

ZINĀTNISKIE RAKSTI

<https://doi.org/10.22364/lviz.115.01>

LATE BRONZE AND PRE-ROMAN IRON AGE BRONZE RINGS – JEWELLERY OR INGOTS?

Andrejs Vasks

Dr. habil. hist., senior researcher, Institute of Latvian History, University of Latvia.

Research interests: Latvian archeology, Bronze and Iron Age.

Among the bronze items dating to Latvia's Late Bronze Age (1100–500 BC) and the Pre-Roman Iron Age (500–1 BC) there are rings with open ends that resemble bracelets or necklaces by size. The number of bronze rings and their fragments is not large – 57 units, but that of fragments of casting moulds is much higher – 856. The article deals with the data of both these rings and the respective castings. The main focus is on the problem of the function of these rings: whether they were ingots or jewellery. The author argues that, although bronze rings were used as jewellery, it was probably not their only or even their main function. Bronze rings were used for more convenient storing and transporting of metal, but also as a value equivalent in exchange operations.

Key words: Bronze and Pre-Roman Iron Age, bronze objects, social context, Latvia.

INTRODUCTION

Among the bronze products dating to Latvia's Late Bronze Age (1100–500 BC) (hereinafter LBA) and the Pre-Roman Iron Age (500–1 BC) (hereinafter PRIA) there are rings with open ends that resemble bracelets or necklaces by size. No such rings dating to the Early Bronze Age (hereinafter, EBA) have been found so far, and the evidence of bronze processing is inconclusive. Bronze processing in the Eastern Baltic is believed to have

begun in the EBA, 1800–1100 BC). Fifteen fragments from three or four clay crucibles found in Lagaža settlement (Lubāns Lowland) are indicated as evidence. Bronze had been preserved on one of the crucible fragments, which was confirmed by spectral analysis. The date of the settlement was indicated by three ^{14}C analyses: 2338–1829 calBC (3685 ± 80 BP, TA-749), 2205–1779 calBC (3640 ± 70 BP, TA-396), and 1731–1321 calBC (3240 ± 70 BP, LE-868) calBC, i.e. the end of the Late Neolithic and EBA.¹ However, fragments of the crucibles were found in an excavation site, which was slightly remote from the radioactive carbon sampling site and ^{14}C analyses have not been performed there. Therefore, the possibility that these finds date to a later period and probably are of LBA origin, cannot be ruled out. Another example of bronze processing in the EBA is the discovery of a stone mould in the Late Neolithic and EBA Kretuonas settlement in Eastern Lithuania. However, this find is no longer available and the only evidence of it is a drawing published by the director of the excavations, Algirdas Girininkas.² Consequently, the question of whether bronze processing in the Eastern Baltic, including the production of rings, began in the EBA remains open.

Evidence of bronze processing in the LBA in the Eastern Baltic is unambiguous as indicated by the found fragments of crucibles and moulds. They have been acquired in 30 hillforts in the Eastern Baltic, 17 of them in the territory of Latvia.³ Admittedly, little research has been conducted in open settlements; so far, evidence of bronze processing has been obtained only in the Lake Krigani Island settlement. The bronze items, and especially the moulds, bear evidence of the process of casting bronze items. A total of 228 bronze items dating to the LBA and the

¹ Loze 1978, 121.

² Podėnas, Čivilytė 2019, 171–172.

³ Vasks 2007, Fig. 1.

PRIA have been found in the territory of Latvia.⁴ The range of bronze items comprises weapons – socketed axes, including those of Akozino-Mälar type, socketed spearheads, jewellery – pins, buttons, necklaces, bracelets, as well as so-called toilet-ries – razors, tweezers, tattoo needles – awls. Among the finds there are bronze rings – both bracelet-sized and larger. Given that the rings have a simple shape and are not decorated, the question is whether they are ornaments or whether they were used for other purposes.

BRONZE RINGS

Bronze rings or their fragments, a total of 57 units, have been found in 11 places in the territory of Latvia – in eight hillforts, in one Neolithic settlement, in one cemetery, and in one hoard (Fig. 1). Ring diameters are quite different: 5.5–6 cm (Klangū, Paplaka, Brikulī hillforts), 8–11 cm (Ķivutkalns hillfort, Staldzene hoard), 15 cm (Strazdi cemetery), 26–30 cm (Brikulī hillfort). The cross section of the rings is round, 0.4–0.7 cm in diameter. Also, cross-sections of many rings from Staldzene hoard were irregularly square, prismatic, or segmental.

The number of these rings compared to that of other found bronze items is not large. In Ķivutkalns, out of 65 bronze objects from the LBA and PRIA, there were only five fragments of rings and one whole bracelet was found in the 2nd hoard of Ķivutkalns.⁵ In Brikulī hillfort, six of the 21 bronze item units contained fragments of similar rings.⁶ The exception is Staldzene hoard. This hoard, which dates to the 7th century BC, contained 174 fragments of bronze jewellery; out of 89 items

⁴ Late Bronze Age hillforts continued to exist in the Pre-Roman Iron Age, thus, the bronze items found there, which in most cases are fragmentary and cannot be further typified to be dated to the LBA or PRIA, are considered together.

⁵ Graudonis 1989, XLVI tab.: 2.

⁶ Vasks 1994, X tab.: 45–50.

