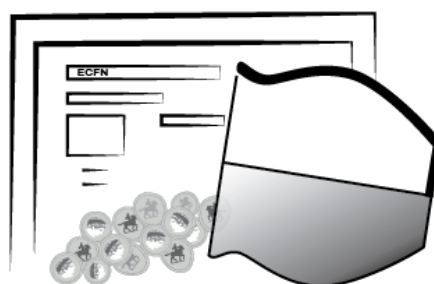


European Coin Find Network

Haarlem, The Netherlands, 5–8 November 2024

Proceedings



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Jan Pelsdonk, David Wigg-Wolf, Rahel Ackermann and Dilyana Boteva (editors)

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Preface

MARC DE BEYER – general director Teylers Museum



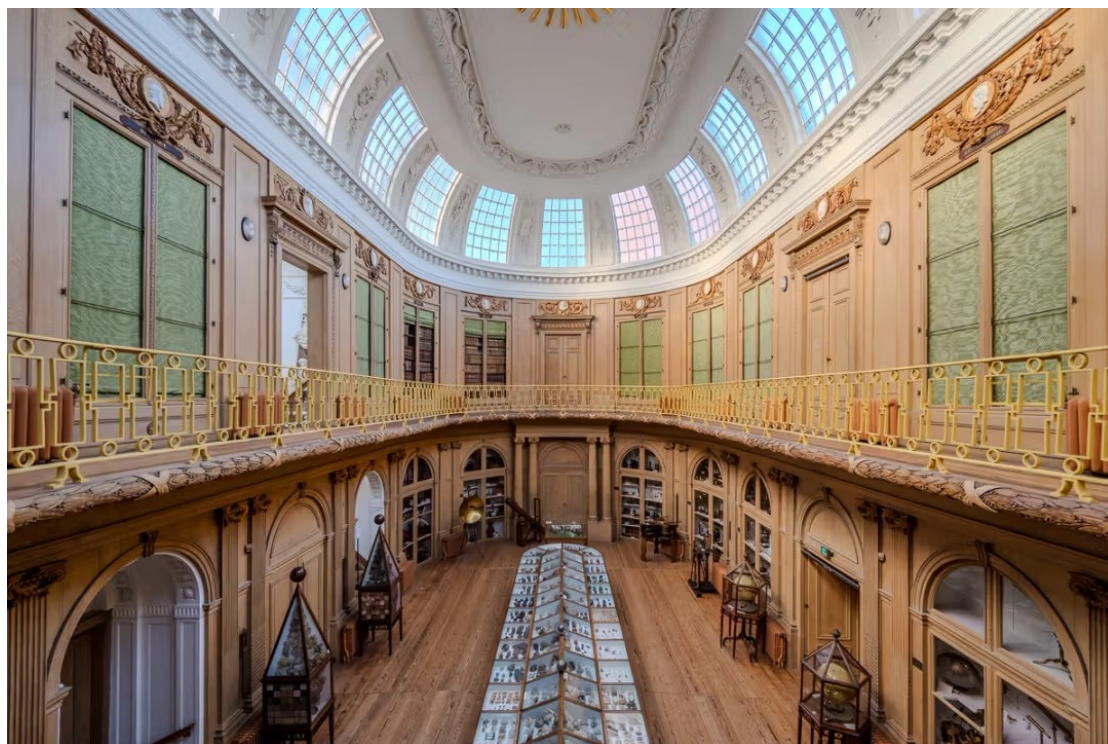
That this conference was held at Teylers Museum is no coincidence: numismatics is inextricably woven into the museum's DNA. The museum's founder, Pieter Teyler van der Hulst (1702–1778),

began collecting coins and medals in the mid-eighteenth century, laying the foundation for the current collection of some 20,000 objects.

Teylers Museum is the oldest museum in the Netherlands. Even now – almost a quarter of a millennium after the first opening – Pieter Teyler's Enlightenment ideals remain highly regarded. As in the past, the rooms housing the scientific collections exude a desire to better understand the world, while visitors to the painting galleries experience the grandeur of bygone times. The same applies to the Numismatic Cabinet, which underwent a full

transformation between the conference in November 2024 and the publication of these proceedings. The space has been completely restored and once again reflects its original, historical layout. This makes the museum – and the Numismatic Cabinet in particular – more worth visiting than ever.

As for the Numismatic Cabinet itself, the collection continues to grow. Not only in size, but also in the sharing of knowledge. Thanks to Jan Pelsdonk, our widely recognised specialist in coins and medals, who, in addition to his key position at Teylers Museum, also keeps the collection at the Rijksmuseum, and thanks to international initiatives such as Nomisma.org, new insights are becoming available that enrich the collection and make it more accessible to an international community of researchers and enthusiasts alike – an admirable development that may even serve as a blueprint for other collection areas.



The Oval Room, one of the museum's time capsules, dating back to 1784

Introduction

DAVID WIGG-WOLF



With the 11th Meeting in Haarlem in the Netherlands, the European Coin Find Network continued its perambulations around the continent, returning to Northwest Europe again after meetings in Sicily

(2019), Serbia (2021) and Bulgaria (2023). Teylers Museum, the oldest museum in The Netherlands with its fine numismatic collection, provided the perfect location, and it was with great pleasure that 44 participants from 14 countries accepted the museum's invitation and met there for two days of stimulating papers and discussions.

The ECFN Meetings provide a relaxed, expert environment for scholars of all levels, from early career to the retired, and the number of masters and doctoral students taking part was highly encouraging. A total of 18 papers and five posters on a truly European range of topics were presented, from the pre-Roman Iron Age to the Medieval, from Fatimid Spain to the Ukraine. Specific emphasis was placed on digital resources, the increasingly productive application of artificial intelligence in numismatics, and public outreach – a particularly important topic at a time of dwindling funding in many areas of the Humanities.

The papers presented at the ECFN meetings have in the past not normally been published, and therefore the offer from Jan Pelsdonk to produce an open access volume was very welcome. Over half of the speakers took up the offer, submitting papers on a wide range of subjects. Page and Allen on the Medieval Coin Hoards of Britain and Ireland, and Tauschensky on the S.E.S.A.M. project in

the German Federal State of Saxony-Anhalt, present contrasting new projects recording coin finds; one with a regional, the other with a chronological focus. While Sánchez-Signes considers aspects of the digitisation of a recent large medieval hoard. Brown discusses the challenges involved in the recording of the masses of coin finds made by the public in the Portable Antiquities Scheme of England and Wales.

Different aspects of the analysis of coin finds are the subjects of papers by Fulbrook on the imitations of Roman antoniniani known as barbarous radiates, and Hillen on the function of late-Roman bronze in hoards. Collections are the theme behind the discussion of the challenges of the extensive Constantin Orghidian collection in Romania by Baltă and Petac, and Devoto's presentation of the digitisation of a cast collection, a numismatic resource of continuing importance even in the digital age. Pelsdonk explains how very easily a collection can be incorporated into the digital world of Nomisma.org, the international controlled vocabulary and ontology for describing numismatic objects, so making it internationally more visible. Finally, strategies for public engagement in numismatics based on their experience at Paestum are discussed by Carbone, Marino and Vynarchuk.

The authors wish to express their thanks to Jan Pelsdonk for providing the opportunity to publish their papers. Our gratitude is furthermore extended to Jan, together with the director of Teylers Museum, Marc de Beyer, as well as the museum team for their wonderful hospitality and support over the two days, as well as for the opportunity to visit the Roman Limes and the Rijksmuseum van Oudheden in Leiden on a memorable excursion.

The Constantin Orghidan collection of the Romanian Academy – present and future endeavours

ANA-MARIA BALTĂ | EMANUEL PETAC*



Figure 1. *Portrait of Constantin Orghidan. 1930s* (source: https://commons.wikimedia.org/wiki/File:Constantin_C._Orghidan.jpg#filehistory)

The Constantin Orghidan collection is not only the most significant numismatic collection from Romania, but it could also be considered one of the most valuable from the entire world, impressive for both its content and noteworthy story. It boasts over 10.000 artefacts, including not only coins (Greek, Roman, Byzantine, Medieval), but also seals (the most renowned being the Byzantine ones published by Vitalien Laurent), medals, cameos, and pieces of ancient jewellery. Many of them are unique and encompass a vast range of historical periods and cultures.¹ Before detailing the present and future endeavours, we would briefly bring to light several aspects concerning not only the collection, but also the person behind it.

Constantin Orghidan (1874–1944) (*Figure 1*) was born in Bucharest on June 22nd 1874. He pursued his education at the National School of Bridges and Roads in the same city (1892–

1899). Between 1900 and 1916, he successfully progressed through all stages of his engineering career in the workshops of the Romanian Railways. Orghidan was significantly involved in several pivotal actions during the First World War (1914–1918) – for instance, he served as the coordinator of the military aid sent by the United States to Romania. Subsequently, he assumed the role of President of the Administration Council of the Union of Metallurgical and Mining Industries of Romania (1923) (Petac et al. 2024, 657).

His first contacts with the Numismatic Cabinet of the Romanian Academy (CNBAR) can be traced back to the 1920s. In 1921, he donated several contemporary coins, and in 1929 a lot of 13 Byzantine coins, the latter becoming one of high interest for him. Certainly by the 1920s–1930s, the collection already had a consistent basis (Petac, Vasiliță 2014, X). The first mention of his collection dates to 1925. Several years later (1931), a complex structure was already visible, and it comprised ancient Greek, Roman and Byzantine coins, as well as over 700 medieval coins of Transylvania.² The latter were bought from the well-known Schulman auction house (Amsterdam, The Netherlands). From the 1930s onwards, Constantin Orghidan became more involved in cultural life. In 1933, he was proposed as a member of the Museum of the City of Bucharest's Administrative Council by Doctor George Severeanu (the founder of this museum). Afterwards, Orghidan was elected Vice President of the Romanian Numismatic Society (1941), an organisation that continues to exist even today.³

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¹ Laurent, 1952; Velter, 1994; Gramatopol 2009; Petac, Vasiliță, 2012; Petac et al., 2024.

² Velter, 1994.

³ <https://www.snr-1903.ro/> [accessed 15 June 2025].



Figure 2. The permanent exhibition 'Constantin Orghidan', Numismatic Department, Library of the Romanian Academy (photo's: Emanuel Petac)

Through his close relationship with the society, he financed several publications, including *Buletinul Societății Numismatice Române* (Romanian Numismatic Society Newsletter). The sources from which he constructed the collection are impressive, as is evidenced by the names of several famous European auction houses: Münzhandlung Cahn (Basel), Naville (Geneva), Santamaria (Rome), Ciani (Paris), Adolph Hess (Frankfurt am Main), Spink & Seaby (London) and Schulman (Amsterdam).

In 1939, Constantin Orghidan bought the impressive collection of Byzantine seals which would be published in 1952 by Vitalien Laurent (director of the French Institute of Byzantine Studies in Bucharest) in Paris, the catalogue being the first comprehensive catalogue of Byzantine sigillography in the world. In 1942, Orghidan became an honorary member of the

Romanian Academy. It was in the same year that he donated a significant hoard discovered in 1938 in Sighișoara (Mureș county, Romania) which comprises 3662 medieval silver coins from Transylvania, Hungary and Poland (Petac et al. 2024, 646).

The last version of his will dates to June 9th 1944 and marks the collection's official donation to the Romanian Academy which would manage it through its Numismatic Cabinet. Constantin Orghidan's knowledge and special character is clearly illustrated by the main requests included in the will, whereby he created a complex and impressive image of his collection's future. One of the most important is the organisation of a permanent exhibition with the title 'Constantin Orghidan collection' (*Colecțiunile Inginer Constantin Orghidan*). He also mentioned the publication of catalogues:

- ‘1. The Catalogue of Byzantine seals (published in 1952, in Paris by Vitalien Laurent) – to be published in 300 copies, 150 copies to be sent to various Universities and Academies.
2. Catalogues as follows:
 - a) The gold, silver and bronze coins from Constantine the Great until 1453. They would be described respecting the model of the Wroth Catalogue of the British Museum with a large number of photos.
 - b) The collection of clipped bronze Byzantine coins.
 - c) The collection of Greek gold coins.
 - d) The collection of Trajanic bronze, silver and gold coins, together with those issued in Cappadocia, and in particular the 23 examples of *Restitutio Traiani*
 - e) The glyptic collection, including the ‘Orghidan cameo’.⁴

Besides the exhibition and publication of his collection, Constantin Orghidan not only envisioned its future evolution through new acquisitions, but also planned the development of the discipline and profession of numismatics. For these purposes, the well-known engineer and collector gave to the Romanian Academy significant sums of money. From these essential passages from his will, we can see how Constantin Orghidan saw the huge importance of numismatics and of its further evolution, his collection being a central element in this process.

Interestingly, even if the will is dated to June 1944, the register of the Numismatic Cabinet shows that the collection was already present from March 1944, before the moment when Constantin Orghidan left Bucharest and took refuge in Ferdinand (today Oțelul Rosu, Caraș-Severin county).⁵ It is noteworthy that a portion of the collection remained in Vitalien Laurent’s possession (specifically the collection of Byzantine coins and seals). Between 1946 and 1948, a commission comprising Constantin Moisil (director of the Numismatic Cabinet) and Vitalien Laurent commenced its inventory. The process was significantly disrupted by the latter’s arrest by the communist authorities, and it was

only concluded in 1948, but under tragic circumstances.

It was in Ferdinand, on August 29th 1944, that the engineer Constantin Orghidan died, leaving behind an impressive collection and life. His request to be buried in the family plot in the Bellu cemetery couldn’t be realised due to the war, and he was buried in the Catholic part of the cemetery in Ferdinand (today Oțelul Rosu, Caraș-Severin county). His tomb was anonymized in an almost Hollywood like agreement between the Orthodox and Catholic priests, who took care of it for several decades. Afterwards, the situation became even worse as Constantin Orghidan was declared *persona non grata* by the communist regime installed in Romania. This meant that it took a long time before his will could actually be executed.

Coming back to the present, the last decades marked a complex process of bringing back to light both the collection and Constantin Orghidan’s legacy. One method was the publication of significant parts of his collection, including: the medieval Transylvanian coins (Velter 1994), and the Greek and Roman gold coins (Petac, Vasiliță 2012).

Another essential point of the will was also realised and the permanent exhibition ‘Constantin Orghidan’ is currently opened for visits (*Figure 2*). Its official inauguration was preceded by a series of reparatory acts, the first and most significant of which being the reburial of Constantin Orghidan as directed in his will, in the Bellu cemetery in Bucharest (September 2023). A year later, on September 5th 2024 another commemoration of Constantin Orghidan took place. It included the consecration of a cenotaph built on the site of his previous grave in the Romano-Catholic Cemetery of Oțelul Roșu, thanks to the joint efforts of the Diocese of Caransebeș and the Library of the Romanian Academy. At the event, the documentary film named ‘Inginerul Constantin Orghidan, un mare industriaș și mecena al României’ was presented.

The final moment when the exhibition was officially opened on November 7th 2024 was a fitting commemoration of the collector’s life, 80 years after his death, held in the aula of the

⁴ English translation of Constantin Orghidan’s will (9th of June 1944).

⁵ Register of the Numismatic Cabinet of the Romanian Academy 678, 15th of December 1944.



Figure 3. Istros, *Lysimachos-type stater*. Middle of the 3rd century BCE, 8.37 grams, 18 mm (CNBAR inv. O.44; Petac, Vasiliță 2012, no. 17)



Figure 4. Trajan, *aureus*. 104/105–107 CE, 7.35 grams, 18 mm (CNBAR inv. O.131; Petac, Vasiliță 2012, no. 95)



Figure 5. Cyzicus, Constantine the Great, *2 solidi*. 326 CE, gold, 8.75 grams, 26 mm (CNBAR inv. O. 200; Petac, Vasiliță 2012, no. 188)



Figure 6. *The Orghidan Cameo (The Great Cameo of Romania)*. 4th century CE, polychrome sardonyx, 905 grams, 175 x 136 x 42 mm (In custody at the National Museum of Romanian History, inv. C4621/246)

Romanian Academy. At the same time, on November 6th and 7th, his story was presented as a poster during the 11th Annual Meeting of the European Coin Find Network in Haarlem.

As far as the future is concerned, there are various plans. One is the continuation of the collection's publication in new catalogues of the following categories: Byzantine gold, silver and bronze coins, Greek and Roman silver and bronze coins, and new versions of the catalogue of the gems and cameos, and of the medieval Transylvanian coins.

Another possible future plan includes the further development of the current exhibition through the integration of modern technologies such as 3D models of the most significant artefacts, but also the creation of an interactive program that would present the story of the Coin Cabinet and of Constantin Orghidan's life and collection. This could also incorporate various temporary exhibitions which would present different components of the collection.

Following this detailed overview of the collection's past, present, and future, several of its most notable artefacts may be presented. One is a Lysimachos-type stater from *Istros* (middle of the 3rd century BCE) (*Figure 3*) that is of exceptional rarity. At the time of its acquisition, only one other example was known to exist, which was part of the collection of Grand Duke Alexander Mikhailovich (Petac, Vasiliță 2014, 12). Its importance is emphasised by the fact that it highlights the evolution of monetary types during the transition from the staters of Alexander the Great to the Lysimachos-type (Petac, Vasiliță 2014, 13).

As was noted above in his will the *aurei* had an important place. One (*Figure 4*) is part of the commemorative series for Trajan's victories against the Dacians and can be dated in 104/5–107 CE. The piece could be linked to various events such as the second Dacian war or its preparation, but also to the emperor's *decennalia* (107 CE). Overall, the Roman coins form the most significant part of the ancient gold coins in Orghidan's collection (Petac, Vasiliță 2014, 21). Another highlight of the collection is the unique 2 solidi piece (*Figure 5*) minted at Cyzicus in 326 CE, which illustrates Constantine the Great's last visit to Rome in the same year. The reverse

shows the image of the emperor holding a *globus cruciger* in his right hand, and a sceptre in his left, while presenting to the Senate the importance of the Nicene Creed.

One of the most impressive pieces is without doubt the Orghidan Cameo (also known as the Great Cameo of Romania) (*Figure 6*) which was bought from the antiquarian Zapletal in 1934. It was most probably produced in a Syrian workshop, and is made of polychrome sardonyx, with a weight of 905 grams. At the moment of its acquisition, it was the biggest cameo in a private collection worldwide. Following the donation in 1944, it became the fourth biggest cameo in a public collection world-wide. The piece shows the apotheosis of an imperial couple, the possible identifications being the subject of much debate over the years. The Orghidan cameo was not the only artefact of this type, the collection includes a range of gems and cameos (*Figure 7*).

As mentioned above, the medieval Transylvanian coins are an extremely important part of Constantin Orghidan's collection due to their role in the reconstruction of Transylvania's monetary history. Several illustrative examples can be highlighted from this complex and varied material. One is a gold piece of 10 ducats dating from the reign of Cristofor Bathory (1576–1586) which is of great rarity (*Figure 8*). The issues of Moise Szekely (1601–1603), such as the taler from Orghidan's collection (*Figure 9*), are of even greater rarity, especially if the short duration of his reign is taken into consideration. Of similar rarity is the piece of 10 ducats (*Figure 10*) dating to the rule of Acathus Barcsay (1660–1660).

From this brief presentation of both Constantin Orghidan's life and his collection, it could be said that the story they tell is almost ripe for the big screen.

The most striking detail is how the engineer envisaged not only his collection's future in his will of 1944, but also how he saw the evolution of the numismatic world, thought about new acquisitions, and the encouragement and training of new researchers in the discipline. Even if his plans were paused by the communist regime, after its fall the memory of Constantin Orghidan slowly but surely came back to life, not only through the publication and exhibition of his collection, but also through a series of reparatory



Figure 7. Roman cameos from Constantin Orghidan's collection. Left: Agrippa, 68 BCE–12 CE, agate, 27 x 19 x 6 mm (CNBAR inv. O.55, Gramatopol 652) Middle: Faustina the Younger, 125–175 CE, agate, 22 x 16 x 9 mm (CNBAR inv. 134, Gramatopol 659) Right: Lucius Verus, 161–169 CE, sardonyx, 30 x 22 x 6 mm (CNBAR inv. 133, Gramatopol 658)



Figure 8. The Principality of Transylvania, Cristofor Bathory, 10 ducats. 1577, gold, 38,4 grams, 41 mm (CNBAR inv. O.949, Velter 19)



Figure 9. The Principality of Transylvania, Moise Szekely, taler. 1603, silver, 25,68 grams, 37 mm (CNBAR inv. O. 2894, Velter 112)



Figure 10. The Principality of Transylvania, Acathus Barcsay, octagon. 1660, gold, 34,64 grams, 36 mm (CNBAR inv. O. 1015, Velter 683)

acts. Among these are the ceremony at the Bellu cemetery (September 2023), his commemoration in the aula of the Romanian Academy (November 7th 2024), and the presentation as a poster of both his life and collection (November 6th–7th 2024).

These events and actions are clearly not the last, as the various future endeavours mentioned here will be pursued in the near future, thus contributing to the fulfilment of Constantin Orghidan's will.

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‘Just another “grot”...’: Roman coins and the PAS

ANDREW BROWN*

The 11th meeting of the European Coin Finds Network (ECFN) comes at a fortuitous time and a moment of change as the Portable Antiquities Scheme (PAS), managed by the British Museum, develops its database and thinks about how to engage with the public and record Roman numismatic data. Although there is a wider discussion surrounding the recording of *all* public finds (e.g. Lewis, Ehrnsten et al., 2025b), the focus of this paper will be on Roman coinage – the single largest category of object within the PAS dataset.

September 2023 saw the retirement of our long-standing National Finds Advisor (NFA) for Iron Age and Roman coinage, Sam Moorhead, commemorated in a striking medallion commissioned by a major supporter of the PAS (*Figure 1*). It fittingly brings to mind, given Sam is author of the new RIC V.5 (Carausius and Allectus), the Carausius medallion in the British Museum (BM) collection (BM 1967,0901.1), whose abbreviated reverse legend, I.N.P.C.D.A., references the Virgilian *iam nova progenies caelo demittitur alto* (‘Now a new generation is let down from Heaven above’ Virgil *Eclogues* iv.7; see also De la Bédoyère, 1999: 34–35). Sam worked tirelessly to encourage the recording and interpretation of Roman coinage within Britain, laying the foundations for future generations of archaeologists and (applied) numismatists, myself included, to develop and thrive.



Figure 1: *The Sam Moorhead medallion*

A more physical change relates to the PAS database, rebuilt after 2006 by former PAS ICT advisor, Dan Pett, but now nearing the end of its life. This continues to be a wonderful resource for recording, storing, and engaging with archaeological finds around England and Wales. However, it needs redevelopment from a technical perspective and in terms of recording and engagement. In this sense, the current paper gives the opportunity to think a little about how the PAS deals with numismatic material and our relationships with public recorders to capture that data.

Where are we now?

The PAS was established in 1997 alongside the introduction of the Treasure Act (1996) – a reform of the common law of Treasure Trove – to mitigate against loss to the archaeological record in England and Wales and encourage best practice in the public recovery and recording of archaeological material. It began as a pilot scheme in six areas of England (Kent, Norfolk, North Lincolnshire, the North West, the West Midlands and Yorkshire) before expanding in 2003 to become a national scheme throughout England and Wales that is now administered through the British Museum in England and the Amgueddfa Cymru – Museum Wales in Wales with funding from the Department for Culture, Media and Sport (DCMS) (Lewis, 2016). At this time, its online database was produced, with a vision to make archaeological finds available for researchers and the public alike.

Numismatic material was recorded from the outset and the first digital Roman coin records appeared in 1998. Some of these earliest records are limited, often lacking real descriptions of the coins but with numismatic data that often allows us to identify and, importantly, map individual finds. The initial uptake in recording was gradual. The PAS emerged against the backdrop of attempts to control or ban metal detecting,

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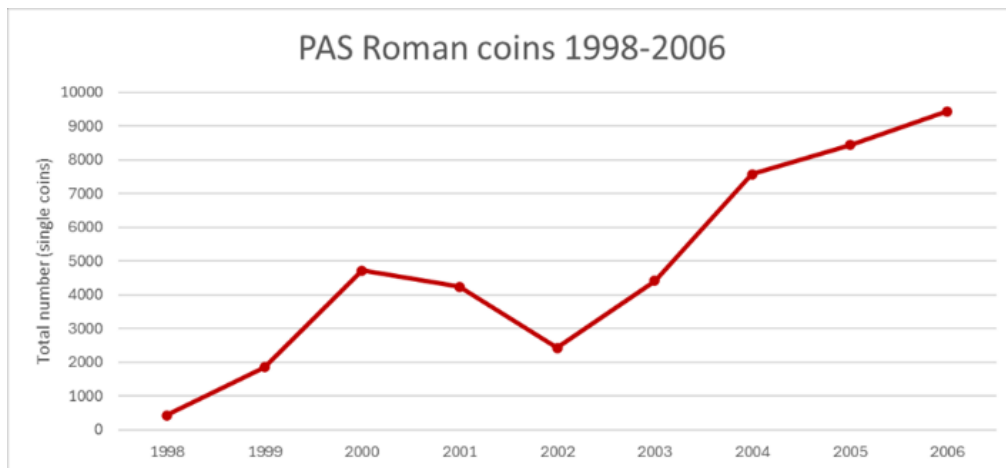


Figure 2. Roman coins recorded through the PAS, 1998–2006

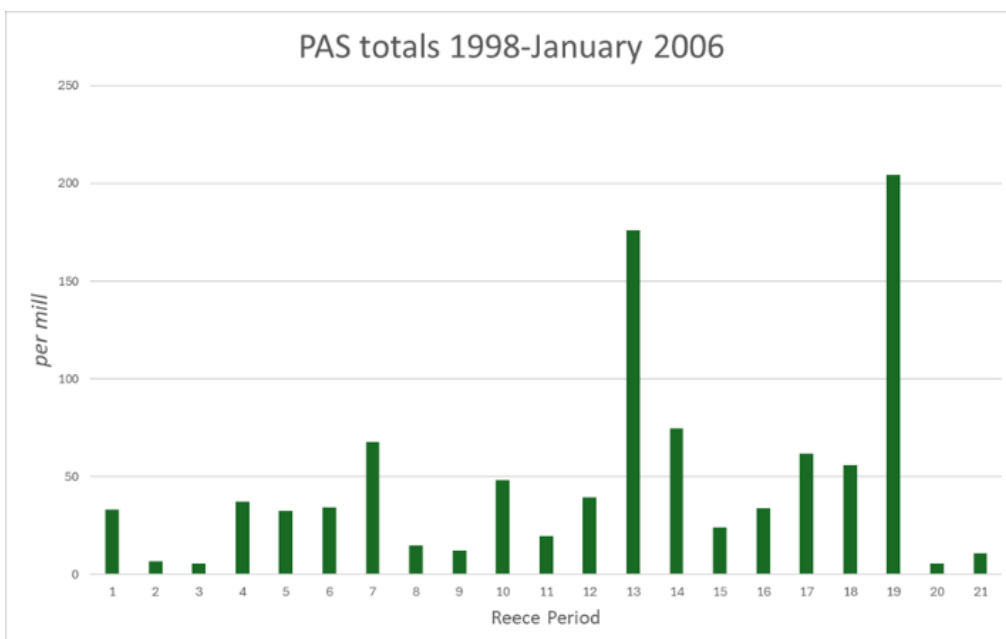


Figure 3. 43,561 Roman coins recorded through the PAS, 1998–2006

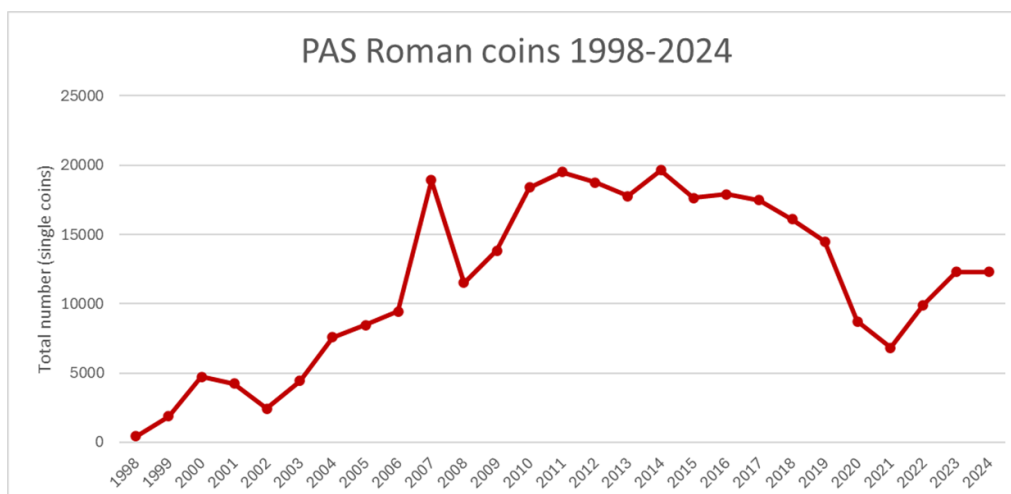


Figure 4. Volume of Roman coins recorded by the PAS between 1998–2024 (data accurate as of 2024). Note the dip in 2020–2021 due to the Covid pandemic that restricted access to the rural landscape

notably the STOP campaign of the 1980s, and so key early aims of the scheme were to encourage reporting and remove barriers to demonstrate the value of recording, hence the Scheme's expansion following a successful pilot phase (e.g. Bland, 2005). Only a few thousand Roman coins were recorded annually to begin with, followed by an understandable increase after 2003 when the PAS was in direct contact with a wider range of finders (*Figure 2*). It was apparent from what was being recorded, though, that the early data was not what we might expect for coin loss in Roman Britain. Prior to 2006, a lot of early Roman coinage was reported but the first half of the 4th century (Reece Periods 15–17) was notably lacking (*Figure 3*). This perhaps resulted from where the early focus of recording had been as well as initial wariness or selectivity by finders in what was offered for recording. The result was continued engagement by Finds Liaison Officers (FLOs) employed by the PAS in England and Wales with public finders – largely metal detectorists – to encourage recording, to educate on the reasoning behind *why* we record archaeological material, and to promote best practice in doing so.

When Sam was appointed in 2006, he noted numismatic gaps in what was being recorded and the unbalanced perspective this afforded on Roman Britain. The result was a series of 'grot drives' that involved direct engagement with over 150 metal detecting clubs/societies throughout England and Wales designed to encourage the reporting of *all* coins, not just those that were interesting, shiny, or unusual (Lewis et al., 2025a). The important factor here was to change perceptions of these 'grots' (*Figure 5*) and highlight that while they are often not particularly attractive, they have the potential to tell us as much, if not more, about Roman Britain and its coin use than those pieces that are singularly, numismatically, significant.

This focussed public engagement proved hugely important and the volume of coinage recorded by PAS increased substantially so that by 2010 between 15–20,000 Roman coins were being recorded annually (*Figure 4*). Similarly, the profile of the PAS dataset and its contents changed. The larger peaks of early Roman coinage dropped and the 4th century re-appeared in full force, with the Constantinian period of the 330s–

340s (Reece Period 17) – largely missing before 2006 – clearly the most prolific of all periods (*Figure 6*). This reflects increased volume of material recorded, better provision for the identification of even the most poorly preserved coins, and ongoing numismatic training for FLOs and finders, with the result that more recent records are likely to be more comprehensive than older ones.

Today, the PAS has a dataset of over 570,000 single coin finds, including c. 370,000 Roman coins, with numismatic material in its entirety making up close to a third of the c.1.8 million objects recorded. The distribution of the Roman material is revealing for the analysis of the Romano-British landscape. Coin finds are particularly prevalent in the south-west, East Anglia, and the north-east of England, a feature highlighted in previous studies, especially Walton's analysis of coin loss in Britain (Walton, 2012). The volume of material also means we can move away from simple distribution maps to utilise more applied approaches that explore regional or national development by, for example, period, coin type, or geographic constraints, albeit understanding that access to the modern landscape plays a role here too (e.g. Robbins, 2013). Similarly, at the individual coin level, efforts to



Figure 5. A typical group of 'grots': 53 Roman radiates and nummi from Bedfordshire (PAS: BH-7A89C2)

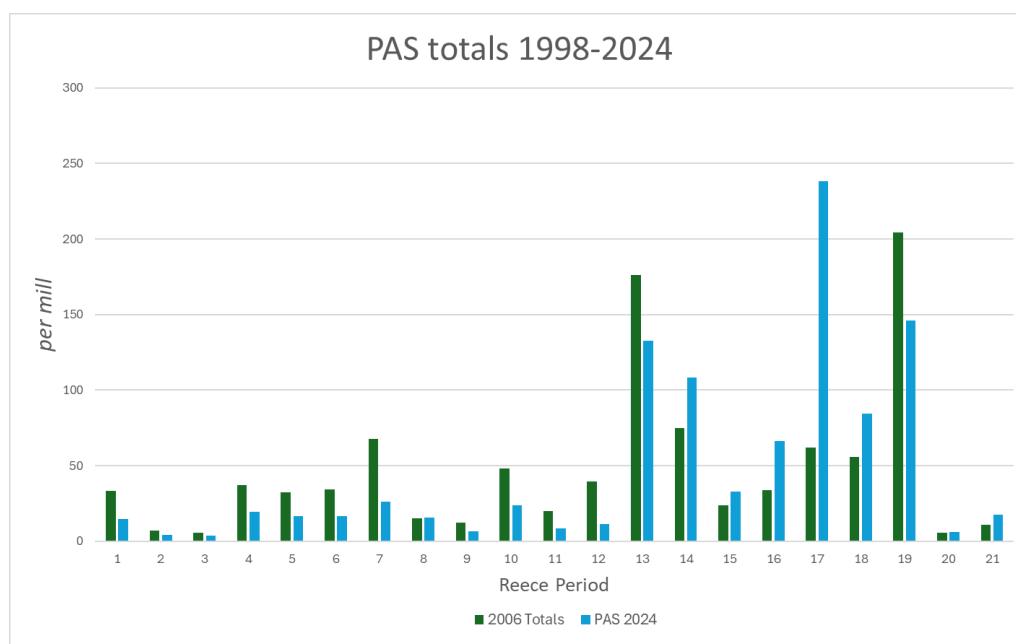


Figure 6. *The PAS coin profile by Reece Period (per mill) comparing totals from 2006 (green) and 2024 (blue)*

record all Roman coin finds continue to produce numismatically interesting and significant material (Figure 7).

