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IMITATION OF THE DENARIUS OF OCTAVIAN AUGUSTUS OF MALA KOPANYA TYPE

Abstract. The purpose of the article – the study of imitation denarii of Octavian Augustus of the Malokopan type and the archaeological context of their finds. **Scientific novelty** of the study. The article is the first to identify the source of the Malokopan type denarius and to determine the chemical composition of the imitation alloy using XRF analysis and to suggest the possibility of the local origin of the imitation based on the archaeological context of the finds. **The methodology of the study** includes a combination of archaeological, numismatic, chemical and physical, and general scientific research methods. **The Conclusion.** The article describes the context of numismatic items of the rare Mala Kopanya type. The related finds in the Chelenytsia, Serednyi Hrunok, and Mala Kopanya tracts are analysed. For the first time, the article identifies the type of Augustus coin, which was used as a basis for imitation. Thus, based on the materials of the study, it was established that the basis for the imitation was the denarius of Octavian Augustus which was coined in nineteenth-fourth centuries BC. The chronological boundaries of the denarius minting are correlated with the accompanying

archaeological material discovered during excavations in 2010 and earlier archaeological expeditions in the Chelenytsia, Seredniy Grunok, and Mala Kopanya tracts.

The article also establishes that coins of this type were minted for a long time. This is evidenced by the data of non-destructive X-ray analysis and dies analysis. According to the dies analysis, no die pairs were identified. In turn, XRF analysis revealed differences in the ligature, namely, Zn was found in one of the coins under study, which was completely absent in the second coin, while in the second coin, Fe was found, which was completely absent in the first coin. The content of such an identifying ligature is significantly higher than the margin of tolerance and forms the belief that the coins were minted from different batches of silver with different origins.

Key words: imitation, coin, antiquity, Celts, Geto-Dacians, money circulation, minting, XRF analysis, Octavian Augustus, Eastern Europe.

ІМІТАЦІЯ ДЕНАРІЯ ОКТАВІАНА АВГУСТА МАЛОКОПАНСЬКОГО ТИПУ

Анотація. *Мета статті* – дослідження імітації денарія Октавіана Августа Малокопанського типу і археологічного контексту місць їхніх знахідок. **Наукова новизна** дослідження. В статті вперше встановлено джерело для наслідування денарія малокопанського типу та встановлено хімічний склад сплаву імітації з допомогою РФА аналізу та сформовано припущення про можливість місцевого походження імітації на основі археологічного контексту знахідок. **Методологія проведеного дослідження** включає поєднання археологічних, нумізматичних, хіміко-фізичних та загально наукових методів дослідження. **Висновки.** У статті описано контекст нумізматичної пам'ятки рідкісного Малокопанського типу. Проаналізовано супутні знахідки в урочищах Челениця, Середній Грунок та Мала Копаня. У статті вперше встановлено тип монети Октавіана Августа, що був взятий за основу для імітації. Так, за матеріалами проведеного дослідження встановлено, що основою для імітації став денарій Октавіана Августа, 19 – 4 рр. до Р. Х. Хронологічні межі карбування денарія співвідносять із супутнім археологічним матеріалом, що було виявлено під час розкопок 2010 р. та більш ранніх археологічних експедицій в урочищах Челениця, Середній Грунок та Мала Копаня.

У статті також встановлено, що монети такого типу карбувалися протягом тривалого часу. Про це свідчать дані неруйнівного методу РФА аналізу, а також штемпельний аналіз. Зі свого боку, РФА аналіз встановив розбіжності в лігатурі, а саме в одній із досліджуваних монет було виявлено Zn, який повністю відсутній у другій монеті, натомість у другій було виявлено Fe, якого зовсім не було у першій. Вміст такої ідентифікуючої лігатури є значно вищим за межі похибки та формує переконання у тому, що монети карбувалися із різних партій срібла, що мали різне походження. За даними штемпельного аналізу не було встановлено наявності спільних монетних штемпельів для досліджуваних монет.

Ключові слова: імітація, монета, античність, кельти, гето-даки, грошовий обіг, карбування, РФА, Октавіан Август, Східна Європа.

