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SYSTEM AND PRODUCT IN ROMAN MINTS FROM THE LATE REPUBLIC TO THE HIGH PRINCIPATE: SOME CURRENT PROBLEMS

Abstract *– This contribution treats various questions relating to the inner working of Roman mints. It has two main parts. The first one deals with Roman coin types of the late Republican period bearing marks of different kinds – control numbers and letters – whose interpretation is disputed. In the second part of the article, the organization and the administration of the Roman mint in the High Principate are discussed in the light of epigraphic and numismatic evidence. A special focus is on the interpretation of the job designations of Roman mint workers as preserved in the Trajanic inscription* CIL VI, 44, *and in particular on the role of the* signatores *in the coining process.*

I. INTRODUCTION

In 1956, ROBERT CARSON PUBLISHED THE ARTICLE 'SYSTEM AND PRODUCT IN the Roman Mint' in the *Festschrift* for Harold Mattingly. This contribution became rather influential, in a methodological perspective, since Carson was one of the first British scholars to specifically highlight the importance to investigate thoroughly the organizational context of Roman imperial coinages. He reminded his readers that "coin issues are the ends of certain means, the results of a certain system" (1956, p. 228) and emphasized that "it is certain that the Roman coinage like other things Roman *was* organized and was systematically produced" (1956, p. 233). Carson forcefully argued that the adequate consideration of structural aspects of coin production can provide numismatists with a most welcome additional tool, allowing them to work out the relative chronology of the imperial issues, to arrange them with a higher degree of precision and thus to reconstruct the activity of the mint in greater detail: "If some reasonable idea can be established of the organization and machinery of the Roman mint, the pattern into which its product, the coin issues, falls should then also be perceivable with reasonable accuracy" (1956, p. 228). He pointed out that for the arrangement of large Roman imperial coinages such a 'sys-

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tematic' approach was far more practicable than to conduct die-studies – a method which had been developed on Greek coinages of a modest scale and which is hardly applicable to mass-produced silver or bronze issues of the High Principate.

It is immediately obvious that this article – as, by the way, Carson's volume 6 of the BMC, which was published six years after the *Festschrift* for Mattingly in 1962 – is deeply influenced by the work of the 'Vienna school' of numismatics. Carson acknowledges this debt expressly by citing some contributions in which the Austrian scholars Otto Voetter (1841-1926), Karl Pink (1884-1965) and Georg Elmer (1908-1944) had demonstrated that the arrangement of Roman imperial issues of the third century AD critically depends upon, *inter alia*, observations concerning the internal structure of the mint.

From this period onward, the relationship between 'system' and 'product' in Roman mints is fairly straightforward, since imperial coins began to carry explicit administrative information in the mid third century. The reign of Philippus I Arabs (244-249) saw the appearance of *officina* marks on antoniniani, which were produced in six workshops under this emperor. [1] Apart from exceptional late Caesarian issues which will be discussed below, this was the first time since the late 60s or early 50s BC that coins struck at the mint of the empire's capital bore administrative marks. [2] In the intervening period of about 300 years which I will be looking at here, the situation is somewhat uncertain: In the closing stages of the Republican age as well as in the Early and High Principate, the mint authorities refrained from putting control marks, sequence-marks or *officina*-marks on the coins, thereby leaving us entirely in the dark regarding the number of dies used for specific coin types, the precise sequence in which they produced the various issues or the internal structure of the minting establishment(s) in this period. This situation presents a considerable methodological challenge for numismatists dealing with later Republican and earlier Imperial coins, and it is therefore perhaps not by chance that Carson decided to devote a substantial portion of his overview to developments of the third century and beyond, which are more easily accessible to scholarship (1956, p. 235-239).

This contribution has two parts: In the first one, which focuses on several specific coin issues – hence, on the 'product' –, I will briefly discuss a problematic marked Sullan series, the above-mentioned, exceptional Caesarian control marks

[1] The *officina* marks are found on the issue produced for the Secular Games in AD 248 (SAECVLARES AVGG: marks in Latin numerals) and on a smaller related issue (Greek numerals): RIC 4.3 [MATTINGLY, SYDENHAM & SUTHERLAND 1949], Philip I, 7ff. and 12ff., 115-116 (Otacilia Severa) and 223-224 (Philip II). On administrative marks on Roman coinages of the third and fourth centuries AD in general, see the contributions by J.-M. Doyen and J. van Heesch in this volume.

[2] On the use of control marks on Roman Republican silver coins, especially from the later second century onwards, see the contribution by R.B. Witschonke in this volume.

from the mint of Rome as well as several different marks on Late Republican imperatorial coinages which have, at times, been thought to convey some administrative notion. In the second part of the paper, which will mainly be concerned with theoretical aspects – hence, the 'system' –, I propose to briefly survey what is known about mint administration in the High Principate before the introduction of *officina* marks, taking into account mainly non-numismatic evidence. In this context, I will also take a closer look at modern interpretations of the technical job designations of Roman mint workers as preserved in the epigraphic record. Finally, a special focus in that part of the article will be on recent developments in numismatic scholarship regarding the reconstruction of the inner division of the mint of Rome in the High Principate.

II. MARKS ON LATE REPUBLICAN COIN TYPES: NEW EVIDENCE AND SOME PROBLEMS OF INTERPRETATION

The *denarius* production of what is commonly referred to as the 'Republican' period of Roman monetary history lasted from *c.* 211 BC to the Battle of Actium (31 BC), thus about 180 years in total. During the major part of this time-span, systems of control marks were not in operation. After a famous early forerunner of the mid-third century, the 'Roma/Victory'-didrachms (*RRC* 22) displaying a complex system of controls, [3] there was a huge chronological gap of more than a century; a concentration of *denarius* issues with control marks – of several different systems – may be observed only from c. 125 BC to the early 50s, thus in a period of just about 70 years. [4] The first *denarius* issue to display this kind of marking system was the issue of N. Fabius Pictor (*RRC* 268, dated to 126 BC by Crawford), but the use of controls became the norm only about two decades later. [5]

Control marks did not occur exclusively on issues from the mint of Rome, but also on imperatorial silver coinages struck in Italy or in the provinces to pay soldiers in periods of civil strife. [6] Good examples are provided by issues of the late 80s, presumably produced in the context of the war against Sertorius,

[3] On the Campanian affinities of the system of controls used, see Burnett 1977, p. 119, and especially Hollstein 2000, p. 7-10. The widespread belief that the system was borrowed from Ptolemaic coinage is an illusion. For a die study of the type, see Burnett 1998, p. 36-47.

[4] The lower end of the date range is given according to the revised datings of Roman *denarii* of the mid-first century BC, based on the evidence provided by the Mesagne hoard: see Hollstein 1993, p. 381f. and Mattingly 1995.

[5] Normally, the use of control marks was confined to silver coins under the Republic, which is quite significant in itself. For an overview of the few exceptional Roman Republican bronze issues with controls, see the article by Witschonke in this volume.

[6] Such coins were apparently produced either in field mints or camp mints (the Latin term was *moneta castrensis*: Lucanus 1.380), or in permanent minting establishments which had been occupied.

viz. the *denarius* issue of C. Valerius Flaccus, struck in Massilia (*RRC* 365), [7] and the series of the proconsul C. Annius from two different mints in Italy and Spain (*RRC* 366/1-2 and 3-4). [8] It is obvious that such 'provincial' mainstream issues merely reflect the then current practice at the mint of Rome, as far as the use of control systems is concerned: The 80s were the heyday of control marks at the central mint, and this fashion was imitated in the contemporary imperatorial coinages; the occurrence of such marks on them is not due to local traditions in provincial mints.