Engagement, outreach, and collaboration

Public engagement by the PAS has been vital and from a numismatic perspective the benefits of the Scheme's ability to directly interact with finders of new material have been enormous. In 2023 alone, 3,877 finders had their finds recorded through the PAS, FLOs interacted with 168 metal detecting clubs/societies, and over 29,000 people attended 1,855 outreach events (Lewis, 2023).



Figure 7. *Recent PAS finds. Top left to bottom right: contemporary copy of an as of Nerva (CORN-2443A7); Modified aureus of Gordian III (SOM-2563D2); VOTA PVBLICA token of Constantine II (SUR-A3A374); miliarensis of Gratian (SUSS-D378D3)*

For Roman coinage, this represents over 12,000 single coin finds. The form this engagement takes, varies from regular FLO visits to metal detecting clubs/societies, to finds days/surgeries, or one-to-one meetings with finders. However, it helps to foster greater understanding of the *why* behind the importance of recording archaeological material and its context. This is further emphasised through public talks or lectures, events like the Council for British Archaeology's Festival of Archaeology, social and printed media (e.g. *British Archaeology*, *Current Archaeology*, *Treasure Hunting* or *The Searcher*), and promotion of the PAS in places like museums and libraries where visitor footfall might bring greater awareness.



Figure 8: *Half siliqua of the House of Theodosius (PUBLIC-B3678A)*

Education is an important component of this process. It begins with regular provision of coin-specific training to ensure best practice and data accuracy, but expands to academic engagement through attendance at events like ECFN or the publication of numismatic data recorded through the PAS (Allen, Brown, and Naylor, 2024; Walton, 2012; Moorhead, 2013; Lewis et al., 2025a; Brown, 2024). At the heart of the Scheme's outreach, though, is the promotion of *why* we record this material, *why* findspots are essential for understanding surviving archaeology (and without which we would not record finds presented to us at all), and *why* best practice in the discovery and recovery of new finds is vital to mitigating against damage to archaeological context. At the same time, acknowledging the roles of all parties in the process enables us to move away from perceived 'us vs them' perspectives that created division in the past, to develop better collaborative relationships and ultimately datasets that can, for example, highlight why even the most seemingly insignificant 'grots' are important archaeologically.



Figure 9. The Rauceby (Lincolnshire) hoard (top; LIN-F6D516) and Wickwar II (Gloucestershire) siliqua hoard (bottom; GLO-91B4E3) (CC BY 2.0 The British Museum)

In recent years, the benefits of engagement and collaborative working have been apparent in many ways. Perhaps most obvious was the National Lottery Heritage Fund sponsored PAS Explorers project that ran between 2014 and 2021, designed to support finders and volunteers, some of whom might not otherwise have regular contact with the Scheme, to record new finds directly (and remotely) with the PAS themselves. Its legacy lies in the range of resources and training freely available to those engaged with the Scheme while the process of 'self-recording' continues to generate significant numismatic data with 'PUBLIC' prefixed records for Roman coin on the PAS now numbering over 10,000 (Figure 8). Changing perceptions and understanding of the reasons behind recording new archaeological finds properly has also resulted in the identification of significant new numismatic material. The Owermoigne hoard from Dorset (PAS: DOR-931390; BM 2013,4101.1-15) is a good example of this. Its 15 coins – Republican *denarii* of M. Furius Philus (119 BC) and P. Servilius Rullus (100 BC), four local Iron Age Durotrigan staters, a *denarius* of Tiberius, and eight *sestertii* and *dupondii* of Claudius I – provide key evidence for coin circulation and use/loss in conquest period Britain. Similarly, an initial handful of 'grotty' nummi reported from the site of Ipplepen (Devon) in 2008 have since developed into a collaborative programme of geophysics and excavation with the University of Exeter that has revealed a Roman settlement, road, burials, and 308 Roman coins, the largest Roman numismatic assemblage in southwest Britain outside the *civitas* capital of Exeter (Rippon and Smart, 2024; Brown and Moorhead, 2025). We can also talk about the 'Frome effect', so-called after the hoard of c.52,500 3rd century coins excavated in Frome, Somerset, in 2010 (PAS: SOM-5B9453; Moorhead, Booth, and Bland, 2010). This had an instrumental effect on perceptions and practices when dealing with large, complex archaeological assemblages and their contexts, in large part thanks to the responsible actions of the finder who reported the find to the FLO to enable full archaeological investigation. Publicity surrounding the hoard promoted increased awareness amongst finders regarding how to approach similar finds without damaging or

destroying delicate archaeological context, resulting in many more hoarded assemblages being left *in situ* for proper archaeological investigation and/or subsequent analyses in laboratory conditions at the BM (*Figure 9*). The AHRC-funded BM and University of Leicester hoards project (Bland et al., 2020) resulting from the discovery of Frome further demonstrated the importance of archaeological context when dealing with these kinds of assemblages, continuing to promote understanding of the archaeological or historical contexts within which these coins circulated and were deposited.

Challenges

The PAS still faces many challenges in recording finds, promoting best practice, and mitigating against damage or loss to the archaeological record. In some cases, there remains reticence or reluctance to record. In others, there might be an element of selectivity, whether on the part of finder or recorder, over what is presented for recording. The process is, after all, entirely voluntary and other than objects that qualify as potential Treasure in England, Wales, and Northern Ireland, there is no requirement to report even if continued engagement over the last two decades has removed some of the barriers and misconceptions (on both sides). Particularly poorly preserved Roman coins present their own difficulties in this regard, whether not presented for recording because they're 'illegible' or perhaps perceived to be of no historical value as a result. The real benefit of PAS engagement with finders is to demonstrate that even the most worn coins can usually be given some level of identification, offering insight and often cumulative evidence for coin use/loss, and therefore still vital components of the archaeological record. Of course, other factors affect the feasibility of this. Illicit activity by a few individuals is destructive archaeologically and places continued strain on collaborative relationships between the heritage sector and the majority of finders who are acting responsibly. Large, organised events ('rallies') present similar problems in terms of producing useful, usable archaeological data (Lewis and Heyworth, 2021). While it must also be remembered that the PAS is a partnership scheme, hosted by local partners around England and

Wales, which results in variation in terms of the level, degree, or capacity of local engagement in the recording process.

Ultimately, we can't know how much we aren't seeing and, in the context of Roman coin use/loss, what this might mean in terms of understanding Roman Britain. While the c.74,500 single finds recorded by the PAS in 2023 represents a substantial contribution, the limitations to what is and can be recorded have to be remembered. However, continued engagement to demonstrate the reasoning behind the process and the importance of best practice, acknowledging the roles and contribution of *all* parties involved, should go some way to alleviate some of these issues in the future.

The future

Thanks to Government funding through DCMS, the PAS is in the process of rebuilding its database, with developers Numiko working in collaboration with the BM, PAS, finders, and the wider academic community to produce a new version of the database in 2026. This will force us, to some degree, to think about how we're currently recording numismatic data and whether this is the best or only way we could do so. Many of these discussions are ongoing, with a focus currently on the structure of the numismatic pages and numismatic guides/guidance within the database for those using it for recording or research. The key element here is that the data should be usable and accessible using FAIR ('Findable', 'Accessible', 'Interoperable' and 'Reusable') principles (Lewis et al., 2025a). PAS data has been used for many hundreds of research projects (<https://finds.org.uk/research>) and the Roman coin data feeds into both OCRE and CRRO. It is vital that these linkages are maintained and developed so that the Roman numismatic data being put into PAS can achieve its best potential.

Perhaps as important is continued engagement with finders, collaboration with public and academic communities, and promotion of best practice to ensure that we have good data for archaeological material being discovered every year. We must continue to demonstrate why we record material, why the data is important, and why doing things correctly means that we can mitigate against damage to our finite and often



Figure 10. A nummus of the House of Valentinian (top; NLM-0DA5D1) and a solidus of Valentinian I (bottom; LVPL-8A8E89)

fragile archaeological record. The redevelopment of the database may be crucial in this regard. As technology advances and new digital tools emerge, the potential for developing better, more comprehensive ‘citizen science’ approaches become a reality (Lewis, Ehrnsten et al., 2025b) and this might in turn help to resolve some of the capacity issues faced by the PAS noted above.

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- Greater accessibility and ease of recording (‘people power’) through better digital tools would undoubtedly prove beneficial in ensuring that as many of the large numbers of finds discovered annually within England and Wales are recorded. Of course, this also brings with it added challenges of ensuring data accuracy and quality from an archaeological and research perspective. However, the potential is there through the (re)development of the PAS database for better (and digital) engagement – particularly with finders – in the recording process to produce extensive, good archaeological data.
- Great strides have been made in the last two decades and the potential to work collaboratively, to remove barriers, or to promote better understanding between all parties involved is essential. In so doing, we can hopefully develop more widespread understanding that a horrible, grotty 4th century nummus is just as important archaeologically as a nice shiny gold solidus (Figure 10). More importantly, by highlighting the significance of context and spatial data we can move away from dots on maps to more useful and revealing analyses that will help to demonstrate *why* we need to protect and fully record any archaeological finds (and by implication the limitations imposed if we don’t), but also ultimately lead to better understanding of coin use and loss within Roman Britain.

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Public Engagement Strategies for the Enhancement of the Numismatic Heritage from Paestum

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The documentation from Paestum represents a privileged case within the framework of research on the monetary systems of the ancient world.¹ It is particularly significant for the experimentation with systems for managing numismatic heritage and for the application of this body of knowledge in strategies aimed at communicating the history and social dynamics of one of the emblematic cities of Antiquity to the public.²

In particular, this is the case for the project *Dip_Coins* – Digital Paestum Coins – aimed at the digitisation, cataloguing and study of the coins found at the archaeological site of Paestum. The project aims to create a comprehensive digital database, accessible to both scholars and the public, to promote knowledge of the local numismatic heritage. The finds are documented not only as individual coins, but also with references to the excavation context, analysis and previous documentation, thus reconstructing the object biography. The initiative also aims to contextualise the coins within the economic and political history of Paestum, combining scientific research and cultural enhancement.

The numismatic heritage from the ancient city of Paestum

Thanks to past research efforts, it is now feasible to systematise a wide array of numismatic data recorded since the earliest systematic investigations in the urban area at the beginning of the 20th century. The bulk of the numismatic collection of the Museum of Paestum comprises a

substantial number of coins recovered during excavation campaigns carried out during the Fascist period, both within the urban area and in the extra-urban sanctuary of *Hera Argiva* at Foce Sele. In addition to the small number of coins discovered in the earliest investigations within the city walls, these finds have significantly contributed to reconstructing the monetary landscape of the ancient city and its surroundings.

The dual origin of the numismatic materials – from both urban and extra-urban contexts – provides a unique opportunity to analyse the interaction between the economic and social dynamics of Paestum. Most coins were recovered during the extensive excavations of the 1960s and 1970s, which included investigations in the necropolis areas. These finds expanded the numismatic corpus, providing a broader perspective on coin circulation across urban, sanctuary, and funerary contexts. For example, the inclusion of coins from funerary contexts can offer critical insights into burial practices and the symbolic role of coinage, complementing urban and sanctuary assemblages.³ Subsequent excavations, carried out in the following decades and progressing to this day by various research teams, continue to enrich the informational heritage on coin finds. Specifically, over 8,000 coins are currently preserved at the Museum of Paestum, primarily from the urban area, with smaller quantities from the necropolis and extra-urban sanctuaries (notably Santa Venera near the city walls and the *Heraion* at Foce Sele). However, this corpus of material remains incomplete for two main reasons.

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¹ Ebner, 1970: 19–44; Crawford, 1973: 47–109; Crawford, 1976–77: 151–159; Cantilena, Pellegrino & Satriano, 1999: 9–154; Cantilena, Pellegrino, Pantuliano & Satriano, 2003: 25–156; Cantilena, 2010: 685–732; Cantilena, 2011: 15–28; Carbone, 2012: 253–260; Carbone, 2014; Carbone & Grimaldi, 2014: 92–97;

Cantilena & Carbone, 2015; Carbone, 2018: 443–450; Debernardi & Carbone, 2018: 305–314; Cantilena, 2021: 407–414; Cantilena, 2022: 201–222; Carbone, 2022a: 529–538; Carbone, 2022b: 223–250; Libero Mangieri, 2006; Carbone, 2024.

² Carbone, 2022a: 529–538.

³ Prisco, 1981: 23–56; Sestieri, 1967: 185; Scafuro, 2019: 56, 62–63, 80, 152.



Figure 1. Hoard of bronze coins and gaming tokens from the suburban territory of Paestum (1st century BCE)

First, additional groups of coins from Paestum are held in other institutions – often transferred there before the establishment of the local museum – such as certain hoards of silver coins today stored in the Coin Cabinet of the Archaeological Museum of Naples.⁴ Some further coins from excavations conducted by different local authorities, or currently held at the Superintendency based in Salerno, are also part of this dismembered *corpus*. This includes only three gold coins: a stater from Lampsacus, an aureus of Clodius and an aureus of Augustus.⁵ The coin finds generally consist of single finds of bronze coins, apart from a hoard of about thirty bronze coins published by Annalisa Polosa and two other hoards found near the area of Licinella. There is a significant number of silver pieces, although this figure must take into account the presence of hoards. Of about 1400 silver coins, just under 1000 come from hoards and in particular a group of 646 specimens – therefore about half of the total – is composed of a homogeneous nucleus of the Augustan period.⁶

The second reason is related to the presence of many other coins still stored with unpublished

contextual materials. Consequently, the number of specimens has progressively increased over the years and is expected to grow further.

Therefore, considering the vast amount of available data and the specificity of the material, the coinage of Paestum provides a significant example for understanding the economic and institutional dynamics of a vital and prolific city in ancient Lucania. The study of finds of both foreign and local coinage provides effective insights into the developmental phases and economic dynamics of the Greek city. Moreover, bronze coins – and especially those from the Roman period – characterised by types associated with local dignitaries and events, reflect a complex administrative structure and a remarkable ability to adapt to the monetary needs of the time. This coinage, for instance, often served to address the shortage of Roman bronze issues, playing a complementary role within the monetary system of the time. The coinage of Paestum thus allows for the reconstruction of the city's transition from a Latin colony to a *municipium*, tracing its development up to the Tiberian era. Through the analysis of legends and coin types, key institutional roles emerge, such as those of the *quattuorvirii*, *duovirii*, *patroni*, *praetori*, *epulonii*, and *flamines*. In some cases, coin production may have involved private citizens, an unusual but noteworthy phenomenon that underscores the unique local context. This is exemplified by Mineia, a wealthy matron notably active in the social fabric of the city during the early Augustan period (Figures 1–3).⁷

Another point of interest is the diffusion of Paestum's coins beyond the city's boundaries, with a series of imitations produced in other territories. This phenomenon indicates an extensive monetary circulation, as the same types were copied even in regions far from Paestum.⁸

Finally, the analysis of this coinage sheds light on the relationships between Rome and its peripheral centres, revealing an active interaction

⁴ IGCH 1876 (Pozzi, 1962-64: 77–82), IGCH 1892 (Pozzi, 1962-64: 82–90), IGCH 1893 (Pozzi, 1962-64: 91–109).

⁵ Cantilena, 2017: 323–327; Carbone, 2016: 101.

⁶ Polosa, 2000: 113–117; Carbone [forthcoming]; Cantilena, 2000; Debernardi & Carbone, 2018: 305–314.

⁷ Cantilena & Carbone, 2015: 62–63; Crawford, 1973: numbers 37/a, 37/b, 38/a, 38/b, 38/c; Carbone, 2014:

number 27; Torelli, 1981: 103–115; Torelli, 1996: 154–158; Torelli, 1988: 111; Torelli, 1999: 101–105; Cantilena, 2021: 407–414.

⁸ Stannard & Carbone, 2013: 255–301; Cantilena, 2021: 407–414.



Figure 2. *Semis from the local mint attributable to emissions linked to Mineia, a local matron (late 1st century BCE)*



Figure 3. *Semis from the mint of Paestum with reference to local magistrates (late 1st century BCE)*

that contributed to the Romanisation of local institutions. While local coinage mainly provides insights into the period spanning from the late 6th century BCE to the Tiberian era, other finds provide evidence of the city's monetary practices extending into Late Antiquity, with hoards of small-change playing a key role. These discoveries align with a broader pattern of circulation of coins not from Paestum, persisting even after the cessation of local minting. The presence of foreign currency – not limited to Roman issues – highlights its complementary role to local coinage in later phases, shedding light on Paestum's economic activity and continuity up to the early 5th century CE. This continues with findings from more recent phases, recounting stories of the spoliation of architectural materials for reuse in other contexts, as well as serving as evidence of the rediscovery of the ruins in more recent times.

This wealth of knowledge provides a unique perspective for recounting the city's history in an accessible way, leveraging one of the most iconic objects the ancient world has left us. In the context of museum communication, the features of that coinage can serve as a unique medium to narrate stories of territories, societies, and individuals who produced and used them. This applies to both single coins and large hoards, making numismatics an effective tool for engaging audiences and deepening our understanding of the ancient world. This, for example, helps us to understand who assembled a hoard and how they did so, coins of what values were in use during the various phases of the city's life, and how the sense of economic value could shift depending on the wealth of the different strata of

the population. Similarly, it reveals the challenges faced during times of crisis or how economic decisions made in centres of power were subsequently bypassed through alternative measures adopted in the local context.

[F.C.]

Coins, new permanent exhibition and public engagement at the National Archaeological Museum of Paestum

The Archaeological Parks of Paestum and Velia (PA-PAEVE) is an Institute of the Italian Ministry of Culture with special autonomy that manages the museums and archaeological areas of the ancient cities of Poseidonia-Paestum and Elea-Velia, included in the UNESCO World Heritage List since 1998. The institutional mission of the Archaeological Parks of Paestum and Velia is the protection and enhancement of its archaeological collections and monuments, as well as research and dissemination of knowledge among scientific and non-scientific communities.

In recent years, a series of major projects have been designed and implemented to improve public access to the cultural heritage of the ancient city of Poseidonia-Paestum. In particular, the Parks carried out a complete renovation of the National Archaeological Museum of Paestum from a structural-technical and museological-museographic point of view. The works included the restoration of the building, a general reorganisation of the permanent exhibition and of the communication strategy, as well as the improvement of the physical, sensorial and cognitive accessibility of the archaeological and documentary heritage.⁹ The project consist of two

⁹ D'Angelo, Marino & Manzo, 2025.



Figure 4. Roman Republican silver denarius from Paestum: before and after the conservation treatments, with the corresponding analysis of degradation factors

interrelated projects financed by European funds.¹⁰ The new permanent exhibition of the National Archaeological Museum of Paestum was inaugurated on 2 October 2023, while the section dedicated to Paestum from the Roman period to the present day was opened to the public on 15 November 2024; other exhibition spaces are currently being renovated and will be opened soon.

The museum's new visit pathway ideally follows the stratigraphic sequence of an archaeological excavation, from the bottom to the top, from the oldest to the most recent periods. The archaeological collection spans the Prehistory and Protohistory of the site (section 'Prehistory and Protohistory'), the development of the city of Poseidonia during the Greek and Lucanian periods (section 'The Graeco-Lucanian city'), the transformations that took place in Paestum from the Roman period to the modern era, and finally the 'rediscovery' of the site from the 18th-century *Grand Tour* to the most recent archaeological

research and studies (section 'Paestum: from the Roman city to the present day'). The visit also includes the storage areas (section 'Beyond the museum').

Apart from a single hoard of silver coins from the Augustan period, coins and medals had never previously been displayed in the museum. A close collaboration between the Archaeological Parks of Paestum and Velia and the University of Salerno ensured that the new exhibition included coins both in the section dedicated to the Graeco-Lucanian city and in the section dedicated to the development of the city from the Roman period to the modern era.

Nowadays, the main challenge for the museum is to provide equal access to culture and information for all users. The aim is to make archaeology, and even more so numismatics, accessible to the general public and to help people understand the role of coinage in the society and economy of the ancient city. Therefore, the museum's narrative was specifically designed to enhance the rich heritage of coins and coin finds from Paestum through innovative display solutions, educational tools and communication strategies.

Once the scientific and exhibition project was completed, the first practical step was to carry out cleaning and conservation treatment on the selected coins in the museum's Conservation Laboratory, in order to display them in the best possible condition (*Figure 4*).

Display cases and inclined stands were specially designed for coins and coin hoards to ensure that the items can be viewed with optimum ease, even by wheelchair users (*Figure 5*). A unified communication system was developed for the entire museum exhibition. The educational content follows the current guidelines on accessibility, clarity and hierarchy of information: each section of the museum is identified by a specific colour and a wall banner; information totems placed along the pathway mark the sub-sections; the narrative is based on panels for general topics

¹⁰ National Operational Programme (NOP) 'Culture and Development' 2014-2020 called 'Lavori di ristrutturazione, ammodernamento e riqualificazione finalizzati all'implementazione dell'offerta di visita, al miglioramento della fruizione in sicurezza e al contenimento del fabbisogno energetico – Museo

Archeologico Nazionale di Paestum'; NOP 'Culture and Development' 2014-2020 called 'Completamento del restauro e del recupero del Museo Archeologico Nazionale di Paestum con interventi di sistemazione degli spazi esterni, adeguamenti funzionali e per il superamento delle barriere architettoniche'.

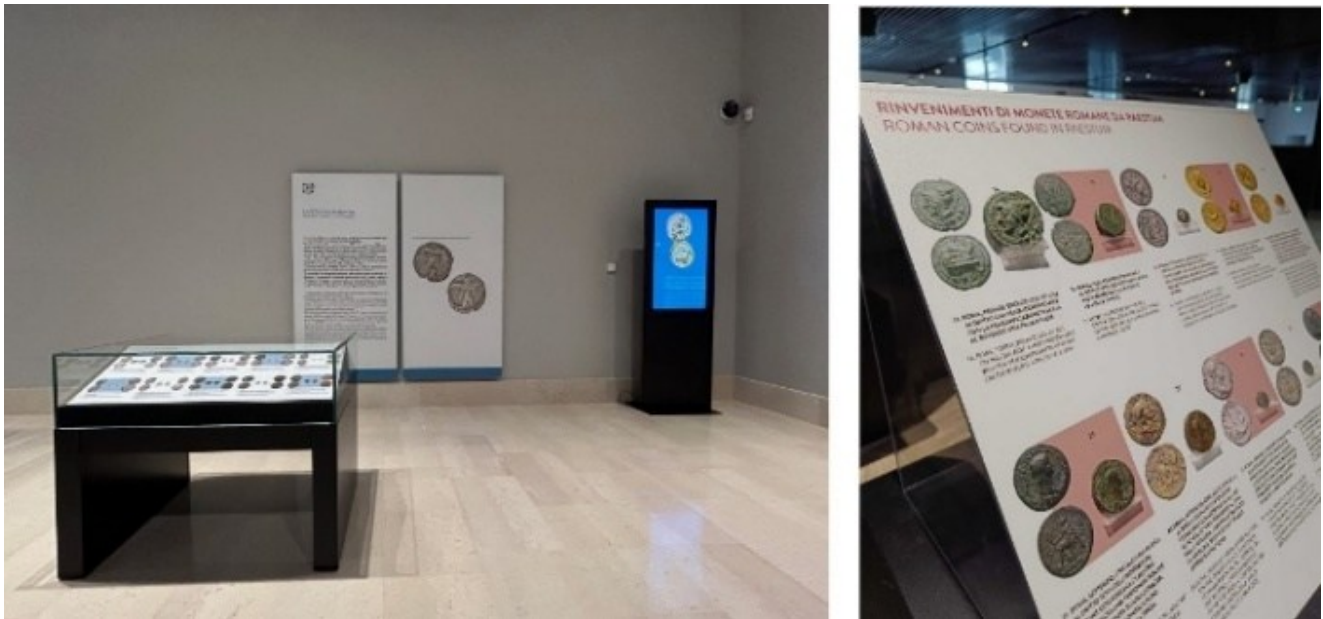


Figure 5. *National Archaeological Museum of Paestum: display cases, inclined stands and educational content designed for the coin exhibition*

and captions for individual objects. The coins are accompanied by enlarged images of the obverse and reverse to make the types and legends easier to read.

The texts use a language that is immediately understandable to the general public and technical terms are always accompanied by the corresponding general word. An effort has been made to simplify without losing sight of the museum's educational role.

Digital devices and sources play a key role in supporting the narrative of the exhibition: multimedia displays are integrated into the visit pathway to assist in learning more about coins and coinage; the museum also offers a digital archive, called 'HERA', to explore its archaeological and numismatic heritage.¹¹ 'HERA' is an open-access integrated digital platform for the cataloguing, management and study of the cultural heritage of the Archaeological Parks of Paestum and Velia.

Several European and nationally funded projects have also improved the museum's accessibility, including the production of three-

dimensional tactile replicas of artefacts (and coins) for the visually impaired and the creation of multimedia content in LIS (Italian Sign Language) and ISL (International Sign Language) about the archaeological collection specifically designed for the hard of hearing, both of which have been incorporated into the permanent exhibition.¹²

At the same time, the Parks are working on several projects to engage the public more effectively through educational activities and innovative temporary art exhibitions.

As part of the European Archaeology Days 2024 (15 June), the Archaeological Parks of Paestum and Velia in collaboration with the University of Salerno organised a workshop for the general public to discover the numismatic collection of the Museum of Paestum: 'Coins tell tales. Stories, myths and people of ancient Paestum'. The public was actively involved in the storytelling, they could see and touch coins, satisfy their curiosity and learn more with the help of numismatists and museum curators (Figure 6). The Parks also hosted 'Epochal signs. Fernando

¹¹ D'Angelo & Scelza, 2023.

¹² European funded intervention of the National Recovery and Resilience Plan (NRRP), Mission 1, Component 3, Culture 4.0 (M1C3), Measure 1, Investment 1.2 entitled 'Miglioramento dell'accessibilità fisica e cognitiva del patrimonio archeologico e documentale storico e corrente

del Parco Archeologico di Paestum e Velia. Museo Archeologico Nazionale di Paestum'; Nationally funded project called 'E.LIS.A. – ENJOY LIS ART CAMPANIA. Percorsi multimediali inclusivi sul patrimonio artistico e culturale della Campania accessibili per le persone sorde'.



Figure 6. *Workshop on coins organised at the National Archaeological Museum of Paestum during the European Archaeology Days 2024*

Mangone narrates Paestum' (26 October 2024 – 12 January 2025), a temporary exhibition of contemporary art in the Museum and the Archaeological Area of Paestum. Mangone is an internationally renowned local artist who depicts the Paestan artefacts and monuments in his paintings with a particular use of colour and light.¹³ During the opening ceremony, the artist performed an improvisation inspired by a Greek coin from Paestum, which was much appreciated by the audience (*Figure 7*).

Finally, and more generally, activities for the documentation of coins and those designed to increase public awareness of the importance of ancient coins have produced important results, such as the return of coins by anonymous visitors who had stolen them from Paestum decades ago. These actions also had a great deal of resonance with the local and national press. The Parks will therefore continue to work on new activities aimed at enhancing the numismatic heritage and involving the public.
[T.M.]

¹³ Marino, Silveti & Sirleto, 2024.



Figure 7. *Mangone's artistic performance inspired by an incuse silver stater from the Greek mint of Poseidonia*

A tale for all: selection and dissemination of numismatic material

In outlining the research and valorisation pathway, it is essential to dwell on the methods that the National Archaeological Museum of Paestum within the Archaeological Parks of Paestum and Velia and the numismatists collaborating in the project have adopted for the selection of materials, aiming to give back to the public not only an exposition, but a conscious narration. The reorganisation of the permanent exhibition has resulted in the display of more than 900 specimens related to individual finds or groups of them, of which 646 specimens are part of a single hoard.¹⁴ Without oversimplification, but always telling in an accessible and clear way, coins can help to bring the public closer to such topics as production, circulation and hoarding, tracing a long chronological timespan that begins with the monetary production of the ancient city until traces of activity in more recent times.

For this purpose, in the sub-section 'Public Space', part of the more general section 'The Graeco-Lucanian city', the magnificent incuse staters of Poseidonia are displayed, flanked by

¹⁴ Cantilena, 2000.

other silver and bronze fractional denominations produced by the local mint. Adjacent to this group, foreign coins are also illustrated, that is those produced in other cities or regions that circulated on the territory of Poseidonia, coming from Magna Graecia and Sicily, but also from more distant areas as in the case of a gold stater of Lampsacus.¹⁵

The structure of the sub-section ‘Roman public life’ (section ‘Paestum: from the Roman city to the present day’) follows that of ‘Public Space’ (section ‘The Graeco-Lucanian city’): a first part presents small bronzes of the city selected in particular for their local character, the types of which are related not only to the religious sphere, but also to the public sphere by representing local magistrates and public buildings; a second part is dedicated to Roman coins found in Paestum. The selection favours specimens in a good state of conservation which can be easily recognised even by a non-specialist public; therefore, specimens produced with different techniques (for example, a cast Republican triens and a struck Republican as) and in different metals (gold, silver and copper alloys) were selected, starting with coins minted in Republican Rome, through the High and Middle Empire, and to bronze pieces of the Constantinian age.

In any story about coins, it is crucial to include examples of different types of hoardings. In the same display case, on two different shelves, three hoards were selected: the large hoard of 646 denarii from the city and two smaller complexes, containing bronze coins and objects of various kinds, found outside the urban area.¹⁶ All three are displayed together with their containers. The choice was driven by the desire to show the visitor the largest hoard discovered at Paestum in comparison with more common forms of small savings that include objects of a different nature.

To enhance and facilitate the understanding of these two sections, two multimedia displays have been installed, one for the Graeco-Lucanian area and one for the Roman area, where high-resolution photos of the obverse and reverse of each specimen are projected. Details, such as engravings, symbols, decorations or small objects, are graphically highlighted for simpler and faster visualisation; some legends are trans-



Figure 8. National Archaeological Museum of Paestum: multimedia totem from sub-section ‘Roman public life’ (top: general view and bottom: detail of the displayed information)

¹⁵ Cantilena, 2017: 323–327.

¹⁶ Cantilena, 2000.

lated into both Italian and English; the most significant types of coins from the hoards are illustrated individually (*Figure 8*). For example, reverses with a depiction of everyday life such as a voting scene (RRC 292/1), of a mythological representation like the rape of the Sabine women (RRC 344/1a) or Aeneas with Anchises on his shoulders (RRC 458/1), but also of characters like Marsyas (RRC 363/1) whose statue can be seen in the Museum of Paestum.¹⁷

The use of these digital tools has proved particularly useful in differentiating information: while the captions are standardised with basic information described in a simplified lexicon, technological tools make it possible to enrich the information through thematic content – for example – on the monetary system in use in Latin Paestum where the different denominations and their value are explained, flanked by photos of the respective coins. These media are designed – following the communication strategies designed during the installation phase – to calibrate the information to the target users to which the museum addresses itself, allowing the creation of multi-level content.

A small space dedicated to coins is also reserved in the sub-section ‘From Late Antiquity to the modern era’. The pieces, displayed together with contemporary finds, were in this case selected with the purpose of telling the visitor about the frequentation of the site related to the progressive spoliation of the buildings in later periods up to the modern age. It consists of a hoard of 129 coins from the final centuries of the Roman Empire, three Byzantine folles, three billon denarii from the Swabian period and a small hoard of silver from the period of the Spanish viceroyalty.¹⁸ This is a little known aspect that it was felt important to emphasise, in this case the coins represent a tangible trace of the frequentation of the various places at times when other evidence is particularly rare.

The selected specimens, despite their uniqueness and ability to tell a local story, correspond to a traditional approach that can also be observed in other cabinets. However – in order to illustrate good storytelling – it is also worth mentioning the exhibition of a paper archival document that represents a fragment of history with which visitors can identify themselves. It consists of a letter from a primary school teacher in Paestum, Miss Guglielmina De Vito-Pastore, addressed to the Paestum Museum and kept with three almost illegible bronze coins, which were given to her by students long ago in 1929.

The desire to make the public more involved, a topic that is still hotly debated, has prompted the Archaeological Parks of Paestum and Velia to organise the workshop ‘Coins tell tales. Stories, myths and people of the ancient Paestum’, held during the European Archaeology Days 2024.¹⁹ On this occasion, visitors were able to learn about the role of the numismatist and the working tools used, and in particular they could touch the coins that are actually displayed in the sections of the museum. The team told the stories behind each piece, trying to make the public aware of the importance of the context of origin, too often lost. The participants, all belonging to the young-adult/adult-age category, showed great interest and curiosity for this initiative, still relatively rare in Italy.

There are numerous laboratory activities focused on coins, both in Italy and across Europe, mainly aimed at children aged 6–10. The most popular workshop is the one that allows you to reproduce a coin or create a personal one using different techniques.²⁰ Other forms of educational entertainment have also been tried, such as traditional games, team games or treasure hunts.²¹ However, although they are valid activities, they exclude an important category that is difficult to actively involve: teenagers. In strategies for wider dissemination more stimulating activities could

¹⁷ Denti, 1991: 133–188; Torelli, 1999: 12–13.

