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COIN FINDS FROM ARCHAEOLOGICAL SITES IN CAMPANIA: A NEW PORTAL FOR DOCUMENTATION AND RESEARCH

Abstract

At the University of Salerno, the CFH (Coin Finds Hub) portal on coin finds is being set up in collaboration with several Italian and foreign institutions. In addition to describing its contents, the authors illustrate the first elements emerged from the study of coins from the excavations currently under study, the cataloguing of which will feed into the portal's database.
The sites investigated are Naples, Pompeii, Paestum, and Velia: for each of them, insights related to sample cases are presented. As is usual for those working on coins finds, the most interesting aspects concern the uses of small change, the most used and therefore lost and unrecovered, for which an extensive statistical survey is now available. The comparison of coin finds from different urban communities leads one to reason about how much and to what extent the overlapping or non-overlapping of modern cities with archaeological sites has affected the quality and quantity of numismatic data available; as also the potential for interpreting the incidence of coinage in economic activities.

Keywords

Coin finds, CFH-Italy, Naples, Paestum, Pompei, Velia

First of all, on behalf of the University of Salerno group, I would like to express my sincere thanks to the organisers for their kind invitation to take part in a meeting that will allow us to discuss the many aspects of the study and valorisation of coin finds. And it is a source of genuine satisfaction that the occasion of this meeting is the 30th anniversary of the printing of the first volume of *Ritrovamenti monetali di età romana nel Veneto*, a successful publishing initiative sponsored by Giovanni Gorini and undertaken by his school. It is truly a merit to have succeeded in fulfilling the intentions of a vast research programme and to have ensured its continuity over such a long period of time. Initiatives of this kind undoubtedly require a constant commitment to the formation of a cohesive team of researchers for more than a generation, and to the maintenance of constructive relations with the organisations and institutions responsible for the protection and valorisation of numismatic heritage. The presence of a three-part report to present the work in progress at the University of Salerno is precisely to testify how valuable the experience of collaboration that has matured for the realisation of this solid publishing reality conceived by Gorini and the University of Padua has been for us.

You can't go anywhere alone, and that's why a team is currently working hard at our University to create the *Coin Finds Hub - Italy* (*CFH-Italy*) portal, made up not only of us but also of a valuable working group[1]. In the following, Giacomo Pardini and Federico Carbone will discuss the collaboration with several national and foreign institutions, the contents of the portal, and considerations about the necessary connection between our hub and other databases, addressing issues related to the study and computer archiving of coins from excavations at Pompeii and Paestum, while I will present some considerations that have emerged from the analysis of coins from excavation contexts at Velia and Naples, which will also be included in the portal.

THE STUDY OF COIN FINDS AT VELIA

At present, there are over 9,000 coins found in the archaeological excavations at Velia (Municipality of Ascea, Salerno), among which 3,200 specimens, recently restored with Art Bonus funds, are now in the laboratories of the University of Salerno.

The research concerns their classification and the inclusion of the data in the computerised database of the portal, in order to contribute to the study of the mone-

[1] The team from the University of Salerno is composed of ICT professors (M. De Santo, F. Colace) and research fellows, PhD students, graduates and students of the Master's Degree in Archaeology and Ancient Culture (F. Marani, L. Arbezzano, O. Vynarchuk, A. Tedesco, G. De Benedictis, M. C. Iovino, G. Mannara, L. Cuccurullo, S. Terralavoro, G. Del Vecchio).

tary circulation relating to the different phases of life in Elea in the Greek and Roman periods, from the 6th century BC to the 5th century AD.

Of the coins from the site (if we exclude almost 2,000 from the Roman imperial period and about 450 from Late Antiquity), the vast majority come from Elea. The data from the old excavations, carried out on several occasions since about the middle of the 20th century, are read and evaluated in relation to the results of the most recent investigations, namely those of the researchers from the University of Naples Federico II, coordinated by Giovanna Greco, and the archaeological mission of the University of Vienna, directed by Verena Gassner. The work is therefore developed, in collaboration with archaeologists, through the phasing of the contexts, in order to determine how the deposits were formed and the sequences of construction, use and abandonment of the structures in which coins are found. It is worth reiterating that a correct understanding of finds requires a contextual approach to numismatic research, a concept that is shared and consolidated (even if not always practised by all), in full awareness of the importance of the place, nature and circumstances of the discovery of a coin or group of coins and/or their association with other finds. The subject has been discussed for decades, and today there is a widespread tendency to carry out research on excavated coins, starting with empirical analysis in concrete case studies, from which it becomes clear how an integrated study can increase the informative value of both the coin and its use, and the archaeological context of reference[2]. The architecture of the *CFH-Italy* portal, currently under construction at the University of Salerno, is based on this foundation.

One of the aims of the research is to compile a corpus of the bronze series issued by Elea, with the indispensable help of archaeological provenance data, in order to resolve the many open questions concerning the date of their issue, their circulation period and the practice of minting small denominations. We are therefore photographing, classifying, and entering numismatic finds from urban areas, necropolises, and surrounding areas into the *CFH-Italy* portal. From this study we derive considerations on the quality of the denominations used in the different periods in relation to the type of use suggested by the nature of the find (i.e. depending on the different chronological phases, which were the minor denominations in circulation, which were offered to the deity as *ex voto*, which were used as Charon's 'obol', etc.). As is usually the case when dealing with excavated coins, the most interesting aspects concern the functions performed by the coin with the lowest denomination, the one

[2] For a concise and judicious review of the development of studies see *Numismatics and Archaeology* 2018, pp. 13-14 and pp. 179-185. This same volume presents and discusses the contributions of several scholars who set out their research experiences on the relationship between monetary finds and the dynamics of the formation of archaeological stratigraphies at different sites in the Mediterranean, from Classical Antiquity to the Middle Ages.

that was most often used and therefore lost and not recovered[3]. In the case of the bronze coinage from Elea, a comprehensive statistical study is now available. The main data that emerged from the analyses concern:

a. the absolute prevalence of the local currency in circulation in the different historical phases, covering the chronological span from the 5th to the 1st century BC.
b. the chronological definition, thanks to contextual data, of some previously undated typological groups
c. an increased demand for small denomination coins in the first century BC.

The percentage of locally produced coinage is very high compared to the currency of other contemporary Greek or Roman-Republican cities, exceeding 90%[4]. Although the prevalence of local coinage is common in excavations of inhabited strata, the phenomenon is even more pronounced at Velia than at other sites in Tyrrhenian Campania, and even at nearby Paestum; at Paestum, for example, in addition to the Paestum series, from the end of the 4th century BC there is evidence of a discrete number of coins from *Neapolis*, Sicily and/or other Greek cities, or Roman-Republican issues. In Velia, on the other hand, the considerable increase in local production from the last decades of the 4th century BC has meant that even the Roman bronzes from the Republican period are present in relatively small numbers. The local production of bronze, which was issued in large quantities from the Hellenistic period until the late Republican period, was quite sufficient for the needs of the exchange of low-value goods and services.

A group of issues frequently found is the one with the head of Zeus on the obverse, a type reproduced in several variants and with different stylistic quality on flans of about g 3-4 (14-16 mm) and on flans corresponding roughly to half (about g 1.5-2, 11-13 mm). On the reverse of these series there is the open-winged owl and the legend reproduced in full (ΥΕΛΗΤΩΝ) or abbreviated (ΥΕΛΗ)[5]. It is probable that the type always distinguishes the same denomination, even if it is found on series of different weight and modulus, possibly due to a reduction in the weight of bronze coinage during the 3rd century BC. It is a rich issue (second only to the last bronze production with the head of Athena/Tripod in the number of specimens collected). More than 800 specimens come from excavations at Velia in the Acropolis area, the theatre cavea, from the *Insula* II and Southern Quarters. The series with Zeus are by

[3] DE CALLATAŸ 2016, p. 242: the author points out that out of the 38 sites surveyed, in 4 out of 5 cases bronze coins exceed 95% of the total and in 1 out of 3 cases 99% of the total. At Velia, the percentage of recovered bronze coins also exceeds 99% of the total.

[4] For the amount of non-local coinage found in Velia, see CANTILENA 2023, pp. 246-248.

[5] *H.N*. 2001, p. 121, nos. 1326-1330.

far the most attested, also from centres in neighbouring areas (Moio della Civitella, Roccagloriosa, Caselle in Pittari). The material collected during the excavation campaigns of the University of Vienna offers useful elements for determining the date of issue of this type group and, above all, its duration in circulation. With regard to the date of issue, particular interest lies in the finding of 6 specimens[6], all from the series with the largest form and weight, among the group of about 20 bronze coins from Elea found inside a *naiskos* in the sacred area 4[7]. The coins, together with miniature vases and small animal bones, were offered as *ex voto* to the female deity to whom the small votive shrine was dedicated, and it is possible that they were not deposited all at once; however, the entrance to the sacellum was sealed, during a closing ceremony, with a tile and two large stones placed on a layer containing fragments of pottery and votive gifts dated no later than the first half of the 3rd century BC. The documentation of the *naiskos* therefore provides a reliable *terminus ante quem* for the dating of the Eleatic series deposited in it, including the earliest issues of the Zeus head group[8]. The finding also fixes the date of issue of the group with the head of Athena with Corinthian helmet with *lophos* and *kyne*, with some doubt previously placed between the 2nd and 1st century BC[9], and that with the laureate youthful head of Apollo dated between the 4th and 2nd centuries BC, within the first or at most the second quarter of the 3rd century BC[10]. The pieces with the last two types are the best preserved, but it is no coincidence that the most represented group is the one with the head of Zeus. Also confirming the date of issue not later than the end of the 4th to the beginning of the 3rd century BC is a specimen found in the filling of a spoliation pit with materials from the beginning of the 3rd century BC (Fig. 1) and another collected in a destruction layer with materials from the first third of the 3rd century BC[11]. The series remained in circulation for a long time: five pieces were found in an alluvial layer with pottery sherds from the last third of the 3rd century BC, one specimen comes from a layer related to the construction of the conglomerate walls from the 2nd quarter of the 2nd century BC and one is present in the hoard found in *Insula* I of the Southern Quarter, which contains a large number of pieces from the Head of

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6 In addition to these 6 with the Head of Zeus, there are two others in poor condition, of smaller form and weight, which only dubiously depict the head of the god on the obv.

