

ANJA BERTOL

*Srednjaci 17*  
*HR – 10000 Zagreb*  
*anjuska12@gmail.com*

KARMEN FARAC

*Trg Ivana Kukuljevića 3*  
*HR – 10000 Zagreb*  
*karmen.kaa@gmail.com*

## *AES RUDE AND AES FORMATUM – A NEW TYPOLOGY BASED ON THE REVISED MAZIN HOARD*<sup>1</sup>

**UDK: 737.1»652«:069.5(497.5 Zagreb)**  
**Izvorni znanstveni rad**

*R. Garrucci was the first researcher who classified aes rude, amorphous bronze pieces of unequal weight and without any official stamp or mark. Following him, J. Brunšmid based the typology of aes rude on the material from the Mazin hoard, found in 1896 and kept, almost in its entirety, in the Archaeological Museum in Zagreb (1537 pieces). In 1910, E. Haeberlin offered his typology based on material then known from Italy and Central Europe. A new typology of aes rude and aes formatum, based on the revised Mazin material, is presented in this paper.*

*Key words: bronze, aes rude or aes infectum, aes signatum, Mazin, Mazin-type hoards, Japodes, typology, aes formatum*

### *AES RUDE IN GENERAL*

There are different theories concerning the beginnings of Roman coinage, as well as the early economy of ancient Rome. For instance, H. A. Grueber considers that in the Italic area, as in other territories in their first stage of civilization, not only trade, but also the payment of fines for violations of the law, was conducted by a system of barter, the basis of which was

<sup>1</sup> We would like to thank T. Bilić, I. Mirnik, M. Nađ and P. Visonà for their selfless assistance and much useful advice.

mainly cattle. That law was supposedly retained until 454 and 452 BC, when fines of this type were replaced with their equivalents in money or metal (GRUEBER 1970: xv-xvi). Since gold and silver were extremely scarce in the central Italy of that period, and since copper was abundant, whereas the practice of making regular coins of specific weight was then unknown to the Romans (GRUEBER 1970: xvi; VECCHI 1979: 15), it appears they used *aes rude* or *aes infectum* (HN XXXIII. 3. 13; Fest. s. v. *Rodus*). These pieces of bronze were lumps of no specific form, which passed by weight (THOMSEN 1957: 201; GRUEBER 1970: xvi; SYDENHAM 1975: xv; VECCHI 1979: 15). On the other hand, M. H. Crawford, having studied and analysed incoherent and occasionally self-contradictory sources, came to the conclusion that it is very unlikely that fines in Rome had ever been levied in cattle and sheep (CRAWFORD 1985: 19-20). He believes that a metallic unit was clearly introduced in 450 BC under the Law of the Twelve Tables (THOMSEN 1957: 201; VECCHI 1979: 15; CRAWFORD 1985: 20).

The Italic people started to produce *aes rude* in very early times, from the first half of the first millennium BC down to the end of the fourth century BC. In that period *aes rude* was frequently included in hoards of votive deposits and was often found along with *aes signatum* (VECCHI 1979: 15).

It is probable that in Italy, as in other parts of southern Europe, rings, axe-heads and other bronze items, besides *aes rude*, were also sometimes used as currency. At a later date, the metal was cast into ingots, bars, or oblong blocks, sometimes marked with ribs or a kind of herring-bone pattern (SYDENHAM 1975: xv).

At the beginning of the third century BC, *aes signatum*, a new form of Roman money, appeared. This consists of heavy oblong, quadrilateral or brick-shaped pieces of bronze, with depictions of animals (e.g. birds, elephants, oxen, pigs and dolphins), Pegasus, corn-ears, a caduceus, or a sword and sheath. Their weight averages approx. 1350 g (GRUEBER 1970: xvii-xviii; SYDENHAM 1975: xv; KOS 1998: 13). As they are without any marks of value, it has been questioned whether these 'bricks' had ever been intended as currency, or issued only as species of raw material, which could have been used in the form of large fragments (GRUEBER 1970: xviii).

Rough brick-shaped pieces without any imprint were also made, which seem to be a link between the *aes rude* and the *aes signatum* (GRUEBER 1970: xvi-xvii).

Although the Romans, like their neighbours in central Italy, had been used to some kind of cast bronze currency for a long time, they are likely to have been familiar with the far more convenient silver and struck bronze coinages of *Magna Graecia*. But, as one Italian state after another fell under the domination of the Roman Republic, changes in the Roman monetary system also occurred, resulting in the bronze bars' being replaced by Roman Republican coins. These were used not only locally, but also for trade with non-Italic peoples (SYDENHAM 1975: xvi).

## THE MAZIN HOARD

Đ. and R. Zavišić discovered the Mazin hoard on 22 June, 1896, at a site close to the local cemetery (Fig. 1). They and other local residents found the hoard enclosed within several slabs of stone 1 m long, 0.60 m wide and 0.40 to 0.50 m high. But there were no stone slabs

on the top or at the bottom of the enclosure. As usual in this kind of situation, the hoard was soon dispersed, because everybody took as much as they could. Luckily, J. Vojnović, a local teacher, salvaged part of the hoard (about forty pieces) and made it available for scientific research. He gave it to B. Budisavljević, the High Prefect in Gospić. Budisavljević transmitted it to J. Brunšmid, who was at the time the Director of the Archaeological Department of the National Museum in Zagreb. As soon as he realized the importance of these finds, Brunšmid asked the High Prefect if he could track down the rest of the hoard. The official managed to collect almost all the objects that had been discovered, and he sent them to Zagreb's National Museum (BRUNŠMID 1896-1897: 42).

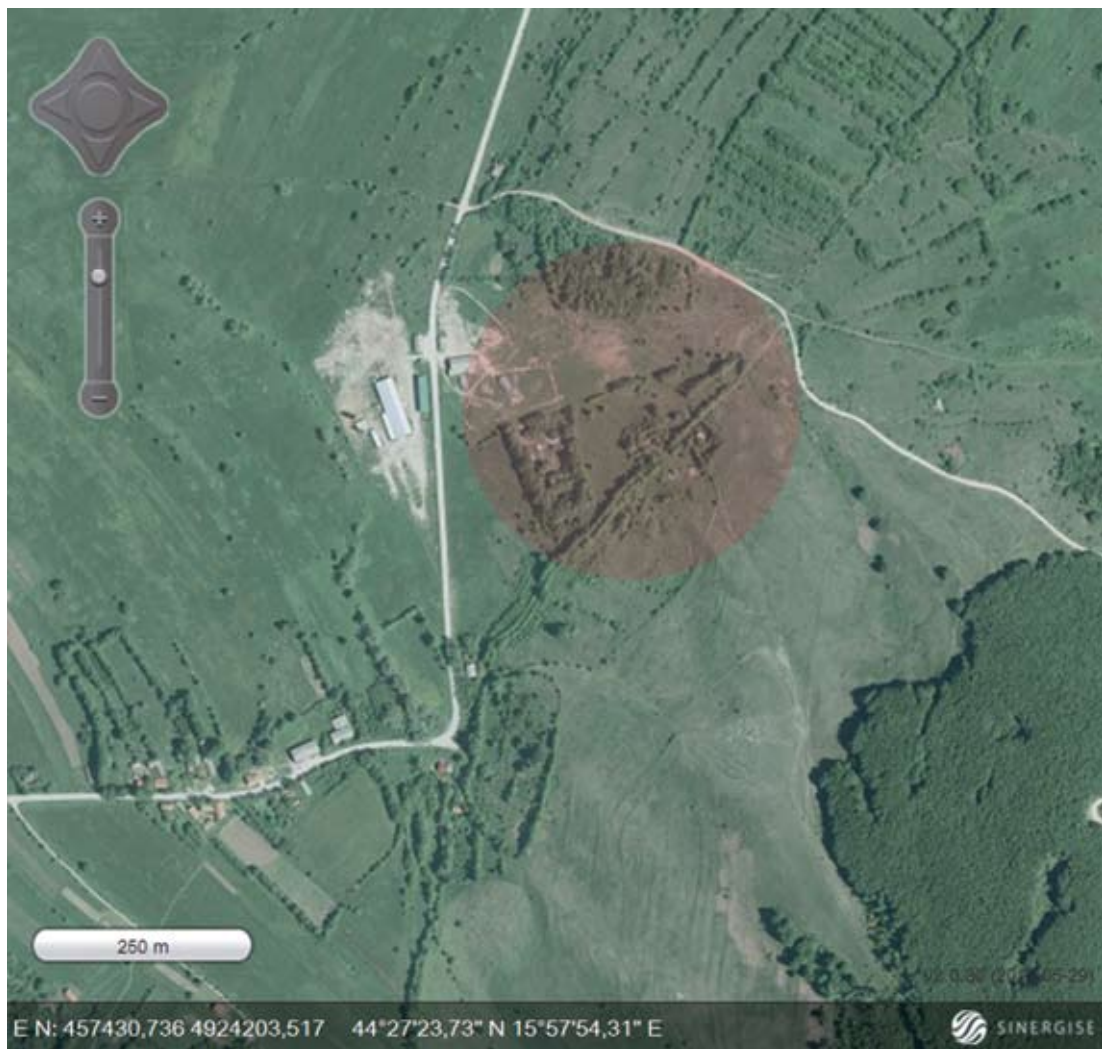


Fig. 1 The location of the Mazin hoard (© Arkod; adapted by T. Bilić)

Brunšmid initially published the Mazin hoard in the *Journal of the Croatian Archaeological Society* (today's *Journal of the Archaeological Museum in Zagreb*) in 1896/1897, and he further published certain additions on three more occasions, in 1899/1900, 1902 and 1905.