This is also borne out by the fact that marking systems disappeared from Republican coins struck in the provinces when such control marks ceased to be used in Rome. Therefore, the imperatorial coinages of the civil wars in the closing stages of the Republican period, from Caesar's crossing of the Rubico in 49 BC onward, lack control marks. From this, another important deduction follows automatically. Roman imperial coinage basically had two different roots: the coinage produced at the Roman mint under the supervision of the *monetales* and the coinage struck by the imperators in the provinces. Since neither of these two classes of coins regularly bore control marks in the period of the civil wars of the final phase of the Republic, the coinage of the Principate was bound to start without any marking systems visible on the dies.

The latter qualification requires some explanatory remarks. The fact that marked and unmarked Roman Republican issues were minted concurrently, from the 120s BC, has puzzled numismatists for a long time. [9] In order to evade the necessity to explain it, some scholars preferred to posit that the dies used to strike at least some of the coinages without any marks visible in the coins' fields or exergues may have been marked on other parts of the die, possibly on the haft, perhaps with marking systems similar to those visible on other issues on the coins themselves. [10] This theory, difficult to verify, of course opens up completely new possibilities of interpretation. For example, it can be used to hypothesize that in periods for which no control marks are attested at all on the faces of the Republican *denarius* dies (*e.g.* before around 130 BC), similar systems might have been in place, without leaving traces in the numismatic material. For the development of this theory, a prominent Roman imperatorial precious metal issue of the late 80s BC played an important role. Hence, we have to look at it in greater detail here.

Sulla's largest issue of precious metal coins was produced in his name (L. SVLLA IMP, *vel sim.*) and in the name of his *proquaestor* L. Manlius (*RRC* 367). It comprises both *aurei* and *denarii*. The issue is stylistically quite diverse

[7] For a study of his coins, see Alföldi 1969.

[8] Further marked imperatorial issues of the same period include the anonymous *quinarii* *RRC* 373/1b and the anonymous *denarii* *RRC* 376 (struck EX SC).

[9] The problem is discussed by Witschonke in this volume.

[10] For a systematic exposition of this concept, see Zehnacker 1973, p. 192.

and must have been struck in one or two mints somewhere on the Italian peninsula before Sulla became *dictator* in 82 BC. On the obverse, which is signed by Manlius, it displays the helmeted head of Roma; the reverse shows most probably Sulla (whose name appears in the exergue) in a triumphal quadriga to the right, holding a *caduceus*. He is crowned by Victory flying toward him *(figs 1 and 1A, p. 122)*. [11]

Fig. 1 – Denarius, RRC 367/5. CNG electronic auction 272 (25/II/2012), no. 323 (3.88 g, ↑→)

Only a small number of silver coins of this large group bear Latin numerals on the reverse, a fact to which Michael Crawford first drew attention in one of his early papers on Republican numismatics. [12] These few coins with numerals all come from a single die each, and, as has correctly been observed by Crawford, the numerals (normally barred) are not well engraved but very faint and almost "appear as if scratched on as a sort of last-minute extra" (*RRC*, p. 387). Crawford envisaged two possible explanations for the peculiar behaviour of the controls on this issue: "Either the mark was normally placed elsewhere than on the face of the die or it was usually scratched on the die so lightly that it became obliterated almost as soon as striking began". [13] In any case, he felt entitled to hypothesize that originally all the dies of the huge issue – the *denarii* were estimated to have been produced from no less than 207 reverse dies by Crawford [14] – were marked with a numeral in some way. According to his interpretation, these marks "were not intended to survive", and a few elements of a very long sequence came down to us simply by chance. [15]

Due to the potential implications of this hypothesis for the modern understanding of the marking practice of Roman Republican issues in general, it is most important to test Crawford's theory carefully. At the time of publication of *RRC* in 1974, only four numerals in that series in all were known (VI, IX, XV and XX). [16] Luckily, we have much better evidence today: seven years

[11] This reverse type thus seems to anticipate Sulla's triumph over Mithridates, which he was to celebrate in 81 BC.

[12] CRAWFORD 1966, p. 22.

[13] CRAWFORD 1974, p. 585.

[14] CRAWFORD 1974, p. 386; these estimates of course just indicate an order of magnitude, at best.

[15] CRAWFORD 1966, p. 22 & 1974, p. 387.

[16] For references, see CRAWFORD 1974, p. 386.

ago, Phillip Davis published a short but important note on this type containing, *inter alia*, a list of all the coins of the series with control marks that he knew of, altogether no less than 22 specimens. From his collection of the material it becomes clear that the numerals are not always in the same position, but that they were sometimes engraved in the left and sometimes in the right field of the reverse (above or below the foreleg of the quadriga's first horse), apparently at random. This is quite unusual and may be thought to strengthen Crawford's contention that the numerals were added to the dies at the end of the production process, when the design and the legends had already been engraved. Expanding the listing in *RRC*, Davis was able to add the numbers I, II and X, all known to him from multiple examples (from the same reverse dies). Furthermore, he reported specimens on which he proposed to read the numerals IIII, XI and XXV, although he expressly indicated his reading as uncertain in these cases. It has to be stressed that the numerals are not only very small, but most carelessly engraved and therefore extremely difficult to read. Hence, new material is not only likely to provide, apart from additional examples struck from known numbered reverse dies, [17] numerals hitherto unattested, but inevitably also triggers revisions to the list. For example, recently a very clearly struck and well-preserved specimen that seems to display the numeral XXV in the right reverse field turned up *(figs 1 and 1A, p. 122)*. [18] Since this coin is from a different die than the specimen published by Davis as perhaps reading 'XXV', [19] and there should be only one numeral per die, the latter coin must be re-examined: the last of the three digits is hard to discern, but perhaps this numeral is rather to be read 'XXX'.

Where does this leave us? Unbiased consideration of the evidence currently available suggests it is highly unlikely that "the whole issue" was originally provided with a system of control marks, only very few of which survive, as Crawford presumed (*RRC* p. 387). This notion is supported by a typological observation concerning the *quadriga* on the reverses. As Davis pointed out correctly, all the control marks occur on *denarii* on which the horse in the foreground is shown to the right of the other horses, whereas all the coins showing it to the left of the three others are unmarked. [20] Hence, in all probability just a small

[17] See, for example, *CNG* 75 (23/V/2007), no. 900 (4.01 g, ↑↘): same dies as the specimen cited and illustrated in Davis 2005, p. 38-39 (control no. IIII, author's collection), but numeral partly off flan.

[18] *CNG* electronic auction 272 (25/I/2012), lot 323. This is decidedly the most likely reading; while perhaps not absolutely certain, it is, to my eye, far more likely than the other possible readings XVII or XXII. A badly worn specimen from the same dies was sold on ebay by Numismatik Lanz (Munich) on 31/I/2012 (no. 300653387753: 3.41 g).

[19] Lanz Munich 54 (12/XI/1990), no. 372 (3.8 g).