7 Gassner 2008, 148-151; Parisi 2017, 465-467.

8 The readable coins collected in the *naiskos* belong to the following groups: Head of Heracles right/Closed-winged owl (1); Head of Heracles bearded right/Open-winged owl (2); Head of Zeus right/Open-winged owl (4); Graduated head of Zeus left/Open-winged owl (2); Graduated head of Zeus?/Open-winged owl (2); Graduated head of Apollo right/Open-winged owl (4); Head of Athena with Corinthian helmet right/Open-winged owl (2): cfr. Cantilena 2023, pp. 254-256.

9 *H.N.* 2001, p. 122, no. 1337.

10 *H.N.* 2001, p. 122, no. 1336.

11 Cfr. Cantilena, forthcoming: from the Austrian excavations (US 521/1997 and US 211/1999).

Fig. 1 - Elea coin (g 3.30; mm 15.00), from a spoliation pit with materials from the early 3rd BC.

Athena/Tripod series and Roman silver and bronze numerary coins dating from the beginning of the 2nd century BC to the end of the 1st century BC[12].

The issue of bronze denominations calibrated to low weight values had moments of strong increase, especially during the 3rd century BC and the last decades of the 1st century BC, and some series remained in use for a long time. We can therefore understand why there is a scarcity of finds of bronze coins produced elsewhere: the local currency was still being issued in such quantities in the late 1st century BC that it did not justify the current use of cheap foreign currency. Especially the last series with the head of Athens/Tripod and the legend YE-ΛH (Fig. 2) was issued in considerable quantities. Since 331 of the more than 1,000 specimens found in the urban area came from the aforementioned hoard found under the floor of a room in a 1st century AD building in the lower town[13], one might think that the large quantity was due to the concentration of pieces in a single hoard. However, the abundance of production is confirmed by an indicative sample of the percentage of low denomination coins in circulation in Elea, derived from the coins recovered from the excavations in the Southern Quarter (areas 01, 02, 03, 04). This is an urban area that has been affected by alluvial phenomena over time, so the coins are not in a primary deposit, but have been transported there by natural events. Among the different areas in which the coins were found, area 02 proved to be important for understanding the development of the settlement; in particular, sect. 02.1. has revealed the complete sequence of events that affected the area, allowing the archaeologists to define a precise periodisation[14]. The stratigraphic sequence testifies to the continuity of the settlement from Hellenism to Late Antiquity: the first period is Hellenistic, between the 4th century BC and the beginning of the 3rd century BC; the last is from the end of the 5th century AD.

From the Southern Quarter, 739 coins have so far been studied: of those that can be read, 130 are Greek, 11 Roman-Republican and 226 Roman-Imperial (Fig. 3). Of the 130 Greek coins, 102 are from Velia (perhaps another 25 barely legible to add) (Fig. 4). In this statistically significant sample, as in others analysed, the most common series, after those with the head of Zeus, are those with Athena/Tripod (Fig. 5),

[12] Pontrandolfo 1971- 1972, pp. 91-111.

[13] See footnote 12.

[14] The preliminary presentation of the excavation work is in Greco 2003, pp. 29-44.

Fig. 2 - Elea coin (g 1.44; mm. 12.5), from the Southern Quarter (area 03).

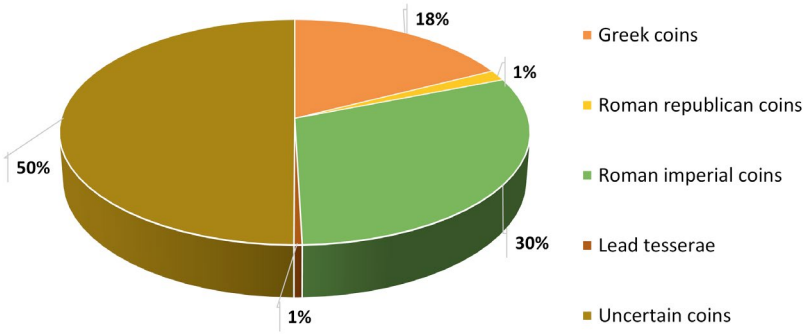

Fig. 3 - Distribution by chronological phases of 739 coins from the Southern Quarter - areas 01, 02, 03, 04.

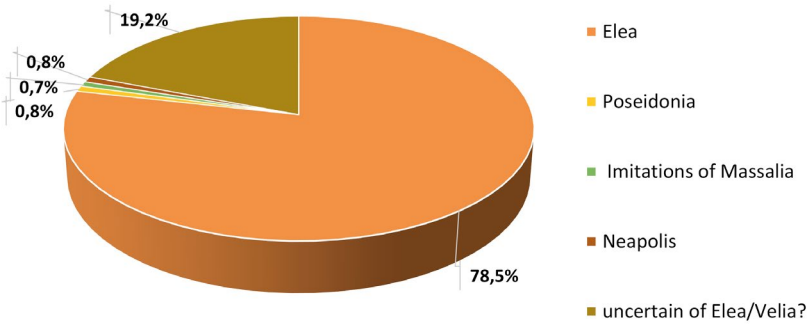

Fig. 4 - Greek coins from the Southern Quarter - areas 01,02,03,04.

far outnumbering those from Rome[15]. It can therefore be said that the last issue was indeed very abundant.

A total of 1,000 Athena/Tripod type coins have been recovered from archaeological excavations in the city. As mentioned above, many of these were found in a hoard

[15] The data and graphs reproduced in (Figs. 3-5) are taken from the Master's thesis entitled 'Velia, excavation coins: recent finds in the Southern Quarter', compiled by A. Iannone (2016-2017), for which I was the supervisor.

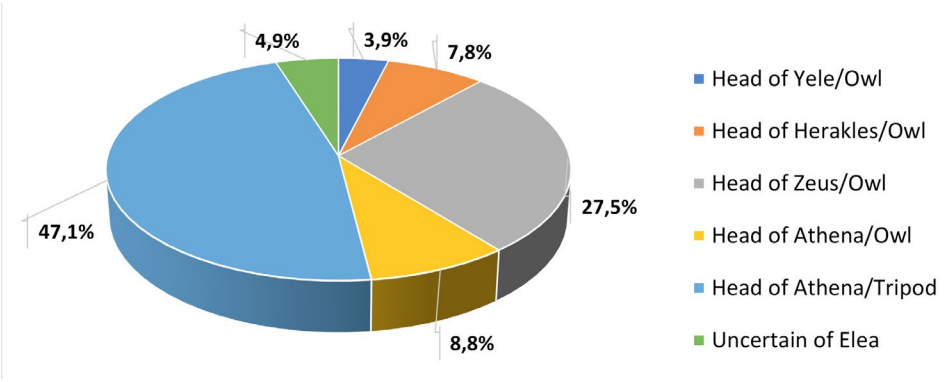

Fig. 5 - Elea coins from the Southern Quarter - areas 01,02,03,04.

found under the floor of a room in a 1st century AD building in the lower city. From the analysis of the coins contained in the hoard, at least 17 obv. and 21 rev. coins were identified with close die-links within them[16], an element suggesting their issue at a time close to the date of the hoard (late 1st century BC).

In Paestum, too, there was an increase in production from the middle of the 1st century BC to the time of Octavian, a period in which the issue of small denominations by Rome was practically non-existent. The non-interference of the Urbe in local coinage led to an increase in the production of local coins of low value in Velia and Paestum. On the other hand, in other areas of Campania and in the rest of the Italic peninsula, in order to meet the demand for small denominations, the coin users themselves sometimes resorted, until the reform of Augustus, to expedients such as the frequent recourse to the halving of the Roman asses still in circulation, or the prolonged use of imitations of the first *Ebusus* and then *Massalia* coins, issued in private circulation[17].

In any case, the use of the local currency mainly concerned the bronze coinage. Once silver production ceased in the first quarter of the 3rd century BC, the silver currency of Rome must have been used in Elea, as in other areas of southern Italy. There is a lack of evidence, but the absence or scarcity of valuable coins in excavations in the urban area does not prove that they were not used but is due to the nature and circumstances of the find. In any case, the only two hoards found in the city so far date from the last decades of the 1st century BC[18] and the silver coins in them are of course Roman.

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[16] I owe the information to F. Carbone, who is in the process of carrying out a study of the series of this rich typological group by means of die link analysis.

[17] Cantilena, Carbone, Pardini 2022, pp. 463-466.