Other similar hoards were named after the biggest and most important hoard of this type, the one found at Mazin<sup>2</sup>, which is almost entirely preserved in the Archaeological Museum in Zagreb (1537 pieces). The *Kunsthistorisches Museum* in Vienna holds 13 pieces (MIRNIK 1981: 46) and the National Museum in Belgrade has an additional 15 pieces (BORIĆ-BREŠKOVIĆ 2006: 18). It has been reported that some finds from the Mazin hoard are kept in Sarajevo, but without any specific information (BORIĆ-BREŠKOVIĆ – POPOVIĆ 2006: 18, note 42). According to the archives of the Museum of Croatian Archaeological Monuments in Split, 82 pieces of *aes rude* from Mazin were being kept there in 1903 (ŠEPAROVIĆ 2003: 421). Unfortunately, this is the only information we have on these coins. The Mazin hoard comprises Carthaginian, Numidian and Ptolemaic bronze coins, a large number of pieces of bronze with a certain shape (*aes formatum*), many fragments of bronze lumps, *aes rude*, some *aes signatum*, some Italian cast coins, *aes grave*, several fragments of jewellery, and other similar ornamental objects.

Other hoards of the Mazin type are as follows: Bosanska Krupa (discovered *ca.* 1891)<sup>3</sup>, Bosanska Krupa ('Kruinwa' – discovered around 1932; THOMPSON – MØRKHOLM – KRAAY 1973: 81, no. 567; CRAWFORD 1985: 222, 321; MIRNIK 1987a: 370), Bosanski Petrovac (which might in fact be identical to the Donji Unac hoard; MIRNIK 1987a: 370), Donji Unac<sup>4</sup>, Gračac<sup>5</sup>, Obrovac<sup>6</sup>, Široka Kula<sup>7</sup>, Štikada<sup>8</sup>, Vrankamen<sup>9</sup> and Izačić<sup>10</sup> (Fig. 2).

<sup>2</sup> BRUNŠMID 1896/7: 42-103; 1899/1900: 81-155; 1902: 167-184; 1905: 176-192; BAHRFELDT 1901; PATCH 1900: 52-53; SALLET 1904: 23; WILLERS 1904: 6; HAEBERLIN 1910: 3; NOE 1925: 127-128; 1937: 176-177, no. 666; MAZARD 1955: 24, 27, 31; THOMSEN 1961: 203, 210-211; JENKINS – LEWIS 1963: 61, XXI; CRAWFORD 1969: 78-79, no. 142; KURZ 1969: 31; MARIĆ 1971: 35; THOMPSON – MØRKHOLM – KRAAY 1973: 88, no. 644; DUKAT – MIRNIK 1976: 175-210; MIRNIK 1981: 45-46, no. 76; CRAWFORD 1985: 222-223, 321; MIRNIK 1985: 104; DUKAT – MIRNIK 1987: 138, no. 31; MIRNIK 1987a: 370; DUKAT – MIRNIK 1988: 56, no. 31; 1989: 85, no. 31; 1989a: 85, no. 31; 1991: 207, no. 305; 1993: 207, no. 305; 1993a: 207, no. 305; ŠEPAROVIĆ 2003: 421; ŠEPAROVIĆ 2003a: 124; BORIĆ-BREŠKOVIĆ 2006: 18-19, 25; BONAČIĆ MANDINIĆ 2006: 197; BRNIĆ 2006: 118-120; MIRNIK 2009: 447, 454-472, 484-485, 490; BATOVIĆ 2011: 13, 29, 30.

<sup>3</sup> MIRNIK 1981: 38, no. 31; CRAWFORD 1985: 222, 321; MIRNIK 1987a: 370; 1993: 196-211.

<sup>4</sup> NOE 1937: 97, no. 335; KURZ 1969: 30; MIRNIK 1981: 42, no. 57; CRAWFORD 1985: 222; MIRNIK 1987a: 370.

<sup>5</sup> SARIA 1927: 12; KLEMENC 1934-36: 126-127, no. 13; CRAWFORD 1969: 79, no. 145; THOMPSON – MØRKHOLM – KRAAY 1973: 81, no. 569; MIRNIK 1981: 38, no. 24; CRAWFORD 1985: 222, 321; MIRNIK 1987; 1987a: 370; BATOVIĆ 2011: 13, 29.

<sup>6</sup> PEGAN 1959: 154-155; THOMPSON – MØRKHOLM – KRAAY 1973: 81, no. 568; MIRNIK 1981: 46, no. 79; 1987a: 370.

<sup>7</sup> TRUHELKA 1889: 41; NOE 1937: 157, no. 584; KURZ 1969: 30; THOMPSON – MØRKHOLM – KRAAY 1973: 81, no. 566; MIRNIK 1981: 40, no. 43; CRAWFORD 1985: 222, 321; MIRNIK 1987a: 370; BATOVIĆ 2011: 29.

<sup>8</sup> DUKAT – MIRNIK 1978: 27, no. 119; MIRNIK 1978: 16, no. 50; DUKAT – MIRNIK 1979: 17, no. 57; PRICE 1979: 17, no. 57; MIRNIK 1981: 47, no. 88a; 1983: 149-174; CRAWFORD 1985: 222, 321; MIRNIK 1987a: 370.

<sup>9</sup> TRUHELKA 1893: 148-188; 1889: 38-43; BAHRFELDT 1901: 1-2; WILLERS 1904: 6-7; HAEBERLIN 1910: 16; NOE 1925: 234; 1937, no. 1169; KURZ 1969: 27-34; CRAWFORD 1969: 79-80, no. 146; THOMPSON – MØRKHOLM – KRAAY 1973: 88, no. 643; MIRNIK 1981: 48-49, no. 93; CRAWFORD 1985: 222, 321; MIRNIK 1987a: 370; BATOVIĆ 2011: 29.

<sup>10</sup> MIRNIK 2009: 484.