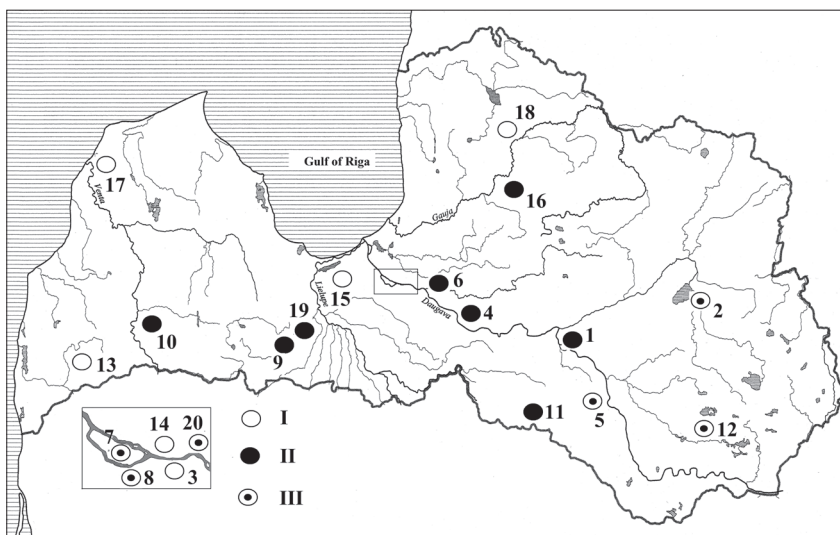


Fig. 1. Finds of bronze rings and moulds in the territory of Latvia.

I – bronze rings, *II* – moulds for bronze rings, *III* – bronze rings and moulds for rings.

1 – Asote hillfort; *2* – Brikuļi hillfort; *3* – Daugmale hillfort; *4* – Dievukalns hillfort; *5* – Dignāja hillfort; *6* – Ķenteskalns hillfort; *7* – Ķivutkalns hillfort; *8* – Kļanģukalns hillfort; *9* – Klosterkalns hillfort; *10* – Krievukalns hillfort; *11* – Kriģāni lake settlement; *12* – Madalāni hillfort; *13* – Paplaka hillfort; *14* – Reznes cemetery; *15* – Romi–Kalniņi settlement; *16* – Sārumkalns hillfort; *17* – Staldzene hoard; *18* – Strazdi cemetery; *19* – Tērvete hillfort; *20* – Vīnakalns hillfort

1. att. Bronzas riņķu un riņķu lejamveidņu atradumi Latvijas teritorijā.

I – bronzas riņķi, *II* – veidnes bronzas riņķu liešanai, *III* – bronzas riņķi un riņķu lejamveidnes.

1 – Asotes pilskalns; *2* – Brikuļu pilskalns; *3* – Daugmales pilskalns; *4* – Dievukalna pilskalns; *5* – Dignājas pilskalns; *6* – Ķenteskalna pilskalns; *7* – Ķivutkalna pilskalns; *8* – Kļanģukalna pilskalns; *9* – Klosterkalna pilskalns; *10* – Krievukalna pilskalns; *11* – Kriģānu ezersalas apmetne; *12* – Madalānu pilskalns; *13* – Paplakas pilskalns; *14* – Reznu kapulauks; *15* – Romu–Kalniņu apmetne; *16* – Sārumkalna pilskalns; *17* – Staldzenes depoziāts; *18* – Strazdu kapulauks; *19* – Tērvetes pilskalns; *20* – Vīnakalna pilskalns



Fig. 2. Bracelet-like rings in Staldzene hoard (Vasks, Andrejs, Vijups, Armands (2004). *Staldzenes bronzas laikmeta depoziits. Staldzene Bronze Age Hoard*. Rīga: Ventspils muzejs, photo No. 8/foto Nr. 8)

2. att. Aproces formas riņķi Staldzenes depoziitā

obtained by putting together the mutually compatible fragments, 34 were bracelet-like rings.⁷ However, in this case, the context of the hoard must be taken into account – it indicates that the finds constitute a craftsman's stock. The open alternating ends of the rings close with an uneven fracture, which indicates that the closed ring has been cut after its removal from the one-piece mould. Apparently, during this operation, due to the internal tension of the metal, one end of the ring was tilted down / up from the horizontal plane – for all bracelet-like rings, the distance between the ends is 1–2 cm (Fig. 2). This is also the

⁷ Vasks, Vijups 2004, p. 26, fig. 8, XII–XVI.

case for the ring found in the 2nd hoard of Ķivutkalns – the distance is about 2 cm. If the rings found in the hillforts are pieced together from compatible fragments (for example, in the case of the Paplaka hillfort), deviation of their ends from the horizontal plane cannot be detected.

MOULDS FOR RINGS

In the LBA and PRIA, two types of casting moulds were used – double-sided and one-piece moulds. The moulds were made of clay and fine-grained sand, thus achieving a fine structure and providing a smooth surface for casting. Bronze rings were cast using the so-called *cire perdue* technique for making one-piece moulds. When casting the object into a one-piece mould, the model of the desired object was first made of wax or other easily meltable and plastic material (wood resin, animal fat). It was then immersed in a liquid clay suspension, taken out and dried; this cycle was repeated several times to ensure that the surface of the item to be cast was as smooth as possible.⁸ The model was then covered with the prepared clay mass, creating a funnel with a gap in the channel / cavity for the item to be cast. The mould was made on a flat surface – a board, which is indicated by the flattening of one side of the mould (Fig. 3). When the mould was fired, the plastic material flowed out and, in its place the molten bronze was poured into the mould through the funnel. Unlike double-sided moulds, which served to cast axes and spearheads and could be used two to three times,⁹ one – piece moulds could only be used once, as they had to be broken to remove the cast (it should be noted that the double-sided moulds could also stick to the bronze product, so that in the process of their removal, the mould could be damaged¹⁰).

⁸ Luchtanas, Podėnas, Babenskaskas 2019, 28.

⁹ Information from Dr. hist. ArtursTomsons, who demonstrated the relevant experiments, to the author on 23 February 2021.

¹⁰ Jantzen 2008, 96.