The Problem Statement and Analysis of Recent Researches. Coin finds are known to be one of the main numismatic sources. However, coin finds have a significant differentiation in terms of information content and scientific significance. The famous British scientist Philip Grierson divides coin finds into “casual or stray finds, hoards, and excavation finds” (Grierson 1975, p. 125). In recent decades, a body of work has been published that mainly describes “casual or stray finds of coins and hoards (Mielczarek, 1989; Mielczarek, 2008; Kotsur, 2017; Myzhin, 2017; Myzhin, Stepanenko & Sytiy, 2019; Orlyk, Kotsur, & Tsyganenko, 2019; Kazakevych, 2021; Orlyk 2022a; Orlyk 2022b; Orlyk 2022; Boiko-Haharin, Sustrietov, & Zadorojna, 2022; Orlyk & Kolesnichenko, 2023; Orlyk & Pyzyk, 2023). Among the corpus of the above-mentioned scientific works, there are also publications that address the problem of the distribution of Celtic and Geto-Dacian coins on the territory of Ukraine and their typology.

However, the most informative for scientists are coin finds made during archaeological excavations. The works of E. Kolnikova and V. Kotyhoroshko (Kolnikova & Kotygoroshko,

2007; Kolnikova & Kotygoroshko, 2009; Kolnikova & Kotygoroshko, 2010) are devoted to such finds, in particular, to the barbaric imitations found in the area of the Mala Kopanya and Chelenytsia complexes. Our article is devoted to coins from the archaeological excavations at Mala Kopanya.

The site in Mala Kopanya became known to the scientific world in the late nineteenth century when a small report by local historian I. Mihalyk published data on individual finds collected in Mala Kopanya (Mihálik, 1893). In 1893, on the pages of the journal “*Archaeologiai Értesítő*”, a teacher of the Sevlus Gymnasium reported the discovery of a number of kurgans and kurgan groups on the territory of the Ugochanska group. He also mentioned the presence of fortifications near the village of Mala Kopanya. Half a century later, beyond the 50’s and 60’s years of the twentieth century, this area attracted the interest of the staff of the Transcarpathian Museum of Local Lore (Peniak, 1980), who examined the territory of the settlement and laid several pits. As a result of the research, this site was introduced into scientific circulation as a settlement of the Hallstatt and Ancient Rus periods. Half a century ago, Mala Kopanya’s peasants were cultivating their land on the upper part of the mountain, unknowingly destroying the ancient horizons. The destruction of the monument stopped only after it attracted the attention of researchers from Uzhhorod State (now National) University, led by V. Kotyhoroshko. Since 1977, the hillfort and its periphery have been subject to systematic study. At that time, systematic annual fieldwork by scientists was initiated and continues to this day. A significant number of residential, household, and industrial objects have been discovered, and a substantial collection of mass and individual material has been collected.

The publication’s purpose study the imitation of a coin of the Mala Kopanya type, to supplement information about the archaeological context of the find, to classify the archaeological site, and to establish the origin of the coin.

The Statement of the Basic Material. The Mala Kopanya archaeological complex consists of a hillfort in the Horodyshche tract, a landscape sanctuary in the Chelenytsia tract, and a group of burials in the Srednyi Hrunok tract. Today, it is one of the most researched monuments among Transcarpathian antiquities and a reference for the entire Upper Tysa region. The stratigraphic record of the multilayered site includes the horizons of the Stone Age, the Hallstatt period, the Dacian culture of the Turn of the Era, and the Middle Ages. The dominant part of the cultural layer is rich in finds from the 1st century BC to the 1st century AD, associated with the penetration and settlement of the Dacians in the region.