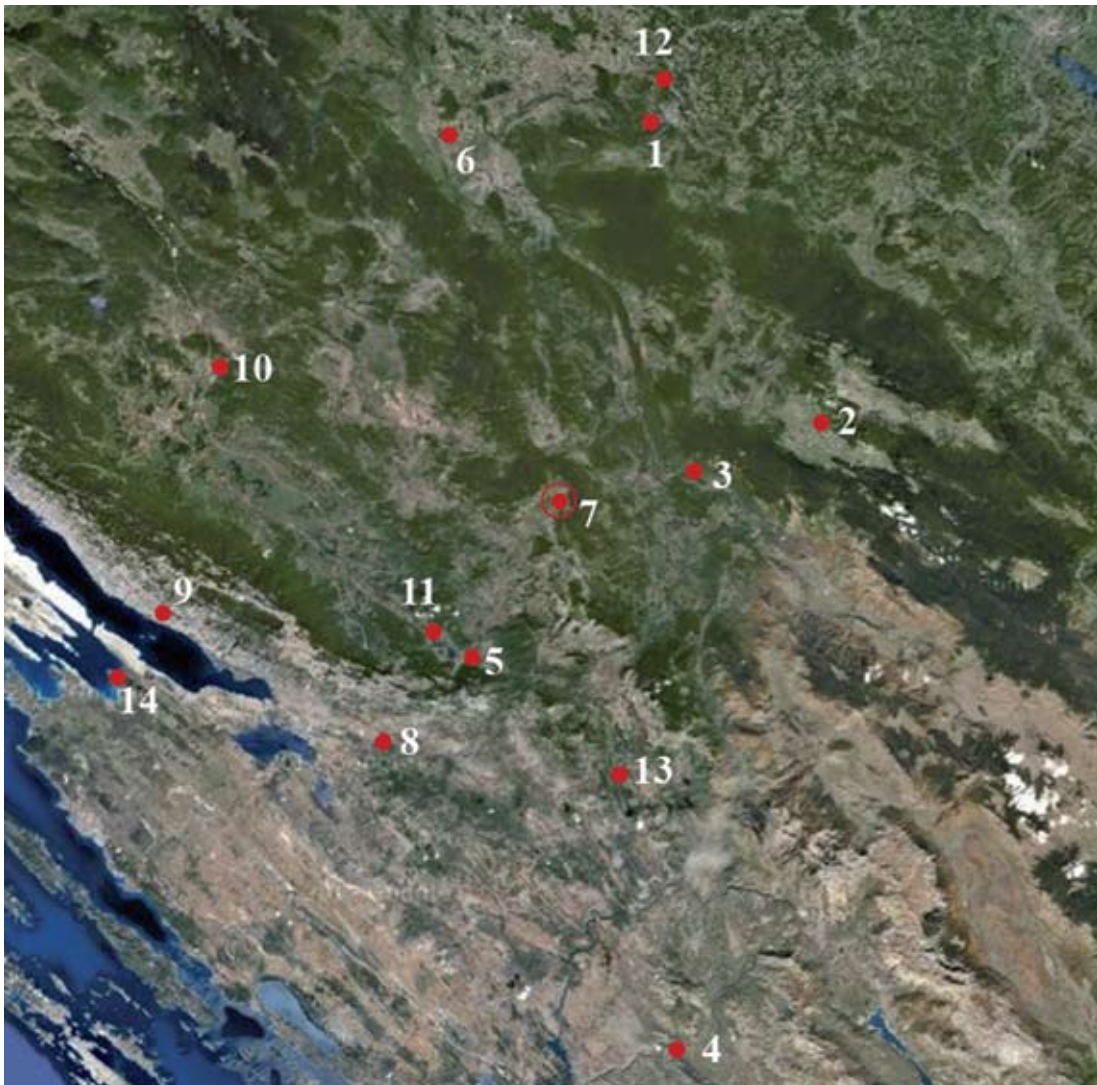


Fig. 2 Other hoards of the Mazin type (© Google Maps; adapted by T. Bilić)

1 Bosanska Krupa; 2 Bosanski Petrovac; 3 Donji Unac; 4 Drniš; 5 Gračac; 6 Izačić; 7 Mazin;  
8 Obrovac; 9 Sv. Trojica; 10 Široka Kula; 11 Štikada; 12 Vrankamen; 13 Zvonigrad; 14 Ljubač bay

Between 1893 and 1907 two Punic bronze coins from Zvonigrad were donated to the Archaeological Museum in Zagreb. Today, they are kept together with the remains of a hoard of Roman Republican silver coins. However, it is very difficult to say whether a hoard containing Carthaginian, Numidian, and Ptolemaic bronzes was ever found at Zvonigrad (KURZ 1969: 30; MIRNIK 1981: 49, no. 100; 1987a: 370).

There is also a possibility that the Carthaginian, Numidian, Ptolemaic and Italic coins that were found near Drniš (ILKIĆ – FILIPČIĆ – KRAMBERGER 2012: 7-10) originated from another dispersed hoard of the Mazin type.

Between 1997 and 2008, 33 pieces of Numidian, Carthaginian and Ptolemaic coins were found in the vicinity of Starigrad Paklenica (ancient *Argyruntum*) at the Sv. Trojica hill fort.

One of these coins (a Carthaginian coin) was found as a result of an archaeological survey, while others were found by detectorists. The finder also discovered a bronze vessel containing two Numidian coins. The vessel is well-preserved, and we will know a lot more about it after a professional analysis is carried out. These finds could represent another hoard of the Mazin type (DUBOLNIĆ GLAVAN – GLAVAŠ 2012).

In 2008 six pieces of *aes rude* were found in Ljubač Bay, about 18 km north of Zadar (DUCA 2010: 6). Today they are preserved in a private collection and could represent another dispersed hoard of the Mazin type.

A common feature of all these hoards is that they consist exclusively of coins imported by the ancient trading route from the Adriatic coast along the rivers Zrmanja and Una towards the north. They include Numidian, sometimes Ptolemaic and other Greek coins (from, e.g., the Achaean League, Macedonia, Sicily and Hispania), as well as heavy Italic bronze currency (*aes grave*), and bars (*aes formatum*) and lumps (*aes rude*) of bronze. A few Greek coins were found in the Mazin and Štikada hoards, and coins from Sicilian and Italian mints in the Bosanski Petrovac, Mazin and Vrankamen hoards, while coins from Hispania were found in the Gračac, Štikada and Vrankamen hoards. *Aes formatum* and *aes rude* were found in the Gračac, Mazin, Štikada and Vrankamen hoards. They may be, but are not necessarily, of Italian origin. *Aes signatum* from Italy, but always fragmented, was found in the Gračac, Mazin and Vrankamen hoards. *Aes grave* were found in the Bosanska Krupa (1932), Mazin and Vrankamen hoards, and reduced Roman *asses* in the Bosanska Krupa (1932), Gračac, Mazin, Štikada and Vrankamen hoards. A Romano-Campanian coin was discovered only in the Mazin hoard. There is also a possibility that the 1932 Bosanska Krupa hoard contained several Celtic coins. Fragments of jewellery and other decorative items were buried together with coins and lumps of bronze in the Gračac, Mazin, Štikada and Vrankamen hoards (MIRNIK 1987a: 371).

The hoards of the Mazin type are concentrated in the area which was settled in antiquity by the Japodes, and that area comprises eastern Lika and western Bosnia, along the Lika, Una, Unac and Zrmanja rivers. The time of the concealment of the Mazin hoard, or of other hoards of the Mazin type, cannot be studied as an isolated case (MIRNIK 1987: 50). It is believed that the concealment of these hoards belongs to the same period because they are crowded in a relatively narrow zone. The Gračac (MIRNIK 1987: 49) and Vrankamen (TRUHELKA 1889: 38; BATOVIĆ 2011: 29.) hoards were concealed in vessels covered with a stone slab, the Štikada hoard was buried below the fireplace inside a house (MIRNIK 1982: 149), while the Mazin hoard was placed in a stone cist (BRUNŠMID 1896-1897: 42). These hoards were buried relatively close to the ancient trading route which led from the coast to the interior across the saddle on the Velebit massif near Obrovac. The concealment of the Mazin type of hoards seems to represent a period of great insecurity among the Japodes (MIRNIK 1987a: 373).

*Aes rude*, *aes signatum* and one specimen of *aes grave* are among the oldest pieces of the Mazin hoard. *Aes rude* and *aes signatum* were definitely produced in the 4th, but could also have been made in the first half of the 3rd century BC. The latest coin in the hoard is a semuncia, attributed to the Roman colony of Luceria in Apulia, which was dated by Brunšmid *ca.* 90 BC. He concluded that the concealment of the Mazin hoard could be dated immediately after that year, therefore in 89 BC (BRUNŠMID 1896/7: 44).

Besides the dating suggested by Brunšmid for the Mazin hoard, various other dates have been proposed by different authors: the first half of the 1st century BC (DUKAT – MIRNIK 1976: 200), *ca.* 100 BC (WILLERS 1904: 6; CRAWFORD 1985: 223; KURZ 1969: 31), 90 BC (PATSCHE 1900: 52; HAEBERLIN 1910: 3), 89 BC (BRUNŠMID 1896/7: 44; BAHRFELDT 1901: 18; THOMPSON – MØRKHOLM – KRAAY 1973: 88), 90/80 BC (MARIĆ 1971: 35), 80 BC (MAZARD 1955: 27; THOMSEN 1961: 203, 210-211).

However, in view of the circumstances, given above, of the discovery of this hoard, one should be very careful about suggesting a specific interment date. The hoard was not fully documented, and it was discovered by amateurs. We cannot be completely sure whether the Mazin hoard is preserved in its entirety. Therefore, establishing the time and cause of its concealment is not, and cannot be, a valid objective (KOS 1997: 114).

The inventory of bronze hoards found in the Japodic region, as well as individual finds, suggests that the coinage was used as currency, but it also served as a precious metal which could have been melted anytime in any desired shape. For these reasons, it is believed that the Mazin hoard was concealed during the first half of the 1st century BC, a period of time characterized by frequent Roman military campaigns (DUKAT – MIRNIK 1991: 207).

