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CONTENTS

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Renata Ciołek

MINTING ERRORS IN ANCIENT ROME: DOUBLE DIE STRIKES IN THE LIGHT OF COIN FINDS FROM SECTOR XII AT NOVAE (BULGARIA)

Abstract: This article analyses double die strikes as a production error in ancient Roman minting, using as an example coins found at Novae (Bulgaria). These coins, struck during the reigns of Gordian III, Elagabalus, and Gallienus, offer a unique glimpse into the minting techniques, organisational challenges, and economic realities of the third century. The author highlights the significance of double strikes as an indicator of production stress during the political and economic crises of the Roman Empire. A comparison of production flaws from Novae with similar phenomena in minting centres and other cities like Ephesus, Antioch, and Rome, reveals both the universality of the problem and local technical conditions. This study provides new insights into the oversight mechanisms in ancient mints, and the ways in which production processes were adjusted in response to changing circumstances.

Keywords: double die strikes, Roman minting, Novae, production errors, provincial coins

This article aims to examine minting errors in ancient Rome, with particular focus on the phenomenon of the double die strike (hereafter referred to as 'double strike').[1] Three newly discovered coin finds from the legionary fortress at Novae (Bulgaria) are analysed: Roman provincial coins issued by Gordian III and Elagabalus, as well as Gallienus' *antoniniani*. These finds offer valuable testimony regarding the technical aspects of minting in the third century AD, and provide unique evidence on the operation of Roman mints during a period of deep economic and political crisis in the Roman Empire. This article examines the historical, economic, and numismatic context of the coins in question, drawing on recent research and the contributions of distinguished scholars.[2] The study places particular emphasis on investigating the causes of double strikes, their implications for monetary circulation, and the insights these minting defects provide into the production processes and organisational structure of ancient mints.

The phenomenon of overstrikes has received considerable attention from scholars, mainly due to its economic significance.[3] It is rightly emphasised that so-called 'overstrikes' can provide valuable information about monetary policy, administrative changes, or crises that forced mints to convert older issues.[4] In contrast, double-struck coins, usually treated as simple production errors,

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[2] Cf. van Heesch 2018; McCabe 2018.

[3] Hill 1922; Gysels 2014, pp. 18–20.

[4] Gysels 2014, pp. 22–24 analyses examples of political and administrative reasons for the occurrence of overstrikes.

have been studied much less frequently and do not attract as much interest among specialists. The absence of in-depth analyses has led to a scarcity of publications, and limited the scope for comparative studies.

This limitation presents a methodological challenge, as the formulation of advanced conclusions regarding minting techniques, the organisation of labour in mints, and the underlying causes of such errors remains difficult in the absence of extensive comparative material.[5] Furthermore, double strikes are inherently unique, as each coin exhibiting this type of defect constitutes a singular specimen. This uniqueness is influenced by many factors, such as the angle of the die offset, the force applied to the strike, or the position of the planchet. For this reason, double strikes are of particular interest to collectors and numismatic hobbyists, who value their rarity and distinctive characteristics.[6]

Although double strikes may appear less significant than overstrikes from a scholarly perspective, their study can provide valuable information on minting quality control, the organisation of labour, and the adaptation of the production system to evolving political and economic conditions.[7] Another anomaly is called 'brockage', which is the reflection of the obverse or reverse of a coin on its opposite side. The similarity of this type of defect to a "double strike" is noteworthy, as both errors may stem from the same organisational issues, including haste, worker fatigue, or inadequate supervision of the production process.[8] By analysing these errors in tandem, it is possible to better understand how the inefficiency of the Roman Republican minting system facilitated various defects in coinage.[9] It is therefore essential to expand research in this area to gain a deeper understanding of the complexity of minting processes in ancient Rome, and to fully appreciate the range of phenomena involved in coin production.