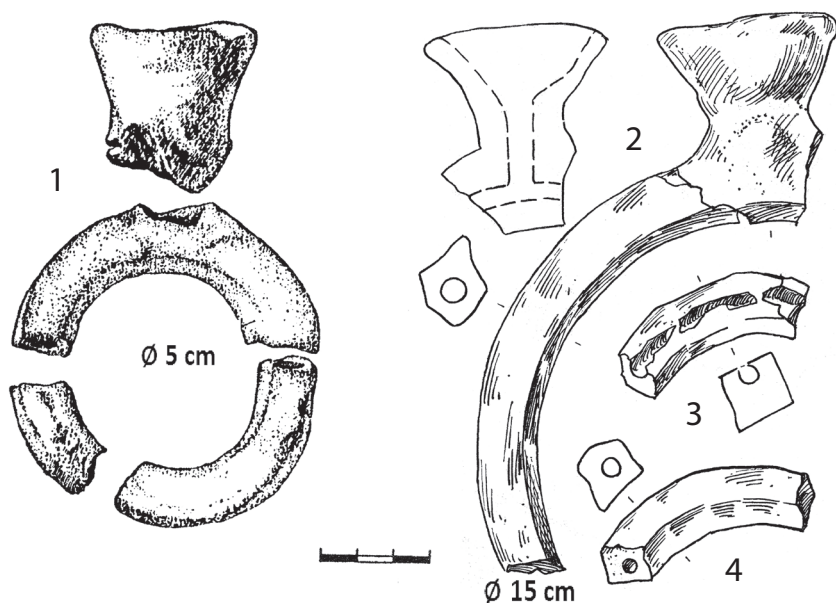


Fig. 3. Moulds for bronze rings. 1 – Ķivutkalns hillfort (from: *Latvijas senākā vēsture: 9. g.t. pr. Kr. – 1200. g.* Rīga: Latvijas vēstures institūta apgāds, 2001, fig. 133), 2–4 – Brikuļi hillfort (from: Vasks, Andrejs (1994). *Brikuļu nocietinātā apmetne. Lubāna zemīene vēlajā bronzas un dzelzs laikmetā. 1000. g. pr. Kr. – 1000. g. pēc Kr.* Rīga: Preses Nams, table XV)

3. att. Bronzas riņķu lejamveidnes. 1 – Ķivutkalna pilskalns, 2–4 – Brikuļu pilskalns

The number of one-piece mould shards is much higher than that of double-sided ones. Thus, for example, in Ķivutkalns hillfort, out of 556 fragments of clay moulds, 494 (91%) were from one-piece and only 50 (9%) – from double-sided moulds. In Brikuļi hillfort these figures were 227 (92%) and 21 (8%), respectively. This shows that the number of one-piece mould shards cannot be used to judge the number of the cast bronze items, as the number of fragments of a mould used to cast a single bronze ring can vary widely. A total of 856 fragments of such moulds have been found in the territory of Latvia. The majority of moulds have a single channel, which

means that they were designed to cast a single ring. However, four fragments of two-channel moulds were found in Brikuļi hillfort, which shows that sometimes two rings were cast in one mould. However, two-channel moulds, judging by the small number of relevant fragments, were not widely used. Two-channel moulds are also rare elsewhere in the Eastern Baltic and Poland.¹¹

In Brikuļi hillfort some moulds intended for casting straight bars have also been found.¹² Such castings could be used to make, for example, awls, such as were also found in Brikuļi hillfort.¹³ However, the number of such mould fragments is also negligible.

The diameters of the rings cast in moulds are rather different. However, large enough fragments of moulds are needed to measure the diameter, but such finds are few. Thus, for example, out of all fragments of Ķivutkalns one-piece moulds (494), it was possible to measure the diameter of the arc only of 19 fragments. The measurements showed that the diameters of the cast rings were 4–6 cm (in two cases), 8–10 cm (in four cases), 10–12 cm (in six cases), 12–14 cm (in two cases), 14–16 cm (in four cases), and 18–20 cm (in one case). As regards the standardisation of ring sizes, they are considered to have been manufactured in size relationships 1: 2: 3, judging by the finds from Brikuļi hillfort.¹⁴ However, the measurements of ring mould diameters do not indicate dimensional standardisation – they are very different – in Brikuļi fluctuating from 5 to 30 cm, in Ķivutkalns from 4 to 20 cm.

¹¹ Sperling 2014, 135.

¹² Vasks 1994, XV tab.: 28–33.

¹³ *Ibid.*, X tab.: 37.

¹⁴ Lang 2007, 119; Čivilytė 2014, 146; Sperling 2014, 156.

CHRONOLOGY OF RINGS

The chronology of bronze rings can be judged by relevant finds in hillforts, burial sites, and hoards, as well as by the stratigraphic location of the corresponding moulds in the cultural layers of hillforts. There is no evidence that such rings were known in the Eastern Baltic in EBA. It should be noted, however, that there is little archaeological evidence of this period in general – a few settlements and burial sites, as well as stray finds of bronze objects. In Scandinavia in the EBA, such rings-bracelets are well-known, because their function as bracelets is indicated by their design – they are decorated with either a twisted bow or a narrowing of the ends of the bracelet.¹⁵ However, among the finds dating to the EBA there is also a ring called the *Bronzeringbarren*, hence the bronze ingot.¹⁶ There is more evidence of bronze rings dating to the LBA, and thus we know more about their chronology. The rings found in Staldzene hoard, judging by the chronology of the other items, date to the 7th century BC.¹⁷ The ring found in the 2nd hoard of Ҷivutkalns, judging by the bronze socketed axe and the spiral-headed pin, dates to the end of the Bronze Age, i.e. to about the same period as Staldzene rings.¹⁸ Three rings were found in the cultural layer of a subterranean building in Paplaka hillfort. Charcoal radiocarbon analysis indicated 2210 ± 60 BP (TA-3151), or 273 calBC, respectively, the PRIA.

