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METHODOLOGICAL OBSERVATIONS ON THE STUDY OF ROMAN COIN FINDS: A GERMAN PERSPECTIVE*

Abstract

Located in southwestern Germany, the sites of Bad Wimpfen and Jagsthausen form a part of the Roman frontier in the province of Germania Superior called the Limes. Whereas Bad Wimpfen emerged from a military camp and developed into a civilian settlement in the second half of the second century CE, the fort of Jagsthausen was established later when the frontier was relocated further east. Given their similar geographical relation yet variable contexts, the two sites were chosen as a case study on Roman coin finds in the Limes region between the Neckar and Jagst rivers. Using modern statistical methods, this paper provides a comparative study of the coins from Bad Wimpfen and Jagsthausen to illustrate the contemporary development and state of research in the German Sprachraum. By identifying the opportunities and limitations of certain methodical approaches, the study aims to show the extensive potential contextualized analyses of coin finds can have.

Keywords

Coins in context, visualization of coin finds, roman frontier regions, roman military

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INTRODUCTION

In the last 15 years, several important publications have been published in German-speaking numismatic scholarship that deal with the interpretation of Roman coin finds and the methodology of studying such coins from excavations, reflecting a growing interest in understanding ancient coinage[1]. In order to illustrate the current trends and methods in the study of Roman coin finds within Germany, the potentials and limitations of various methods of the visual presentation and interpretation of coin finds will be discussed in this paper. Readers should note that the methods presented are primarily concerned with the study of individual sites and how best to compare numismatic data from different settlements and does not aim at analysing coin data at a national or regional level[2]. In addition, this paper does not reflect upon the study of hoards, but rather examines finds classified only as accidental losses[3]. All diagrams are based on numismatic research conducted in southwest Germany where Roman Archaeology is traditionally focused on military sites and the Roman frontier in the province of Germany Superior. The perspectives offered in this paper might also be biased by the authors' scholarly backgrounds and research interests in studying coins as archaeological artifacts.

FROM EXCAVATION TO THE STUDY OF COINS

As ancient mass medium, Roman coins appear in almost all archaeological excavations – even if in quantitative terms they lag behind the mass finds of pottery. Pottery finds are often classified promptly after their discovery on site by pottery experts, or at least later identified and documented in drawings by part of the excavation team. The processing of coin finds usually follows a different path.

Coin finds are usually handed over for identification after a considerable time after the excavation to external experts in museums or universities. Thus, the coin finds are sometimes published years after the publication of an excavation. The external numismatists, who were not part of the excavation team, lack knowledge about the contextualisation of the material and find circumstances, with no understanding of the archaeology of the site. With no thorough intellectual exchange with the excava-

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1 Vondrovec 2005; von Kaenel and Kemmers 2009; Kemmers and Myrberg 2011; Chameroy 2013; Schachinger 2015; Krmnicek and Kortüm 2016; Thüry 2016; Frey-Kupper et al. 2019; Krmnicek and Chameroy 2019; Gazdac 2020.

2 See, for instance, Walton 2012 for this approach.

3 Bland et al. 2020 for studies on hoards. Also, this paper does not expound the challenges in studying decontextualized finds from 18th and 19th century excavations.

tors and the rest of the team who worked on other small finds – a general norm – a knowledge gap remains, negatively impacting further processing and studying of the coins and, therefore, on general scientific practice.

Because of the limited knowledge described above, scholars often tend to treat coins as decontextualized objects, preparing them only for publication in a condensed catalogue, i.e. a coin list without further reference to the archaeological context. A review of a representative sample of excavation publications from recent decades illustrates this dilemma. In excavation reports, coin lists are most often added separately at the end of the archaeological discussion and interpretation of the site. In larger monographic excavation reports, the coins are often listed in a strictly hierarchical order within the metal finds, aptly symbolising the spatial and methodological separation from the archaeological context in which the artifacts were once embedded.

Due to the aforementioned practice of processing Roman coins, coin experts, at best, include the coin find number from the excavation logbook or find bag in their coin lists and leave it to the readers of the final publication to examine the significance of a coin and its archaeological context. Of course, this critique should not obscure the fact that the problems of an adequate and methodically reflected study affect all archaeological finds – pottery and coins alike. In the case of pottery, the focus is always on fine ware, resulting in the coarse ware, which represents the bulk of the pottery finds, often remaining unstudied or treated only in a cursory manner. Compared to other types of archaeological finds, coins are published comparatively well in excavation publications due to the institutionalized expert knowledge on ancient numismatics available, although this should not obscure the fact that the full potential of the study of coin finds is not entirely exploited.

Such concerns stem from weighty reasons established in common practice that prevent a more meaningful treatment of the coin finds. Some numismatists, for example, lack a well-founded connection to field archaeology due to their mainly non-archaeological but historical training, which is reflected in the lack of interest in an intensive engagement with both the excavation data and the actors involved, i.e. the excavators and the other small finds experts. On the other hand, many excavators' interest in the processing of coins is limited to date excavated layers and features.

Even if field archaeologists and numismatists are professionally compatible and willing to work together on the coin finds and excavation documentation together, time and cost often hinder a fruitful cooperation. For external coin experts, it is an extremely time-consuming task to familiarise themselves with the excavation documentation, given the many other responsibilities many often have in addition (teaching and student supervision at university, curating a collection and organizing exhibitions at museums, etc.). Highly motivated numismatists are often left with no other option but to work unpaid overtime or utilize their own free time to complete such a time- and labour-intensive undertaking. However, the results of the efforts are worth it.

THE VISUALISATION OF COIN FINDS

Following the strong focus on military sites in Roman Archaeology in southwest Germany, the coin finds of two sites on the Roman frontier in the province of Germania Superior, Bad Wimpfen on the Neckar Limes and Jagsthausen on the Upper Germanic Limes, are presented here (Fig. 1). Bad Wimpfen was home to an auxiliary fort on the Neckar Limes from Trajanic times until c. 160 CE. It became a pure civilian settlement when the military garrison left for the newly established frontier, the Upper Germanic Limes, c. 25 km eastwards. The military camp at Jagsthausen was in place from c. 160 CE until the 250s, when the Alamanni, a German tribe, overran the Limes. At that point, the Roman administration hastily moved the frontier back to the River Rhine and evacuated the entire area of present southwest Germany.