[18] One of them, recovered in the 1950s in the Cobellis property, contained 2 denarii and 56 quinarii dating from 121 to the 1930s BC together with a semis from Paestum (Carbone 2019, pp. 331-340). The

The documentation from Velia thus confirms the rule that the quantity and quality of the coins recovered depends on the nature of the context, the causes and the way in which a stratum was formed: generally valuable coins from hoards or rich sanctuary deposits, a large number of bronze coins from inhabited strata, especially in situations of material dumping or soil washing, or in the event of large-scale ground movements in the case of major urban redevelopment. And at Velia, the moments of the most drastic urban transformations concerned the end of the 4th and the beginning of the 3rd century BC (not by chance the period of a large production of silver didrachms, hoarded in many areas of southern Italy[19] and of the abundant Zeus series) and later the early imperial period, years in which coins from the massive mintage of the last series of the Athena/Tripod group were still in use.

The study of coin finds in Naples

The study of the coin finds in the archaeological sites of Campania leads to a series of considerations that are no less important from a methodological point of view, since they invite us to reflect on how much and to what extent the overlapping or non-overlapping of modern centres with archaeological sites has affected the quality and quantity of the numismatic data available. In this respect, the situation revealed by the excavations in Naples is exemplary. Its urban centre, although it has been studied in a number of cases, even at the height of the Classical period, has so far not yielded any silver or bronze coins before the last decades of the 4th or the beginning of the 3rd century BC, the years to which date a worn silver stater of the Corinthian type from *Leukas*[20] and the few examples of the local mint minted during this period, recovered from the seabed unearthed during the underground excavations for the construction of the Piazza Municipio station. And yet, *Neapolis* is known to have been a *polis* with a significant production of silver coins from the second quarter of the 5th century BC, and between the 4th and 3rd centuries BC it was one of the most productive mints of Magna Graecia, both for silver and bronze coins[21].

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other hoard (cfr. see note 12) consisted of 53 coins from Rome, of which 26 in silver (denarii, quinarii, sestertii, and a vittoriatus) and 27 in bronze (asses and half-asses), together with local coinage (one with Head of Zeus/Owl and over 330 pieces with Head of Athena/Tripod) and 2 bronze coins from Paestum.

[19] On the circulation of silver coins from Elea, see Taliercio Mensitieri 1999, pp. 69-92 and Taliercio Mensitieri 2002, pp. 195-223.

[20] To my knowledge, the presence of coinage of the Corinthian type in Campania is not common. On the finds of coins from Corinth and its colonies in the West, see Taliercio Mensitieri and Spagnoli 1993, pp. 87-293.

[21] On the coinage of *Neapolis*, see Rutter 1979 and the contributions collected in *La monetazione di Neapolis nella Campania antica* 1986, pp. 67-373.

In Naples, a large number of coins come from the stratigraphic excavations carried out in recent years in Piazza Municipio, on the site of the station of the underground lines 1 and 6[22]. There are 4,245 pieces, dating from the end of the 4th century BC to the modern period, with a large number of late antique pieces in particular, dating from the 4th to the 6th century AD[23]. This documentation will also be integrated with the excavation data in the *CFH-Italy* portal.

The area where the coins were found was originally part of a large coastal inlet that stretched from Castel Nuovo to Piazza G. Bovio. The basin where the port of the Greek and Roman periods was located has been identified[24] in the area between Piazza Municipio and Via Medina. With the exception of a few bronze coins from *Neapolis* recovered from the sandy seabed, which was repeatedly dredged to combat siltation from the 3rd century BC onwards, all the other coins belong to the later phases, from the Republican to the full Imperial period. A few other coins from *Neapolis* and from Greek, Italic, Magna Graecia, Sicilian, Hispanic, of *Massalia* and Cyrenaic mints (of the same types as those found in Pompeii in the pre-79 BC layers and in Rome) also come from the seabed, but from the area of the present port[25]. In the ancient port, during the imperial period, various maritime infrastructures and a road were built, probably the *per cryptam* road that connected *Neapolis* to the Campi Flegrei, near which thermal buildings were erected from the beginning of the 1st century AD and in the 2nd century AD. A hoard of 204 coins minted in the 40s of the IV century AD (the most recent coin dates from 348 AD) has been found[26] in a wall of one of these thermal buildings, concealed by a blockage in the passage between the *apodyterium* and the *frigidarium*, indicating that the baths were abandoned (Fig. 6).

The wrecks of merchant ships that sank between the 1st and 3rd centuries AD have been found on the seabed of the Roman port, and among the numerous archaeological finds found around the ships there is a small bronze with the *Massalia* types, a republican denarius of *Paullus Lepidus* (62 BC) and about 20 imperial coins from the 1st and 2nd centuries.

However, as mentioned above, most of the coins found in the underground excavations date back to the late Imperial and Byzantine periods, when the mouth of the

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[22] The excavations were directed by D. Giampaola, an archaeological officer at the Ministry of Culture, who has long been responsible for the archaeological heritage in the historic centre of Naples.

[23] Among the 4,525 coins, currently in storage at the laboratories of the Department of Heritage Sciences at the University of Salerno, an initial batch of 800 was recently restored with Art Bonus funds. Of the entire nucleus found in Piazza Municipio, about 43% belong to coins from the 4th and 5th century AD and about 23% are from the 5th -6th century and Ostrogothic and Byzantine issues. The study of coins dated from the late antique phase to the 7th century AD is entrusted to F. Marani.

[24] Giampaola, Carsana 2021, pp. 343-347; Giampaola, Carsana 2007, pp. 205-217.

[25] This nucleus of over 400 pieces is currently being studied by G. Pardini.

[26] Marani, Carsana, forthcoming.

Fig. 6 - The 4th cent. AD hoard from a thermal building in Piazza Muncipio (Naples).

river silted up and the port moved eastwards, near Piazza G. Bovio. The excavation of the road between the city and the new port of the Byzantine period has brought to light many *minima* from the 5th and 6th centuries, attesting to their use up to the latest levels of the road, which date from the middle of the 7th century AD. The recent restoration of the coins has made it possible to identify the issuing authority of many of the more difficult to read coins[27], and this has allowed an updated study of the use of divisional coinage between Late Antiquity and the early Middle Ages, with particular emphasis on the contexts of the 5th to 7th centuries AD. These coin finds represent an important point of observation, especially in relation to the prolonged use of small denominations issued between the 4th and 5th centuries AD in the circulating coinage of the 6th and 7th centuries AD. This finding is confirmed by the situation recorded in Rome during the excavation of the exedra of the *Crypta Balbi*, where the strata of the late 6th and early 7th centuries AD also yielded several hundred *minimi*[28].

[27] Interesting considerations on the monetary circulation in Naples in the Byzantine era, also arising from the study of the coin finds from Piazza Municipio, in Marani 2023, pp. 185-207. Previously, remarks in Rovelli 2010, pp. 693-711.

[28] See the considerations of A. Rovelli and L. Sanguì in Cantilena, Rovelli, Sanguì 2018, pp. 180-182.

After a period of abandonment in the early Middle Ages, the area was revived in the Angevin period, coinciding with the construction of Castel Nuovo by Charles I, from which coins have also been recovered.

The finds from Piazza Municipio and the surrounding area are almost entirely devoid of silver coins, with the exception, not surprisingly, of a splendid hoard of 134 denarii and 6 victoriati from Rome, buried at the beginning of the 1st century BC, a period when extensive hoarding was recorded throughout the peninsula due to the turbulent phase of the social war. The hoard was found intact in a terracotta jug because the burial site was silted up and a harbour quay was built on top of it in the early imperial period.

This is an excellent example of why there are no finds of Greek and Roman silver coins in Naples, which has been subject to constant urban restructuring over the centuries, probably manipulated to extract precious metal.

Renata Cantilena

THE PROJECT COIN FINDS HUB - ITALY / RINVENIMENTI MONETALI IN ITALIA.

The *Coin Finds Hub - Italy / Rinvenimenti monetali in Italia (CFH - Italy)* project, promoted by the University of Salerno (UNISA), is a collaborative project aimed at the registration, filing, and cataloguing of numismatic objects found in archaeological contexts studied on the national territory. It has been set up with the aim of generating multilevel interpretation processes[29].

The elaboration of a project for the systematisation of coin finds from excavations - but also their communication and valorisation - and the first reflections on how to manage a considerable mass of coins entrusted to us for cataloguing, study and edition[30], was born in 2018 as part of the research activities of the

[29] The project, in its embryonic phase, was first presented at the International Conference *The 8th Joint Meeting of ECFN and nomisma.org 2019*, Messina, 02/05/2019, with the paper *Coin finds, contexts and data management between Pompeii and Velia* see Carbone, Pardini, forthcoming Pardini 2022. The realisation of the pilot project *CFH-Italy* was made possible thanks to the generous support of the Fondazione Cultura e Arte, an emanation of the Fondazione Terzo Pilastro - Internazionale chaired by Prof. Avv. Emmanuele F.M. Emanuele, who decided to invest in this research project, supporting it with an important contribution that has enabled us to train young scholars who have benefited from scholarships and research grants, to continue the filing (also through the purchase of instrumentation that has enabled us to speed up image acquisition and processing processes), research and publishing activities, and to inaugurate the first three thematic portals dedicated to Naples, Pompeii and Velia.

[30] The coin finds entrusted to UNISA researchers and included in the project come from: Velia (ca. 9,000 coins), Paestum (ca. 8,800 coins), Pompeii (ca. 2,800 coins), Naples (ca. 5,000 coins), Rome

Chair of Numismatics of the Department of Cultural Heritage Sciences (DiSPaC/UNISA). The questions we asked ourselves at the time concerned the optimal management of coin cataloguing, as well as all the institutional and protective operations that had to be carried out in relation to the institutions that had entrusted us with the finds, such as inventorying, cataloguing, etc. In order to cope with the large amount of material to be studied, it was necessary to turn the work and time invested in the creation of a correct and complete documentation of the coin finds into an investment, also in terms of valorisation and dissemination of knowledge, which would allow us to return the precious amount of information collected to the entire scientific community.

