorians have accepted the possibility of multiple origins, meaning that the wheeled vehicles could have been invented independently in various regions.

Similarly to other major inventions, the idea of wheeled conveyances was based on a very simple notion: the need for something which would roll and could be dragged along for transporting items that were too bulky or too heavy to be carried by hand. This called for some sort of rollers, a box-like container and one or more animals to pull it along. The creation of vehicles from these structural elements is shown in a series of illustrations I found on an educational website (*Fig. 34*).³⁴ These simple elements were available around the world, but obviously the early need for this innovation was greater in regions where travel and transportation were more difficult (e.g. in deserts and mountainous areas).

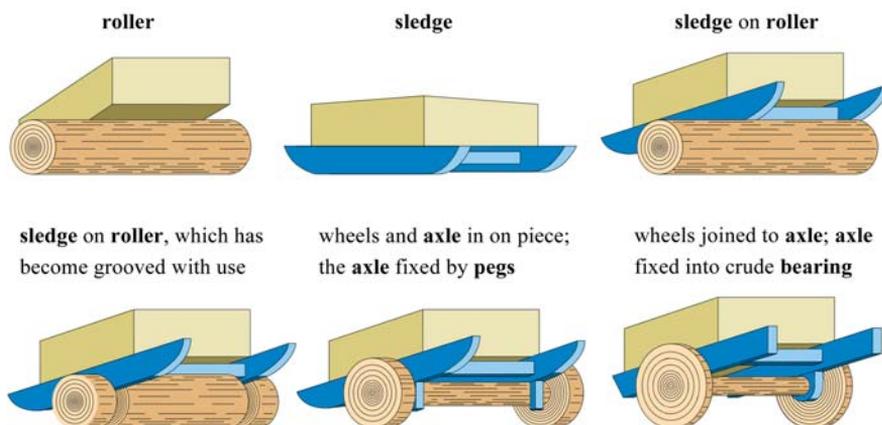


Fig. 34. Invention of wheeled vehicles
(after <http://library.thinkquest.org/C004203/science/science02.htm>).

³⁴ <http://library.thinkquest.org/C004203/science/science02.htm>

Archaeological evidence for the chronological sequence described here comes from sites of the Late Neolithic Tripolye culture (RASSAMAKIN 1999, Fig. 3. 51. 6–7).

The maps published in the Frasnais conference volume reflect the three most emblematic views (represented by Sherratt, Matuschik and Vosteen) on the invention and diffusion of wheeled vehicles (PÉTREQUIN – PÉTREQUIN – BAILLY 2006, Fig. 4; *Fig. 35*). In Sherratt's view, wheeled vehicles were invented in Mesopotamia around 4000 BC, whence they spread to Europe during the next five hundred years. Matuschik argued that wheeled conveyances first appeared in the northern Pontic around 3800 BC and were diffused to Europe and Mesopotamia within three hundred years. Vosteen argued for a simultaneous innovation in Mesopotamia and the Carpathian Basin around 3500 BC, claiming that vehicles reached other regions from these two centres (PÉTREQUIN – PÉTREQUIN – BAILLY 2006, 363–366).

In the past few decades, studies on the history of the Indo-European peoples have explored the possible connection between horse-breeding, wagons and the migration and dispersal of the Indo-European tribes; however, no conclusive answers are forthcoming regarding the key question.

Wagon models are now dated to ever earlier periods in the light of recent finds and other evidence confirming the early existence and use of wheeled vehicles. Research into early vehicles and wagon models does not simply focus on iconographic traits, but also on the ritual and mythological dimensions of these finds. There has been a growing emphasis on the role of wheeled vehicles in daily life, their economic significance, the importance of innovations and the level of technical advances in various prehistoric cultures, as well as on the extent to which cultures were receptive to new inventions and on how innovations were transferred. Sherratt's model on the secondary exploitation of animals brought a new perspective to research on early wheeled vehicles (SHERRATT 1981, 1983).

The number of wagon models has increased manifold since Childe published his seminal study. The new radiocarbon and dendrochronological dates for the Baden culture have called for a re-assessment of earlier hypotheses regarding the appearance of wagons and have shown that this major innovation can be dated earlier than previously believed. The fresh evidence for the European spread of wheeled vehicles has outlined a potentially new route of diffusion from north to south. It is an open question why the communities using wagons would have only migrated southward and why they would not have set off in all directions, reaching even the remotest corners of Europe during their journeys to explore the

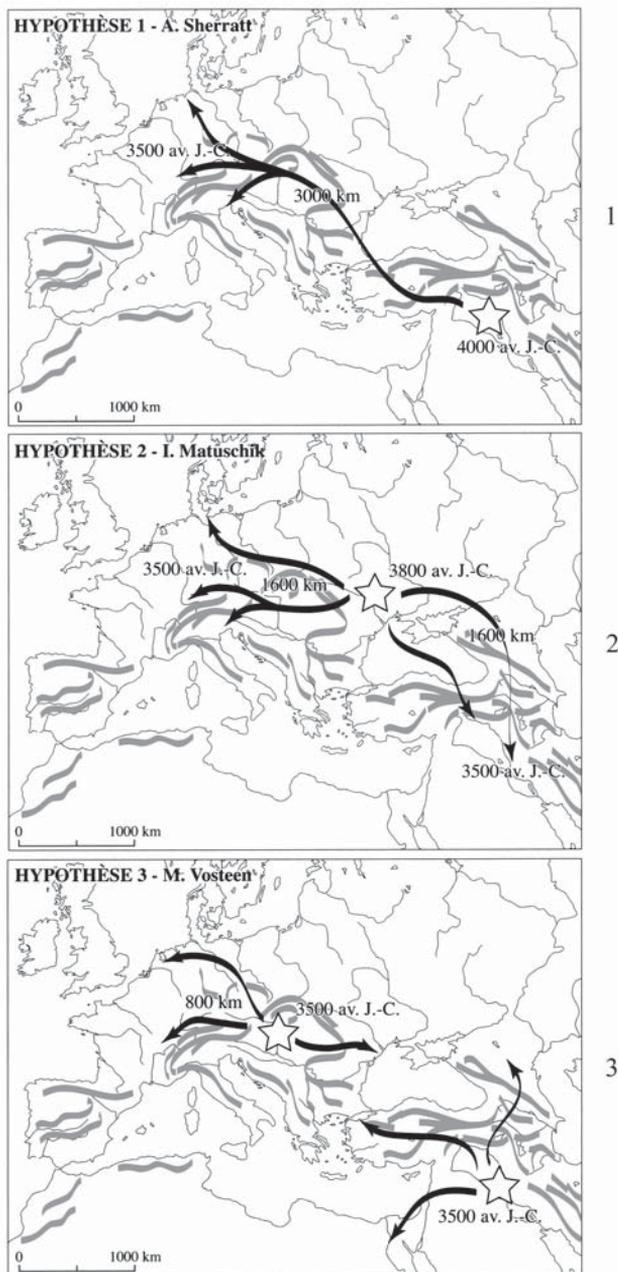


Fig. 35. Hypotheses on the origins of wheeled vehicles and animal traction (after PÉTREQUIN – PÉTREQUIN – BAILLY 2006, Fig. 4).