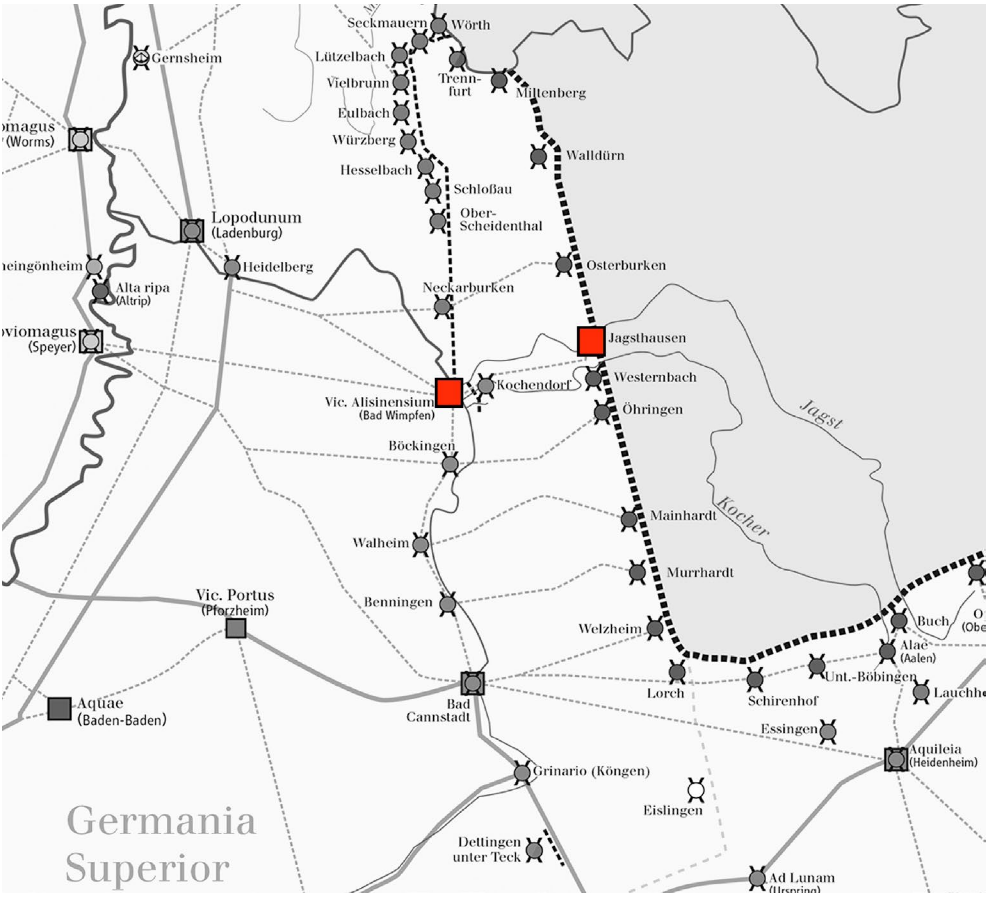

FIG. 1 - Neckar Limes and Upper Germanic Limes (illustration: Klaus Günter Berger).

Bad Wimpfen is located 10 km north of Heilbronn on the southwestern shore of the Neckar River along a bend where the River Jagst joins the Neckar. Due to its location by the water, Bad Wimpfen has been an important crossroad since antiquity, connecting the cities on the Rhine with the Neckar Region. During the expansion of the Roman Empire east of the Rhine at the beginning of the second century CE, the fort of Bad Wimpfen formed the most northern point of the Neckar Limes, merging the riverline of the Neckar with the Odenwald Limes to the north. When the borderline changed once more and Roman troops were relocated further east in 160 CE, a civilian administration was established in Bad Wimpfen and the settlement became the *civitas* capital of the region, likely referred to as *civitas alisinensium*[4]. The first systematic investigations were conducted by the Reichs-Limeskommission between 1894 and 1898. Their results uncovered a city wall built at the beginning of the third century. With the wall surrounding an area of 19 ha, Bad Wimpfen only compares to the Roman settlements of Ladenburg in the north and Rottenburg in the south of modern Baden-Württemberg[5]. Extensive excavations by the Landesamt für Denkmalpflege (The State Office for the Protection of Monuments) between 1969 and 1971 and during the 1980s focused on areas in the southwest and northeast of the settlement and yielded – in addition to other finds – a large number of coins[6]. Around 170 CE, a fire destroyed the early wooden structures in the northeast of the city, which were subsequently replaced by more resilient stone buildings[7]. Because of the distinction between the two main architectural phases, Bad Wimpfen provides an exceptional opportunity to evaluate coin finds within their stratigraphical context in the Neckar Limes region.

The Roman settlement of Jagsthausen is situated on a western slope facing the Jagst River, which meanders to the east and south. The civilian settlement extended from the fort to the meander. A cemetery was located downstream at the exit of the basin. Archaeological investigations began with the excavations in 1766, but it was not until 1886 and 1887 that the fort in the northern part of the village was discovered. The investigations of the Reichs-Limeskommission in 1893 clarified the size and orientation of the fort, when sections of the wall, parts of the principia, and a bath, among other things, were uncovered. The redevelopment of the town centre in 1987-1989 and archaeological investigations to the west of the Roman fort by the Landesamt für Denkmalpflege in 1992 contributed significantly to the knowledge of the Roman settlement and documentation of its material culture[8]. The auxiliary fort,

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4 Kortüm 2020, 59.

5 Filgis – Pietsch 1985, 168; Schumacher 1914, 4 f.

6 Filgis 2005, 24–26.

7 Frey 1991, 11.

8 For an overview, see Thiel 2005a; 2005b.

with a size of just under 3 ha, was built c. 160 CE when the Neckar Limes was moved eastwards to become the Upper Germanic Limes. The *cohors I Germanorum* is the only troop unit documented in the epigraphic evidence as occupying the fort. The fort is of particular importance for numismatic analyses given that most of the coins found in the fort and the surrounding extramural settlement, i.e. in the vicus, are well documented. The coins come from excavations of the Reichs-Limeskommission, construction in the 1930s-1970s, and recent excavations in the 1980s and early 1990s in the town centre.

The coin finds discussed in the case studies are solely classified as accidental losses[9]. Following the basic assumption that accidental losses are more likely to represent ancient monetary circulation than coins taken out of circulation in antiquity for deliberate depositions (such as hoards, offerings, etc.), the material lends itself particularly well to a discussion of different methods of visual presentation and interpretation against the background of the archaeology of the sites.