For this reason, thanks to the seminars and workshops organised by DiSPaC and to an agreement with the Istituto Centrale per il Catalogo e la Documentazione (ICCD) for didactic-scientific and protection purposes, such as the training of students in the use of the ICCD standards for numismatic objects and the expansion of the national database called SIGECweb (Sistema Informativo Generale del Catalogo[31]), we have developed *CFH - Italy*, a resource that aims at creating a digital platform in *open* format for archiving, research, knowledge and free use of the information and data collected in it. This resource has been created mainly thanks to the multidisciplinary expertise that UNISA offers within DiSPaC, with the contribution of colleagues from the University's ICT Centre for Cultural Heritage, which promotes the use of ICT and the Web in services that support research activities for the protection, and with the support of a group of Italian and foreign colleagues from universities, research institutes and the Ministry of Culture (MiC), who work or have worked in the past on issues related to cataloguing, the interpretation of coin finds, numismatic heritage management strategies and free data sharing[32].

(ca. 3,000 coins) and San Casciano dei Bagni-Siena (ca. 5,300 coins), for an approximate total of ca. 33,900 specimens.

[31] See <http://www.iccd.beniculturali.it/it/sigec-web>.

[32] In order to ensure a rigorous scientific approach, the project is supported by an international scientific steering committee, which we thank for its support; the committee is composed of the scientific leaders: R. Cantilena, F. Carbone and G. Pardini (UNISA/DiSPaC), with - strictly in alphabetical order – E. Calandra (MiC/Central Institute for Archaeology), F. Colace (UNISA/Centre ICT for Cultural Heritage), V. Boi (MiC/Central Institute for Archaeology), S. Buttò (MiC/Central Institute for the Unique Catalogue of Italian Libraries and for Bibliographic Information), B. Callegher (University of Trieste), A. Cavagna (University of Milan), M. De Santo (UNISA/Centre ICT for Cultural Heritage), A.F. Ferrandes (Sapienza-University of Rome), M.L. Mancinelli (MiC/Central Institute for Catalogue and Documentation), A. Meadows (Oxford University, New College), M. Osanna (MiC/Directorate General for Museums), A. Rovelli (University of Tuscia), C. Veninata (MiC/Central Institute for Catalogue and Documentation) and D. Wigg-Wolf (Römisch-Germanische Kommission).

In addition to the presence of the scientific-directory committee, the project has also attracted the interest of the MiC and its central offices[33], with which the University of Salerno has signed a Framework Agreement[34] with the aim of promoting, improving, and implementing the project. The aim of the agreement signed is to facilitate the comparison between the various scientific, technical and administrative competences on the subject of tools and methodologies useful for the interpretation and management of coins found in context, in order to fully exploit the information potential of these finds, also in relation to the needs of knowledge and protection of the cultural heritage, as well as to promote communication with its peripheral offices operating in the territory, such as the ABAP Superintendencies, Archaeological Parks and Museums, in relation to the territorial contexts of competence and through the establishment of specific agreements.

The main platform of the project, to be released during 2023, will host content, bibliographic and archival materials useful for those approaching the knowledge of numismatic assets found in multi-layered archaeological sites. In addition, information on descriptive ontologies for this category of material and their proper sharing has been collected and reported, in order to also provide up-to-date bibliographic and regulatory tools. In fact, *CFH - Italy*, as well as proposing itself as a meeting point for the international scientific community interested in the study of coin finds, has among its objectives the structuring of an architecture that acts as a link between the needs of scientific research and the strategies of protection and valorisation promoted by MiC and its peripheral bodies. In this sense, we have provided for the integration of the systems currently used for the digitisation and management of information on the public numismatic heritage[35], in full compatibility with the open sharing systems most widely used in the various international contexts[36]. The main portal will therefore serve as a platform for thematic containers, which may concern the finds of individual sites, specific or regional contexts, and monographic ones, which will be promoted from time to time by universities, peripheral bodies of the MiC or other public or pri-

[33] Directorate General for Museums (DGMu); Directorate General for Archaeology, Fine Arts and Landscape (DGABAP); Central Institute for Archaeology (ICA); Central Institute for the Single Catalogue of Italian Libraries and for Bibliographic Information (ICCU); Central Institute for Catalogue and Documentation (ICCD).

[34] UNISA-MiC Framework Convention of 15/04/2021, identified by No. 639/2021 in the UNISA Register of Conventions and Memoranda of Understanding.

[35] In this regard, see the Guidelines for the *Drafting of the Data Management Plan*, developed within the framework of the *National Plan for the Digitisation of Cultural Heritage 2022-2023 - Release v1.0-June-2022* (<https://docs.italia.it/media/pdf/icdp-pnd-docs/v1.0-giugno-2022/icdp-pnd-docs.pdf>) and drafted by the Central Institute for the Digitisation of Cultural Heritage - *Digital Library* (<https://partecipa.gov.it/uploads/decidim/attachment/file/58/M1C3_1.1.1_2_Linee_guida_Piano_gestione_dati_Consultazione.pdf>).

[36] See the international *Nomisma.org* project (<http://nomisma.org>) to which *CFH - Italy* adheres.

vate structures that will adhere to the project, in order to collect data and information for their study and use. It is therefore a single space that gathers all coin information and documentation. A first level concerns numismatic data, with direct access from the main page to the various thematic portals, with a single search query for all: it will indeed be possible to search for coins for individual sites, but also across all the thematic portals available. This is our concept of a *hub*, i.e. a place where information from different sites is channelled, gathered in a single virtual space that allows it to be searched simultaneously. But the hub also concerns a second level, that of documentation: We expect that *CFH - Italy* will also be the place to find information on reference standards, ontologies, and the reflection on their semantic alignment, on archival documentation and bibliographic references. Finally, there are sections where Datasets and legal information about them can be shared.

In concrete terms, therefore, UNISA will provide the scientific and complementary expertise of its partners, expertise related to research activities concerning the analysis and study of numismatic heritage, but also to the activities of the Third Mission. It will also guarantee the availability of technical facilities and virtual spaces for the purposes envisaged by the project, in particular:

- for the design, management and virtual space of the main portal of the *CFH - Italy* project, currently in the beta testing phase.
- for the design, management and virtual space of the individual thematic projects related to the *CFH - Italy*. This will be the responsibility of the UNISA/ DiSPaC contact persons, as well as the online publication of the data, according to the national regulations implemented by the information elaborated within the project and agreed with the MiC entities.
- to host on the main portal any other projects on coin finds carried out on the national territory and under the scientific responsibility of the MiC and/or of Italian universities other than the University of Salerno.

The integrated management of the project will therefore allow the information and data on the numismatic heritage collected according to the ministerial *standards* to be included in the National Geoportal for Archaeology[37], managed by the ICA, and in the SIGECweb, managed by the ICCD, an institute that will also make available to the project its expertise in the creation of specific ontologies for the cultural heritage sector and in the dissemination and exploitation of data in open formats (OD and LOD). At the same time, the ICCU is supporting the project by providing all the necessary instructions for the creation of digital objects, images and metadata, guaranteeing the supervision of all the technical operations for the valorisation of the

[37] See <http://www.ic_archeo.beniculturali.it/it/222/il-geoportale-nazionale-per-l-archeologia>.

resources on national and European portals, and supervising the work of importing metadata into its own online platforms and their aggregation in the European portals with which the Institute collaborates.

Convinced that good data management is the basis for reliable and correct scientific research and its dissemination, the *CFH - Italy* has been built on the principles of *Open Data* according to a so-called FAIR data production. *FAIR data*, for a numismatic heritage that we want to be, precisely, *Findable*, *Accessible*, *Interoperable* and *Reusable*[38]. This is why we started to think about how to build the information platform, from the descriptive ontology to the hardware, the software and the final user interface.

The first reflection stemmed from an analysis of reference ontologies. An apparently simple step, but not an obvious one, since we have a mandatory national reference standard to adhere to. Furthermore, at the international level, 57 projects have been published with ontologies corresponding to the *Linked Open Data* domain (at least as of 2019): in (Fig. 7), which shows the results of the census carried out by C. Veninata of the ICCD[39], the projects created by Italian institutions are shown in green, while those related to the numismatic sector are shown in red (only 2!). This analysis made it necessary to establish a dialogue between the different documentation systems taken as our reference: that proposed by the *Nomisma.org* network and that of the ICCD.

As we know, the cataloguing of Italian cultural heritage is structured according to the standards established by the ICCD of the MiC. For numismatic heritage, there are 46 compulsory fields, with an additional 84 if more information is available: these data are not related to the context in which the coin was found, but mostly to technical-scientific and administrative data. In some cases, these fields have a predefined vocabulary, in others they have values or codes that generally describe not only a coin but also administrative and patrimonial elements such as ownership, availability, previous restorations, estimated value, etc. Our first objective was to establish a semantic alignment between the ontology proposed by *Nomisma.org*[40] and the national cataloguing standards[41] (Fig. 8). This became possible in 2017 thanks to the introduction by the ICCD, in collaboration with the Institute of Cognitive Science

[38] For the principles of *FAIR data*, see Wilkinson, Dumontier, Aalbersberg *et al*. 2016. An explanatory summary of FAIR data *is* provided by the Swiss National Science Foundation and is available at the following link: <http://www.snf.ch/SiteCollectionDocuments/FAIR_principles_translation_SNSF_logo.pdf>; see also <https://force11.org/info/guiding-principles-for-findable-accessible-interoperable-and-re-usable-data-publishing-version-b1-0/>.