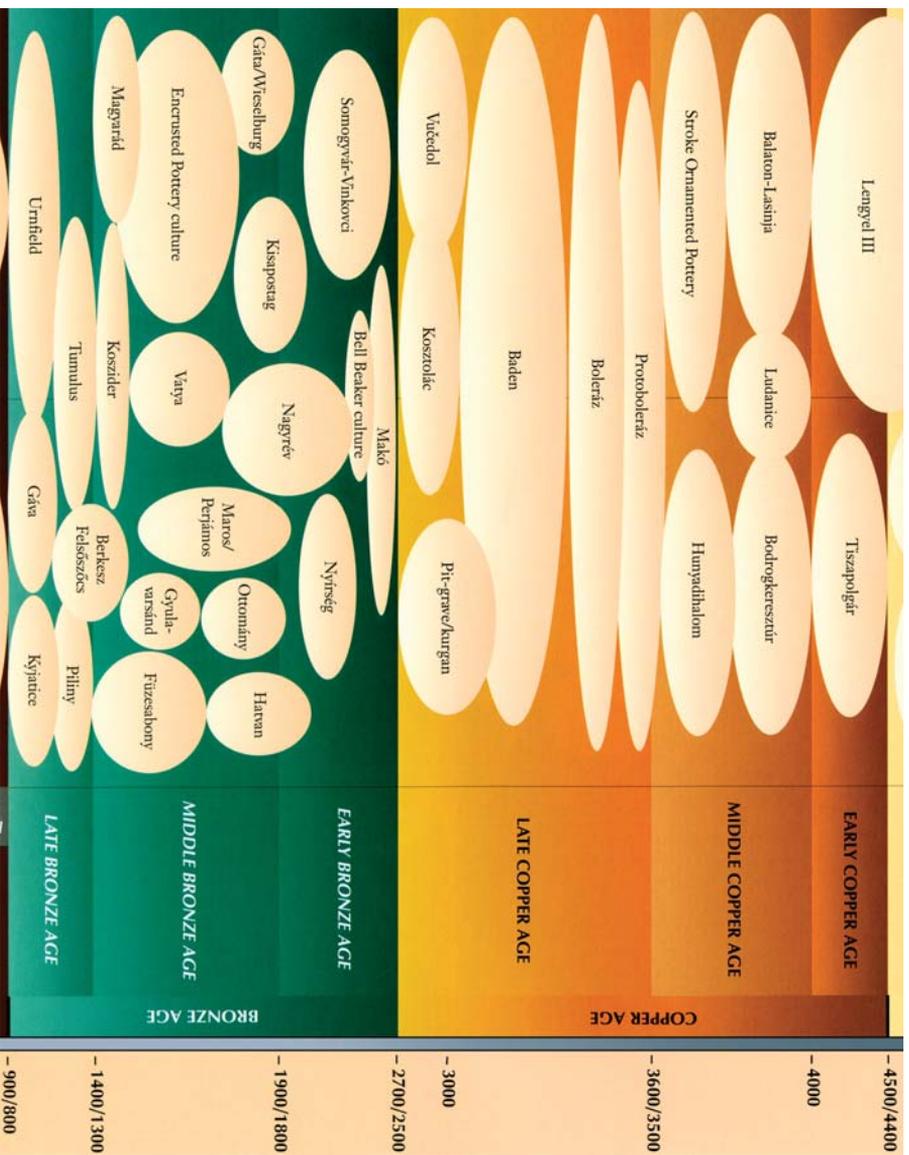


Fig. 36. Chronological chart (from Hungarian Archaeology at the Turn of the Millennium).

world around them. The question of origins and diffusion remains unresolved, as does the speed and route of the diffusion. It seems most unlikely that an innovation as important as the wagon would have sunk into oblivion, and thus the low number of wagon models and wheels perhaps reflects the changing role of wheeled vehicles in everyday life. It would appear that once wagons became nondescript items of daily life and economic activities, and the novelty of the exceptional, magical innovation wore off, the need to create miniature replicas of wagons slowly evaporated.

The remains of real wheels, wooden trackways and finds of genuine wooden carts deposited in burials have added new dimensions to the study of wagons and simple transport vehicles.

The assumption that real wooden wagons with wooden wheels existed simultaneously with their miniature counterparts in clay from the Late Copper Age to the Middle Bronze Age was recently confirmed by the discovery of a real wooden wheel and a clay wheel model at Olzreuter Ried near Federsee in Germany (SCHLICHTERLE 2006, 2010). Genuine wheeled vehicles and their reduced clay models were obviously made for different purposes: wagons played a crucial role in a given community's daily life, while their miniature replicas were part of the sacral sphere, perhaps as devices used in rituals designed to ensure that a cargo of goods reached its destination safely. However, any speculation regarding the one-time function of the clay models remains educated guesswork at best. Nothing certain can be known. Most prehistorians regard them as ritual, ceremonial artefacts, symbols of the Sun, although it is equally possible that they were toys.

It is now evident, for example, that wheels had also been attached to transport conveyances other than wagons. We can now draw a difference between four-wheeled wagons and two-wheeled carts or two-wheeled ploughs. Archaeozoologists are now studying possible morphological alterations caused by harnessing and yoking on animal bones, which hardly occur from one moment to the other.

The ornamentation of the wagon models usually corresponds to the decorative motifs occurring on the vessels of the cultures they are assigned to. One of the implications is that some of the designs adorning pottery too carried a symbolic meaning which also appeared on other artefacts such as figurines and wagon models. Suffice it here to quote the correspondences between the adornments on the so-called bell-skirted figurines and the ceramics of the Encrusted Pottery

culture.³⁵ The currently known corpus of wagon models suggests that some cultures used both decorated and plain pieces, and that there was considerable variation in type even within a single culture. Surprisingly enough, the rich diversity in wagon models is not a reflection of many different cultures, but rather an indication that wagon models were vested with different meanings within the same archaeological culture, recalling the similar diversity of Late Copper Age figurines (BONDÁR 2008, 174).

Despite the testimony of the literary sources of later ages, it is virtually impossible to decipher the beliefs and the cognitive contents associated with the vehicle models of the Bronze Age. Customs, rituals and various elements of religious beliefs survive for extremely long periods of time even if they are in constant flux. Suffice it here to recall the still surviving elements of the Celtic mythological traditions – rediscovered by 19th century romanticism – and the over two thousand years of Christianity and its symbols. With due caution, we can turn to the legends of various peoples and the scattered references in myths in order to interpret the more unusual artefacts of prehistory. Using this approach, we can perhaps identify a correlation between various artefacts and their associated abstract content. This represents the initial phases of symbolic thought and the creation of symbols, as well as the formative phase of similar cognitive elements linking various regions (often lying at great distances from each other) which eventually led to the rise of the rich diversity of symbols. These symbols form the building blocks of mythologies and the colourful tapestry of beliefs in the canonised religions of later ages. An analysis of this type, however, would lead far from archaeology.

None of the known wagon models came to light in their original context; all were recovered from secondary contexts, most often from the refuse pits of settlements into which the broken pieces were discarded. It is virtually impossible to reconstruct the original function of the wagon models. The few pieces recovered from burials were accessories of the funerary ceremony similarly to the other grave goods, which were buried with the deceased after the conclusion of the burial ceremony. We shall never know whether they were funerary gifts or status symbols expressing the deceased's rank during his lifetime. The genuine wooden wagons deposited in burials would suggest that these four-wheeled vehicles still carried an aura of mystery around them and that they were only used on

³⁵ Géza Szabó came to a similar conclusion from his analysis of the rich material of the Encrusted Pottery cemetery at Bonyhád (SZABÓ – HAJDU 2011, 100–105).

exceptional occasions and by specific members of a community as an expression of their status.

At present, we have no way of deciphering either the ritual meaning of wagon models, or their one-time role. The wagon models of the “dark age” may well have been simple toys, but they may equally have been the embodiments of prestige items symbolising wealth and social standing, or symbols of the Sun in formative, early beliefs transmitted from one generation to the next. They may also represent the rudimentary forms of iconographic signs associated with later deities. Whatever their one-time meaning and function, we can at best only make educated guesses. The currently known wagon models are restricted to a far smaller area than the one in which wheeled vehicles were actually known and used. The many pieces known from Mesopotamia, Greece, Italy, the Carpathian Basin, the Pontic, India and China indicate that the miniature models had a specific meaning and significance in certain regions, and it can hardly be mere chance that the temporal distribution of the known models correlates with the flourishing prehistoric cultures and civilisations. In contrast, several regions from which models are lacking, such as the Netherlands, Germany, Switzerland and Slovenia, have yielded the remains of genuine wooden vehicles.