The largest number of fragments of bronze ring moulds were found in Ҷivutkalns and Brikulī hillforts (528 and 227 fragments, respectively). In the up to 3 m thick cultural layer of Ҷivutkalns hillfort, in which 10 sub-layers were discerned, they were located as follows: in the 10th–5th sub-layers, 66 fragments of moulds were found, which accounted for 8% of all artefacts

¹⁵ Oldeberg 1974, Abb. 16, 73, 376 etc.

¹⁶ Ibid., Abb. 361.

¹⁷ Vasks, Vijups 2004, 31.

¹⁸ Graudonis 1989, 42.

obtained in these sub-layers (1282) while in the 1st–4th sub-layers 462 fragments or 36% of all finds were found. Based on the dating of the Ķivutkalns cemetery, which was located just below the cultural layer of the hillfort, and the radiocarbon dating of the samples of charcoal from the fort and skeletal bones from the cemetery, the latter was used in the period from ~ 800 to 680 BC, but the hillfort was built around 650 BC and existed until the 1st–2nd century AD.¹⁹ Thus, at the beginning of the inhabitation of the hillfort, bronze casting was practiced there, but more activity in this regard began later – in the PRIA, especially in the final stage of the transition to the Roman Iron Age.

RING FUNCTIONS

The first one to pay attention to the function of these bronze products was Carl F. Meinander, admitting the possibility that these rings were not jewellery, but rather ingots made for more convenient transportation of metal.²⁰ In Latvia, until recently, such finds, which usually were fragmentary, were identified as bracelets or necklaces.²¹ However, in his 1967 book, Jānis Graudonis has placed a question mark in parentheses in the figure captions of two bracelet fragments found in Kļīgukalns, indicating that he was not entirely sure that they were indeed ornaments.²² In 2004, the author of this article described the bracelets in Staldzene hoard as castings that were intended for storage and transportation of metal and could be used as a means of exchange, without excluding their functioning as jewellery.²³ According to Valter Lang, bronze rings, or at least part of them, were cast from scrap in the Eastern Baltic to be

¹⁹ Vasks, Zariņa 2014, 35–36.

²⁰ Meinander 1954, 60.

²¹ See for instance, Šnore 1936, 7. att.: 20; Graudonis 1967, 20, 24, 25; Vasks 1994, X tab.: 45–50.

²² Graudonis 1967, tabl. XX: 24, 25.

²³ Vasks, Vijups 2004, 26.

returned to Scandinavia. However, in his opinion, although the production of these rings was obviously important, their meaning remains unclear.²⁴ Agnė Čivilytė in her book on bronze processing in the Eastern Baltic in the Bronze Age argued that considering the mass-scale production of such rings of standardised size, they had presented commercial value.²⁵ In his book on the exchange in the Bronze Age in the Eastern Baltics, Uve Sperling also paid great attention to bronze rings and their corresponding casting moulds. In addition to Estonian material, he has also extensively used data from other Baltic Sea basin countries, including Latvia. He considers these rings to be ingots or “ring bars” made by remelting worn-out jewelry that thus reduced their value to that of the respective metal. According to him, these rings were used in the interregional exchange system.²⁶

RINGS AS JEWELLERY

Assuming that in the Bronze Age and PRIA, bracelets and necklaces were cast in casting moulds, the dimensions of those articles, i.e. their diameter and their conformity with the dimensions of bracelets and necklaces must be assessed. The diameter of the bracelet from Ķivutkalns 2nd deposit is 8 cm,²⁷ but that of the two bracelets from Kalēji hoard is 6–7 cm.²⁸ In the Iron Age, the diameters of bracelets were similar – 6–8 cm.²⁹ The diameter of necklaces from Laidze Lazdiņi burial ground is 10–15 cm.³⁰ That of necklaces from Valmiera Strazdi – 14 cm,³¹ from Staldzene hoard 15–23 cm,³² but the two necklaces from

²⁴ Lang 2007, 118–119.

²⁵ Čivilytė 2014, 236.

²⁶ Sperling 2014, 153–167.

²⁷ *Latvijas PSR arheoloģija*, 1974, 26. tab.: 3.

²⁸ Urtāns 1977, 34. att.: 8, 9.

²⁹ *Latvijas PSR arheoloģija*, 1974, 28. tab.: 18, 30. tab.: 8, 11, 12, 14, 32. tab.: 11–15, 34. tab.: 14–18 u. c.

³⁰ Shnore 1970, 191, rys. 5: 2–4.

³¹ *Latvijas PSR arheoloģija*, 1974, 21. tab.: 5.

³² Vasks, Vijups 2004, 7–9.

Ķivutkalns 1st hoard were 15 and 16 cm large.³³ There were four narrow-ended necklaces with a diameter of 14–15 cm in Pabaliai hoard in Lithuania.³⁴ The Roman Iron Age necklaces are similar in size.³⁵ Thus, apart from some necklaces found in Lazdiņi, which probably were associated with children's burials and therefore were smaller in size, most necklaces have a diameter of 14–16 cm, sometimes larger. Considering the diameters of the moulds, it can be concluded that some of the moulds could be used for casting bracelets and necklaces, however, many of them were made for rings that did not correspond to the dimensions of either bracelets or necklaces.

RINGS AS INGOTS

Assessing the rings as ingots, let's look at the 34 rings found in Staldzene's hoard. Some have 8 to 11.5 cm in diameter, but two-thirds are 8.5 to 9.5 cm and weigh 21 to 78 grams. If we compare the metal composition of rings and other jewellery scrap contained in the hoard, it can be seen that it is quite similar – the amount of tin added to rings is from 5.4–21.2%, but for jewellery scrap it constitutes 5.1–30.2%.³⁶ Thus, conclusion can be drawn that the hoard rings were cast from approximately the same alloy that was used to make jewellery. Regarding the composition of the metal, a different picture is in Ķivutkalns, where metal objects, including rings, are made of almost pure copper – in only 19 of the 47 analysed samples the tin admixture ranged from 2 to 11%.³⁷

If these rings are considered to be commodity money, it is not clear how the value of such “money” was determined, as the weight of the rings is quite different. There is also no evidence

³³ Urtāns 1977, 36. att.: 1, 2.

