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(WITH AN APPENDIX BY DANA ASHKENAZI AND YESHU DRAY)

A NEW CLASS OF 'UNILATERAL' FRAMED ROMAN BASE METAL COINS?¹

PLATES 4–9

Recently two pseudo medallions consisting of orichalcum coins of the emperors Domitian (81–96 CE) and Trajan (98–117 CE) respectively, which are mounted in decorated 'uniface' frames, turned up in the market. They seem to belong to a hitherto unknown class of numismatic objects. Technically the two specimens are evidently related to each other, but at the same time clearly set apart from all Roman medallions and pseudo medallions documented up to now: in both cases the frames cover the reverses of the coins and are plain on the back, thus conferring a unilateral appearance on these newly discovered objects. The purpose of this paper is to briefly present them and discuss some of the questions associated with them, both from a numismatic and a technological point of view: both specimens underwent extensive metallurgical analyses, both non-destructive and invasive (as documented in the appendix below), which were instrumental in reconstructing their manufacturing process and original appearance.

Description

A Israel Museum, Jerusalem. Inv. no. 2005.50.24592 (*Figs. 1–2*)

Cast round base metal casing. Maximum diameter 40.3 mm, maximum thickness 6.8 mm, weight 58.89 g.

The back is slightly convex, with a drilled hole at the centre. The upper side is structured by five concentric raised circles. The inner, the middle and the outer circle are decorated with chisel marks, giving them a beaded appearance (see the appendix for details). In the centre, an orichalcum coin is inlaid in a circular cavity of the base metal disk.

The coin is an orichalcum semis of Domitian, struck in Rome in 85 CE. It is somewhat corroded but only slightly worn.

¹ The authors would like to thank R. Abdy (London), M. Amandry (Paris), R. Ashton (London), E. Deschler-Erb (Cologne), M. Fernandez (Augst), J.-P. Fontanille (Quebec), H. W. Horsnæs (Copenhagen), K. Siegl (Vienna), R. Traum (Vienna) and K. Vondrovec (Vienna) for help in the preparation of this paper.

Obv.: IMP - DOMIT AVG - GERM COS XI

Laureate bust of Apollo, draped, r.; to r., branch.

The reverse type of the coin can be determined by studying X-ray photos of the object, which show slight traces of a horizontal structure. The obverse type with Apollo's bust occurs in combination with three different reverse types on semisses of Domitian: a lyre (RIC II.1, second ed., 310), a tripod (RIC II.1, second ed., 312) or a raven, standing r. on a branch, SC in exergue (RIC II.1, second ed., 314). The latter is the only type which would not be completely obscured by the bust of Apollo on X-ray photos, if we assume a die-axis of 6 o'clock for the piece, as is usual for Domitian's imperial coinage. RIC II.1 (second ed.) 314 also happens to be the most common of the three types, and several semisses with the raven struck from the same obverse die as our example are attested, see e.g. figures 3–4². So there can hardly be a doubt that our coin also bears the raven reverse.

B Private collection, ex Hirsch 303 (25 September 2014), no. 3270 (*Figs. 5–6*)

Cast round base metal casing. Maximum diameter 40.3 mm, maximum thickness 5.7 mm, weight 48.99 g.

The back is slightly convex, but does not have a central hole. The upper side is structured by four concentric raised circles of different widths: the two outer ones are narrow (and rather shallow), the third one is broad; the innermost circle is beaded. A coin is inlaid in a circular cavity in the centre of the base metal disk.

The coin is a specimen of the largest orichalcum denomination of Trajan struck in Rome in 116 CE for circulation in Syria (*cp. Fig. 7*)³. These coins do not fit the imperial denominational system: they are smaller and lighter than imperial orichalcum dupondii and therefore have been thought to represent brass asses, although this is not certain⁴. The coin is considerably worn, more so than the surrounding frame.

Obv.: [IMP CAES NER TRAI]ANO OP[TIMO AVG GERM]

Radiate bust of Trajan in paludamentum, seen from the side, r.

Only one reverse type occurs with this obverse: SC in wreath; DAC PARTHICO P M TR POT XX COS VI P P around (WOYTEK 2010, no. 937v; RIC II Trajan 647). Due to its circular composition the reverse design is not clearly detectable on X-ray images.

² Cayon, 16 May 2012, no. 4323 (*Fig. 3*); Marti Hervera / Soler & Llach 1086, 30 April 2015, no. 2761; Hirsch 326, 16 February 2017, no. 1932 (*Fig. 4*); they all share the same reverse die. Lanz 32, 29 April 1985, no. 473: same obverse, but different reverse die.

³ For the attribution of this group to Rome, see CARRADICE – COWELL 1987; *pace* METCALF 1977 (Antioch).

⁴ On the problem of nomenclature, see WOYTEK 2010, p. 172. The series is discussed by BUTCHER 2004, p. 410 f. and McALEE 2007, p. 193 f. and 212–215. See also the section on «Geographical and chronological aspects» below.

Provenance and the question of authenticity

The medallion integrating the Domitian coin was purchased by the Israel Museum in 2005 from a local dealer. The precise provenance of the piece is unknown. However, the dealer who sold the medallion to the museum claimed that it was found in Israel.

The medallion incorporating the Trajan coin was acquired in the auction sale Gerhard Hirsch Nachfolger (Munich) 303 (25 September 2014), no. 3270. It presented heavy encrustations especially on the reverse that were since removed by a conservator. The provenance of the piece is unknown.

The two objects were carefully studied in Basel by all three authors of this article. On visual inspection, both objects seem unquestionably ancient in all their parts: both the coins and the frames appear to be authentic; also, the coins seem to have been mounted in antiquity. There are no indications whatsoever that we might be dealing with modern forgeries. This impression was fully confirmed by the metallurgical analyses, see the appendix.

The relationship of the objects to other classes of Roman medallions and pseudo medallions

The two main contributions of 20th century numismatic scholarship to the study of Roman imperial medallions are the monumental catalogue by Francesco Gnecci (in three volumes)⁵ and the monograph by Jocelyn Toynbee⁶. Both are indispensable for research: while Gnecci's work provides the most complete collection of the material published to date and is profusely illustrated, Toynbee's book focuses on the interpretation of the medallions. She not only gives a concise overview over their typological development, but also offers a judicious in-depth analysis of key aspects like the purpose of medallion issues⁷ and their geographical distribution within the Roman empire. More importantly in the present context, Toynbee also carefully considered the classification of medallions and related objects and was most attentive to terminology: especially in this field she made huge advances over Gnecci's treatment. Toynbee is responsible for the basic definitions of the various classes of medallions (and related pieces) currently regarded as orthodox. She distinguished «medallions proper» – the bronze pieces of fine style and special typology that normally lack the letters SC and are sometimes struck on bi-metallic flans or set into rims –, «money medallions» in gold or silver (in German called «Multipla») and «pseudo medallions»⁸. This latter class comprises different sub-categories. Firstly, it includes pieces struck from normal coin dies, but on significantly larger flans than the denomination for which the dies were produced would have required – for example sestertius-sized flans struck with dies for middle bronzes, or broad and thick medallion flans

⁵ GNECCHI 1912.

⁶ TOYNBEE 1986 (originally published 1944).

⁷ On this problem, see also CLAY 1976.