In addition to simple (reduced) wagon models, the appearance of protomes modelled in the shape of animal heads and, later, of bird chariots represents a distinct category. This is a reflection of the cognitive changes in the secondary role of this major innovation – the process of how wheeled vehicles were gradually transformed from sacred ritual paraphernalia into profane objects of daily life without any special meaning. This transformation outlines a cultural trajectory from the simple commemoration of an exceptional invention to mythical abstraction and then to simple, nondescript items of everyday life.

The earliest depictions of wheeled vehicles reflecting a familiarity with this innovation seem to suggest their ritual importance. The symbols on the Bronocice vessel, perhaps representing trees, water and buildings (KRUK – MILISAUSKAS 1991, Fig. 3) and the fact that real wagons were sometimes deposited in graves would imply that four-wheeled vehicles were vested with magical properties after their invention, to be used by certain individuals only on exceptional occasions. The deposition of these wagons and of miniature clay models in graves too leads into the realm of religious beliefs.

Although we will probably never be able to fully reconstruct prehistoric beliefs and rituals, it seems instructive to review a few of the explanations proposed by various scholars.

Soproni believed that the wagon model from Grave 177 of the Budakalász cemetery, a symbolic burial, could somehow be associated with the cult of the dead and that the deposition of the wagon model was a forerunner of later burials containing real wagons (SOPRONI 1954, 35). Bóna suggested that the wagon model, originally a ritual device, had acquired a secondary role and had become an unused vessel by the time it was deposited (BÓNA 1960, 109). János Makkay interpreted the wagon model as a votive object used for presenting sacrifices to the Great Goddess (MAKKAY 1963; 1965), while Feticch suggested that the miniature wagons represented the funerary wagons on which the deceased were transported to the goddess presiding over the netherworld (FETTICH 1969, 51). Kalicz too regarded wagon models as part of the paraphernalia used in rituals. Quoting Mesopotamian parallels, he claimed that wagons had perhaps been used for storing the sacred oil used in rituals (KALICZ 1976a, 117). The few interpretations quoted here illustrate the difficulties in inferring past modes of thought from material remains.

The ritual role of the Late Copper Age wagon models from the Carpathian Basin can hardly be challenged.³⁶ The distribution of wagon models and of other ritual artefacts such as figurines and vessels modelled in the shape of a stylised female body shows a concentration in certain regions. It is possible that – similarly to the urban settlements in Anatolia and the Caucasus, and the large Cucuteni–Tripolye settlements – these regions played an important role in the Baden world and there was a hierarchy and a difference in status between the culture’s settlements. The concentration of ritual finds perhaps reflects administrative, economic or ritual centres with a larger population, where trade was conducted or where the ceremonies and rituals expressing the community’s cohesion were enacted (BONDÁR 2007). The current evidence is insufficient for proving the existence of settlements resembling the highly-developed city states of the Ancient Near East in the Carpathian Basin, even if it seems likely that the concentration of these rare, unusual ritual or prestige items was not mere chance (BONDÁR 2008, 180). Different lines of enquiry can contribute valuable insights into the hierarchy and status of Late Copper Age communities. They include the evaluation of settlement patterns and the study of subsistence in the light of the potentials of the environment. Determining the relation of crop cultivation to animal husbandry in the economy would be of special importance. Demographic

³⁶ A function as toys can perhaps be ascribed to some of the small Bronze Age wagon models (OLEXA 1983; BONDÁR 1990; SCHLICHTERLE 2010).

analyses of burials and the identification of various prestige items, as well as the fortuitous discovery of assemblages from well-documented contexts permit us to broaden the picture of the cognitive sphere and religious beliefs. The assessment of finds from large-scale excavations will no doubt provide an answer to the question of whether the receptiveness of the communities of the Carpathian Basin was governed by genuine socio-economic needs, or whether the innovations were born among the communities living here and then diffused to more distant regions whose economy was ready for their integration.

Wagon finds could doubtless be studied and discussed from several other aspects too. In this study, I have focused on the current state of prehistoric vehicle studies and the major advances made in this field, especially regarding dating and the origins of this innovation. My goal was to add new perspectives to the study of this fascinating artefact type by reviewing the evidence on the currently known wagon models from Hungary and other regions of the Carpathian Basin.

The growing number of wagon models and the increasing evidence on wheeled vehicles, as well as the precisely documented find contexts will no doubt add new dimensions to the study of wheeled vehicles, raise new questions and enable a broader perspective on the archaeological record of an innovation that played and continues to play a vital role in human life.

6. CATALOGUE

The Catalogue contains a brief description of the Late Copper Age, Early Bronze Age and Middle Bronze Age wagon models found in Hungary. Alongside a brief description, I have included only the first publication of the known models and the studies with a new photo or illustration of a particular piece. I have quoted the dimensions as specified in the original publication, this being the reason for the slight inconsistencies in this respect.

Abbreviations:

H: height, L: length, W: width, dR: diameter of rim, dB: diameter of base

6.1. Late Copper Age wagon models from Hungary

Eighteen Late Copper Age wagon models are currently known from the Carpathian Basin, eleven of which were found in Hungary (*Fig. 19*).

1. **Balatonberény, 22 Ady E. Street** (County Somogy) (*Fig. 11*)

Boleráz culture. Gift.

Body and basal fragments of a thick-walled wagon box. The sides are decorated with a horizontal zig-zag pattern, the underside is plain. The axle probably passed through the two handle-like knobs on the underside. Assembled from its fragments and restored. H. 12.5 cm, L. 23 cm (top), 20 cm (bottom), W. 16.5 cm (top), 13 cm (bottom). Kaposvár, Rippl Rónai Museum, acquisitions register no. 02/04 (BONDÁR 2004, *Fig. 5. 1*, *Fig. 6*).

2. **Boglárlelle, 74–76 Úszó Street** (County Somogy) (*Fig. 8. 2a–b*, *Fig. 9*)

Boleráz culture. Settlement find.

Fragment of a thick-walled wagon box. The four corners are topped by flattish knobs. Each side is decorated with an incised zig-zag pattern. The stubs of two applied ornaments remain in the middle of one of the short sides. The underside bears a mat impression. Assembled from its fragments. Almost intact, save for a small part of the base and one corner. H. 10 cm, L. 16 cm (top), 14 cm (bottom), W. 11 cm (top), 9 cm (bottom). Kaposvár, Rippl Rónai Museum, acquisitions register no. 76/18

(ECSEDY 1982, Fig. 8. 9a–b; HONTI – KÖLTŐ – NÉMETH 1988, Pl. II. 1–2; BONDÁR 2004, Fig. 3; BONDÁR 2007, 25, Fig. 13).³⁷

3. **Budakalász-Luppa csárda, Grave 158** (County Pest) (*Fig. 6*)

Baden culture. Grave find from an inhumation burial.

Plain vessel with roughly trapezoidal sides modelled in the shape of a wagon, painted red on the exterior and interior. The rim is peaked at the four corners. The four tiny knobs on the underside indicate the place of the axles. H. 5.5 cm, dR. 9.3 cm, dB. 5.5 cm. Szentendre, Ferenczy Museum, inv. no. 61.2.27.2. Sándor Soproni's excavation, 1953 (SOPRONI 1954, Pl. VI. 5; BONDÁR 2009, Pl. LXVI. 158/2).

4. **Budakalász-Luppa csárda, Grave 177** (County Pest) (*Fig. 1 A, Fig. 5*)

Baden culture. Grave find from a symbolic burial.

Rectangular vessel with peaked rim modelled in the shape of a four-wheeled wagon model. Each side is decorated with zig-zag lines under the rim. The short side opposite the handle has a design of three parallel zig-zag lines. The incised lines on the underside mark the axles and the planks from which the wagon was constructed. The wheels are solid, unperforated discs on which the hubs are represented by a small knob. One wheel is missing. Painted red on the exterior and interior. H. 8 cm, dR. 8 cm, dB. 7.6 cm. Szentendre, Ferenczy Museum, inv. no. 61.2.35.5. Sándor Soproni's excavation 1953 (SOPRONI 1954, Pl. VII. 1–2; BANNER 1956, Pl. 120; BONDÁR 2009, Pl. LXXIX. 177/3).