³⁴ Merkevičius 2011, 92–93, pav. 151.

³⁵ *Latvijas PSR arheoloģija*, 1974, 28. tab.: 3, 4; 30. tab.: 6, 7; 32. tab.: 1–3 u. c.

³⁶ Vasks, Vijups 2004, tab. 2.

³⁷ Graudonis 1989, 13. tab.

that the rings were broken into smaller pieces by weighing them, as was done later in the Viking Age with silver bars and their cuts.

But can all bronze rings be considered as ingots? There is no doubt that Staldzene rings did not serve as ornaments and, according to Uve Sperling, were intermediate products.³⁸ However, this can hardly be said about all the other bronze rings found in the territory of Latvia. Most of the 57 bronze rings found in Latvia are fragmentary, and therefore, it is usually not possible to say whether the respective fragment is a part of a bronze ingot or a bracelet. There is one exception – the ring found in the 2nd hoard of Ķivutkalns. The hoard consisted of three bronze items – a socketed axe, a spiral-headed pin, and a ring. One end of the ring had been shifted from the horizontal plane by 1.5 cm, just like it was with the rings from Staldzene hoard. However, unlike the latter, the surface of the Ķivutkalns ring was thoroughly polished, but in the middle of the ring, in the process of grinding the excess bronze left in the mould funnel and “sticking” it to the ring, a small constriction had formed on the inside of the bow. It is possible that this was the set of items that the depositor had placed in the hoard: one weapon and two pieces of jewellery.

Given that bronze was an exotic material, its display, even in the form of rustic ingots, could be a sign of social status. In the Late Iron Age, bracelet-like silver spirals served a similar purpose alongside cast silver bars.³⁹ Obviously, these rings and, accordingly, the moulds for their production are to be regarded as ingots, but if processed accordingly, they could also serve as ornaments (Ķivutkalns bracelet, necklaces from Strazdu burial and Pabaļi hoard, etc.).

³⁸ Sperling 2014, 136.

³⁹ Urtāns 1977, 109.

SOCIAL CONTEXT

Why was it necessary to cast rings? Bronze founders in Scandinavia could not have had a problem to melt broken bronze jewellery in a crucible and cast new items. However, in order to do so, the artisan first had to collect the jewellery, which was no longer worn, from its users. Yet, as bronze was an exclusive material in Northern Europe, the owners of worn-out jewellery probably wanted compensation when they returned their worn-out jewellery. It could come in the form of bronze ingots. Secondly, as casting rings was a rather labour-intensive process, according to Valter Lang, probably it was more profitable for Scandinavian bronze founders to transport scrap to the eastern shore of the Baltic Sea, where local artisans smelted it into rings – ingots and were allowed to keep some of the rings as a reward for their work.⁴⁰

Andrew Sherratt's theory about the relationship between the centre and the periphery would be applicable here.⁴¹

In our case, the centre was Scandinavia, and the periphery was Eastern Baltic. The 7th century BC is significant in this regard, because around this time the exchange contacts across the Baltic Sea between Scandinavia and the Volga–Kama Ananjiño cultural area became active, the Daugava River becoming a strategic transit route. It should also be noted that in the 7th century BC a bronze processing centre was established at Ķivutkalns hillfort, and mass production of bronze rings was started there. Apparently, a new social elite emerged during this time, with the involvement in bronze exchange and processing as one of their priorities. Indirectly, this is indicated by the post-burial in the 2nd barrow at Reznēs cemetery in the lower reaches of the Daugava River.

⁴⁰ Lang 2007, 117–119.

⁴¹ Sherratt 1993, 1–57.

Many of the dead were usually buried in barrows of the Bronze Age cemeteries, as was the case in Reznes cemetery. Burial in such a barrow, which had been used for many generations, can obviously be explained by the desire to emphasise the family's genealogical succession, thus legitimising one's historical right to the family's territory. Even if the family's succession ended for various reasons, the non-family members of the new elite could also symbolically restore the succession by using the burial place of the extinct family. It seems that this is what happened in the case of the 2nd barrow in Reznes cemetery, when in the 7th century BC, five centuries after the beginning of burials in this barrow, a "leader's tomb" was built there – the central cist with the dead buried in it. In the process, the earliest burials were disturbed, i.e. destroyed.⁴² The fact that fragments of moulds for casting such rings have been found in all the hill-forts of the Eastern Baltic, where evidence of bronze processing has been acquired, suggests the existence of a larger, branched communication network. Judging by the prevalence of these moulds, Scandinavia, southern Finland, northern Germany, and Poland, which are part of the Baltic Sea basin, were included in this network in addition to the Eastern Baltic.⁴³ Judging by the finds of moulds, the largest centre for the production of bronze rings was located in the fortified settlement of Asva on the island of Saaremaa, where about 3000 fragments of moulds have been found.⁴⁴ In the territory of Poland, ring moulds were found in a number of settlements, the largest number of finds concentrating in Grzybiany (1500), Biskupin (698), and Bnin (591). In Denmark, Germany, Sweden, and Finland, there are fewer such finds – up to a few dozen fragments.⁴⁵

There are differing views on who these bronze processors were. The hypothesis of Agnė Čivilytė and Vytenis Podėnas that

⁴² Vasks 2021, 143.

⁴³ Sperling 2014, Abb. 53.

⁴⁴ Sperling, Karlsen, Lang, Lõugas, Lau 2021, 53–64.