In some publications, one may find simple diagrams with the numbers of coins found on site plotted in absolute numbers, with the numismatic data grouped along the x-axis according to individual emperors or periods when the coins were minted (e.g. Flavians, Trajan, etc.). Such diagrams do not give more than a first chronological-quantitative impression. For inter-archaeological comparisons, this form of representation has a limited extent. The period-based classification takes centre stage in the diagrams developed by Richard Reece[10]. In order to make it possible to compare different site finds, Richard Reece developed a model in which the coins of a site are divided into periods according to the date of minting and then presented in histograms according to the formula introduced into numismatics by Alison Ravetz[11] (Figs. 2a and 2b).

Today, the use of histograms and the period classification according to Reece is the standard in Anglo-Saxon scholarship[12]. Histograms were introduced into German scholarship by David Wigg-Wolf. Since then, they have been widely received, particularly in the 1990s[13]. In Switzerland, for instance, Markus Peter further developed Reece's model with 40 chronological periods and a conversion into percentages using his study of the coin finds from Augst[14]. It must be pointed

9 Gebhart et al. 1956, 39–40 (single finds as accidental losses as opposed to deliberately deposited coins); Collis 1974 (chance losses); Kent 1974 (site-finds); Noeske 1979 (settlement-finds); Reece 1995 (coin loss); Vondrovec 2007, 63 (accidental losses); Wigg-Wolf 2019 (coin finds as processes).

10 Reece 1972, 271.

11 Ravetz 1964.

12 Casey 1986; Walton 2012.

13 Wigg-Wolf 1991.

14 Peter 2001.

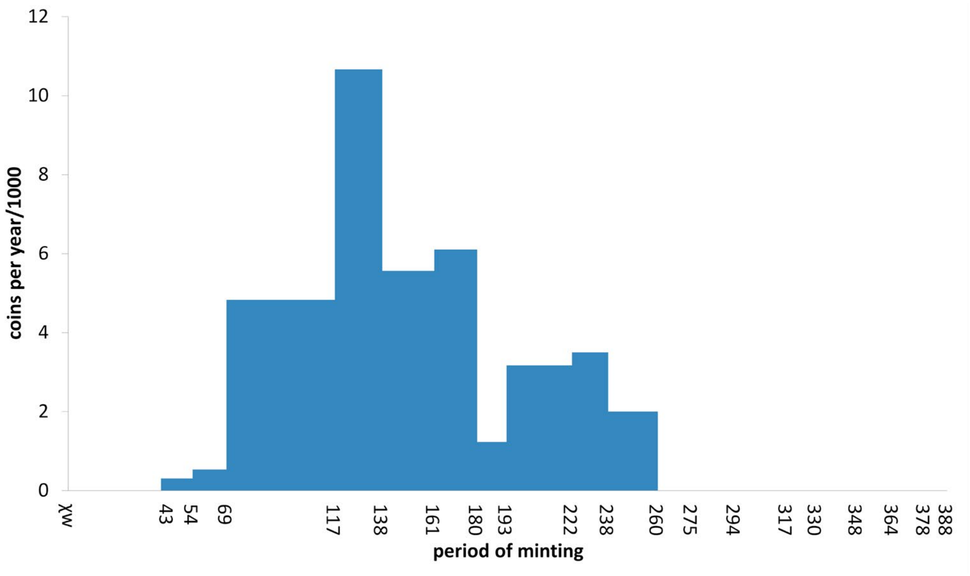

FIG. 2a - Bad Wimpfen, FMRD II/4 N1 4279 E1 & unpublished material. Coins per year/1000 (n=244).

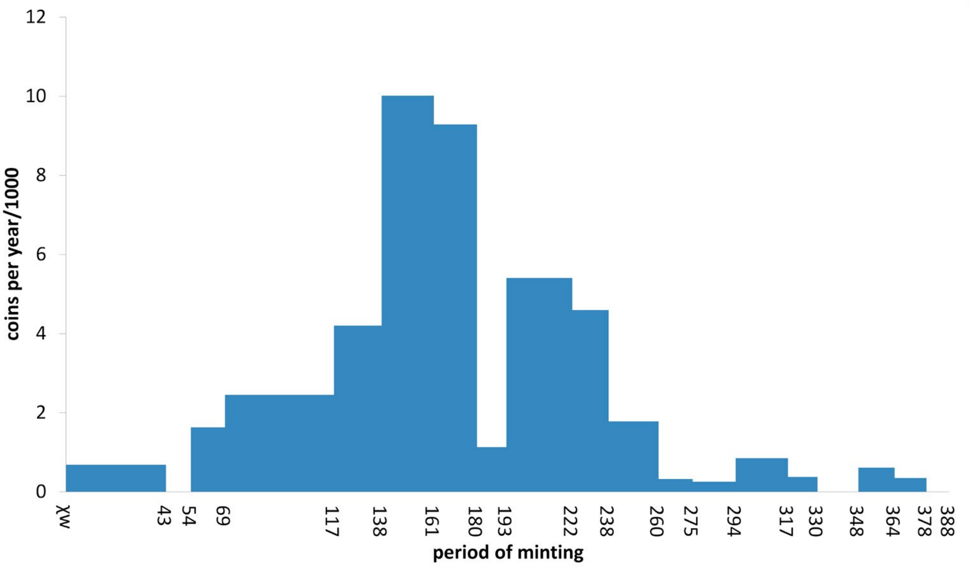

FIG. 2b Jagsthausen, FMRD II/4 4247, 4247 E2. Coins per year/1000 (n=196).

out that the so-called "coin index," obtained by Ravetz's method, only shows the frequency of coins found at a site according to minting dates and their proportional distribution, not the date a coin was lost. Histograms equate different coin samples with different numbers of coins through a hypothetical conversion into a total number of 1000 coins. As such, these graphs are useful tools for comparing different sites, but are unsuccessful in providing a thorough understanding of the individual genesis of the composition of the coin finds of a site.

In order to gain a better understanding of an individual site's coin sample against the contemporary general monetary patterns prevailing in the entire area, Richard Reece further advanced Ravetz's model by introducing the "British mean" based on selected sites that he considered representative of Roman Britain[15]. While this concept is still used in recent British scholarship, only few studies accepted Reece's model in German academia. For instance, in his study on the dating of the Upper Germanic Limes, Klaus Kortüm utilized a "German mean" of coin finds to discuss the beginning of settlements at and around the Limes[16]. The majority of German academia has not followed Reece's model, since the critiques of a "British (or German) mean" are manifold: "representative coin series" are subjective; chronologically and functionally different sites are thrown together; the theoretical concept of New Archaeology (producing objective facts with scientific-mathematical methods) is outdated; etc.