If we were to hypothesize and attempt to establish a connection between the hoards of the Mazin type and a specific war or military campaign, it would be the war conducted by the Roman consul *Lucius Aurelius Cotta* and his legate, a member of the Metellus family (*Lucius Caecilius Metellus Diadematus?*). In 119 BC they attacked the Segesticani while *Metellus Delmaticus* (118 – 117 BC) was fighting against the Delmates. M. G. Morgan (MORGAN 1971) convincingly showed that the historian Appian pastiched two different sources and that *Metellus Delmaticus* did not participate in both of these campaigns.<sup>11</sup> Earlier authors had considered that the same *Metellus (Metellus Delmaticus)* was involved in both campaigns.<sup>12</sup> Nevertheless, the idea of Diadematus as Cotta's subordinate is only Morgan's conjecture. The other members of the Metelli family can also be taken into account, e.g. Diadematus's younger brother, *Caius Metellus Caprarius* (ŠAŠEL KOS 2005: 333-334; 2005a: 436; DZINO 2010: 72). It seems that Cotta's and Metellus's campaigns were a strategic continuation of Tuditan's campaigns of 129 BC, which aimed to take advantage of a local crisis, unknown to us, to complete the establishment of a new political order in the Southern Alpine region (DZINO 2010: 72). The second campaign with which the Mazin type of hoards could hypothetically be connected is the Third Dalmatian War, which commenced in 78 BC, when *Caius Cosconius* was sent to intervene against the Delmates.<sup>13</sup> We have no information about that campaign, except that *Caius Cosconius* reconquered Salona and defeated the enemy, after two years of fighting, in 76 BC (Eutr. 6.4; Oros. 5.23.23; cf. Cic. *Clu.* 97; DZINO 2010: 68). The last date is very close to the dating of the Štikada hoard (75 BC, according to PRICE 1979: 17, no. 57). It is probable that the time of the concealment of the hoards under discussion could be settled in the period from the end of the 2nd century BC to 75 BC (MIRNIK 1993: 199).

However, it is well-known that a great danger lies behind any attempt to associate coin hoards, which might not have been preserved or documented in their entirety, with historical events, the latter perhaps reported by literary sources. In such cases, the latest coin in the hoard only approximately corresponds to the events mentioned in the literary sources, so that the necessary objectivity is entirely lacking (KOS 1997: 114).

<sup>11</sup> ŠAŠEL KOS 2005: 329-334; 2005a: 435-436; OLUJIĆ 2007: 79-80; DZINO 2010: 72.

<sup>12</sup> LAST 1951: 108; WILKES 1969: 33-34; BROUGHTON 1951: 525; DZINO 2010: 72.

<sup>13</sup> WILKES 1969: 30; BRENNAN 2000: 424-425; BROUGHTON 1952: 36, 39 n. 21; 1986: 77; DZINO 2010: 67.

*AES RUDE* AND *AES FORMATUM* – TYPOLOGY

R. Garrucci was the first author who, in his work *Le monete dell' Italia antica* (1885), offered a typology of *aes rude*, based on finds from Italy. He distinguished among the following types of *aes rude*: I. In the first group, he included pieces which are similar to a truncated cone with a concave end (*i pani di conica forma rovescia e a fondo convesso*); II. Although very rare, pieces cast from an oval mould (*i pani fusi in scodelle ovali*) were recognized as a second group in his typology; III. He assigned pieces with annular cross-section to the third group (*i pani in forma anulare*); IV. Bun ingots with a convex cross-section (*rotonda forma piano convessa*) were singled out as the fourth group; V. Quadrilateral pieces with a rectangular cross-section comprised the fifth group (*i pani che imitano la forma rettangola dei quadrilateri*); VI. The sixth group included pieces cast in the shape of a bar with a rectangular cross-section (*la forma di verga quadrata*) (GARRUCCI 1885: 2-3).

On the basis of his analysis of the Mazin hoard, Brunšmid divided all lumps of bronze into five categories: I. Amorphous pieces; II. Semi-cylindrical bars; III. Pieces cast in oblong forms; IV. Pieces in the shape of quadrangular plates; V. Bun ingots (BRUNŠMID 1896/7: 47).

A typology of *aes rude* was also offered in 1910 in E. Haerberlin's *Aes grave*. This typology was based on previously discovered material from Italy and Central Europe (Austria, Germany, France, Croatia, etc). Haerberlin recognizes the following types: I. the first type are bun ingots (*Rundkuchen*) cast from simple bowl-shaped molds; II. the second type are pieces in the shape of a cake or a truncated cone with a concave end (*Tortenförmige Stücke*); III. the third type are bar-shaped pieces (*Barrenförmige Stücke*); IV. *aes rude* in the shape of a rod is the fourth type (*Stangenförmige Stücke*); V. the fifth type is ship-like pieces (*Nachenförmige Stücke*), which is the same as Garrucci's second type (HAEBERLIN 1910: 4).

These classifications were a good starting point for study of the material. The problem was that they were incomplete, and the terminology was not established. Therefore, a new typology of the Mazin hoards needed to be done. First, we had to do a revision of the Mazin hoard. After the revision, we concluded that the Mazin hoard consists of 1537 pieces. A great part of the Mazin hoard consists of *aes formatum* (320 pieces), followed by *aes rude* (254 pieces), *aes signatum* (32 pieces), *aes grave* (1 piece), and *asses* (32 pieces); there is also a large number of Carthaginian (495 pieces), Numidian (353 pieces) and Egyptian coins (28 pieces), as well as one *Urbs incerta Africae* coin, Greek (Sicily, 4 pieces; Achaean League, Caphyae Arcadiae, 1 piece), Romano-Campanian (1 piece) and other Italian coins (15 pieces). Besides the currency, the remaining part of the hoard consisted of several fragments of certain decorative objects (e.g. a large bird's head) and jewellery (e.g. fragments of fibulae and bracelets), which were most probably also employed as currency, with the intention of melting them down once they were no longer in use, in order that they could be reused for making new objects.

Amorphous pieces of bronze are, as a rule, not often terminologically differentiated from bronze pieces of a certain shape, so a clear line between the terms given above has to be drawn. *Aes rude* are amorphous pieces of bronze of irregular weight without any official stamp or mark (Pl. I) while *aes formatum* are pieces of bronze which have a certain shape. I. Mirnik differentiated between these two groups, but he did not further classify the *aes formatum* pieces (MIRNIK 1987: 53-54). On the basis of the revised Mazin hoard material, we can divide *aes formatum* into three types:



- I ingots in the shape of a bar, frequently having a rounded end (Pl. 2. 1, 2)
- II quadrilateral ingots, which can be:
- brick-shaped (IIa) (Pl. 2. 3, 4)
  - brick-shaped with a lateral projection (IIb) (Pl. 2. 5, 6)
  - in the shape of thin quadrangular plates (IIc) (Pl. 2. 7)
- III pieces of a circular section, which can be divided into:
- disc ingots (IIIa) (Pl. 2. 8)
  - bun ingots (IIIb) (Pl. 2. 9)
  - ingots in the shape of a truncated cone (IIIc) (Pl. 2. 10, 11).

The majority of the Mazin specimens are broken. Accordingly, *aes signatum* are actually bronze pieces which are similar to *aes formatum* type IIb and are distinguished from them by a depiction on both sides. Precisely because of this fact, we consider that *aes formatum* type IIb is an intermediate form towards *aes signatum*.

## CONCLUSION

The *aes rude* and its typology are, unfortunately, poorly studied. Several typologies of *aes rude* have indeed been offered, but they are all inconsistent and outdated. Furthermore, the proposed terminology has tended to be imprecise, so there have been a lot of unanswered questions concerning this type of currency. This paper offers a new typology of *aes rude* and *aes formatum*, based on the revised Mazin hoard. Along with typological problems, we have further attempted to solve some problems concerning the terminology. It needed to be emphasized that *aes rude* and *aes formatum*, often lumped together, must be differentiated from each other. Thus, *aes rude* are amorphous pieces of bronze of irregular weight without any official stamp or mark, and 254 pieces of them were found in the Mazin hoard. On the other hand, the greatest part of the Mazin hoard consists of *aes formatum* (320 pieces), being pieces of bronze which have a certain shape. There are three main types of *aes formatum* (I - ingots in the shape of a bar which frequently have a rounded end; II - quadrilateral ingots; III - pieces of circular cross-section). The second and third types are further divided into three more subtypes each. Thirty-two pieces of *aes signatum* were also found in the Mazin hoard, which are heavy oblong, quadrilateral or brick-shaped pieces of bronze, with depiction of animals. We concluded that *aes formatum* type IIb (brick-shaped ingot with lateral projection) can be understood as a connecting link between *aes rude* and *aes signatum*. This new typology and terminology of *aes rude* and *aes formatum* is just a suggestion, and it will certainly be subjected to new changes and additions in light of new archaeological discoveries and studies.