¹⁸ Cantilena, 2010: 700–703; Carbone, 2022b: 228, 238–239.

¹⁹ Volpe, 2020.

²⁰ Arqueología Somos Todos, <https://www.arqueocordoba.com/arqueologiasomostodos/didactica/>; Bibliothèque nationale de France, <https://www.bnf.fr/fr/agenda/week-ends-familles>; Museo Archeologico di Venezia,

<https://museiveneto.cultura.gov.it/eventi-e-mostre/crea-la-tua-moneta-romana-laboratorio-gratuito-bambini-al-museo-archeologico> [accessed 24 February 2025].

²¹ <https://cultura.gov.it/evento/tombola-con-monete-antiche-a-naxos-e-conversazione-sulla-filosofia-all-odeon>; <https://www.parcoarcheologicodidatticofrancavilla.it/laboratorio-di-numismatica-antica/> [accessed 24 February 2025].

be programmed for this target group, such as design competitions that have coins as their subject that can be reinterpreted according to the ideas of each participant. These works could then be exhibited in the museum, integrating them into its history.

The creation of calibrated strategies to encourage and involve more visitors is one of the objectives that the Archaeological Parks of Paestum and Velia and the numismatists who collaborate in these projects have proposed to be incorporated in the planning of future actions of public engagement.

[O.V.]

Credits

The content of this paper is the result of a joint collaboration between the Archaeological Parks of Paestum and Velia and the Chair of Numismatics at the University of Salerno. The reorganisation of the permanent exhibition of the Museum of Paestum was carried out by the Archaeological Parks of Paestum and Velia thanks to a major project financed by European funding, under the direction of Gabriel Zuchtriegel (2019–2021), Massimo Osanna (2021) and Tiziana D'Angelo (2022–2025) and the scientific coordination of Teresa Marino (2022–2025); the project for the documentation and integration of numismatic records, coordinated by the University of Salerno under the direction of Federico Carbone, was carried out with the collaboration of Olena Vynarchuk, whose contribution is part of her doctoral research [PhD funded by a PNRR Cultural Heritage scholarship, entitled 'The Enhancement of the Numismatic Heritage from Elea-Velia and Its Territory: Research and Knowledge for Protection and Public Enjoyment', supervisor Prof. R. Cantilena, co-supervisor Prof. F. Carbone].

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Collecting Casts. A project of digitalisation and musealisation of the coins in the *Museo dell'Arte Classica* at La Sapienza, Rome

CLAUDIA DEVOTO*

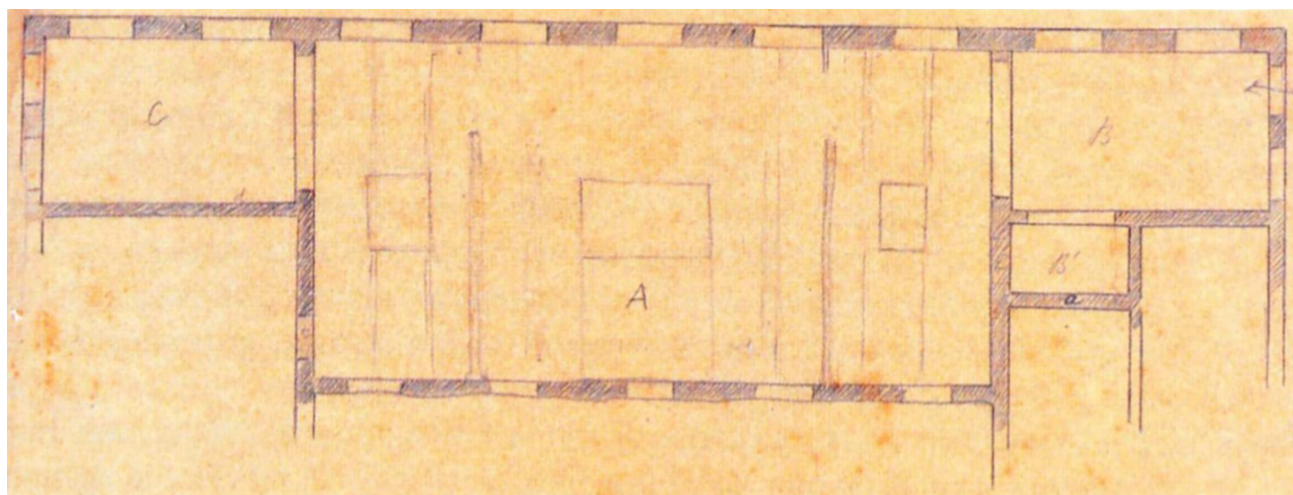


Figure 1. *The first location of the Museum in a sketch by E. Löwy (Barbanera, 1995)*

This paper presents the project of digitalisation of the plaster casts of coins kept in the Museo dell'Arte Classica of La Sapienza Università di Roma. The collection of the Museo encompasses more than 1300 plaster copies of statues, friezes, monuments and inscriptions that have been collected by several scholars starting in 1890. Among them, more than 200 coin casts lie unstudied and uncatalogued in the drawers of the Museum. Since 2020 they have been the subject of a photographic campaign, accompanied by the cataloguing and the study of their history. The project, developed under the direction of the then director, professor Marcello Barbanera, has continued thanks to the support of the director of the Polo Museale Sapienza, Dr Claudia Carlucci, and of the director of the Museo dell'Arte Classica, Professor Massimiliano Papini. The activities have also involved students from the Numismatics course taught by Professor Annalisa Polosa (see below). On the one hand, the digitalisation of the collection will provide a useful tool to preserve these fragile

samples; on the other, the identification of the prototypes along with information regarding their acquisition, that can sometimes be found in the registers of the Museum, contribute to writing the history of the studies in Numismatics carried out by the scholars who studied and worked at La Sapienza through the last century.

From the Museo dei Gessi to the Museo dell'Arte Classica

In December 1889, Emanuel Löwy, then professor of Classical Archaeology at the University of La Sapienza in Rome, wrote to the rector, V. Cerruti, proposing the establishment of an 'Archaeological Cabinet' within the University.¹ He argued that 'in order to make the study of Archaeology and Art History effective and to maintain it at the level of contemporary methods, the chair of Archaeology must be equipped with suitable resources to serve: 1) teaching, by providing the necessary materials for both lectures and practical exercises; 2) the execution of specialised research, in order to actively

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¹ Stucchi, Matini Morricone, 1984: 65–68; Barbanera, 1995: 1–36; Morricone, 1981; Bucolo, 2024; Donato, 1993: 62–75; Picozzi, 2013.

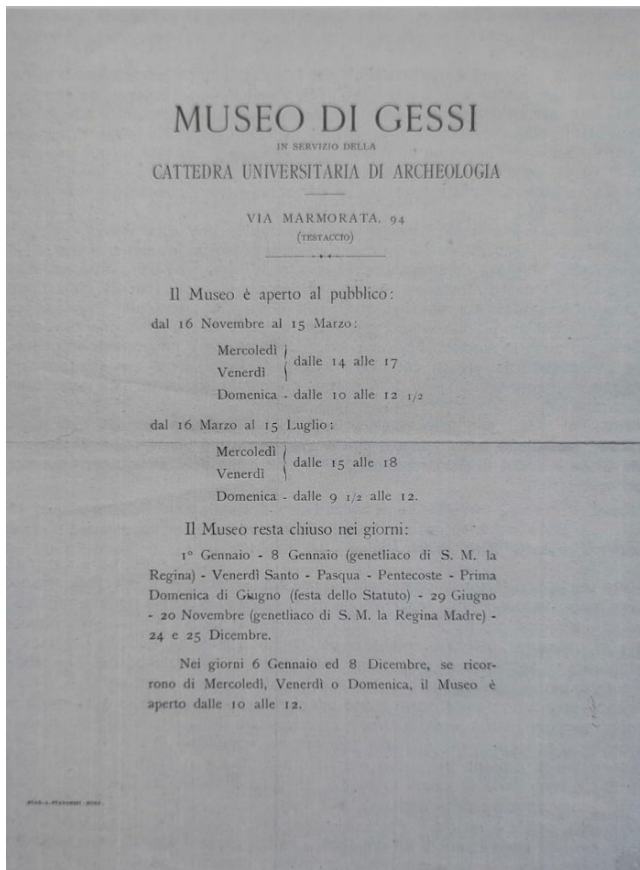


Figure 2. *A poster with the opening hours of the Museo dei Gessi in Testaccio (Barbanera, 1995)*

contribute to the advancement of the sciences'.² According to Löwy's project, the Cabinet was to consist of graphic and bibliographic materials and, finally, a carefully selected collection of plaster casts. Löwy's project was finally implemented in the autumn of 1892, when he himself identified the premises for the Archaeological Cabinet in several rooms in the Testaccio district, which were leased by the Rectorate. The facility consisted of a large rectangular hall, flanked by two smaller rooms, with a total area of 650 m² (Figures 1–2). The signing of the lease on September 30, 1892 marked the official founding of what was then called the 'Museo dei Gessi'. Simultaneously with the renovation, which was immediately undertaken to make the space suitable for housing the Cabinet, Löwy worked on assembling the collection, obtaining an initial set of plaster casts from the Institute of Art and

² Stucchi, Matini Morricone, 1984: 65; Barbanera, 1995: 1: 'per rendere efficace lo studio di Archeologia e Storia dell'Arte, e tenerlo al livello dei metodi odierni, la cattedra di Archeologia deve essere dotata di un corredo adatto a servire: 1) all'insegnamento, fornendo il



Figure 3. *The locations of the Museo dei Gessi from its creation to its current position at La Sapienza Campus*

the Museo Nazionale Romano. Through continuous effort, the director was able, in the following years, to expand the number of pieces through acquisitions and donations while also acquiring adjacent rooms to accommodate them. By December 31st, 1899, Löwy estimated the collection's value at 25,375.59 lire, and the Museum's area had expanded to 1,000 m², divided between the exhibition space and a lecture hall where classes were held.³

In 1911, on the occasion of the fiftieth anniversary of the Regno d'Italia, a large archaeological exhibition was organised at the Terme di Diocleziano, featuring works of art and plaster casts sent by various nations that had once been under Roman rule. At the end of the exhibition, Greece donated its 183 plaster casts to the Museo Nazionale Romano, which, two years later, assigned them to the Museo dei Gessi. However, with the outbreak of World War I, Löwy, who was of Austrian origin, was forced to return to his homeland. The direction of the Museum then passed to professor Lucio Mariani, who sought a new location for the collection, which had grown too large to be housed in its original premises in Trastevere. The Museum was thus relocated to several rooms within the Hospice of San Michele in Testaccio. However, the new spaces, covering

materiale necessario tanto per le lezioni, quanto per le esercitazioni pratiche; 2) all'esecuzione di lavori speciali, onde poter prendere parte attiva ai progressi delle scienze' (Archive of the Museum, 16th December 1889).

³ Stucchi, Matini Morricone, 1984: 65.



Figure 4. *One of the galleries of the Museo dell'Arte Classica*

700 m², proved insufficient to accommodate the collection, which had by then expanded to approximately 800 pieces. As a result, professor Giulio Emanuele Rizzo, who became director in 1925, immediately sought a more suitable solution for the collection, repeatedly appealing to the academic authorities and emphasizing that ‘the capital of the new Italy cannot show foreign visitors the most expressive monuments of Greek and Roman civilisation relegated to a hospice without embarrassment’.⁴ A solution was finally reached in 1932, with the decision to establish the new university campus. The rector wrote to Rizzo inquiring about the spatial requirements of the Institute. Rizzo not only provided the rector with a detailed list of the necessary spaces but also contacted Marcello Piacentini, the architect over-

seeing the construction of the Città Universitaria. The Museum was allocated rooms in the basement of the Faculty of Letters, where it remains to this day. It was renamed the ‘Museo dell’Arte Classica’, with a collection of at least 1200 works and an area of 3000 m² (Figures 3–4).

The Coin Casts

The collection of the Museo dell’Arte Classica includes a small group of coin casts, which have been the subject of analysis since 2019, when a project aimed at their documentation, cataloguing and study was developed during the directorship of Professor Marcello Barbanera. This collection, which had never before been systematically studied, is only partially displayed in the Museum’s entrance showcases. The exhibition was created

⁴ Barbanera 1995, p. 21: ‘la Capitale della nuova Italia non può mostrare senza arrossire agli stranieri monumenti più espressivi dell’arte della civiltà greca e romana relegati

nell’ospizio’ (Archive of the Museum, 28th September, 1926).



Figure 5. *The casts in their current condition*

on the occasion of the inauguration of the new Museum's entrance, in 1995, by doctor Patrizia Calabria.⁵ The majority of the pieces are stored in the drawers beneath these cases, from which they are progressively removed for photography, cataloguing, and the assignment of an inventory number. The assemblage consists of highly heterogeneous pieces in terms of manufacturing techniques and state of preservation, acquired from different mould makers and therefore presumably originating from various places and periods (*Figure 5*). Consequently, each piece requires specific approaches both for documentation and for preservation and cataloguing methods. Some casts replicate the full appearance of a coin, featuring both obverse and reverse, while others have a single decorated face with the other side left smooth. Among the latter, some are affixed to cardboard cards, which have prevented

their separation and sometimes bear useful information regarding the coin's identity and provenance. Others, however, are loosely scattered in the drawers, requiring an initial effort to identify their corresponding reverse or obverse in order to reconstruct the original pairing. Further pieces are housed in small wooden trays with their own numbering system, likely indicating that they were acquired as a single lot and originate from yet another distinct source.

The research on this collection has been structured along two closely interconnected lines of inquiry: the cataloguing of the pieces and archival research. Due to the very nature of these items – small in size and thin in form – cataloguing is a crucial tool in preventing potential losses as well as damage. The first step of the project involved an approximate quantification of the pieces under examination. Given their small

⁵ Carandini, Barbanera, 1996: 329.

dimensions, many may have been dispersed across different museum spaces; for this reason, the total number – currently estimated at around 250 – is constantly being updated.

Two different cataloguing criteria have been adopted: alongside a descriptive cataloguing method based on the parameters generally adopted in numismatic catalogues (authority, mint, dimensions, description, bibliography), the ICCD (Istituto Centrale per il Catalogo e la Documentazione) cataloguing system has been implemented in parallel. This dual approach ensures both the creation of a comprehensive catalogue – soon to be made available on the Museum’s website – and the structured recording of data in an Excel file formatted according to the Scheda NU (Numismatic documentation standard), allowing for the eventual integration of these records into the Catalogo Generale dei Beni Culturali.⁶

Particular attention is being devoted to the identification of the prototypes from which the casts were made. While it is relatively straightforward to trace the archetype for casts of statues, friezes, or stelae, the situation is significantly more complex for coin casts. Although these can be linked to their original production series with relative ease, it is far more challenging to identify the specific prototype from which they were derived. In this regard, comparisons with printed catalogues, monographs – such as Rizzo’s volume, which likely utilised some of the casts currently housed in the museum for its plates on Greek coins from Sicily – and online databases of museums and auction houses play a crucial role.⁷ Identifying the archetype often enables the reconstruction of the individual cast’s history and, progressively, the history of the collection as a whole.

This effort is further supported by a second line of inquiry, namely archival research conducted directly within the Museum’s documentation. While tracing the entry of larger and presumably more significant works into the collection is relatively straightforward, coin acquisitions often occur in bulk, making it



Figure 6. *Top: the cast of the medallion in the Museo dell’Arte Classica. Bottom: its prototype (Gnecchi, 1989: 51 number 13 and plate 76.9)*

difficult – if not impossible – to determine their precise provenance and date of acquisition. In such cases, direct analysis of the piece, combined with a certain amount of luck in locating its prototype within a well-documented collection, becomes essential.

Thus, both archival research and cataloguing efforts contribute to the gradual reconstruction of the Museum’s history.⁸ The casts of dispersed or stolen coins can sometimes provide valuable information for reconstructing the history of numismatic collections. A remarkable example is the collection of casts preserved at Burton Constable Hall (Yorkshire, UK), made in the eighteenth century from a substantial portion of the coins in the Farnese Collection. Thanks to these casts, it has been possible to fill knowledge gaps regarding the composition and organisation of the Farnese collection before its transfer to the Museo Nazionale di Napoli.⁹ Purchase orders and requests for casts submitted by various directors to museums and private collectors provide direct insights into the formation of the collection. These archival records, integrated with data derived from the direct study of the coin casts and

⁶ Arslan et al., 2004.

⁷ Rizzo, 1945-1946.

⁸ Frederiksen, Marchand, 2010; Szöcs, Tóth, 2024; Hoover, 2012: 18–27; Williams, 2020: 555–572.

⁹ Cantilena, 2008: 261–269; Connell, 2009b: 231–255; Connell, 2009a: 33–47.

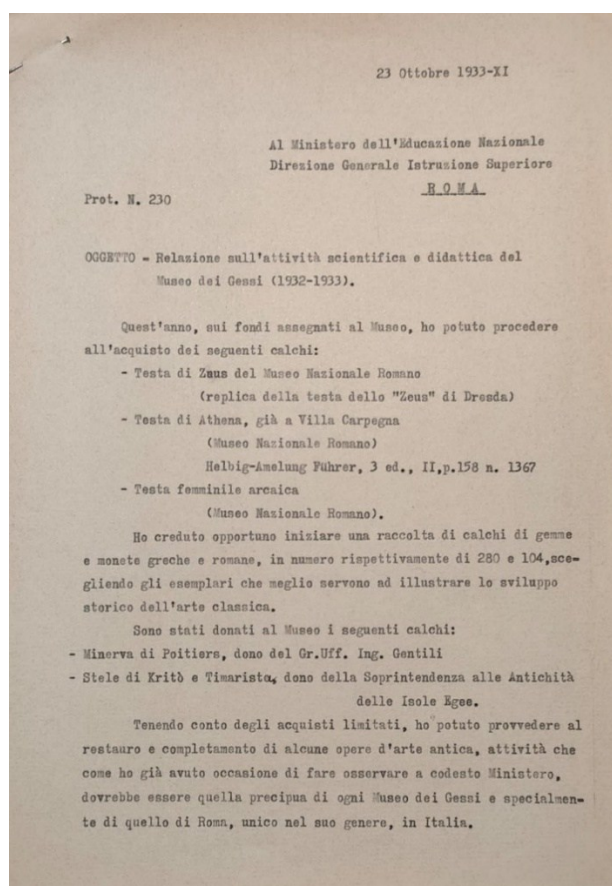


Figure 7. The letter of the director G.E. Rizzo announcing the creation of the numismatic collection (Archive of the Museum)

the challenging process of identifying their prototypes, help to piece together the history of the museum's holdings.

First Results

Since 2021, the cataloguing of these pieces has been incorporated into the practical exercises of undergraduate and graduate students in Archaeology, as well as those enrolled in the *Scuola di Specializzazione in Beni Archeologici* and the international programme in Mediterranean Archaeology. Students have had the opportunity of handling the casts themselves, gaining hands-on experience in identification and cataloguing, as well as engaging in the meticulous (and at times unsuccessful) search for their archetype. This direct engagement has allowed them to confront both the material and the challenges it presents in terms of study and conservation – challenges that, while in some respects similar to those posed by

genuine coins, differ significantly in terms of documentation, preservation, and philological analysis.

Among the newly acquired data, an interesting discovery is the identification of a medallion of Lucilla featuring a small inlaid eagle with outstretched wings, recognizable as a cast of a prototype originally belonging to the Gonzaga collection (*Figures 6a–b*).¹⁰ The obverse shows the bust of Lucilla to the right, LVCILLAE AVG ANTONINI AVG F and the reverse bears six vestals scarifying on an altar, in front of the temple of Vesta. It is well known that the Gonzaga family customarily affixed an inlaid emblem in gold onto silver coins, and in silver onto gold and bronze coins within their collection.¹¹

The ongoing analysis of acquisition records has made it possible to identify a series of dates corresponding to the procurement of coin lots. However, as previously noted, these acquisitions were recorded in general terms without detailed listings of individual pieces, making it necessary, in the next phase of research, to group the casts into major sets that can be linked to specific acquisition dates. Meanwhile, the examination of archival documentation has yielded an initial significant insight into the formation of the collection: a letter from the then director Rizzo to the Ministry of National Education, Directorate General for Higher Education, dated October 23rd 1933 (*Figure 7*). The text reads as follows:

‘This year, using the funds allocated to the Museum, I was able to proceed with the acquisition of the following casts:

- Head of Zeus from the National Roman Museum (a replica of the ‘Zeus’ head from Dresden)
- Head of Athena, formerly in Villa Carpegna (National Roman Museum) *Helbig-Amelung Führer*, 3rd ed., II, p. 158, no. 1367
- Archaic female head (National Roman Museum)

I considered it appropriate to initiate a collection of casts of Greek and Roman gems and coins, numbering 280 and 104 respectively, selecting

¹⁰ Gnechi, 1912: 51, number 13 and plate 76.9.

¹¹ Simonetta, 1979: 359–373; Simonetta, Riva, 1983: 333–341.

those specimens that best illustrate the historical development of classical art. The following casts have been donated to the Museum:

- Minerva of Poitiers, donated by Gr. Uff. Eng. Gentili
- Stele of Kritò and Timarista, donated by the Superintendency for Antiquities of the Aegean Islands.

Given the limited acquisitions, I have been able to allocate resources to the restoration and completion of certain works of ancient art – an activity that, as I have previously pointed out to the Ministry, should be the primary objective of any Museum of Plaster Casts, and particularly of the one in Rome, unique in its kind in Italy’.¹²

Based on this letter, it appears that Rizzo himself was responsible for acquiring the first nucleus of what is now the Museo dell’Arte Classica’s collection of coin casts – an operation likely carried out between 1932 and October 1933. This is not surprising, as it is well known that numismatics was among Rizzo’s academic interests, as evidenced by his aforementioned monograph on *Greek Coins of Sicily*, for which at least some of the plates were likely produced using the very casts that remain stored in the Museum’s drawers and display cases to this day.

A second letter, dated 1937, from Professor Secondina Lorenza Eugenia Cesano, who was

then working at the Medagliere of the Museo Nazionale Romano, to the then director of the Museum, Professor Giulio Quirino Giglioli, refers to his request for a series of coin casts intended for the Mostra Augustea della Romanità, which was inaugurated in Rome on the 23rd September 1937.¹³ Giglioli requested a double copy of the casts so that one set could be allocated to the Museo dell’Arte Classica. On that occasion, Professor Cesano sent 80 coin casts, each provided with its own label.¹⁴

Based on this information, it may be possible to make an initial distinction between the group of two-sided casts – possibly those requested by Rizzo and added to the Museum’s collection between 1932 and 1933 – and a second lot, acquired by Giglioli in 1937. This hypothesis could be confirmed as the work progresses. So far, efforts have led to the completion of the cataloguing of pieces from the Roman Imperial period, which will soon be available on the Museum’s website.

In the meantime, based on better knowledge of the collection, the possibility of a new arrangement of the numismatic section is being considered. This would not only enhance the educational activities already taking place at the museum, but also improve the overall accessibility of the collection for visitors.

¹² Archive of the Museum, 23rd October 1933: ‘Quest’anno, sui fondi assegnati al Museo, ho potuto procedere all’acquisto dei seguenti calchi:

- testa di Zeus del Museo Nazionale Romano (replica della testa dello ‘Zeus’ di Dresda)
- testa di Athena, già a villa Carpegna (Museo Nazionale Romano), Helbig-Amelung Führer, 3ed., II, p. 158 n. 1367
- testa femminile arcaica (Museo Nazionale Romano).

Ho creduto opportuno iniziare una raccolta di calchi di gemme e monete greche e romane, in numero rispettivamente di 280 e 104, scegliendo gli esemplari che meglio servono ad illustrare lo sviluppo storico

dell’arte classica. Sono stati donati al Museo i seguenti calchi:

- Minerva di Poitiers, dono del Gr. Uff. Ing. Gentili
- Stele di Kritò e Timarista, dono della Soprintendenza alle Antichità delle Isole Egee.

Tenendo conto degli acquisti limitati ho potuto provvedere al restauro e completamento di alcune opere d’arte antica, attività che come ho già avuto occasione di fare osservare a codesto Ministero, dovrebbe essere quella precipua di ogni Museo dei Gessi e specialmente di quello di Roma, unico nel suo genere, in Italia.’

¹³ Liberati, 2019: 53–96.

¹⁴ Archive of the Museum, 24th May 1937.

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Radiates in context: chemical and archaeological analysis of the ‘Barbarous Radiates’ coinage phenomenon in Roman Britain

TASHA FULLBROOK*



Figure 1. *Barbarous radiate* dating to c. 275 – 285 CE, prototype unknown (PUBLIC-D7CECD)(Image with cm scale)

In the 270s and 280s, huge numbers of imitations of copper-alloy radiate coins, usually referred to as ‘barbarous radiates’, appeared predominately in Britain and Gaul. These typically copy coins of the central emperors from Gallienus (sole reign, c. 260–268 CE) to Quintillus and the Gallic usurpers from Postumus to Tetricus II, with some later examples, e.g. for Aurelian (270–275 CE) and Probus (276–282 CE). My research aims to provide a refreshed approach to this undervalued coin type, and this paper will introduce key elements of my methodology. Using an interdisciplinary approach which combines numismatic, archaeological and metallurgical analyses, my project will explore the production and use of these imitations and attempt to place them within the context of late 3rd century Britain.

The chronic debasement of silver coinage in the 250s and 260s resulted in earlier large bronze (copper and tin) denominations being driven out of circulation as their value as scrap metal far exceeded their official monetary value. The



Figure 2. *Barbarous radiate* copying *Tetricus I* (AD 271–4), dating to c.AD 275–285 (PUBLIC-033BBE) (Image with cm scale)

empire was split after Postumus led a revolt in 260, forming the breakaway ‘Gallic Empire’. When the central and Gallic Empires were finally reunified in 274 under the emperor Aurelian, there was a shortfall in low value small change which is argued to be the driving force behind the production of radiate ‘imitations’ to fill this gap (Reece 2012, 15).

Barbarous radiates vary in size, style and execution, with some measuring only a few millimetres in diameter and far removed from their original prototypes (*Figure 1*). Others are well executed but can be distinguished from official coins based on errors in the iconography or legends and their varying sizes (*Figure 2*).

Aims and objectives

The core aims of my topic are to provide new practical and conceptual frameworks for the study of these coins. This will be achieved by investigating regional variation in selected case studies. These case studies will cover regional distributions across Britain, as well as different

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types of sites (rural, military, votive etc). Variation in individual coins may be in the form of their iconography, size, or metal composition. I will also assess the character of different collections of imitations, for example hoards, coin scatters and stray finds.

This project will attempt to explore the meaning of copying, irregularity or imitation at this time and relate this to contemporary metallurgical practice. Key research questions will focus on the function and production of these coins and how they operated in the monetary economy. Combining this with chemical analysis will be key, as we can begin to establish the source of the metal and assess alloy varieties within the barbarous radiate phenomenon, as well as establishing if they are radically different in their composition to their official prototypes.

Methodology

This project uses an interdisciplinary approach (numismatic, archaeological and metallurgical analyses), each of which is introduced below.

Numismatic analysis

Terminology

A new terminology for barbarous radiates is sorely needed. What do we actually mean by the term ‘barbarous radiate’? It is useful to move towards the term ‘imitation’? Have the connotations of the word ‘barbarous’ hindered the study of these coins? There needs to be a clear distinction to whether they are named ‘barbarous’ based on the chosen art style or because they badly copy official types. Additionally, are the examples that closely copy an official prototype ‘barbarous’? Their purpose may not have been to directly deceive as copies or forgeries and therefore the terminology must clearly reflect this.

This study will attempt to redefine these ‘imitations’ and give them a new meaning, by placing them in their historical and archaeological context and considering them as currency. The smaller barbarous radiates are often referred to as ‘minims’, a term that has been employed since the 19th century (Davies 1988, 99). As Davies correctly points out, this term is extremely vague and therefore he specifically applies this term to barbarous radiates with a diameter of 13mm or below, as these coins are distinctly

different in their appearance from regular coins (Davies 1988, 100). It is useful to distinguish between larger and smaller barbarous radiates in site and hoard collections, and therefore developing new precise terminology will be crucial.

Typology and classification

Fundamental to my project is the development of a new typology for the classification of barbarous radiates. Although previous attempts have been made to devise a system of classification for them (Sutherland, 1937; Hill 1949; Davis 1988), no universal approach or methodology for their classification has yet been adopted by numismatists. This has resulted in many issues when they are found as site finds, in hoards or during excavations, leading to a diverse range of recording practices. This further hampers the comparable study of this material.

There are many criteria which will need to be considered such as size and weight, prototypes for obverse and reverse, die-links and more. A draft typology will be developed in collaboration with heritage professionals such as Finds Liaison Officers from the Portable Antiquities Scheme, numismatists and archaeologists, in order to capture their experience of recording barbarous radiates. This working typology will be tested on various case studies, including both hoards and site finds, before further cycles of consultation and refinement.

Function

Despite their interpretation as a reaction to Aurelian’s reforms in 274 CE, the reason for the production of barbarous radiates is certainly more complex than one single historical event. Although it does seem that it stemmed from a lack of low denomination coinage in the western provinces and the higher value of the newly reformed *aureliani*.

Counterfeiting in the Roman Empire was met with stiff resistance from the authorities and punishments were severe, especially in the case of gold and silver (Boon 1988, 103), but the reaction to barbarous radiates seems different. Pilon argues that imitations would not be accepted by authorities but were tolerated to maintain economic activity and relative social peace in the provinces concerned (Pilon 2019, 9). If this view

is correct then it is misleading to class them as forgeries. Were they meant to deceive or were they just meant to generally look like coins? The subtle difference here could explain their ‘crude’ and ‘barbarous’ stylisations.

Archaeological analysis

To understand the production and motivations behind the circulation of barbarous radiates, it is necessary to assess monetary and economic policy in their historical and archaeological backgrounds. The framework of late third century politics and monetary policy is an essential part of my approach to interpreting barbarous radiates and their function. The Portable Antiquities Scheme (PAS, <https://finds.org.uk/>, founded in 2003) aims to record public discoveries of archaeological material outside of excavated contexts, and will therefore provide a large proportion of finds data for my project. Barbarous radiates were less frequently recorded (and without images) when the Scheme first began, largely due to the lack of understanding of their potential research benefit. However, attitudes towards them have changed and they are now encouraged to be recorded in as much detail as possible with high quality images, facilitating an updated study.

The data from the Scheme regarding barbarous radiates has never been fully analysed. As it stands, a search of the term ‘barbarous’ and ‘radiate’ brings up just over 16,300 coins, 12,082 of which are recorded as ‘barbarous radiates’. This data will inevitably need systematic and meticulous analysis to draw out precise results, however the PAS provides us with a new source of information that has not previously been integrated with literature on barbarous radiates and hoard finds. Through the PAS, it is possible to identify regions which have higher proportions of barbarous radiates recorded as site finds compared to other areas of the country (*Figure 3*). These include Suffolk, Wiltshire, Norfolk and Yorkshire. These will inform the selection of case studies for this project. Of course, this approach is constrained by a potential recording bias when considering factors such as deposition, preservation, survival, recovery, reporting and recording (Robbins 2014, 25). However, it does highlight areas that might be worth investigating in terms of circulation and function.

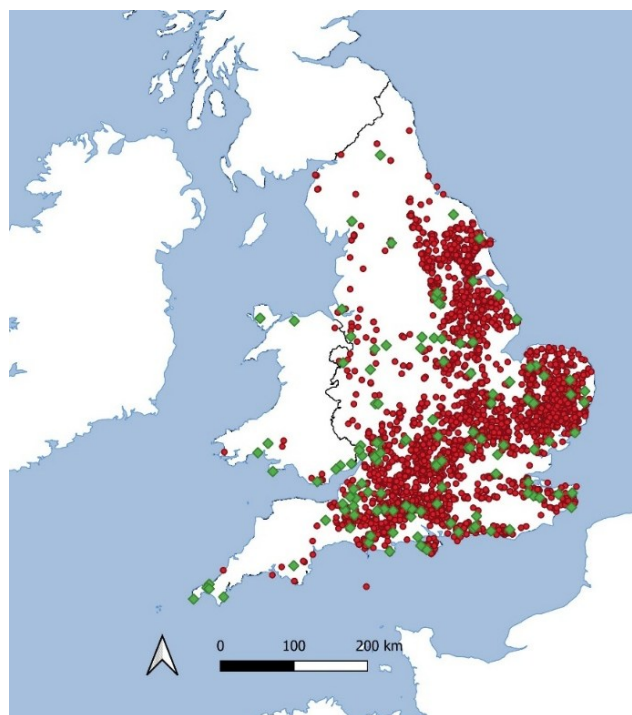


Figure 3. *Barbarous radiates on the PAS database (red dots) and hoards containing barbarous radiates (green lozenges).* (© T Fullbrook / PAS. Source: Office for National Statistics under the Open Government license v.3.0 Contains OS date © Crown copyright and database right 2025)

Metallurgical and chemical analysis

To chemically analyse the coins I am predominantly using portable X Ray Fluorescence (pXRF) which is a non-destructive analytical technique used to determine the elemental composition of materials. However, as it is a surface level technique it has some drawbacks as it will only analyse the first few micrometres of the item depending on the elements present. The reading can also be affected by surface corrosion or post-excavation treatment on the coins, meaning that the results are complicated to interpret in relation to the core composition of the coins. Despite these limitations, pXRF is a very rapid technique, which, along with its non-destructive nature, will allow the analysis and comparison of a large volume of material. This will enable cross-site and location manufacture patterns to be understood for the first time. To be consistent across assemblages a threshold of 1% to be counted as ‘present’ will be used for pXRF measurements of zinc, tin and lead when describing alloy major classifications (Bray

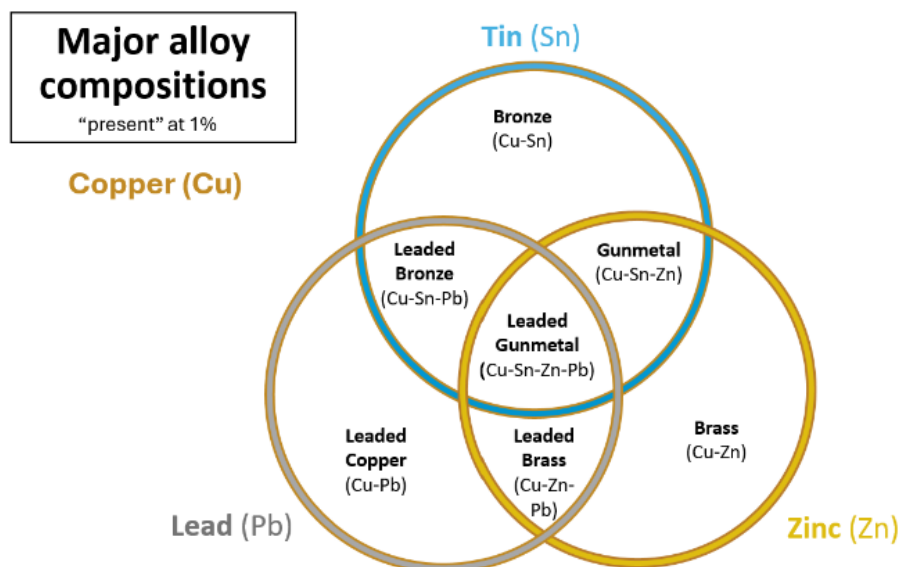


Figure 4. *Major alloy compositions*

2020). This also accommodates the fact that zinc is often underrepresented in pXRF analysis (Figure 4).