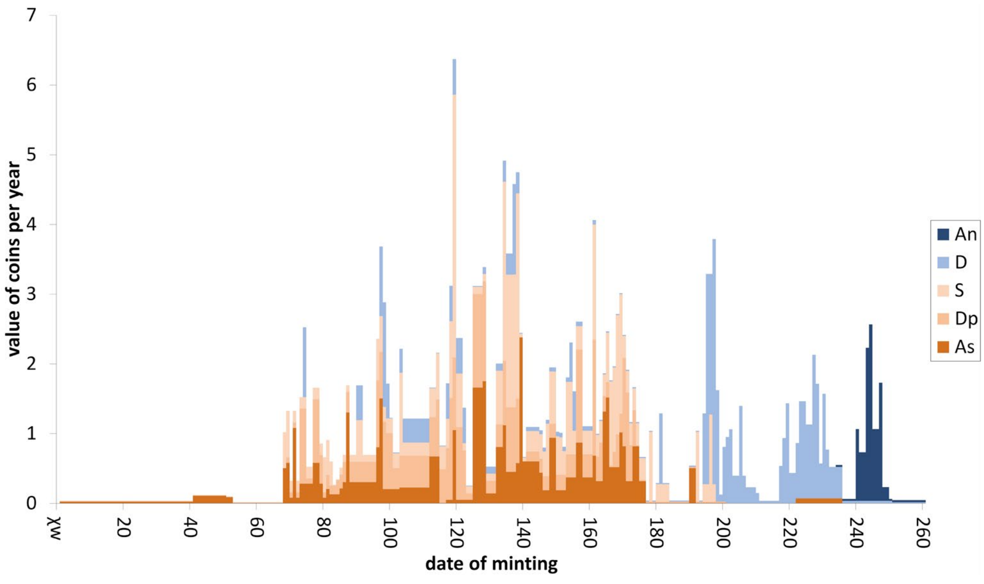

FIG. 3a - Bad Wimpfen, FMRD II/4 N1 4279 E1 & unpublished material. Coins per year in colours according to denominations (n=244).

[15] Reece 1972.

[16] Kortüm 1998; also Kopf 2011 adopted the model.

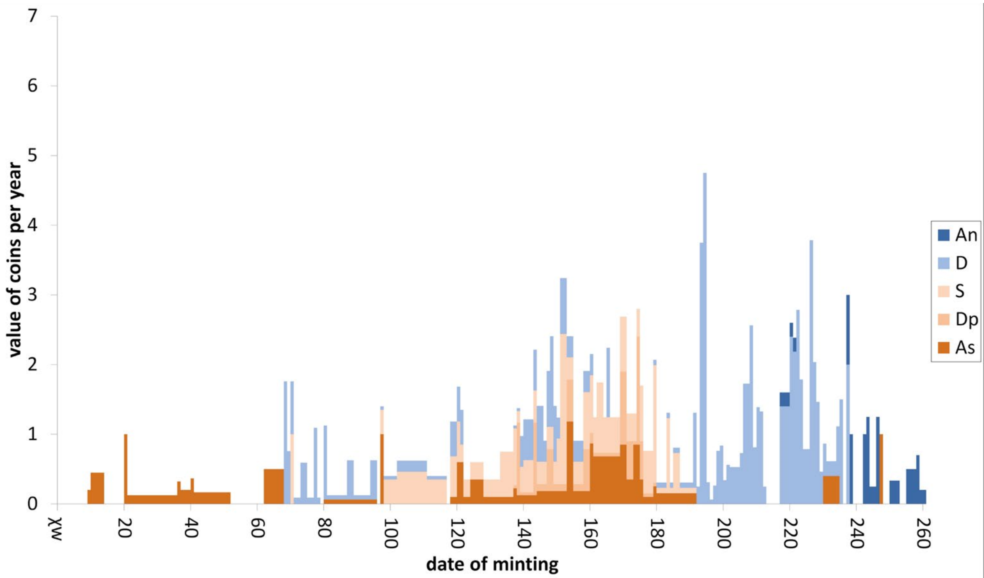

Fig. 3b - Jagsthausen, FMRD II/4 4247, 4247 E2. Coins per year in colours according to denominations (n=196).

Another method to illustrate and discuss coin finds of a site and make the data useful for further interpretation is to divide the possible minting period of a coin into individual years. In such a frame, a coin whose date is 100-103 CE, for example, is divided into four years where each year (100, 101, 102 and 103) is represented by the value of 1/4 on the y-axis. This calculation represents the annual mintage probability[17] (Figs. 3a and 3b). The method was developed in the late 1970s by Hans Joachim Hildebrandt in a study on ancient Hispanic coinage that has since been used regularly in recent Austrian scholarship[18]. The colour subdivision according to individual denominations helps to illustrate developments in monetary history, such as the change from bronze to silver denominations in the Severan period or the shift from *denarius* to radiate in the 240s CE. It must be emphasized again that the year provided on the x-axis denotes the date of minting of the coins, not the date of loss at the site. As such, the diagrams do not provide any information regarding the chronology of coin loss at the site, but rather the chronological distribution of the coins. The need for several colours to represent all denominations severely restricts the practical use of this method. Due to cost, many publishers reject multi-coloured

[17] For a detailed explanation of the model, see Kalisch 2019.

[18] Hildebrandt 1979; 1984; Vondrovec 2005; 2007; Schachinger 2015.

graphics or diagrams. Even in monographs, colour illustrations have a decisive influence on printing costs.

The discrepancy between the absolute numbers of coins and their value is apparent when studying the coin finds from Pompeii and Kalkriese[19]. In order to correct a potentially distorted representation of coin finds in favour of a quantitative approach, the numbers are converted into the value of *denarii* (Figs. 4a and 4b). Such a conversion is more likely to represent ancient reality and relevance of daily life. For instance, if one were asked how much money one had in their pockets, the answer would be 2 Euros and 43 Cents, not 8 coins. This approach anticipates the Romans would reply in the same vein.