[20] Davis 2005, p. 39. This typological distinction is not made by Crawford in the catalogue entries for *RRC* 367. That the issue falls into two groups is evident from stylistic and technical considerations as well (head of Roma; fabric of the flans).

part of the total of reverse dies used for this issue were numbered. [21] These marked dies seem to have formed a rather short sequence running from I to (at least) XXV or XXX. Roughly one third of the dies in this sequence are attested so far. The fact that no higher numerals have been discovered up to now makes it unlikely that the sequence originally comprised hundreds of dies, and therefore the vast majority of the *denarii* of the type *RRC* 367 were probably struck from reverse dies bearing no control marks whatsoever. Since the sequence of controls on these *denarii* was apparently rather short, and the number of marked dies known has more than doubled since the publication of *RRC*, remaining gaps may be filled in the future when new material comes to light. The issue may thus be seen not to provide any evidence for the assumption that sometimes Roman Republican dies were marked not on their faces, but elsewhere. Though it remains possible (and may even be thought to be likely) that Republican mints at times kept track of their dies by marking them, *e.g.,* on the haft, one has to acknowledge that for the moment this hypothesis is not backed up by hard and fast contemporary evidence. [22]

The marked *denarii* struck for Sulla by Manlius clearly were an extraordinary issue to some extent, and perhaps we should not be too optimistic about the possibilities to learn about regular Republican minting practice from it. [23] Crawford's contention that the small numerals on *RRC* 367 were intended to be obliterated immediately after production began – an idea criticized by Hersh 1971, p. 22 – can, of course, neither be proven nor refuted. It is true that they may have been applied after the design of the dies had been completed, by a less competent engraver in what approaches a cursive style of writing. But the fact that quite a number of specimens of a relatively restricted series survive seems to prove that no one minded the numerals being visible on at least a fraction of the coins. Still, it is evident that the numbering system in operation here doubtless served to distinguish the single dies in the mint, rather than the products of the dies.

For a part of the huge *denarius* issue of the mint of Rome struck in 44 BC, we can be sure that the opposite must be true. Two *denarius* types with Caesar's portrait signed by the moneyer M. Mettius bear control letters in the left field of the reverse: On the *denarii RRC* 480/17 showing Caesar's wreathed head with the legend CAESAR IMPER, one of the five letters A, B, C, D or E accompanies Venus holding a sceptre and a statue of Victory on the reverse,

[21] See already HERSH 1971, p. 22 for a similar conclusion. This is nothing extraordinary; there are numerous examples in Roman Republican coinage for just a part of certain series bearing control marks, see, *e.g.*, *RRC* 337 or 346.

[22] One also has to bear in mind that if dies were marked in this way, it was impossible for mint authorities to trace back a coin to the specific context in which it originated, to the 'anvil', the production team etc.

[23] Thus ZEHNACKER 1973, p. 192.

while on the *denarii* RRC 480/3 (obverse CAESAR IMP, with *lituus* and *culullus*) it is one of the five letters G, H, I, K or L: the F is not attested and seems to have been left out. The portraits on the latter type are of good style, while most of the IMPER heads are quite crude. There is more than one die per letter, in this *denarius* issue, so the letters were evidently not intended to distinguish single dies. Moreover, one of the quite puzzling aspects of the control system we are dealing with here is that the marks B, C, D and E on the CAESAR IMPER coins are normally found recut; they are frequently altered from the preceding letter of the alphabet, so that B is cut over A, C over B and so on. [24] Sometimes we can document the use of single dies before and after the recutting. [25] This is most unusual, since conventional Roman Republican control marks are, to the best of my knowledge, normally not found recut. [26] The fact that the second to fifth letters of the alphabet are so often found recut in our case was interpreted as an additional hint at the completely different organizational backgrounds of the 'IMPER' and 'IMP'-groups of Caesar's portrait *denarii* of 44 BC by Alföldi, [27] who regarded the IMP-coins as lifetime issues, while he dated the IMPER group to the period after Caesar's assassination. [28] Apart from a single instance, no such recut reverse dies are listed for the CAESAR IMP group (letters G-L) in Andreas Alföldi's 1974 corpus, [29] in which 45 different reverse dies were catalogued in all for the type. [30] This is quite surprising since Alföldi himself had correctly identified two recut reverses on which the letter G had been replaced by H, in his 1964 contribution „Die verstümmelte Emission des M. Mettius mit der Legende CAESAR IMP und den Münzbuchstaben G – H – I – K – L". [31] New evidence strengthens the notion that the differences in the behaviour of the controls in the two

[24] ALFÖLDI 1974, p. 41-43 and pl. CXIV ff.

[25] A clear example: ALFÖLDI 1974, pl. CXVII, no. 59 (A) = pl. CXX, no. 83 (B, with the horizontal bar of the A still visible beneath the B).

[26] See also CRAWFORD 1974, p. 588 with notes 2 and 3 on this point. It is interesting to observe that this sets Republican control marks apart from control marks on many civic and regal coinages of the Greek world, which are often found recut; for examples and a commentary on the phenomenon, see the contribution by F. de Callataÿ in this volume.

[27] ALFÖLDI 1984, pp. 27 and 111.

[28] This dating has been accepted widely: see the doxographical notes in WOYTEK 2003, p. 421-422. Evidence for it is, however, inconclusive: WOYTEK 2003, p. 423.

[29] The exception concerned a case regarded as dubious by Alföldi and Kellner: ALFÖLDI 1974, p. 18, reverse die no. 33: K, probably recut from I by adding two tiny strokes.

[30] The distribution as established by Alföldi and Kellner is as follows: G – 9 dies; H – 8 dies; I – 12 dies; K – 11 dies; L – 5 dies (ALFÖLDI 1974, p. 17-19).

[31] The paper is reprinted in ALFÖLDI 1984, p. 22-33. See p. 24 (drawings no. 15 and 16) and p. 27; the dies are illustrated (but no longer properly described) in the corpus ALFÖLDI 1974, reverse dies R15 (no. 106, pl. XIX) and R16 (no. 94 pl. XVIII). For two more suggested recuttings see ALFÖLDI 1984, p. 27 (L replacing I?).

Mettius-subgroups perhaps should not be overstated: The hitherto unpublished IMP *denarius* depicted in *figs 2* and *2a, p. 122*, which was struck from a reverse die unlisted in Alföldi 1974, again clearly shows a control letter H recut from a G. Furthermore, we have to bear in mind that recuttings of I into K are „schwer feststellbar", as Alföldi himself correctly remarked (1984, p. 27). Altogether, it seems as if some consistency in the peculiar engraving practice of the control marks in the two groups could be observed. The pattern well-established for the IMPER coins, with one letter being replaced by the next in the alphabet, occurs in the other group as well.

Fig. 2 – Denarius, RRC *480/3* (H, *recut from* G)
NAC *33 (6/IV/2006), no. 357 (3.70 g)*

As noted above, the fact that recutting from one letter to another took place on the Mettius reverses implies that these control marks did not identify specific groups of dies, but that they were intended to relate the final product – the coins – to a factor in the production process other than the tool used to manufacture them. Therefore Colin Kraay's suggestion that the letters might have referred to the metal supply does not appear too far-fetched: "A possible explanation of the letters might be that they marked the quantities of bullion struck, so that when one quantity was completed the reverse die in current use had its control letter altered before being transferred to the next". [32] In any case, it seems that the controls were applied for accounting purposes of some sort.

Still, it has to be acknowledged that the precise meaning of the letters, present on just a small part of the total *denarius* production of 44 BC, escapes us. What seems clear is that they are somewhat different in character from the 'classic' Republican control marks in use up to the early 50s BC. [33] After the Mettius experiment, such marks disappeared from Roman silver coins for good. There is one series of bronzes, however, which may be associated with the Caesarian period and displays control marks as well, albeit of a different kind. The two more common of the three varieties of *orichalcum* coins of Q. Oppius, which show Victory walking to the left with a bowl of fruit on the reverse (*RRC* 550/2-3), display figured control marks on the obverse and/or the reverse. Symbols occurring include a star in crescent, crescent, capricorn, thunderbolt and a vine-leaf. It is difficult to precisely date and localize the series, which

[32] Kraay 1954, p. 25.