What is a 'double strike'? A 'double strike' is a production error that occurs during the manual hammering of coins, involving the same stamp being struck several times on the planchet. This results in the displacement or duplication of design elements, such as the emperor's portrait, legends, or iconographic details. This phenomenon was most likely the result of the minter's haste, imprecise work, or shifting of the planchet between strikes. Although no direct evidence exists, reasonable inferences can still be made through careful analysis. In addition, worn or damaged minting tools increased the risk of such defects.[10] Minters and the mint administration saw double strikes as defects and thus tried to avoid them. Defective coins were often remelted or withdrawn from circulation. However, in periods of crisis, when production pressure was immense, such defects were tolerated, and double-struck coins were put into circulation. It can be inferred that for those using these coins, particularly during periods of economic instability, their primary concern was their face value as a means of payment rather than the quality of their craftsmanship. In practice, this meant that double strikes were tolerated, even though their appearance may have deviated from contemporary standards. Today, these coins are highly valued by both collectors and researchers as unique testimonies to minting techniques and as evidence of organisational challenges in ancient minting.

Examples of Roman double-struck coins span a wide range of denominations and different periods of Roman coinage, showing that this type of error was not an isolated phenomenon.[11]

[5] Witschonke 2012, pp. 359–361.

[6] Witschonke 2012, pp. 373–375 analyses the impact of the unique characteristics of minting errors on collectors' appraisal and research value.

[7] McCabe 2018, p. 89.

[8] For an analysis of the impact of organisational pressure on the occurrence of overstrikes and double strikes, cf. Gysels 2014, pp. 25–27.

[9] Witschonke 2012, 75.

[10] Hill 1922, pp. 14–16; Delamare, Montmitonnet 1985, pp. 508–509; de Callataÿ 1995, pp. 303–305.

[11] Witschonke 2012, pp. 360–364: examples of stamps and their markings in Republican minting.

Among the Republican coins, *denarii* from the second and first centuries BC are particularly common and show features of double striking. During the Roman Republic, coin minting was carried out manually using relatively primitive techniques, which made it easier for the planchet to shift between strikes, leading to overlapping designs and visible duplication.

An example of a coin with an apparent double strike error dating from the Roman Republic is a *denarius* minted in 121 BC, the reverse of which features a dynamic scene depicting Jupiter racing in a *quadriga*.[12] This coin, housed in the British Museum, stands out from other specimens not only because of the double strike itself, but also by the unusual offset of the design. In most cases, the dies were held in a fixed position relative to the planchet, reducing the risk of significant pattern shifts during striking. However, in this case, there was both a shift and slight rotation of the planchet between consecutive punch strikes. This has led to a noticeable duplication of the design, which is evident across the surface of the coin.

Another interesting example of a double-stamped coin is the *sestertius* of Marcus Aurelius from AD 171–172,[13] held in the collection of the British Museum.[14] The reverse of this large brass coin depicts the personification of Germania seated beneath a war trophy. The double strike of the stamp is particularly evident on the figure of Germania, where the outlines have been duplicated and some details shifted relative to each other. Although efforts were made to avoid such errors in Imperial minting, they occurred even on larger denominations with a clearly visible representation, such as the *sestertius*, reflecting underlying technical and organisational issues in Roman mints of the period.

Sometimes even medallions, which were, after all, considered exceptional and prestigious mint wares, bore traces of production errors in the form of double strikes. An excellent example of this phenomenon is the bronze medallion depicting Emperor Commodus, struck in Pergamon between AD 177 and 192.[15] The reverse of this medallion depicts an extremely detailed scene in which Commodus, dressed in military attire, holds a spear and raises a trophy before a captive seated and bound to his left. The background of this dynamic composition features a scene of a bull sacrifice, with the animal chained to a podium. According to the *Roman Provincial Coinage* (*RPC*) catalogues, only nine copies of this type of medallion are known, six of which are held in public collections.[16] Such a small number of surviving specimens indicates that they were not minted *en masse*. Therefore, the fact that a double strike defect is discernible on one of them seems all the more surprising. The prestigious nature of the medallions, their representative function, and the meticulous attention typically given to the quality of their workmanship would suggest that manufacturing defects of any kind were rarely tolerated. Meanwhile, the presence of a double strike on such a prestigious specimen indicates that even in the case of exceptional numismatic products, errors may have gone unnoticed or been corrected before the medallion was released from the mint.