## ABBREVIATIONS

**Bulletin Lon.** – *Bulletin of the University of London Institute of Archaeology*. (London).

**CAH** – *Cambridge Ancient History*.

**ERC** – *Early Roman Coinage*. (Copenhagen).

**IGCH** – *An Inventory of Greek Coin Hoards*. (New York).

**WMBHLA** – *Wissenschaftliche Mitteilungen des Bosnisch-Hercegowinischen Landesmuseum, Heft A – Archäologie*. (Sarajevo).

## BIBLIOGRAPHY

- BAHRFELDT, M. 1901 – *Der Münzfund von Mazin (Croatien). Afrikanische und italische Kupfermünzen, Aes rude und signatum. Eine vorläufige Erörterung der Barrenfrage*. Berlin, 1901.
- BATOVIĆ, Š. 2011 – Predrimski novac iz južne Italije na istočnom jadranskom primorju. *Diadora* 25/2011: 7–45.
- BONAČIĆ MANDINIĆ, M. 2006 – Aes rude i ostava sjevernoafričkog novca iz Arheološkog muzeja u Splitu. Summary: Aes rude and a hoard of North-African coins in the Archaeological Museum in Split. *VAPD*, 99/2006: 195-205.
- BORIĆ-BREŠKOVIĆ, B. – POPOVIĆ, P. 2006 – *Coins of the Roman Republic. Collections of the National Museum in Belgrade and Belgrade University*. Belgrade, 2006.
- BRENNAN, T. C. 2000 – *The Praetorship in the Roman Republic*. Oxford, 2000.
- BRNIĆ, Ž. 2006 – Predmonetarni sustavi i početak novčane privrede (Mazin). In: S. MIHELIĆ (ed.), *Trgovina i razmjena u pretpovijesti* (exhibition catalogue). Zagreb, 2006: 118-120.
- BROUGHTON, T. R. S.  
– 1951. *The Magistrates of the Roman Republic 509-100 BC*. Vol I. New York, 1951.  
– 1952. *The Magistrates of the Roman Republic 99-31 BC*. Vol II. New York, 1952.  
– 1986. *The Magistrates of the Roman Republic: Supplement*. Vol III. Atlanta, 1986.
- BRUNŠMID, J.  
– 1896. Nekoliko našašća novaca na skupu u Hrvatskoj i Slavoniji V – VII. *VAMZ*, 2/1896/7: 42–103.  
– 1900. Nekoliko našašća novaca na skupu u Hrvatskoj i Slavoniji. Dodatak k V. Našašće italjskih i afrikanjskih novaca u Mazinu. *VAMZ*, 4/1899/1900: 81–155.  
– 1902. Nekoliko našašća novaca na skupu u Hrvatskoj i Slavoniji. II. dodatak k V. Našašće italjskih i afrikanjskih novaca u Mazinu. *VAMZ*, 6/1902: 167–184.  
– 1905. Nekoliko našašća novaca na skupu u Hrvatskoj i Slavoniji. III. dodatak k V. Našašće italjskih i afrikanjskih novaca u Mazinu (kotar Gračac). *VAMZ*, 8/1905: 176–192.
- CRAWFORD, M. H.  
– 1969. Roman Republican Coin Hoards. The Royal Numismatic Society, Special Publications 4. London, 1969: 78-79, no. 142 (Mazin); 79, no. 145 (Gračac); 79-80, no. 146 (Vrankamen).  
– 1985. *Coinage & Money under the Roman Republic*, London, 1985.
- DUBOLNIĆ GLAVAN, M. – GLAVAŠ, V. 2012 – Prilog poznavanju najstarijeg optjecaja novca na prostoru južnog Velebita. Summary: Contribution to the study of the oldest coin circulation on the territory of Southern Velebit. *Prilozi* 28/2012, in press.
- DUCA, D. 2010 – *Aes rude* s rta Ljubljana. Summary: *Aes rude* from Ljubljana Point. *NumVij*, 63/2010: 5-9.

- DUKAT, Z. – MIRNIK, I.  
 – 1976. Pre-Roman Coinage on the Territory of Modern Yugoslavia. *Bulletin Lon.* 13/1976: 175-210.  
 – 1978. Skupni nalazi novca od 1936. godine do danas. Summary: Finds of coins from 1936 up to nowadays. *Numizmatika*, 6/1978: 27, no. 119 (Štikada).  
 – 1979. Štikada, Gračac, Croatia, Yugoslavia. *CH*, 5/1979: 17, no. 57.  
 – 1987. Cat. no. 31. In: J. JEVTIĆ (ed.), *Antički portret u Jugoslaviji* (exhibition catalogue). Belgrade, 1987: 138.  
 – 1988. Cat. no. 31. In: N. CAMBI – N. LJAMIĆ-VALOVIĆ – W. MEIER-ARENDE – I. POPOVIĆ – Lj. B. POPOVIĆ – D. SREJOVIĆ (eds.), *Antike Porträts aus Jugoslawien* (exhibition catalogue). Frankfurt 1988: 56.  
 – 1989. Cat. no. 31. In: E. MARIN (ed.), *Retratos Antiguos en Yugoslavia* (exhibition catalogue). Barcelona 1988: 85.  
 – 1989a. Cat. no. 31. In: E. MARIN (ed.), *Retrats antics a Iugoslàvia* (exhibition catalogue). Barcelona, 1989: 85.  
 – 1991. Numismatica. In: A. RENDIĆ-MIOČEVIĆ (ed.), *Tesori nazionali della Croazia* (exhibition catalogue). Arezzo, 1991: 203–216, no. 305.  
 – 1993. Numizmatička zbirka. In: A. RENDIĆ-MIOČEVIĆ (ed.), *Arheološki muzej u Zagrebu - izbor iz fundusa* (exhibition catalogue). Zagreb, 1993: 203-227, no. 305.  
 – 1993a. Numismatica. In: A. RENDIĆ-MIOČEVIĆ (ed.), *Arte e cultura in Croazia dalle Collezioni del Museo Archaeologico di Zagabria* (exhibition catalogue). Turin, 1993: 203-216, no. 305.
- DZINO, D. 2010 – *Illyricum in Roman Politics 229 BC - AD 68*. Cambridge, 2010.
- GARRUCCI, R. 1885 – *Le monete dell' Italia antica*. Rome, 1885.
- GRUEBER, H. A. 1970 – *Coins of the Roman Republic in the British Museum. Volume I: Aes rude, Aes signatum, Aes grave, and Coinage of Rome from 268 B. C.* Oxford, 1970.
- HAEBERLIN, E. J. 1910 – *Aes grave*. Frankfurt, 1910.
- ILKIĆ, M – FILIPIĆ, D. – KRAMBERGER, V. 2012 – *Ususret antičkoj numizmatiki* (exhibition catalogue). Zadar, 2012.
- JENKINS, G. K. – LEWIS, R. B. 1963 – *Carthaginian Gold and Electrum Coins. RNSSP 2*. London, 1963.
- KLEMENC, J. 1934 - 1936 – Nalazi novca u Jugoslaviji 1910 – 1936. Résumé: Die Münzfunde in Jugoslavien 1910 – 1936. *Numismatika*, 2 – 4/1934 – 36: 124-133, no. 13 (Gračac).
- KOS, P.  
 – 1997. Interpretacija (antičnih) novčnih najdb. Metodologija – njene možnosti in pasti. Summary: Interpretation of (Roman) coin finds. Methodology: its potentials and pitfalls. *AVes*, 48/1997: 97-115.  
 – 1998. *Leksikon antičke numizmatike*. Zagreb, 1998.
- KURZ, K. 1969 – Zum Charakter der Geldwirtschaft im Japodengebiet. Povzetek: O značaju denarnega gospodarstva na japonskem področju. *AVes*, 20/1969: 27-34.
- LAST, H. 1951 – Tiberius and Gaius Gracchus; The wars of the age of Marius. *CAH*, 9/1951: 1-157.
- MARIĆ, Z. 1971 – Die Japodischen Nekropolen im Unatal. *WMBHLA*, 1/1971: 13-96.
- MAZARD, J. 1955 – *Corpus nummorum Numidiae Mauretaniaeque*, Paris, 1955.
- MIRNIK, I.  
 – 1978. Lovinac, Štikada, Yugoslavia. *CH*, 4/1978: 16, no. 50.– 1981. Coin Hoards in Yugoslavia. *BAR*, 95/1981.  
 – 1982. Skupni nalazi novca iz Hrvatske III. Skupni nalaz afričkog brončanog novca i *aes rude* iz Štikade. Summary: Coin Hoards from Croatia III. The hoard of African bronze coins and *aes rude* from Štikada. *VAMZ*, 3. s., 15/1982 : 149-174.  
 – 1985. Nalazi starog novca s karlovačkog područja. Summary: Finds of old coins from the Karlovac region. *IzdHAD* 10/1985: 103-118.  
 – 1987. Skupni nalazi novca iz Hrvatske V. Ostava iz Gračaca iz godine 1926. Summary: Coin Hoards from Croatia V. The 1926 Gračac Hoard. *VAMZ*, 3. s., 20/1987: 49-84.