5. **Esztergom-Szentkirály** (County Komárom-Esztergom) (*Fig. 13. 1a–b*)

Baden culture. Settlement find.

Five fragments of a diagonally broken oblong wagon box with rounded corners. The wagon box was originally set on four oval knobs. An irregular double zig-zag line runs under the rim. The wagon box was covered with bright red paint, probably by immersion into the paint. H. 3.5 cm, L. (diagonal) 11 cm (top), 7 cm (bottom). Esztergom, Balassa Bálint Museum, inv. no. 2000.78.18./a. Etelka Kövecses Varga's excavation, 1988 (KÖVECSES VARGA 2010, 4–8, Fig. 15).

³⁷ Balatonlelle and Balatonboglár formed a single settlement known as Boglárlelle for some time; today, they are again separate settlements; the wagon model was found at Balatonlelle.

6. **Esztergom-Szentkirály** (County Komárom-Esztergom) (*Fig. 13. 2*)

Baden culture. Settlement find.

Fragment of the lower corner of a wagon model's rear end. Part of the zig-zag motif adorning the rear side and the stub of a loop handle survive. A small rib, probably marking the axle of the rear wheels, runs across the underside. The pair of asymmetrical chevrons on either side of the loop handle was part of the zig-zag pattern. H. (surviving) 2.6 cm, W. (under the handle stub) 3.3 cm, W. of handle stub 2 cm. Esztergom, Balassa Bálint Museum, inv. no. 2001.21.95. Etelka Kövecses Varga's excavation, 1988 (KÖVECSES VARGA 2010, 9–11, Fig. 14. 1).

7. **Esztergom-Szentkirály** (County Komárom-Esztergom) (*Fig. 13. 3*)

Baden culture. Settlement find.

Body and base fragment of a rectangular wagon box with rounded corners. No traces of painting survive on the fragment. Judging from the surviving fragment, the wheel had a diameter of *ca.* 4 cm. A design of four bands separated by more or less parallel lines adorns the lower part. One band is filled with vertical hatching, the other three with oblique hatching. Another incised line, perhaps marking the axle, can be made out between the two shortest bands. H. 2 cm, L. (internal) 3.5 cm, L. (external) 4.8 cm, W. 3.1 cm. Esztergom, Balassa Bálint Museum, inv. no. 2001.29.60. Etelka Kövecses Varga's excavation, 1988 (KÖVECSES VARGA 2010, 12–13, Fig. 14. 2).

8. **Kaposvár-Toponár, Bypass Site 61/2** (County Somogy) (*Fig. 14*)

Boleráz culture. Settlement find.

The surface of the imperfectly fired wagon model is rough. Three sides are decorated with a pattern of vertical incisions arranged into three rows, and it seems likely that the fourth side too bore some decorative pattern. The underside of the wagon box is plain. L. of the long side 9.5 cm (top), 8.3 cm (bottom), L. of the short side 8.5 cm (top), 7 cm (bottom), H. (without the knobs) 5 cm. Kaposvár, Rippl Rónai Museum, identification number: 98/102.597.264. Edith Bárdos's excavation, 1999 (BÁRDOS – GALLINA 1999; BONDÁR 2012, Fig. 1) A colour photo of the restored

and reconstructed wagon model published in the centennial jubilee volume of the Kaposvár museum erroneously specifies the findspot as Balatonőszöd.³⁸

9. **Moha-Homokbánya** (County Fejér) (*Fig. 12*)

Boleráz culture. Stray find.

Rectangular wagon box with the stub of an applied decoration on one of the short sides. Each side bears a design of hatched lozenges. The axles are marked by small handle-like knobs. Almost intact. H. 11.5 cm, L. 14.5 cm (top), 14 cm (bottom), W. 12.2 cm (top), 10.5 cm (bottom). Private collection (KOVÁCS 2006, Abb. 1).

10. **Pilismarót-Basaharc, Grave 445** (County Komárom-Esztergom) (*Fig. 8. 3a–c*)

Boleráz culture. Settlement find.

Plain rectangular vessel with trapezoidal sides and peaked corners. The underside bears a mat impression. Assembled from its fragments and restored. H. 4.9 cm, L. 7.5 cm (top), 8.5 cm (bottom), W. 7.5 cm (top), 8.5 cm (bottom). Esztergom, Balassa Bálint Museum, inv. no. 88.102.2. István Torma's excavation, 1971 (BONDÁR 1990, Abb. 7. 3a–c).

11. **Szigetszentmárton, 13 Dózsa György Street** (County Pest) (*Fig. 15. 2*)

Baden culture. Grave find from an inhumation burial.

Rectangular vessel modelled in the shape of a four-wheeled wagon with trapezoidal sides. The rim is curved, the corners are peaked. One long side and one short side is decorated with an incised zig-zag pattern under the rim. A vertical zig-zagging line runs from the corners to the base. The wheels are connected with a clay cylinder marking the axles. The wheel hubs are indicated by tiny knobs. H. 7.2 cm, W. 7.3 cm, L. 7.6 cm. Hungarian National Museum, inv. no. 72.19.1. Found in 1972, during house construction. The site was excavated by Tibor Kemenczei (KALICZ 1976, Abb. 3).

³⁸ *Jubileumi kötet. 1909–2009. 100 éves a Múzeum* [Jubilee volume 1909–2009. The hundred years old museum], published as volume 19 of *Somogyi Múzeumok Közleményei* in 2010. A colour photo of the wagon model discussed and published here appears on p. 59, together with the pieces from Boglárlelle (with the findspot erroneously specified as Balatonlelle) and Balatonberény (specified as coming from Balatonendréd).

6.2. Early and Middle Bronze Age wagon models from Hungary

The corpus of Early and Middle Bronze Age wagon models from the Carpathian Basin has increased manifold. A total of eighty-nine sites yielded wagon models (discounting the sites where miniature wheels have been found), twenty per cent of which, nineteen models in all, came to light in Hungary (*Fig. 33*).

1. **Alsóvadász-Várdomb** (County Borsod-Abaúj-Zemplén) (*Fig. 20. 5*)

Hatvan culture. Settlement find.

The short side and a section of the adjoining long side survived of the rectangular wagon box. The four sides were probably decorated with an identical design. A drawn reconstruction was published by Kalicz (KALICZ 1968, Taf. CXIII. 2). In contrast to Kalicz's interpretation, Fettich believed that the surviving short side represented the wagon's front and that the two outcurving peaks in the upper corners symbolised how the draught animals were harnessed. His reconstruction does not have peaked corners on the back side (FETTICH 1969, Pl. XI. 3). Fettich also claimed that the model had been found at Felsővadász, quoting Kalicz's informant as his source (FETTICH 1969, 55, note 39).

2. **Békés** (County Békés)

Gyulavarsánd culture. Stray find.

In his study on wagon models and miniature wheels, Bóna quoted the upper corner fragment of a wagon model, noting that two corner fragments, one from Szamosújvár, the other from Békés, recalled the upper section or corner of the then known wagon models (BÓNA 1960, 86). The fragment from Békés is also listed in the catalogue of Bronze Age wagon models from Hungary (BÓNA 1994, 74).³⁹

3. **Berettyószentmárton** (County Hajdú-Bihar) (*Fig. 21. 4*)

Gyulavarsánd culture. Stray find.

Conical wagon box with incised decoration. H. 8 cm, L. 15 cm (BRONZEZEIT IN UNGARN Cat. no. 330).

³⁹ Despite a thorough search, I was unable to find the fragment in the collection of either the Békéscsaba, or the Gyula museum. I looked through the relevant archaeological literature and the volumes of the Hungarian Archaeological Topography, and I enlisted the help of Imre Szathmári, director of the County Békés Museums, whom I wish to thank for his selfless help in checking old inventory numbers in search of the wagon model. It seems that this fragment has been lost.