These types of production errors were not typical double strikes, but the result of a more complicated displacement of the planchet or its rotation during minting. This phenomenon offers valuable insights into the technique of coin production in ancient Rome, showing that, despite attempts to minimise errors, factors such as haste, inaccuracy, and wear and tear on minting tools could lead to defects. These unique examples of double-struck coins are not only a testament to

[12] *RRC* 279/1. https://www.britishmuseum.org/collection/object/C_2002-0102-5434 (accessed: January 2025).
[13] *RIC* 1021 (source: https://www.britishmuseum.org/collection/object/C_R-14624; accessed January 2025).
[14] Inv. no. R.14624. See: https://www.britishmuseum.org/collection/image/631167001.
[15] *RPC* IV.2 (source: https://www.cngcoins.com/Coin.aspx?CoinID=394247, cat. no. 3255; accessed January 2025).
[16] *RPC* IV.2.

the technical problems of the time, but also serve as unique objects for modern researchers and collectors, enabling a better understanding of the manufacturing processes and challenges faced by Roman minters.

Supervision of mint work was entrusted to young magistrates (*tresviri monetales*), tasked with overseeing the whole coinage process.[17] The magistrates' inexperience and superficial supervision may have led to errors such as the double strike. Actual supervision was entrusted to the experienced mint master, but he was not always effective in preventing such defects.[18]

Examples of Roman double dies cover a wide range of denominations and different periods of Roman coinage, showing that this type of defect was not uncommon. Among Republican coins, *denarii* from the second and first centuries BC are particularly widespread and display double strike features.[19] Similar errors also appeared on *sestertii* and *asses* from the Roman Imperial period. These large brass coins were particularly prone to double striking due to their considerable size and weight. During hand-minting, the larger planchets may not have held a stable position on the die, leading to displacement and overlapping of design elements or legends. As a result, clear doubling of lines, figures, or letters could be observed on the surface of the coin, indicating inaccuracies in production.

Notable examples of double strikes can also be observed among gold coins, although they are much rarer compared to bronze or silver coins. This was because gold coins were produced with greater care and were subject to more rigorous quality control. Nevertheless, production errors, such as those seen on the Justinian *tremissis*, did occur. This coin has a clearly visible double strike, which was created by moving the planchet by approximately 15% to the left and rotating it ten degrees clockwise between consecutive strikes of the die.[20] As a result, elements of the image created with the first strike were partially obliterated by the second strike, particularly in areas where the surface was shallower.

Such instances of double strikes are indicative of technical problems that occurred during the minting of coins by hand, regardless of their denomination or the metal of which they were made. The causes of these errors could have been haste on the part of mint workers, inaccurate planchet placement, or tool wear.[21] The high frequency of die wear and intense pace of production further contributed to such defects. Dies were used for an average of four to five days, and daily production reached about 4,000–5,000 coins,[22] increasing the likelihood of errors.[23] Haste and worker fatigue often led to double strikes, reducing the quality of the final minted products.[24] Although for minters, double strikes were considered a manufacturing defect that would normally result in the coin being remelted, such defects were tolerated during periods of crisis. Today, double strike coins are treasured by researchers and collectors alike, offering a unique testimony to ancient minting techniques and the challenges encountered by Roman minters.