- 1987a. Circulation of North African etc. currency in Illyricum. Sažetak: Opticaj sjevernoafričkog itd. novca u Iliriku. *AVes*, 38/1987: 369-392.
- 1993. Le trésor monétaire de Bosanska Krupa. *Actes du Xie Congrès International de Numismatique, Bruxelles 8-13. septembre 1991*, I. Louvain-la-Neuve, 1993, 113-116 + Pl. II.
- 2000. Skupni nalaz novca iz Krupe. Résumé: Le trésor monétaire de Krupa, *Bosna franciscana*, (Sarajevo), godina 8, 12/2000, 196-211.
- 2009. Nacrt numizmatičke topografije Like. Summary: Sketch of the Lika numismatic topography. In: Ž. HOLJEVAČ (ed.), *Identitet Like: korijeni i razvitak*, II. Zagreb – Gospić, 2009: 442-492.
- MORGAN, M. G. 1971 – *Lucius Cotta and Metellus*: Roman campaigns in Illyria during the late second century. *Athenaeum*, 1971/49: 271-301.
- NOE, S. P.
- 1925. A Bibliography of Greek Coin Hoards. *ANSNMN*, 25/1925: 127-128, 234.
- 1937. A Bibliography of Greek Coin Hoards. *ANSNMN*, 78/1937: 176-177, no. 666 (Mazin); no. 1169 (Vrankamen).
- OLUJIĆ, B. 2007 – *Povijest Japoda. Pristup*. Zagreb, 2007.
- PATSCH, K. 1900 – *Die Lika in Römischer Zeit*. Vienna, 1900.
- PEGAN, E. 1959 – Najdba numidskih novcev iz okolice Obrovca v srednji Dalmaciji. *VAHD* 61/1959: 154-155.
- PRICE, M. J. 1979 – Greek hoards. *CH* 5/1979: 17, no. 57 (Štikada).
- SALLET 1904 – Zeitschrift für Numismatik. Jahresberichte über die Numismatische Litteratur 1901. 1902., Berlin, 1904.
- SARIA, B. 1927 – Numismatischer Bericht aus Jugoslawien. *NZ*, 60/1927: 10-19.
- SYDENHAM, E. A. 1975 – *The Coinage of the Roman Republic*. New York, 1975.
- ŠAŠEL KOS, M.
- 2005. *Appian and Illyricum. Situla* 43, Ljubljana, 2005.
- 2005a. The Pannonians in Appian's Illyrike. Sažetak: Panonci u Apijanovoj »Illyrik««. In: M. ŠEGVIĆ – I. MIRNIK (ed.), *Illyrica antiqua – ob honorem Duje Rendić-Miočević*. Zagreb, 2005: 433-439.
- ŠEPAROVIĆ, T.
- 2003. Predrimski novac u Muzeju hrvatskih arheoloških spomenika. Summary: Pre-Roman coins in the Museum of Croatian Archaeological Monuments. *OpA*, 27/2003: 417-433.
- 2003a. *Zbirka rimskog novca u Muzeju hrvatskih arheoloških spomenika*. Split, 2003.
- THOMPSON, M. – MØRKHOLM, O. – KRAAY, C. (eds.) 1973 – *IGCH*, Published for the International Numismatic Commission by the American Numismatic Society, New York, 1973: 81, no. 566 (Kula); 81, no. 567 (Kruinwa); 81, no. 568 (Obrovac); 81, no. 569 (Gračac); 88, no. 643 (Vrankamen); 88, no. 644 (Mazin).
- THOMSEN, R.
- 1957. *ERC: A Study of the Chronology I*. Nationalmuseets skrifter: arkaeologisk – historisk raekke, V, Copenhagen, 1957.
- 1961. *ERC: A Study of the Chronology III*. Nationalmuseets skrifter: arkaeologisk – historisk raekke, X, Copenhagen, 1961.
- TRUHELKA, Č.
- 1889. Afrikanski novci od tuča (mjedi) nađeni na Vrankamenu kod Krupe. *GZM*, 1/1889: 38-43.
- 1893. Depotfund afrikanischer und anderer Bronzemünzen von Vrankamen bei Krupa. *WMBH*, 1/1893: 148-188.
- VECCHI, I. G. 1979 – *Italian aes rude, signatum and the aes grave of Sicily*. In: THURLOW, B. K. – VECCHI, I. G. 1979 – *Italian Cast Coinage*. Dorchester, 1979.

- WILKES, J. 1969 – *History of the provinces of the Roman Empire: Dalmatia*, London, 1969.
- WILLERS, H. 1904 – Italische Bronzebarren aus der letzten Zeit des Rohkupfergeldes. *NZ*, 36/1904: 1-34.

### *AES RUDE I AES FORMATUM* NOVA TIPOLOGIJA NA OSNOVI REVIZIJE MAZINSKE OSTAVE

Pretpostavlja se da su Rimljani negdje od sredine 5. st. pr. Kr. prilikom plaćanja koristili *aes rude* ili *aes infectum*, tj. amorfne komade bronce bez službenog pečata ili oznake. Početkom 3. st. pr. Kr. javlja se nova vrsta platežnog sredstva, *aes signatum*. To su komadi bronce pravokutnog oblika koji nose prikaze na objema stranama, a prosječne su težine oko 1350 grama. Godine 1896. u Mazinu (Lika) pronađena je ostava koja je sadržavala *aes rude*, *aes signatum*, *aes grave*, punski, egipatski i numidski novac, nešto grčkog i italiskog kovanog novca te nekoliko ulomaka nakita i sličnih ukrasnih predmeta. Poznato je još desetak ostava sličnog sadržaja koje nose naziv prema navedenoj ostavi. Ostave mazinskog tipa koncentrirane su na području koje su nastavali drevni Japodi, a možemo ih smjestiti u razdoblje od kraja 2. st. do 75. g. pr. Kr. *Aes rude* je tipološki prvi razvrstao R. Garrucci. Njihovom tipologijom pozabavili su se i J. Brunšmid te E. Haebler. *Aes rude* i *aes formatum* međusobno treba razlikovati. *Aes formatum* su također komadi bronce bez službenog pečata ili oznake, ali imaju određeni oblik. Mogu biti u obliku šipke, kvadra, diska, pogače ili krnjeg stošca. *Aes formatum* tip IIb mogao bi zapravo biti prijelazni oblik prema brončanim komadima u obliku kvadra s prikazima na objema stranama (*aes signatum*).

MAZIN – *AES RUDE*

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
52	77	73	28	556.2
56	74	57	31	494.9
57	70	76	35	462.3
59	69	56	42	443
4760	71	67	36	443
60	88	61	17	406.9
61	71	60	25	405.7
62	75	61	20.5	396.1
63	-	-	-	378
64	69	55	26	374.7
68	74	64	25	341.9
4761	53	50	36	319
70	52	35	29	311.1
71	73	56	20	309.81
72	66.5	55	23	295.92
73	61	50	30	291.99
4763	53.5	48.5	26.5	285.01
4762	57	41	34	284.11
74	59	48	27	282.91
76	53	51	24	272.73
12600	60	58.5	23	263.40
78	60	58.5	23	263.4
77	63	51	29	262.75
79	60	57	22	261.41
80	58	31	26	247.60
81	47	39	30	243.97
82	77	34	32	243.13
83	61	57	18	243.12
84	71	60	23	230.50
85	59	34	40	221.57
4764	57	52	21	220.75
86	55	37	31	212.37
88	49	46	27	211.83
87	50	45	29	211.49
89	61	45	22	211.39
90	52	45	33	209.61
91	53	51	25	207.52
92	55	51	21	204.39
94	52	48	30	200.35
96	64	40	28	194.32
95	64	44	26	193.62
97	43	36	25	193.27
4765	52	41	35	189.10
99	46	42	27	188.43
100	53	45	27	186.64
102	51	49	26	181.37
103	55	49	22	178.99
105	45	44	24	174.25
104	59	42	21	173.77
106	45	39	24	173.05
107	45	40	25	169.52
108	51	39	24	168.74
110	-	-	-	165.34