4. **Berettyóújfalu-Herpály** (County Hajdú-Bihar) (*Fig. 21. 1*)
Ottományi culture. Settlement find.
Plain, conical wagon box with perforated lower corners. The exact dimensions were not published by the excavator (MÁTHÉ 1984, Pl. 6. 1).
5. **Berettyóújfalu-Herpály** (County Hajdú-Bihar)
Ottományi culture. Settlement find.
Sz. Máthé mentioned the fragment of a wagon model, without publishing an illustration. According to her description, the fragment is decorated and represents the Pocsaj type, characterised by four oblique perforations in the upper corners (MÁTHÉ 1984, 148–149).
6. **Berettyóújfalu-Herpály** (County Hajdú-Bihar)
Ottományi culture. Stray find.
Sz. Máthé mentioned the fragment of a wagon model, without publishing an illustration. According to her description, the fragment is decorated and represents the Pocsaj type, characterised by four oblique perforations in the upper corners (MÁTHÉ 1984, 148–149).
7. **Börzönce-Temetői dűlő** (County Zala) (*Fig. 20. 1*)
Somogyvár–Vinkovci culture. Settlement find from a pit.
Plain, conical wagon box with rounded, perforated lower corners for the axles. L. 5.4 cm, W. 3.9 cm and 3.2 cm (BONDÁR 1990, Fig. 5).
8. **Füzesabony-Öregdomb** (County Heves) (*Fig. 21. 2*)
Late Hatvan culture. Settlement find.
Fragment of a rectangular wagon box with perforated lower corners. Decorated. L. 5.6 cm, W. 5 cm, H. 4.8 cm (KOVÁCS 2006, Abb. 4, The caption is erroneous because the wagon model shown in the figure is an unprovenanced piece, while the model in question is shown in Abb. 3).
9. **Nemesnádudvar** (County Bács-Kiskun) (*Figs 23–25*)
See the description on pp. 64–71 (SZÉKELY 2010).

10. **Novaj** (County Borsod-Abaúj-Zemplén) (*Fig. 1, Fig. 22. 1*)
 Fűzesabony culture. Settlement find.
 Fragment of a rectangular wagon box with perforated lower corners. Decorated.
 H. 6.6 cm, W. 6.1 cm, L. 5.5 cm. Bóna published a reconstruction of the wagon
 model (BÓNA 1960, Abb. 3, Taf. LXII. 1–3). Fettich’s reconstruction of this wagon
 model differs slightly (FETTICH 1969, 41–43, Pl. V. 1, 1a, 1b).
11. **Pocsaj-Leányvár** (County Hajdú-Bihar) (*Fig. 22. 2*)
 Ottomány culture. Stray find.
 Almost intact wagon model with conical wagon box and perforated lower corners.
 L. 13.5 cm and 14 cm, W. 8 cm. Mesterházy published a detailed description, photo
 and drawing of this piece (MESTERHÁZY 1976). Bóna published a colour photo (BÓNA
 1994, Fig. 34). Although Bóna assigned this wagon model to the Gyulavarsánd
 culture, the analogies to this piece from the tell settlements in Transylvania suggest
 a cultural attribution to the Ottomány culture. A good drawing of the wagon model
 was recently published by János Dani (DANI 2005, 306, Fig. 3).
12. **Polgár-Kenderföldek-Kiscsósshalom** (County Hajdú-Bihar) (*Fig. 20. 2*)
 Late Hatvan culture. Settlement find.
 Fragment of a wagon model (MÁTHÉ 1991, 13). While an illustration of the wagon
 model was recently published, its dimensions were not specified (RACZKY –
 ANDERS 2001, Fig. 13, colour photo). The photo and additional data on the find
 circumstances (according to which the fragments came to light from two separate
 features) were kindly provided by János Dani. I would here like to thank Ákos Jurás
 for the photo.
13. **Tószeg** (County Szolnok)
 Hatvan culture. Settlement find.
 In his study on wagon models and miniature wheels, Bóna quoted the lower corner
 fragment of a wagon model from this site, noting that the fragments of the rectangular
 wagon box “with low rim” had been recovered from Layer B of the Hatvan culture
 settlement (BÓNA 1960, 86, fragment no. 133 of the 1912 excavation). Although
 the wagon model is mentioned in the catalogue of Bronze Age wagon models from
 Hungary (BÓNA 1994, 75), nothing more is known about it.

14. **Törökszentmiklós-Terehalom** (County Szolnok) (*Fig. 20. 3*)
Hatvan culture. Unstratified settlement find.
Fragment of a conical wagon box with perforated lower corners. Decorated.
L. 12.9 cm, W. 4.8 cm (TÁRNOKI 1999, Pl. 2).
15. **Vésető-Mágor** (County Békés) (*Fig. 21. 3*)
Gyulavarsánd culture. Settlement find.
Conical wagon box with perforated lower corners. Decorated. L. 18 cm, H. 6 cm
(KOVÁCS 1994, 76, Fig. 38, colour photo; LE BEL AGE 1994, Cat. no. 425; MAKKAY
2004, 54, Fig. 12).
16. **Unprovenanced** (*Fig. 20. 4*)
Late Hatvan culture. Stray find.
Fragment of a rectangular wagon box set on four perforated knobs. Decorated with
a finely incised design. L. 11 cm, W. 5.5 cm, L. 11 cm (top), W. 3.2 cm, H. 5.5 cm,
L. 5.8 cm (bottom), W. 3.7 cm, H. 4.6 cm (KOVÁCS 2006, Abb. 3, however, the
caption is erroneous because the wagon model shown in the figure was found at
Füzesabony, while the model in question is shown in Abb. 4; SZATHMÁRY 2007, 22,
colour photo).
17. **Berettyószentmárton-Korhány-halom** (County Hajdú-Bihar)
Middle Bronze Age. Stray find.
Possible fragment of a wagon model found during a field survey in 2000 (DANI in
print).
18. **Cegléd, Intézeti- és Bába-Molnár-dűlő** (County Pest)
Nagyrév culture. Settlement.
A 5 cm x 8 cm large fragment of the base and side of a wagon model came to light
from a pit. Excavation by András Rajna, 2005 (RAJNA 2005, 219).
19. **Vatta-Dobogó** (County Borsod-Abaúj-Zemplén)
Hatvan culture. Settlement find.
Almost intact, plain wagon box. L. 13.5 cm, W. 8 cm. Excavation by Judit Koós,
2009 (KOÓS 2009, 379).

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Appendix.
Most important data of the sites shown on the map in Fig. 37.

Site	Number on map	Country	Find	Cultural context/Date*	Literature
Abamor	147	Turkey	wagon model and free-standing animal figurines	late 3 rd –early 2 nd millennium	KULAKOĞLU 2003, Figs 2, 7.
Adunații Copăceni	141	Romania	wagon model (?)	Middle Bronze Age	SCHUSTER 1996, 127.
Aiton, “Locul lui poțu” (Ajton)	89	Romania	wagon model	Wietenberg culture	BOROFFKA 1994, Taf. 1. 5; SCHUSTER 1996, 111, note 72.
Algyógy see Geoagiu					
Alsónémedi	59	Hungary	human and cattle burials	Baden culture	KOREK 1951.
Alsóvadász-Várdomb	20	Hungary	wagon model	Hatvan culture	KALICZ 1968, Taf. CXIII. 2.
Altyn-Depe	143	Turkmenistan	wagon model	late 4 th –early 3 rd millennium	BOROFFKA 2004, Fig. 11; KIRTCHO 2009, 30.
Arslantepe	144	Turkey	clay wheel	3374+/-30 (Late Uruk period)	BAKKER <i>et al.</i> 1999, 781.
Bădăcin (Szilágybadacsony)	78	Romania	wagon model	Coțofeni III	BĂCUEȚ 1998, Pl. 1.
Balatonberény	100	Hungary	wagon model	Boleráz period	BONDÁR 2004, Fig. 5. 1, Fig. 6.
Balatonőszöd	98	Hungary	animal figurine attached to a vessel	Baden culture	HORVÁTH 2010, 19, Abb. 7. 1, HORVÁTH 2010a, Fig. 10. 3.
Baraolț (Barót)	125	Romania	wagon model	Wietenberg culture	BOROFFKA 1994, 164. Taf. .8.8; SCHUSTER 1996, Pl. 3.1.
Bărboasa	124	Romania	wagon model	Monteoru culture	CĂPITANU – FLORESCU 1969, Fig. 7; SCHUSTER 1996, Pl. 5. 1.
Békés	95	Hungary	wagon model (?)	Gyulavarsánd culture	BÓNA 1960, 7.
Berea	42	Romania	human figurine	Nir (Nyírség) culture	BADER 1978, Pl. 8. 7.
Berettyóújfalú	64–66	Hungary	wagon model	Ottomány culture	MÁTHÉ 1984, 148.
Berettyóújfalú		Hungary	wagon model	Ottomány culture	MÁTHÉ 1984, Pl. 6. 1a–c; BONDÁR 1992, Fig. 8. 3.
Berettyóújfalú		Hungary	wagon model	Ottomány culture	MÁTHÉ 1984, 148.
Berettyószentmárton	67–68	Hungary	wagon model	Gyulavarsánd culture	DANI in print.
Berettyószentmárton		Hungary	wagon model	Gyulavarsánd culture	BRONZEZEIT IN UNGARN 1992, Cat. no. 330; LE BEL AGE 1994, Cat. no. 330.