⁴⁵ Sperling 2014, 426–429.

the bronze processors in the Eastern Baltic were immigrants from Scandinavia⁴⁶ is difficult to prove, as is the view that they were local craftsmen. This can only be judged indirectly. As new technologies spread rapidly, there had to be people – distributors of these technologies. The author of this article argues that it cannot be ruled out that in the Late Bronze Age, one of the locals travelled “abroad” to Northern Europe and learned the basics of the complex but tempting bronze processing. The situation was similar with the extraction and further processing of iron from bog/ meadow ores. Iron objects appeared in the Eastern Baltic in the PRIA, however, local iron production began only in the 1st century AD.

During the period under review, the largest bronze processing centres in the territory of Latvia were in Ķivutkalns, Kļanġukalns, and Brikuļi hillforts, where rings made a significant part of the range of bronze objects produced there. Judging by the rest of the archeological material and first of all the ceramics, the inhabitants of these hillforts were of local origin. Since bronze rings also served as an exchange equivalent and their production was nevertheless a labour-intensive process, based on the principles of centre–periphery theory, it was obviously more advantageous to direct this operation to the periphery, i.e. to the Eastern Baltic, where it was performed by local bronze casters. If bronze processing in the Eastern Baltic is viewed in the context of social relations, the involvement of the local communities and their elites seems completely unambiguous.

Moulds for bronze rings have also been found further east in several hillforts in both the Upper Dnieper district of the Dniepro–Dvina culture and in the Volga–Oka interfluvium in the Djakovo cultural area, but the number of such finds is small there compared to the evidence of bronze processing obtained

⁴⁶ Podėnas, Čivilytė 2019, 189.

elsewhere.⁴⁷ Further in the east, in the sites of Ananjino culture in the Volga – Kama region, bronze rings – bracelets and necklaces – are found, but no corresponding moulds similar to those found in the Baltics, are known there.⁴⁸

With the beginning of the Early Iron Age, the former socio-economic system, which had been based on bronze processing and exchange and covered the entire Baltic Sea basin, collapsed, and the largest centres of this system in Latvia – at Ķivutkalns, Kļanġukalns and Brikuļi hillforts – ceased to exist.

CONCLUSIONS

The production of bronze bracelets and necklaces in the Eastern Baltic began in the Late Bronze Age, probably in the 8th–7th centuries BC, and continued until the beginning of the Roman Iron Age in the 1st–2nd century AD. Although bronze rings were used as jewellery, this was probably not their only or even their main function. Bronze rings served as a convenient way to store and transport metal, but also as a value equivalent in exchange operations. Since fragments of ring castings were found in all the hillforts of the Eastern Baltic, where evidence of bronze processing has been discovered, there is a reason to assume the existence of a larger, branched communication network. In addition to the Eastern Baltic, this network also included Scandinavia, modern-day southern Finland, northern Germany, and Poland, which are part of the Baltic Sea basin. Based on the theory of the relationship between the centre and the periphery, the Eastern Baltic was a periphery to the centre in Scandinavia. At the end of the PRIA and the beginning of the Roman Iron Age, the earlier socio-economic system based on the processing and exchange of bronze, which covered the range of lands in the Baltic Basin, ceased to exist.

⁴⁷ Shmidt 1992, 89–91; Smirnov 1974, 68–69; Krenke 2011, 52.

⁴⁸ Kuz'minykh 1977, 142–143.

BIBLIOGRAPHY

- Čivilytė, Agnė (2014). *Žmogus ir metalas priešistorėje: žvilgančios bronzos trauka*. Vilnius: Diemedžio leidykla.
- Graudonis, Janis (1967). *Latvia v epokhu pozdnei bronzi i rannego zheleza*. Rīga: Zinatne, tabl. 20, 24, 25.
- Graudonis, Jānis (1989). *Nocietinātās apmetnes Daugavas lejtecē*. Rīga: Zinātne, 1. tab., XLVI tab.: 2.
- Jantzen, Detlef (2008). *Quellen zur Metallverarbeitung im nordischen Kreis der Bronzezeit. Prähistorische Bronzefunde*. Abteilung XIX, Bd. 2. Stuttgart: Franz Steiner Verlag, s. 96.
- Krenke, Nikolai (2011). *Poselok D'yakovo: kul'tura naseleniya basseyna Moskvyy-reki v I tysyacheletii do n.e. – I tysyacheletije nashey ery*. Moskva: Rossiyskaia akademija nauk, Institut arkheologii, rys. 52.
- Kuz'minykh, Sergei (1977). *Ob anan'inskoy obrabotke bronzy. Iz istorii i kul'tury volosovskikh i anan'inskikh plemen Srednego Povolzh'ya. Arkheologiya i etnografiya Mariyskogo kraja*. Vyp. 2. Otv. red. G. A. Arkhipov. Yoshkar-Ola: MarNII, s. 142–143.
- Lang, Valter (2007). *The Bronze and Early Iron Ages in Estonia. Estonian Archaeology 3*. Tartu University Press, p. 119.
- Latvijas PSR arheoloģija* (1974). Rīga: Zinātne, 26. tab.: 3.
- Loze, Ilze (1979). *Pozdnyy neolit i rannyya bronza Lubanskoj ravniny*. Rīga: Zinatne.
- Luchtanas, Aleksiejus, Podėnas, Vytenis, Babenskas, Evaldas (2019). *Romėniškojo laikotarpio ritis smeigtukas: nuo archeologinio radinio iki rekonstrukcijos / Spool-headed Pin from the Roman Period: From Archaeological Find to Reconstruction*. In: *Eksperimentinė Archeologija. Lietuvos materialaus paveldo rekonstrukcija. III tomas / Experimental Archaeology. Reconstructions of Material Heritage of Lithuania. Volume III*. Vilnius: Akademikai.
- Meinander, Carl F. (1954). *Die Bronzezeit in Finnland*. SMYA, Vol. 54, s. 60.
- Merkevičius, Algimantas (2011). *Ankstyvieji metaliniai dirbiniai Lietuvoje*. Vilnius: Versus Aureus, pp. 92–93, pav. 151.
- Oldeberg, Andreas (1974). *Die Ältere metallzeit in Schweden*, I. Stockholm, Abb. 16, 73, 376 etc.
- Podėnas, Vytenis, Čivilytė, Agnė (2019). *Bronze casting and communication in the Southeastern Baltic Bronze Age*. *Lietuvos Archeologija*, Vol. 45, pp. 169–199.