The settlement is located on a mountain (the edge of the Khust-Rokosovo volcanic ridge) on the right bank of the Tysa River on the east side of the village of Mala Kopanya in Berehove (until recently Vynohradiv) district of Zakarpattia region of Ukraine. The height of the mountain on which the fortified settlement is built is 85 m. The total area bounded by the ramparts is 5 hectares. The shape of the monument is close to oval, stretching from north to south. The slopes of the mountain are steep from the east, south, and southwest. The eastern foothills are washed by the Tysa River, while the southern and south-western ones are low-lying. There is a system of two ramparts. The first, the main one, fits into the relief of the southern top, passing along the sides of steep slopes, except for the gentle eastern one, which it crosses. The height of the embankment is 0.4 – 2.2 m, the width is 3.5 – 20 m. The central entrance is particularly well fortified. Another rampart (4 m high) overlooking the Tysa River valley protected the eastern slope of the mountain.

The northern side of the settlement was the most vulnerable, adjacent to the saddle, where the slope was only 15–20 meters high. Therefore, for more reliable protection, two additional ramparts were erected on the northern top of the mountain, which formed a foregarden. The height of the embankments is 1 – 1.7 m, and the width of the base is 8 – 10.2 m. The area between the saddle and the rampart III (Small settlement) does not contain a cultural layer (except for the southern edge), which indicates that it was used only for defensive purposes.

The northeastern periphery of the settlement (Chelenytsia tract) was also covered by an additional system of seven ramparts most likely already in the Middle Ages. They protected the passage from the Khust-Rokosovo volcanic ridge, that is, the most accessible road to get to the site. The height of these ramparts was insignificant. Together with a shallow moat, the total thickness of the fortifications did not exceed 2 m. They had not so much a defensive function as they did not allow vehicles to get to the site in any other way than the main road.

Among the various finds, a special place is occupied by coins, which are among the clearest chronological indicators. The basis of this group is made up of denominations of Celto-Dacian coinage, Roman Republican and Empire denarius and their imitations, as well as Illyria drachms. One of the rarest types of coins found at the Mala Kopanya site is an imitation of a Roman denarius. To date, the discovery of such an imitation is known exclusively at this location. This publication is devoted to its analysis.

The first specimen of the Mala Kopanya coin type (Fig. 1) was published in 2007 in the collection “Carpatica-Carpathia” by E. Kolnikova and V. Kotyhoroshko among a group of random finds of the local population (Kolnikova & Kotygoroshko, 2007).

Given that the scientific collections of the Research Institute of Carpathian Studies of Uzhhorod National University contained only black-and-white photographs of poor quality, and this was the first time such a denomination was encountered, sketching the obverse and reverse was accompanied by certain difficulties. As a result, the description was based on the available image. It was noted that the coin did not belong to the Dacian imitations of Republican denarius known at the time. On the obverse remains an indistinct object resembling a branch, below which is the inscription CAESAR. The researchers noted that similar inscriptions are known on the denarius of Mark Antony of 46–45 BC but based on the probable image of a horse on the reverse, this is clearly not a Roman coin. The scientists cautiously identified the find as a Celtic denomination, most likely of the Pannonian Kapos or Totfolu types of the second half of the first century BC, emphasizing the impossibility of establishing the place and exact time of minting, as this is the first specimen of this type (Kolnikova & Kotygoroshko, 2007, pp. 56–57, fig. 6, 005H).



Fig. 1. A casual find by local residents (drawing based on a photo from the scientific collections of the UzhNU Research Institute of Carpathian Studies)

Two years later, the same coin (Fig. 2) was discovered in the southern part of the Mala Kopanya settlement near excavation XXXVIII. It became possible to detail the image.

Obverse: the head turned right with laurel wreath, left side with CAESAR inscription.

Reverse: a horse turned to the left is depicted, and under its feet is a line as a symbol of the water's surface. Below it and above the horse are the remains of indeterminate letters. The only clear sign in the form of the letter S is placed in front of the horse. There are two sticks on the horse's spine, which, according to researchers, could mean a rider or Pegasus wings.

Weight – 1.9 g, diameter – 1.4×1.62 cm.



Fig. 2. Mala Kopanya. Find a coin near excavation XXXVIII.