Observations regarding minting techniques should be approached with great caution. It appears that certain cases previously identified as overstrikes may, in fact, be the result of double strikes. In particular, without a thorough examination of the *as* from the PT series,[25] which was supposedly minted on a post-*semilibrium sextans*, it is difficult to assess conclusively whether it

[17] Mommsen 1887, *passim*; Crawford 1966, pp. 19–20; Witschonke 2012, pp. 370–372.
[18] Witschonke 2012, pp. 73–74.
[19] Crawford 1975, pp. 177–179.
[20] Source: https://www.calgarycoin.com/reference/grading/strike.htm (accessed on 17.12.2024).
[21] Williams 1985, pp. 84–86.
[22] Hill 1922, pp. 8–10; Williams 1985, pp. 87–88; Delamare, Montmitonnet 1985, pp. 506–507; de Callataÿ 1995, pp. 291–293.
[23] Bastien 1967, pp. 53–55 writes about the effect of production intensity on the frequency of minting errors at the Lugdunum mint.
[24] de Callataÿ 1995, p. 301.
[25] *RRC* 177/1; McCabe 2018, pp. 91–92.

is indeed an overstrike, a double strike, or perhaps an imitation.[26]. In addition, Olivier Legrand, analysing an *as* with a star[27] on a C.SAX *semis*,[28] suggests that instead of an overstrike it could be an imitation, where a double strike may have distorted the original design.[29]

Similar doubts arise in the case of the purported overstrike of the quadrant of L. Memmius Gala[30] on the *quadrans* of M. Herennius.[31] The author notes that the visible element, interpreted as Cupid in front of a ship's bow, may be the result of a double strike. The lack of a clear trace of the L. MEMMI legend and the obverse style, which more closely resembles Herennius issues, suggest that this is a Herennius' *quadrans* with a double strike rather than an actual overstrike.[32]

All these cases illustrate the difficulty of unambiguously distinguishing between a double strike and an overstrike.[33] Oftentimes, distortions resulting from a double strike can mimic the characteristics of an overstrike, leading to misinterpretations.[34] Systematic marking of dies may have made it possible to identify problems in the minting process and assign responsibility to specific workers, which may have been part of quality control in the Roman Republic mint.[35]

At least three specimens of double-struck coins were found among the coin finds from the legionary camp at Novae (Bulgaria). The numismatic finds from Novae contribute to a broader understanding of the monetary crisis that afflicted the Roman Empire in the third century AD. This period was marked by continuous warfare, frequent changes on the imperial throne, and numerous usurpations, all of which led to economic instability and significant challenges in maintaining the quality of coinage.[36] These finds offer significant testimony to the minting activities during the reigns of emperors such as Gordian III (AD 238–244), Elagabalus (AD 218–222), and Gallienus (AD 253–268).[37] Each of these finds highlights the peculiarities of monetary production in Roman provinces, and the challenges arising from the broader organisational and economic crises of the period.

1. The Coin of Gordian III (AD 238–244). Mint: Nicopolis ad Istrum[38]

The Gordian III coin was struck at the provincial mint of Nicopolis ad Istrum between AD 238 and 244 (Fig. 1).[39] The double strike is visible on both the obverse and the reverse. On the obverse, the misalignment of the emperor's facial features and elements of his armour indicates a second strike without the proper removal of the planchet. On the reverse, the doubling of the eagle's contours and parts of the legend suggest haste and a lack of precision in the minting process, echoing the technical challenges faced by a provincial mint operating under pressure to produce a large volume of coinage for the army stationed in the region. This is an extremely interesting specimen as the double strike is visible on both the obverse and reverse, making this coin unique from both a technical and numismatic perspective. In contrast, the double strike on coins housed in the British Museum is typically visible on only one side, and is often barely discernible. In the case of the Gordian III coin from Novae, however, the technical difficulties encountered during the minting process are clearly evident.

[26] McCabe 2018, p. 88.
[27] *RRC* 196/1.
[28] *RRC* 173/2.
[29] Schaefer, McCabe 2011, 101.
[30] *RRC* 313/4.
[31] *RRC* 308/3. Paris, Bibliothèque nationale de France, Département des Monnaies, Médailles et Antiques, inv. no. a10253 (available at: http://catalogue.bnf.fr/ark:/12148/cb419867068) classified as a Herennian *quadrans* without a commentary.
[32] McCabe 2018, pp. 90–91.
[33] McCabe 2018, pp. 94–96.
[34] Delamare, Montmitonnet 1985, pp. 509–511; Witschonke 2012, pp. 374–375; Gysels 2014, pp. 30–32.
[35] Crawford 1966, pp. 20–21; Witschonke 2012, pp. 365–368; McCabe 2018, p. 95.
[36] van Heesch 2018, pp. 209–210.
[37] Gysels 2014, pp. 16–18; van Heesch 2018, pp. 211–212.
[38] Type Moushmov 1912, no. 1506, identified by Renata Ciołek.
[39] Ciołek 2025, *forthcoming.* The coin has not been published before.