Due to the changes in monetary history from the Diocletian reform onwards, the timeline on the x-axis should only cover coins up to the end of the radiate period. Of course, it is debatable whether the drastic devaluation of the radiate from the middle of the 3rd century onwards does not already prohibit a comparison with coinage on the basis of the value of the *denarius*. Irrespective of this question, it is evident using the conversion into the value of *denarii,* that pre-Severian bronze coins found at both sites, despite their large number, make up only a tiny equivalent value. The disadvantage of this method is that high-value coins, especially *aurei*, might exceed the scale of the y-axis. On the other hand, the large difference in value between a single *aureus* and the bulk of low-value bronze denominations that occur in everyday excavations becomes all the more apparent.

Another type of diagram particularly helpful for clarifying questions related to the chronology of a settlement is a cumulative or aggregated curve. In this method, the coins are grouped according to the above mentioned periods and the numbers of coins of each period are added to each other within this so-called cumulative or aggregated curve[20] (Fig. 5). For better comparison with other sites, the data can also be calculated relatively. Whether operating with absolute or relative figures, both forms of representation illustrate the changing quantity of coins by their minting period. Again, the x-axis does not represent the date of loss at the site, but rather the minting date of the coins. A steep rise in the curve indicates an increase in the number of coins at the site during a certain minting period. While a flat curve – since the pandemic, a very familiar term – indicates a decrease in the number of coins on site during a certain minting period. A horizontal line indicates that no coins during the period in question are present. As such, trends in the loss of coins over time can be determined by the change in the angle of the curve. The steep rise of the curve of Bad Wimpfen in the minting period of Trajan and the steep rise of the curve of Jagsthausen in the minting period of the mid-2nd century CE agrees well with the

[19] von Kaenel 1999, 372–373 (Rome and Kalkriese); Duncan-Jones 2003 (Pompeii).

[20] Reece 1995.

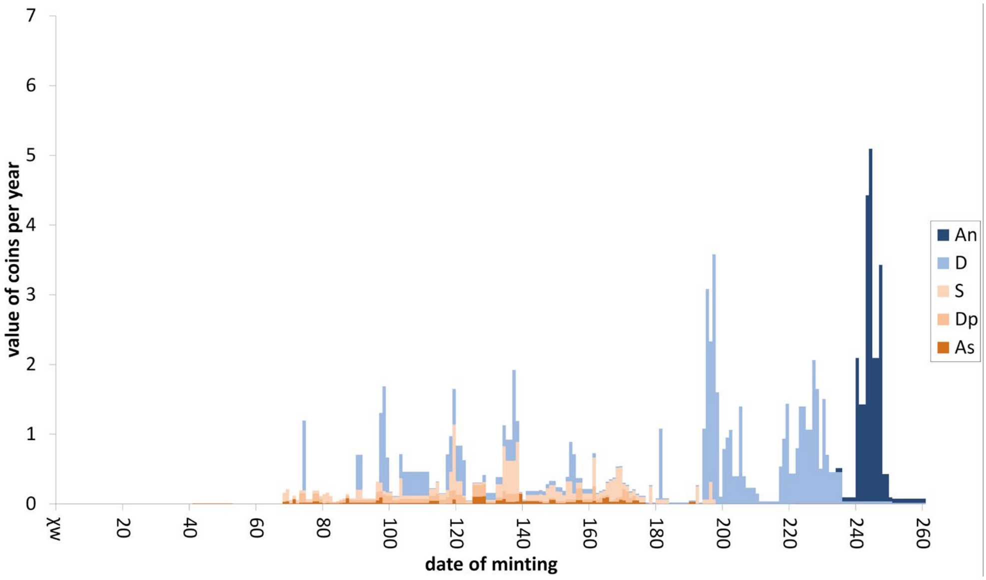

Fig. 4a - Bad Wimpfen, FMRD II/4 N1 4279 E1 & unpublished material. Value of coins per year in denarii (n=244).

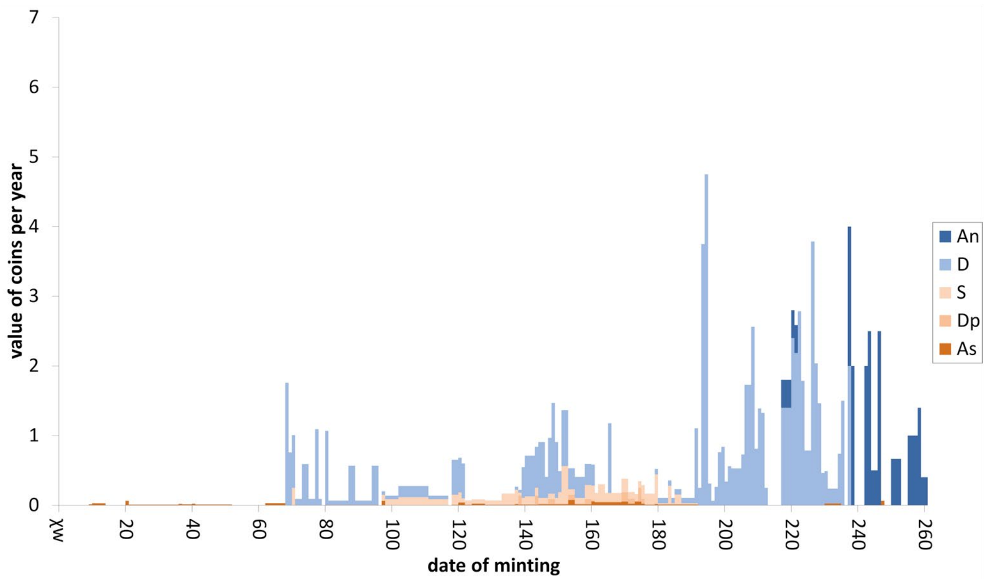

Fig. 4b - Jagsthausen, FMRD II/4 4247, 4247 E2. Value of coins per year in denarii (n=196).