The opinion remains unchanged that this is an imitation of the Roman Republican denarius, but it is difficult to determine which of the coins was used as an example by the Dacian master. The inscription CAESAR is present on the obverse of the coins of Julius Caesar the Elder dated 94 BC, but the head turned to the left belongs to Mars. The coins of Julius Caesar of 54–51 BC with this inscription have an elephant on the reverse. The image on the coin of Mala Kopanya, even with its strong stylization, shows that it is an imitation of the obverse of Octavian's coin of 41 BC with the inscription CAESAR, but here there is no wreath on the head. The reverse of the Republican denarius depicts Pegasus. For example, it was depicted on the denominations of Quintilius Titius of 88 BC, which could have been used by the creator of the image of the Mala Kopanya coin, but it could have been made according to his ideas. The researchers suggested that this find could have been minted at the Mala Kopanya settlement, which could be confirmed or corrected by further finds (Kolnikova & Kotygoroshko, 2009, pp. 136–137, fig. 1–2, 064H).

The linkage to a particular excavation allows us to specify the chronological context of the find, for which we will consider the inventory collection of the investigated area. In July 2009, the research of the southern part of the settlement continued at the Mala Kopanya complex, where an 84 sq. m. cut was made to the northern part of excavation XXXVIII. Its limited area is determined by the location between trees. The site is located on a slope (from the zero-survey benchmark at the top to 3.8 meters at the bottom).

The cultural layer lay immediately below the turf and was 1.4 m thick. It consisted of three distinct layers. The top layer was dark grey earth, the middle layer was yellow clay, the bottom layer was brown clay, and the bedrock was dense yellow clay. The upper layer was filled with small fragments of Dacian pottery. A series of haphazardly placed pits and depressions were recorded on the site. Small fragments of ceramics, charcoal, smear and stones were found in their fill.

During the study of excavation XXXVIII, a significant amount of Dacian pottery was discovered. Ceramics are divided into two groups by manufacturing technology: handmade and pottered. Handmade is classified into subgroups A and B according to its functional purpose.

Subgroup A. Kitchenware made of clay dough with admixtures of grus, sand, and chamotte. It is mainly represented by two types of pots.

Type I. Wide-necked pots with a gently curved rim and a slightly oval body. The neck is decorated with a glued roller with finger impressions. The diameter of the rim (D) is 29–31 cm.

Type II. Small pots with a gently curved rim and the largest expansion in the middle part of the body. One of them was reconstructed. D – 7.7 cm, bottom diameter (d) – 4.5 cm, height (H) – 10 cm. As a rule, pots of this type are decorated with various plastic ornaments. These include stickers, cone-shaped protrusions, and garlands. We should also note the bottom of the pot, which had cross-shaped lines on the base.

A significant group of kitchen ceramics consisted of conical cups with handles. Among the numerous sherds, three restored examples stand out. Their dimensions: D – 6.6 – 14.5 cm, d – 2.6 – 6 cm, H – 4 – 6.2 cm.

Subgroup B. Vessels made of clay dough with fine chamotte admixture. The surface was covered with black, sometimes brown glaze. The firing is sufficient. The main assortment consisted of pots, korchagi (large earthenware pot), fruit vases and bowls.

Pots. These are vessels with a more or less curved neck, a slightly oval or convex body. D – 12 – 15.2 cm.

Korchagi. They are presented in small fragments, among which a fragment of a massive neck resembling the shape of a pythos neck stands out. The body is open. D – 26 cm.

“Fruit vases”. They were a bowl with a long curved neck, clearly defined shoulders, and a conical body, which was placed on a pallet of different heights. D – 24.5 – 36 cm.

Bowls. They were found in a fragmentary state. A large fragment of a biconical specimen stands out among them. D – 15.5 cm.