- Sherratt, Andrew (1993). What would a Bronze-Age world system look like? Relations between temperate Europe and the Mediterranean in later pre-history. *Journal of European Archaeology*, Vol. 1 (2), pp. 1–57.
- Shmidt, Yevgeniy (1992). *Plemena Verkhnego Dnepra do obrazovaniya Drevnerusskogo gosudarstva*. Moskva: Prometey, s. 89–91.
- Shnore, Elvira (1970). Kamennyy mogil'ik v Lazdyni. *Studia Archaeologica in Memoriam Harri Moora*. Tallinn: Kirjastus Valgus, s. 189–196.
- Smirnov, Kiril (1974). D'yakovskaya kul'tura (material'naya kul'tura gorodishch mezhdurech'ya Oki i Volgi). In: *D'yakovskaya kul'tura*. Moskva: Nauka, s. 68–69.
- Sperling, Uwe (2014). Aspekte des Wandels in der Bronzezeit im Ostbaltikum. Die Siedlungen der Asva-gruppe in Estland. *Estonian Journal of Archaeology*, 18/25, Supplementary volume, S. 135.
- Sperling, Uwe, Karlsen, Hans-Jörg, Lang, Valter, Lõugas, Lembi, Lau, Ronja (2021). *Ausgrabungen in Asva im Jahr 2020 – Auf den Spuren des Bronzegießerplatzes. Pronksivalamise töökoja jälgedel – väljakaevamised Asvas 2020. aastal*. Tallinn, S. 53–64.
- Šnore, Rauls (1936). Izrakumi Doles pag. Kļauņu pilskalnā. *Senatne un māksla*, 1, 7. att.: 20.
- Urtāns, Vladislavs (1977). *Senākie depozīti Latvijā (līdz 1200. g.)*. Rīga: Zinātne, 34. att.: 8, 9.
- Vasks, Andrejs (1994). *Brikuļu nocietinātā apmetne. Lubāna zemiene vēlajā bronzas un dzelzs laikmetā (1000. g. pr. Kr. – 1000. g. pēc Kr.)*. Rīga: Preses nams.
- Vasks, Andrejs (2007). Bronze-working Centres in the System of Social Relations in the Territory of Latvia During the Early Metal Period. In: Merkevičius, A. (ed.). *Colours of Archaeology. Material Culture and the Society*. Papers from the Second Theoretical Seminar of the Baltic Archaeologists (BASE) held at the University of Vilnius, Lithuania, October 21–22, 2005. *Interarchaeologia*, 2. Vilnius; Helsinki; Riga; Tartu, pp. 65–77.
- Vasks, Andrejs (2021). The Lower Reaches of the Daugava in the Bronze and Earliest Iron Age (1800–500 to the 1st Century BC). *Archaeologia Baltica*, Vol. 28, pp. 132–148.
- Vasks, Andrejs, Vijups, Armands (2004). *Staldzenes bronzas laikmeta depozīts. Staldzene Bronze Age Hoard*. Rīga: Ventspils muzejs.

Vasks, Andrejs, Zariņa, Gunita (2014). Ķivutkalna pilskalns un kapulauks: jauni dati un jaunas problēmas. *Latvijas Vēstures Institūta Žurnāls*, Vol. 3 (92), 5.–36. lpp.

VĒLĀ BRONZAS UN SENĀKĀ DZELZS LAIKMETA BRONZAS RIŅĶI – ROTAS VAI LIETŅI?

Andrejs Vasks

Dr. habil. hist., vadošais pētnieks, Latvijas Universitātes Latvijas vēstures institūts.

Zinātniskās intereses: Latvijas arheoloģija, bronzas un dzelzs laikmets.

Starp Latvijas vēlā bronzas (1100–500 pr. Kr.) un senākā dzelzs laikmeta (500–1 pr. Kr.) bronzas izstrādājumiem ir riņķi ar vaļējiem galiem, kas pēc izmēriem atgādina aproces vai kaklariņķus. Pašu bronzas riņķu un to fragmentu nav daudz – 57 vienības, taču krietni lielāks ir lejamveidņu fragmentu skaits – 856. Rakstā aplūkoti gan šo riņķu, gan attiecīgo lejamveidņu dati. Galvenā uzmanība pievērsta šo riņķu izmantošanas problēmai – vai tie bija lietņi vai arī rotas. Pēc autora domām, lai gan bronzas riņķi tika lietoti kā rotas, tā, domājams, nebija to vienīgā un pat ne galvenā funkcija. Bronzas riņķi kalpoja kā ērts metāla uzglabāšanas un pārvadāšanas veids, bet maiņas darbības arī kā vērtības ekvivalents.

Atslēgas vārdi: bronzas un senākais dzelzs laikmets, bronzas priekšmeti, sociālais konteksts, Latvija.