- **Obverse:** AVT K M ANTΩNIOC ΓORΔIANOC, draped and cuirassed bust of Emperor Gordian III facing right.
- **Reverse:** VP CAB MOΔECTOV NIKOΠOΛEITΩN ΠPOC ICT[...], eagle standing on a thunderbolt with head raised, holding a wreath in its beak.
- **Technical data:** diameter: 27 × 29 mm / weight: 12.39 g / axis of the coin: ↑↓
- **Condition:** the coin was found in a good state of preservation with visible detail and limited surface wear.
- **Archaeological context:** the coin was discovered at Novae in Sector XII.

Fig. 1. Gordian III coin, found at Novae, Sector XII, inv. no. 212/16 (photo by R. Ciołek).

2. Elagabalus Coin (AD 218–222). Mint: Ephesus[40]

The Elagabalus coin was struck at the mint at Ephesus between AD 218 and 222. It too represents a significant example from this period due to a peculiarity on the reverse (cf. Fig. 2).[41] The double strike caused a clear distortion of the reverse legend and a displacement of the representation of the boar. The superimposed outlines of the animal, along with illegible portions of the legend, remain visible. The legend on the reverse, ЄΦЄCCI-ΩN, refers to the city of Ephesus, where the coin was minted. However, due to the double strike, the legend appears distorted. The correct form of the legend, ЄΦЄCIΩN, translates to '[coin] from Ephesus'. This distortion resulted from the displacement of the planchet between the first and second strikes, a typical production flaw, particularly during periods when mints operated under significant time constraints and with limited resources. This coin reflects the technical challenges associated with coin production in a major minting centre such as Ephesus. It serves as a valuable example of Imperial iconography and the technical aspects of coinage production in one of the most significant minting hubs in Ionia during this period. The scene depicting the wild boar may further allude to local traditions and symbolism associated with the hunt, an important motif in Roman propaganda representing Imperial power, symbolising the emperor's ability to subdue nature and impose order over chaos.[42]

- **Obverse:** A-NT[Ω]-NЄINOC A[V] Γ, bust of Emperor Elagabalus (Marcus Aurelius Antoninus) facing right, wearing laurel wreath, armour, and mantle.
- **Reverse:** ЄΦЄCCI-ΩN**,** image of a wild boar pierced by a spear, standing to the right. The legend of the reverse has been distorted due to the double strike. The correct form is ЄΦЄCIΩN '[coin] of Ephesus'.

[40] *SNG COP* 452, inv. no. 55/22.

[41] Ciołek 2025 *forthcoming*. The coin has not been published before.

[42] On the role of coin iconography in Imperial propaganda, see e.g. Howgego 1990, pp. 10–12; Kemmers 2018, pp. 25–27.

- **Technical data:** diameter: 18 × 19 mm / weight: 2.64 g / axis of the coin: ↑↓
- **State of preservation:** the coin was found in an average state of preservation with visible depiction and a relatively high degree of surface wear.
- **Archaeological context:** the coin was discovered at Novae in Sector XII.

Fig. 2: Elagabalus coin, found at Novae, Sector XII, inv. no. 55/22 (photo by R. Ciołek).