⁸ TOYNBEE 1986, p. 17.

struck with sestertius dies⁹. Secondly, Toynbee fittingly used the term «pseudo medallions» for ordinary coins that were «medallised» by setting them into ornate frames (*Fig. 8*). She stressed that while «pseudo medallions» are attested up to the mid-third century CE – a good early third century example is the framed sestertius with Geta's portrait depicted by us¹⁰, they are «essentially a feature of the early imperial period», from Augustus to Hadrian: «their chief part was played before the history of bronze medallions proper seriously begins»¹¹. There can be no doubt that Toynbee's interpretation, according to which all the early «pseudo medallions» were products of a phase of experimentation and «precursors of the true medallion», is correct¹². In an article published in the same year as the first edition of her monograph, Toynbee also explored the world of Roman provincial coinages for medallion-like objects¹³. While most of the large bronzes struck in the east normally are classified as coins of higher denominations with a fixed transactional value, and not as mere presentation pieces¹⁴, Toynbee still was able to isolate very few pertinent provincial groups, for example the large bronzes – often of a particularly fine style – struck in honour of Antinous in various cities of Greece and Asia minor¹⁵. There are also rare occurrences of such large Antinous pieces being set into broad frames, which underlines their medallic status¹⁶. However, in her short survey, Toynbee did not take into account all the evidence for provincial medallions available in her day¹⁷; unsurprisingly, even more evidence has come to light in the meantime¹⁸, although in a global perspective pieces that may be called provincial «medallions» remain very rare, as compared to imperial ones.

Among the imperial medallions proper, Toynbee also discussed a small subgroup of uniface specimens; the relevant passage of her book deserves to be quoted in full: «There remains a small and mysterious group of large bronze pieces to be considered, the unilateral medallions, so called from their blank reverses, but corresponding to the large medallions proper in size of diameter and thickness of flan, in the scale of their weights and in the style and technique

⁹ For specimens of this kind, the German technical term «Abschlag» is frequently encountered.

¹⁰ Cp. GÖBL 1978, vol. 1, p. 30: «Durch mehr oder minder prunkvolle Fassung [...] konnte an sich jede Münze zu einer Art Medaillon werden.»

¹¹ TOYNBEE 1986, p. 25.

¹² TOYNBEE 1986, p. 25.

¹³ TOYNBEE 1944.

¹⁴ TOYNBEE 1944, p. 65; see also GÖBL 1978, vol. 1, p. 30. For a more nuanced view see JOHNSTON 2007, p. 144, note 231, and p. 152, note 250 (who surmises that large «commemorative prestige pieces» may have been produced in the provinces, which however were «brought into circulation» later). See also BENNETT 2014, 50 («local interpretations of imperial medallions»).

¹⁵ TOYNBEE 1944, p. 65 f.; on these pieces see the classic contribution by BLUM 1914, now reprinted in full in PUDIL 2014, p. 115–159.

¹⁶ See RPC III, 1093/5 (Nicomedia) and 3297 (Tarsus). On framed Roman provincial coins (and «medallions») in general, see WOYTEK (in preparation), based on a paper given at the XVth International Numismatic Congress in Taormina in September 2015.

¹⁷ For example, reference to BAHRFELDT 1935 (a spectacular framed piece of Nicaea struck under Antoninus Pius) is missing.

¹⁸ See, for example, THOMPSON 1977 and PAUNOV 2016 (Pautalia, Antoninus Pius) and KOS 1992 (Viminacium, third century).

of their obverse portraiture. Some of these, although recorded as unilateral, were obviously not so originally: sometimes [...] the reverse design has been scraped off or has virtually disappeared through wear. But others are genuinely unilateral. They have smooth, polished backs, sometimes slightly concave or ornamented with a central boss: they show no sign of having ever received a reverse type. Of the various explanations offered to account for these unilateral pieces – that they were «proofs» or experiments for obverse dies, samples of their work submitted by medallists competing for posts at the mint or specimens of imperial iconography destined to serve as models for provincial issues – none are really conclusive or wholly satisfactory. They remain a problem as yet unsolved¹⁹.» However, having stated this, Toynbee immediately put forward a not unconvincing interpretation of her own, viz. that these uniface specimens «were issued as presentation pieces of an experimental and quite exceptional type²⁰.»

Toynbee noted that she had personally examined unilateral imperial medallions of the period from Hadrian (117–138 CE) to Numerianus (283–284 CE)²¹. Production of such pieces indeed seems to have begun in earnest under Hadrian, but in fact there are several earlier attestations, too. The phenomenon of uniface strikes of large Roman aes coins as such may go back to the curious group of sestertii and middle bronzes with portraits of the young Nero, Britannicus and Agrippina minor, apparently produced in Thrace under Claudius²². Already in the corpus of these coins by von Kaenel, one holed uniface sestertius featuring a portrait of Agrippina the Younger on the obverse in the Vienna coin cabinet was included, although the unilateral character of the piece was not discussed there²³. While for this sestertius perhaps a case can be made that the reverse was artificially flattened or filed down²⁴, the occurrence of three further sestertii of this type with a blank reverse in the trade, without any traces of the reverse image (which should be a *carpentum*), in part from the same obverse die²⁵, is baffling (e.g. Fig. 9). On balance, it seems very unlikely that we are dealing with erasures on all pertinent coins of the Agrippina group, and thus with a (remote) parallel to the well-known case of large provincial bronzes issued in the name of Maximinus Thrax (235–238 CE) in some cities of Western Asia minor, on which the obverse featuring the imperial bust is often found completely erased, in the context of

¹⁹ TOYNBEE 1986, p. 20. Some of the explanations of these pieces alluded to by Toynbee are discussed by GNECCHI 1907, p. 38 and 41f.

²⁰ TOYNBEE 1986, p. 20.

²¹ TOYNBEE 1986, p. 20, note 10.

²² On this group see VON KAENEL 1984.

²³ VON KAENEL 1984, p. 141, no. A5 (Vienna, Kunsthistorisches Museum, Münzkabinett [KHM MK] inv. RÖ 38422: 26.64 g; 34.4 mm) and pl. 24, no. 29. The specimen was first published by GERIN 1913, in whose collection it was originally kept.

²⁴ Thus GERIN 1913: «ganz abgeschliffen», followed by Mattingly in BMC I, p. 195, note * («obliterated»). There may be some faint traces of filing visible on the reverse; the piece has been stripped of its patina.

²⁵ CNG Electronic Auction 50 (9 October 2002), no. 69 (26.13 g) = Electronic Auction 280 (6 June 2012), no. 130 (26.08 g); CNG Electronic Auction 274 (22 February 2012), no. 343 (24.37 g; from the same obv. die as the previous piece); CNG Electronic Auction 345 (25 February 2015), no. 459 (26.23 g).

the *damnatio memoriae* of the emperor²⁶: it is hard to see why the *carpentum* should have been expunged on several Agrippina sestertii. Rather, in the Thracian group some uniface sestertius strikes, just from obverse dies, may have been produced.

In the light of the numismatic evidence provided by subsequent reigns, this interpretation does not seem implausible. Already under Nero, the Roman imperial mint-workers experimented with uniface objects: several of Nero's unilateral obverse strikes from dies of different sizes (for middle bronzes and sestertii) have recently been assembled²⁷, one of which is on a very broad flan – perhaps even with a rim added to the edge – and may be termed a true forerunner of the uniface medallions²⁸. Seven years ago, a uniface sestertius strike with the portrait of Domitian turned up in the market (*Fig. 10*)²⁹. Finally, under Trajan, the history of the unilateral medallion proper begins. For his rule, not only a unilateral sestertius obverse strike is attested³⁰, but also a spectacular uniface specimen bought – and allegedly discovered – in Rome and published as early as 1905 by its first owner Giovanni Pansa (*Fig. 11*)³¹. This piece is to be dated to 100–102 CE. It was produced from an obverse die that is without parallel among sestertius dies as for its inscription and thus must have been engraved specifically for medallions.