MAZIN – *AES RUDE*

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
109	53	46	22	164.79
4767	68	31	19	161.10
111	42	39	28	157.83
4768	61	44	22	157.66
112	50	43	24	156.89
113	48	44	21	149.10
4769	46	37	23	147.07
114	50	32	20	143.22
4770	50	36	25	142.27
116	55	40	21	141.99
115	53	44	18	141.29
4771	43	35	25	139.43
117	49	40	21	138.71
118	54	37	21	136.18
119	51	41	25	136.11
416	42	26	24	134.88
120	45	42	22	134.18
122	39	37	23	133.35
123	36	33	24	132.83
121	58	37	20	132.70
124	36	34	31	132.42
125	56	43	24	131.18
126	52	43	21	129.29
128	53	40	20	127.20
127	49	42	24	127.04
4772	45	40	23	126.06
129	37	30	23	121.97
130	41	38	23	120.74
131	56	36	20	118.95
4773	42	24	21	118.76
132	61	30	23	118.61
133	51	48	21	118.01
134	45	36	22	117.76
137	42	27	22	116.21
136	44	32	26	114.71
138	64	47	17	114.46
139	46	37	20	114.30
140	46	37	17	113.08
141	49	36	21	112.09
142	43	32	26	110.95
144	55	41	19	107.62
143	64	30	20	107.27
135	50	36	15	107.08
145	46	34	24	107.06
146	49	36	25	105.69
147	32	31	28	104.98
148	38	37	21	104.42
4774	37	31	23	102.25
149	52	40	25	102.24
151	50	30	23	101.73
150	53	29	22	101.65
152	49	38	18	100.46
153	49	28	16	99.30

MAZIN – *AES RUDE*

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
156	42	36	23	98.51
154	41	30	22	98.47
155	47	31	16	98.40
157	37	35	19	97.43
158	49	35	21	96.92
160	44	32	22	94.73
161	39	37	22	93.98
162	35	26	25	93.52
166	46	44	14	91.51
163	52	32	28	91.44
165	38	37	21	90.83
167	36	35	18	90.27
168	41	33	14	90.00
171	39	29	23	89.18
170	48	36	16	89.12
169	43	32	17	88.90
172	43	28	17	88.87
164	47	30	21	88.84
173	46	37	21	88.72
174	40	34	22	87.90
176	34	26	27	86.06
177	38	29	29	84.01
178	39	29	25	83.76
179	37	26	19	83.07
180	49	36	18	82.83
183	34	25	18	82.08
182	35	32	23	81.76
181	58	29	28	81.73
184	35	29	25	81.13
185	47	29	19	80.41
186	35	30	22	80.37
189	37	30	24	79.20
187	38	34	20	78.71
192	40	33	20	78.63
190	48	29	16	77.98
191	39	36	17	77.52
194	42	33	16	75.24
196	35	23	19	74.73
195	42	26	20	74.48
198	29	28	27	72.54
201	41	32	17	72.45
200	42	33	16	72.40
202	36	27	22	72.38
199	37	28	19	72.23
197	40	28	21	71.85
204	36	30	20	71.40
205	38	23	25	70.99
206	32	26	22	70.68
203	36	32	18	70.58
207	39	24	17	69.50
208	38	26	23	67.84
210	44	38	14	66.20
214	37	27	17	64.18
212	36	25	22	64.16

MAZIN – *AES RUDE*

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
209	34	26	16	63.94
217	37	33	17	63.69
213	36	29	27	63.50
218	40	25	26	63.17
216	41	30	11	62.62
215	49	26	16	61.57
219	30	29	26	60.84
220	34	26	18	59.50
221	41	31	17	59.03
222	34	30	18	58.49
224	34	32	15	58.44
393	32	26	23	58.02
223	45	36	11	57.89
225	43	26	13	56.19
226	31	30	19	55.72
227	33	30	19	53.16
228	28	24	17	52.76
12586	26	27	16	52.40
229	36	34	18	51.93
232	29	27	26	51.49
237	35	28	19	51.10
231	31	26	13	50.99
234	34	33	13	50.93
236	29	25	22	50.92
230	32	23	19	50.70
235	36	34	13	50.67
233	40	32	15	50.49
238	32	31	21	49.97
239	44	36	10	49.93
241	35	28	16	49.61
240	39	24	18	48.56
242	40	29	12	48.25
243	33	30	29	48.06
247	33	26	13	47.58
244	41	21	20	47.57
12585	30	27	14	47.30
246	29	20	19	47.30
248	34	27	22	45.61
249	31	30	17	45.51
250	33	30	22	45.11
252	34	27	16	44.34
253	44	28	10	44.31
12590	37	21	12	44.23
254	39	24	26	43.20
256	34	21	20	42.91
255	34	30	18	42.60
257	29	26	19	42.38
258	32	28	13	42.37
260	30	20	18	40.81
261	34	27	14	40.77
263	34	24	12	38.07
267	32	22	17	36.88
264	29	20	17	36.86
4775	29	24	17	36.47

MAZIN – *AES RUDE*

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
266	32	21	12	35.39
268	29	22	16	34.97
269	25	25	16	34.46
270	29	22	18	34.32
272	38	20	12	32.58
273	36	21	18	32.07
274	29	21	19	31.94
275	24	24	13	30.24
276	27	25	13	29.76
277	28	23	13	28.97
278	29	24	14	28.16
279	32	21	14	27.38
280	35	20	15	26.25
281	30	19	14	25.55
282	32	21	10	24.56
284	35	25	11	23.98
302	29	18	12	23.90
283	35	22	8	23.37
289	27	25	11	23.10
286	22	15	22	23.07
285	22	20	15	22.84
287	25	21	12	22.30
291	23	16	13	20.94
399	25	19	19	20.54
294	26	18	17	18.65
293	27	25	13	18.58
292	16	15	14	18.02
575	31	22	6	17.47
296	26	18	19	17.42
297	22	20	10	16.20
298	25	18	11	16.03
299	22	16	12	15.42
300	21	18	7	15.32
301	21	18	11	14.42
304	23	18	10	13.41
305	24	18	11	13.39
306	19	17	10	12.27
309	19	19	6	9.84
310	20	15	12	6.46

MAZIN – *AES FORMATUM*

MAZIN TYPE I – ingots in the shape of a bar which frequently have a rounded end

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
311	75	37	17	275.12
312	50	26	27	181.95
313	78	30	12	143.73
314	73	19	12	96.96
316	82	20	16	88.71
315	57	40	14	88.69
391	37	31	5.5	76.78
317	64	16	15	69.61
318	40	22	16	67.62
319	62	23	9	49.55
245	33	18	12	47.74
259	25	20	17	41.10
321	35	23	8	33.74
322	53	19	9	30.70
323	19	13	11	13.05
492	19	8	6	5.86

MAZIN TYPE IIa – brick-shaped quadrilateral ingots

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
325	88	63	42	892
41	94	57	37	861
42	87	60	36	854
12597	84	63	38	847
326	88	61	49	846
43	84	59	43	844
327	70	69	45	832
4756	82	55	35	829
45	81	59	39	781
4757	91	40	34	778
330	84	50	28	773
46	89	55	33	759
4758	79	77	36	750
48	67	59	45	730
49	67	60	44	729
4759	61	65	31	715
333	78	47	37	713
334	68	65	35	696
336	71	65	57	683
51	60	43	44.5	611
342	84	59	44	596.2
400	60	52	29	563.0
53	65	45	45	534.4
54	65	47	30	531.4
359+381	63	48	41	528.15
345	63	50	46	527.1
348	56	55	47	503.5
55	58	40	34	502.7
4777	66	49	35	495
350	46	45	44	479.7
418	62	53	27	467



MAZIN TYPE IIa – brick-shaped  
quadrilateral ingots

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
402	41.5	41.5	34	454.1
354	72	48	38	436.5
403	58	54	27	427.9
404	-	-	-	410
355	63	41	39	409.4
405	60	48.5	25	405.6
357	67	40	29	386.4
358	46	51	46	368.2
360	60	43	32	365
363	65	51	29	336.6
69	38	38	37	332.7
419	49	45	26	332
364	69	54	38	325.6
407	51	41.5	25	323.1
365	56	43	36	314
420	52	39	24	312
366	63	30	38	309.43
367	83	45	28	307.96
368	48	39	30	302.53
370	55	45	44	283.09
371	49	56.5	24	275.06
75	58	58	23	273.41
372	56	48	32.5	273.31
374	58	44	35	272.81
373	57	50	22.5	271.44
375	42	30	32	271.15
421	52	49	20	270.02
408	52	42	38	251.51
410	47	37	28	247.53
376	46	47	33.5	238.13
411	51	41	29	234.65
413	50	47	19	215.52
377	62	32	32	205.94
378	47	31	27	179.86
415	42	36	23	171.36
384	46	34	30	148.96
387	45	29	17	122.92
388	42	38	19	109.75
389	43	38	19	104.38
390	35	35	14	79.87
392	34	30	23	59.61
394	29	28	16	54.52
398	30	19	16	24.47