The other analytical technique that I will be using is a Microwave Plasma-Atomic Emission Spectrometry (MP-AES). The main function of MP-AES is to produce very high quality chemical analysis with low detection limits. This improves our ability to understand ancient materials by analysing the trace elements inclusions in copper alloys (for example arsenic, antimony, nickel, bismuth, cobalt, manganese, and gold) to a high degree of accuracy.

MP-AES uses microwaves to create nitrogen plasma, which heats up a liquid sample to several thousand degrees. The sample then emits light at specific wavelengths depending on what elements were in the sample, and comparing the strength of this signal with known standards allows the calculation of the sample's chemical composition. The high sensitivity of the technique provides quantitative analysis of trace and ultra-trace elements, for example tiny amounts of gold in the added silver. MP-AES requires taking a small 10–30mg sample from the coin of an abraded area that does not hinder the legend or iconography on the coin. This can be tricky with the more ‘barbarous’ and smaller coins, however. A small portion of the sampled coin will be dissolved to allow for the analyses of twelve key metal elements (Cu, Sn, Zn, Pb, Sb, Ag, Ni, Fe, Co, Mn, Bi, Au).

Preliminary results

In order to determine how best to integrate these approaches, a case study was used to test the methodologies set out above. A coin hoard from the parish of Saint Anthony-in-Meneage, containing both barbarous radiates and official coins dating to the third century was selected after discussions at the British Museum with Eleanor Ghey (curator: Hoards, Money & Medals). This



Figure 5. *Example of two barbarous radiates from 2021T556* (Photographs: Tasha Fullbrook)

analysis took place over four visits to the British Museum where over 500 coins were analysed with portable X-Ray Fluorescence (pXRF) and photographed in two later visits (*Figure 5*).

The coins were found from 2016 to 2021 by the Meneage Archaeology Group (MAG), who have been carrying out archaeological excavation of a Romano-British site since 2016 under the direction of James Gossip MCIfA (Senior Archaeologist working for the Cornwall Archaeological Unit). The contents of the hoards are summarised in the tables on the right (CORN-FB1561/ 2021T556).

Chemical analysis

Figure 6 shows a breakdown of the alloy types by percentage in both the barbarous (hoard 2) and the official coins of the hoard (hoard 1) from Cornwall. Looking at the ‘barbarous’ coins analysed, the alloys towards the end of the chart are all zinc-containing (brass, leaded brass, gunmetal and leaded gunmetal). This likely indicates that the manufacturers were melting down older coins (*i.e. sestertii, dupondii*), or other sources of zinc-rich metal to make the barbarous imitations. In contrast, there is no zinc in the official coins (*Figure 7*), which closely follow a more consistent pattern of leaded copper or leaded bronze, indicating a level of centralisation and mint control that is absent in the imitations.

We can also see in this chart the high level of leaded bronze imitation coins, indicating a second theme of recycling. This metal may come from recycling contemporary domestic metalwork, however there is often silver present, perhaps indicating the melting of older official radiates. Interestingly, the proportion of leaded copper and leaded bronze in the imitations is comparable to the proportion in official coins, supporting the hypothesis that they were taking out heavier coins that were in circulation to melt them down for lighter imitations, effectively making three coins out of one. In this case study alone, it is possible to see different sources of metal being used and multiple themes of recycling.

Another theme that appears is the relationship between silver and zinc in the barbarous imitations. Figure 8 shows that the coins with high levels of zinc rarely show any silver. It seems as though sources of metal are being

Hoard I	
Central empire	
Valerian and Gallienus, 253–260 Valerian	2
Gallienus, 260–68	10
Claudius II, 268–70	13
Divus Claudius II	1
Quintillus, 270	1
Aurelian (pre-reform, to 274)	1
Tacitus, 275–6	10
Florian, 276	1
Probus, 276–282	4
Gallic empire	
Postumus, 260–9	5
Victorinus, 269–71	36
Tetricus I, 271–4	36
Tetricus II	9
Uncertain Gallic empire	5
Uncertain emperor (inclusive fragments)	7 plus fragments
Irregular	4
Total	145 plus fragments

Hoard 2	
Regular coinage: Gallic empire	
Postumus, 260–9	1
Uncertain Gallic empire	5
Illegible (inc. frags)	c.115 plus fragments
Irregular smaller module	34
Irregular larger module	330
Total	c.485 plus fragments

deliberately sorted and separated to maintain colour contrasts, as the high levels of zinc will maintain a slight golden colour.

There seems to be no attempt to bring through any silver from surface effects whereas there is a high surface zinc content, perhaps to maximise colour range and even project a certain value. These chemical themes could indicate that recycling was occurring in small batches, using a handful of old *sestertii* for one production event, and then more recent silvered leaded-bronze radiates on a different occasion. This would have preserved the chemical patterns from older

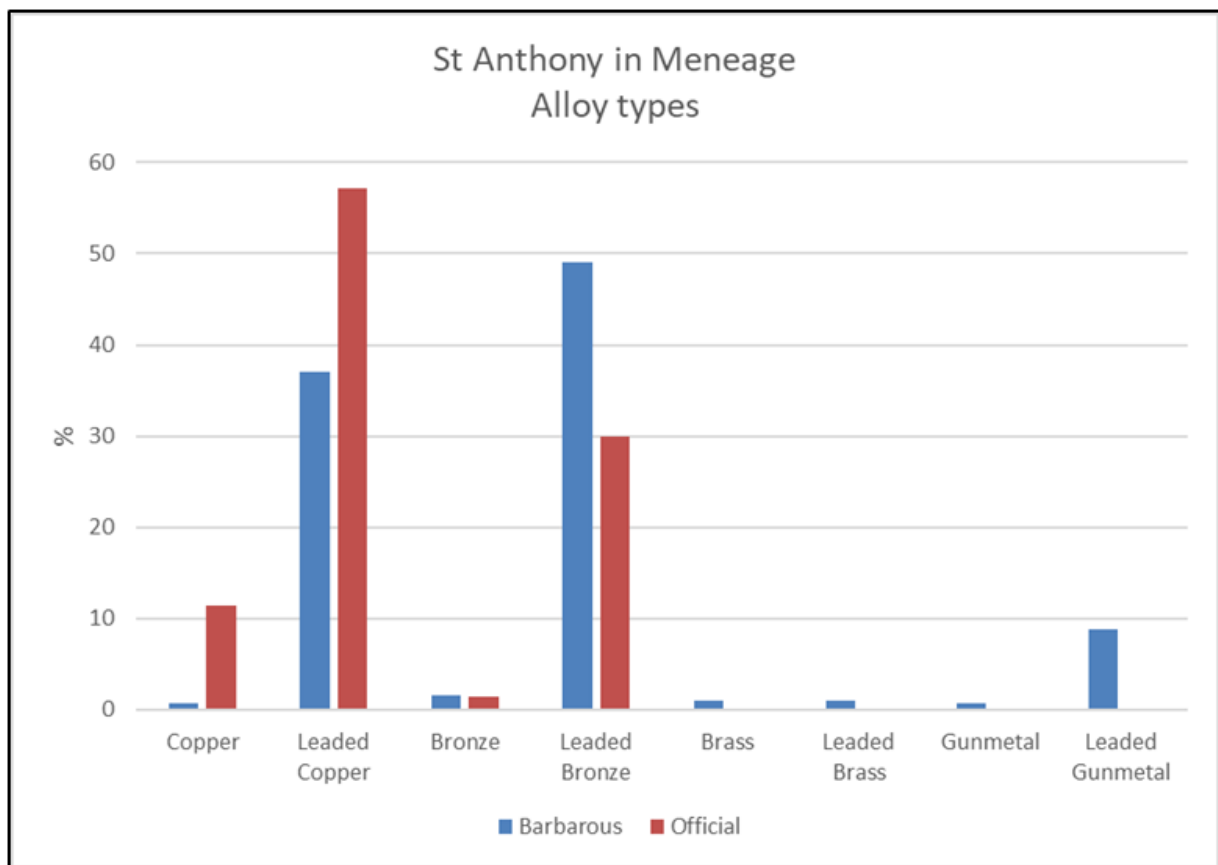


Figure 6. Chart showing the different alloy types of both barbarous and official coins from Saint Anthony-in-Meneage hoard, Cornwall

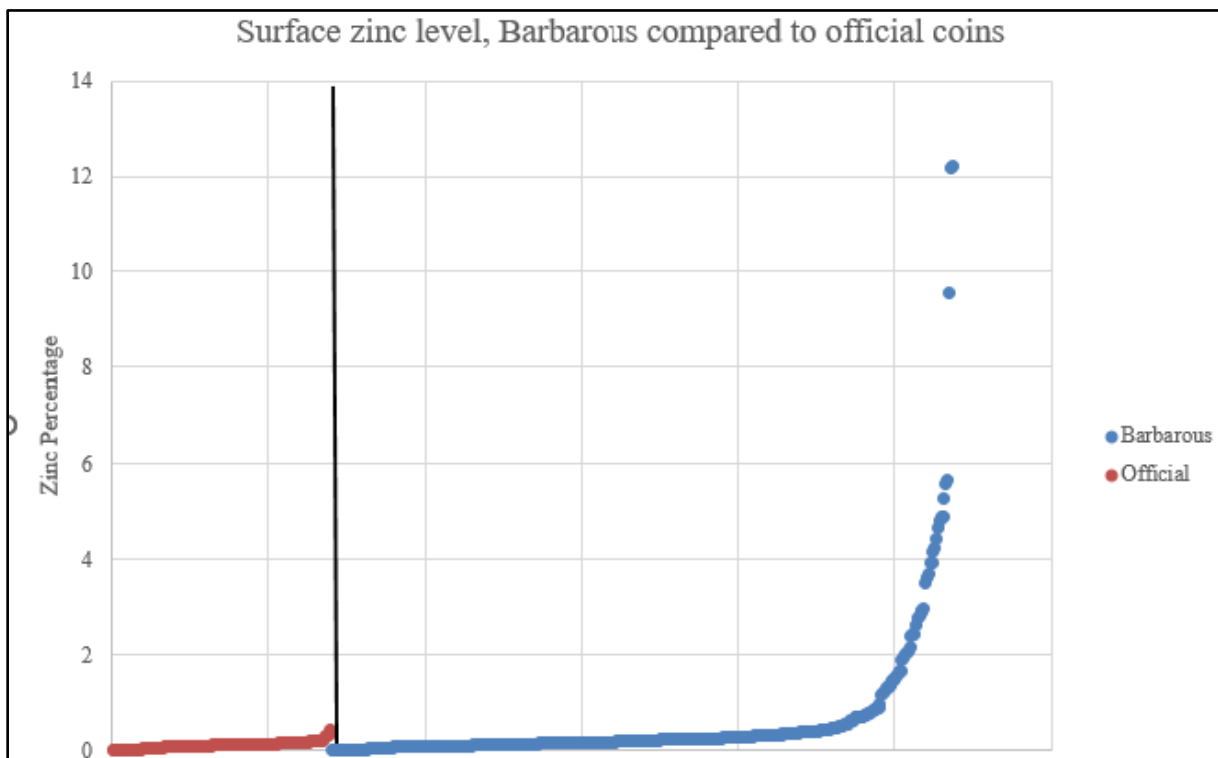


Figure 7. Plot showing the zinc percentage in both official and barbarous coins from Saint Anthony-in-Meneage hoard, Cornwall

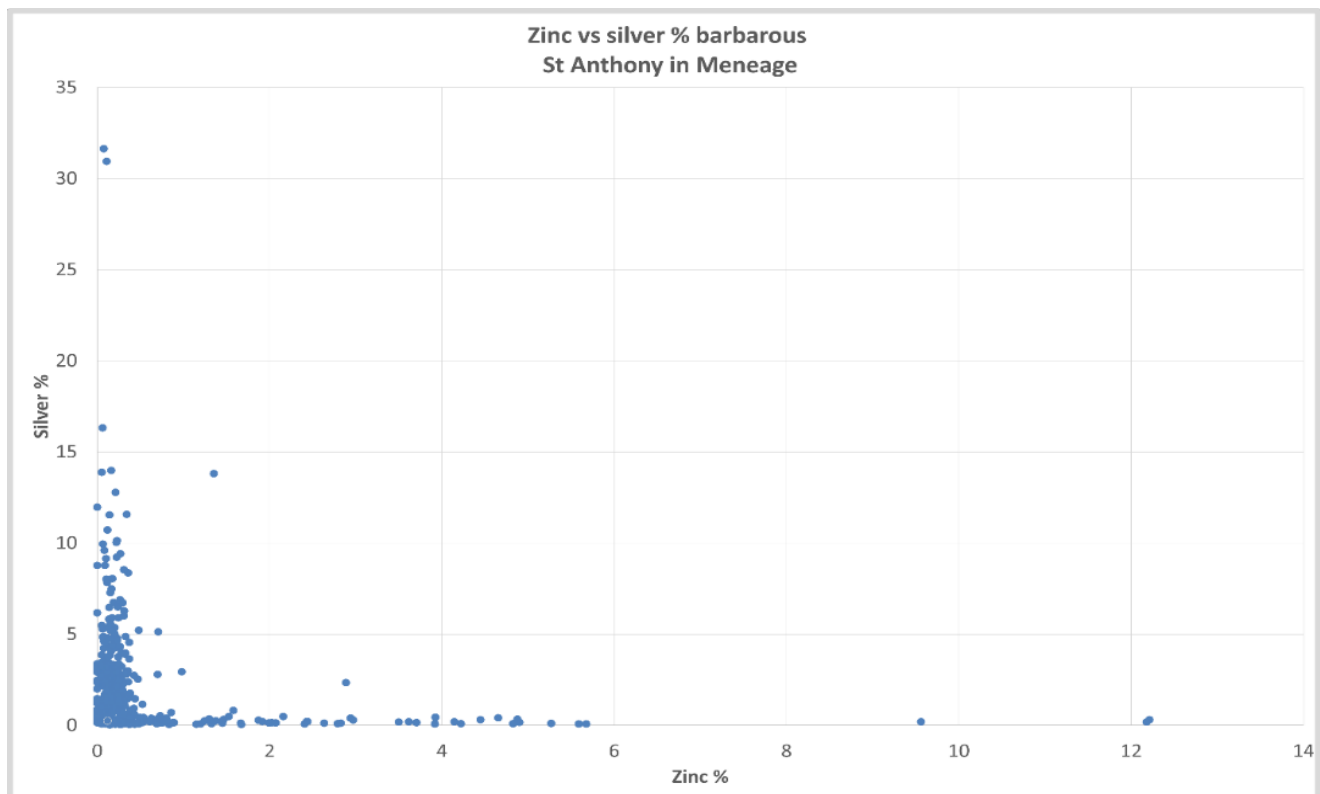


Figure 8. Plot showing the silver and zinc percentages in the barbarous radiates from Saint Athony-in-Meneage hoard, Cornwall

material. These preliminary results are all from pXRF surface level analysis. A key part of my research going forward will be to compare this with core analysis from MP-AES to see if there are similarities in the metal composition and to detect further trace elements.

On a slightly different note, it is important to highlight the difference in weights between the barbarous and the official coins in the hoard from Saint Anthony-in-Meneage (*Figure 9*). This could be due to the poor preservation of the coins in this hoard. Instead of looking at them on an individual basis and focussing on the weight of an individual coin, could we conceptualise the barbarous radiates as a bulk object? For example, are these coins being handed over in large quantities and as a result, are their users more concerned with the volume rather than the weight? This could perhaps indicate why the iconography is not always standard and less tightly controlled as they were rarely looked at as an individual item.

Further research

This paper has covered a small introduction of this project and showcased how much we can

learn from surface level analysis. The next stages will include fully developing my methodology, including MP-AES analysis, and applying this to selected case studies across Britain. This study has the potential to add much to our understanding of third century society and economy, revealing insights into contemporary monetary policy, production and exchange of these coins alongside acting as dating evidence for 3rd century sites. The production of barbarous radiates, and their metallurgy compared to other contemporary metalwork and ‘official’ coinage, can give insights into the metal supply, recycling and craft practices of this period. Metallurgical analysis will allow for a novel understanding of surface treatments and perceptions of relative value and differences between denominations. A systematic typology could provide huge insights into their usage, iconography and the emperors they claim they are ‘imitating’, and help support the work of heritage professionals. It is already clear that these ‘barbarous’ radiates are playing a sophisticated and subtle role in the late Roman world.

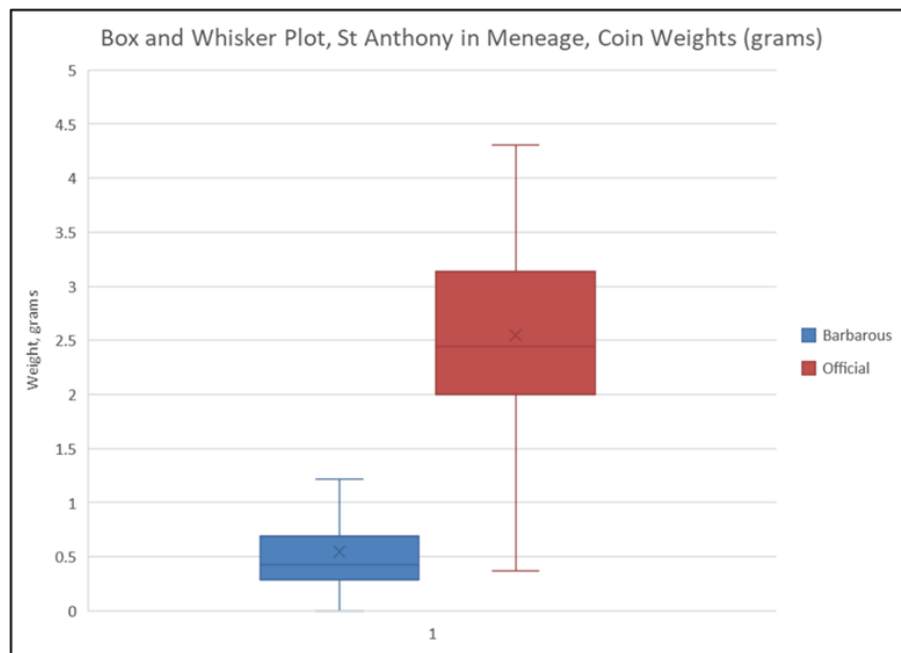


Figure 9. Box and whisker plot showing the weight(g) of both the barbarous and official coins from Saint Anthony-in-Meneage hoard, Cornwall

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Challenges and methodologies in the interpretation of Theodosian hoards

JEHAN HILLEN*



VICTORIA AVGGG



SALVS REI PVBLICAE

Figure 1. *The two most common reverse types in the Theodosian hoard finds*
(sources: hoard Buggenum-I, archaeological depot of the province of Limburg,
left: inv. M0562/011, right: inv. M0562/025)

In 2023, there was an archaeological discovery in the Dutch province of Limburg. A metal detector enthusiast found a hoard of bronze coins on the land of a farmer. The hoard actually consists of two hoards found in proximity to each other with the same features. Both hoards are so-called Theodosian hoards because of the high number of coins of Theodosian emperors. Together, the two hoards contain over 5,000 bronze coins, almost all small AE4 coins. The archaeological report will be published at the end of 2026, this paper will, however, reflect upon the general challenges and methodologies used in the interpretation of such Theodosian hoard finds.

Similarities

The Theodosian hoard considered in this study is part of a set of late fourth-century hoards that portray remarkable similarities in several ways.

The composition of the hoards is similar, as they all primarily contain a large number of poor-quality Theodosian bronzes, but also include earlier fourth-century bronzes and, in some cases, a few third or even second-century emissions. In all of the Theodosian hoards, the majority of the coins date to the Theodosian period. In some cases, those Theodosian coins made up to 90%. They are also all found in more or less the same region, including the southern Netherlands, Belgium, Germany, Luxembourg and Northern France. Moreover, the various finds are similar in mint distribution. Identifying mints of late Theodosian bronzes is not always an easy task because the mint marks are often damaged or cut off, making them hard to identify. In some of the coin finds, only a small percentage of the coins that were found could securely be attributed to a mint. Some have been attributed to eastern mints

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like Siscia or Cyzicus, but they are always tiny minorities in the bigger corpus. In general, the most common mints in these finds are Arelate and Lugdunum, followed by either Treveri, Aquileia, or, more rarely, Rome. Finally, the different coin finds also portray a similar distribution of reverse types. The number of reverse types that can be identified varies greatly because of the poor quality of the Theodosian bronzes and the different circumstances in which these coins were found. In some cases, only about 30-35% of the types could be identified. Fortunately, in most cases, the majority of the reverse types could be identified. The most common types are VICTORIA AVGGG and SALVS REIPVBLICAE, the former being the most common in the majority of the datasets. Generally, the Theodosian hoards contain the same reverse type distribution. Each of the finds has various Constantinian and Valentinianic coin types and sometimes even earlier ones. But in general, the two late-fourth-century types of VICTORIA AVGGG and SALVS REIPVBLICAE are by far the most dominant.

Methods of dating

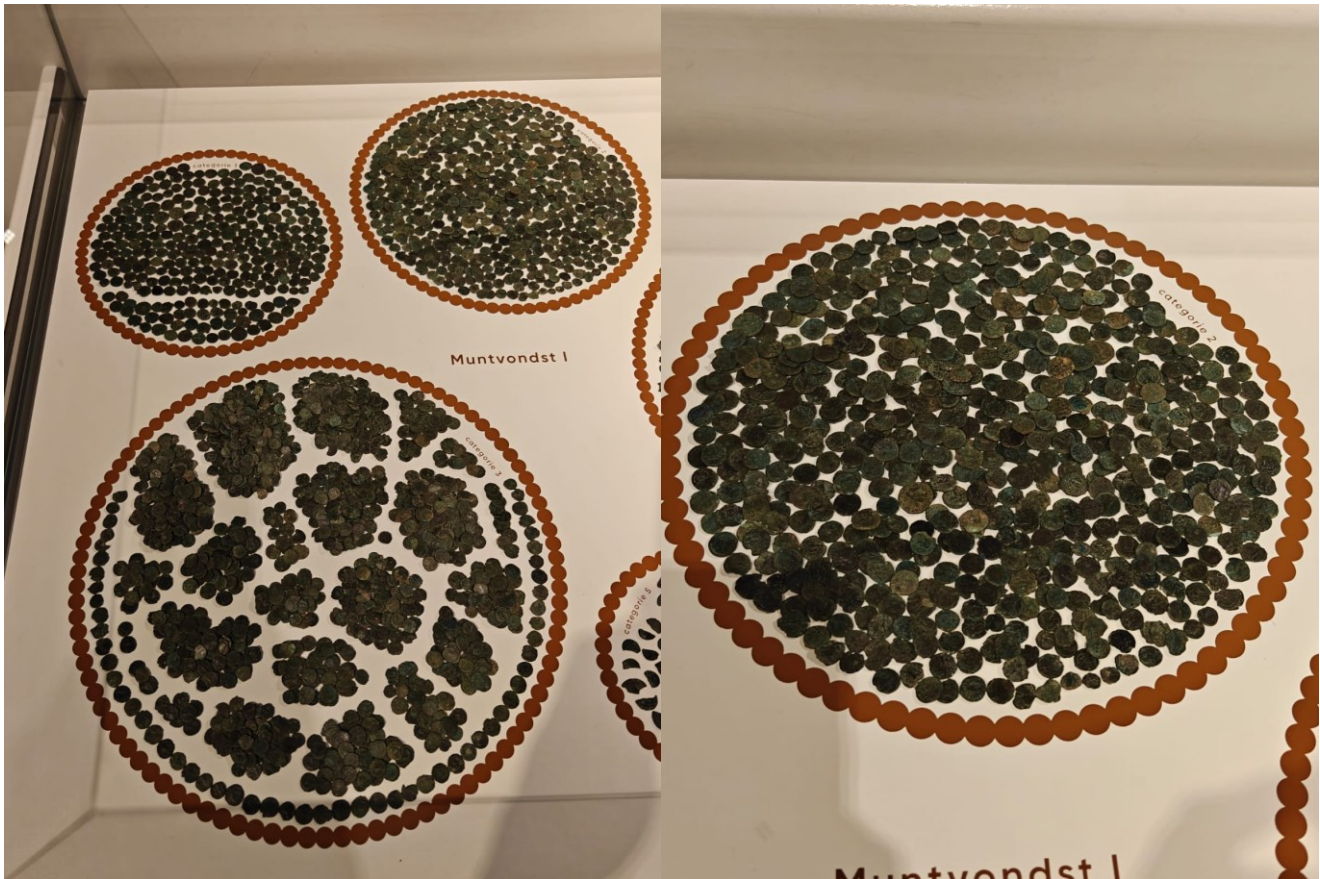
Usually, late Roman hoards can be dated with surprising precision due to the rapid succession of type emissions in the fourth century. The youngest coin of a hoard could indicate the earliest date of the hoard. In the case of the Theodosian hoards, the youngest coin is often dated somewhere between 395–402. Subsequently, the earliest new emission would be the latest date that the hoard could have been buried or deposited, because otherwise the new emission would likely have been included in the hoard. However, in the case of the Theodosian hoards, the dating is more complicated because the first emission of new bronze types does not start until 404 in the east and in Rome not until 413. More importantly, there was a collapse of bronze coin supply to this region in the early fifth century due to the Germanic invasions, frequent usurpations, and the closing of the mints of Arelate, Lugdunum, Treveri and Aquileia around 395. It could therefore be entirely possible that these late fourth-century bronze coins kept circulating for decades in the fifth century in this particular region. Several theories might allow for a more precise dating of these hoards, but none of them

is without limitations. This article will focus on six dating methods:

The first method to determine a more precise closing date is to analyse the proportion between the VICTORIA AVGGG and the SALVS REIPVBLICAE types. The production of the VICTORIA type was limited to Gallic mints, such as Arelate and Lugdunum, while the SALVS type was produced in/by Italian mints, such as Aquileia and Rome. The Gallic Victoria types were produced until 397/398, whereas the SALVS types continued until 405. This theory asserts that if the closing date of the hoard is later than 398 the proportion of the SALVS REIPVBLICAE coins should be larger and outnumber the VICTORIA AVGGG types. The period between the end of the production of the two types is, however, only seven to eight years, which might not be immediately reflected in circulation. Moreover, the amount of SALVS types seems to be a result of the relation between the regions; a find spot being closer to or in better contact with the Italian mints could result in a larger amount of these 'Italian' types.

Another method concerns the analysis of the proportion of coins bearing the portrait of Honorius in contrast to those issued by other emperors or usurpers. The dating is based on the fact that after 397, the number of coins bearing a portrait of Arcadius struck in western mints sharply declines due to issues between the two brothers. Honorius starts issuing coins in 394 and starts to dominate the production in the western mints from 397 onwards. According to this theory, the higher the percentage of Honorius types, the later the potential burial or deposit date of the hoard will be after 394 or 397. If the emperor can be identified, this method could be of value, although coins of Honorius and Arcadius were struck simultaneously between 394–397, and therefore the appearance of a substantial amount of Honorius types does not immediately prove a burial or deposit date after 397.

The third method concerns the proportion between the SALVS REIPVBLICAE from Rome and Aquileia. Rome continued to strike the SALVS type until 402, whereas the mint of Aquileia ceased production sometime after 395. If the dating of the hoard is later than 395, the amount of SALVS coins from Rome should be



The Buggenum-hoard in the Limburgs Museum at Venlo, the Netherlands (foto: Jehan Hillen)

higher for the most recent deposits. However, as with the previous method, the amount of coins with a SALVS type that could be definitively attributed to either Rome or Aquileia is often very low due to the poor quality of the Theodosian bronzes. Moreover, this theory also fails to take into account that the distribution of mints is likely the result of the connection between regions and the supply of the region.

Another method concerns the reverse legend of the VICTORIA AVGGG types from the mint of Treveri. The legend VICTORI-A AVGGG was struck mostly before 395, while the legend VICTOR-IA AVGGG was struck before and after 395. This theory asserts that the higher the percentage of VICTOR-IA AVGGG types from the mint of Treveri, the later the closing date could be determined after 395. Once again, however, the low number of coins that can with any certainty be attributed to the mint of Treveri, or indeed any other mint, in most of these hoards results in the fact that this analysis is often made based on a tiny percentage of coins. Not many coins are

attributed to Treveri because of the latter's low output and the difficulties in identifying mint marks. Finally, the distinction between the two reverse legends is not secure, because the VICTORI-A AVGGG type is struck mostly before 395, and the VICTOR-IA AVGGG type both before and after 395.

The fifth method concerns the identification of types that were certainly struck after 395, indicating a closing date later than 395. Four types fall into this category. The Treveri type concerns a Victoria type containing the reverse legend VICTORIA AVGG (instead of AVGGG). The Lugdunum type contains an officina mark (V) in addition to the mintmark LVGP. Finally, the type from Arelate (Constantia) and Lugdunum concerns an obverse type with a portrait of Honorius or Arcadius on which the obverse legend is split, the legend reading HONO-RIVS, ARCA-DIVS or HONOR-IVS. Identifying these coins does indicate that the burial or deposit date surpasses the canonical date of 395, but it does not offer any more precise information than that.

The sixth method concerns the percentage of cut-up coins in the datasets of the hoards as a way of indicating the closing date. The theory asserts that the cutting up of coins does not start until the law of 395 commanding the withdrawal of AE2 coins, resulting in the fact that the AE3 and AE4 coins remain the only bronzes in circulation. Although this law theoretically only applied to Italy, Illyria, and Africa, it may also have been applied in the western part of the empire. After the closure of the western mints shortly after 395, except for Rome, bronze coins became harder and harder to find. Before 395, people could exchange their AE2 coins for AE4 at the mints, but since the local mints in the north-west were closed, this was no longer an option. Therefore, the AE2 coins were not used as a standalone denomination anymore but instead were cut up into pieces to function as AE3/AE4. This practice was relatively rare until 410, when the need for small change became more problematic. The peak of the cutting up of the AE2 is dated somewhere between 410–450. After 450, even the AE3/AE4 began to be cut up because there was barely any small change left. This method could therewith potentially push the closing date of these hoards as far as the middle of the fifth century, or if there are cut-up AE3/AE4 coins, even later than 450.

In conclusion, there is no method or tool that definitely answers the question of when these hoards were buried or deposited. The various methods could all give potential indications, but are unable to deliver any definitive evidence. Some of the methods rely on the presence of coins from certain mints, which seems to be more a consequence of location and coin supply than their production dates?

Interpretation models

The precise dating of the hoard could influence the interpretation of the find, but this could also work vice versa. Some interpretations of these finds have resulted in a suggested closing date that supports the interpretation of the specific hoard. For example, the massive Theodosian Haarlemmermeer hoard found in 1920 in the Netherlands has been interpreted as part of a shipment of coins to the military in Gaul led by the usurper and later emperor Constantius III (r. 421). In this case, the specific location and

archaeological context allowed for a more specific deposit date of this hoard. The chest of bronze coins found in the Haarlemmermeer could have fallen off a boat during a storm when these coins, along with presumably many others, were sent to Constantine III, who was campaigning in Northern-Gaul in 407. Besides potentially being a shipment of coins for a campaigning emperor, another option considered for the Haarlemmermeer hoard is that the ship smuggled bronze coins from one Roman region to another. This could be a lucrative enterprise because bronze coin values differed per region. These two interpretations do, however, only work for the specific circumstances of the Haarlemmermeer find, but have rarely been considered for other Theodosian hoards.