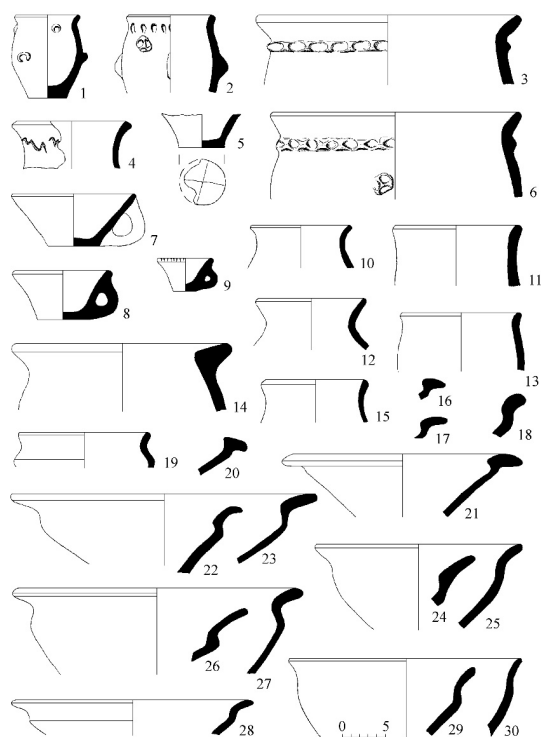


Fig. 3. Mala Kopanya. Handmade ceramics from excavation XXXVIII. (Kotygoroshko, Prokhnenko & Moizhes, 2010)

Pottery is divided into five subgroups according to the manufacturing technique. All of these groups, with the exception of subgroups G and E, are characterised by the thorough processing of the clay mass, minor admixtures of fine sand and very chamotte, or the addition of both.

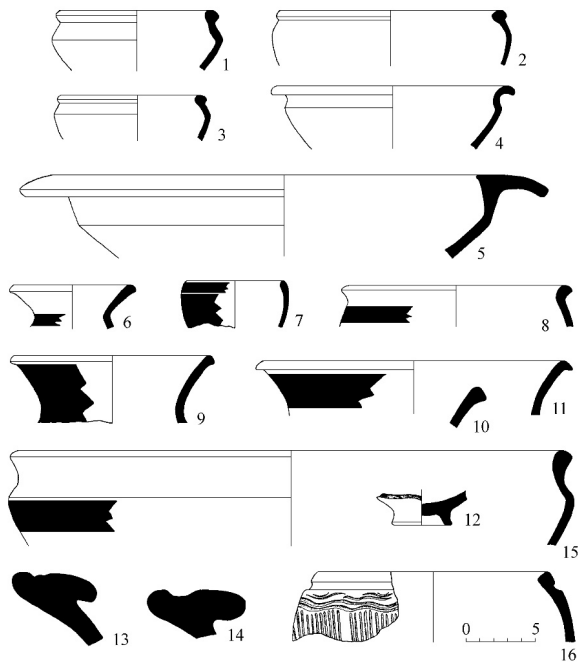
Subgroup A is represented by grey clay ceramics. The firing was uniform, through, and the surface was covered with grey and sometimes black glaze. The main forms are bowls and “fruit vases”.

Bowls. Biconical in shape with a short thickened neck. D – 11 – 16.7 cm.

Fruit vases. Among the numerous fragments, two neck pieces stand out. They are characterised by a sharply profiled neck, clearly marked shoulders and a tapered body, which usually passed into a high tray. D – 18 – 38.4 cm.

Subgroup B is represented by painted ceramics made of thoroughly kneaded dough with very fine chamotte. The yellow surface was covered with dark brown, white and black paint. Basically, these are horizontal stripes of different widths. At the excavation site, this subgroup is represented by fragments of pots, vases and bowls.

A significant number of fragments of pythos and one fragment of a graphite situla are also noted. The diameter of its crown is 17.8 cm.



**Рис. 4. Mala Kopanya. Pottery from excavation XXXVIII.
(Kotygoroshko, Prokhnenko & Moizhes, 2010)**

A small group of finds from the site consisted of clay, stone, iron and bronze products.

A spinning wheel, 3.5 cm in diameter, 0.7 cm wide and 1 cm in diameter, is made of clay, or rather from the side wall of the vessel.

A more significant group of finds is represented by stone products. These include an “iron”, a fragment of a sharpener and fragments of millstones.

Iron. With a flat base and a conical top. Dimensions: base diameter – 10 cm, height – 9.8 cm.

Millstones. They are represented by loungers with a diameter of up to 36 cm and a height of up to 14 cm. The central part has a hole for the trunnion. Among them, an original find is a fragment of a millstone with a working surface with cuts.