* *The cultural contexts and the dates are based on the data published in the literature. The dates are based on different dating methods (dendrochronology and radiocarbon) performed on samples from a diverse range of materials (bone, wood, charcoal, etc.) and they were calibrated using different techniques.*

Site	Number on map	Country	Find	Cultural context/Date	Literature
Bistrița (Beszterce)	85	Romania	wagon model	Wietenberg culture	DĂNILĂ 1971, Abb. 2. 3; BOROFFKA 1994, 167; SCHUSTER 1996, 118, note 76.
Boinești (Bujánháza)	41	Romania	wagon model	Suciu de Sus (Felsőszöcs) culture	SCHUSTER 1996, Pl. 6. 5.
Boglárlelle	99	Hungary	wagon model	Boleráz period	ECSEDY 1982, Fig. 8. 9a–b.
Borinci	134	Croatia	wagon model (?)	Vučedol culture	BAKKER <i>et al.</i> 1999, 788.
Böheimkirchen	22	Austria	wagon model	Veteřov culture	NEUGEBAUER 1979, Abb. 8. 2.
Börzönce	101	Hungary	wagon model	Somogyvár-Vinkovci culture	BONDÁR 1990, Fig. 5.
Brașov (Brassó)	129	Romania	wagon model	Wietenberg culture	BOROFFKA 1994, Taf. 19. 5; SCHUSTER 1996, Pl. 3. 4.
Brzeźniak	2	Poland	bird chariot	Late Bronze Age	VOSTEEN 1998, Taf. 132, 226.
Bronocice	6	Poland	wagon depiction on vessel	Funnel Beaker culture	KRUK – MILISAUSKAS 1982, Abb. 1.
București (Bukarest)	140	Romania	wagon model (?)	Tei culture	SCHUSTER 1996, 118, note 59.
Budakalász	38–39	Hungary	wagon model	Baden culture	SOPRONI 1954, Pl. 6. 5.
Budakalász		Hungary	wagon model	Baden culture	SOPRONI 1954, Pl. 7.
Bytyn	3	Poland	free-standing animal figurine	Funnel Beaker culture	ŠTURMS 1955, 23. Abb. 1. 4; VOSTEEN 1999, Taf. CVII. 61.
Cegléd	61	Hungary	wagon model	Nagyrév culture	RAJNA 2005, 219.
Chorvátsky Grob (Magyargurab)	18	Slovakia	wagon model	Boleráz period	FARKAŠ 2010, Fig. 4.
Ciceu-Corabia (Csicsóújfalú)	79–80	Romania	wagon model	Wietenberg culture	BOROFFKA 1994, Taf. 59. 5; SCHUSTER 1996, Pl. 10. 1.
Ciceu-Corabia (Csicsóújfalú)		Romania	wagon model	Wietenberg culture	BOROFFKA 1994, Taf. 56. 5; SCHUSTER 1996, Pl. 3. 9.
Cîrna (Maroskarna)	130	Romania	human figurine	Middle Bronze Age	KOVÁCS 1972, 48. Fig. 2; KALEGEROPOULUS 2007, Pl. LXVII. a–b.
Cluj (Kolozsvár)	90	Romania	wagon model	Wietenberg culture	BOROFFKA 1994, Taf. 62. 7; SCHUSTER 1996, Pl. 3. 10.
Corpadea (Kolozskorpád)	88	Romania	wagon model	Wietenberg culture	BOROFFKA 1994, Taf. 63. 9; SCHUSTER 1996, Pl. 3. 8.
Crivăț	142	Romania	wagon model (?)	Glina III culture	SCHUSTER 1996, 118, note 57.
Cuciulata (Kucsuláta)	126	Romania	wagon model	Glina III culture	BICHR 1964, Figs 1–2; SCHUSTER 1996, Pl. 2. 12.
Dalj (Dályá)	132	Croatia	human figurine	Middle Bronze Age	KOVÁCS 1972, 49, Fig. 4.
Derșida (Kisderzsida)	71–77	Romania	wagon model	Wietenberg culture	CHIDIOȘAN 1980, Taf. 25. 7.
Derșida (Kisderzsida)		Romania	wagon model	Wietenberg culture	CHIDIOȘAN 1980, Taf. 25. 9.
Derșida (Kisderzsida)		Romania	wagon model	Wietenberg culture	CHIDIOȘAN 1980, Taf. 25. 2.

Site	Number on map	Country	Find	Cultural context/Date	Literature
Derșida (Kisderzsida)	71–77	Romania	wagon model	Wietenberg culture	CHIDIOȘAN 1980, Taf. 25. 4.
Derșida (Kisderzsida)		Romania	wagon model	Wietenberg culture	CHIDIOȘAN 1980, Taf. 25. 1.
Derșida (Kisderzsida)		Romania	wagon model	Wietenberg culture	CHIDIOȘAN 1980, Taf. 25. 3.
Derșida (Kisderzsida)		Romania	wagon model	Wietenberg culture	CHIDIOȘAN 1980, Taf. 25. 5.
Dieburg (?)	5	Germany	free-standing animal figurine	late 4 th –early 3 rd millennium (?)	MATUSCHIK 2006, Fig. 8. 1.
Dupljaja	137–138	Serbia	wagon model	Žuto Brdo culture	MILLEKER 1930, Pl. 8; VASIĆ 2004, Fig. 1.
Dupljaja		Serbia	wagon model	Žuto Brdo culture	MILLEKER 1930, Pl. 8; VASIĆ 2004, Fig. 2.
Esztergom	32–34	Hungary	wagon model	Baden culture	KÖVECSES VARGA 2010, Fig. 13. 1.
Esztergom		Hungary	wagon model	Baden culture	KÖVECSES VARGA 2010, Fig. 13. 2.
Esztergom		Hungary	wagon model	Baden culture	KÖVECSES VARGA 2010, Fig. 13. 3.
Feldioara (Földvár)	127–128	Romania	wagon model	Wietenberg culture	BOROFFKA 1994, Taf. 67. 1.
Feldioara (Földvár)		Romania	wagon model	Wietenberg culture	BOROFFKA 1994, Taf. 76. 1; SCHUSTER 1996, Pl. 3. 3.
Flintbek	1	Germany	wheel ruts	Funnel Beaker culture, 3460–3385 cal. BC	ZICH 1992, 1993, 2006; MISCHKA 2010.
Füzesabony	40	Hungary	wagon model	Late Hatvan culture	KOVÁCS 2006, Abb. 4.
Geoagiu/Geoagiul de Jos (Algyógy)	131	Romania	wagon model	Wietenberg culture	ROSKA 1942, Fig. 4; BOROFFKA 1994, 167.
Gherla “Petriș” (Szamosújvár)	81–83	Romania	wagon model	Wietenberg culture	OROSZ 1901; SCHUSTER 1996, Pl. 3. 6.
Gherla “Petriș” (Szamosújvár)		Romania	wagon model	Wietenberg culture	OROSZ 1901, Fig. 111.
Gherla “Petriș” (Szamosújvár)		Romania	wagon model	Wietenberg culture	OROSZ 1901, 123; BÓNA 1960, 5–6; SCHUSTER 1996, Pl. 3. 6.
Jebel Aruda/Gebel Aruda	148	Syria	clay wheel	Late Uruk period	BAKKER <i>et al.</i> 1999, 781.
Gyulavarsánd see Várşand					
Jigodin (Zsögöd)	123	Romania	animal figurine attached to a wagon model	Wietenberg culture	SZÉKELY 1959, Fig. 2; BICHIR 1964, 82.
Kánya	97	Hungary	free-standing animal figurine	Baden culture	BANNER 1956, Taf. 21. 15.
Kaposvár	103	Hungary	wagon model	Boleráz period	BONDÁR 2012, Fig. 1.
Karolina	8	Ukraine	wagon model	Tripolye B2–C1	MATUSCHIK 2006, 280, Fig. 2.