3. Gallienus' *antoninianus* (AD 253–268). Mint: Rome[43]

The *antoninianus* of Gallienus, minted between AD 253 and 268, is a silver coin measuring 22 × 17 mm in diameter[44] (Fig. 3). On the obverse is a bust of Emperor Gallienus facing right, adorned with a radial crown (*corona radiata*), a symbol indicating that the coin's value equated to two *denarii*. The reverse is heavily worn and illegible due to a production error and intensive circulation. The double strike on the obverse is evident in the duplication of the crown and parts of the emperor's bust. This effect is due to the displacement of the planchet during the hammer strike, an issue commonly encountered in mints operating under intense production pressure to meet wartime monetary demands.

- **Obverse:** [...]ALLI[...], depiction of bust of Emperor Gallienus, facing right, wearing radial crown (*corona radiata*), in armour and cloak (draped and cuirassed).
- **Reverse:** completely obliterated and illegible due to heavy wear and manufacturing error making identification impossible.
- **Technical data:** diameter: 22 × 17 mm / weight: 3.26 g / coin axis: unknown
- **Conservation status:** heavily worn, with clear damage and partly illegible details.
- **Archaeological context:** the coin was found at Novae in Sector XII.

Fig. 3. Gallienus coin, found at Novae, Sector XII, inv. no. 142/15 (photo by R. Ciołek).

[43] The coin's poor state of preservation renders its identification impossible.

[44] Ciołek 2025 *forthcoming*. The coin has not been published before.

The state of preservation of this coin has been classified as 'heavily worn', indicating significant surface wear and visible damage, making it difficult or even impossible to discern the detailed design elements on the reverse. The dimensions of the coin are 22 × 17 mm, suggesting that the planchet was either deformed or damaged due to production errors or prolonged circulation. Such issues were widespread in third-century AD minting, a period marked by frequent challenges related to material quality and minting techniques.

One of the most notable features of this coin is a manufacturing defect characterised by a partial misalignment of the die and an incorrectly centred design. The manual minting process in ancient Rome was prone to various errors that occurred when the planchet was not properly positioned between the die and the die.[45] In such instances, when a minter failed to remove a coin in time or when the planchet shifted at the moment of impact, the design would be imprinted unevenly or extend partially beyond the planchet's surface. This resulted in overlapping details or distorted legends, significantly affecting the legibility of both the legend and the iconography on the obverse.[46]

The coin, discovered in Sector XII of the Novae fortress, is an important source of information on the technical and organisational challenges inherent to the monetary crisis of the third century AD. The reign of Emperor Gallienus (AD 253–268) coincided with one of the most turbulent periods in the history of the Roman Empire. Frequent civil wars, persistent threats from usurpers, and barbarian invasions led to economic collapse and the destabilisation of the monetary system. Amid these crises, mints operated under immense pressure, tasked with producing large quantities of coinage within short timeframes. As a consequence, technical standards declined, and minting errors became increasingly common.

Despite its poor state of preservation, this coin is a valuable testimony to the historical and economic realities of the period. It demonstrates how, in times of crisis, the priority shifted from quality to quantity, as the need to maintain an adequate supply of legal tender took precedence over maintaining high minting standards.[47] By analysing such specimens, we can better understand not only the specific minting techniques used in Antiquity, but also the broader political and economic context that directly influenced both the quality and production of coinage.[48]

Coins issued during the reign of Gallienus, especially *antoniniani*, were often made in haste and with worn or damaged dies.[49] Consequently, many of these coins show clear traces of double striking, uneven impressions of the design, and planchet deformations. On the one hand, these flaws indicate a weakening of quality control at the mints; on the other, they reflect a desperate effort to sustain monetary liquidity amidst ongoing conflict. Faced with the need to finance numerous military campaigns and defend against usurpers, Gallienus was compelled to produce vast quantities of coinage, leading to inevitable compromises in quality. Minting errors, such as double die strikes, thus provide valuable clues to the state of coinage organisation in the third century AD. These defects serve as evidence of the complex realities that mints faced, having to adapt to rapidly changing and often precarious historical conditions. At the same time, they underscore the crucial role of coinage as a fundamental component of the Roman Empire's war economy, ensuring financial stability amid persistent military and political turmoil.