Hence, as may be seen it would be perfectly possible to apply Toynbee's terminological distinction between «medallions» and «pseudo medallions», laid out above, to the unilateral material, too: uniface «pseudo medallions» would be specimens struck from coin dies, and uniface «medallions» would be pieces produced from dies specifically cut for them. In fact, a somewhat similar division of the unilateral material was already proposed by Francesco Gnecci in an important article, although his contention that these two classes of pieces may have had a different function hardly seems convincing³². In any case, the Trajanic «uniface medallion» mentioned above was struck on a solid flan that is grooved on the obverse, around the imperial image, giving the impression of a frame, and it has a smooth, slightly convex reverse. Especially the latter feature is characteristic of several specimens of the group of uniface medallions³³.

²⁶ Now conveniently assembled by CALOMINO 2016, p. 176–183 (with previous bibliography).

²⁷ SCHINDEL – WOYTEK 2011, p. 116 f. and pl. 13, nos. 15–18.

²⁸ SCHINDEL – WOYTEK 2011, pl. 13, no. 17 (Munich, Staatliche Münzsammlung: 31.81 g).

²⁹ The New York Sale 23 (6 January 2010), no. 152 = Hess – Divo 317 (27 October 2010), no. 860 (26.26 g).

³⁰ See WOYTEK 2010, no. 921 (DIVA AVGVSTA MARCIANA) = MITTAG 2012, no. Tra 16.

³¹ WOYTEK 2010, no. 920g = MITTAG 2012, no. Tra I; editio princeps: PANSA 1905. Discussed also by GNECCHI 1905 and GNECCHI 1907.

³² In his terminology, unilateral pieces from coin dies are test strikes, «prove di conio» (1907, p. 33–35), as opposed to «medaglioni unilaterali».

³³ Cp. GNECCHI 1907, pls. III–IV for an overview of the group. In the passage cited above in the text, TOYNBEE (1986, p. 20) refers to the uniface medallions as being «sometimes slightly concave», but this is not necessarily an error or a contradiction; both concave and convex specimens seem to be known (although convex ones are more frequent), see GNECCHI 1907, p. 38. MITTAG 2012, nos. Hadr 123–124 pictures Hadrianic specimens whose back is convex; for two such examples with the portraits of Sabina and Lucius Verus in Verona see SCHMIDT-DICK 1995, p. 696 f. and pl. 100, nos. 19107 and 19121 (both misidentified as modern fakes; the specimen featuring Sabina is erroneously classified as Marciana or Matidia); MITTAG 2012, p. 141 rightly argues in favour of the

Since uniface imperial medallions were first struck in somewhat larger numbers under Hadrian, it is not too surprising to find a few comparable one-sided specimens in the provincial issues of his principate, too. So far, six such pieces have become known, for four of which images of both sides are available: significantly all of them are large bronzes with the portrait of Antinous on the obverse that may be dated to the period 134–138 CE³⁴. This material is difficult to evaluate and classify. In any case, at least three of these four pieces do not seem to display any clear signs of the reverse having been erased, neither is any one of these three seriously underweight as compared to other (not unilateral) pieces of the respective groups, so that we may cautiously assume that at least three specimens are genuine uniface strikes and have not been tampered with after production³⁵. Also, while a disproportionately large number of modified coins and medallions with the portrait of Antinous have been identified³⁶, none of these three uniface Antinous medallions displays evident traces of having performed an identifiable secondary function, for example as part of a box-mirror³⁷. Since one-sided Antinous medallions have never been recorded systematically, it seems reasonable to list them here. We first list the three pieces that are here assumed to be genuine uniface strikes, then an uncertain example, and at the end the two pieces for which only images of the obverse are available.

1. Corinth, signed by Hostilius Marcellus: OCTIAIOC MAPKEAAOC O IEP[EYC TOY A]NTINOOY. Draped bust of Antinous right. RPC III, 260–262 (same obv. die). Paris, BnF, inv. AA GR 1355 (38.63g). Illustrated by PUDILL 2014, p. 100. (*Fig. 12*).
2. Mantinea, signed by Veturius (for the Arcadians): BE – TOYPIOC. Head of Antinous right. RPC III, 326 (same obv. die). Vienna, KHM, inv. GR 39193 (36.69g; 38.4mm). Listed by BLUM 1914, p. 38, no. 12. (*Fig. 13*).
3. Smyrna, from the issue signed by Polemon: ANTINOOC – [HPΩC]. Head of Antinous right. In the centre of the reverse a circle? Traces of silvering on the obverse? RPC III, 1978 and 1981 (our uniface specimen is from the same obv. die as the specimens depicted in RPC). NAC I (19 May 1999), no.

authenticity of the Sabina piece (although he mistakenly accepts the identification of the lady portrayed that was proposed by Schmidt-Dick).

³⁴ On the dating of the various coinages in the name of Antinous see BLUM 1914, p. 59 f.

³⁵ The effect of completely filing down the reverse of a coin on its weight may be assessed by comparing the weight of the Antinous bronze of Mantinea with a smoothed reverse in the collection of the American Numismatic Society in New York, ANS 1967.152.356 (33mm; also three small holes; for its pedigree, see RPC III, 328/5; the coin is illustrated by HEATH 2006, pl. 6, no. 3) of 10.15 g with the weights of the other 8 coins of the type known: they are between 24.42 g and 26.65 g. This piece of the ANS is not included in the group of six specimens mentioned in the text. See also the following note.

³⁶ See HEATH 2006, p. 67 for a convenient general listing of eleven modified pieces.

³⁷ Two box mirrors made from Antinous medallions are known, see HEATH 2006: ANS 2005.19.1 and JAMESON 1980, no. 442 (37.52 g) = Bank Leu 30 (28 April 1982), no. 369 (37.49 g). For Roman box-mirrors in general, see also MITTAG 1997, BESOMBES 1998 and DAHMEN 1998.

1965 (31.48 g) = Gemini 10 (13 January 2013), no. 569 (31.47 g) = H. J. Berk 195 (29 October 2015), no. 523 (31.47 g; 35 mm: «the reverse is blank, never struck, and was either a trial or set into a piece of furniture»). (*Fig. 14*).

4. Bithynium-Claudiopolis: H ΠATPIC ANTINOON ΘEON. Bust of Antinous right. RPC III, 1110–1114 (same obv. die: VON MOSCH 2001, die A). Copenhagen (35.72 g); SNG Cop. (Bosporus–Bithynia) 338 («rev. plain»), already described by RAMUS 1816, p. 266, no. Antinous 1 («Av. omnino extrita»). Listed by BLUM 1914, p. 43, no. 3 (who apparently takes it to be a genuine uniface strike, since he makes reference to GNECCHI 1907: «lisse et légèrement convexe») as well as VON MOSCH 2001, p. 126, cat. no. 22 and p. 110 (with note 4), who suggests that the reverse of this (and the following number) is simply «stark abgeschliffen» and who interprets these pieces as «Spielstein[e]» (gaming tokens). The Copenhagen piece is a little underweight as compared to the two-sided specimens of the respective types listed in RPC,³⁸ but on the other hand it appears worn and damaged. (*Fig. 15*).
5. Bithynium-Claudiopolis. From the same obv. die as the preceding piece (VON MOSCH 2001, die A). Münzhandlung Basel 8 (22 March 1937), no. 448 (32.11 g; 35.0 mm). Not listed by VON MOSCH 2001. No reverse image available.
6. Bithynium-Claudiopolis. From the same obv. die as the preceding piece (VON MOSCH 2001, die A). H. M. F. Schulman (New York), 6 June 1969 (T. O. Mabbott, part one), no. 1098 («cut down in modern times», «apparently used as an ornament»). Listed by VON MOSCH 2001, p. 126, cat. no. 23, and p. 110 (with note 4). No reverse image and no weight available.