[39] See. C. Veninata, Semantic Web Technologies for Cultural Heritage. Ontologies for Cultural Heritage: <http://www.iccd.beniculturali.it/it/834/corsi/4915/summer-school-in-tecnologie-del-web-semantico-per-i-beni-culturali>.

[40] *Numismatic Description Schema* (NUDS), available at: <http://nomisma.org/nuds>.

[41] See also NU - Beni numismatici 3.00 (<http://www.iccd.beniculturali.it/it/ricercanormative/18/nu-beni-numismatici-3_00>).

A 2019 survey made it possible to identify 57 projects for the publication of Linked Open Data (in national systems) attributable to categories relating to cultural heritage.

1. American Numismatic Society
2. Amsterdam museum
3. Archaeology Data Service, Progetto STELLAR
4. Archivio Centrale dello Stato
5. Archivio storico della Presidenza della Repubblica italiana
6. Bavarian State Library
7. Biblioteca de Galicia
8. Biblioteca Nacional de España
9. Bibliotheque Nationale de France
10. Biblioteca Nazionale Centrale di Firenze, Soggettario
11. British Library, British National Bibliography
12. British Museum
13. Camera dei deputati
14. Carnegie hall
15. Casalini Libri (SHARE-VDE group)
16. Centro di Documentazione Ebraica Contemporanea
17. CDEC
18. Claros ProjectCoBIS (Coordinamento delle Biblioteche Speciali e Specialistiche di Torino)
19. Consiglio Nazionale delle Ricerche
20. Corago LOD
21. Cultura Italia
22. Data Archiving and Networked Services (DANS), Royal Netherlands Academy of Arts and Sciences
23. Deutsche Nationalbibliothek
24. Europeana Foundation
25. Fondazione Zeri
26. Fundación Ignacio Larramendi
27. German National Library
28. Getty Vocabularies
29. Goldsmiths' College
30. Hellespont Project
31. Historic Environment Scotland
32. Istituto Centrale per gli Archivi – Sistema Archivistico Nazionale
33. Istituto Centrale per il Catalogo e la Documentazione – Catalogo generale dei beni culturali
34. Istituto per i beni artistici culturali e naturali (IBACN) della Regione Emilia-Romagna
35. Library of Congress
36. Linked Jazz
37. Linking Lives
38. linked open data for ACademia (LOD.AC) project
39. Ministero dei beni e delle attività culturali
40. National Diet Library
41. National Library of Finland
42. National Library of Medicine
43. National Széchényi Library
44. Nomisma
45. North Carolina State University Libraries
46. NTNU (Norwegian University of Science and Technology) University Library
47. OCLC
48. Oslo Public Library
49. Progetto Reload
50. Rijksmuseum
51. Russian Linked Culture Cloud
52. Springer Nature
53. University of Alberta Libraries
54. University of California-Los Angeles
55. University of Nevada, Las Vegas
56. University of Oxford
57. Yale Center for British Art

*C. Veninata, Tecnologie del web semantico per i beni culturali. Ontologie per il patrimonio culturale

Fig. 7 - International projects published with ontologies corresponding to the Linked Open. Data (census by C. Veninata - elaboration by F. Carbone).

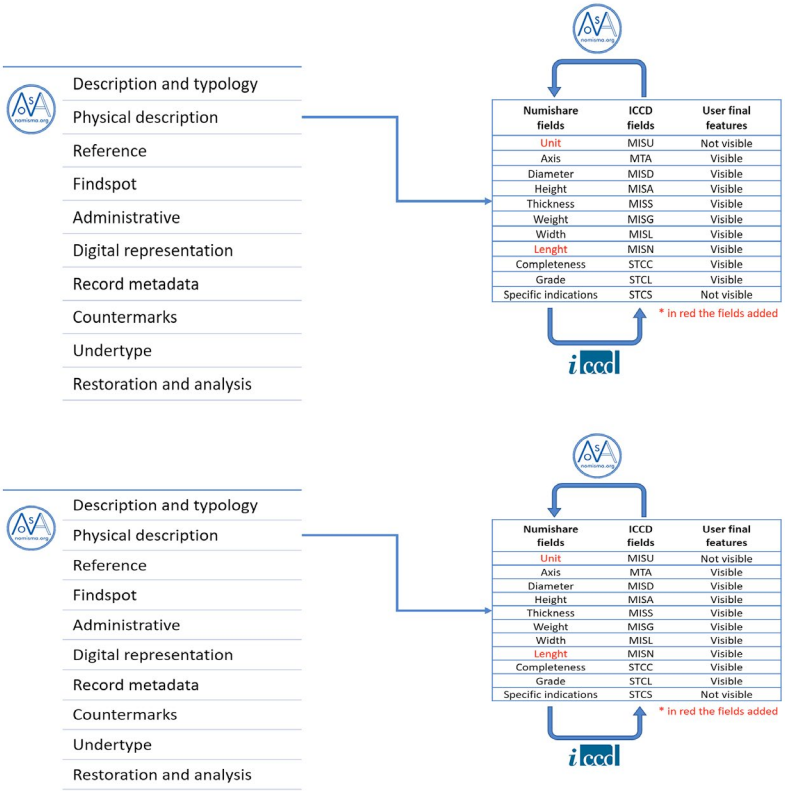

Fig. 8 - Exemplification of the semantic alignment between Nomisma.org and ICCD related to the place of discovery of the coin find (elaboration by F. Carbone).

and Technology (ISTC) of the CNR, of an experimental model of knowledge graph called Architettura della Conoscenza (ArCo), useful for the communication of ontologies for structuring cultural heritage information in digital environments: essentially, a network of ontologies for structuring descriptive data on cultural heritage, allowing the free sharing, accessibility and reuse of data by users[42].

We have therefore started to work - field by field - on the semantic alignment between the entries provided in Nomisma.org and those proposed by the ICCD[43], integrating the two vocabularies and adding the missing entries, to which we have assigned our own identification code[44]. Considering that the main purpose of the *CFH - Italy* is to present coins as *finds* and not as *objects*, and therefore to enhance coin finds in archaeological contexts, the main revision and integration of information has focused on these areas. We have therefore updated the ontologies by bringing together a series of contextual headings that we considered essential for understanding the nature of the coin find and for interpreting it as a documentary source, headings that would also allow the user to better grasp the methodological reflection carried out in the study of excavation finds, functional for a better understanding of the dynamic aspects that the coin from an archaeological excavation brings with it. The structuring of our project and the need to update the *CFH - Italy* data sheet with contextual data has therefore forced us to revise and deepen the methodological reflection carried out by our research group, thanks also to the analysis carried out by the author of some interesting contexts in terms of quantity of finds, quantity and quality of excavation data identified in Pompeii, and in a close, fruitful and continuous comparison with archaeological colleagues, which has allowed us to refine the interpretation and understanding of the coin finds and to make this information available to those who need this data for the recomposition of the stratigraphic sequences of the sites for the purposes of historical-archaeological reconstruction.

The newly added headwords, which are necessary for the analysis and systematisation of contextual information, and which complement the NUDS system, are represented by a four-letter code (ICCD), while others have a UNISA identifier followed by a number; the codes then correspond to a series of terms and definitions that we have included in a vocabulary.

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[42] More information on ArCo is available at: <http://www.iccd.beniculturali.it/it/progetti/4597/arco-architettura-della-conoscenza-ontologie-per-la-descrizione-del-patrimonio-culturale> and <https://dati.cultura.gov.it/progetto-arco-architettura-della-conoscenza/>; see also Mancinelli, Veninata 2019.

[43] For the ICCD tools inherent to archaeological heritage and the system of relations developed for the restitution of contexts, see Moro, Mancinelli, Negri 2017.

[44] In order to facilitate the on-line consultation of the data, not all the entries will be visible to the end user, in particular those of an administrative and judicial nature, although they will be included in our database and will in any case remain available to the bodies in charge of protection.

Once the language was defined, thanks to the collaboration of UNISA's ICT colleagues, we adapted the *Numishare* software, which is based on the XML language and structured by the *American Numismatic Society*[45], then integrated GIS mapping[46] and additional documents, such as:

- searchable excavation notebooks and reports.
- archival documentation and manuscript volumes with previous catalogues that can be searched online.
- historical cartography to read previous situations of excavation areas, etc.

CASE STUDIES FROM POMPEII

Given the specific focus of our project on coin finds in multi-layered archaeological contexts, it is understandable how the major revision and integration of information relates to this area.

For this reason, we have included in our database a series of contextual entries that we consider indispensable for understanding the nature of the coin find and for interpreting it as a documentary source, entries that would allow the user to better grasp the methodological reflection carried out in the study of coin finds, functional for a better understanding of the dynamic aspects that the coin from an archaeological excavation brings with it[47]. The reflection on the coin at the archaeological level, useful for the reconstruction and dating of sequences, was carried out in parallel with the more strictly numismatic one, as they are both necessary and complementary for the definition of the history of the use and circulation of the coin find.