Another interpretation is that the Theodosian hoards belong to some sort of ancient ritual in which the Germanic inhabitants consciously deposited or buried large amounts of bronze coins. One of the hoard finds contains a small bronze statue of Mercurius alongside the coins, indicating a potential ritual burial. There are, however, no other indications for a specific cult place or any other ritual burials close to the location of this find. Moreover, this interpretation runs into the issue of reading ‘rituals’ into activities which are simply not understood. Studies have shown that the role of coins was different in the Germanic hinterland compared to the urbanised Roman regions. Once the coins entered these settlements, they were often merely symbols of personal wealth, were kept for their intrinsic metal value, served an ideological purpose or were abandoned as hoards, grave gifts or ritual offerings. Coins could be buried together with other objects, like military equipment, jewellery or metal utensils. However, most of the Theodosian hoards are not found in a burial context nor often with jewellery or other metal objects.

Economic interpretations consider that the coins could have been collected and kept somewhere safe in the settlement until there was a need to use them for external trade. These Germanic settlements needed official Roman bronzes to trade. The seemingly high number of coins being buried is easily explained by their trade value. One solidus in this period was considered the equivalent of 7,200 bronze coins.

Except for the massive Haarlemmermeer find, none of the other hoards would even come close to the worth of one solidus. Therefore, we could rightly consider these coins as small change for everyday transactions between villagers, soldiers and other travellers. In this interpretation, these coins could never have been dug up simply because the coinage lost its monetary worth in the early fifth century.

Another monetary interpretation asserts that these coins were indeed collected in Germanic settlements, but to be melted down for their 'scrap metal'. This interpretation dates the finds to the middle of the fifth century, when the Roman monetary system collapsed in this region. For this interpretation to be valid, the coins have to be found in a few specific places in high quantities, indicating that these coins were not used in a conventional monetary manner. Moreover, many of the bronzes should be clipped or even melted together, creating fused masses of fourth-century coins. The assemblage of coins should, moreover, consist of coins from a long period, encompassing the entire fourth century, with a few coins even dating back to the third and second centuries. Melting these coins has obvious economic reasons, but there could also be a symbolic reason for this phenomenon. The coins still represented Roman authority with the imperial portrait adorning the obverse, perhaps destroying these objects could be a symbolic

break by the new inhabitants of this region with the ancient authority of Rome.

Hoard are traditionally divided into four categories: accidental losses, 'emergency' hoards, 'savings' hoards and abandoned hoards. The Theodosian hoards seem to be too large to be accidental losses. The other three categories could, however, all be applied to this set of hoard finds. In practice, the categories are not so easily distinguishable from one another; a hoard of 'savings' could readily become an 'emergency' hoard when a disaster hits. The same could be said for the interpretations of these Theodosian hoards, which have come from different find contexts and coin compositions, but rarely exclude each other. The Haarlemmermeer hoard provides a splendid example of how a hoard find could be connected to a specific event, which would require the shipment of large amounts of these Theodosian bronzes. For most Theodosian hoards, such a strong connection can, however, not be found, and their interpretation must therefore be sought in different contexts. Something that has not been considered to the extent that it could, concerns the traditional model of the *versteckhorte* that has often been proposed for the solidi hoards from the same period. Given that the deposit practice is a common occurrence for gold coins in this period in the same region, it should be considered that the bronze hoards also seem to fit very well into this framework.

MCHBI – The Medieval Coin Hoards of Britain and Ireland Database – two years on...

ROBERT PAGE | MARTIN ALLEN*

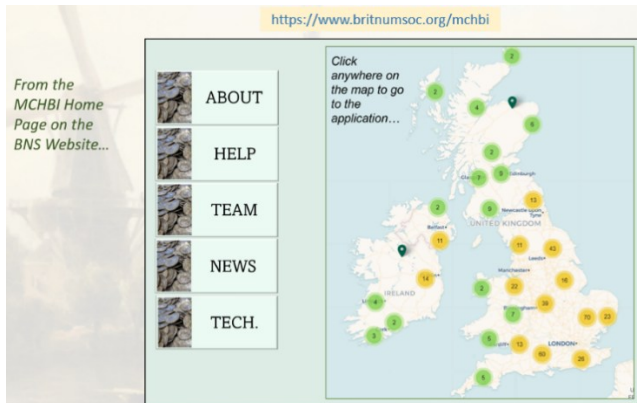


Figure 1. Initial view of the application when accessing via the BNS website

In November 2022 the British Numismatic Society's Medieval Coin Hoards of Britain and Ireland database, 'MCHBI', first appeared online, and was documented in a BNS Research Blog article at the time.¹ In the ensuing period of just over two years the database has been expanded with additional hoards, and some useful new software features added. Currently with over 2,000 hoards and still growing, this is the largest available compilation of medieval coin hoards for Britain and Ireland. It is now timely to present an updated overview of the current state of this important online resource.

MCHBI – What is it?

MCHBI is an online database with a map interface containing summary details of over 2,050 known medieval coin hoards. The map can be zoomed, re-positioned and displayed with a choice of different base maps. Clicking on hoard icons brings up relevant information. Hoard summary sheets include relevant references and, where available, hyperlinks to these references. Target users for the tool are numismatists, historians, archaeologists and others with an interest in

medieval hoards, as well as members of the general public interested in hoards found in their locality. Users can easily employ MCHBI to quickly locate where coins of certain types have been found; and print a PDF report listing these hoards, together with the relevant references. Note that details of how to use the application are to be found on the MCHBI section of the BNS website (www.britnumsoc.org), in addition to the extensive online help within the application.

Entering the Program (Figure 1)

To use the program go to the BNS website and select the MCHBI tab, which takes you to this webpage: <https://www.britnumsoc.org/mchbi>. You can go straight into MCHBI by clicking anywhere on the map shown in figure 1, but before doing that note that you have access with the large buttons located left of the map to ...

- Information about the project
- The Instruction Manual under 'HELP'
- Details of the Team Members
- Latest News on the Project, including recent updates
- And a little about the Technology used in building the application

The Main Menu (Figure 2)

The database is accessed via a map view, which by default shows all the hoards in the database.

- There are five tabs within the Main Menu: Settings, Sliders, Simple Search & Advanced Search, and also the relatively new tab for a 'Coin Type Search'.
- Users may use the 'sliders', or use the simple or advanced search functions to filter the hoards to those of interest, e.g. deposited within a certain time period, or, for example, containing coins issued by a certain ruler.

* Robert Page (British Numismatic Society), Martin Allen (British Numismatic Society).

¹ Page, Robert (22 November 2022) 'MCHBI' – A BNS Online Map Application for Medieval Coin Hoards in

Britain and Ireland, British Numismatic Society Research Blog, <https://britnumsoc.blog/2022/11/22/mchbi-a-bns-online-map-application-for-medieval-coin-hoards-in-britain-and-ireland-rob-page/> [accessed 15 June 2025].

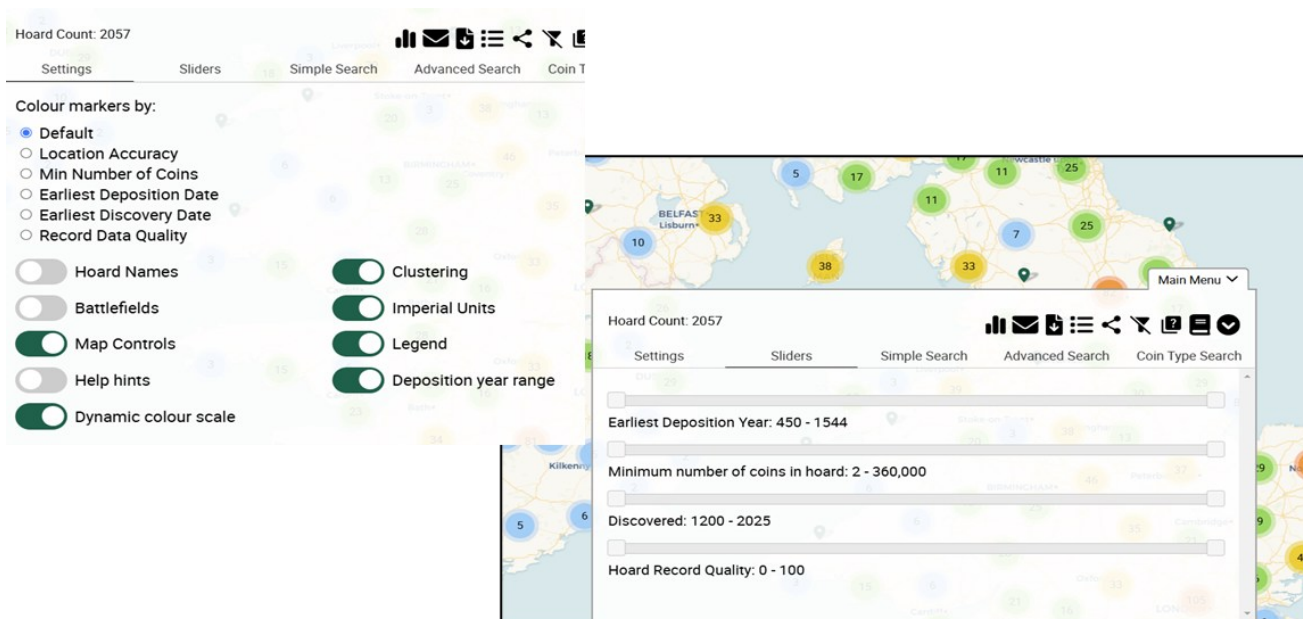


Figure 2. *Illustrating parts of the Main Menu. The left-hand box shows the options available in the settings tab, whilst the right-hand box illustrates the slider controls for hoard filtering. The three other tabs, not illustrated here, are all to do with data searching*

- The Settings tab, shown on the left, controls a lot of what appears on the screen
- Once the desired settings have been selected, and a hoard selection has been made, the user can save the resultant map using their favourite screen capture app.

Filter settings may be saved for later use, or for sharing with others; when saving filter settings the option exists to copy the relevant weblink to the clipboard which can then be emailed to others. Zooming in and out of the map is controlled by the buttons at top left, also located there are the buttons for creating and managing polygons which allow definition of an area of interest or 'AOI'. At the bottom left of the map will be found the scale bar; users have the choice of using metric or imperial units. At top right is a

button for selecting different base maps. The bottom right area is where the context sensitive legends appear, and finally, on the bottom frame is a small button which will cause the Main Menu to pop up. At the top right-hand of the Main Menu there are a series of icons which provide access to useful functions. These are described on *Figure 3*, and a few of these icons have been added since the initial program release.

Hoard Icon Colour Coding (*Figures 4a/4b*)

The Settings tab in the Main Menu will allow a user to choose between six different ways of colouring the hoard location icons – these are illustrated. Each of the five non-default choices has a context sensitive legend automatically displayed at the lower right-hand corner of the map.

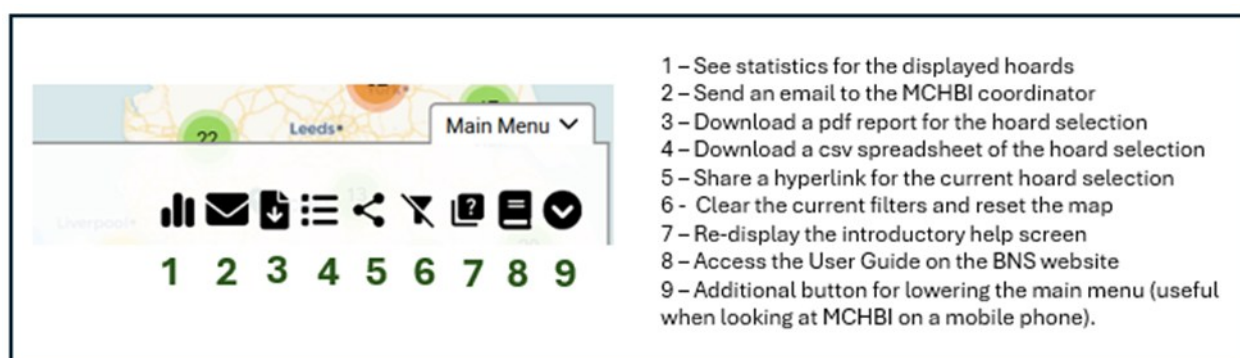


Figure 3. *Main Menu icons*

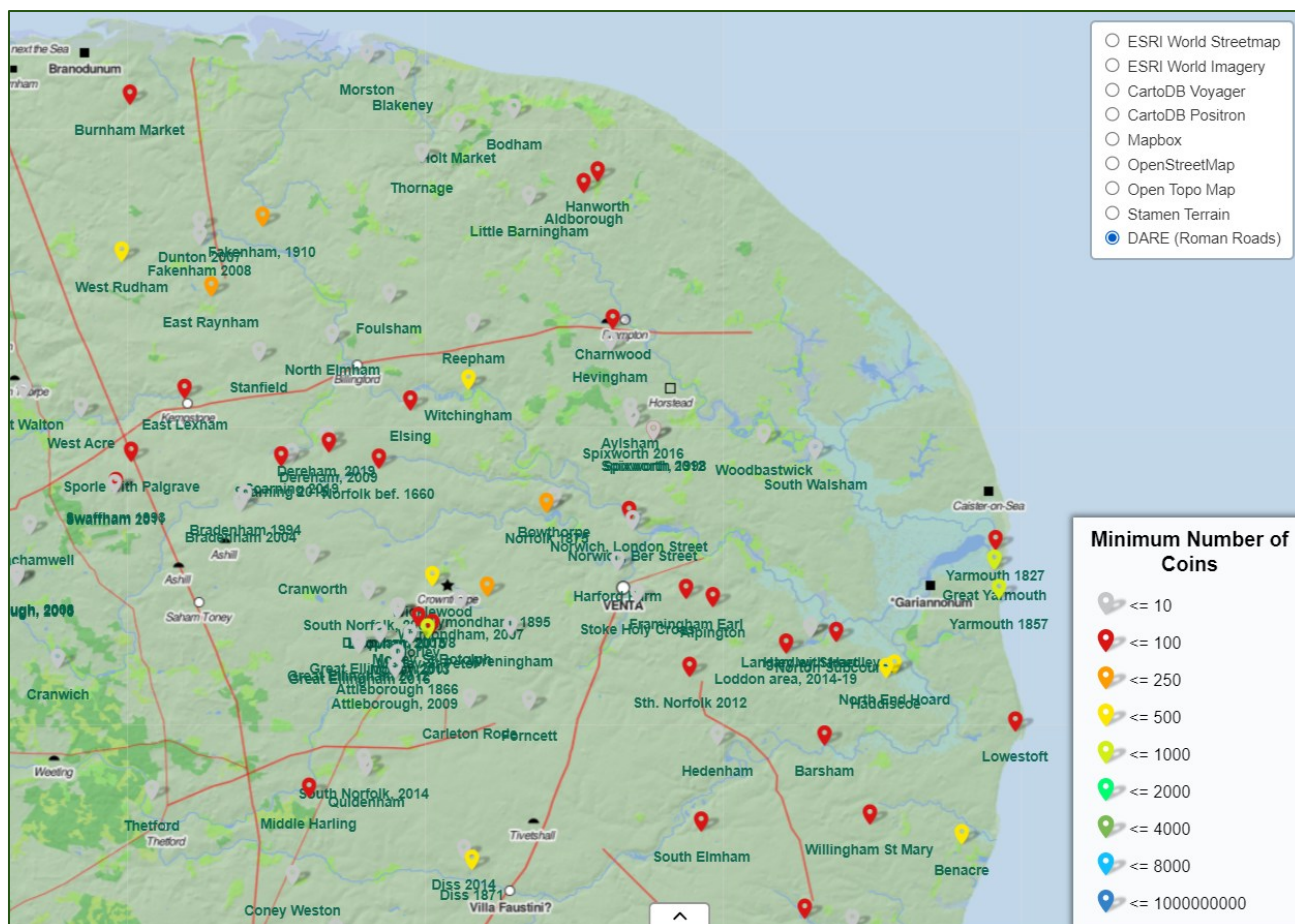


Figure 4a. An example of hoard icons coloured by the minimum number of coins in the hoard, and overlaid on a basemap showing Roman roads

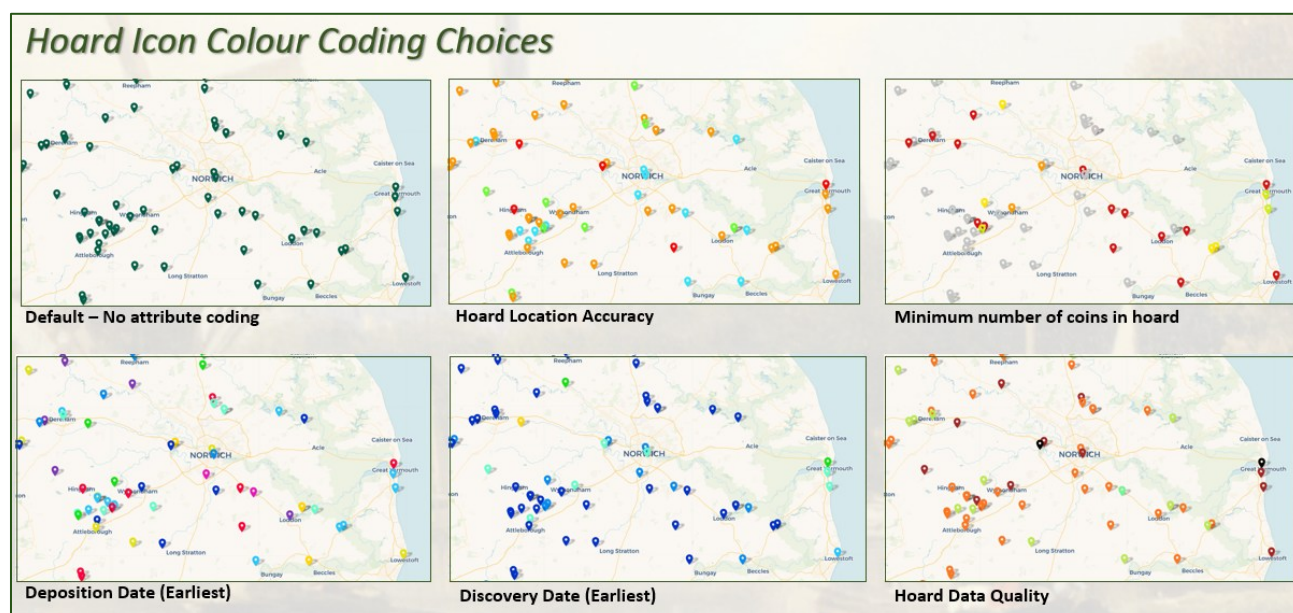


Figure 4b. The hoard icon colouring choices

Lenborough

LOCATION AND SETTING

Region: England
County: Buckinghamshire
Mapped location accuracy: 100-1000 meters

TIMING

Deposited: In or after c.1030

DISCOVERY

Discovered: 2014
Circumstances: Metal-Detecting
Context: Unknown
Feature: Unknown

SUMMARY NOTES

Found in the Lenborough area: A hoard of 5,249 silver pennies contained in a brittle piece of folded lead pinched closed in the form of an ellipse, the base of the container was rounded showing that this was an improvised rather than purpose made or recycled container. For the most part the coins were in good condition with some exceptions showing corrosion, accretions from the lead container, poor striking or wear from circulation. Mints and moneyers were generally identifiable, with 986 coins being minted under Æthelred II and 4236 being minted under Cnut. Three of the pennies of Æthelred II were found to be contemporary imitations minted in Dublin (an independent kingdom at the time). All of the coins of Cnut are of the Short Cross type penny leading to the suggestion that this hoard is an accumulation hoard of Æthelred II coinage with an influx of coins before deposition in the last coinage period of Cnut. As the excavation had to be undertaken in haste it was not possible to gain an understanding of the arrangement of these two probably distinct parcels of coins within the container.

The hoard has been studied by Wendy Scott for her thesis - soon to be published on the University of Leicester website, and eventually the hoard may be published in a sylloge.

CONTAINER AND CONTENTS

Container: Other metal container(s)
Hoard Type: Coins only

COIN SUMMARY

Num. of coins: 5249
Latest Coin: Cnut Short Cross type penny
Latest Coin Date: c.1029 - c.1035
Coins issued by: Æthelred II - "the Unready" [983], Cnut [4236], Hib.-Scand. - undiff. (995-1035) [3]
PAS ref(s): BUC-7FE6F2

DISPOSITION

Acquired by Discover Bucks Museum after being declared as Treasure.

IMAGES



REFERENCES

Portable Antiquities Scheme - Record # BUC-7FE6F2 ([link](#))
Andrews, M., *Coin Hoarding in Medieval England and Wales*, c. 973-1544, Behaviours, Motivations, and Mentalités, BAR British Series 651 (Oxford, 2019).
Williams, Gareth, 2016, "A Hoard from the Reign of Cnut from Buckinghamshire: A Preliminary Report." *Anglo-Saxon England*, vol. 44, pp. 287-305 ([link](#))
Portable Antiquities Scheme - Online Database Search - Results and Maps records from 1998 onwards ([link](#))

Figure 5. *Summary box*. Clicking on a hoard icon brings up a summary box with a hyperlink to the hoard summary report. A key feature for users is the reference list – when references are available online a hyperlink is given which will take the user directly to the reference. The facility exists for users to download a batch of summary reports for a hoard selection.

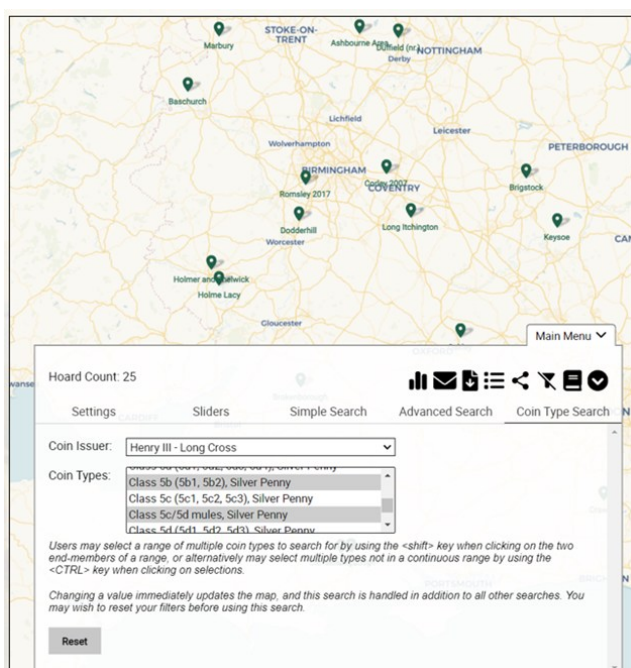


Figure 6. *New feature*. For those occasions when an MCHBI user wishes to search on a particular coin type, or group of types, a new search feature has been introduced. This is accessed from the top right-hand side of the Main Menu. In this example the user has chosen to show hoards containing class 5b and/or class 5c/5d mules of Henry III long cross pennies.

Hoard Summary Sheets (figure 5)

For each hoard in the database a hoard summary sheet is available; an example is shown in figure 5. These summary sheets are not intended to provide a comprehensive account of the hoard, but instead they include a brief summary of the hoard and, importantly, a list of references that can be consulted for further information. Many references are nowadays available online, and working hyperlinks, where available, will take the user directly to the applicable reference.

Selection of Hoards with Given Coin Types (Figures 6/7)

The most significant change last year to the functionality of MCHBI was the addition of the ability to search on selected coin types. All hoards are having their specific coin types entered into the MCHBI database where sufficient information exists; some hoards do not have sufficiently reliable data, particularly those found in the nineteenth century or earlier. Of the hoards in the database it is estimated that about two-thirds have sufficiently good data available for their coin types to be added to MCHBI, and over 700 of the 2,000+ hoards have been processed so far.

Great Glemham						
LOCATION AND SETTING						
Region: England						
County: Suffolk						
Mapped location accuracy: 100-1000 meters						
TIMING						
Deposited: 1353-c.1375						
DISCOVERY						
Discovered: 2000						
Circumstances: Metal-Detecting						
Context: Unknown						
Feature: Unknown						
SUMMARY NOTES						
Four late medieval silver coins, consisting of groats and pence of Edward I-III, were found by a metal-detectorist in May 2000.						
REFERENCES						
Andrews, M., <i>Coin Hoarding in Medieval England and Wales, c. 973-1544. Behaviours, Motivations, and Mentalités</i> , BAR British Series 651 (Oxford, 2019).						
Allen, M., <i>Mints and Money in Medieval England</i> (Cambridge, 2012).						
Allen, M., 2002. "English Coin Hoards, 1158-1544", <i>BNJ</i> 72 (2002), 24-84. (link)						
Blackburn, M. and Peter Woods, (2001), <i>Medieval and Modern Hoards</i> , <i>The Numismatic Chronicle</i> vol. 161 pp. 349-359 (link)						
COIN DETAILS						
Edward I						
Type	Denom.	Mint	# coins	Spink	North	Remarks
Class 3d	Penny	London	1	1390	1019	
Class 4c	Penny	Canterbury	1	1396	1025	
Edward III						
Type	Denom.	Mint	# coins	Spink	North	Remarks
Fourth Coinage, Pre-Treaty, series B-G	Groat (4d)	London	2	1563-72		
Total number of coins: 4 Hoard Face Value: 10d.						

Figure 7. Example Hoard Record with Coin Types

Figure 6 shows where the user can find the coin search option: a tab located in the top right region of the Main Menu. The user enters the name of the coin issuer and is then presented with a list of the available coin types to choose from. It is possible to select more than one coin type at a time by depressing the CTRL key whilst making selections. Particularly considering the fact that coin types are now being added, the MCHBI application is becoming of growing relevance to numismatic researchers.

Hoard Statistics (Figure 8)

Using the main pop-up menu, and clicking on the bar-graph icon on the top menu bar takes one to a screen with a number of graph options. These graphs are dynamically linked to the current hoard selection – e.g. if one choses to plot hoards deposited between 1100 and 1200 the graphs will summarise the data for that particular date selection. Changing the hoard filters will automatically change the data displayed on the plots. There are currently six different charts, and it is hoped to add a few more in due course.

Battlefields Display Option (Figure 9)

Some hoards may have been buried in haste ahead of an impending battle, and it can thus be useful to know battlefield locations. When a user switches on the battlefield display option then the battlefields shown on the map will be controlled by the hoard deposition date slider, for example if hoard deposition dates of 1000–1100 are selected then only battles fought within those dates will appear on the map. This feature is of most use when the selected date range is quite limited. If no hoard deposition range is selected then all battlefields will be plotted on the map. The location of many battlefields is uncertain – those locations that are reasonably well known are shown in a darker symbol.

Hoard Record Quality (Figure 10)

MCHBI contains a spectrum of different quality records. On the one hand we have hoards that were found in recent years that have been fully documented on the basis of current numismatic knowledge, and the coins may have been preserved in a museum. On the other hand are the

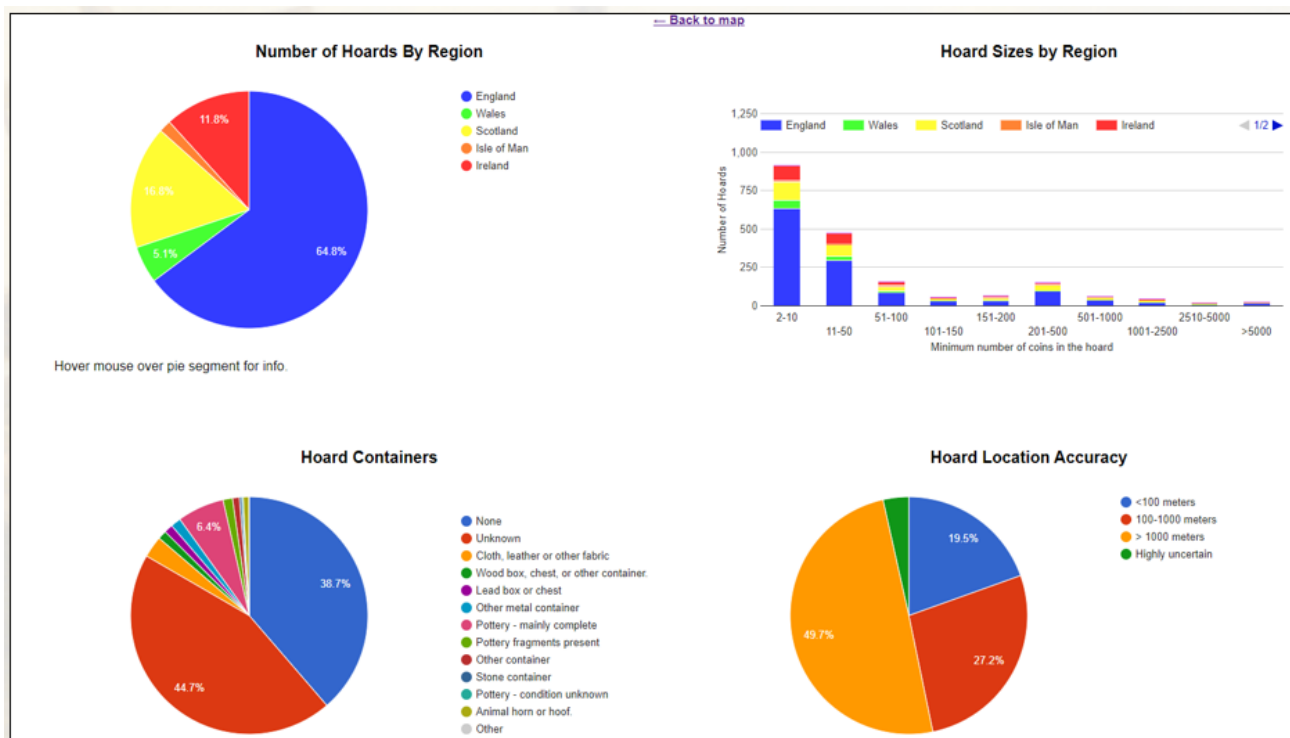


Figure 8. Some of the statistics charts for a hoard selection

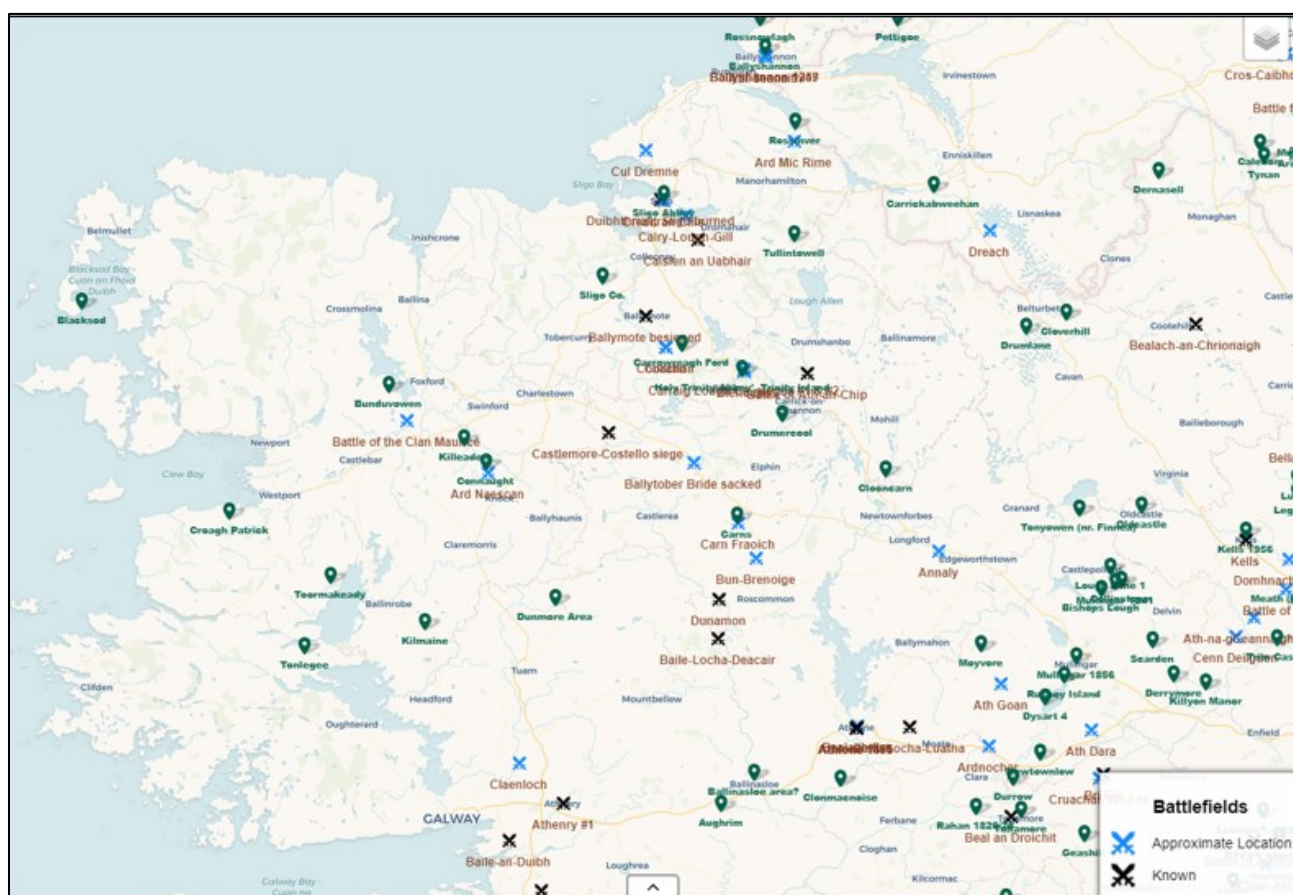


Figure 9. The Battlefields Display Option. Clicking on a battlefield symbol will generate a small pop-up with battle year and, if available, an online reference article for the battle

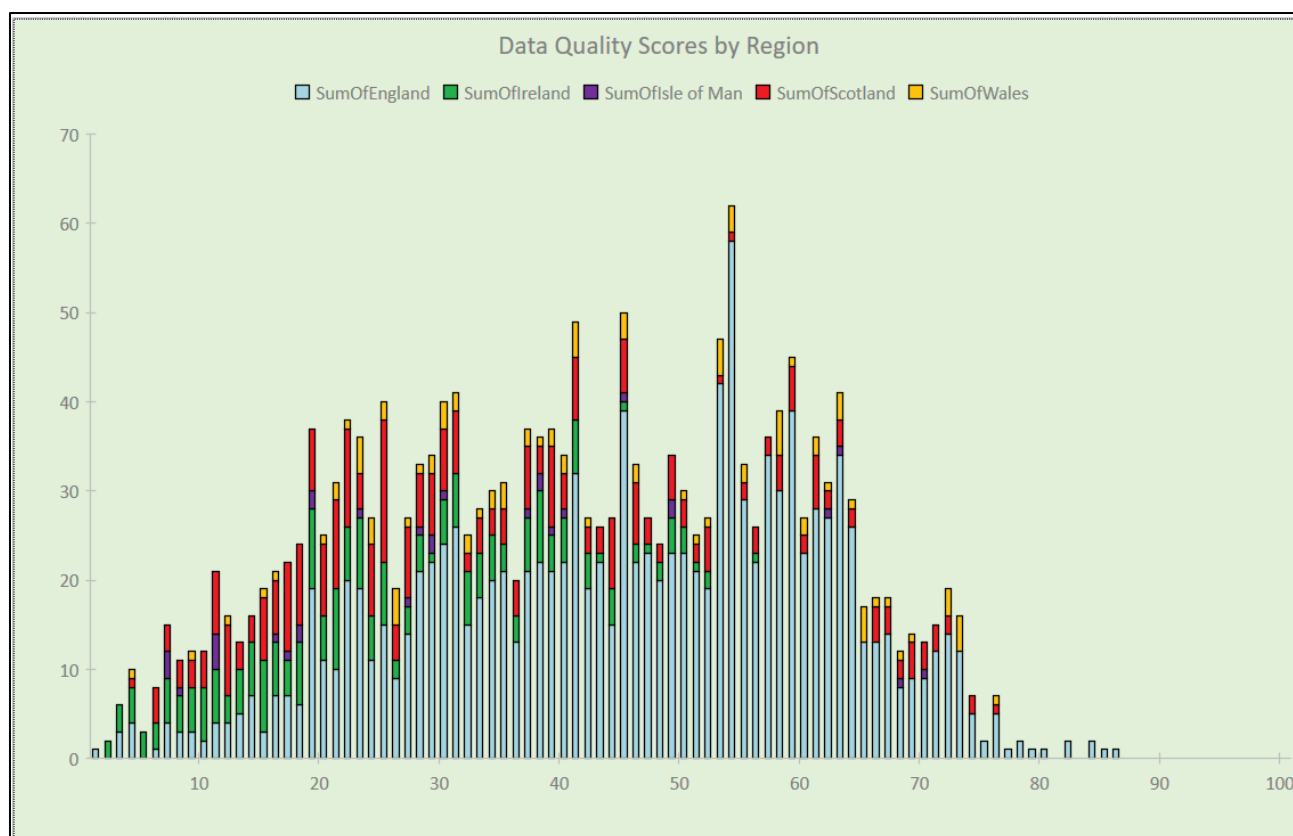


Figure 10. Hoard Data Quality Plot

reports of hoards found hundreds of years ago, vaguely documented and with little knowledge of the type and number of coins, and the whereabouts of the coins often unknown.