Site	Number on map	Country	Find	Cultural context/Date	Literature
Krežnica-Jara	4	Poland	animal figurine attached to a wagon model	Funnel Beaker culture	DINU 1981, Fig. 9. 1; VOSTEEN 1999, Taf. CVII. 62.
Kültepe	145	Turkey	wagon depiction on a cylinder seal	ca. 2000–1850 BC	LITTAUER – CROUWEL 1996, Fig. 2.
Lechința “Podeti” (Maroslekenca)	106	Romania	wagon model	Wietenberg culture	BICHIR 1964, Fig. 4. 3; SCHUSTER 1996, Pl. 3.7.
Lieskovec (Újmogyoród)	13	Slovakia	free-standing animal figurine	Baden culture	MALČEK 2010, Tab. 1–2.
Lisková Cave (Liszköfalu)	9	Slovakia	free-standing animal figurine	Middle Copper Age	STRUHÁR 1999, Tab. II. 10; BONDÁR 2004, Fig. 8. 5; STRUHÁR – SOJÁK 2009, Fig. 7.
Ljublana marshes (Stara gnajme)	102	Slovenia	wooden wheel and axle	4 th millennium BC, the period between the Retz-Gajary and the Baden cultures, 3600–3332 BC	VELUŠČEK 2002, 2006.
Moha	58	Hungary	wagon model	Boleráz period	KOVÁCS 2006, Abb. 1.
Mödling	23	Austria	wagon model	Boleráz period	RUTTKAY 1995, Abb. 7. 3.
Nemesnádudvar	104	Hungary	wagon model	Nagyrev culture	V. SZÉKELY 2010; BONDÁR – SZÉKELY 2011, Fig. 3.
Nemirov	7	Ukraine	wagon model	Tripolye B2–C1	MATUSCHIK 2006, 280, Fig. 2.
Nižná Myšľa (Alsómislye)	11–12	Slovakia	wagon model	Late Füzesabony culture	OLEXA 1983, Obr. 1. 7; OLEXA – PITORÁK 2004, Obr. 3.
Nižná Myšľa (Alsómislye)		Slovakia	wagon model	Late Füzesabony culture	OLEXA – PITORÁK 2004, Obr. 2.
Novaj	28	Hungary	wagon model	Ottomány culture	BÓNA 1960, Fig. 3; FETTICH 1969, Pl. 5. 1; SCHUSTER 1996, Pl. 7. 1.
Oarța de Sus (Felsővárca)	46–47	Romania	wagon model (?)	Wietenberg culture	BOROFFKA 1994, 167.
Oarța de Sus (Felsővárca)		Romania	wagon model (?)	Wietenberg culture	BOROFFKA 1994, 167.
Olzreuter Ried	35	Germany	wooden wheels and clay wheel	ca. 2897 BC	SCHLICHTERLE 2010.
Otomani (Ottomány)	91–92	Romania	wagon model	Otomani (Ottomány) culture	BICHIR 1964, Fig. 2. 1.
Otomani (Ottomány)		Romania	wagon model	Otomani (Ottomány) culture	ROSKA 1925, Fig. 3. 4; BÓNA 1960, 7.
Ózd-Kőaljatető	19	Hungary	clay wheel	Baden culture (?)	BANNER 1956, Taf. 75. 8.
Palaikastro	149	Greece	wagon model	Copper Age	BÓNA 1960, Fig. 3.
Pezinok (Bazin)	16–17	Slovakia	wagon model	Boleráz period	FARKÁŠ 2010, Fig. 2.
Pezinok (Bazin)		Slovakia	wagon model	Boleráz period	FARKÁŠ 2010, Fig. 3.
Piliny	24	Hungary	free-standing animal figurine	Baden culture	PATAY 1999, 53, Fig. 7.

Site	Number on map	Country	Find	Cultural context/Date	Literature
Pilismarót	31	Hungary	wagon model	Boleráz period	TORMA 1972, Abb. 11; TORMA 1973, Abb. 5. 2; KALICZ – RACZKY 2002, Fig. 21.
Pir (Pér)	37	Romania	wagon model (?)	Otomani (Ottomány) culture	BÓNA 1994, 74.
Pleissing	10	Austria	wagon model	Boleráz period	RUTTKAY 2000, Taf. 5. 63.
Pocsaj	69	Hungary	wagon model	Gyulavarsánd culture	MESTERHÁZY 1976, Figs 1–5.
Polgár	27	Hungary	wagon model	Hatvan culture	RACZKY – ANDERS 2000, Fig. 13.
Racoș–Piatra-Detunată	122	Romania	animal figurine attached to a wagon model	Wietenberg culture	COSTEA – SZÉKELY 2011, Pl. 3. 6.
Radošina (Radosna)	14	Slovakia	wagon model	Boleráz period	NĚMEJCOVÁ–PAVÚKOVÁ – BÁRTA 1977, Abb. 7.
Rakovec	21	Ukraine	wagon model	Tripolye B2–C1	MAFUSCHIK 2006, 280, Fig. 2.
Săcuieni (Székelyhíd)	70	Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. VIII; SCHUSTER 1996, Pl. 7. 3.
Sălăcea (Szalacs)	48–56	Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. III. 1–4; SCHUSTER 1996, Pl. 7. 9.
Sălăcea (Szalacs)		Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. V. 1–4; SCHUSTER 1996, Pl. 7. 5.
Sălăcea (Szalacs)		Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. II. 1–2; SCHUSTER 1996, Pl. 7. 6.
Sălăcea (Szalacs)		Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. IV. 1–4; SCHUSTER 1996, Pl. 7. 10.
Sălăcea (Szalacs)		Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. I. 1–4; SCHUSTER 1996, Pl. 7. 4.
Sălăcea (Szalacs)		Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. II. 1–4; SCHUSTER 1996, Pl. 7. 8.
Sălăcea (Szalacs)		Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. VI. 1.
Sălăcea (Szalacs)		Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. VI. 3.
Sălăcea (Szalacs)		Romania	wagon model	Otomani (Ottomány) culture	ORDENTLICH – CHIDIOȘAN 1975, Pl. VI. 2.

Site	Number on map	Country	Find	Cultural context/Date	Literature
Salgótarján-Pécskő	25	Hungary	free-standing animal figurine	Baden culture	KOREK 1968. 57, Taf. XII. 4, Taf. XIII. 1–7.
Sanislău (Szaniszló)	43	Romania	wagon model	Nir (Nyírség) culture	BADER 1978, Pl. VII. 15; SCHUSTER 1996, Pl. 6. 3.
Satulung-Finteuşul Mic (Kisfentős)	45	Romania	human figurine	Wietenberg culture	DUMITRESCU 1974, Fig. 402. 1; DIETRICH 2010, Taf. 2. 1.
Şieu “Măgheruş” (Árokalja)	84	Romania	wagon model	Wietenberg culture	BOROFFKA 1994, Taf. 127. 4; SCHUSTER 1996, Pl. 3. 5.
Sighișoara “Wietenberg” (Segesvár)	107–121	Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 6; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 9; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 17. 27; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 1; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 2; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 4; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 10; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 12; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 13; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 14; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 15; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 16; BOROFFKA 1994, 167.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 5.