A first line of reasoning, carried out thanks to the wealth of information available from the investigations carried out in Pompeii at *Regio* VIII.7.1-15 (*Pompeii Archaeological Research Project: Porta Stabia - PARP:PS*)[48], by evaluating the data from the contexts already studied and on the basis of the most recent numismatic considerations and studies of the coin finds from the Vesuvian city, an attempt has been made to define the types or, if preferred, the categories of the finds, in order to establish their chronological reliability in the context of material culture, going

[45] See <https://numishare.blogspot.com/>.

[46] For each site, we have obtained (or are in the process of obtaining) the official multi-level GIS files that will be integrated into the Leaflet cartographic system, the same one used by the portals belonging to the *Nomisma.org* network.

[47] For the new fields, please refer to the *CFH - Italy* project website and the relevant thematic portals that will be made available to the scientific community in the near future.

[48] The surveys were conducted between 2005 and 2009 by Steven J.R. Ellis (University of Cincinnati, OH). See. Pardini 2017, with bibliography.

beyond the three definitions usually used for classes of materials found in an excavation (mostly for ceramics), which in our opinion are neither sufficient nor exhaustive when applied to coin finds[49]. Therefore, the following definitions were used to define the type of coin layout[50]:

- *residual*.
- *circulating residue* (i.e. false residue).
- *circulating* (i.e. *in-phase*, the find whose chronological span falls within the period of formation of the hoard).
- *dating* (i.e. the earliest *in-phase* find that contributes to the absolute chronological definition of the archaeological deposit).
- *intruder* (i.e. the find whose chronological span is definitely later than the formation of the archaeological deposit).
- *non det*. (i.e. *not determined*, the find that cannot be identified due to its state of preservation and, therefore, cannot be dated).

It is worth noting (and hardly surprising) that, at the level of archaeological analysis, the state of a coin of the same series/issue can vary according to the context of its discovery.

Moreover, the combined consideration of the archaeological data provided by the *PARP:PS* surveys and those found in the extra-urban sanctuary of Fondo Iozzino[51] allowed us to consider another interesting factor related to the interpretation and function of the coins found, as illustrated in (Fig. 9).

Starting from the assumption that every find (monetary and non-monetary) is the result of a deliberate or accidental event that occurred in the past, it must be remembered that the data relating to the cause of deposition (and, consequently, the recognition of the dynamic aspects of the coin) can only be obtained in the presence

[49] It is now well known that coins, because of their intrinsic and legal value, are among the most conservative elements of material culture; they can, of course, still constitute a valid *terminus post quem* for dating stratigraphy, but always in close comparison with all the other available elements, such as certain classes of pottery, which, because of their characteristics of low durability and subject to the tastes of the moment, can often provide a more precise chronology. The bibliography on the interpretation of coin finds is extensive, and reference is made to it for the kind of impact that numismatic finds from a multifaceted archaeological excavation can have on historical reconstruction. An early fundamental contribution to the value of monetary data as an archaeological source was made by Philip Grierson in two separate articles, see Grierson 1965, *Idem* 1966. See also Casey, Reece 1974, Casey 1986, esp. 68-113, Clarke, Schia 1989, *The Coin in Archaeological Contexts*, Sheedy, Papageorgiadou- Banis 1995, Saguì, Rovelli 1998 and Rovelli 2000. For new examples of the interpretation of coin finds in the light of archaeological contexts, see the contributions published in *Numismatics and Archaeology* 2018.

[50] Pardini 2017, pp. 31-33.

[51] The excavation, directed by Massimo Osanna, whom I thank for offering me the study of the coins, was carried out by the Archaeological Park of Pompeii between 2014 and 2018, see Osanna, Pardini, Pellegrino, Toniolo 2021, with bibliography above.

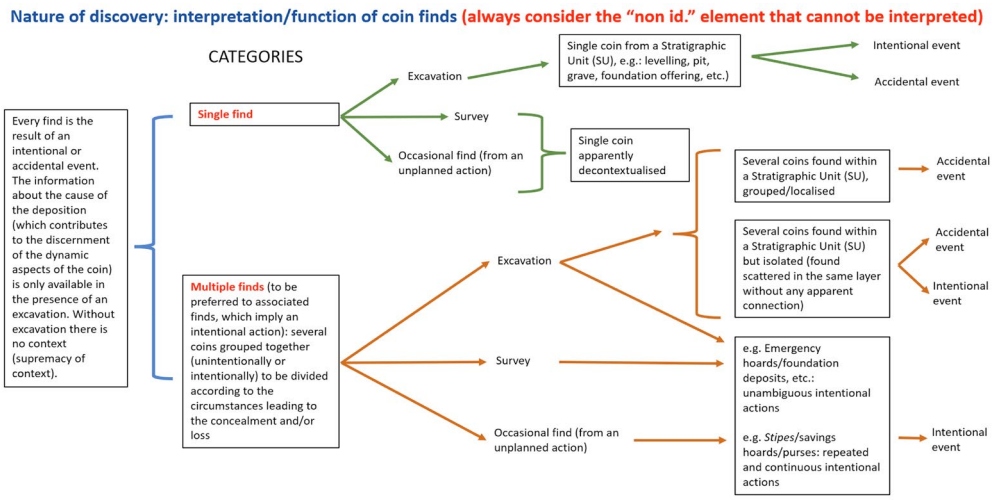

Fig. 9 - Classification of coin finds (elaboration G. Pardini).

of an excavation: Without excavation, there is no context; without taking into account the mode of formation and intended use of the stratigraphic units of discovery, the mode of distribution, the deposition/association of finds, and the relationships of coins within individual stratigraphies, it is not possible to develop a reliable exegesis. Obvious as it may seem, it is the supremacy of the context (often ignored or deliberately distorted in studies of monetary history based on excavated material) that must guide us in the interpretation of excavated coins and the reconstruction of the stories that this class of finds conceals.

Contexts have guided our study of the coin finds, in an attempt, for example, to bring order to the *vexata quaestio* concerning the Ebusus and Massalia coins found in Pompeii and their local imitations[52]. The systematisation of the reflections on the interpretation and function of the coin finds (see below), the information obtained from the Fondo Iozzino excavations and the precise analysis of the stratigraphic sequences, carried out in collaboration with the scholars working on the recomposition of the data from this excavation, and also taking into account the interrelationships between the different classes of material, the presence and absence of certain types of coins, the type of deposit and the contextual analysis of the materials found there, have made it possible to propose - for the first time on a solid basis - a chronology for the arrival of the coin from Ebusus (between the end of the 3rd and the early years of the 2nd century BC and not around the years 150 or 140/130 BC, as some have claimed on the basis of assumptions and suggestions only supported by meager

[52] On this subject, see Pardini 2017, pp. 172-183.

Fig. 10 - User interface of the Paestum Coin Finds portal, main page of the general access.

stratigraphic data[53]) and Massalia (from the second half of the 2nd century BC) in the *ager vesuvianus* and confirm the proposed chronologies for the beginning of the local production of imitation coins to the years 130/20 BC[54].

The reflections based on the concrete examples just mentioned, without forgetting the methodological experience gained at the sites in Rome (NE slopes of the Palatine and *Meta Sudans*[55]) or the reflections developed during the study of other important coin collections (Naples, Velia or San Casciano dei Bagni), experiences characterised by an effective and continuous collaboration between different disciplines, have allowed us to re-examine some issues related to the classification of coin finds that have already been raised in the past but, in our opinion, have not been sufficiently studied.

[53] Frey-Kupper, Stannard 2019 with previous bibliography.

[54] See the author's preliminary contribution in Osanna, Pardini, Pellegrino, Toniolo 2021, pp. 203-207.

[55] Sincere thanks are due to S. Zeggio with whom the author has had fruitful discussions over time on methodological issues, from excavation to the study of materials.

We refer, for example, to Philip Grierson's proposed classification and subdivision of monetary finds into three categories ('accidentally lost coins', 'hoards' and 'excavation finds')[56], which is no longer satisfactory in the current state of research, since the three categories overlap (their discovery can be due to accidental circumstances as well as planned research, be it excavation campaigns or survey activities) and concern the moment of interpretation rather than the type of coin find.

In this sense, it may be more correct to go beyond Grierson's definition and propose the categories of 'single find' and 'multiple find' (to be preferred to 'associated find', which implies and requires a deliberate action) for the correct interpretation of coin finds. Both, as highlighted in (Fig. 10), can encompass the different occasions on which the find was made (excavation, survey, accidental find, the latter to be understood as an event triggered by an unplanned action). Once we have identified a category to which our new finds belong, thanks also to an analysis of their context (at this stage in a broad sense), we can interpret and explain their nature and function.

Giacomo Pardini

A DIGITAL MANAGEMENT MODEL FOR COINS FROM PAESTUM[57]

The numismatic documentation of Paestum represents a privileged case study for the design of virtual systems for the specific management of numismatic records. The Archaeological Park of Paestum preserves a remarkable number of specimens from excavations carried out in and around the ancient town, as well as contextual and archival documentation. For decades, the Numismatics chair of the University of Salerno has been analysing the specific features of these finds. In fact, the University has always been a leading partner in archaeological and numismatic research in Paestum, where research activities continue to this day[58].

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[56] Grierson 1975, pp. 124-138.