A numismatist using MCHBI for their research may wish to have a quick and easy way to filter out the less reliable hoard records. Nine different input parameters are assessed, and a total record quality score (0–100) calculated for each hoard. A slider bar in the MCHBI Main Menu is available such that the poorer documented hoards can easily be filtered out. The 2023 introduction of Analytics, Hoard Record Data Quality and Battlefields were all documented in a brief 2023 article on the British Numismatic Society's Research Blog.²

Technology utilised

A summary of the open-source software used for MCHBI can be found on the BNS website.³

MCHBI – Future Plans & Challenges

New hoards continue to be added as soon as sufficient data becomes available, either through the Portable Antiquities Scheme website, or the Scottish equivalent. Sadly, the Republic of Ireland has no similar website. Occasionally the MCHBI utilises information from the press, but supplements these records when more reliable data becomes available. In addition to adding new hoards there is a continuous process of corrections and updates to existing listed hoards underway, including information notified by users. The MCHBI application continues to benefit from minor programming enhancements, and readers are encouraged to suggest further programming ideas.

The hoard data quality algorithm will be revised during 2025 to better utilise the full range of possible scores. Besides the work outlined above, the major current effort is being devoted to

² Page, Robert (12 June 2023) *Three Recently Added New Features on the Medieval Coin Hoards Website, MCHBI*, Robert Page, 12 June 2023, British Numismatic Society Research Blog, [https://britnumsoc.blog/wp-](https://britnumsoc.blog/wp-content/uploads/2023/06/three-recently-added-new-features-on-the-medieval-coin-hoards-website-mchbi.pdf)

[content/uploads/2023/06/three-recently-added-new-features-on-the-medieval-coin-hoards-website-mchbi.pdf](https://britnumsoc.blog/wp-content/uploads/2023/06/three-recently-added-new-features-on-the-medieval-coin-hoards-website-mchbi.pdf).

³ Technology link: <https://www.britnumsoc.org/mchbi?view=article&id=292:mchbi-technology&catid=13>.

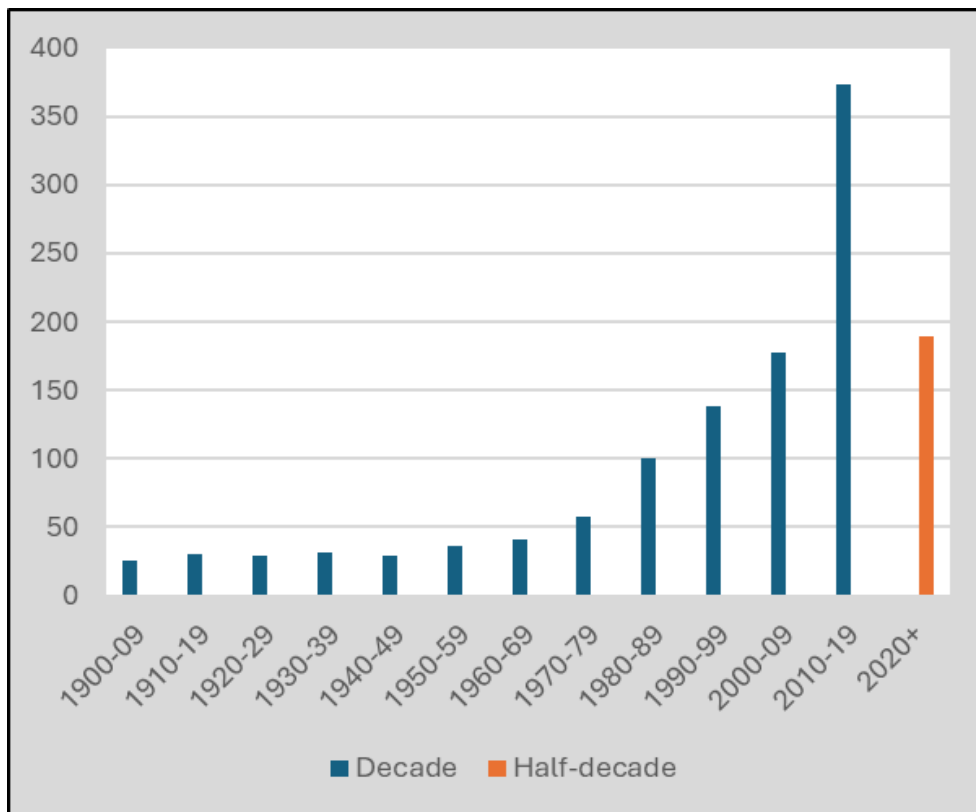


Figure 11. *Number of Hoards Discovered since 1900*

continuing refinement of the tables of coin issuers and coin types, as well as continuing to capture the various coin types for those hoards where sufficiently detailed and reliable data exists.

It is expected that the MCHBI will continue to grow over the coming years, and indeed there is no sign that the rate of discovery is slowing down. The chart (Figure 11) shows that for the first half of the 20th century the discovery rate was fairly constant at about 30 hoards per decade. From the middle of the 20th century the finding and reporting rate increased dramatically. We are only about halfway through the 2020-29

decade, but the discoveries so far indicate that the discovery rate is probably still increasing. The MCHBI database is now the largest repository of medieval hoard data for Britain and Ireland, and at the time of writing contains data on 2,057 hoards. As further data is added on the various coin types present in the hoards, the MCHBI application should prove of increasing value to numismatic researchers and other users. The MCHBI team welcome comments from users, and these may be sent using the relevant email icon in the Main Menu.

A Guide to Getting a Collection ready for Nomisma

JAN PELSDONK*

Teylers Museum holds a collection of approximately 20,000 coins and medals. The foundation of the collection was laid by Pieter Teyler van der Hulst (1702-1778, *Figure 1*). A quarter of a millennium later, around 2,000 coins and medals of his original collection are still preserved in the museum's vaults. *Figure 2* shows a general classification in groups. This paper describes what we encountered when we wanted to link the collection database to the international data standard.

Eighteenth century

The museum's collection of ancient coins is relatively small, but it includes two very interesting subcollections formed in the eighteenth century. The largest group was assembled by Johannes Enschedé (1750-1799, *Figure 1*). Enschedé was a wealthy printer based in Haarlem and he devoted part of his time to collecting. Later, his Roman and Byzantine coins came into the possession of his grandson, Adriaan Enschedé (1829-1896), who was associated to Teyler's Museum. In 1876, Adriaan made a rough inventory of the museum's numismatic collection after which he donated his grandfather's collection of 568 Roman, Byzantine and Ostrogothic coins to the museum to improve this underdeveloped part of the collection. Up to that moment, it contained only 'eenige consulaire en slechts 41 keizerlijke' (some consular and only 41 imperial) coins.¹ The description in the note appears to match a small group of Roman coins with no known provenance. Before this note was discovered in the museum's archives, it was no longer known that Pieter Teyler had also collected Roman coins. In this way, a second, smaller eighteenth-century collection came to light.

Last year, intern Thomas Rademakers focused on improving the documentation of the Roman coins. The research also included the very modest collection of Roman coins held at the



Figure 1. Left: Johannes Enschedé (1750-1799) in 1796. Right: Pieter Teyler van der Hulst, ±1760.

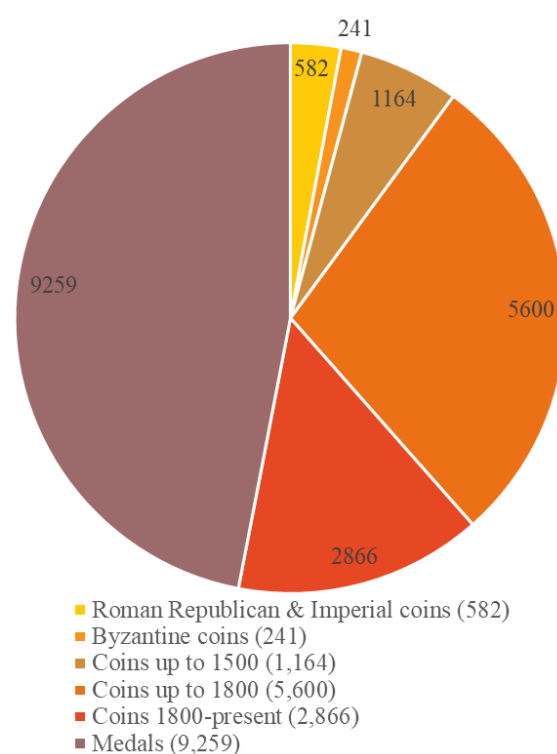
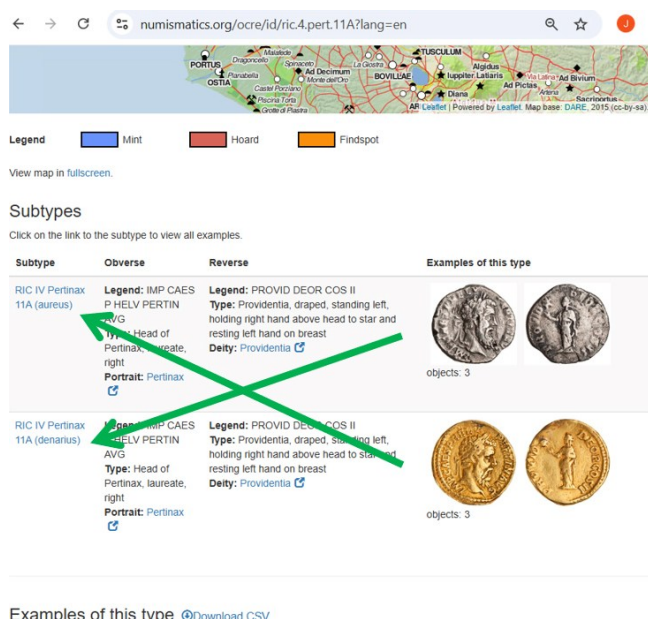


Figure 2. Numismatic collection of Teylers Museum

Rijksmuseum in Amsterdam. The latter collection is small because the museum primarily focuses on objects from the sixteenth century onwards. He

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¹ Archive of Teylers Foundation, ATS 26, letter of Adriaan Enschedé to the directors, 19 September 1877.



Examples of this type [Download CSV](#)

Figure 3. An example of a wrong attribution in OCRE

reviewed the identifications and descriptions of the coins, and he used nomisma.org to add links to literature references, depicted individuals and deities. As a result, the controlled vocabulary of the collection databases was enhanced and brought up to date.

Correct and incorrect links

An update of the descriptions was long overdue. The coins were identified in the nineteenth century using catalogues such as those by Cohen and Sabatier, and have remained virtually untouched ever since.² Thanks to nomisma.org and websites that use its vocabulary and ontology – in particular Online Coins of the Roman Empire (OCRE) and Coinage of the Roman Republic Online (CRRO) – creating coin descriptions has become significantly easier than in the past.³

However, a word of caution is needed, as it is tempting to draw a supposed connection too quickly, which can have far-reaching consequences. As shown in Figure 3, the systems are not yet foolproof. Incorrect connections can be made quickly, and in many cases, this depends on the quality of the researcher and the data processing

at the institutions involved. A misidentification or a typographical error in a collection database can lead to an incorrect link. This also affects other users, as anyone who then works with OCRE, for instance to make new determinations, might rely on the incorrect link. Anyone who is not well-versed in the subject, or who does not pay close attention, could mistakenly link an aureus to the description of a denarius, as shown in the example in Figure 3 on the basis of a coin displayed in OCRE that has been incorrectly linked by the collection holding the coin. The error persists until the relevant collection submits new, corrected data to OCRE. Especially in museums with large collections – which may not quickly recheck all recent determinations – this can result in errors persisting for decades.

Missing links

Sometimes, museum collections contain special objects. Coins that, upon initial inspection, appear to be nothing more than bulk items, but which, upon closer examination, reveal unique characteristics. If a researcher fails to notice this, they may mistakenly link their special coin to a group of regular specimens, thereby obscuring its exceptional nature. Who will verify a link once it is made in the future? Moreover, museum collections can also house ‘rarities’ that, without proper reference in Nomisma, may take on a life of their own. The differences lie primarily in varieties, forgeries, uncertainties, and unknown rulers. For example, in Teylers Museum, there are two medals (Figure 4) depicting the usurpers Titus Cornelius Celsus (263) and Appius Claudius Censorinus (270). The medals themselves exist (they were made around 1700 by Christian Wermuth), but the emperors depicted on them do not. By including these non-existent figures in Nomisma, both emperors can be explained and clarified, allowing future researchers to assess their significance. If they are absent from Nomisma, their uncertain status persists. Also, several deities and persons, like Bellona, Prometheus, Leda and Paris are not incorporated

² Cohen, Henry (1880) *Description historique des monnaies frappées sous l'empire romain communément appelées Médailles Impériales* 1 (Paris/London); Cohen, Henry (1859) *Description des monnaies frappées sous l'empire romain communément appelées Médailles Impériales* (Paris/London); Sabatier, J. (1862) *Description générale*

des monnaies byzantines 1 (Paris/London); Sabatier, J. (1862) *Description générale des monnaies byzantines* 2 (Paris/London).

³ <https://numismatics.org/ocre/>;
<https://numismatics.org/crro/>.



Figure 4. Christian Wermuth (1661-1739), *Two medals of supposed Roman emperors*. Above: Titus Cornelius Celsus (263) supposed emperor (usurper), pewter, 32 mm (TMNK 14804). Below: Appius Claudius Censorinus (270) supposed emperor (usurper), pewter, 32 mm (TMNK 14803)



Figure 5. Roman Empire, Augustus, *denarius*. 19-18 BCE, Caesaraugusta (Zaragoza). Above a genuine coin (inv. TMNK 12846), below a contemporary forgery (inv. TMNK 09301, from the 18th century collection of Enschedé)



Figure 6. Roman Empire, Trajan, *denarius*. 103-111, Roma, silver (forgery, cast of an aureus, inv. TMNK 09367, from the 18th century collection of Enschedé)



Figure 7. Roman Empire, Faustina senior, *denarius*. 161-176, Roma, silver (above: inv. TMNK 09404, below: example from OCRE with peacock)⁴



Figure 8. Roman Empire, Gallienus, *antoninianus*. 260-268, Roma, silver (inv. TMNK 09569, in OCRE only without harness)⁵

⁴ http://numismatics.org/ocre/id/ric.3.ant.338_denarius.

⁵ [http://numismatics.org/ocre/id/ric.5.gall\(2\).242](http://numismatics.org/ocre/id/ric.5.gall(2).242).

in Nomisma. In total, in 57 cases we could not make a link to Nomisma. Of those, 10 persons were added to the system, *Figure 10* shows the remaining persons.

And how can a forgery (*Figures 5–6*) be linked to the system? When including a modern collector's forgery, you can still wonder if it is needed (although it can be quite useful), but contemporary forgeries should not be omitted. If you include them under the regular number, fake and authentic coins will get mixed up, which is undesirable.

Finally, for the dedicated numismatists, there are also variations on familiar types, such as an emperor wearing armour instead of having a bare chest (*Figure 7*) and Juno depicted (probably) without a peacock (*Figure 8*). Throughout the process of creating descriptions, small additions have been made to Nomisma. For instance, the above mentioned Titus Cornelius Celsus and Appius Claudius Censorinus were added, with the clear remark that these names should not be used for authorities on actual Roman coins.

Creating a data dump in VoID

The next step is simpler than it might initially seem. At nomisma.org/documentation/contribute, clear instructions are provided on how the data should be formatted (using VoID: the Vocabulary of Interlinked Datasets) before it can be linked to a system like OCRE. The website presents understandable examples of a datadump in VoID for three categories: 'General Metadata', 'Physical Coins' and 'Hoards'. As shown clearly on that webpage, only a few fields from the collection database are required. This makes sense, as the basic terminology is already defined within Nomisma and in this case OCRE, and the types themselves are already included in OCRE. It is mostly a matter of creating a two-way link. *Figure 9* shows the example for 'Physical Coins', with the required fields from the collection database highlighted in black. In addition, several references (stable links) are needed, pointing to where the objects and photographs can be found on the museum's website.

```
<rdf:RDF xmlns:dcterms="http://purl.org/dc/terms/"
  xmlns:void="http://rdfs.org/ns/void#"
  xmlns:nmo="http://nomisma.org/ontology#"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:foaf="http://xmlns.com/foaf/0.1/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#">
  <nmo:NumismaticObject rdf:about="http://coins.lib.virginia.edu/id/1991.17.140">
    <dcterms:title>Antoninianus of Gallienus, Rome, 254-255. 1991.17.140.</dcterms:title>
    <dcterms:identifier>1991.17.140</dcterms:identifier>
    <nmo:hasCollection rdf:resource="http://nomisma.org/id/uva"/>
    <nmo:hasTypeSeriesItem rdf:resource="http://numismatics.org/ocre/id/ric.5.gall(1).143fA"/>
    <dcterms:replaces rdf:resource="http://coins.lib.virginia.edu/display-uva?id=n1991_17_140"/>
    <nmo:hasAxis rdf:datatype="http://www.w3.org/2001/XMLSchema#integer">6</nmo:hasAxis>
    <nmo:hasDiameter rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">22</nmo:hasDiameter>
    <nmo:hasWeight rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">2.86</nmo:hasWeight>
    <dcterms:isPartOf rdf:resource="http://nomisma.org/id/olivers_orchard_hoards"/>
    <nmo:hasObverse rdf:resource="http://coins.lib.virginia.edu/id/1991.17.140#obverse"/>
    <nmo:hasReverse rdf:resource="http://coins.lib.virginia.edu/id/1991.17.140#reverse"/>
    <void:inDataset rdf:resource="http://coins.lib.virginia.edu/">
  </nmo:NumismaticObject>
  <rdf:Description rdf:about="http://coins.lib.virginia.edu/id/1991.17.140#obverse">
    <foaf:depiction rdf:resource="http://coins.lib.virginia.edu/images/coins/screen/n1991_17_140_obv.jpg"/>
    <foaf:thumbnail rdf:resource="http://coins.lib.virginia.edu/images/coins/thumb/n1991_17_140_obv.jpg"/>
  </rdf:Description>
  <rdf:Description rdf:about="http://coins.lib.virginia.edu/id/1991.17.140#reverse">
    <foaf:depiction rdf:resource="http://coins.lib.virginia.edu/images/coins/screen/n1991_17_140_rev.jpg"/>
    <foaf:thumbnail rdf:resource="http://coins.lib.virginia.edu/images/coins/thumb/n1991_17_140_rev.jpg"/>
  </rdf:Description>
</rdf:RDF>
```

Figure 9. Example of the VoID for 'Physical Coins' in *nomisma.org*

For the Rijksmuseum and Teylers Museum, FileMaker Pro was used to break the dataset quickly and easily into separate parts, which were then reassembled using formulas and combined with the relevant fields from the collection database. A data dump can also be created with the more commonly used Microsoft Excel. In Excel, the dataset can likewise be broken down into sections. The basic principle is: (first part of the formula) + (field from the collection file) + (middle part of the formula) + (field from the collection file) + (final part of the formula). Each part is placed in a separate column and each line represents one object. It is important not to forget punctuation marks, especially tabs, returns, spaces, periods, and commas. The section between the black ‘6’ and the black ‘2.86’ from the example in (Figure 9) is explained below.

Example

First, an extract of the collection database must be created in Excel, with the relevant fields placed in separate columns, one object per row. In this case, the values ‘6’, ‘22’, and ‘2.86’ should each be placed in individual columns. Next, a blank column is needed before the ‘6’, between the three numbers, and after the ‘2.86’. These columns will contain sections of the VoID.

	A	B	C	D	E	F	G
1	VoID	value	VoID	value	VoID	value	VoID
2		6		22		2.86	
3		12		17		3.77	

The table above shows one object on row (2) and another on row (3). As shown in Figure 9, the data dump in VoID includes various punctuation marks. I chose to replace tabs with \$\$ and line breaks with %% because this combination of characters does not appear in my collection databases. I always use two-character combinations because the individual characters, \$ and %, do appear in the text. Column A will contain a section of text for the data dump. This starts with the end of the preceding line (">), followed by a line break and two tabs (%%\$\$\$\$), immediately followed by part of the formula (<nmo:hasAxis rdf:datatype="http://www.w3.org/2001/XMLSchema#integer">).

Column B contains the values from the collection file, and the formula continues in column C and so on.

Column B: die-axis

Column C: </nmo:hasAxis>%%\$\$\$\$<nmo:hasDiameter rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">

Column D: diameter

Column E: </nmo:hasDiameter>%%\$\$\$\$<nmo:hasWeight rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">

Column F: weight

Column G: </nmo:hasWeight>%%\$\$\$\$<nmo:hasObverse rdf:resource="

Next, the Excel file needs to be converted to the structure shown in Figure 9. First, all the data in the Excel file is transferred to a Word document: select all the relevant fields and copy them. Then, paste them into a blank Word document using the ‘Keep Text Only’ option (this prevents the Excel table from being transferred and ensures only the plain text is used).

Naturally, some adjustments will be needed in Word. First, use the ‘Find and Replace’ function to remove all tabs (^t). The result will be a nearly unreadable block of text, but that’s okay. Next, search for all \$\$ and replace it with an automatic command for tabs (^t). (Note: where \$\$\$\$ appears in the text, two tabs will automatically be inserted.) Finally, replace all %% with an enter (^p). The result will be a layout similar to the one shown in Figure 9.

Mindset

With a data dump for each object, the foundation is laid for adding objects to a system like OCRE. However, there’s more to it. And on that note, for the few readers who haven’t lost interest after the previous paragraph, I regret to inform you that this is where things get tricky. The reason is that links to and from the collection database are required. The online version of the collection database typically includes a description and photos of each object. These records should be supplemented with a single field that describes the permanent link (a stable URI) to the object in OCRE. Conversely, a permanent link from OCRE back to the online collection file is also necessary. In short: an additional field needs to be added to

the online collection database, and each object must be assigned a stable URI.

At this point, the curator must engage with two very different groups: the administrators of the collection database (who must either create or free up an additional field for the link) and the website administrators (who need to make this field visible and assign stable URIs to the objects). At Teylers Museum, these two conditions have not yet been met. The Rijksmuseum already provides permalinks. Also, in the offline section of the collection database, a field for adding URIs to external databases exists already. At this moment however, our need to present that field in the online database is still under discussion, because the numismatic dataset will then be further developed in terms of data sharing, more so than the other collection sections. It is likely just a matter of time before this final hurdle is overcome.

To conclude

In conclusion, it would be clever to look twice before describing and labeling an object. Does the coin truly conform to a standard description or are there small differences and is the object unique? And if a discrepancy is detected, it's important to consult the managers of systems like Nomisma and OCRE to ensure the observed discrepancy doesn't fade into obscurity. The online systems like Nomisma are still under development, and it would be a missed opportunity if they weren't subjected to as many checks and improvements as possible. The question remains how to deal with persons – fictional or not – who are not included in Nomisma.

Furthermore, exporting data in VoID (Vocabulary of Interlinked Datasets) is relatively simple. The main challenges are arising in the final step: ensuring the collection holder provides fields for permanent links in the online database and digital references to the external web pages.

Hektor (Hector)	son of king Priamos and queen Hekabe of Troy
Argus Panoptes	giant
Iö	daughter of river god Inachus, mistress of Zeus
Bellona	Goddess of war
Europa	Phoenician princess
Atlas	bearer of the vault of heaven
Prudentia	personification of prudence, judiciousness and wisdom
Phaëton	son of Helios
Pyrrha	survivor of the deluge
Prometheus	son of the titan Lapetos
Nereïde	daughter of sea god Nereus
Nessos (Nessus)	centaur
Arethusa	nymph
Paris	prince of Troy
Antigone	daughter of Oedipus
Nisos	king of Megara
Terminus	God of the Borders
Pomona	Goddess of tree fruits
Ganymedes	prince of Troy
Cacus	son of Vulcan
Syrinx	Nymph
Leda	queen of Sparta
Kadmos	inventor of the alphabet
Morpheus	God of dreams

Elektra	Oceanid
Thaumas	son of Pontos and Gaia
Kelaino	harpy
Okypete	harpy
Aëllō	harpy
Laocoön	Trojan priest
Kalliope	muse of the heroic epic, philosophy and rhetoric
Kleio	muse of history
Erato	muse of the hymn, song and lyric
Melpomene	muse of tragedy
Polyhymnia	muse of rhetoric and sacred songs
Terpsichore	muse of dance and lyric poetry
Thalia	muse of comedy
Andromeda	princess from Ethiopia
Hymen (Hymenaeus)	God of marriage
Gaius Mucius Cordus (Scaevola)	Roman hero ±-480
Theseus	king, founder of Athens
Eurytos (Eurytus)	centaur
Endymion	shepherd, lover of Artemis, personification of sleep
Alkestis	princess of Pelias, queen of Phereai
Admetos	king of Phereai in Thessaly
Aietes (Aëtes)	king of Corinth and Colchis
Venus Cloacina	Goddess of the main sewer

Figure 10. 47 missing persons in *Nomisma* that appear in the museum's collection

Digitalisation of catalogues for the publication of large numismatic repertories. A practical example with *Dédalo*: the medieval hoard of Llibertat Street (Valencia, Spain)

MIQUEL SÁNCHEZ SIGNES*



Figure 1. Location of the city of Valencia and, within the urban center, the site where the hoard was discovered

 Our objective is to use the medieval Christian silver coin hoard from Llibertat Street, which was found in Valencia, Spain, as a central thread to explore the significance of digitizing numismatic catalogues from major numismatic collections—an approach we consider essential.

Digitisation and the Llibertat Street hoard

The Llibertat Street hoard was discovered in 1994 in the medieval heart of the city of Valencia, located on the eastern coast of Spain (*Figure 1*), during an archaeological excavation of two plots in the historic centre, specifically on Llibertat Street. Valencia is a city characterised by its Ro-

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man, Islamic, and Christian medieval past, which has been well documented archaeologically in recent decades. The discovery took place near the cathedral and the northern city wall, in a quarter that, during the Late Middle Ages, had a significant population.

The hoard was concealed within a wall dated to the 14th century, which was part of a series of medieval structures documented throughout the archaeological excavation process. The 2,483 silver coins composing the hoard, minted in Barcelona and known as ‘groats’, were struck under the successive reigns of Peter III, Alfonso III, James II, Alfonso IV, and Peter IV of Aragon, between the late-13th century and the mid-14th century. This type of coin, introduced in 1285 by King Peter III of Aragon, remained in circulation, with variations, until the early 18th century, when it disappeared due to monetary changes implemented by the new ruling dynasty in Spain.

All the coins were carefully selected for their excellent state of preservation: they showed no signs of clipping or metal removal through filing, which suggests that they were part of a significant wealth deposit accumulated over several years. The hoard was likely lost during the 1350s or 1360s, possibly during one of the plague epidemics that struck Valencia amidst the armed conflict between the Crown of Aragon and the Crown of Castile—a war that had a direct and significant impact on the city.

Faced with the challenge of documenting a hoard consisting of 2,483 coins, studying it, and, above all, preparing its publication, we began to consider the most suitable means of presenting the entirety of the information to an interes-

ted audience. This would ideally be achieved without resorting to large printed volumes containing extensive coin catalogues, often in black and white, which are still being published today. Consequently, we opted to work within a digital environment, as we will now explore.

Previous studies and publications

Since the Llibertat Street hoard was discovered in 1994, this monetary accumulation has been the subject of research for three decades. However, relatively few results have been published, as a comprehensive and detailed analysis of all the coins had not been undertaken until recently.

A first publication on the hoard appeared in 1994, just a few months after its discovery (Llorens, Matamoros, Ripollés 1994). It was a small book illustrating some of the coins that had been cleaned in the restoration laboratory following the archaeological excavation. A total of 300 coins were cleaned and restored, while the rest remained untreated. Additionally, the hoard was divided into two parts: approximately 2,000 coins were deposited at the Museum of Prehistory of Valencia, while the remaining 400 were taken to the building of the Corts Valencianes, the governing body of the Valencian autonomous community, since the hoard had been discovered during the construction of an extension to this government building.

No further publications on the Llibertat Street hoard appeared until 2005 (Ripollès, Llorens, Matamoros 2005). However, due to the summary nature of this publication and the limited space allocated to each study in the publication—it presented numismatic hoards from various periods across Valencia and its surroundings—the data included in the chapter dedicated to the Llibertat Street hoard were essentially the same as those in the publication from a decade earlier. In both cases, only a selection of coins was illustrated in large format, a common practice in numismatic publications of that time.

In 2010, research on the hoard resumed (Bouzas 2010-2011). The entire collection was restored, and with the coins now cleaned and legible, it became possible to complete their cataloguing (Figure 2). The data on all 2,483 coins (along with the resulting 4,966 photographs) were entered into a database, which was



Figure 2. *Preliminary cataloguing process of the hoard* (photo: MPV archive)

built at the time using the FileMaker software. Based on this data, a detailed study of the monetary deposit was conducted, yielding a vast amount of information on the production of Barcelona's silver groats and their use and circulation in the Kingdom of Valencia during the 13th and 14th centuries. This research later became a two-volume doctoral thesis (Sánchez 2021), which in 2023 was published by the Museum of Prehistory of Valencia and the Diputación Provincial of Valencia (Sánchez 2023; *Figure 3*).

The challenge of large numismatic catalogues

The 2023 doctoral dissertation dedicated nearly an entire printed volume to illustrating all the pieces that made up the catalogue of the Llibertat Street hoard. At that point, during the preparation of the thesis publication, we began considering a more efficient solution for presenting this extensive collection of images. Producing a book of over 600 pages—or even two volumes—would significantly increase production, printing, and distribution costs while limiting its accessibility (*Figure 4*). From the outset, one of our main objectives was to ensure broad dissemination, making the information as accessible as possible to both specialists and the general public.

For some time, the Museum of Prehistory of Valencia had been working with the Dédalo system, an open-source, accessible, and collaborative content management system. The project *monedaiberica.org* is integrated into this system and has been presented at various numismatic conferences and events across Europe in recent years. *Monedaiberica.org* hosts the *Iberian Coinage Catalogue* (*Moneda Ibérica*), a project that compiles the coinage of the Iberian Peninsula in Antiquity and currently contains thousands of images and Iberian coin types accessible to anyone, anywhere, at any time (Gozalbes et alii 2021; Peña, Gozalbes 2021).