The phenomenon of double strikes occurred on different denominations and during different periods of Roman minting. Republican *denarii* from the second and first centuries BC frequently exhibit signs of double striking, while similar errors can be seen on Imperial *sestertii* and *asses*.[50] Large copper or brass coins were particularly susceptible to this defect due to their size and weight,

[45] Hill 1922, pp. 3–6.
[46] Williams 1985, pp. 83–85.
[47] On the quality of coins in the context of economic crises, cf. Howgego 1990, pp. 12–14.
[48] Williams 1985, pp. 78–79; Howgego 1990, pp. 20–22.
[49] Bastien 1967, pp. 38–40; van Heesch 2018, p. 214; Kemmers 2018, pp. 28–30.
[50] Crawford 1966, pp. 21–23.

which increased the likelihood of planchet displacement during the minting process. Even gold coins, though less frequently affected, also display evidence of double striking. The second strike partially obliterated elements of the initial design, particularly in shallower areas of the surface. The displacement affected both the obverse and the reverse, indicating that the position of the planchet changed between the two strikes.

The most common causes of double strikes included human error, haste, and the wear and degradation of minting tools. The manual process of coin minting required precise placement of the planchet between the dies.[51] If the mint master did not manage to remove the planchet swiftly after the first hammer strike, the design could be re-impressed in a slightly different position, resulting in a double strike.[52] Additionally, planchet displacement during striking often led to overlapping patterns, particularly in the case of heavier coins, which were more prone to shifting on the die due to vibrations caused by the hammer strike. Another contributing factor was the progressive wear and damage to dies and hammers, which compromised precision in striking and further increased the likelihood of double strikes.

Double strikes are an important aspect of the study of ancient Roman minting techniques.[53] As Andrew McCabe notes, the term 'double strike' is often confused with 'overstrike', although the two differ in meaning. A double strike occurs when the same die is reapplied to a planchet, imprinting the design twice, whereas an overstrike involves the use of a different die to alter an existing coin, effectively transforming it into a new issue.[54] McCabe emphasises that distinguishing these errors accurately requires detailed visual analysis and precise documentation, as misclassification can lead to incorrect conclusions about the minting process.[55] Examples from the British Museum's collection show that, without proper illustrations, it is difficult to determine unequivocally whether one is dealing with a double strike or an overstrike.[56]

Johan van Heesch, in his article 'Overstriking on Roman Coinage in the Third Century AD', examines the historical context for the occurrence of double strikes in the third century AD. This was a period of economic and political crisis, when frequent changes of emperors, usurpations, and civil wars led to organisational chaos in the mints. The reigns of Trajan Decius (AD 249–251) and Gallienus (AD 253–268) were particularly turbulent in this regard. Van Heesch points out that, during this time, mints operated under immense pressure to provide a steady supply of coinage for the army, resulting in numerous defects, including double strikes. The degradation of the dies, combined with the urgency of production, further exacerbated the situation.[57]

Double strikes were tolerated in circulation because, in times of crisis, the value of coins was determined not by their bullion content but by the face value assigned by the state.[58] In an economically unstable environment, where precious metal resources were scarce, the priority was to maintain a sufficient supply of coinage rather than ensuring flawless technical quality. For Roman soldiers and provincial residents, it was crucial that coins retained their function as a means of payment.[59]

Finds of double-struck coins today provide valuable research material for a better understanding of minting technology and organisational challenges faced by ancient mints.[60] The analysis of these enables the reconstruction of historical and economic conditions with greater accuracy.[61] Each double-struck coin is a testament to the realities of Roman minting and the adaptability of the