[57] The results of the project presented here have been achieved thanks to the active support of the Archaeological Park of Paestum and Velia. I would like to thank the Director, T. D'Angelo, and her predecessor, G. Zuchtriegel, and the staff, M. Boffa, G. Capo, G. Manzo, T. Marino, F.U. Scelza and D. Rossetti, for their constant collaboration. I would also like to thank R. Cantilena and G. Pardini of the University of Salerno and A. Ferrighi and M. Piccininno of the Fondazione Scuola per i beni e le attività culturali. Also collaborating on the project were students A. Tedesco and O. Vynarchuk from the University of Salerno and E. Levrieri and L. Solazzo from the Academy of Fine Arts in Naples, to whom my gratitude goes.

[58] For a summary of the numismatic research on Paestum to date, see Ebner 1970, pp. 19-44; Crawford 1973, pp. 47-109; Crawford 1976-77, pp. 151-159; Cantilena, Pellegrino, Satriano 1999, pp. 9-154; Cantilena, Pellegrino, Pantuliano, Satriano 2003, pp. 25-156; Cantilena 2010c, pp. 685-732; Cantilena 2011, pp. 15-28; Carbone 2012, pp. 253-260; Carbone 2014; Carbone, Grimaldi

As far as the coin surveys are concerned, they have recently been enriched with the experimentation of a pilot project called 'DiP_Coins - Digital Paestum Coins', which has allowed the testing of a model for the integration and use of numismatic documentation, and the conception of a thematic portal for the 'Coin Finds Hub - Italy. Coin Finds in Italy' project, named 'Paestum Coin Finds'. This also includes the enrichment of the Hera digital catalogue, promoted by the Archaeological Park of Paestum and Velia, and other international systems configured according to the framework defined by Nomisma, one of the most active international networks for the description and online sharing of numismatic data.

THE NUMISMATIC HERITAGE OF THE NATIONAL ARCHAEOLOGICAL MUSEUM OF PAESTUM.

Thanks to the research carried out in the past, it is now possible to systematise a whole series of data on coins that have been collected since the systematic surveys carried out in the urban area since the beginning of the 20th century.

In addition to the few pieces found during the early research in the area within the walls, the bulk of the medal collection of the Museo di Paestum is made up of a large number of pieces found during the excavations of the Fascist period, still in the urban area and in the area of the sanctuary of Hera Argiva at Foce Sele.

Most of the coins, however, were found during the great excavations of the 1960s and 1970s, when research was also carried out in the necropolis areas[59]. The excavations carried out in the following years and up to the present day by various research groups, including teams from France, Germany, the Universities of Naples 'L'Orientale' and 'Federico II' and, of course, the University of Salerno, continue to add to the wealth of information on the coin finds.

In detail, over 8,000 coins are currently preserved in Paestum, mainly from the urban area, with smaller quantities from the necropolis and the sanctuaries outside the city (in particular Santa Venera near the walls and the Heraion at Foce Sele). Of these, 5,125 have been restored over time, while a further 3,200 await cleaning and consolidation.

2014, pp. 92-97; Cantilena, Carbone 2015; Carbone 2017, pp. 443-450; Debernardi, Carbone 2018, pp. 305-314; Cantilena 2020, pp. 407-414; Cantilena 2022, pp. 201-222; Carbone 2022, pp. 223-250; Carbone 2022a, forthcoming. For the analysis of the Sallusto collection, which includes many coins from Poseidonia-Paestum and is probably also composed of material found *in situ*, see LIBERO MANGIERI 2006; other coins from the private collection of R.B. Witschonke are described in Carbone 2022b forthcoming.

[59] For the Spinazzo necropolis see Prisco 1980-81, pp. 23-56; for those of Licinella and Gaudo see Sestieri 1967, p. 185; for Santa Venera see Scafuro 2019, pp. 56, 62-63, 80, 152. On the same subject see also Sallusto 1971-72, pp. 57-71.

More problematic is their documentation, as only roughly 2,600 of these have a complete catalogue card compiled according to the standards of NU Card 3.00[60], while about 1,100 are inventoried only with initial paper documentation[61].

The data on the number of coins from the Paestum area are, however, partial, for two main reasons. The first, because other hoards of coins from Paestum are kept in other institutions, generally brought there before the creation of the museum. This is the case of some small silver hoards that are now in the Medagliere of the National Archaeological Museum in Naples[62], some coins from excavations carried out by the Salerno Provincial Authority[63] or that are in the Salerno office of the Superintendency, waiting to be returned to Paestum after the reorganisation of the competences. The second reason is related to the existence of many other coins with contextual material that has not yet been published. This is therefore a figure that has gradually increased over the years and is destined to continue to do so.

Looking only at the details of the quantitative data, which are useful for at least a synthetic knowledge of the finds, we find that gold coins are very rare (only three specimens[64]), coin finds are generally of single bronzes, apart from a hoard of about thirty Paestum semisses edited by Annalisa Polosa[65].

There are quite a few silvers, although this figure has to be weighed against the analysis of the hoards. Of the 1,400 or so coins in this metal, just under 1,000 are from hoards, and in particular 646 - just over half the total - are from a single hoard of Augustan coins[66].

Indeed, while there are many individual finds, a significant number (around 15%) are in precious metal[67].

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[60] Arslan 2004.

[61] The first inventories were carried out first by F. Sallusto, at the request of the then Superintendent M. Napoli, and then by G. Libero Mangieri as an official of the Salerno office of the Archaeological Superintendency.

[62] These are the hoards IGCH 1876 (see Pozzi 1962-64, pp. 77-82), IGCH 1892 (see Pozzi 1962-64, pp. 82-90), IGCH 1893 (see Pozzi 1962-64, pp. 91-109; Kraay 1967, pp. 127-129).

[63] A preliminary study carried out in recent years, when coins from the Paestum area were still stored in the storerooms of the Museo Archeologico Provinciale di Salerno, made it possible to identify coin cores from the Villa Salati area and other areas within the walls.

[64] These include a gold stater from Lampsaco (see Cipriani 2012, p. 104; Cantilena 2017, 323-327); an aureus of P. Clodius M.f. and an aureus of Augustus (see Carbone 2016, p. 101).

[65] Polosa 2000, pp. 113-117; Carbone c.d.s. To these must be added the recent discovery in the deposits of two other small hoards - probably from the excavations carried out in the Licinella area in the 1930s - consisting of bronze coins, still with the jar in which they were contained, which is currently being restored.

[66] Cantilena 2000.

[67] Cantilena 2000; Debernardi, Carbone 2018, pp. 305-314.

If we analyse the overall data - which is purely quantitative - according to series, it is not surprising that a large number of attestations come from Poseidonia-Paestum, a mint which in any case had a discrete productivity and continuity[68].

Less than half of the base metal coins can be traced back to Greek issues, generally from other cities of Magna Graecia, being mainly bronzes from the nearest centres, including Velia.

As far as Republican coins are concerned, there are less than 1,000 specimens, most of which come from small hoards: in addition to the Augustan hoards mentioned above, there are two victoriati hoards from the so-called Ara Basilica[69]. As for the Republican bronze currency, it seems to be very scarce among the circulating currency, a fact that has already been linked to the abundant production of Paestum bronzes between the 2nd and 1st centuries BC[70].

The number of later series is much higher, with a good concentration of coins from the mid imperial period[71]. Given the history of the city, the scarcity of Late Antique coins is not surprising, as are all the later series, which, although they testify to a continuous occupation of the area, are weak indicators of the gradual abandonment of the site and the military events that affected the area[72].

It should be noted, however, that a large number of coins are of uncertain attribution due to their poor state of preservation and limited legibility. Many of them are awaiting restoration work and, given their specificity, especially with regard to module and weight, they seem to belong mainly to the last bronze issues of Poseidonia or Paestum semisses and quadrants. This would complement the attestation of coins produced by the municipal workshop.

In fact, a comparison with the data from nearby Velia would suggest a greater quantity of local coinage, and perhaps a future restoration of this material will increase this number.

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68 Carbone 2014; Cantilena, Carbone 2015.

69 Debernardi, Carbone 2018, pp. 305-314.

70 Carbone 2014; Carbone 2017, pp. 443-450.

71 Cantilena, Pellegrino, Pantuliano, Satriano 2003, pp. 25-156.

72 Recent research on the Paestum material has made it possible to detail the post-classical material and to enrich what has already been identified (see Sallusto 1969-1970, pp. 247-251). To date, the finds from the urban area and from the Heraion of Foce Sele show concentrations from the Swabian and Aragonese periods. Only in the Heraion have coins of the Byzantine series been found; here the finds testify to a continuous occupation from the 10th to the 19th century, while the area within the walls shows more significant concentrations, albeit with some gaps in the documentation. There is also evidence of modern times and, in particular, Bourbon coins from the most recent phases of the site (see Carbone 2022, pp. 223-250).

THE 'DIP_COINS - DIGITAL PAESTUM COINS' PROJECT

Given the volume and the specificity of the material to be discussed, a project has been designed to update and enrich the documentation of these finds, proposing the creation of a tool to link the digital catalogue of the Park to the pilot thematic project on Paestum for the *Coin Finds Hub - Italy* portal (Fig. 11).

This was possible thanks to the support of the Foundation for Cultural Heritage and Activities - a direct emanation of the Ministry of Culture - and the collaboration of the partners involved in the main project Coin Finds Hub - Italy. In this way, after formalising a comprehensive collaboration between the University of Salerno, the Archaeological Park of Paestum and Velia and the Foundation, a collaborative network has been set up, sharing the same need: to know, manage, analyse and document - digitally - the numismatic heritage of Paestum.

Both the University and the Paestum Park have created their own digital structures, so it was necessary to consider how to make them interact and provide data also to those platforms that use other languages, as in the case of those based on the ontology promoted by the working group belonging to the Nomisma.org project.