Through the NUMISDATA platform, which hosts the digital *Iberian Coinage Catalogue* and operates using the Dédalo system, a vast amount of data can be compiled without necessarily being stored on the Museum of Prehistory of Valencia's server (*Figure 5*). Instead, the system operates through permanent URIs that remain stable even if the content itself is updated. This approach not only reduces the volume of data stored on a

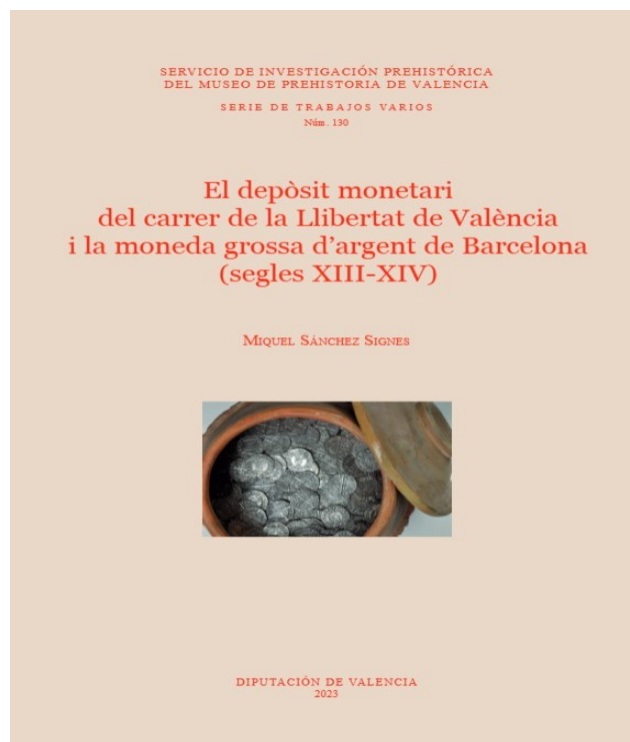


Figure 3. Cover of the monographic study publication on the hoard (Sánchez 2023)

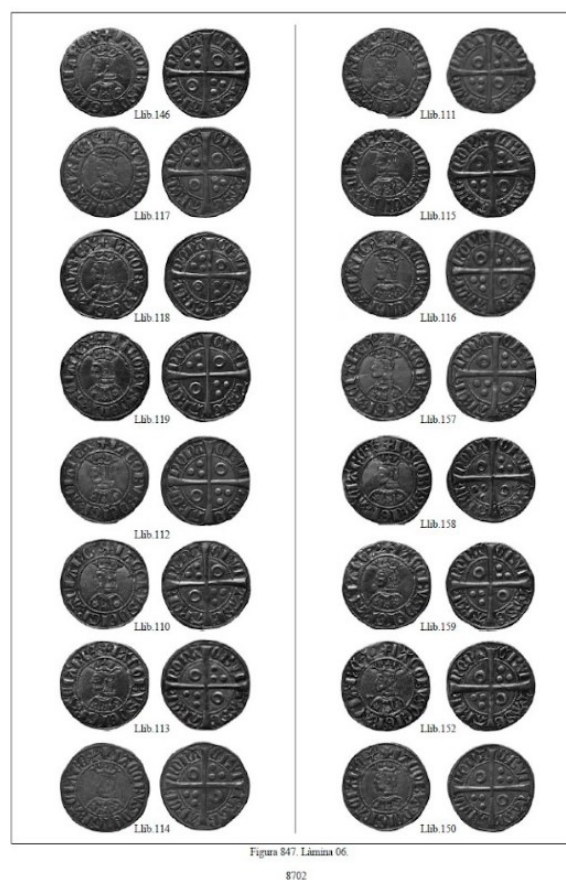


Figure 4. Example of a catalogue plate layout in the doctoral thesis on the hoard, Volume 2, Plate 6 (Sánchez, 2021).

Pere IV d'Aragó, el Cerimoniós (1336-1387). Croat. Barcelona.



Number: 35856
 Set: Tresor del carrer de la Llibertat
 Objeto: Coin, Money, Object
 Place of production: Barcelona |
 State / Authority: Pere el Cerimoniós (IV d'Aragó, II de Valencia)
 Name: Croat
 Culture / production: Christian
 Measures: Weight 3.18 g
 Axis 3.00 h
 Description: Pere IV. Croat. Barcelona.
 Croat amb tres flors i cabell fluent. AR.
 a/ -PETRVS DEI GRACIA REX (A, U i T gòtiques, sense punts de separació) Bust coronat, a l'esquerra. Vestit partit en tres àrees on hi ha flors de sis pètals. Cabell fluent.
 r/ -CIVI - TASB - ARCH - NONA- (A, V i T gòtiques). Creu de tern. CIVI a anell.
 6 h.
 Bibliographic Ref.: Cru 2220L
 Income: 1994
 Permanent IRI: <http://mupreva.org/cat/35856/en>

Figure 5. Record of one of the hoard's coins, available for consultation in the online catalogue of the Museum of Prehistory of Valencia

single server—especially when dealing with extensive and heavy datasets—but also ensures that the information remains accessible as long as the URI remains active, without overloading the system.

During the planning of the Llibertat Street hoard's publication, two options were considered: either not publishing the full catalogue, including only a selection of images of the most representative coin types, or making the entire catalogue fully accessible online through content hosted by the Museum of Prehistory of Valencia. Since all the coin photographs were already stored in the museum's database, the second option allowed free and open access to high-quality catalogued images, directly linked to the information provided in the book and using the same catalogue numbers for easy reference. Consequently, when

the book was finally published, it did not include a complete photographic catalogue at the end, as is customary in similar works. Instead, a link was provided to the hoard's digital catalogue, hosted by the Museum of Prehistory of Valencia.

As a result of these considerations, we identify several key challenges posed by the publication of large numismatic hoards and extensive coin collections:

- The high cost of production and printing.
- The difficulty of consulting large printed volumes and the challenges this presents for both researchers and the general public in locating specific information. In this regard, the digital environment facilitates fast and precise searches.
- The presentation of the coins themselves. Traditional publications often feature ima-

ges in black and white, at reduced sizes, or arranged in overcrowded plates to minimise production costs. This limits the ability to analyse and understand coin details, often forcing researchers to examine the physical coins, which may not always be easily accessible.

For all these reasons, we firmly believe that digitisation is the most effective solution to address these challenges.

The digitisation of large numismatic collections

What are the benefits of digitizing large volumes of coins for publication? Based on our experience with the Llibertat Street hoard, we can say that there are several advantages, all highly significant in adapting to an increasingly globalised and digital world.

First, digitisation ensures universal access to the catalogue, as we have already mentioned, by providing high-quality, high-resolution images that allow for the appreciation of all details on the coins—sometimes even better than with the physical piece in hand. This is particularly useful for researchers, enabling them to delve deeper into aspects of the coins that have not been covered in previous studies and to explore new and significant details. Without digital accessibility, this level of study would require traveling to the museum, institution, or private collection housing the coins.

Second, we believe this approach guarantees the widespread dissemination of information. Traditional printed publications have a relatively limited reach, especially when acquisition costs are high. Not everyone can afford to purchase catalogues that often exceed more than a hundred euros, and few bookstores, unless they specialise in a very specific subject, carry such volumes. Through digitisation, it becomes much easier to make this information widely available, and, more importantly, to offer it for free, accessible from anywhere with an internet connection.

Finally, the digitisation of large numismatic collections helps reduce the volume of information published in a book. By digitizing the catalogues and making them available online, it is possible to illustrate in the book only the most relevant pieces for understanding the collection

while maintaining a manageable amount of text in print.

As we can see, the future is moving toward the universalisation of free knowledge and the provision of high-quality, high-resolution open-access resources, with the participation of museums, institutions, and private collectors. This applies not only to the publication of large coin hoards, like the case we have discussed, but also to typological collections and catalogues that would otherwise become expensive, bulky, and difficult-to-use publications.

This goal is now a solid line of work. Not only is *Moneda Ibérica* continuing to grow and expand its content, but we are also working on the creation of a new catalogue, in the same spirit, for medieval coinage of the Iberian Peninsula. This is still a project in development, which has been underway for two years, starting with the digitisation of medieval coin types from the kingdoms of Valencia and Mallorca between the 13th and 15th/16th centuries (*Figure 6*), starting with the digitisation of the Valencian medieval coin collection Vidal Valle (Ripollès et alii 2020). In the future, the catalogue is expected to expand to include the coinage of other medieval Christian territories of the Iberian Peninsula, always in an open and collaborative manner. This project, like *Moneda Ibérica*, also incorporates catalogues of coin finds and hoards, such as the Llibertat Street hoard, which will become part of a much larger body of information.

This digitisation project can also be applied to other coin hoards whose publication has been partial or incomplete due to the challenges we have analyzed in this work. In our area of study, we can cite, for example, the case of the Lluís Vives Street hoard in Valencia, composed of 1,674 fragments of Almohad dinars, which was published only partially in 2005 (Algarra, Ripollès, Salavert 2005), leaving the complete catalogue still inaccessible to researchers and interested individuals. The same situation applies, although from a different period, to the hoard known as *Lliria III*, discovered in 1999 in Lliria, a town near Valencia. This hoard consists of nearly 6,000 Roman silver denarii and has been the subject of several scientific articles and a doctoral thesis (Gozalbes et alii 2005;

Inventario													Actividades	Recursos	Procesos	Tesauro	Administración	Desarrollo	Ontología	MiquelS	Castellano	datos: Castellano	Tpo			
Code v. 6.4.3 2025-02-21T10:13:41+01:00 DB: dedalo_numisdata_monedaberica PG v. 16.8 (Ubuntu 16.8-1 pps22 04+1) PHP v. 8.3.17 jti.0 memory: 16384M sapi: fpm-fcgi monedaberica 10																										51.68.38.124
20362		Crusafont 2009	2127a	Valencia 1247 <-> 1516 ?	A cerradas por arriba	1247 <-> 1249	Real ?	Cabeza coronada, a derecha.	IACOBVS REX	Árbol a modo de flor, surmontado de cruz. Ramas altas con punto cruzado de línea en sus extremos.	✠ VALE-NCIE															
20363		Crusafont 2009	2127b	Valencia 1247 <-> 1516 ?	Laterales de la corona inclinados	1247 <-> 1249	Real ?	Cabeza coronada, a derecha.	IACOBVS REX	Árbol a modo de flor, surmontado de cruz. Ramas altas con punto cruzado de línea en sus extremos.	✠ VALE-NCIE															
20364		Crusafont 2009	2128	Valencia 1247 <-> 1516 ?	Cabeza a izquierda	1247 <-> 1249	Real ?	Cabeza coronada, a izquierda.	IACOBVS REX	Árbol a modo de flor, surmontado de cruz. Ramas altas con punto cruzado de línea en sus extremos.	✠ VALE-NCIE															
20365		Crusafont 2009	2129	Valencia 1247 <-> 1516 ?	Módulo pequeño	1247 <-> 1249	Real ?	Cabeza coronada, a izquierda.	IACOBVS REX	Árbol a modo de flor, surmontado de cruz. Ramas altas con punto cruzado de línea en sus extremos.	✠ VALE-NCIE															
20366		Crusafont 2009	2130	Valencia 1247 <-> 1516 ?		1271	Real ?	Cabeza coronada, a izquierda.	IACOBVS REX	Árbol a modo de flor, surmontado de cruz. Ramas bajas con puntos en sus extremos.	✠ VALE-NCIE															
20367		Crusafont 2009	2131	Valencia 1247 <-> 1516 ?		1247 <-> 1249	Óbolo ?	Cabeza coronada, a izquierda.	IACOBVS REX	Árbol a modo de flor, surmontado de cruz. Ramas altas con punto cruzado de línea en sus extremos.	✠ VALE-NCIE															
20368		Crusafont 2009	2132	Valencia 1247 <-> 1516 ?		1247 <-> 1249	Real ?	Cabeza coronada, a izquierda.	IACOBVS REX	Árbol a modo de flor, surmontado de cruz. Ramas altas con punto cruzado de línea en sus extremos.	✠ VALE-NCIE															
20369		Crusafont 2009	2133	Valencia 1247 <-> 1516 ?			Real ?	Cabeza coronada, a izquierda.	IACOBVS REX	Árbol a modo de flor, surmontado de cruz. Ramas bajas con puntos en sus extremos.	✠ VALE-NCIE															

Figure 6. Working environment in *Dédalo* for the Kingdom of Valencia project

Delegido 2014). However, the publication of its complete catalogue will only be possible in a digital environment, which facilitates comprehension and searchability.

Another significant publication, relevant to the issues discussed here, is the hoard of Sant Joan d'Alacant (Alicante), which was the subject of a monograph that highlights many of the challenges we have outlined (Ramón 2013). This deposit contains 501 coins from the 17th and 18th centuries. However, the hoard's catalogue was published in black and white, with many images reduced in size to fit the collection into a single, non-bulky book. A glance at these pages quickly convinces us that this is not the best option for the 21st century.

Some conclusions

Rather than conducting a detailed analysis, our aim has been to present some thoughts on the necessity of digitizing numismatic content and ensuring its accessibility. To conclude, we would like to emphasise two main ideas.

The first is the need to publish numismatic records in a fully accessible and free manner. Now that we are approaching the end of the first quarter of the 21st century, we should take full advantage of the tools at our disposal to facilitate research without requiring direct handling of the original

pieces—except in cases where highly specific analyses demand it. While in-person work will always be necessary, high-quality digital content allows a significant portion of research to be conducted remotely, helping to universalise access to knowledge and study.

Secondly, we firmly believe that research funded with public resources should be publicly available and accessible to everyone interested. Finally, we strongly advocate for collaborative work, as fully individual research makes less sense in the 21st century. Teamwork, collaboration, and the contribution of information from various institutions and fields are the foundation of comprehensive digital research. This is only possible through the digital publication of numismatic records which can be consulted by researchers and enthusiasts worldwide to enhance or complete their own studies. We recognise that this path requires continuous development and the collective effort of all involved.

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Digitisation of Numismatic Collections in Saxony-Anhalt: The S.E.S.A.M. Project and its Contributions to Archaeology and Numismatics

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The S.E.S.A.M. project aims to digitise and catalogue coin finds from museums and archives in Saxony-Anhalt, Germany. By developing and implementing innovative technologies such as O.S.C.A.R. (Optical System for Coin Analysis and Recognition), this project transforms numismatic collections into accessible digital resources.

Introduction

Coins recovered through archaeological excavations and surveys represent valuable historical artefacts, offering insights into economic, social, and cultural structures of the past, particularly for periods with limited written records. Despite their significance, coin finds in Saxony-Anhalt have often been inaccessible for research due to decentralised storage in numerous different museums and archives, and incomplete cataloguing. To address these challenges, the S.E.S.A.M. (systematische Erfassung sachsen-anhaltischer Münzen) project was launched in July 2022 with funding from the state of Saxony-Anhalt under the auspices of the State Office for Heritage Management and Archaeology Saxony-Anhalt.¹ This initiative aims to digitise coin collections from small and medium-sized museums dating from Antiquity to the Second Imperial Coinage Act of 1873, creating a robust, centralised data framework to facilitate advanced research and public engagement.

Objectives and Challenges

Importance of Coin Digitisation

The digitisation of coins discovered in archaeological contexts is of fundamental importance for both numismatics and archaeology. Coins are three-dimensional objects, yet they are often



Figure 1. O.S.C.A.R. (photo: State Office for Heritage Management and Archaeology Saxony-Anhalt)

represented through two-dimensional photographs, which fail to capture the full scope of information. As a result, numismatic analyses are typically conducted directly on the physical objects themselves. The use of digital methods is an enormous support in this case and will lead to ever new research approaches in the future. Visualisation techniques, such as 3D imaging and Reflectance Transformation Imaging (RTI), aid in the analysis and identification of coins with worn inscriptions or unclear features by simulating various lighting angles and intensities. Additionally, machine learning and image recognition

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¹ <https://www.sesam-projekt.de/en/>.

technologies are broadening the range of analytical possibilities.

By creating high-resolution digital representations, researchers can analyse and compare coins without direct physical access, preserving fragile objects while enabling broader scholarly collaboration. Numismatics benefits from digitisation by facilitating large-scale comparative studies, improving typological classifications, and enabling statistical analyses of coin circulation, production techniques, and economic systems across different historical periods.

For archaeology, the integration of numismatic data with excavation records enhances contextual interpretations. Coins serve as chronological markers, helping to date archaeological layers and understand trade networks, economic interactions, and cultural exchanges. Digital tools allow for the georeferencing of coin finds, which, when combined with other archaeological evidence, can reveal settlement patterns, political influences, and even monetary policies. By linking coin datasets with broader archaeological databases, interdisciplinary studies can explore economic fluctuations, coin hoarding behaviours, and regional variations in currency use.

Additionally, digital repositories and collection databases such as OCRE, CRRO, KENOM, IKMK.net and many more provide an open-access platform for researchers worldwide, promoting collaboration and data standardisation.² Ultimately, the digitisation of archaeological coin finds not only preserves cultural heritage but also expands the methodological framework for studying historical economies and societies, fostering new insights at the intersection of numismatics and archaeology.

Challenges in Numismatic Research

Today, coin finds are not only located underground but also in the collections and depots of numerous museums and archives across Saxony-Anhalt, Germany and Europe. The previous practice of decentralizing the storage of archaeological finds has led to the situation where, in addition to the State Office for Heritage Management and Archaeology Saxony-Anhalt,

nearly all medium-sized and smaller museums in the region hold coin collections of varying sizes, which have largely remained unexplored and are not digitised. Furthermore, coin finds were often divided and acquired by different institutions as well as private individuals for their personal collections, further complicating their systematic exploration.

This significant cultural heritage has thus far been accessible only to a highly regulated circle of individuals – if it was even known at all. Many of these coin finds have never been published, or only partially, often in the form of selective excerpts, summary catalogues, and without illustrations. However, such limited documentation provides only a restricted foundation for scientific analysis and significantly hinders comparative studies. In particular, for the neighbouring discipline of numismatics, the lack of clarity in the collections and the specialised knowledge required often posed considerable obstacles, preventing the effective utilisation of the coin find material. The accessibility of the material and, above all, its processing through the systematisation of the specific objects are essential for creating a comprehensive data foundation. The more thoroughly and comprehensively the coin finds of a region are recorded, described in detailed scholarly terms, and the information on their provenance and discovery circumstances documented, the more precise and far-reaching scientific conclusions can be drawn.

Most museums that store coin finds lack the personnel and financial resources, due to the diverse tasks in their daily operations, to carry out the necessary documentation and digitisation in a high-quality manner, particularly with regard to compatibility for data exchange and the subsequent data maintenance. Without a standardised, centralised approach, isolated datasets risk incompatibility and limited utility for researchers and the public. Therefore, a centrally organised approach for the digitisation of coins found in Saxony-Anhalt needed to be pursued, and is now being implemented by the State Office for Heritage Management and Archaeology Saxony-Anhalt through the S.E.S.A.M. project.

² Respectively <https://numismatics.org/ocre/>, <https://numismatics.org/crro/>, <https://www.kenom.de/> & <https://www.ikmk.net/>.

Methods

The O.S.C.A.R. System

The use of digitisation techniques for cataloguing and examining historical coins in particular has become increasingly important in recent years. Photogrammetry and RTI in particular are being used increasingly and are continuing to develop.³ The digitisation of coins is a complex process that requires advanced technological solutions.

In collaboration with the Fraunhofer Institute for Factory Operation and Automation (IFF) in Magdeburg, a specialised device, O.S.C.A.R. (Optical System for Coin Analysis and Recognition), has been developed to digitally capture gold, silver, and copper coins with diameters ranging from five to 75 millimetres. Since its introduction in 2018, O.S.C.A.R. has undergone continuous improvements in both hardware and software. The primary motivation behind its development was not mass digitisation but rather the need for an unequivocal method to describe and identify each coin within a collection. Unlike other artefacts, coins cannot be marked directly without obscuring their minted details. O.S.C.A.R. addresses this issue by generating a unique recognition key—comparable to a ‘digital fingerprint’—derived from approximately 1000 optical features.⁴

Currently, three prototypes of O.S.C.A.R. are in operation, differing slightly in design while retaining the same core components (*Figures 1-2*). The main elements include a centrally positioned camera within a dome, which is now automatically adjustable in height, improving upon earlier manual adjustments. The dome is equipped with LEDs, further enhanced by additional ring and side lighting. A calibration element featuring colour charts for RGB colour adjustments, reference holes for scale calibration, and black ceramic spheres for LED position detection through reflection is also integrated into the system.

For each coin side and each LED multiple images are taken at varying exposure times to

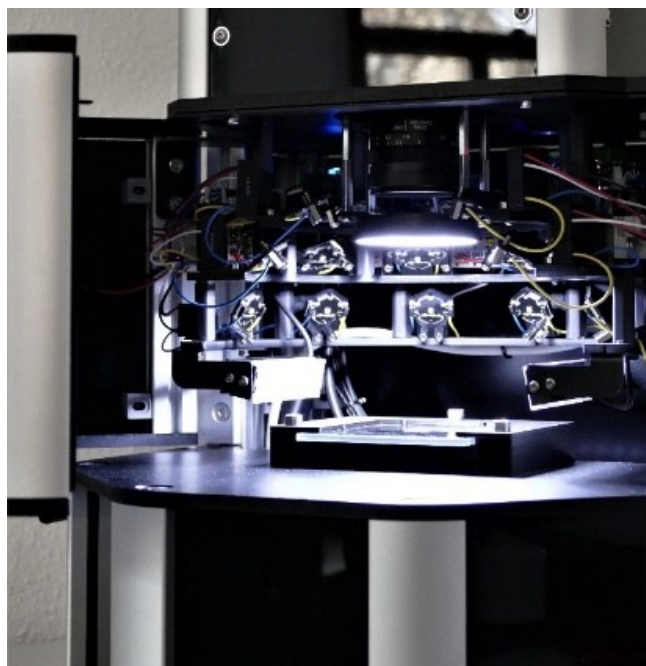


Figure 2. O.S.C.A.R. – Interior view of the LED dome (photo: State Office for Heritage Management and Archaeology Saxony-Anhalt)

accommodate differences in light intensity across a broader dynamic range. For every coin, approximately 450 images are recorded, from which high dynamic range (HDR) images are computed. Additionally, a second camera, employing specialised lighting, photographs the coin from below to precisely capture its contour and automatically determine the die axis. The entire digitisation process, including data processing and storage, is completed within approximately five minutes, with processing time varying according to the coin’s size.

The underlying technology of O.S.C.A.R. is based on ‘photometric stereo analysis’, which shares similarities with RTI. Relighting techniques like RTI aim to compute an image for an arbitrary light direction by interpolating the captured ones. Approximation with suitable base functions enables efficient rendering. Photometric stereo estimates local surface normal and albedo under some model assumptions. By integrating the surface normals, a depth map can be created, which produces a 2.5D representation of the

³ Hess, Macdonald, Valach, 2018; Macdonald, 2015; Macdonald, Moitinho, Hess, 2017; Mara et al., 2007; Morris, Emmitt, Armstrong, 2022; Mudge et al., 2005; Palma et al., 2014; Zambanini, Schlapke, Kampel, 2008; Zambanini et al., 2009.

⁴ Trostmann, Dresely, Tauschensky 2019; Arandjelović, 2012; Boon, 2006; Deligio et al., 2024; Huber-Mörk et al., 2012; Van der Maaten, Kim, Pavlovic, 2014; Reisert, Ronneberger, Burkhardt, 2007; Zambanini, Kampel, 2011; Zambanini, Kavelar, Kampel, 2014.



Figure 3. RGB colour values, surface orientation based on the normal and resulting image of a denarius, Septimius Severus (202-210 CE)

(photo's: State Office for Heritage Management and Archaeology Saxony-Anhalt, ID 9920:1611)

object surface. This method effectively distinguishes geometric structure from material colour using captured image data (Figure 3).

Full 3D colour digitisation would require a higher effort to obtain a similar resolution of meaningful variation of the surface normal. Fringe projection and laser scanning methods give smaller overall geometric error but noisy small-scale details. Digital holography requires more expensive equipment. That is why photometric stereo seems to be efficient for the documentation of extensive coin collections. The benefits of full 3D modelling over 2.5D representation are often negligible in numismatic studies, making the latter a more practical choice. Nevertheless, it is possible to generate a triangularly meshed 3D model from the gridded 2.5D representation (Figure 4). This 3D model enables further analysis options.⁵

The principle of surface analysis in O.S.C.A.R. is based on the correlation between an object's brightness and its orientation relative to a light source. For instance, when examining a matte, monochromatic cube, the surface facing the light source appears brightest. By analysing surface orientation under multiple light sources, O.S.C.A.R. determines the precise structure of the coin's surface. Each pixel in an image corresponds to a surface element on the coin, and its brightness under varying illumination levels provides critical data for analysis.

The extracted information is synthesised into a greyscale image, forming the basis for coin recognition. The unique distribution of grey values for each coin forms the recognition key. The recognition relies in a first step on the coin's outline. By comparing simple scalar features such as diameter, deviations from a perfect circular shape, cracks, and edge breakouts, the number of possible matches is significantly reduced. While ancient and medieval coins often exhibit unique shapes, modern machine-minted coins of the same type are more difficult to differentiate based on shape alone.

The recognition process proceeds with an analysis of the synthetic greyscale images (Figure 5). Feature points, similar to those used in panoramic image stitching, are identified and compared. This multi-stage process begins with low-resolution images and gradually increases in resolution as more feature pairs are detected. Once a sufficient number of feature pairs is identified, rotational alignment is checked. If the check fails, it is concluded that the coin sides are different, indicating that the coins do not match. If the process reaches the highest resolution level, the number of matched feature points determines the degree of similarity.

A notable feature of this method is its ability to virtually alter the intensity and position of the light source using a dedicated viewer. This capability allows researchers to examine the coin's surface in greater detail using the digital

⁵ Dunker et al., 2024.

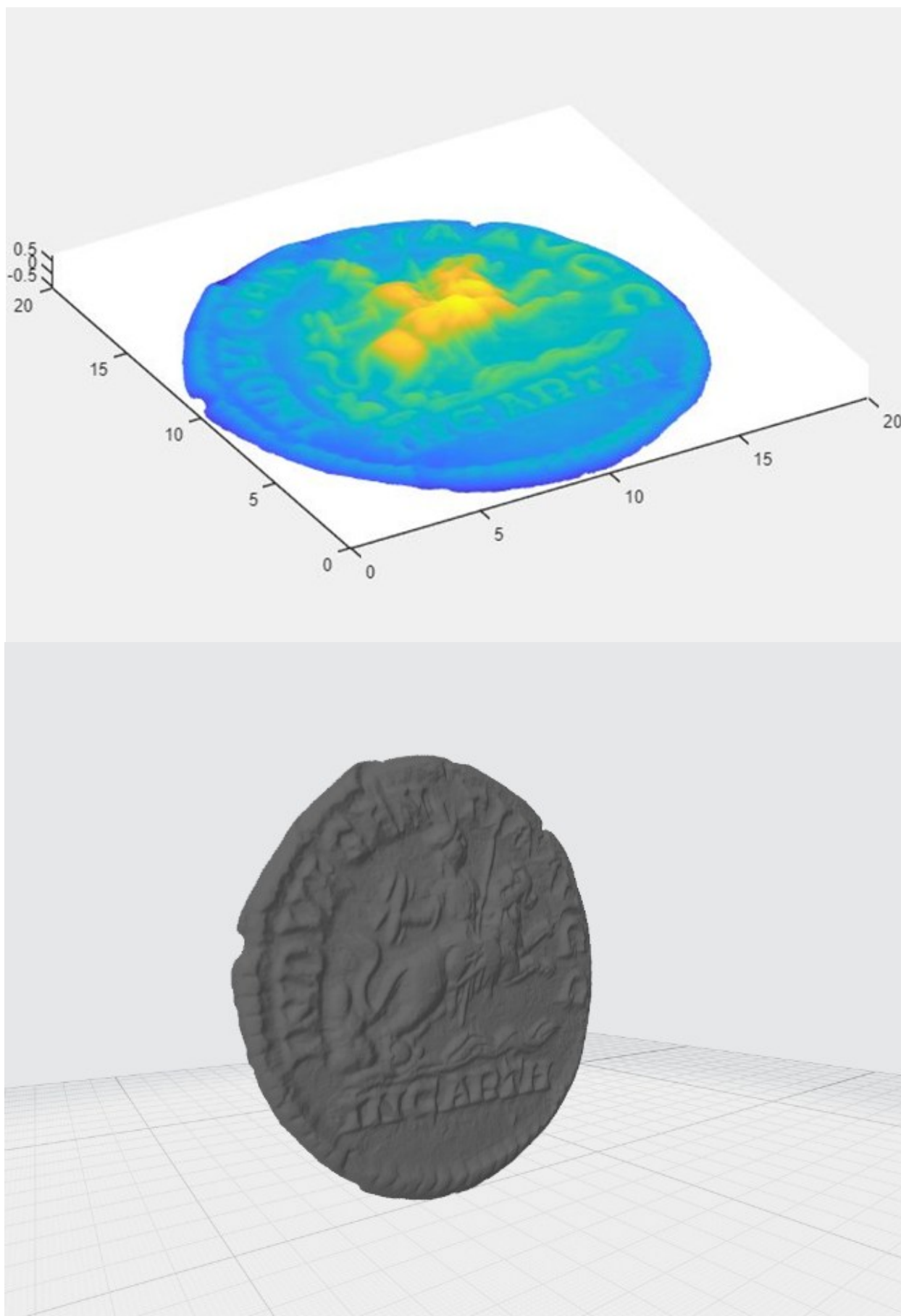


Figure 4. *Depth map and 3D model of a coin without the edge*

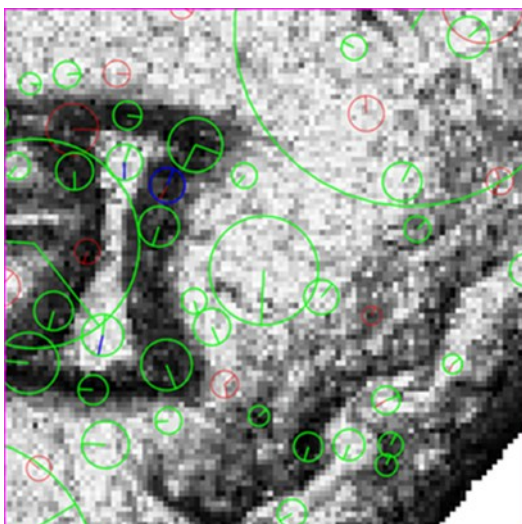


Figure 5. *Feature recognition, red = no match; blue = match but not after rotation; green = match even after rotation* (photo: State Office for Heritage Management and Archaeology Saxony-Anhalt)

representation, independently of the physical coin. Similar to rotating a coin under sunlight or employing sidelight methods, this technique enhances the visibility of fine surface structures, facilitating the identification of specific coin types—particularly useful for corroded numismatic finds. This lighting simulation functionality will also be integrated into the upcoming database update of KENOM, further improving accessibility and research capabilities.

KENOM database

In addition to digitisation, the KENOM database is utilised to systematically record and present numismatic, descriptive, and technical data. KENOM is a database with an online portal specifically designed for the documentation and presentation of numismatic object data. To ensure comparability, all data entries adhere to standardised vocabulary and include georeferenced location information, which is crucial for systematic statistical analyses. Furthermore, internationally standardised metadata formats enable seamless data exchange with other repositories. Above all, the standard data and concepts standardise and facilitate work with large volumes of data from a wide variety of sources and provide a common data ontology.

The German Numismatic Commission's catalogue of coin finds is also integrated in KENOM. This register systematically records hoard and individual coin finds along with essential archaeological contextual information. KENOM is directly linked to this catalogue, allowing for the integration of individual coin records with corresponding hoard find data.

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Conclusion

The digitisation of coin finds is of central importance for both numismatics and archaeology in Saxony-Anhalt, as it facilitates the analysis and comparison of coins while providing access to a large number of coin finds. It promotes scientific cooperation and thus enhances the study of coins found across Germany and Europe. The challenges lie in the decentralised storage of coins, inadequate documentation, and the lack of resources in museums, all of which make systematic research difficult. A centrally organised approach, such as the one implemented in the S.E.S.A.M. project, aims to overcome these issues and create a comprehensive, standardised data foundation. Until the end of 2024, over 35,000 coins from 20 museums have been digitised, with approximately 10,000 of them already catalogued in KENOM with full numismatic descriptions.

The O.S.C.A.R. device addresses key challenges in the digitisation of numismatic collections, such as the difficulty of identifying coins without labels and ensuring consistent recognition, including in cases of museum theft. The acquisition of standardised image data and the ability to control exposure interactively enhance analysis and classification, while also offering new avenues for research.