A sharpening bar. Hundreds of bars for sharpening piercing and cutting tools were found at the site. This collection also included a fragment of a sharpening bar found in excavation site XXXVIII.

The objects made of ferrous metal are mainly household items. These include a fragment of a knife, a long rectangular plate, a cross-shaped object with a hole in the middle, a braid ring, and a rivet.

A single arrowhead with an elongated triangular nib and an open sleeve is represented. The tip is 5.2 cm long.

The bronze collection includes only a few items. These are a fragment of a belt chain, a pendant, a fragment of a bracelet with notches on the outside, and a small fibula form (A67), typical of the Carpathian area of the early first century AD.

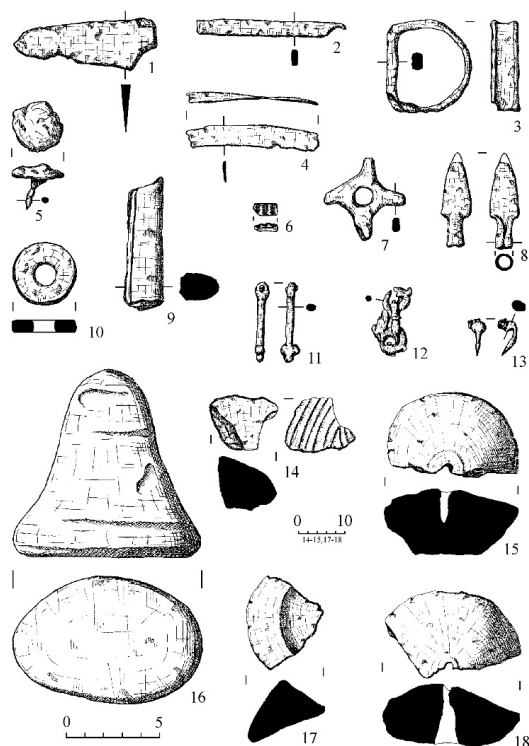


Рис. 5. Mala Kopanya. Individual inventory of excavation XXXVIII. (Kotygoroshko, Prokhnenko & Moizhes, 2010)

The analysis of the bedrock obtained during the study of excavation XXXVIII allows us to date it to the end of the first century BC – beginning of the first century AD (Kotygoroshko, Prokhnenko & Moizhes, 2010).

At another location of the archaeological complex, a landscape sanctuary in the Chelenytsia tract, a third coin of this type was discovered in 2010 (Fig. 6).



Fig. 6. Mala Kopanya. The coin find in the Chelenytsia tract.

Weght – 1,21 g., Diameter – 1,62 sm.

A thorough analysis of the scientific literature allowed the researchers to conclude that as of 2010, small silver coins with the obverse depicting a stylized head with a laurel wreath turned to the right and a stylized CAESAR inscription to the left are known exclusively from Mala Kopanya. They also found that the symbolism and style of the figure indicate that the motif was adopted from Celtic masters, possibly the reverse of a Totfolu-type drachma. With reference to previous findings, the name of these denominations as the Mala Kopanya type was confirmed and their local production in the second half of the first century BC was emphasized (Kolnikova & Kotygoroshko, 2010, p. 90–91, fig. 3, 078H).

The presence of a third specimen in another part of the site allows us to consider the chronology of the associated material in this case. Since the middle of the first decade of the twenty-first century, research has been carried out simultaneously with the excavations of the Mala Kopanya settlement in the Chelenytsia tract. It occupies an elevation 200 m northwest of the closed settlement. The eastern and northeastern parts of the tract are sloping and difficult to access, and the western part, with a complex terrain, continues the Rokosovo-Khust volcanic ridge.

The relief of the tract is in the form of small waves. The bedrock lies at a depth of 0.5 – 0.6 m, in some areas up to 0.7 m from the modern surface. The material collected during the research allowed us to divide the tract into two parts: northern (Chelenytsia I) and southern (Chelenytsia II). The first part is a cluster of burials, complexes and single finds. Only a few objects (arrowhead, bridle, blacksmith's pliers, fibulae and a fragment of a bracelet) were found on the territory of Chelenytsia II (432 sq. m), which make up a limited collection.