Site	Number on map	Country	Find	Cultural context/Date	Literature
Sighișoara “Wietenberg” (Segesvár)	107–121	Romania	wagon model	Wietenberg culture	HOREDŢ – SERAPHIN 1971, Abb. 39. 7.
Sighișoara “Wietenberg” (Segesvár)		Romania	wagon model	Wietenberg culture	SCHROLLER 1933, Pl. 9. 6; BICHR 1964, Abb. 4. 2; BÓNA 1960, Fig. 3; FETTICH 1969, Pl. III. 1; SCHUSTER 1996, Pl. 3.2.
Straubing-Lerchenhaid	36	Austria	animal head from a vessel	Middle Copper Age, Stroke Ornamented pottery culture	EIBL 2009, Taf. 4. 5.
Stránska (Oldalfala)	15	Slovakia	free-standing animal figurine	Baden culture	NEVIZÁNSKY 2009.
Szalacs see Sălacea					
Szamosújvár see Gherla					
Szelevény	96	Hungary	rectangular vessel (?), wagon model (?)	Copper Age	FETTICH 1969, 37, Pl. I. 1–3; REZI KATÓ 2001, 120; HORVÁTH 2009, 133; HORVÁTH 2011a, 229.
Szigetszentmárton	60	Hungary	wagon model	Baden culture	KALICZ 1976, Fig. 3.
Szombathely	57	Hungary	clay wheel	Middle Copper Age	ILON 2001, 476, Pl. I.
Szurdokpüspöki	29	Hungary	human figurine	Hatvan culture	KOVÁCS 1977, Figs 8–9.
Târgu Frumos	86	Romania	wagon model	Precucuteni culture	URSULESCU – BOGHIAN – COTIUGĂ 2005, Fig. 12. 1.
Țebea (Cebe)	105	Romania	clay wheel	Coțofeni III	BAKKER <i>et al.</i> 1999, 781.
Tepe Gawra	146	Iraq	wagon model	late 3 rd millennium BC (?)	LITTAUER – CROUWEL 1974, Fig. 2.
Tîream (Terém, Mezőterém)	44	Romania	wagon model	Ottomány culture	BADER 1978, Pl. 36. 36; SCHUSTER 1996, Pl. 7. 2.
Tószeg	62	Hungary	wagon model (?)	Hatvan culture	BÓNA 1960, 17.
Törökszentmiklós	63	Hungary	wagon model	Hatvan culture	TÁRNOKI 1999, Pl. 2.
Vác	30	Hungary	vessel with bovine head	Boleráz period	KÓVÁRI 2010, Figs 3–7.
Vârșand (Gyulavarsánd)	94	Romania	wagon model	Vârșand (Gyulavarsánd) culture	BÓNA 1960, Pl. 61, Pl. 62. 4–5, Pl. 63; ORDENTLICH – CHIDIOȘAN 1975, Pl. VII.
Vatta	26	Hungary	wagon model	Hatvan culture	KOÓS 2009, 573.
Vattina (Versecvát)	135	Serbia	human figurine	Middle Bronze Age	PRAISTORIJA JUGOSLAVENSKIH ZEMALJA IV. Pl. 82. 1.
Vésztő	93	Hungary	wagon model	Gyulavarsánd culture	KOVÁCS 1994, Fig. 38, Cat. no. 425.
Vinča	139	Serbia	human figurine	Middle Bronze Age	KOVÁCS 1972, 48. Fig. 1.

Site	Number on map	Country	Find	Cultural context/Date	Literature
Voivodeni (Vajdaszentivány)	87	Romania	wagon model	Wietenberg culture	PETICĂ 1981, Fig. 8. 2; BOROFFKA 1994, 167.
Vršac (Versec)	136	Serbia	human figurine	Middle Bronze Age	PRAISTORIJA JUGOSLAVENSKIH ZEMALJA IV. Pl. 84. 2, 2a.
Vučedol	133	Croatia	clay wheel and wagon model (?)	Vučedol culture	DURMAN 1988, Cat. no. 24.
Wietenberg see Sighișoara					

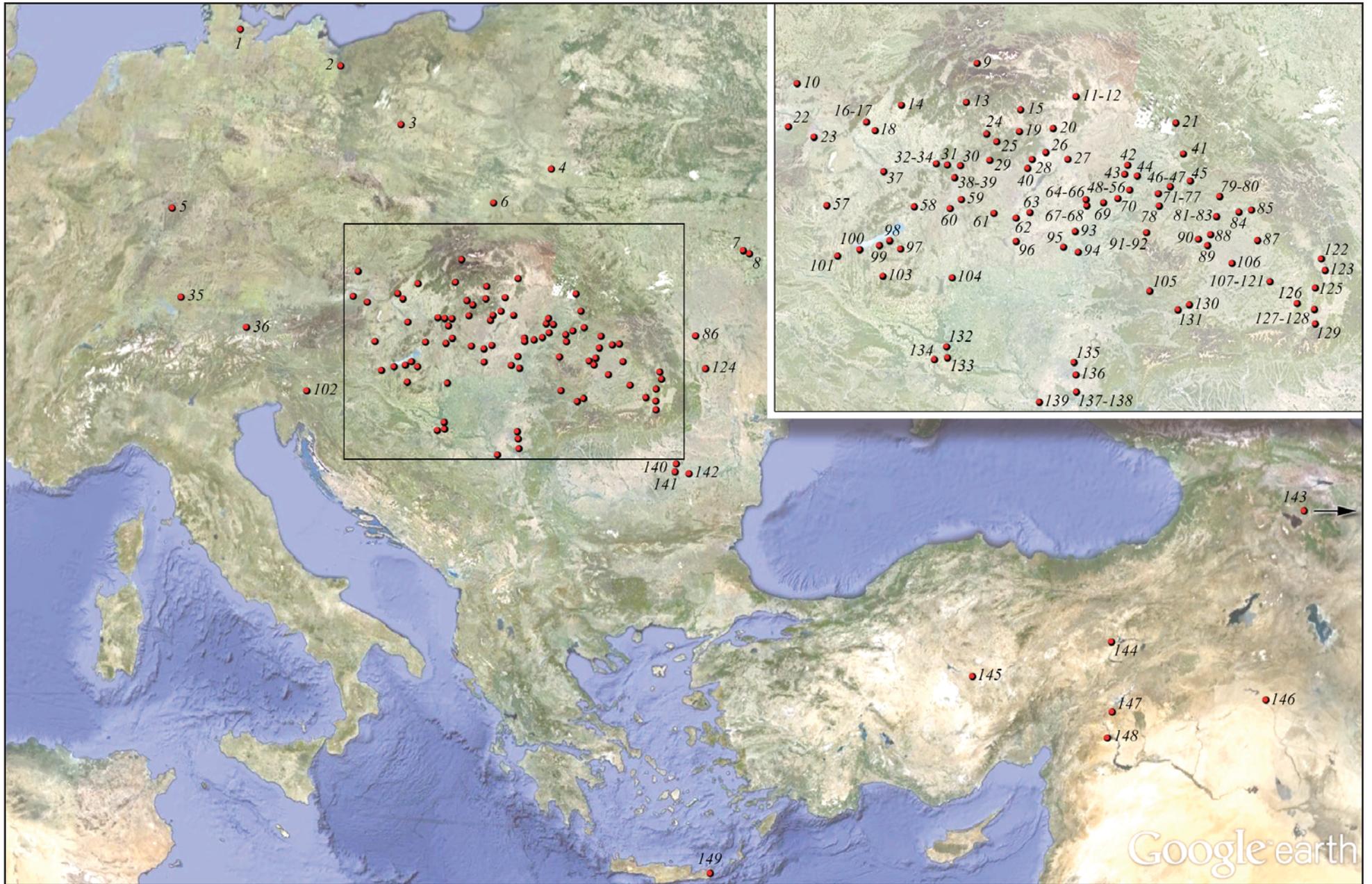


Fig. 37. Map of sites mentioned in the text