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Program

November 5th

15.00 – Tour in Teylers Museum

November 6th

10:00 – *Welcome, registration and Coffee*

10:30 – Opening

Marc de Beyer, director Teylers Museum / David Wigg-Wolf

10:45 – Miquel Sánchez Signes (online)
Digitalisation of Catalogues in the Publication of Large Numismatic Repertories. A Practical Example with *dédalo*: the Medieval Hoard of Llibertat Street (Valencia, Spain)

11:10 – Annika Tauschensky
Digital Recording of Coin Finds in the S.E.S.A.M.-project

11:35 – Wojciech Ostrowski, Barbara Zajac & Jarosław Bodzek
Digitisation of the Nietulisko Małe I Hoard (Poland, Ostrowiec county) using RTI. The Future Numismatics Digital Workflow at Archaeological Excavations

12:00 – *Lunch*

13:30 – Karsten Tolle
Supporting Ancient Coin Find Die Studies Based on Machine Learning

13:55 – Tasha Fulbrook
Radiates in Context: Chemical and Archaeological Analysis of the ‘Barbarous Radiates’ Coinage Phenomenon in Roman Britain

14:20 – Poster Slam

14:35 – *Coffee and Posters*

15:05 – Federico Carbone & Teresa Marino
Public Engagement Strategies for the Enhancement of the Numismatic Heritage from Paestum

15:30 – Marija Jović
Illicit trade as a Serious Obstacle in Promoting Numismatic Finds to the General Public in the Balkans

15:55 – Andrew Brown
‘Just another “grot”...’: Roman Coins and the PAS

16:20 – Martin Allen (online)

Medieval Coin Hoards of Britain and Ireland (MCHBI): an Update

16:45–17:00 Discussion

November 7th

10:00 – *Coffee*

10:20 – Kris Lockyear

The Problem of Percentages

10:45 – Zabya Abo Aljadayel
Fatimid Coins in Al-Andalus: An Economic and Political Analysis of Discoveries in the Iberian Peninsula

11:10 – Jehan Hillen
Challenges and Methodologies in the Interpretation of Theodosian Hoards

11:35 – Rahel Ackermann
Coins, Coinfinds, and Ordonnances: Some Aspects of Coin Circulation in Early Modern Times

12:00 – *Lunch*

13:30 – Mario Schlapke
Heavily Barbarised Denarii of the C. L. CAESARES Type from Thuringia – Material Overview and Approaches to Classification

13:55 – Aleksander Bursche, Arkadiusz Dymowski & Kyrilo Myzgin
Corpus Nummorum Barbarorum

14:20 – Mark Pyzyk
Coin Finds of Ukraine

14:45 – *Coffee*

15:05 – David Wigg-Wolf
Online Celtic Coinage – Networking the Iron Age

15:30 – Jan Pelsdonk
A Guide to Getting a Collection ready for Numisma

15:55 – Closing Discussion
How do we Make Data Re-Usable?

16:45 – Closing

Posters

Ana-Maria Baltă & Emanuel Petac

The Constantin Orghidan collection of the Romanian Academy – present and future endeavours

Claudia Devoto

Collecting casts. A project of digitalisation and musealisation of the coins in the Museo dell'Arte Classica at La Sapienza, Rome

Lily Grozdanova

The 'DigiDeultum concept' in light of the coin finds from the 2023 Deultum archaeological season

Julia Tzvetkova

'Coins in context': 'The Gluhite kamani research project' and its coin collection

Jonas von Felten

DISCO – Digital Inventory of Swiss COin finds

November 8th

Excursion: Northern Frontier of the Roman Empire. A visit to several Roman castella along the Lower Rhine, museum Castellum Hoge Woerd in Utrecht and the State Museum of Antiquities (Rijksmuseum van Oudheden) in Leiden

9.10 – meet in front of Teylers Museum

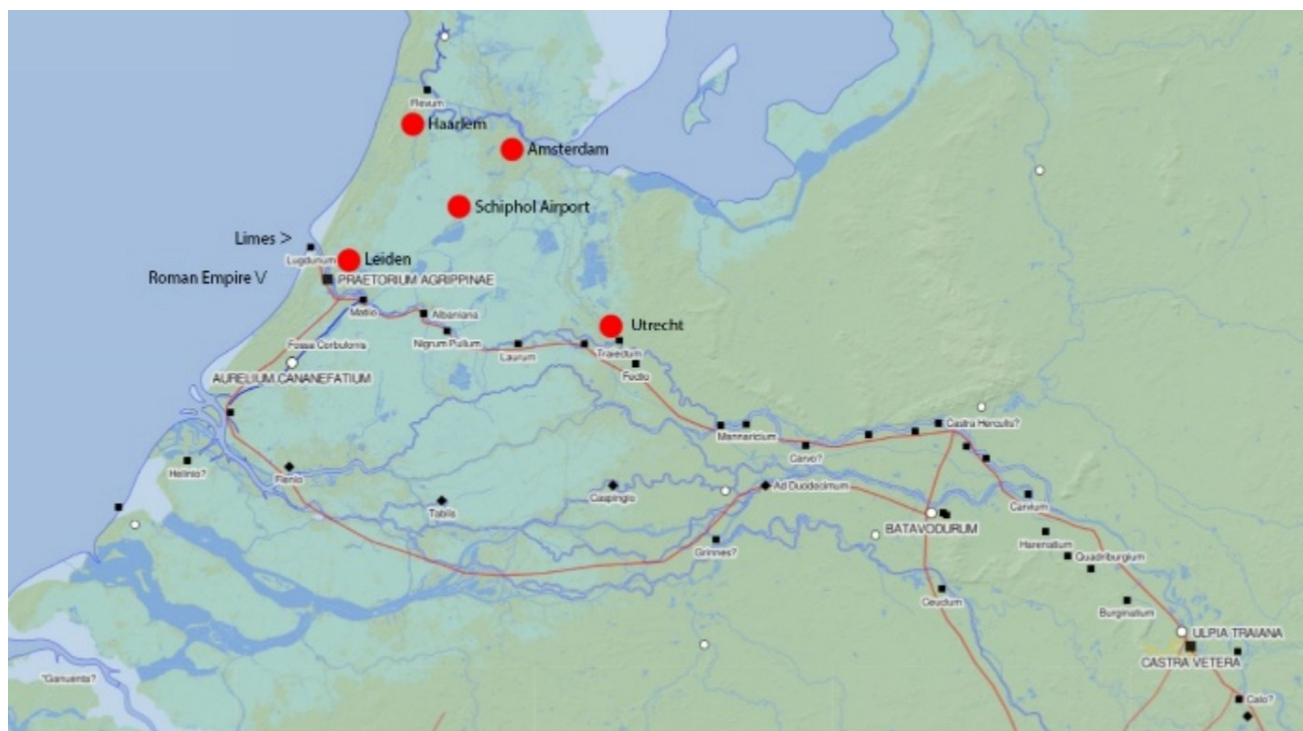
9.30 – Travel to the location of the Roman castellum Fectio

11.00 – Roman castellum at De Hoge Woerd (possibly castellum Fletio. With a reconstructed Roman guard tower and an original Roman ship)

12.00 – Lunch in restaurant Anafora

14.15 – State Museum of Antiquities, Leiden (amongst other with an exhibition of finds from Fectio)

Circa 17.00 end of the excursion; back at Teylers Museum



The Roman Limes in the Netherlands

List of participants

name	affiliation
Abo Aljadayel, Zabya	Faculty of Social Sciences and Humanities, Universidade Nova de Lisboa, Portugal
Ackermann, Rahel	Swiss Inventory of Coin Finds, Switzerland
Allen, Martin (online presentation)	British Numismatic Society, United Kingdom
Baltă, Ana-Maria	University of Bucharest, Romania
Berendse, Caina	Student, Reinwardt Academy, Amsterdam, the Netherlands
Bodzek, Jarosław	Jagiellonian University National Museum in Krakow, Poland
Boteva, Dilyana	Sofia University ‘St. Kliment Ohridski’, Bulgaria
Brey, Leonard	PhD student
Brown, Andrew	British Museum PAS, United Kingdom
Bursche, Aleksander	Warsaw University, Poland
Carbone, Federico	University of Salerno Archaeological Parks of Paestum and Velia, Italy
Cruysheer, Anton	Landschap Erfgoed Utrecht, Meldpunt Archeologie (Landscape Heritage Utrecht, Archaeology Reporting Center), the Netherlands
Devoto, Claudia	Università di Roma La Sapienza, Italy
Felten, Jonas von	Swiss Inventory of Coin Finds, Switzerland
Fullbrook, Tasha	PhD Researcher in Archaeology, University of Reading, United Kingdom
Grozdanova, Lily	‘St. Kliment Ohridski’ University of Sofia, Faculty of History, Department of Ancient History, Thracian Studies and Medieval History, Bulgaria
Heesch, Johan van	KU Leuven University, Belgium
Hillen, Jehan	RAAP Rijksdienst Cultureel Erfgoed (Cultural Heritage Agency of the Netherlands), the Netherlands
Jović, Marija	Institute of Archaeology Belgrade, Serbia
Lockyear, Kris	Institute of Archaeology, UCL (London), United Kingdom
Marino, Teresa	University of Salerno Archaeological Parks of Paestum and Velia, Italy
Möhring, Pim	Dutch Central Bank, the Netherlands
Moore, Lucy	University of Leeds, Associate Curator of Numismatic and Object Collections / Special Collections. University of Leeds Libraries, United Kingdom
Myzgin, Kyrilo	Warsaw University, Poland
Otte, Rahel	Innendienstleitung / Archaeologist and Numismatist. LVR-Amt für Bodendenkmalpflege / State Service for Archaeology, Außenstelle Nideggen-Wollersheim, Nideggen, Germany
Pelsdonk, Jan	Curator of the numismatic collections of Teylers Museum, Haarlem and the Rijksmuseum, Amsterdam, the Netherlands

name	affiliation
Pyzyk, Mark	Getty Research Institute, Los Angeles, United States
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Sánchez Signes, Miquel (online presentation)	Department of Archaeology and Cultural Heritage, City Council of Llíria. Valencia, Spain
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Stroobants, Fran	KBR, Royal Library, Belgium
Tauschensky, Anika	S.E.S.A.M. Projektkoordinatorin, State Office for Heritage Management and Archaeology Saxony-Anhalt, Germany
Tolle, Karsten	Goethe University Frankfurt, Germany
Tzvetkova, Julia	Sofia University 'St. Kliment Ohridski', Bulgaria
Vojvoda, Mirjana	Institute of Archaeology Belgrade, Serbia
Vynarchuk, Olena	University of Salerno, Italy
Wigg-Wolf, David	German Archaeological Institute, Frankfurt am Main, Germany
Zajac, Barbara	National Museum in Krakow, Poland
Zoccoli, Matteo Maria	Italy

Abstracts of Papers

Fatimid Coins in Al-Andalus: An Economic and Political Analysis of Discoveries in the Iberian Peninsula

Zabya Abo Aljadayel

During the 10th-12th centuries, the Fatimid monetary system exerted substantial influence across the Mediterranean. Fatimid coins, prized for their purity, stood out whereas Europe relied on silver due to a scarcity of gold. In al-Andalus, the circulation of Fatimid coins was influenced by political dynamics between Fatimid and Andalusí rulers. Nonetheless, Fatimid coins dominate foreign monetary finds in present-day Portugal, Spain, and the Balearic Islands. This study systematically compiles data on coin hoards across the Iberian Peninsula, contextualizing them within historical events to highlight the interplay between economic processes and political landscapes. Drawing on insights from my MA thesis, this analysis enriches our understanding. By scrutinizing the distribution and context of these hoards, the research illuminates the economic strategies and political manoeuvres of the era. Furthermore, this research enhances our understanding of the Fatimid influence in Al-Andalus and underscores the interconnectedness of medieval Mediterranean economies. Through a rigorous examination of numismatic evidence, the study elucidates the implications of Fatimid monetary policies and their lasting impact on regions where their coins circulated. This comprehensive analysis underscores the pivotal role of numismatics in reconstructing historical narratives and unravelling past economic complexities.

Coins, Coinfinds, and Ordonnances: Some Aspects of Coin Circulation in Early Modern Times

Rahel C. Ackermann

Some coins were not produced for local circulation but as export goods. In order to maximise profit, many of them were produced below the standard of the 'Reichsmunzordnung'. They were validated abroad and either accepted

for their nominal value or a reduced value, or they were banned, confiscated, and destroyed. The testimonies of these acts, coins, coinfinds, and ordonnances provide a network of information – an ideal showcase for Linked (Open) Data. The new database of the SICF – Swiss Inventory of Coin Finds, DISCO – Digital Inventory of Swiss COin finds, provides the toolbox to bring together all this information and visualise the evidence. We will present a working prototype based on data on the 17th and 18th century coinage of the Grisons, Switzerland.

Medieval Coin Hoards of Britain and Ireland (MCHBI): an update

Martin Allen

Medieval Coin Hoards of Britain and Ireland (MCHBI) is an online resource launched by the British Numismatic Society in November 2022. A preliminary report on the project was presented at the ECFN meeting in 2023. The website now provides access to some 2,000 summaries of coin hoards from England, Scotland, Wales, Ireland and the Isle of Man deposited between the fifth century CE and the debasement of the English coinage in 1544. This comprehensive resource has various mapping and search functions. At first, the level of detail stored for hoard coins was only at the level of the rulers issuing the coins, but now, in phase II of the project, details of the various coin types and mints are being added, with additional search capability being added for this new data.

'Just another "grot"...': Roman coins and the PAS

Andrew Brown

In 25 years of recording archaeological material discovered by members of the public, the Portable Antiquities Scheme (PAS) has identified over 570,000 single coin finds alongside many hundreds of hoards and many thousands of other numismatic items (e.g. tokens and jettons). The volume of material is significant numismatically but presents its own set of

problems in terms of how to process the data and disseminate to a wider public. In this paper, I will look at how the PAS has engaged with public finders and some of the palpable benefits of these interactions. I will also touch on some of the difficulties that arise and might, for example, introduce bias or gaps in the dataset, and how we are attempting to mitigate against this as best as we can. Looking to the future, how do we make the numismatic material we record more readily accessible and understood by finders or the general public alike so as to encourage more systematic recording of new finds, particularly with a revised PAS digital platform on the horizon?

Corpus Nummorum Barbarorum

Aleksander Bursche | Arkadiusz Dymowski | Kyrylo Myzgin

Since the beginning of the 21st century, there has been a sharp increase in the number of so-called barbarian imitations of Roman coins, mainly from Central and Eastern Europe, but also from other areas outside the Empire, including India. Growing interest in them has led to several international research projects, of which IMAGMA is one of the best known. Detailed research has revealed a wealth of information about previously unidentified imitations in collections, archives or publications. Many of the coins previously described as hybrids have turned out to be barbarian imitations. We now have more than 5,000 examples linked by dies, punches, pseudo-legends or iconography. We have already learned to distinguish between them and to describe them as accurately as possible. Barbarian coinage has grown into a separate branch of numismatics. However, we are still at the beginning of the study of barbarian coins, as was Celtic numismatics 100 years ago, from whose methodology we can learn much. A necessary first step in this situation is to publish all available material preferably in the form of an online database. Only then can we begin to distinguish centers of production or workshops including using of AI as well as get closer to chronological issues.

Public Engagement Strategies for the Enhancement of the Numismatic Heritage from Paestum

Federico Carbone | Teresa Marino

The Archaeological Park of Paestum, in collaboration with the Chair of Numismatics of the University of Salerno, is experimenting with tools for the valorisation of its coin heritage. This is a way of promoting an important heritage, the result of more than one hundred years of excavations, consisting of about ten thousand coins found in the city and its surroundings. The project included the reorganisation of the permanent exhibition and the communication strategy for the involvement of the public that normally uses the museum and the potential public that does not yet have forms of interaction. This was made possible by the construction of a new strategy based on the knowledge of the museum's collection, now updated by a project that allowed the reconstruction of the biography of coins as objects capable of telling a multitude of stories.

Radiates in context: chemical and archaeological analysis of the 'Barbarous Radiates' coinage phenomenon in Roman Britain

Tasha Fullbrook

In the 270s and 280s, huge numbers of imitation copper-alloy coins referred to as 'barbarous radiates' were struck in Britain and Gaul. They have been the subject of much debate but little intensive study. My research aims to explore their production, function and use and place them within the context of late 3rd century Britain using archaeological, numismatic and metallurgical analyses. This paper will showcase elements of my methodology which combines iconographic study with metallurgical analyses (including both pXRF and MP-AES) in order to classify 'barbarous radiates' and study regional variation in the metallurgy. I aim to provide a new typology for the study of barbarous radiates. In doing so I will address the prevailing perception that these are 'crude fakes' and suggest that they are a far more sophisticated and complex coinage than they may appear.

Challenges and methodologies in the interpretation of Theodosian Hoards

Jehan Hillen

In 2023, a Roman bronze hoard was found in the Dutch province of Limburg consisting out of over 3600 late Roman bronze coins. The recent hoard find in Limburg belongs to a series of late Roman bronze hoards in this region. This paper will discuss the various challenges encountered during the interpretation of late-fourth century ‘Theodosian’ hoards as well as some of the methodologies to resolve these challenges. One of the issues of the interpretation of these late Roman hoards is their dating. Usually, late Roman hoards can be dated with surprising precision due to the rapid succession of type emissions in the fourth century. In the case of the Theodosian hoards, dating is significantly more difficult due to the lack of bronze coin supply in this region in the fifth century and the closing of the ‘western’ mints in 395. Various methods have been devised to estimate a more precise date for the burial or deposition date of these hoards. Because of the difficulties in dating Theodosian hoards, there have been various interpretations for the sudden burial of so many of these unappealing small bronzes. The interpretations greatly vary from ritual deposits, melting, trade, or coin transport for the army.

Illicit trade as a serious obstacle in promoting numismatic finds to the general public in the Balkans

Marija Jović

Although the illicit trade of archaeological material is strictly prohibited and preventive measures are in place, this illegal activity remains widespread in Serbia and all former Yugoslav countries (Montenegro, Macedonia, Bosnia and Herzegovina, Croatia). Data from the Ministry of Internal Affairs of the Republic of Serbia indicates that coins are the most trafficked archaeological items, often openly resold on various online platforms. Serbia serves as one of the main route for such activities. These facts limit the presentation of coins to the public and the scientific community due to the risk of disclosing information that could

motivate illegal excavations, resulting in irreversible data loss. While awaiting significant changes such as stricter enforcement of laws or the adaptation of legal regulations to make them more effective, as well as a fundamental awakening of awareness about the importance of artifacts, the scientific community needs to find alternative ways to convey the significance of coins to the general public. Digital technology provides countless opportunities for the scientific community to capitalise on, enabling them to gather data on illegally excavated coins in a manner accessible to the public. One proven effective method has been citizen science projects.

The problem of percentages

Kris Lockyear

Institute of Archaeology, University College London, United Kingdom The use of percentages (or permills, or proportions) is ubiquitous in numismatic studies. Percentages allow us to meaningfully compare assemblages of varying sizes, for example the 50,767 coins from Richborough to the 63 coins from Rudston Roman villa. It has been known since Karl Pearson’s fundamental paper in 1899, however, that percentages can create false correlations in our data. Arguments amongst statisticians around ‘compositional data analysis’ (CoDA) have raged since the publication of a seminal book by Aitchison in 1986 and have led to a fundamental schism between proponents of the various approaches with no clear-cut solutions. In archaeology, many have wrongly assumed that the problems only apply to the analysis of materials, such as the metallic composition of coins, whereas in fact they are fundamental to any data with a fixed total such as hours in a day. This paper will introduce the problem, briefly review the methods proposed by the CoDA school of data analysis, and then look at some numismatic examples. The ultimate aim is not to offer absolute solutions but to raise awareness of the problem and to offer some pragmatic work-arounds.

Digitisation of the Nietulisko Male I Hoard (Poland, Ostrowiec county) using RTI. The future numismatics digital workflow at archaeological excavations

**Wojciech Ostrowski | Barbara Zajac |
Łukasz Wilk | Paulina Zachar | Jakub
Modrzewski | Jarosław Bodzek**

The Nietulisko Male I Hoard was discovered in 1939 and bought in 1943 by A. Siedlecki. It originally consisted of 3170 Roman denarii mainly of the 1st and 2nd centuries CE. The hoard was considered lost after the owner's death in 1945. It was rediscovered in 1995 buried in the basement of one of the buildings in the center of Krakow. However, it consisted of only 2759 denarii. Another set of 89 coins was bought from a private person in 2000. The hoard now consists of 2848 coins from the reign of Nero to Septimius Severus. As one of the largest hoard ever discovered in Poland, it is one of the important testimonies to the cultural heritage of the Polish lands. It was documented using the Reflectance Transformation Imaging (RTI) which is one of the best methods of coin archiving, allowing for later virtual analysis. The database model with a webbased RTI viewer using the Linked Open Data standards is currently being prepared. During our work, we also tried to facilitate semantic annotation of a coin using the Segment Anything Model – a general approach image segmentation model developed by Meta – and make our (new and old) data compatible with the international LOD standard of nomisma.org. We tried to confront our experiences with the workflow used by numismatists in the field and found hardware and software solutions for issues with our 'laboratory' approach. We found that applying RTI as a documentation method may solve problems with image quality and provide reproducibility of the proposed workflow.

A Guide to Getting a Collection ready for Nomisma

Jan Pelsdonk

Earlier this year, the collections of Roman coins of the Rijksmuseum in Amsterdam and Teylers Museum in Haarlem were researched.

In total, these museums have some 600 Roman coins in their collections, partly dating back to the 18th-century collections of Johannes Enschede (1750-1799) and Pieter Teyler van der Hulst (1702-1778). In most cases, the find spots of these coins is no longer known. Maybe this will change in the future, since the provenance research of the museum's collections is an ongoing task. For instance, recent I managed to trace some 60 objects back to an auction in 1720, giving them a known provenance of a bit over 300 years. Safekeeping of objects and adding provenance is – or should be – one of the core tasks of museums. Another task is to make the objects visible on the internet, more precise: outside of a local museum website. This is often limited by the available workforce and the knowledge about the objects by the responsible curator. For instance, the Rijksmuseum – until recently – never had a curator specialised in numismatics. An extremely useful tool is [Nomisma.org](https://nomisma.org), where the ontology of numismatics – the description of all numismatic terms, like coin names, deities and rulers – is becoming available. In this presentation, I will focus on the problems and possibilities we encountered during the research, in our way to create a blueprint for linking data and objects to the international standards and umbrella websites like OCRE (numismatics.org/ocre/).

Coin Finds of Ukraine (CFU)

Mark Pyzyk

Coin Finds of Ukraine (CFU) is an international project to document, store, and visualise coin hoards and other coin finds discovered on the territory of modern Ukraine since 1973 (adding to hoards already in Thompson et al.'s Inventory of Greek Coin Finds). Over two years, along with scholars from Central Ukrainian Technical University and Taras Shevchenko National University, CFU has digitised 374 coin finds, considerably improving upon the 132 hoards in Thompson et al. This talk will discuss the data, our methodology in digitizing it (including our approach to Nomisma-compliance), and will present our approach to visualisation and analysis. It will also discuss the future of the project, which has not yet exhausted the available information on coin

finds discovered on Ukrainian territory. The presentation, therefore, will be of work in progress.

Heavily barbarised denarii of the C. L. CAESARES type from Thuringia – Material overview and approaches to classification **Mario Schlapke**

The paper deals with the heavily barbarised denarii of the C. L. CAESARES type (based on RIC I2 Augustus 207), which are known in larger numbers from museum collections, but most of them without concrete find spot information. The coins are characterised by a very high degree of barbarisation of both sites of the coins. Today, we know almost 30 of these pieces found in Thuringia or near today's state borders. These mostly detector finds, so that archaeology actual still give no concrete contribute to the exact date of manufacture of these imitations. In addition to the examination of die links, attempts made to classify the coins using 'workshop features'. Density measurements will used to check whether there are any conformities with these numismatic groups. Another interesting approach is the use of an AI tool to search for possible models for the portraits on the obverse. Here the results show that later Roman rulers such as Marcus Aurelius or Commodus should also be included in the considerations and could thus provide a new aspect dating of some of these imitations.

Digitalisation of catalogues in the publication of large numismatic repertories. A practical example with *dédalo*: the medieval hoard of Llibertat Street (Valencia, Spain) **Miquel Sánchez Signes**

Increasingly, there is a shift towards the advantages of digitalisation over paper publication, a trend that benefits scientific and numismatic research. Projects such as Monedaiberica.org, built on the powerful Dedalo tool, have long been creating an extensive online catalogue of ancient coins from the Iberian Peninsula. This catalogue is free, collaborative, and universally accessible. This foundation has been used for the publication of large coin sets from a period still underrepresented in digital formats: the

Middle Ages in the Iberian Peninsula. We will take as a primary example the recent publication of the Llibertat Street hoard (Valencia, Spain), consisting of 2,483 silver coins issued in the Barcelona mint between XIIIth and XIVth centuries. We will analyze the advantages of its online release, complementing paper and digital publication, and the free, universal, and open access to the entire catalogue. We believe this is the best option for the near future, as it allows high-resolution image downloads, detail enlargement that would otherwise be invisible, and the creation of a complete colour catalogue—something that would be expensive, bulky, and less accessible to the non-specialist public if published in print.

Digital recording of coin finds in the S.E.S.A.M.-project **Anika Tauschensky**

S.E.S.A.M. is a digitisation project carried out by the State Office for Heritage Management and Archaeology Saxony-Anhalt in cooperation with several partners to make accessible and record coin finds that were found in Saxony-Anhalt and are still today in different museums in the state. Most of these coin finds have rarely been explored and digitised, but they form the basis for research into the structure, volume and movement of coinage in Central Germany. Therefore, we are digitizing all coin finds from antiquity to the end of the 19th century. For this purpose, we use a specially developed device that not only takes pictures in 5 minutes, but also creates a 2 1/2 D model that allows light to move across the coin surface from different positions, similar to sidelight. This enables a better type classification, especially for corroded coins. Based on about 1000 optical features, a recognition key, a 'digital fingerprint' of the coin, is also calculated, so that each coin can be identified unmistakably. The numismatic, technical and archaeological data are recorded and published via the KENOM database, the GIS based heritage information system of Saxony-Anhalt and the Coin Find Catalogue of the Numismatic Commission of Germany. You can find more information about the project here <https://www.sesam-projekt.de/en/>.

Supporting Ancient Coin Find Die Studies based on Machine Learning

Karsten Tolle

In context of the ClaReNet project, we developed a Machine Learning approach to support a die study based on image matching. The results on the coin hoard material of Le Catillon II are promising and we generated a system that allows the numismatist to define existing dies based on the calculated distances of the image matching results. In other words: The system orders the coins based on its view on similarity and the expert can view and compare closely related coins and can assign them to the same die if it is really a die match. This process is currently implemented in Orange Datamining, a generic tool that supports various analytical possibilities. We plan to improve and extend the current approach in light of a new DFG project called ‘De rebus nummorum. Die Vernetzung der spatkeltischen Welt am Beispiel der Munzwirtschaft’ that will probably start officially end of 2024. The goal is to work on the following challenges: 1. Improve the current image matching approach by testing additional algorithms of this space and their fine tuning. 2. Generate tools to enable numismatists to handle the whole process themselves including the preprocessing of the coin images and the feature detection and matching. 3. Support the visualisation and data quality check (e.g. by taking additional information into account) of the die links once they are defined. The presentation will include a demo of the current status and ideas how to proceed.

Online Celtic Coinage – Networking the Iron Age

David Wigg-Wolf

The last decade has seen the development of web-portals, or online union catalogues, of typologies of various coinages. The earliest were Coinage of the Roman Republic Online (CRRO) and Online Coins of the Roman Empire (OCRE), developed with international support by the American Numismatic Society. A number of portals for other typologies have since also gone online, initially for coinages of the Hellenistic world, but more recently also for other areas, for example the Online Swiss Coin Archive (OSCAR) for coins from the territory of Switzerland from medieval to modern times. What these online typologies have in common is that they are generally based on widely accepted, printed typologies which can be reproduced 1:1. However, Celtic coinages present several challenges that other portals have not had to face. On the one hand, there is no widely accepted reference work covering all Celtic coinages, but a patchwork of often quite disparate, even conflicting individual typologies. The various coinages are themselves quite disparate, hampering the creation of an overarching framework for a portal. As part of the ClaReNet project (<https://clarenet.hypotheses.org/>), a prototype portal for Celtic typologies, Online Celtic Coinage, was created in cooperation with international partners. This paper will present the prototype, and discuss the challenges faced in its creation and plans for its further development.

Abstracts of Posters

The Constantin Orghidan collection of the Romanian Academy – present and future endeavours

Ana-Maria Baltă

The Orghidan collection boasts an impressive array of over 10,000 gold, silver, and bronze coins (Greek, Roman, Byzantine, Medieval, etc), gems, cameos, and other various types of artifacts, many of which are unique and encompass a vast range of historical periods and cultures. The most spectacular part of it is currently on display at the Numismatic Cabinet of the Romanian Academy, where visitors can gain a deeper understanding of the significance of the collection. To further enhance its comprehension recent publications have been released. They provide additional context and insights into its history and cultural importance, but the future of the Orghidan collection remains to be seen. Possible ventures include creating a digital catalogue, using 3D projections to present the pieces, or integrating AI technologies into a new exhibition format to improve access for the general public. The proposed poster aims to provide an overview of the current and future relationship between the non-academic world and this magnificent collection of the Romanian Academy.

Collecting casts. A project of digitalisation and musealisation of the coins in the Museo dell'Arte Classica at La Sapienza, Rome

Claudia Devoto

The paper presents the project of digitalisation of the plaster casts of coins kept in the Museo dell'Arte Classica of La Sapienza Università di Roma. The collection of the Museo encompasses more than 1300 plaster copies of statues, friezes, monuments and epigraphs that have been gathered by several scholars from 1890. Among them, more than 100 coin casts lie unstudied and uncatalogued in the drawers of the Museum. Since 2020 onwards, they have been the subject of a photographic campaign, accompanied by the cataloguing and the study of their history. On the one hand, the digitalisation of the collection will provide an useful

tool to preserve these fragile samples; on the other, the identification of the prototypes along with the news regarding their acquisition, that can sometimes be found in the registers of the Museum, contribute to write the history of the studies in Numismatics carried out by the scholars who studied and worked at La Sapienza through the last century.

The 'DigiDeultum concept' in light of the coin finds from the 2023 Deultum archaeological season

Lily Grozdanova

The new project BNSF KII-06-H80/7, 08.12.2023 'Upgrading the Historical Narrative: From Deultum to DigiDeultum' concentrates on the following question: Has digital humanities, particularly the study of Antiquity, reached the level of synthesising new research directions, methods, and ultimately – knowledge? The project explores whether there is a fundamental shift in the reconstruction of historical narratives. It combines traditional historical and archaeological methods with those of digital humanities and archaeological sciences (archaeometry, GIS, archaeoinformatics, etc.) to study and reconsider the Roman colony of Deultum. The project covers a variety of source materials through the prism of innovative approaches, allowing the exploration of complex social, cultural, economic, and political processes. It also studies the possibilities for improving the dissemination, educational and preservation potential of a specific institution – Regional History Museum Sredets, where the materials from Deultum are stored. The poster concentrates on the coin finds from four excavation areas on the territory of the archaeological site of Deultum recovered during the 2023 archaeological season. By processing the 538 coins with computerbased methods and digital numismatic tools, the work aims to present not just observations on the materials but also innovative research questions that could be formulated within the project's fundamental research frame.

‘Coins in context’: ‘The Gluhite kamani research project’ and its coin collection

Julia Tzvetkova

Modern studies have outlined the numismatic richness of Bulgaria through the ages (de Callatay 2023). In contrast, the level of digitisation of museum coin collections, their inclusion into a local or general database, and offering online access to public is very low. Previous initiatives (CCCHBulg series, with Ilya Prokopov as editor-in-chief) have launched an extensive publication program to bring Bulgarian museum coin collections to light. Since 2020, the ‘Measuring ancient Thrace’ project (KII-06-H50/3 from 2020, BNSF) has reopened the discussion among Bulgarian numismatists on this issue, offering possibilities for the standard and rapid digitisation of coins. As a continuation of this project, the concept was adopted also in ‘The Gluhite kamani research project’ (KII- 06-H80/6 from 2023, BNSF). The latter focuses on the processing of the results from the archaeological excavations of the Gluhite kamani rock-cut complex – a multi-layered cult complex from the prehistory to the Middle Ages, located in the mountainous region of the Eastern Rhodopes. The coin collection from the site is relatively small (282 coins), but reflects a wide range of periods and issuing authorities – ancient Greek poleis, Macedonian kings, Roman Republic, Late Antiquity, Byzantine coinage, etc. Its processing, as part of the

Gluhite kamani website, will offer the possibility of adopting the general structure of the unified database, following LOD principles, and offering it to the public as an online catalogue.

DISCO – Digital Inventory of Swiss COin finds

Jonas von Felten | Rahel Ackermann

The SICF has long supported the international community in the creation and development of standards that promote the exchange of data on a global scale. Until now, the data offered by the SICF on Swiss coin finds could only be rated with three to four stars on the Tim Berner-Lee scale for open data, as the data could not be accessed via permanent URIs, and linked open data was not implemented. In order to reach the last stars, we decided to use the database solution Dedalo, developed and hosted by Render SA, Valencia. This database allows us to share the data with the scientific community and the interested public. Dedalo is an open-source solution that offers flexible modules for cultural heritage management, and for many areas in the humanities. Thus, it provides extremely exciting applications in and for numismatics, as it is at the intersection of several disciplines. The move to DISCO enables the SICF to perform its role as data steward more efficiently. In turn, more resources can be devoted to research and cataloguing data.

Jan Pelsdonk, David Wigg-Wolf, Rahel
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The European Coin Find Network (ECFN) is a cooperation between institutions engaged in researching and recording coin finds from Europe with the aim of encouraging cooperation and dialogue between them. The network is coordinated by the Römisch-Germanische Kommission (RGK) des Deutschen Archäologischen Instituts (DAI).

The ECFN focuses on digital methodologies and Linked Open Data in partnership with Nomisma.org. The network hosts annual meetings to foster dialogue among specialists.

This volume contains the proceedings of the conference at Teylers Museum, Haarlem, The Netherlands, 5–8 November 2024.