The network created was formalised through a series of agreements resulting from the framework agreement within the *CFH* project. Thanks to the willingness of the partners, and in particular the support of the Foundation for Cultural Heritage and Activities, it has been possible to plan three activities that are fundamental to achieving the objectives set: the creation of scholarships for young scholars with a degree in numismatics, the purchase of tools and equipment for the restoration and conservation of coins, and the creation of content for communicating the museum's numismatic heritage and this project in particular.

The Foundation's mission includes three actions, i.e. training *in the first place*, but also the development of useful tools for the conservation and the communication

Fig. 11 - Example of a specimen (Stater of Poseidonia, inv. 22-M267-1-166) traced back to its provenance thanks to the reconstruction of the restoration and conservation activities.

of the heritage itself; there is a fourth action in the hands of the University, which coordinates the whole, linked to the scientific research of these materials, i.e. the coins held by the Archaeological Park of Paestum, promoting their comprehensive protection and valorisation.

The DiP_Coins project[73] was planned in three stages: a first stage for the recovery of past documentation; a second for the restoration of new materials, the updating of old records and the cataloguing of new specimens; and finally, the design of the Paestum Coin Finds platform and the gradual input of data into the Hera Catalogue, the digital catalogue of the Park.

More specifically, the recovery of the documentation involved both the transfer of the paper files produced by the previous study and documentation activities, and the recovery of all the additional documents useful for reconstructing the biography of the 'coin object', such as labels, envelopes, tags, cataloguing notes, etc.

These are the catalogue cards where the recovery of historical documentation has been combined: they are mainly subaccounts and inventories that follow the formation of the collection, describing its various compositions and competences. This operation is necessary to reconstruct the history of individual objects, tracing their path from the moment of their discovery to their present location: this is the case, for example, of materials from the suburban necropolises and materials from the Heraion of Foce Sele (Fig. 12).

The second stage involved the restoration and updating of the catalogue. The restoration was made possible thanks to the Park's involvement of two students from the Academy of Fine Arts in Naples, with whom a specific work plan was drawn up. Two restorers specialising in metals were able to perfect their skills in the restoration of coins from the two contexts under study, the so-called Roman Garden and the *Athenaion*[74].

The first step in the process of recovering past documentation was to convert the paper records to digital form. Previous catalogues in RA format were updated according to NU 3.00 standards.

The new data sheets have been converted into .csv format according to the structured model for uploading to three reference portals:

- Paestum Coin Finds, the thematic portal of the main project Coin Finds Hub – Italy.
- Hera, the digital catalogue of the Park in web-gis format.
- platforms using Nomisma's ontology.

[73] For an overview see Carbone 2022.

[74] Restoration and cleaning work was carried out on two-coin cores characterised by the presence of a self-passivating patina, typical of the alteration of copper over time. In some cases, particularly in the case of silver or silver alloy coins, the presence of material indicative of previous restorations was noted, such as resinous patinas for protective purposes and adhesives for the adhesion of fragments.

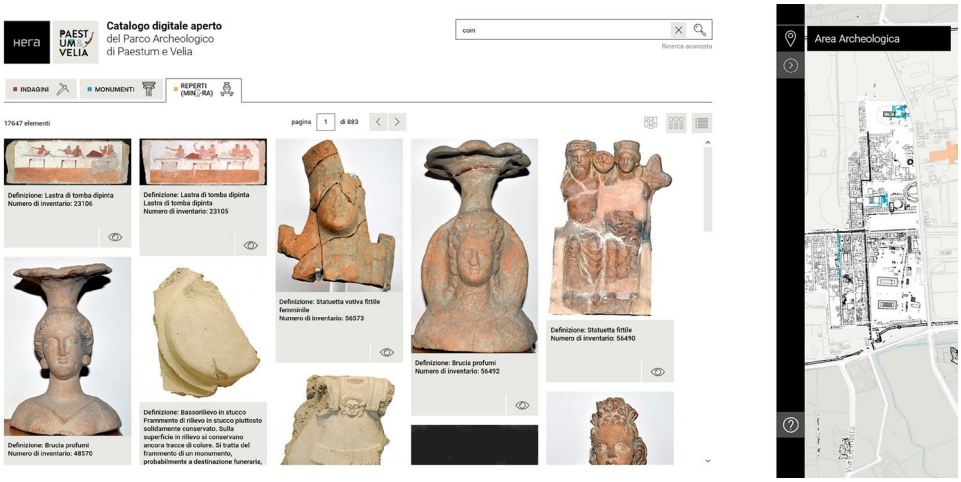

FIG. 12 - HERA System user interface, main screen of the general access.

Therefore, once the archive documentation had been retrieved and - after a cataloguing update - the previous storage of the objects had been converted, a first model platform was created and used for a preliminary test.

THE HERA DIGITAL CATALOGUE

This is the Park's digital catalogue, structured on the basis of a web-gis platform, which collects data on the contexts, finds and monuments identified during research in the Paestum area; a shared digital system that allows the management and consultation of finds, documents and images relating to the archaeological heritage within the Park's jurisdiction[75].

This tool has many potentialities, in particular the possibility of geo-referencing all the described finds and associating them to a specific in-depth sheet, with all the necessary information set according to the ICCD standards. The graphical interface, structured to be user-friendly for the end user, facilitates consultation and study activities. Everything is positioned within the same cartographic system used for the numismatic portals of the Nomisma network, and in particular for those using the Numishare[76] software, namely the Leaflet application.

[75] A summary of the methodology and approach of the Hera Digital Catalogue can be found in ZUCHTRIEGEL, SCELZA, AUCI, DE VITA, 2022.

[76] This is an open-source suite of applications for the digital management of archaeological objects, with a particular focus on numismatic objects. The software is developed and maintained by the American Numismatic Society, which first used it to create its online database (<https://numishare.

The Hera system is therefore able to return data on contexts, placing them on up-to-date cartography and attaching the relevant graphic, descriptive and bibliographic documentation. It also includes data on movable and immovable evidence, be it more or less manifest monuments, but also the material culture originating from them. It is the practical application of a cultural operation that falls under the principles of 'public archaeology', making archival data, excavation reports, restoration work and cartographic elements accessible to all. This provides the tools to initiate a process of knowledge and identity building, generating processes of interpretation at several levels: from the interested user's access to individual finds to the needs of scientific research[77].

From a GIS perspective, the Hera Catalogue consists of two integrated interfaces, i.e. a schedographic and a cartographic component. The first takes into account all the documentation of the materials and proposes their subdivision into categories. There are currently more than 27,000 items catalogued according to the ICCD standards. These include plans and documentation of a scientific and administrative nature, as well as a bibliography, photographs, details of mobile finds and archaeological reference surveys. In addition, the maps that make up the documentary part can be modified, exported and added to by those who are authorised to work within the structure.

The second interface is of a cartographic nature, implemented precisely through a georeferenced computerised map of the ancient city and fully updatable through the addition and superimposition of further documentation from multi-scalar and multi-temporal supports, such as surveys, cadastral maps, regional technical maps, etc.

The integration of the two components of the catalogue makes it possible to digitally reconstruct the contextual link between the finds, and therefore the coins, and the places and events of their discovery. In this way, it is possible to reconnect this class of material with the research that produced it and with the documentation relating to it.

INTEGRATION WITH THE NOMISMA NETWORK

In addition to the integration with the Hera catalogue, it was also possible to test the integration with the Nomisma.org network platforms. Some of these platforms are already structured as thematic portals and can easily integrate the data produced by the DiP_Coins project. These are, for example, the thematic projects on Greek treas-

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blogspot.com/>). The application architecture is based on XML and coins are described in an XML adaptation of NUDS, the Numismatic Description Standard (<http://nomisma.org/nuds>). Other materials are described and coded in VRA Core 4.0.

[77] More information about the project and the descriptive ontology can be found at <http://www.nomisma.org>.

ures[78], on Republican[79] and Imperial age[80], on Republican[81] and Imperial coinage[82], as well as provincial issues[83] including the latest Paestum mintings.

In this case, it was possible to import the records of the Paestum coins using the same data set as for the import into the Hera catalogue. This was achieved thanks to the semantic alignment provided by the Coin Finds Hub - Italy project, which correlates the terms provided by the NUDS (Numismatic Description Schema) with those of the national NU 3.00 standards. In addition to these fields, specific ones have been added for the collection of contextual data, sometimes known for coins from Paestum.

In the specific case of these coins, it was also necessary to integrate data from other portals managed by a large and specialised network in order to implement a preservation strategy for the data itself. The sharing of datasets on portals related to different projects and also based on different ontological models, although communicating, will allow the integration and medium-term preservation of the information transferred.

In addition, the possibility of having a freely accessible information base makes it possible to use all this also for third-party projects, with a view to disseminating the results of scientific research and reusing them for the creation of new knowledge processes.

Federico Carbone

78 Inventory of Greek Coin Hoards (IGCH): <http://coinhoards.org/>.

79 Coin Hoards of the Roman Republic (CHRR): <http://numismatics.org/chrr/>.

80 Coin Hoards of the Roman Empire (CHRE): <http://chre.ashmus.ox.ac.uk/>.

81 Coinage of the Roman Republic Online (CRRO): <http://numismatics.org/crro/>.

82 Online Coins of the Roman Empire (OCRE): <http://numismatics.org/ocre/>.

83 Roman Provincial Coinage online: <http://rpc.ashmus.ox.ac.uk/>.

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