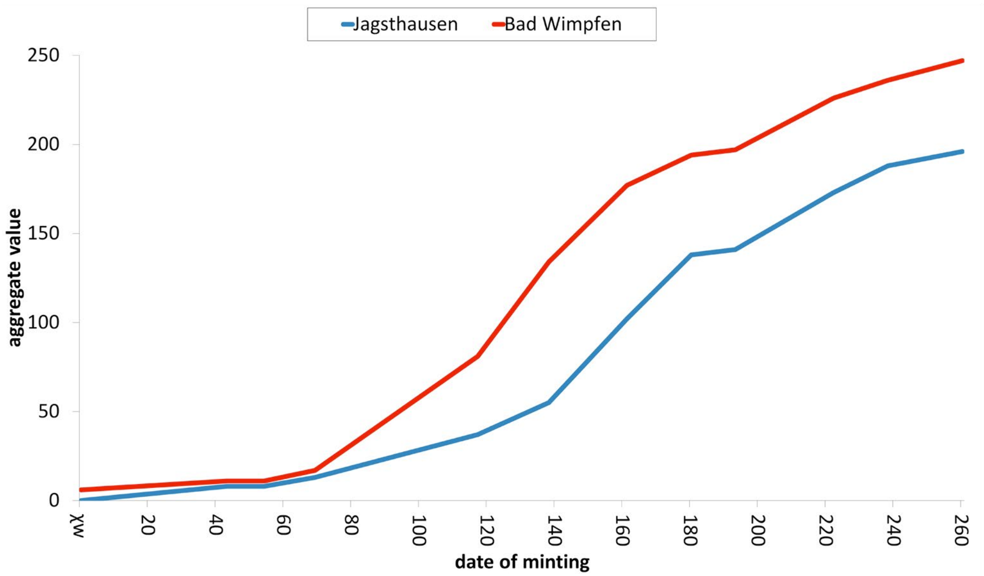

FIG. 5 - Bad Wimpfen, FMRD II/4 N1 4279 E1 & unpublished material and Jagsthausen, FMRD II/4 4247, 4247 E2. Aggregated value (Bad Wimpfen, n=244; Jagsthausen, n=196).

different chronologies of both sites. As such, this method serves as a model for interpreting the beginning of the coin loss and of a settlement similar to the indicator of the "initial maximum" proposed in Klaus Kortüm's study[21].

The following diagrams present a different model to illustrate the chronological and functional sequence of two neighbouring sites. The diagrams show the annual minting probability of the coins from Bad Wimpfen and Jagsthausen divided into bronze and silver coinage (Figs. 6a and 6b). In addition, the military (green) and civilian (grey) phases of both sites are presented by the colour in the background. The x-axis thus indicates both the date of minting and the chronology of the different phases of the site without providing any information about when the coins were lost on site.

Comparing the two diagrams shows how the different periods of occupation are reflected in different circulation patterns. In Bad Wimpfen, which pre-dates Jagsthausen, many bronze denominations (small change) arrived during its military phase. These coins form a typical "whale curve" with a slow rise and rapid fall[22]. However, without knowledge of the coin's stratigraphy, it remains unclear whether the bronze coinage was only lost during the military or also during the civilian phase of the settlement. In such a case, a classification of the degree of wear of the coins

[21] Kortüm 1998.

[22] Collis 1974, 178–181.

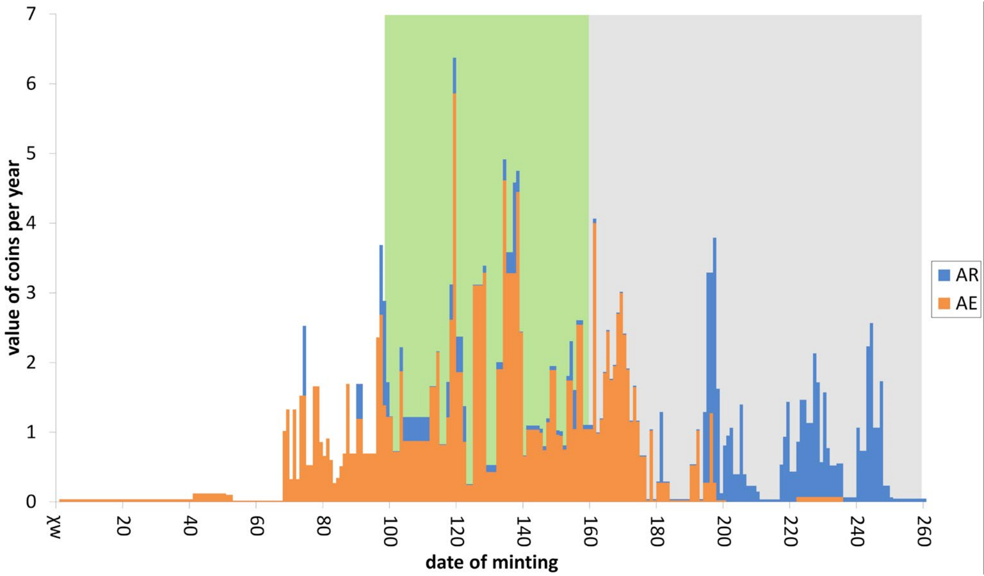

Fig. 6a - Bad Wimpfen, FMRD II/4 N1 4279 E1 & unpublished material. Coins per year with military (green) and civilian phase (grey) (n=244).

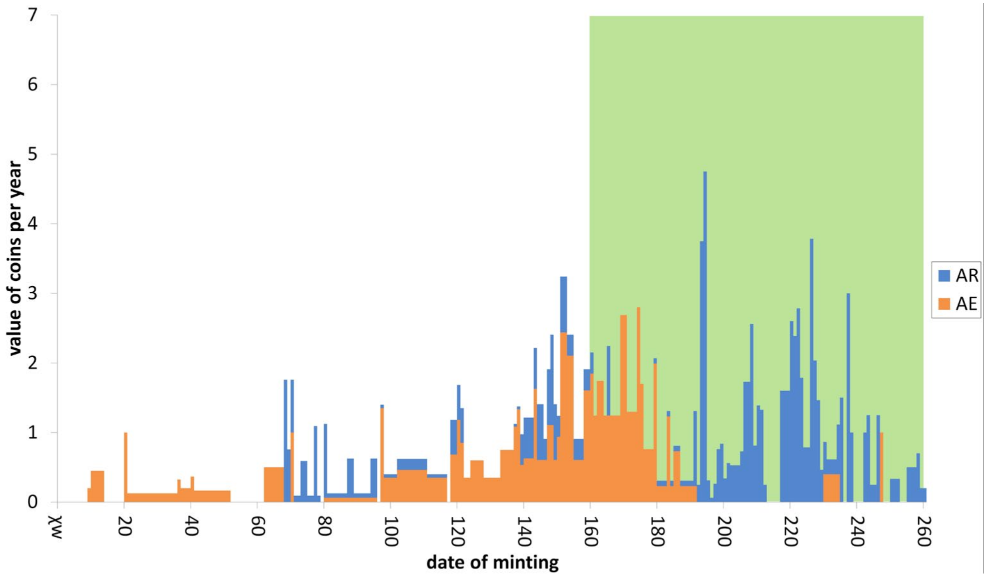

Fig 6b - Jagsthausen, FMRD II/4 4247, 4247 E2. Coins per year with military (green) and civilian phase (grey) (n=196).

would be helpful to show whether the coins were circulated for a short or long period. Especially when sites have unclear or completely unstratified find contexts, the study of the degree of wear of the coin finds should receive more attention than has been common until now[23].