[33] Thus already Crawford 1974, p. 588, note 3. Therefore, Pink's statement that these issue marks give an impression of being an archaism (Pink 1952, p. 41) is hardly convincing.

bears just the legend Q. OPPIVS PR(aetor), and consequently several wildly differing attributions have been proposed over the last 100-odd years, ranging from Cilicia in the early 80s BC (*RRC*) to Syria in the late 30s BC (GRANT 1969, p. 61-64). [34] Since the coins, most probably *dupondii*, share several features with the more common *orichalcum* issue struck by the prefect C. Clovius in Julius Caesar's name in 46/45 BC (*RRC* 476), the majority of scholars – including this author (see WOYTEK 2003, p. 277ff.) – believe, however, that the issue of Oppius may plausibly be ascribed to the Caesarian period. An attribution to the mint of Rome in 46 BC is perhaps a possibility. [35] It is true that Clovius did not employ, for his issue, a control system comparable to the one used by Oppius, but there seems to be at least a rudimentary form of marking: some of Clovius's coins have a star on the obverse (*RRC* 476/1b), others lack it (476/1a). [36] If the proposed attribution of the Oppius bronzes is accepted, their control marks might provide some context for the use of control letters on the *denarii* of the moneyer Mettius in 44 BC, and we could assume that the Roman mint toyed with two different experimental control systems in Julius Caesar's age.

The vast majority of Julius Caesar's imperatorial coinages – some of which were extremely large like the elephant issue (*RRC* 443) or the *denarii* with Aeneas and Anchises (*RRC* 458) – do not display marks of any kind. The enigmatic *denarii RRC* 467, which lack Caesar's name, but prominently advertise his titles COS TERT DICT ITER (obv.) / AVGVR PONT MAX (rev.), are different. In the right field of the reverses, where priestly implements illustrating the legend are depicted, these coins are signed with the letter D (*RRC* 467/1a) or the letter M (*RRC* 467/1b). Specimens with D are considerably more frequent than pieces with M; at least one obverse die was used to strike both *denarii* with D and with M, which should therefore have been produced at the same mint, unidentified as yet. They can be dated to the period between 1 January and mid-April 46, the time of the *bellum Africum*, on the basis of Caesar's titulature. The issue is his main coinage for the African campaign, and I have the suspicion that it may have been produced in Sicily, the *dictator*'s main supply base for the war. [37]

The letters cannot be mint-marks, nor can they be control numerals, since they occur on many dies each, and the numerals 500 and 1000 would not make sense. The conventional explanation, ultimately going back to Bartolomeo Borghesi (1781-1860) and Celestino Cavedoni (1795-1865), but repeated up to the numismatic present, [38] is that they are to be expanded to D(onum) or D(ona-

[34] For an overview and a detailed commentary on the series, see WOYTEK 2003, p. 275-283.

[35] WOYTEK 2004, p. 349-350.

[36] It may be observed that the star fits well with some of the Oppius control marks, which also belong to the celestial sphere (star, crescent, capricorn etc.).

[37] On the attribution, already suggested by ALFÖLDI 1984, p. 172, see WOYTEK 2003, p. 253.

[38] CRAWFORD 1974, p. 736; SEAR 1998, p. 40.

tivum) and M(unus). [39] This supposed indication of the inferred use of the coins (for distribution to the people and the military) would, however, be unheard-of in the coinage of the period, and the concept doubtless is to be discarded. Careful numismatic analysis of the reverses makes it clear that the style of engraving of the two groups of dies is markedly different. On pieces with D, the *sitella* is sometimes smaller and less well engraved than on reverses with M, and the distribution of the other priestly implements in the field often is somewhat uneven, with the *simpulum* and sprinkler being shifted to the left. But the main difference concerns the lettering: On coins featuring the D, the word AVGVR is always in its entirety placed to the left of the *lituus*, while it constantly terminates above the crooked staff on the pieces with M. I therefore have to insist on my observation that the reverses of the two groups marked with different letters must in all probability be the product of two different engravers. [40]

The idea developed on the basis of this observation, *viz.* that the two letters might be signatures of these two die-engravers, has been received with extreme caution by critics. [41] This is, of course, understandable, since parallels for this phenomenon are few and far between in Republican coinage; as will be shown below, some of the parallels that once seemed to exist are about to dissolve in the light of new scholarship. Thus, the abbreviations D and M remain somewhat problematic, and it is perhaps time to proclaim the *non liquet* recently called for by Hubert Zehnacker. [42] Still, it must be emphasized that, on numismatic grounds, the only alternative to an identification as engravers' signatures would be to hypothesize that two different engravers were asked to produce two groups of reverse dies which for some other unknown purpose were marked with two different letters, apparently unrelated to the reverse design.

In the treatment of these coins in *Arma et nummi*, it was noted that Max von Bahrfeldt had tentatively identified as an artist's signature the L accompanying the trophy on the majority of the famous *aurei* struck by Casca Longus on behalf of Brutus, whose portrait they bear on the obverse (*RRC* 507/1b). [43] It seems, though, that this idea might have to be abandoned in favour of an expansion into L(ycia) or (de) L(yciis), as David R. Sear had proposed. [44] Wil-

[39] For detailed references, compare Woytek 2003, p. 250.

[40] Woytek 2003, p. 252.

[41] See, for example, the remark by Hollstein *(in preparation)* ("not completely convincing"). For Jehne 2010 (reviewing *Arma et nummi*), p. 298, it is „immerhin eine bessere Lösung […] als die bisher in der Forschung vorgeschlagenen".

[42] In his review of *Arma et nummi* (2005, p. 229f.: « Nous aimerions mieux que l'on conclue par un *non liquet* »).

[43] Bahrfeldt 1923, p. 68.

[44] Sear 1998, p. 126. This hypothesis was developed on the basis of Crawford's remark, the L "may conceivably serve to point to a particular victory" (*RRC* p. 518).

helm Hollstein recently supported this solution by pointing out a possible analogy on a variety of an urban *denarius* type of the moneyer C. Coelius Caldus, struck in about 51 BC (*RRC* 437/1b). [45] On its reverse, the head of Sol is flanked by two shields, one of which is Gaulish in appearance, while the other one is round. Next to the former, there is the letter S, probably specifying that the Celtic victory of the moneyer's grandfather, C. Coelius Caldus (cos. 94 BC), who is portrayed on the coin's obverse, had been achieved against the tribe of the Salluvii in southern Gaul. [46] Similarly, the letter on the reverse of the *aureus* of Brutus might have been intended to make clear which of Brutus's military victories the trophy that the coin shows celebrated, *viz.* his success in Lycia. A clarification in that respect could have been perceived all the more necessary since the numismatic iconography of Brutus's victories in the east is notoriously complex and ambiguous, with a constant interference of Thracian and Lycian imagery. [47] However, the perplexity of modern scholars regarding the letter should, perhaps, guard us against overestimating the intelligibility of the 'explanation' provided by Casca's mintmaster.

The only letter on a Roman Republican coin type today commonly acknowledged as being a real artist's signature is the P (followed by a dot) concealed behind the ear in the hair of Mark Antony's portrait on two *denarius* types of the later 30s BC. They are linked by the same obverse type, on which Antony is styled ANTON AVG IMP III COS DES III III V R P C. The reverses are purely epigraphic, naming, in two lines, Antony's subordinate M. SILANVS AVG | Q PRO COS (*RRC* 542/1; *figs 3 and 3a*) or oddly repeating Antony's name and part of his titulature in the form ANTONIVS | AVG IMP III (*RRC* 542/2; *fig. 4*).