At Chelenytsia I, on an area of more than 5,000 square meters, two dozen soil cremation burials, a dozen weaponry complexes without calcified bones, and numerous individual materials represented by weapons, rods, psalms, spurs, knives, as well as jewellery and clothing items were discovered.

In the field season of 2010, a coin of the Mala Kopanya type was discovered in the area of square M-29 of excavation II in the Chelenytsia I tract. This coin was the third such find at the site. The accompanying material allows us to clarify the chronology of denominations of this

rare type. A spur button, an umbron rivet, a part of a spearhead, a garter buckle and a fragment of a nondiagnostic object were found in the immediate vicinity of the coin's discovery point, which are traditional and massive finds of the Mala Kopanya sanctuary, and therefore fall within the general chronological column of the site.

The analysis of the material obtained during the study of the Chelenytsia tract allows us to date it to the first century BC – early first century AD. In the case of the dating of coins of the Mala Kopanya type, it coincides in the main points with the chronology of the inventory of the excavation of the XXXVIII settlement. Accordingly, on the basis of the chronological attribution of archaeological materials of the settlement and landscape sanctuary, the dating of the denominations can be limited to the end of the first century BC - beginning of the first century AD (Kotygoroshko, Prokhnenko & Moizhes, 2011).

The coins of the Mala Kopanya type were also analysed by K. Myzgin. According to the scientist, this coin was an imitation of Octavian's denarius on the obverse, while the reverse with the image of a horse was of Celtic origin and was borrowed from tetradrachms (Myzgin, 2017, p. 9). As for the obverse, it is difficult to disagree with the author. Since the CAESAR legend is clearly readable, which gives us confidence in the Roman origin of the coin prototype, and the accompanying excavation materials allow us to establish a periodisation within the second half of the first century BC. However, there are significant doubts about the reverse. Indeed, the motif of the horse on the reverse was quite popular with both the Celts and the Geto-Dacians. However, the combination of separate reverses and obverses of different types in one coin is quite rare, or even unique. In such a case, such a coin would not be able to fulfill its main task, namely to imitate a common coin, and would raise additional doubts when payment with these coins. Therefore, this assumption, although it has its arguments, is not sufficient.

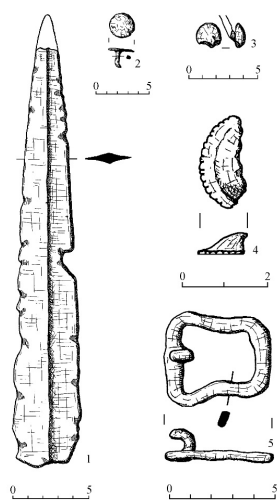


Fig. 7. Mala Kopanya (Chelenytsia tract). Individual excavation inventory II

In our opinion, the Mala Kopanya type coin is an imitation of an Octavian Augustus coin of 19 – 4 BC (ANS) with a Pegasus on the reverse. Let us consider this coin in more detail:



Fig. 8. (ANS)

Obv. Head of Augustus in profile to right. Legend: CAESAR AVGVSTVS.

Rev. In beaded circle Pegasus with raised wings to right. Legend: PETRON TVRPILIAN III VIR.

For comparison, there is above considered example:



Fig. 9. Imitation of a coin of the Mala Kopanya type.

Obv. Head in profile to right. Legend: CAESAR.

Rev. Pegasus with raised wings left. Legend: S, rest illegible.

The obverse of the coin has only a part of the legend, on the same side of the portrait as in the original. On the reverse, however, we can see that the Pegasus or horse was reflected during minting. Such a defect in the production of coins was common and is still quite common in imitations of the Celts and the Geto-Dacians.

Comparing the metric characteristics of the coins, we can see that the parameters have been reduced compared to the original. For example, the original coins that have survived to this day weighed between 3.58 and 4.12 g (Numista, a), while the imitation weights range from 1.90 to 1.21 g. The diameters of the coins are more similar, measuring 18 mm for the original coin and 16.2 mm for the imitation.

Considering the tradition of minting Pegasus coins in ancient Rome, we can also mention a later coin of 76-77 by Filius Domitianus (Fig. 2).