For the large Antinous pieces of a medallic character, some of which are signed by individuals who were responsible for their production – as numbers 1, 2 (and 3) above –, an identification as special celebratory «issues, struck for such occasions as the annual ceremonies and four-yearly festivals, established by Hadrian at Mantinea in Arcadia in the dead hero's honour» was proposed³⁹. If this is correct, a distribution of the Antinous medallions in general at such festivals might be envisaged, and this should be true of the unilateral pieces of the group as well. By analogy, this may lend further credibility to the interpretation of unilateral imperial strikes as presentation pieces, too, as proposed by Toynbee⁴⁰.

But let us return to the two orichalcum objects that are presented in this article for the first time. It may be suggested that these coins set into large frames that cover the reverse and have a smooth back in some way represent a combination of the concept of the framed coin or «pseudo medallion», in Toynbee's terminology, with the concept of the unilateral «Abschlag» or unilateral medallion, as documented at the mint of Rome since the time of Nero and in the provincial area for the pieces of Antinous from Greece and Asia minor, listed above. Two physical

³⁸ RPC III, 1110: 45.23 g; RPC 1111: average weight 40.00 g; RPC 1112: average weight 44.19 g; RPC 1113: 43.62 g; RPC 1114: 44.78 g.

³⁹ TOYNBEE 1944, p. 66; cp. also BLUM 1914, p. 61 and BENNETT 2014, p. 94–96.

⁴⁰ TOYNBEE 1986, p. 20.

features of the newly discovered objects connect them with some of the imperial uniface strikes: the slightly convex back, which is in evidence on many imperial uniface medallions⁴¹, and the central depression on the back of the Domitian piece in the Israel Museum, which is familiar from the reverse of several imperial uniface strikes of coin dies⁴² as well as from a few unilateral imperial medallions⁴³.

As outlined above, «pseudo medallions» had come into being by the time of Augustus, and it is important in our context that small bronze coins were part of the phenomenon almost from the outset. Already under the first princeps, quadrans dies were used to strike oversized flans at the mint of Rome (see *Fig. 16*). What is more, such «medallised» quadrantes – sometimes struck on just slightly larger planchets than normally, but sometimes also on flans destined for asses – are attested all the way through the first century, as may be seen from the useful listing provided by Peter Mittag, who, however, decided to exclude these smaller pieces from his main catalogue and not to illustrate them⁴⁴. This approach was criticized in a review of Mittag's monograph by Johan van Heesch, who felt that these pieces should have been included properly and submitted that also «les plus petites dénominations peuvent constituer des émissions exceptionnelles destinées aux distributions par les autorités»⁴⁵.

Three most unusual small «pseudo medallions» with the types of Hadrianic semisses deserve special attention in our context. Two of them are of the same, rather uncommon type, with the emperor's portrait on the obverse and scales on a cornucopia on the reverse⁴⁶. Perhaps it is not a coincidence that the latter image combining the two attributes of Aequitas/Moneta has associations with the commercial or monetary sphere. In the review just cited, van Heesch illustrated an intriguing specimen of this type (not listed by Mittag) kept in the Vienna coin cabinet which exhibits a grooved frame. Typologically this frame provides an exact parallel to the frames in evidence on some medallions or «pseudo medallions» of larger modules (*Fig. 17*)⁴⁷. Characteristically, the frame is profiled not only on the obverse and reverse around the design, but it also has a groove along the edge – a feature well-known from larger framed coins and medallions⁴⁸. We are inclined to

⁴¹ See GNECCHI 1907, pl. III and especially IV.

⁴² See GNECCHI 1907, pl. I.

⁴³ SCHMIDT-DICK 1995, pl. 100, no. 19107; MITTAG 2012, no. Hadr 124.

⁴⁴ MITTAG 2012, p. 187–204: Aug(ustus) XI (Vienna, KHM MK, inv. RÖ 4858: 8.12 g, 10 h, 24.3 mm, *Fig. 16*), XII (Paris: GIARD 1988, no. 600), XV (trade); Cal(igula) II (Rom, Museo Nazionale); Clau(dius) I (London: BMC I, p. 189, note * and pl. 37, 8), II (Rom, Museo Nazionale); Nero I (trade); Tit(us) I (Paris: GIARD 1998, Titus no. 227); Dom(itian) VII (Paris: GIARD 1998, Domitian no. 538). For a quadrans of Claudius struck on an as flan that is not listed by Mittag see *Ars Classica* 15 (2 July 1930), no. 1401 = Glendining's 16 November 1950 (Platt Hall part 2), no. 1044, pictured by GÖBL 1978, vol. 2, pl. 26, no. 306A. On the medallised quadrantes in general see MITTAG 2012, p. 35, note 84.

⁴⁵ VAN HEESCH 2011, p. 284.

⁴⁶ STRACK 1933, no. 582; BMC III Hadrian 1275. Obv. legend IMP CAESAR TRAIAN HADRIANVS AVG, rev. legend P M TR P COS III, S-C.

⁴⁷ VAN HEESCH 2011, p. 285, figure 1; KHM MK, inv. RÖ 9765 (not 765 as indicated by van Heesch: 8.00g, 6h, 24.1 mm).

⁴⁸ See MITTAG 2012, p. 142, no. Hadr 1 («aussen profiliert»).

accept the piece as ancient and authentic, although the end of the obverse legend (after the HADRIANVS) presents some anomalies, and one cannot exclude with certainty that we are dealing with an early modern cast: however, if this is the case, it should probably be a cast after a framed original. Visual inspection of this unusual specimen has not enabled us to ascertain without doubt the production technique used for the frame, either, although the fact that on the reverse (and just on the reverse) the round of the coin is somewhat off-centre, as compared to the frame, seems to suggest that the dies were struck on a large unadorned blank that was secondarily grooved and embellished⁴⁹.

The authenticity of this unusual semis is perhaps also vindicated by the existence of a related piece with the same images, kept in Bologna and published in print⁵⁰. This second specimen is of a more modest appearance (*Fig. 18*). It was struck on a plain large flan that is almost double the weight of the piece in Vienna; in fact, one cannot even rule out the possibility that the Bologna specimen is a semi-finished pseudo medallion that was due to be grooved around the obverse and reverse designs after striking, but that in the end, for unknown reasons, remained undecorated and therefore looks quite crude. Be that as it may, the Bologna specimen comes from a different reverse die than the Vienna semis⁵¹.