Fig. 3 – Denarius, RRC 542/1. Helios 7 (12/XII/2011), no. 71 (3.77 g)

Fig. 4 – Denarius, RRC 542/2. Rauch 85 (26/XI/2009), no. 337 (3.69 g)

These coins have recently been dated to the summer of 32 BC and localized in Athens by David Sear (1998, p. 228f.). An undated inscription was set up in honour of M. Iunius Silanus as ἀντιταμίας in this city (*SIG* 767), and Sear inferred from this evidence that the *denarius* issue signed by Silanus should have been produced there, too. [48] Since he also presumed the *denarii* to have

[45] HOLLSTEIN *(in preparation).*

[46] Liv. per. 73. See HOLLSTEIN 1993, p. 365f., who rightly rejects the traditional expansion S(ol), adopted by CRAWFORD (*RRC* p. 458, note 1).

[47] On the problem, see WOYTEK 2003, p. 516-525 and HOLLSTEIN *(in preparation).*

[48] Thus already NEWMAN 1990, p. 51 with note 30.

been struck in Antony's presence, he arrived at a possible *terminus post quem* of May 32 BC for the coins, as it was only then that Antony arrived in Athens from Samos. The dating proposed by Sear is therefore somewhat later than the date envisaged by Crawford, Martini and Newman, 33 BC. [49] The attribution of the issue to Greece, though recently preferred, [50] is not universally accepted: E.A. Sydenham had opted for Asia minor, [51] while Rodolfo Martini, for his part, proposed an attribution to Antioch in Syria, mainly on grounds of supposed analogies in portraiture to provincial coins of Antony from Syria. [52]

The letter in Antony's hair is so small and so ingeniously hidden among the locks that it was first described as late as 1920 in an auction sale catalogue of the coin dealers P. & P. Santamaria in Rome. [53] The 'P's' artistic integration into the design sets this case apart from the various lone letters on Late Republican coins discussed up to now and seems to be in accordance with the interpretation as a die-cutter's signature which was given by the cataloguer in 1920 [54] – an explanation which, to my knowledge, has not been challenged so far. [55] Indeed, the portraits of Antony on the issue *RRC* 542 are, as a rule, rather consistent, both within each of the two groups and also when the obverses of varieties 1 and 2 are compared, with and without Silanus's name on them.

The one obvious parallel, on ancient coinages, to this integration of a single letter into a portrait has not been pointed out and discussed in this context so far. It is the case of the minuscule Greek letter Δ occurring on the obverses of Ptolemaic gold, silver and bronze coins of the late fourth and earlier third cen-

[49] CRAWFORD 1974, p. 538; MARTINI 1987, p. 83; NEWMAN 1990, p. 51 with note 30. Previously, only BERNAREGGI 1973, p. 98 had expressly opted for a date range of 33-32 BC for this issue. It has to be stressed, however, that Crawford indicated the uncertainties in the chronological attribution of the issue, too (*RRC* p. 102: between an issue "dated to 34, and the issues of 31 BC").

[50] And already proposed by GRUEBER 1910, vol. 2, p. 522f., note 1.

[51] SYDENHAM 1952, p. 194, nos 1208-1209.

[52] MARTINI 1987, p. 83: end of 33 BC, Antioch.

[53] P. & P. Santamaria, 29/XI/1920 (Médailles romaines, *Aes grave*), write-up to no. 177 (a *denarius* of the variety *RRC* 542/2; cp. also no. 184, variety *RRC* 542/1).

[54] « Cette lettre (car nous sommes persuadés qu'il s'agit d'une lettre suivie d'un point) est, sans doute, l'initiale du nom du graveur, car on ne pourrait raisonnablement l'attribuer à l'atelier où cette médaille a été frappée. Et il nous sera permis de retenir acceptable notre hypothèse car on ne saurait autrement expliquer ni le soin avec lequel ce P· a été caché dans la chevelure du Triumvir, ni la raison pour laquelle cette étrange lettre ne soit pas visible sur toutes les médailles frappées à l'effigie de Marc Antoine à cette époque. » (Santamaria 29/XI/1920, commentary on no. 177).

[55] The most famous case of ancient dies signed by engravers are the signed dekadrachm and tetradrachm dies of Syracuse: for the varied positioning of the signatures on the tetradrachm dies see, *e.g.*, TUDEER 1913, p. 79f.; one of the classic spots is the *ampyx* of Arethusa.

turies and traditionally explained as an engraver's signature, too. [56] On early coins of Ptolemy I (323 – *c.* 283 BC), the letter is integrated in or placed near the scales of the *aegis* on the posthumous portraits of Alexander the Great wearing an elephant skin headdress *(figs 5 and 5A, p. 122)*. On the subsequent issues bearing the king's own portrait, the tiny letter is placed immediately behind the ear of Ptolemy *(figs 6 and 6A, p. 122)*.

Fig. 5 – Tetradrachm, Ptolemy I Soter as satrap in the name of Alexander, c. 310-305 BC, Alexandria. SNG Copenhagen 19. CNG 88 (14/IX/2011), no. 534 (15.69 g, ↑↗)

Fig. 6 – Tetradrachm, Ptolemy I Soter as king, c. 305-283 BC, Alexandria. SNG Copenhagen 72. NAC 59 (4/IV/2011), no. 657 (14.08 g)

Not too long ago, R.A. Hazzard devoted an entire chapter of his introductory volume to Ptolemaic money to "Coinage by Delta" and proclaimed this individual "the greatest engraver of the Hellenistic age". [57] According to Hazzard's reconstruction, coins with the letter Δ began to appear about 314 BC, and the die-cutter was active for about 25 years; Hazzard thus placed the end of 'Delta's' activity some years before the death of Ptolemy I. [58] There are, however, considerable problems with his hypothesis in the light of recent scholarship. As already noted by Hazzard himself in the last note of his chapter on 'Delta', the re-arrangement of the issues of Ptolemy I and II proposed by Alain Davesne in the publication of the all-important Meydancıkkale hoard involves a shift of many issues signed by 'Delta' to the reign of Ptolemy II (*c.* 283-247 BC). [59] This would stretch this engraver's professional life to about sixty years, if Davesne is right in assigning coins with Δ to as late a period as *c.* 258/7-252/1. [60] Hence, the assumption that Δ was a die-cutter's signature

[56] This interpretation was already advocated in the fundamental modern work on the coins of the Ptolemies, SVORONOS 1908, p. 54 (coins bearing „hinter dem Ohre des Königs in einer Haarlocke verborgen ein mikroskopisches Δ, offenbar den Anfangsbuchstaben des Namens des Künstlers der die Stempel zu sämtlichen Stücken dieser Klasse von wirklich bewundernswerter Schönheit geschnitten hat"; see *ibid.* note 1 for the reference to a bronze coin with the letter).

[57] HAZZARD 1995, p. 25.

[58] *Ibid.*

[59] DAVESNE & LE RIDER 1989, p. 161ff., esp. p. 178.