The silver denominations that prevail from the Severan period onwards appear in much smaller quantities in the civilian phase of Bad Wimpfen in contrast to Jagsthausen. At Jagsthausen, the coin sample consists of fewer bronze coins due to the later start of the settlement at c. 160 CE. In the few years between the foundation of the fort and the change of the monetary policy in Severan times, fewer bronze coins had the opportunity to reach the site and be lost. On the other hand, the shift in the monetary system in favour of silver denominations in Severan times comes to full fruition at this site: *denarii* and radiates of the 3rd century dominate. Both, in Bad Wimpfen and Jagsthausen, the earlier silver coinage does not extend beyond the monetary reform of 64 CE. All older *denarii* had disappeared from circulation when Bad Wimpfen and Jagsthausen were founded in Trajanic times and in c. 160 CE respectively.

A CONTEXTUAL APPROACH

Drawing from the different methods of presenting and interpreting the material, the question arises as how best to compare different sites and their coin finds. It is important to acknowledge that the coin list of one site can be created by qualitatively different sources such as at Jagsthausen where coins come from the excavations of the Reichs-Limeskommission, construction during the 1930s-1970s, and excavations in the 1980s and early 1990s. These changes result in variability based on different excavation techniques, changing archaeological methods, and the use of a metal detector during excavations since the 1980s. Even two excavation areas lying directly next to each other in a settlement can produce different coin profiles due to the different genesis of the archaeological features in question (levelling, reconstruction, filling, etc.). The coin finds from Augst are a good example of this phenomenon where the coin finds from insula 24, which are often cited for comparison, represent only a small section of the settlement. The "total curve" of 7,565 coins from neighbouring areas looks different[24].

Even in the case studies of Bad Wimpfen and Jagsthausen, which are exceptional due to their geographical proximity, changing functional context, and consecutive

[23] Pilon 2011; 2019 and Doyen 2019 for approximate dating on the basis of the degree of the wear of coins.

[24] Peter 1996a; 1996b; Wigg-Wolf 2009, 113–114 Fig. 2: while the diagram of insula 24 features a slump after 117 CE, the diagram of the rest of the colonia continues at the same level in the Trajanic period.

chronology, all diagrams presented operate only as an attempt to mirror the former reality of life in a simplified way using mathematical calculations. Diagrams only represent a highly selective and artificial construct that does not depict the individual dynamics of ancient everyday reality. A coin series – the basis of all diagrams presented – always implies a theoretical ideal state consisting of a constant monetary supply, a constant influx of newly minted coinage, and an even and representative loss of coins. Such a model negates the different qualities of ancient actions, levelling all actions to the same level of meaning. However, every single loss of a coin is the result of an individual action of an ancient actor with different levels of meaning.

Even in our own present, there are differences between whether a 5-cent coin falls out of one's hand while paying at a ticket machine and rolls irretrievably into the gully or whether, while paying for the sixth round of beer in the pub, a 10-Euro banknote slips out of one's wallet and slides unnoticed under the bar. In this context, it is not only the monetary value of the monetary objects that is of decisive importance, but also the situation in which the individual's action take place. For good reason, therefore, studies influenced by contextual archaeology and agency theories focused on the actions of actors should be adopted to examine the significance of coin use in various life situations in the ancient world. Such an objective must inevitably lead to a contextual approach to study the material. Using the case study of the coin finds from Bad Wimpfen, a new method connecting contextual and stratigraphic data will be presented. The case study of Bad Wimpfen lends itself particularly well to the discussion of a find-oriented approach because of its well documented archaeological features and finds, its changing functional character, and its rather short-lived occupation of only c. 150 years.

Thanks to the excellent archaeological documentation of the excavations by the Landesamt für Denkmalpflege between 1983 and 1987, the coins from Bad Wimpfen can be plotted according to their position within the archaeological layers (Fig. 7). The y-axis indicates the sequence of archaeological layers (1-14, whereas layer 0 means that the coins were discovered on the surfaces), while the x-axis shows the date of minting of the coins. In the case of coins with a minting date spanning several years, the arithmetic mean is taken. The diagram presents a visualisation of the degree of wear of the coins in their respective layer. The classification of the degree of wear, developed by the Swiss Working Group for Coins Finds, serves as the basis for the five-stage colour scheme[25]: the lighter the colour, the more worn a coin; whereas the darker the colour, the less worn it is. The diagram shows a clear correlation between the degree of wear and the minting date of the coins. As expected, earlier coins show a significantly higher degree of wear than the coins whose date of minting is closer to the abandonment of the settlement. It is therefore obvious to

[25] Dubuis et al 1995.

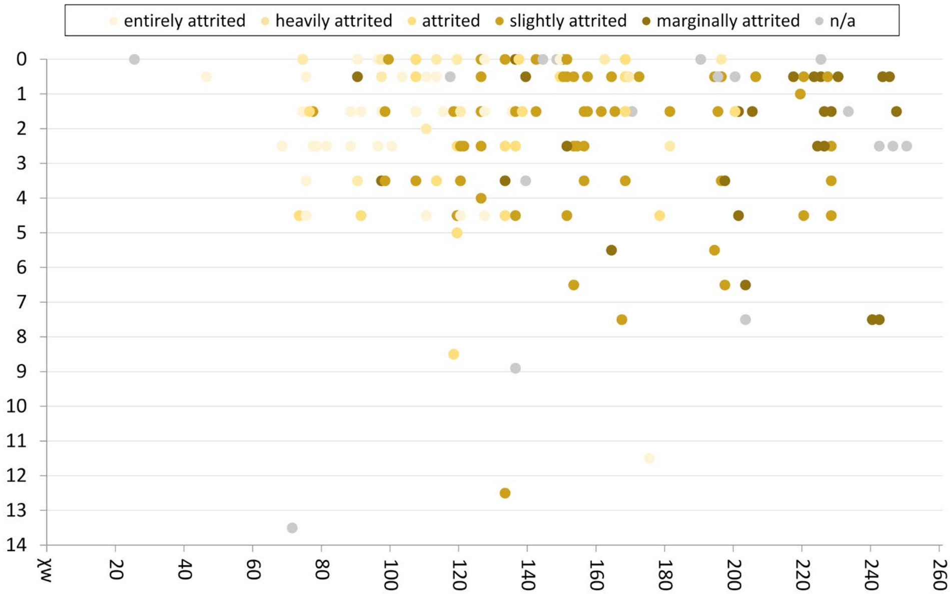

FIG. 7 - Bad Wimpfen, unpublished material. Coins in stratigraphy according to their degree of wear (n=199).