The third medallic semis of Hadrian is known just from its appearance in an auction catalogue (*Fig. 19*)⁵². It belongs to a different type and bears the images most commonly encountered on Hadrianic semisses, referring to Jupiter, viz. an eagle with spread wings (in this case standing right, looking left) on the obverse and a winged thunderbolt on the reverse.⁵³ The description in the auction catalogue declares it a «curious but contemporary product» and adds that «it is possible that the flan is made of only one piece of copper⁵⁴.» Evidently a similar manufacturing technique was used for this specimen and for the Vienna specimen discussed above. However, at 17.08 g this eagle/thunderbolt piece is not only the heaviest of the three medallised Hadrian semisses, but it also has the biggest diameter: 30 mm, as compared to c. 24 mm for the piece in Vienna and c. 27 mm for the specimen in Bologna. Both on the obverse and on the reverse the frame is decorated with two concentric grooves.

⁴⁹ For this production technique used under Hadrian for medallions, see MITTAG 2012, p. 48–50, 142 and 149: the round of the medallions Mittag no. Hadr 1 and Hadr 19 is also clearly off centre on one side of each piece only.

⁵⁰ PANVINI ROSATI 1981, p. 104 f., no. 337 (14.30 g): «coniato su un tondello che ha il modulo di un asse o dupondio, ed è pesante quanto un dupondio»; «trattasi forse di prove della moneta».

⁵¹ The Bologna specimen was struck from the same reverse die as the London specimen pictured by Mattingly in BMC III, pl. 80, no. 11 and the specimen illustrated in Rodolfo Ratto, *Roma imperiale nelle monete di Adriano e di sua famiglia. Importante collezione specializzata nelle serie romana e coloniale*, FPL (Milano, no date [after 1930]), pl. 8, no. 750.

⁵² NAC 9 (16 April 1996), no. 864. Not listed by MITTAG 2012.

⁵³ Strack 1933, no. 579; BMC III, Hadrian 1278 f. Obv. legend IMP CAESAR TRAIAN HADRIANVS AVG, rev. legend P M TR P COS III, SC.

⁵⁴ NAC 9 (16 April 1996), p. 82. The illustration in the auction catalogue is just in black and white; the catalogue description states «good green patina». Consequently, it is not clear if the hypothesis that the piece is made of copper is correct.

These three medallised half-asses of Hadrian eloquently show that during the High Principate, «pseudo medallions» covered the entire spectrum of aes denominations, which extended from the sestertius down to small bronzes⁵⁵. Hence, these specimens are useful comparanda for the «uniface» framed orichalcum pieces of Domitian and Trajan presented here. However, it needs to be stressed that the diameter of the latter objects is about 10mm larger than the diameter of the largest framed semis of Hadrian known, viz. the eagle/thunderbolt piece in the coin trade.

All in all, one may conclude that there are some remote parallels to the two pieces we are presenting here, but that they essentially represent a phenomenon *sui generis*.

Geographical and chronological aspects

It is not easy to determine the geographical and chronological context of the two framed objects presented here, although the specimen in the Israel Museum is said to have been found in Israel, as mentioned above. Both pieces are evidently related from a technological point of view, and the similarities seem to suggest that we are dealing with a regionally and chronologically restricted phenomenon. The different detailing, however, is an argument against a common workshop. In any case, we are well aware that the hitherto limited evidence makes all assumptions very hypothetical for the moment.

The framed coins themselves do not provide decisive evidence regarding the place and date of production of the objects. Both are orichalcum coins belonging to relatively uncommon imperial aes denominations of the late 1st and early 2nd centuries. Semisses like the Domitianic coin (and equally quadrantes) were struck only intermittently and in smaller numbers than the more frequent asses, dupondii and sestertii in the High Principate. Although the main groups of Flavian quadrantes and semisses were put into circulation in Rome and circulated mostly, but far from exclusively within Italy⁵⁶, there is one group with particular typological features that seems to have been produced in Rome under Vespasian specifically for the east⁵⁷. Another group of aes coins struck under Titus and Domitian which includes semisses and quadrantes may have been produced in an

⁵⁵ This may be the occasion to reference another Hadrian medallion of small module in a grooved frame, viz. Hans M. F. Schulman (New York) 27 October 1969 (Mabbott part two), no. 4790 (CONCORDIA, two standing figures; interpretation as a «checker» suggested in the auction catalogue without apparent reason): details unclear due to the quality of the image available.

⁵⁶ They are slightly less frequent in northwestern contexts; however, KEMMERS 2003 provides clear evidence for a deliberate supply of Domitianic quadrantes to the Rhine legions. As far as we can see, no significant quantities of Domitianic small bronzes struck in Rome are found in the Roman East; the situation is thus different for Domitian as compared to Trajan: see BOWSER 1987.

⁵⁷ RIC II.1 (second ed.), p. 28 and 48, Vespasian 1564–1581 (where asses, semisses and quadrantes of this group are listed); 1 quadrans (RIC 1569) was found in Antioch, WAAGE 1952, p. 94. On this issue as a whole, see BUTTREY 2012.

eastern mint, probably in Thrace⁵⁸. However, the semis of Domitian mounted in our pseudo medallion does not belong to this group, but to an issue with purely Roman connotations. Hence, the coin does not provide additional evidence in regard to the supposed eastern provenance of the object⁵⁹.

The coin of Trajan mounted in the second pseudo medallion, by way of contrast, does belong to a group which was produced in Rome for the east, where finds are well attested⁶⁰. Coins of this series also circulated in the western provinces in considerable numbers, but presumably only after being reimported from the east⁶¹.

All in all, the alleged find spot of the Domitian pseudo medallion and the type of the Trajanic coin may hint at an eastern provenance of the two objects; still, it is important to underline that the evidence is far from conclusive up to now.

Concerning chronology, the dates of the coins provide termini post for the production of the two pseudo medallions, and it is noteworthy that the pieces were struck within a quite short time span of 31 years (in 85 and 116 CE respectively). But we must not postulate too precise a date for the manufacture of the two medallions, on the basis of the chronology of the coins. The Trajan «as» in the pseudo medallion kept in a private collection is quite worn, much more so than the surrounding frame, which supports a production date of the composite object several years after the striking of the coin. Thus, we prefer to date the two objects not more precisely than to the second (or perhaps even early third?) century. If we assume that the coins were taken directly out of circulation before mounting, a terminus ante quem for the production of the Domitian pseudo medallion is provided by the vanishing of semisses from circulation, at the latest when the Augustan denominational system lost its balance with the growing predominance of the radiate coins after the mid-3rd century CE.

Function

The fact that somewhat worn low-value coins were framed in the two objects published here clearly sets them apart from imperial medallions of the Rome mint, but also from all the other similar objects discussed above. Therefore, it seems safe to deny an official context for our objects, and one should rather assume a private production of decorative lookalikes of official imperial medallions, with only remote ideological connotations.

The metal analyses (see below) indicate a high zinc content for both frames, which implies a brassy colour almost matching the original appearance of the framed coins. The (relative) uniformity in colour of both the frame and the inserted coin must have been deliberately aimed at, and is in stark contrast to bimetallic medallions. This point might also explain the choice of two rather

⁵⁸ RIC II.1 (second ed.), p. 194, Titus 504–513; p. 256–257, Domitian 835–836.

⁵⁹ This type is not recorded in finds from the Roman East as far as we know.

⁶⁰ Antioch: 6 «asses» and one «semis» from this series (WAAGE 1952, p. 94); Dura Europos: 3 «asses» and 2 «semisses» (BELLINGER 1949, p. 61).