[60] DAVESNE & LE RIDER 1989, p. 177f.

was understandably criticized by Richard Ashton. [61] Recently, Catherine Lorber undertook a detailed review of the chronology of the coinage of Ptolemy I and also critically re-analyzed the attribution of the relevant obverse dies to different engravers which had been proposed in the late 1960s and 1970s by O.H. Zervos. She discovered that the letter Δ occurs on dies cut under Ptolemy I by different hands (her engravers A1, A2 and B) [62] and concluded that it therefore cannot represent an artist's signature, but that "the letter must have had a control function of some sort". [63] The traditional engraver-hypothesis thus has come under attack from different angles. Scholars who prefer to stick with it would see themselves forced to assume that Δ was originally a die-cutter's signature, but became immobilized at some point and was then carried on simply as part of the design. Admittedly, this is not particularly satisfying either, especially since on some of the late Δ-groups as defined by Davesne, occasionally a few other letters or symbols occur at the position of the Δ as well, for example an A or a dash. [64]

Prima facie, recent research on the enigmatic Δ on Ptolemaic coins thus seems to undermine the hypothesis that the letter P on Antony's *denarii* is to be interpreted as an engraver's signature. However, closer inspection reveals that the new findings hardly have a direct bearing on the interpretation of the Roman issue, since in this case the systematic context of the letter's occurrence is fundamentally different. The P is present just on two closely related coin types, the production of which will not have lasted too long, while the Δ is to be found on many Ptolemaic issues distributed over a considerable period. Due to the limited volume of Antony's series *RRC* 542 it is not *a priori* unreasonable to suppose that all the obverse dies used for it (which are all marked) were the product of a single engraver. Therefore the equation of P with an artist's signature remains attractive, although we have to bear in mind that it is a pure conjecture, at the current state of research. That the letter was placed behind Antony's ear in deliberate imitation of the Ptolemaic practice may seem possible, although the temptation to speculate about the potential background of the die-cutter must be resisted. It is, in any case, not easy to see which other 'control function' such a single letter present on all the coins of an issue could have had, since it probably cannot be taken to be a mint-mark. On imperatorial coins of the Late Republican period, no mint-marks are attested so far with the exception of the explicit signature LVGVDVNI on Antony's *quinarii* *RRC* 489/5. There have repeatedly been claims that Spanish *denarius* issues of the Pompeians were provided with marks indicating their place of issue, but this is a misconception. In the case of the *denarii* of Minatius Sabinus (*RRC*

[61] Ashton 1997, p. 226.

[62] Lorber 2005, p. 54-56.

[63] Lorber 2005, p. 56.

[64] Davesne & Le Rider 1989, p. 177f.

470), the error had already been recognized by Crawford. [65] As for the earliest *denarii* of Sextus Pompey (*RRC* 477), Crawford preferred to follow Buttrey (1960, p. 97) in attributing them to the mint of Salpensa on the basis of the letters SAL present on most of the varieties of the issue. [66] It seems, however, that this attribution is unfounded, and that the letters rather are to be connected with the IMP of the legend, standing for *imperator salutatus*. [67]

III. THE ADMINISTRATION AND OPERATION OF THE ROMAN MINT IN THE HIGH PRINCIPATE: MODERN THEORIES AND THE ANCIENT EVIDENCE

As briefly mentioned in the introduction, the marks on some of the *antoniniani* of Philip I provide evidence for a division of the Roman mint into six workshops for the production of coins of this denomination in AD 248. It has long been regarded as one of the main problems of Roman numismatics that the organizational structure of the mint in earlier imperial times is not evident, since the issues up to Philip I are completely unmarked. Thus, numismatic scholars felt obliged to try and find out whether (or: how far) the system evidently in operation in AD 248 could be traced back to an earlier period. It might, at the first glance, seem somewhat simplistic to presuppose that the introduction of *officina* marks was merely intended to visualize a set-up already in existence long before, and not a completely new one, but contributions like Otto Voetter's analysis of a division into six reverse types in the coinage of Maximinus I Thrax (AD 235-238), the issues of the eventful year AD 238 and in the coinage of Gordianus III (AD 238-244) fostered the belief in the legitimacy of this quest. [68] A quote from R.A.G. Carson's above-cited paper about 'System and Product' vividly illustrates the tangible preoccupation to reconstruct stable organizational structures for the mint of Rome over the centuries: "It has not yet been determined how far back into the second century this particular mint organization [*i.e.* into six *officinae*] can be detected as being reflected in the coinage. A very superficial scrutiny directed at three points, taken at random, in the coinage of Marcus Aurelius, Antoninus Pius, and Trajan suggested that it was inherently most probable that the six-*officinae* mint plan could be detected in these reigns" (CARSON 1956, p. 239). Before we deal with the problem of the internal subdivision of the mint of Rome in the light of the results of recent systematic analyses of imperial coinages and series struck in Rome for the east, some general remarks about the administrative framework of coin production in the Early and High Principate are necessary.

The office of moneyer did not die out with the disappearance of the names of the *tresviri aere argento auro flando feriundo (IIIviri a.a.a.f.f.)* from the

[65] *RRC* p. 93. See also WOYTEK 2003, p. 289f.

[66] CRAWFORD 1974, p. 94, note 2.

[67] For a detailed reasoning, see WOYTEK 2003, p. 498f.

[68] VOETTER 1894, p. 387ff.

Roman coinage under Augustus. Epigraphic evidence proves that this most prestigious of the vigintiviral offices, held at the beginning of the *cursus honorum*, survived into the third century AD: it is attested until Severus Alexander (AD 222-235), perhaps even until *c.* AD 250. [69] What the competences of the *monetales* were, after Augustus, and to which degree they continued to be involved in the production of coinage is, however, largely unclear. It seems safe to assume, though, that their role was minor, at least from the late first century (?) AD onward, when a procuratorial post for the administration of the mint was created. The first attested *procurator monetae*, who was the immediate subordinate of the imperial Minister of Finance (*a rationibus*), is L. Vibius Lentulus, who held office in the period *c.* AD 96-102. [70]

A group of celebrated Trajanic inscriptions discovered in Rome next to the church of San Clemente, on the Caelian Hill, provides important evidence that the identification of the large first century AD building beneath the church as the Roman mint of the High Principate is correct. [71] The inscriptions offer unique insight into the structure of the personnel responsible for the production of coins at the mint – the so-called *familia monetalis*. [72] Needless to say, these most important sources not only provide fascinating information, but also pose a lot of questions. Therefore, together with further epigraphic documents from Rome mentioning various other employees of the mint with their respective job designations, the Trajanic inscriptions gave rise to a great number of different modern reconstructions of the inner working and the division of labour at the Roman mint. It is, of course, impossible to review all the pertinent modern contributions in detail here. [73] We will simply give a short survey of the core of the primary evidence and its implications and specifically focus on one particularly controversial and momentous aspect, *viz.* the meaning of the term *signator* used in one of the inscriptions.

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[69] For a collection of epigraphic testimonies, see Jones 1970 (with the additions by Crawford 1974, p. 599, note 1).

[70] Peachin 1986, p. 95.

[71] The most comprehensive treatment of the question from the archaeological point of view is by Coarelli 1994, p. 47-61, who argued for a date between AD 81 and 84 for the opening of the building; this was accepted, *inter alios*, by Burnett 2001, p. 41f.

[72] For this term, see *e.g.* CIL VI, 239, an undated dedication to the *Genius* of the *familia monetalis*, set up by an imperial slave calling himself *disp*(ensator). This inscription, although discovered later than the dated inscriptions just mentioned, seems to be part of the Trajanic ensemble.

[73] For a good doxographic overview, see Wolters 1999, p. 89-96. The most notable contributions are the following: Mommsen 1887; Hirschfeld 1905, p. 184-189; R.-Alföldi 1958/59; Instinsky 1962, p. 47-50; Lafaurie 1972; Göbl 1978, vol. 1, p. 165-169; Göbl 1980. See also Bernareggi 1974. The texts of most of the relevant epigraphic documents have been conveniently assembled by R.-Alföldi 1958/59 in her *Anhang* (p. 47f.); it has to be stressed, though, that the listing is far from being exhaustive.