MAZIN TYPE IIb – brick-shaped quadrilateral ingots  
with a projection on lateral sides

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
324	72	64	38	960
44	63	51	49	822
329	94	65	31	801
331	93	58	36	758
332	70	63	39	722
335	90	63	39	691
337	73	48	37	673
338	60	50	49	670
339	78	40	36	655
343	80	64	34	594
341	66	68	29	591.4
344	68	52	42	581
346	76	59	34	514
4776	71	52	23	511.2
347	74	47	34	506
349	80	33	41	492
351	48	47	35	475
352	57	50	25	460.7
353	66	56	38	459.9
356	59	43	41	397
406	52	38	29	388.4
361	58	31	38	351
4778	59	44	33	341
362	64	55	27	340
369	52	40	28	290.04
412	44	37	24	219.56
414	48	27	27	209.15
379	64	28.5	23.5	175.61
380	38	35.5	23	162.84
382	48	32	33	149.52
383	45	36	23	149.02
395	28	27	11	48.63

## MAZIN TYPE IIc – in the shape of thin quadrangular plates

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
417	60	53	26	525
422	81	51	10	271.13
425	132	49	5	262.61
423	86	53	10	254.38
12589	111	49	9	253.37
424	101	52	7	252.46
426	117	52	6	229.18
427	71	54	9	218.06
428	64	55	9	217.68
429	74	63	10	199.28
4779	64	52	11	194.12
4780	60	53	11	169.12
430	71	52	8	166.90
431	60	55	7	162.00
432	70	52	10	161.59
433	56	51	7	154.31
434	58	53	8	146.46
436	53	41	11	140.97
437	72	33	6	140.01
438	54	48	9	138.42
439	52	49	9	132.72
440	53	42	9	116.37
441	61	49	5	109.05
442	66	30	8	101.65
586	45	44	10	101.48
443	62	55	5	101.11
444	54	44	7	99.61
445	43	42	9	97.97
12587	58	49	3	97.42
446	53	45	6	97.35
12594	52	35	5	96.93
447	51	46	6	96.55
448	50	42	7	94.00
449	56	50	6	90.42
450	61	49	4	87.11
451	53	42	7	86.33
452	53	36	7	84.24
453	36	35	13	78.87
188	41	39	10	78.82
454	47	46	7	77.95
456	43	42	6	75.40
455	59	50	4	75.38
457	50	47	5	69.33
458	50	32	7	67.82
460	59	32	5	65.53
459	51	38	6	64.67
461	56	41	9	61.91
462	51	36	6	59.43
463	55	39	3	56.78
464	52	42	6	55.39
465	47	27	9	53.72
466	36	32	7	52.09
467	64	27	6	47.38
468	42	28	6	45.21

## MAZIN TYPE IIc – in the shape of thin quadrangular plates

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
251	41	27	9	45.00
469	49	32	5	41.95
471	36	33	6	41.05
470	46	31	6	40.82
472	36	26	7	40.53
396	25	21	12	40.09
473	44	31	5	39.55
474	9	24	7	37.86
265	38	27	10	36.35
475	42	26	5	36.18
476	27	24	10	34.38
477	34	28	9	32.61
478	40	25	6	30.73
479	35	22	6	30.53
480	37	32	6	30.39
12591	42	25	3	29.16
481	52	19	5	28.52
397	32	27	3	28.12
482	33	32	7	27.52
483	34	28	5	25.19
288	24	17	10	23.97
484	45	33	4	23.61
485	39	26	7	23.05
486	33	26	6	22.44
12592	31	20	8	21.76
12595	37	20	5	21.52
12593	31	20	3	18.19
488	24	23	6	17.63
295	24	19	8	17.12
489	23	19	5	12.73
490	40	33	3	8.36
491	20	13	6	7.91

## MAZIN TYPE IIIa – disc ingots

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
494	101	99	6	350.60
500	71	69	9	208.08
501	65	61	13	199.10
502	67	60	10	184.87
504	66	66	8	183.58
505	63	61	9	182.69
508	62	62	8	173.14
510	66	64	8	145.76
536	57	43	10	132.80
4782	62	57	7	128.34
538	60	37	12	127.94
4783	61	58	7	127.43
515	55	61	8	120.27
516	61	60	8	114.18
540	48	44	10	101.53
522	47	43	8	86.56
547	62	34	8	81.12

## MAZIN TYPE IIIa – disc ingots

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
548	46	41	10	78.21
523	47	40	8	73.77
557	43	38	6	55.49
12584	44	34	8	53.52
560	46	29	9	44.85
563	35	31	8	38.95
566	36	25	8	33.29
567	38	25	6	31.63
569	58	25	5	27.70
570	36	27	10	26.45
571	33	30	7	25.37
572	31	27	7	24.35
573	34	29	5	22.00
574	27	21	10	17.39
580	25	23	5	13.20
581	26	19	5	13.09
583	20	16	5	9.05

## MAZIN TYPE IIIb – bun ingots

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
47	94	55	41	754
401	72	67	27	477.8
65	82	71	20	367.0
66	60	30	49	358.8
496	72	68	14	286.29
499	62	58	18	217.05
527	46	45	21	189.02
101	54	48	19	183.39
4766	55	42	24	178.15
530	45	39	24	159.70
385	44	31	22	146.52
386	49	27	31	132.82
539	54	29	19	116.82
544	58	49	3	97.42
542	41	38	16	97.35
550	56	27	10	65.71
549	39	28	13	65.61
211	40	27	19	64.28
561	38	31	8	44.31
12588	31	22	18	42.86
262	33	25	16	39.85
576	25	18	7	17.34
578	39	26	4	13.44
579	31	21	6	13.36
582	33	13	10	11.54

## MAZIN TYPE IIIc – ingots in a shape of a truncated cone

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
328	87	53	42	820
58	62	40	29	442.6
495	84	83	11	382

## MAZIN TYPE IIIc – ingots in a shape of a truncated cone

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
524	103	51	13	331
4784	69	60	13	318
525	70	50	13	288.38
497	71	60	17	283.35
498	78	76	9	239.14
526	90	44	11	225.69
4781	65	64	10	200.35
503	55	54	6	186.13
506	66	66	9	181.73
529	75	39	10	165.39
531	79	50	10	158.67
532	45	43	15	155.68
533	70	48	7	154.50
534	76	40	12	149.50
535	49	48	13	146.74
509	65	60	9	145.99
512	50	49	10	130.91
537	63	42	9	129.58
513	54	50	12	129.42
517	48	47	9	113.46
518	51	50	10	101.37
519	55	49	9	101.09
541	51	40	11	100.88
520	57	58	9	95.56
543	42	41	11	90.40
521	49	48	10	86.63
546	56	34	10	83.94
551	44	39	8	63.25
552	58	37	7	62.43
553	60	29	8	57.23
554	41	33	8	56.98
555	42	32	9	56.69
556	40	34	8	55.86
558	40	37	9	53.37
545	37	26	8	43.16
562	37	34	10	41.66
564	37	26	7	35.67
565	31	30	7	34.85
568	29	25	10	27.97
290	21	20	11	20.97
577	23	18	7	14.32

## INDETERMINABLE

Inv. No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
98	-	-	-	185.52
511	61	55	12	144.19
12596	-	-	-	134.15
514	-	-	-	116.69
193	-	-	-	72.18
271	20	19	12	35.66
307	-	-	-	20.78
584	35	24	4	8.08
585	17	14	7	5.68
493	25	20	3	3.79



Pl. 1

MAZIN – *AES RUDE*



1



2



3



4



5



6



7



8



9



10



11

Pl. 2

MAZIN – *AES FORMATUM*

1-2 Ingots in the shape of a bar, having a rounded end; 3-4 Brick-shaped ingots;  
5-6 Brick shaped ingots with a lateral projection; 7 Ingots in the shape of thin quadrangular plates;  
8 Disc ingots; 9 Bun ingots; 10-11 Ingots in the shape of a truncated cone