⁶¹ The examples found in the western provinces are normally quite worn and some of them bear eastern countermarks, indicating a primary circulation in the east; see e.g. WALKER 1988, p. 289 and PETER 1996, p. 100–101.

modest coins as centres of quite elaborate objects: maybe it was not the coin type and its meaning at all that governed the choice of the specimens, but simply their size and metal. Perhaps the craftsmen who produced our objects took each coin more or less randomly from an assemblage of orichalcum coins of similar size, only making sure that the size fitted the central cavity of the frame and that the head of the coin (the obverse) was visible on the medallion's upper side.

Like Roman medallions in general, our two objects do not seem to have had a specific practical use except as decorative pieces, perhaps for distribution. Metrology for instance does not support a function as weights; the lack of any file marks or scratches on the backs also excludes a function as gaming tokens. There are no traces of mounting which might indicate a use as phalerae. The pseudo medallion featuring the Trajan coin was described in the auction catalogue Hirsch Nachfolger (Munich) 303 (25 September 2014), on p. 116 as a «Massive AE-Zierscheibe mit einseitig geprägter Darstellung in Perlrahmen», without any indication that this is, in fact, a framed coin. For alleged comparanda, reference was made in the catalogue to the handbook on ancient numismatics by Robert Göbl⁶², who illustrates two round bronze fibulas of a diameter of 22 mm each⁶³, showing a male and a female portrait to the right respectively, in a decorative border; these «Scheibenfibeln» come from a second century CE burial in Bavaria, and the designs are swaged onto a thin sheet of metal. The discovery of these objects provided the occasion for a systematic overview of this type of fibulas (and related material) that all seem to have been produced in Germania Superior or Raetia⁶⁴. However, these «Scheibenfibeln» do not bear any closer resemblance to the framed Trajan coin: most importantly, there is no physical evidence that our object ever decorated a fibula.

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⁶² GÖBL 1978, vol. 2, pl. 19, no. 200 (with text on p. 237).

⁶³ The illustrations are, however, enlarged to 200 % in Göbl's book, so that their size roughly corresponds to the original size of the Trajan pseudo medallion.

⁶⁴ See MACKENSEN 1973, who provides a catalogue of 95 «Rahmenscheibenfibeln» and 6 «Scheibenfibeln mit Bronzepressblech mit figürlicher Darstellung». See also RYCHENER 1999, p. 143 and pl. 87, no. 2591 as well as JANDRASITS 2002.

*Appendix: Manufacturing technique and metallurgical analyses*⁶⁵

The manufacturing process of the Domitian and Trajan pseudo medallions may be described as follows: Each of the objects consists of a casing and an inlaid coin. The casing was cast with a general outline of the concentric circles, and with a shallow depression in the centre fitting of the coin. The coin was then inlaid into the casing's depression by a simple technique of hammering the innermost circle of the casing, in order to tighten its edges and to fix the coin in place. Tool marks can clearly be seen on the Domitian medallion (*Fig. 21b*), indicating that an instrument was used to forge its surface. The circles were shaped by hammering the object with a semi-circular chisel; then, the perpendicular radial lines were made with a small chisel, which bestowed a beaded appearance on the circles in question⁶⁶.

The surface examination of the inlaid coin of the Trajan medallion reveals superficial corrosion.

A metallurgical characterisation of the two pseudo medallions was performed by using both non-destructive testing (NDT) and minimally invasive methods. These included visual testing (VT), radiographic testing (RT), multi-focal light microscope analysis (LM)⁶⁷ and scanning electron microscope (SEM) with energy dispersive spectroscopy (EDS)⁶⁸ analysis.

SEM-EDS chemical analysis is a powerful NDT tool for connecting the observed topography of the object at high magnifications with its local chemical composition. Therefore, the resultant data contribute to the understanding of the manufacturing process of the two objects as well as their preservation state. However, EDS is a surface technique: surface measurements of ancient metals such as copper alloy objects may not provide reliable information of the bulk composition of the object due to corrosion, oxide layers, cleaning residues, conservation treatments, and enrichment of the surface of the objects⁶⁹. Hence, in order to obtain, via SEM-EDS chemical analysis, quantitative results that will represent the bulk of the examined ancient object, it is crucial to understand the limitations of this method. Therefore, different parameters should be considered during the examination of such objects as well as in the interpretation of the results. Those considerations should include the operation parameters of the machinery

⁶⁵ A detailed version of this section will be published in the future.

⁶⁶ For microscope movies of the surface of the Domitian pseudo medallion by Haim Kravits, Microtech LTD (Israel), see <<https://youtu.be/ra7E543wD-E>> and <<https://youtu.be/0UovtAIZ7AU>> (both accessed on 28 November 2018).

⁶⁷ Three-dimensional (3D) digital HIROX RH-2000 LM was used to examine the surface of the Domitian pseudo medallion, with high intensity LED (5700 K colour temperature) lighting, auto focus and multi-focus systems combined with integrated stepping motor and 3D software for surface topography and roughness.

⁶⁸ SEM-EDS analysis was performed to examine both sides of the two pseudo medallions, including their surface topography and chemical composition. The two objects were characterized with a FEI Quanta 200 FEG Environmental SEM (ESEM) in high vacuum mode and a secondary electron (SE) detector. The composition of both pieces was detected by EDS using an Si (Li) liquid cooled Oxford X-ray detector (each EDS measurement was performed in a scanned area of 150 µm x 150 µm).

⁶⁹ ASHKENAZI *et al.* 2017.

during the examination, the calibration of the EDS detector and system as well as the examined object's surface topography and condition (e.g. preservation and presence of cracks and holes). The limitations mentioned above should, however, not prevent the use of SEM-EDS as a functional instrument for the study of ancient metal objects⁷⁰. In order to achieve reliable EDS chemical analysis results in the present study, first the two pseudo medallions' thick green oxide and thinner brown-orange oxide layers were examined; subsequently some areas of their exposed metal surfaces were analysed. Finally, small minimally invasive drillings were made in different spots of both objects – including the edges of the casings – and the resulting chips (bulk metal) were collected and examined as well (see *Fig. 20* for the areas on the coins that were examined).

In general, the analyses of the pseudo medallions' surfaces revealed them to be covered with thick oxide layers. Based on the layers' rough morphology and thickness combined with their chemical composition (for example the low concentration of zinc of less than 28 wt% Zn, which is typical of ancient cementation processes), it may be concluded that both are authentic ancient objects⁷¹.

The results of the SEM-EDS analysis of the Domitian pseudo medallion are shown in table 1. If we discount the measurements near the surface, the inserted coin consists of brass, a Cu-Zn alloy, with a zinc content between 15.8 and 17.0 weight percent (wt%). EDS analysis of the drilled bulk of the coin revealed similar results (*Tab. 1*). This is in good agreement with the zinc values obtained in the analyses of 68 imperial orichalcum coins of Domitian in the Garonne hoard, which were found to contain 15.7 (± 2.2) wt% Zn on an average⁷². The casing of the medallion (*Figs. 21–22*, decorated external circles) is much less homogenous metallurgically than the coin. It is made of leaded tin brass; the composition of its alloy is of 56.5–76.2 wt% Cu, 6.6–10.6 wt% Zn, 3.3–7.7 wt% Sn, and 6.7–20.6 wt% Pb (for both the areas of exposed metal and the drilled metal). Maybe the alloy of the casing consists of recycled copper alloys (due to economic constraints), possibly with a deliberate addition of zinc and lead, the latter in order to lower the melting-point and to improve the castability. Adding more than 3 wt% Pb to bronze increases the fluidity of the melt and improves the surface finish of the object⁷³.