The Trajanic inscriptions [74] adorn the bases of statues which were probably all set up on January 28, 115 AD – not by chance the *dies imperii* of the emperor. [75] On three of them, Felix is named, a freedman of Trajan, who apparently oversaw the day-to-day operation at the mint: the full version of his title is given as *optio et exactor auri argenti et aeris* on the base of a statue of Apollo Aug(ustus) which was dedicated by Felix alone (*CIL* VI, 42). [76] A dedication to Fortuna Aug(usta) (*CIL* VI, 43), set up by the *officinatores monetae aurariae argentariae Caesaris n*(ostri), carries a list featuring the names of Felix himself, of his deputy Albanus (a *libertus*, too, styled *optio* as well) and 16 freedmen expressly called *officinatores*, as well as nine slaves without that specific title: note the overall ratio of 2 ÷ 1 between freedmen and slaves in this group. On the contrary, in the opening lines of the longest of the inscriptions, a dedication to Hercules Aug(ustus) (*CIL* VI, 44), the name of Felix is carefully distinguished from the *signat*(ores) *suppostores malliatores monetae Caesaris n*(ostri), who had contributed to the setting up of the statue (D.S.D.D.). These three groups of workers apparently made up the bulk of the personnel at the mint. A long list of names in this inscription, written in four columns, comprises 63 names in total which are distributed as follows:

	Total number	of which freedmen	of which slaves
Signatores (column I)	**17**	12	5
Suppostores (column II)	**11**	7	4
Malliatores (columns III-IV)	**32**	11	21
TOTAL	***60***	*30*	*30*
Workers mentioned in column IV after the *Malliatores*, affiliation not specified [77]	**3**	2	1

Table 1 – The Roman mint workers as listed in CIL VI, 44

[74] *CIL* VI, 42-44 and 791; see also 239 (note 72 above).

[75] STROBEL 2010, p. 171. The precise date is given on two of the inscriptions, *CIL* VI, 43 and 44; just the consular date on *CIL* VI, 791. The significance of the date had first been noted by INSTINSKY 1962, p. 45f.

[76] It is interesting to note that under Commodus, in 190, the Roman mint issued *denarii*, *sestertii* and *asses* showing a statue of the nude Apollo standing right in quite an unusual posture, with crossed legs, leaning on a column; the god is identified as APOL MONETAE on the *sestertii* and *asses* (SZAIVERT 1986, p. 164, nos. 793/4 and 794/6 and 9; *RIC* [MATTINGLY & SYDENHAM 1930] Commodus 205, 559 and 569 – *RIC* 584 and 594 seem to be ghosts). It has been suggested that these coins depict the statue which was dedicated by Felix: see MOWAT 1909, p. 101-103, BABELON 1914, p. 278-281 (unreliable) and HILL 1989, p. 72f.; for the general context, see also MATTINGLY 1940, p. clxvi f. SCHMIDT-DICK 2011, p. 111, Apollo II.1.01, does not want to connect the type with the mint.

[77] For the interpretation of the status of these three men, see MOMMSEN 1887, p. 36, note 2 and HIRSCHFELD 1905, p. 185, note 2. Their function is unknown; the considerations on this problem by R.-ALFÖLDI 1958/59, p. 38 and GÖBL 1978, vol. 1, p. 167 are purely speculative.

As already mentioned above, there are quite a few uncertainties regarding the interpretation of these inscriptions. First, it is not clear whether the men listed – altogether ninety – are to be taken to represent the entire workforce of the Roman mint at the beginning of AD 115 or just part of it. While early 20th century scholarship tended to opt for the latter possibility, [78] currently the inscriptions are sometimes regarded as preserving a snapshot of the entire personnel. [79] Obviously, we should be very cautious with such far-reaching deductions. It is true that the precise overall ratios of 2 ÷ 1 and 1 ÷ 1 between freedmen and slaves to be observed in *CIL* VI, 43 and VI, 44 are suggestive and that we therefore may possess a complete record of the *officinatores* and their staff as well as of the *signatores*, *suppostores* and *malliatores*. [80] On the other hand, there may well have been further groups of employees who either did not dedicate a statue in AD 115 or whose inscription has not come down to us – we simply cannot know. We shall return to this question shortly.

This uncertainty is closely intertwined with another problematic point, *viz.* how the technical job designations of the various workers at the mint are to be interpreted and explained and what they tell us about the mint's inner structure. It is evident that the *officinatores* were higher in rank than the three groups of workers who, together, dedicated the statue of Hercules Augustus – Felix, who seems to have directed the daily business at the mint, heads the list of the *officinatores* himself, after all. It is, however, not clear what their precise tasks were. If, as it seems, the division between the workers listed in *CIL* VI, 43 and 44 was, in the main, one between men doing manual work and those doing 'white collar' work of some sort, [81] *officinatores* perhaps had various administrative duties, including accounting and perhaps also some aspects of quality control. This hypothesis derives from the fact that in two other inscriptions, the term *officinator* is found in close association with the term *nummularius* ('money-tester'): *CIL* VI, 298 is an undated dedication to Hercules set up by *officinatores et nummulari officinarum argentariarum familiae monetari* [*sic*]. Even more revealing is a funerary monument set up by the mint worker Secundus, an imperial freedman, in the Trajanic period (*CIL* VI, 8463): In the inscription he had engraved for his wife, he is called *off*(icinator) *mon*(etae), whereas his own inscription reads *M. Ulpio Secundo* / *nummulario* / *offic*(inatori) *monetae*. Perhaps checking the quality of the freshly produced coins was one of the jobs

[78] Hirschfeld 1905, p. 187 („nur die Repräsentanten"); Mowat 1909, p. 107 (« il n'y a là qu'une partie du personnel de l'établissement »).

[79] Coarelli 1994, p. 62 ("si può ricavare probabilmente il numero totale degli operai che lavoravano alla Moneta in quell'anno").

[80] Thus also R.-Alföldi 1958/59, p. 35f.; Duncan-Jones 1994, p. 109, note 67; Wolters 1999, p. 89.

[81] Although not even this is generally accepted: Mattingly 1936, p. xviii suggested that the *officinatores* were "responsible for preparation of dies and flans"; see also Lafaurie 1972, p. 269.

of the *officinatores.* Be that as it may, they seem to have been key members of the staff at Roman mints for centuries, as their occurrence in a dedication to Constantine the Great set up in Rome by the *procurator monetae* Valerius Pelagius after AD 312 demonstrates eloquently. [82] The term *officinator* – in itself rather generic – of course derives from the word *officina* ('workshop'), which is why Robert Göbl was eager to stress that the mention of *officinatores* in CIL VI, 43 implied the division of the Trajanic mint into a certain number of *officinae*. [83] This is a possibility. On the other hand, one of the principal conclusions of any analysis of the inscriptions of AD 115 inevitably has to be that a division into a fixed number of *officinae* is not evident from them. Neither the *officinatores* nor the *signatores, suppostores* and *malliatores* are specifically assigned to separate workshops within the mint. [84] If such a division was in operation, it may therefore perhaps be thought not to have been of a paramount importance in the Trajanic period.

The statistical analysis in table 1 indicates that the three groups of workers detailed in CIL VI, 44 are listed in a descending order of social status. While there are many more freedmen than slaves among the *signatores*, exactly the opposite is true for the 'hammerers' *(malliatores)*, who seem to have been unqualified labourers and formed the largest group of the three by far. The terminology hardly leaves room for equivocalness concerning the precise tasks of the *malliatores* and the *suppostores* in the coining process: There is a broad consensus in scholarship that the *suppostores* put the blanks between the dies and then removed the coins, which were struck by the *malliatores* through a hammer blow. [85]

But what was the function of the *signatores*? [86] Modern orthodoxy regarding the interpretation of the term goes back to the beginning of the 18th century at least: In 1700, the Danish numismatist Otho Sperling identified them as die-cutters: "Signatores igitur dicuntur, qui cuneum signis suis & literis sculpserunt" (SPERLING 1700, p. 238). This explanation was accepted by

[82] CIL VI, 1145: *curante Val*(erio) *Pelagio v*(iro) *e*(gregio) *proc*(uratore) *s*(acrae) *m*(onetae) *u*(rbis) *una cum p*(rae)*p*(ositis) *et officinatoribus*. For Valerius Pelagius, see Peachin 1986, p. 100, no. 15.