[51] Delamare, Montmitonnet 1985, pp. 503–505; Williams 1985, pp. 80–82.
[52] Hill 1922, pp. 11–13; Williams 1985, pp. 79–81.
[53] Hill 1922, pp. 18–20.
[54] Delamare, Montmitonnet 1985, pp. 510–512; van Heesch 2018, p. 213; McCabe 2018, p. 81.
[55] McCabe 2018, pp. 79–80.
[56] McCabe 2018, p. 85.
[57] van Heesch 2018, pp. 215–219.
[58] Howgego 1990, pp. 3–5; Kemmers 2018, pp. 8–10.
[59] van Heesch 2018, p. 205.
[60] Crawford 1966, pp. 18–19; de Callataÿ 1995, pp. 310–311; Kemmers 2018, pp. 15–18.
[61] Van Heesch 2018, pp. 211–213 emphasises the scholarly value of analysing minting errors in the context of the crises of the third century AD.

monetary system in times of crisis. For collectors, such coins are a unique part of ancient Roman history, admired for their special character.

Minting errors, such as double strikes, represent an important aspect of the study of coinage technology in ancient Rome. A comparative analysis of finds from Novae with those from other regions of the Roman Empire reveals that such defects were widespread, though their characteristics varied depending on local production conditions. In provincial mints, such as Nicopolis ad Istrum, limited technological resources and a shortage of skilled workers contributed to a higher occurrence of minting defects, including double strikes and irregularities in legends. By contrast, in central mints such as Rome, stricter quality control and more advanced techniques helped to minimise the frequency of such errors. However, even in these mints, defects persisted, particularly during periods of intensified production, such as political or economic crises.[62] As Delamare and Montmitonnet pointed out in 1985, the technological and organisational disparities between provincial and central mints had a significant impact on coin quality. Factors such as the intensity of work, the materials used, and the technology of dies shaped the specificity of minting errors in each region.[63]

In the case of the coins found at Novae, these minting errors primarily resulted from the pressure to rapidly supply coins to the army, leading to design distortions, as observed in the coinage of Gordian III and Elagabalus. These coins exhibit characteristic duplications of image contours and misaligned letters in the legend, both of which stem from the repeated striking of dies on an unstable planchet. Provincial mints, such as Nicopolis ad Istrum, often struggled with a shortage of appropriate tools and experienced workers, further increasing the risk of defects.

In Antioch, these errors frequently resulted from the unstable positioning of the planchet during striking, leading to an uneven distribution of the design on the surface of the coin. Asymmetrical legends and iconographic misalignments, caused by the dynamic shifting of the planchet between successive die strikes, were characteristic features of coinage from this region. Antioch, as an important minting centre in the east, faced a high demand for coinage, which often compromised the quality of production.[64]

Even at the Roman mint in the Imperial capital, errors caused by planchet rotation and offsetting occurred, although less commonly thanks to better quality supervision. Coins issued in Rome, especially *sestertii* and *aurei*, exhibit a higher standard of workmanship. However, the occasional occurrence of double strikes reveals the difficulties associated with intensified production during periods of heightened military activity.

Juxtaposing these defects demonstrates that double die strikes were a universal technical problem, highlighting both the technological limitations of ancient minting and the different strategies employed across different regions of the Roman Empire to manage production pressures. The variability in error characteristics across mints reflects regional differences in production conditions, the level of quality supervision, and the economic and political constraints that shaped coinage in each area.

Abbreviations

RIC	Mattingly, H., Sydenham, E.A. (eds.). *The Roman Imperial Coinage*. London, 1923–
RPC	*Roman Provincial Coinage*, London-Paris 1992–2006.
RRC	M. H. Crawford, *Roman Republican Coinage*, Cambridge 1974.

[62] de Callataÿ 1995, pp. 300–302.
[63] Delamare, Montmitonnet 1985, pp. 513–514.
[64] McAlee 2007, *passim*.

SNG COP. — *Sylloge Nummorum Graecorum. The Royal Collection of Coins and Medals. Danish National Museum. Thrace, Munksgaard, E. (ed.), Copenhagen 1942; Sylloge Nummorum Graecorum Denmark. The Royal Collection of Coins and Medals, Danish National Museum, vol. II: Macedonia-Thrace, Munksgaard, E. (ed.), reprint, New Jersey 1981–1984.*

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