Fig. 10 (Numista, b).

Obv. Head of Domitian, laureate, right. Legend: CAESAR AVG F DOMITIANVS in a circle around the coin counterclockwise.

Rev. Pegasus standing right, left foreleg raised, wings curling up on back. Legend: COS IIII.

Figure 10 shows that the coin has a similar iconography to the coin of Octavian Augustus and could also serve as a basis for imitation. However, the dating of this denarius does not allow us to choose this coin as the original to imitate, as archaeological research shows that the settlement on the site of the archaeological complex disappeared in the middle of the first century.

The study of the metal composition of certain specimens is of great importance for the study of the origin of Barbarian imitations. The authors analysed two coins, fig. 2 (No. 2 in the table) and 6 (No. 3 in the table), using a non-destructive method of analysis with an express XRF analyser (Expert 3L) that uses the energy dispersive X-ray fluorescence method¹ (see Table 1).

Table 1

X-ray analysis of Barbarian imitations of the denarius of Octavian Augustus

No Coin	Ag	Cu	Au	Pb	Bi	Fe	Zn
2	95.4	3.4	0.7	0.44	0.05		0.03
3	95.4	3.0	0.9	0.34	0.01	0.37	

The analysis data showed some differences in the composition of the ligature. For example, coin 2 contains Zn impurities in the amount of 0.03, which are completely absent in coin 3, while coin 3 has a rather significant proportion of Fe in the amount of 0.37. Such discrepancies can be explained by the fact that the coins were made from different batches of silver and may indicate that despite the rarity of this type of coin, at least several series were produced. This statement can also be confirmed by the fact that during the analysis of the coins (Figs. 3, 2, 3), no die repetition was found either of the obverse, which is faster to be out of order, or of the reverse, whose dies could be used for a long time.

However, another situation may also be possible. A slight difference in the components can be explained by the percentage of the margin of error, which can sometimes reach tenths of a percent. Therefore, the difference in hundredths could be due to the different environment (tract Horodyshche and tract Chelenytsia) in which the specimens were kept for two millennia. The chemical structure of both specimens, to a large extent, is very similar, and it should be noted that the silver content is significant. This allows us to clarify many points related to the reasons for the imitation of Roman coins. In this case, we are not dealing with counterfeiting of denominations for the purpose of enrichment by reducing the quality of the metal. Although, prior to chemical analysis, the weight of these coins suggested just such an assumption, it was the minting of their own coins based on Roman prototypes in the eastern part of the Carpathian-Danube region to provide the developed trade network with means of payment. Also, at the moment, there is no doubt about the assumption that this type of specimens was produced by the Dacians of Mala Kopanya, at least until a significant number of similar denominations could be found at other sites, which is currently unlikely in the context of the long-term development of modern technologies and archaeological tools.

In conclusion, it should also be noted that a clearly identified prototype still does not provide an absolute date for these finds. Each coin found on archaeological sites has several dating parameters: issue, active use, and archaeologisation, i.e. the moment it entered the soil. On the basis of the Roman original, which was imitated by the Dacians, we can attribute the stage of the issue to the date not earlier than the twenties of the first century BC, and based on the analysis of the accompanying material, we can define the archaeological stage as no

¹ The range of measured elements is from 0.005 to 100%; detection limits of elements are from 1 to 10 ppm.

later than the thirties of the first century AD, which allows us to limit the use of coins of the Mala Kopanya type to a probable half-century range.

The Conclusion. Our study of the imitations of Octavian Augustus coins allowed us to establish a relative chronological framework, within the twenty years BC - early first century AD, which was confirmed by the accompanying archaeological material. The article also reveals for the first time the source of the imitation of the Mala Kopanya type coin and correlates it with the original denarius of Octavius Augustus. This allowed us to narrow down the chronological boundaries of the imitation coinage to the 19 – 4 BC. To find out additional information about the imitation, we conducted an X-ray analysis. By correlating the data from XRF analysis and dies analysis, it was established that this type of coin had a long minting period and could well have been part of the monetary circulation of Barbarian tribes in the region under study.

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