The SEM-EDS analysis results of the Trajan pseudo medallion (*Fig. 23*, bright areas of exposed metal) are shown in table 2⁷⁴. The coin itself consists of a brass alloy, with a zinc content of 13.9–15.9 wt%, and 1.5–2.5 wt% tin. Again, the zinc content of this piece is in keeping with previously published results of analyses of orichalcum coins of this emperor: in the Garonne hoard, 355 brass specimens of

⁷⁰ ASHKENAZI *et al.* 2017.

⁷¹ ASHKENAZI *et al.* 2015.

⁷² ÉTIENNE – RACHET 1984, p. 378; see also p. 381 (where their results are compared with the values obtained by RIEDERER 1974).

⁷³ DILO *et al.* 2010, p. 985; SCOTT 1991, p. 24.

⁷⁴ Again, the measurements near the surface are not taken into account in the following comments.

Trajan yielded an average of 14.5 (± 2) wt% Zn⁷⁵. As in the case of the Domitian piece, the casing is less homogenous metallurgically: it consists of a leaded tin brass alloy with a composition of 53.1–70.1 wt% Cu, 8.1–9.7 wt% Zn, 4.1–4.4 wt% Sn, and a high quantity of Pb (14.5–33.0 wt%).

Although all the alloys examined are low zinc brasses, the metallurgical composition of the two casings is different from the alloy of the two inserted coins; hence, the colours of the casings were perhaps slightly different from the colours of the inserted coins.

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⁷⁵ ÉTIENNE – RACHET 1984, p. 378; see also p. 381 (where their results are compared with the values obtained by RIEDERER 1974, who also incorporated the data provided by CALEY 1964). On the zinc content of Trajanic imperial coins, see in general WOYTEK 2010, p. 24.

Measuring point	Composition weight percentage (wt%)									
	Cu	Sn	Zn	Pb	As	O	Si	P	Cl	Al
Central part of the object, large drilled hole (<i>Fig. 20, area A</i>) measured near the external surface of the hole	80.7	–	15.4	–	–	3.9	–	–	–	–
Central part of the object, small drilled hole (<i>Fig. 20, area B</i>), measured in SA 1 inside the drilled hole	83.0	–	17.0	–	–	–	–	–	–	–
Central part of the object, small drilled hole (<i>Fig. 20, area B</i>), SA 2, near the external surface of the hole	78.2	–	5.6	–	–	16.2	–	–	–	–
Central part of the object, chips taken from the large drilled hole, SA 1	84.2	–	15.8	–	–	–	–	–	–	–
Central part of the object, chips taken from the large drilled hole, SA 2	83.5	–	16.5	–	–	–	–	–	–	–
Central part of the object, chips taken from the large drilled hole, SA 3	83.9	–	16.1	–	–	–	–	–	–	–
Casing, external circle, area of exposed metal, SA 1 (<i>Fig. 21b, 22c–d</i>)	56.5	3.8	7.9	20.6	–	9.5	–	1.7	–	–
Casing, external circle, area of exposed metal, SA 2 (<i>Fig. 21b, 22c–d</i>)	67.0	3.3	6.6	8.8	–	9.5	1.9	0.7	1.1	1.1
Edge of the object, measured inside the drilled hole	61.6	7.7	7.0	11.8	0.6	11.3	–	–	–	–
Edge of the object, drilled chips taken from the large drilled hole, SA 1	75.6	5.6	9.3	6.7	–	2.8	–	–	–	–
Edge of the object, drilled chips taken from the large drilled hole, SA 2	76.2	4.5	10.6	7.0	–	1.7	–	–	–	–

Tab. 1 SEM-EDS results (values in wt%) of the pseudo medallion with the Domitian semis, using an ESEM in high vacuum mode and a secondary electron detector. Scanned Area = SA.

Measuring point	Composition weight percentage (wt%)							
	Cu	Sn	Zn	Pb	O	Si	P	S
Central part of the object, drilled hole, external surface of the hole (<i>Fig. 20, area C</i>)	56.8	5.3	2.5	–	23.2	3.1	0.8	8.3
Central part of the object, drilled chips taken from the drilled hole, SA 1	78.3	2.2	14.3	2.3	2.9	–	–	–
Central part of the object, drilled chips taken from the drilled hole, SA 2	81.1	1.9	14.4	–	2.6	–	–	–
Central part of the object, drilled chips taken from the drilled hole, SA 3	83.6	2.5	13.9	–	–	–	–	–
Central part of the object, drilled chips taken from the drilled hole, SA 4	81.0	1.5	15.9	–	1.6	–	–	–
Central part of the object, drilled chips taken from the drilled hole, SA 5	82.3	2.4	13.9	–	1.4	–	–	–
Edge of the object, drilled chips taken from the large drilled hole SA 1	70.1	4.4	9.7	14.5	1.3	–	–	–
Edge of the object, drilled chips taken from the large drilled hole, SA 2	53.1	4.1	8.1	33.0	1.7	–	–	–
Edge of the object, drilled chips taken from the large drilled hole, SA 3	60.3	4.2	8.5	27.0	–	–	–	–

Tab. 2. SEM-EDS results (values in wt%) of the pseudo medallion with the Trajan coin, using an ESEM in high vacuum mode and a secondary electron detector. Scanned Area = SA.

Abstract

This article deals with two orichalcum coins of the emperors Domitian and Trajan set into ancient decorative «uniface» frames made of a copper alloy. These most unusual «pseudo medallions» (in J.M.C. Toynbee's terminology), published here for the first time, are clearly related to each other morphologically. They are examined in the context of hitherto known pseudo medallions and medallions of the High Principate, and the question of their function in antiquity is discussed. Both of the objects were subjected to extensive metallurgical analyses at Tel Aviv University, the results of which are published in an appendix.

Zusammenfassung

Dieser Artikel befasst sich mit zwei Orichalcum-Münzen der Kaiser Domitian und Trajan, die in antike Buntmetall-Fassungen eingebettet sind, die den Blick jeweils nur auf den Avers der Münzen freigeben. Diese höchst ungewöhnlichen «Pseudo-Medaillons» (in J. M. C. Toynbees Terminologie) werden hier erstmals veröffentlicht und sind morphologisch eng miteinander verwandt. Sie werden im Kontext der bisher belegten kaiserzeitlichen Pseudo-Medaillons und Medaillons untersucht, wobei auch ihr Herstellungszweck erörtert wird. Beide hier besprochenen Objekte wurden an der Universität Tel Aviv ausführlich metallurgisch untersucht; die Ergebnisse der Analysen sind als Appendix angefügt.