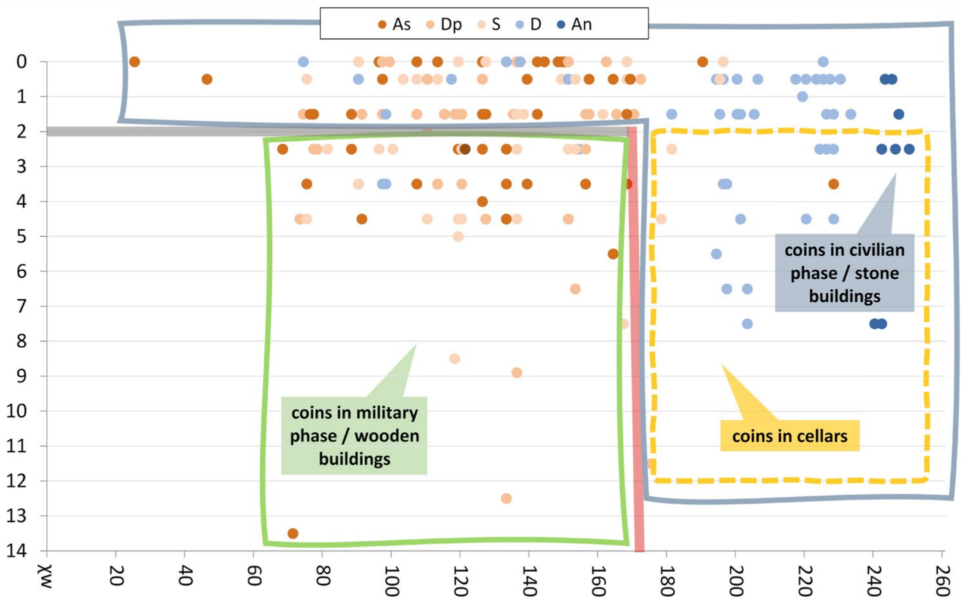

FIG. 8 Bad Wimpfen, unpublished material. Coins in stratigraphy with the chronology of the site (n=199).

relate the degree of wear to a supposedly longer circulation time, which causes wearing due to physical mechanisms.

As opposed to the previous diagrams presented in this paper, this diagram enables retrieval of the date of loss by plotting the coins according to the archaeological layer in which they were found (Fig. 8). In order to do this, it is necessary to fine-tune the archaeological stratigraphy against the backdrop of the chronology of the settlement. Only a decade after the troops were relocated to the Upper Germanic Limes and the site became a civilian settlement, a fire destroyed the wooden structures, which were subsequently replaced by stone buildings. Layer 2 – represented in the diagram by a grey bar – marks this divide between the military phase with wooden buildings and the civilian phase with stone structures. The x-axis therefore not only represents the date of minting of the coins, but also the chronology of the site. To that end, a second bar (red) is included to mark the fire that destroyed the wooden buildings at c. 170 CE. With these two main divides in place, it is possible to distinguish the coins that entered the archaeological record during the military phase (in the green rectangle) from the coins that were lost during the civilian phase (outlined in blue). The civilian phase presented in the diagram as an inverted L-shape includes coins from layers that are underneath layer 2. The separation from wooden structures to stone buildings does not extend beyond 170 CE on the x-axis. Instead, the phases below layer 2 belong to cellars of the strip houses that were built during the civilian phase (in the yellow rectangle). The coins are presented in different colours according to their denominations. In this combined diagram, it becomes clear that almost exclusively bronze coins were circulated (and lost) during the military phase of the settlement. After 170 CE, when the troops left Bad Wimpfen and the site became a civilian centre, a significant number of 2nd century bronze coins continued to be circulated and lost in the settlement. This observation agrees well with the prominent function of the site as *civitas* capital of the region.

CONCLUSION

The case studies discussed in this paper illustrate the potentials and pitfalls of various methods to present and interpret coin finds. The challenges and shortcomings inherent to mathematical models in numismatics were already formulated in 1995 by Richard Reece – ironically himself a leading figure in the statistical approach to study coin finds:

"One problem is that classical statistics rely on the assumption that the information being analysed will have a certain orderly distribution. This is not true of much archaeological material, and the methods which need to be used to make the operation valid are complex and seem to produce few good results. A second problem concerns the extreme variability of different groups of archaeological material and the background noise which such variability creates in any numerical study. For example, it is commonplace that different excavations take place using different methods, and this inevitably modifies the total material available for study. Clearance of topsoil by mechanical means cuts down the number of unstratified finds. Although these points are clear and obvious to the archaeological interpreter, they create havoc in any numerical study for they are extremely difficult to build into any scheme of calculation. In short, archaeologists are used to making allowances for differences in their groups of material which mechanistic numerical studies regard as major differences of high statistical significance. This leads to a reasonable archaeological statement that 'Given the fact that the coins from these two sites were excavated by different people at different times by different methods and have been stored in different museums, they are quite similar'. This statement is probably worth making, for we can make allowances for the excavators and methods and museums, but they are not the stuff of simple classical statistics[26]."

Another problem lies in the reflection on the genesis of archaeological data, which has hardly reached the mind of most numismatists. Questions such as "what is the interpretation of the archaeological feature?; how did a layer come into being?; and how did the coins enter the archaeological record?" can only be answered by a combination of experts – numismatists, excavators, small finds experts – in archaeological projects with ideal conditions. As a conclusion, it can be said that contextual studies provide the most innovative potential. Through this approach one can identify unconscious biases and individual peculiarities in the genesis of a site's finds and assess the potential impact on interpretation. Future numismatic research should therefore take on the arduous but worthwhile effort to study coin finds in their archaeological context and publish them in fruitful cooperation with the excavators and small finds experts.

[26] Reece 1995, 180.

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