Kopsavilkums

Starp Latvijas vēlā bronzas (1100–500 pr. Kr.) un senākā dzelzs laikmeta (500–1 pr. Kr.) bronzas izstrādājumiem ir riņķi ar vaļējiem galiem, kas pēc izmēriem atgādina aproces vai kaklariņķus. Jautājums par to, vai šādus riņķus izgatavoja jau agrajā bronzas laikmetā (1800–1100 pr. Kr.), liecību trūkuma dēļ paliek atklāts. Neapšaubāmas liecības par bronzas apstrādi konstatētas vēlajā bronzas laikmetā, uz ko norāda atrastās tīģeļu un lejamveidņu lauskas. Tādas zināmas 30 Austrumbaltijas pilskalnos, 17 no tiem Latvijas teritorijā. Bronzas priekšmetu klāstā ir ieroči – uz mavas cirvji, uz mavas šķēpu gali, rotas – rotadatas, podziņas, kaklariņķi, aproces, kā arī t. s. tualetes piederumi – bārdas nazīši, pincetes, tetovēja-

mās adatas – īleni. Starp atradumiem ir arī bronzas riņķi – gan aproču izmēra, gan lielāki. Ievērojot to, ka riņķiem ir vienkārša forma un nav iestrādātu ornamentālu rotājumu, rodas jautājums par šo izstrādājumu nozīmi – vai tās ir rotas, vai arī tie izmantoti citiem nolūkiem?

Bronzas riņķi vai to fragmenti, pavisam 57 vienības, Latvijas teritorijā ir atrasti 11 vietās – astoņos pilskalnos, vienā apmetnē, vienā kapulaukā un vienā depozītā. Riņķu diametrs ir visai atšķirīgs: 5,5–6 cm, 8–11 cm, 15 cm, 26–30 cm. Riņķu loks šķērsgrīzumā ir apaļš, 0,4–0,7 cm diametrā. Šo riņķu skaits citu bronzas izstrādājumu vidū nav liels. Ķivutkalnā starp 65 bronzas un senākā dzelzs laikmeta bronzas priekšmetiem bija tikai pieci riņķu fragmenti, kā arī viens vesels apročveida riņķis no Ķivutkalna 2. depozīta. Brikuļu pilskalnā no 21 bronzas priekšmeta seši bija līdzīgu riņķu fragmenti. Izņēmums ir Staldzenes depozīts. Šajā ar 7. gs. pr. Kr. datētajā depozītā no 174 bronzas rotu fragmentiem, kurus savietojot ieguva 89 priekšmetus, 34 bija apročveida riņķi. Daudz lielāks ir lejamveidņu fragmentu skaits – 856. Bronzas riņķu atliešanai izmantoja t. s. *cire perdue* tehniku viengabala veidnes izgatavošanā. Atšķirībā no saliekamajām veidnēm, kurās atlēja cirvjus un šķēpu galus un kuras varēja lietot divas trīs reizes, viengabala veidnes izmantoja tikai vienu reizi, jo, lai izņemtu atlieto priekšmetu, veidne bija jāsasit. Mērījumi parādīja, ka atlejamo riņķu lejamveidņu diametrs bija 4–6, 8–10, 10–12, 12–14 un 18–20 cm.

Par bronzas riņķu hronoloģiju var spriest pēc šo izstrādājumu atradumiem pilskalnos, apbedīšanas vietās un kopatradumos – depozītos, kā arī pēc atbilstošo lejamveidņu stratigrāfiskā izvietojuma pilskalnu kultūrslāņos. Nav liecību, ka Austrumbaltijā šādi riņķi būtu pazīstami agrajā bronzas laikmetā. Vēlajā bronzas laikmetā liecību par bronzas riņķiem un to hronoloģiju ir vairāk. Spriežot pēc tām, riņķi izgatavoti, sākot ar 8.–7. gs. pr. Kr. līdz ēru robežai.

Par šo riņķu nozīmi ir izteikušies vairāki pētnieki, uzskatot tos par lietņiem. Arī raksta autors pievienojas šim viedoklim, tomēr neizslēdzot iespēju dažos gadījumos tos uzlūkot kā rotas.

Kāpēc vajadzēja atliet riņķus? Bronzas apstrādātājiem Skandināvijā taču nevarēja būt problēmu salūzušās bronzas rotas izkausēt tīģeli un atliet jaunas. Tomēr amatniekam, lai to darītu, pirmkārt, vajadzēja šīs valkāšanai vairs nederīgās rotas savākt no to lietotājiem. Taču, tā kā bronza bija ekskluzīvs materiāls arī Ziemeļeiropā, rotu īpašnieki, atdodot savas nolietotās rotas, droši vien vēlējās saņemt kompensāciju. Tāda varēja būt

bronzas riņķi – lietņi. Otrkārt, tā kā riņķu atliešana bija visai darbietilpīgs process, iespējams, ka Skandināvijas bronzas lējējiem bija izdevīgāk lūžņus pārvest uz Baltijas jūras austrumkrastu, kur vietējie amatnieki tos pārkausēja riņķos – lietņos, bet kā atlīdzību par darbu varēja paturēt daļu riņķu. Tas, ka lejamveidņu lauskas šo riņķu atliešanai atrastas visos Austrumbaltijas pilskalnos, kur konstatēta bronzas apstrāde, liek domāt par plašāka sazarota sakaru tīkla pastāvēšanu. Spriežot pēc šo lejamveidņu izplatības, šajā tīklā bez Austrumbaltijas iekļāvās arī Skandināvija, mūsdienu Somijas dienviddaļa, Ziemeļvācija un Polija, kas ir Baltijas jūras baseina zemju loks.

Saņemts/Submitted 26.01.2022.

© 2022 Andrejs Vasks.

Latvijas Universitāte

Raksts publicēts brīvpieejā

saskaņā ar Creative Commons

Attiecinājuma-Nekomerciāls 4.0 Starptautisko
licenci (CC BY-NC 4.0)

This is an open access article licensed

under the Creative Commons Attribution 4.0

International License (CC BY-NC 4.0)

(<https://creativecommons.org/licenses/by-nc/4.0/>).