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Illustrations

- 1 Domitian, uniface pseudo medallion: Israel Museum, Jerusalem
- 2 Virtual section of the object illustrated in figure 1, on the basis of a 3D-scan (Israel Museum, Jerusalem).
- 3 Domitian, semis, RIC II.1 (second ed.) 314: Cayon 16 May 2012, no. 4323
- 4 Domitian, semis, RIC II.1 (second ed.) 314: Hirsch 326 (16 February 2017), no. 1932
- 5 Trajan, uniface pseudo medallion: private collection
- 6 Virtual section of the object illustrated in figure 5, on the basis of a 3D-scan (Israel Museum, Jerusalem).
- 7 Trajan, orichalcum «as» (?) struck in Rome for Syria, WOYTEK 2010, no. 937v: CNG electronic auction 361 (14 October 2015), no. 934
- 8 (Septimius Severus in the name of) Geta Caesar, framed sestertius, for the coin type see BMC V, p. 318, ‡. London, British Museum, reg. no. 1872,0709.407
- 9 (Claudius in the name of) Agrippina minor, uniface sestertius strike, von KAENEL 1984, p. 141 f., Typus A: CNG electronic auction 345 (25 February 2015), no. 459
- 10 Domitian, uniface sestertius strike: Hess – Divo 317 (27 October 2010), no. 860
- 11 Trajan, uniface medallion, WOYTEK 2010, no. 920g: CNG 31 (9 September 1994), 978
- 12 Corinth, Antinous, uniface bronze, RPC III, 260–262: Paris, BnF (© gallica.bnf.fr), inv. AA GR 1355

- 13 Mantinea, Antinous, uniface bronze, RPC III, 326: Vienna, KHM MK, inv. GR 39193
- 14 Smyrna, Antinous, uniface bronze, RPC III, 1978 and 1981: H. J. Berk 195 (29 October 2015), no. 523
- 15 Bithynium-Claudiopolis, Antinous, uniface bronze: Copenhagen, SNG Cop. (Bosporus–Bithynia) 338
- 16 Augustus, quadrans struck on an oversized flan, RIC I (second ed.) 420: Vienna, KHM MK, inv. RÖ 4858
- 17 Hadrian, 'framed' semis, Strack 1933, no. 582: Vienna, KHM MK, inv. RÖ 9765
- 18 Hadrian, semis struck on an oversized flan, Strack 1933, no. 582: Bologna, PANVINI ROSATI 1981, no. 337
- 19 Hadrian, 'framed' semis, Strack 1933, no. 579: NAC 9 (16 April 1996), no. 864
- 20 The pseudo medallions' obverses: (a) the two holes drilled in the Domitian pseudo medallion (areas A and B); (b) the hole drilled in the the Trajan pseudo medallion (area C)
- 21 The Domitian pseudo medallion: (a) LM 3D images of the medallion's casing with decorated circles around the coin; and (b) SEM image of the casing showing the vertical decoration notches between the circles, which were manufactured by plastic deformation. The white arrow shows the external circle of the casing (BSE mode).
- 22 SEM images of the Domitian pseudo medallion, showing: (a) the upper part of the coin, surrounded by the casing's internal circle (SE mode); (b) the plastically deformed circles of the coin's casing (BSE mode); (c) the exposed metal in the external circle (SE mode, arrow, dark area); and (d) the exposed metal shown in figure 22c (BSE mode, arrow, bright area)
- 23 SEM images of the Trajan pseudo medallion, showing: (a) the upper part of the coin, surrounded by the casing's internal circle (SE mode); (b) the plastically deformed internal circle (SE mode); (c) the upper part of the coin (BSE mode), covered with brown oxide (dark areas) and some exposed metal areas (bright areas); and (d) higher magnification of the central part of the coin (bright areas, BSE mode).



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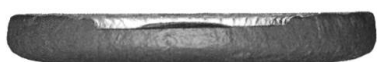
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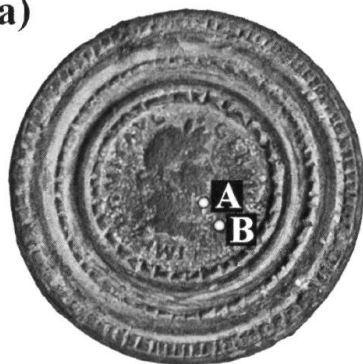


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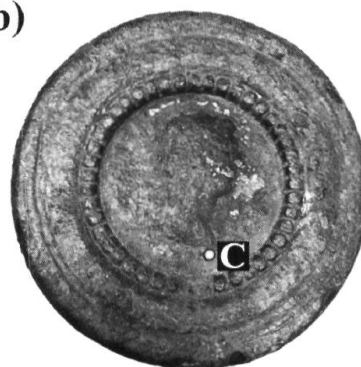


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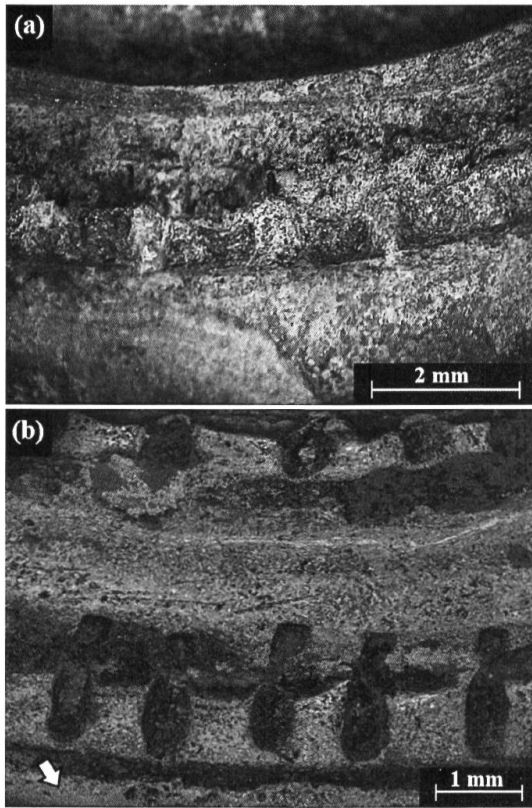
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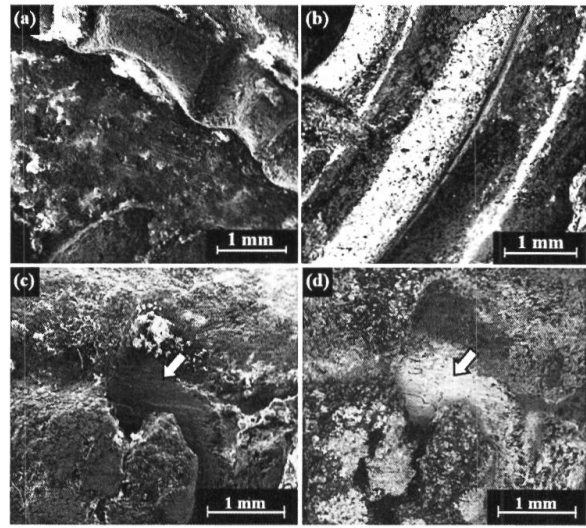
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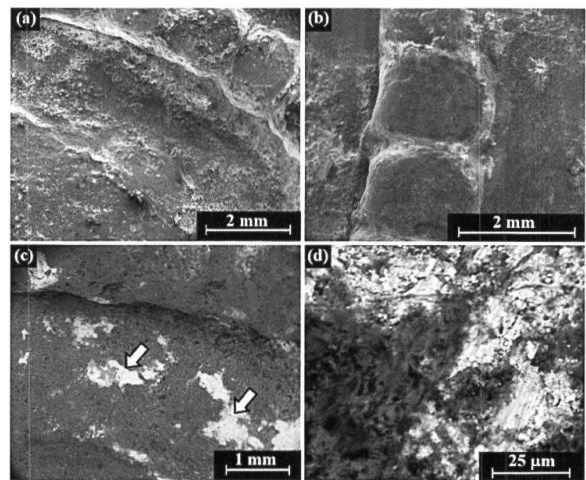
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