[83] GÖBL 1978, vol. 1, p. 167.

[84] See already WOLTERS 1999, p. 98 („So spiegelt sich auch in den Inschriften der trajanischen Zeit die Offizinsstruktur nicht wieder [*sic*]").

[85] See, for example, BABELON 1901, col. 867; R.-ALFÖLDI 1958/59, p. 35f.; WOLTERS 1999, p. 93. The one scholar disagreeing fundamentally is LAFAURIE 1972, p. 270; for the untenability of his interpretation see, however, already GÖBL 1978, vol. 1, p. 168. VITTINGHOFF 1937, col. 2044 preferred to regard the *suppostores* as „ … ‚Setzer', die den Oberstempel auf den Unterstempel, auf dem der Schrötling liegt, setzen", but this is equally unconvincing, since the linguistic point of reference should be the blank/coin, rather than the upper die.

[86] For a thorough and systematic treatment of this problem, see WOYTEK (in preparation).

Bᵒⁿ Bimard de la Bastie in his erudite and extremely influential *Remarques* in the definitive edition of Jobert's *Science des Médailles*, published in 1739: "[les ouvriers] étoient diviséz en plusieurs classes, les uns nomméz *Signatores*, gravoient les coins" (vol. 2, p. 65). This traditional interpretation of the term has been repeated up to the present day, despite the fact that a sepulchral inscription from Rome for a worker of the Roman mint (*CIL* VI, 8464) casts severe doubts on its correctness. The text runs as follows: *D*(is) *M*(anibus) *P*(ublius) *Aelius Felix q*(ui) *et Novellius Aug*(usti) *lib*(ertus) *atiutor praepos. scalptorum sacrae monetae se vibo fecit sibi et suis libertis libertabusque posterisque eorum*. The inscription does not bear a dating. Still, Hirschfeld (1905, p. 186) did not hesitate to attribute it to „Hadrians Zeit" because of the *nomen gentile* of the imperial freedman, although the mint's attribute *sacra* might arouse some perplexity in this respect.

The title of P. Aelius Felix has been expanded in different ways, but should most probably be *adiutor praepositi scalptorum*. [87] He must have been a fairly prominent member of the division of die-cutters of the Roman mint: *scalptor* is the well-known Latin word for 'glyptic artist'; *scalpere* was the Romans' technical term for cutting precious stones. [88] In fact, the working routine of glyptic artists and die-cutters was quite similar in antiquity, [89] and in rare instances it is even possible to document the activity of Greek artists in both media. [90] Therefore, it is not surprising to see a term which is frequently attested for gem cutters in ancient literary texts being used for a die cutter of the imperial mint in this inscription.

Since P. Aelius Felix is given his full title in *CIL* VI, 8464, it is safe to assume that *scalptor* was the technical term used to designate die-cutters in the jargon

[87] Thus Hirschfeld 1905, p. 186 and Regling 1930a; for the suggestion *adiutor praepositus* see Babelon 1901, col. 866. For the title *praepositus* at Roman mints in general, see *CIL* IV, 1878 and especially the Constantinian inscription *CIL* VI, 1145, cited above in note 82.

[88] For the word *scalptor* see, for example, Pliny the Elder, n.h. 37.60, and Pliny the Younger, ep. 1.10.4 *(ut enim de pictore scalptore fictore nisi artifex iudicare, ita nisi sapiens non potest perspicere sapientem)*. For the by-form *sculptor*, see Isidore, orig. 6.11.3 *(gemmarum sculptores)* and *CIL* VI, 9436: *L. Uttedius Hermias* / *gemmarius sculptor* / *ann*(os) *vix*(it) *XLV*. For *scalpere* in connexion with gems, see Plin. n.h. 37.8, 37.63, 37.177. On terminology in general: Zehnacker 1973, p. 20-21 (especially on *scalpere* and *sculpere*) as well as Zwierlein-Diehl 2007, p. 4.

[89] On technical aspects, see in general Hill 1922, p. 16-19, and Zehnacker 1973, p. 18-25. Die-cutter's tools are probably depicted on the famous relief with the busts of the *liberti* P. Licinius Philonicus and P. Licinius Demetrius from Tusculum (*CIL* XIV, 2721-2722); see the discussion by Vermeule 1954, pp. 18, 37 and 47-51.

[90] See especially Zwierlein-Diehl 2007, chapter 10 („Gemmenschneider als Münzstempelschneider"), p. 78-80, and Zazoff 1983, p. 137-140. The most famous case is Phrygillos (*c.* last quarter of the fifth century BC), whose name is known from two signed gems as well as from Syracusan coins; he apparently also signed coin dies for Thurioi and Terina. For his activity, see Dembski 1981.

of the Roman mint under the Empire. But how to conciliate this with the hypothesis that the *signatores* mentioned in CIL VI, 44 are engravers? Mommsen paved the way for many generations of scholars by postulating, in a footnote of an article published in 1887, that the two terms were simply used synonymously and that there was no difference in meaning between them at all. [91] It would be unnecessary to enumerate all the scholars who followed suit – including this author, in a previous contribution. [92] Suffice it to indicate that authorities like Ernest Babelon, [93] Otto Hirschfeld, [94] Kurt Regling [95] and Michael Crawford [96] supported Mommsen's interpretation, and that Reinhard Wolters also acknowledged the equation *signatores* = *scalptores*, adding the suggestion that the term *scalptor* was perhaps being used in a later period, as compared to *signator*. [97] In a lengthy treatment, Wolters then tried to use the ratio between *signatores*, *suppostores* and *malliatores* (as attested in the inscription CIL VI, 44) for statistical calculations regarding the numerical relationship between die-cutters and the production teams of the Roman mint – which he took to consist solely of *suppostores* and *malliatores*. [98]

As will be argued in greater detail elsewhere, [99] the almost universally acknowledged assumption that the terms *signator* and *scalptor* are synonyms is doubtless incorrect. The main reason for the equation's acceptance – *viz.* that otherwise die-cutters would not be attested in the Trajanic inscriptions from the *Mons Caelius* [100] – is invalid. We must not postulate that the epigraphic documentation at our disposal is complete. On the other hand, apart from the existence of the inscription of P. Aelius Felix attesting the technical term

[91] MOMMSEN 1887, p. 36f., note 2: „Die auch vorkommenden *scalptores* sind ohne Zweifel identisch mit den *signatores*". In the same footnote, Mommsen also hypothesized that *nummularius* (attested, *e.g.*, in CIL VI, 298) may have been a collective term for *signatores*, *suppostores* and *malliatores* – a most unlikely suggestion.

[92] WOYTEK 2010A, p. 46.

[93] BABELON 1901, col. 866: « Les *signatores* se confondaient plus ou moins avec les *scalptores*. »

[94] HIRSCHFELD 1905, p. 187.

[95] REGLING 1923: *Signator* as „ein Münzarbeiter, der das Prägegeschäft versieht (*signare* = prägen); im besonderen Sinne scheinen die *signatores* der Inschrift Dessau 1635 diejenigen zu sein, die die Stempel schneiden, da die eigentlichen Präger, *suppostores* und *malliatores*, neben ihnen genannt werden". REGLING 1930B: „Amtsbezeichnung eines Münzhandwerkers, wohl = scalptor"; see also REGLING 1930A.

[96] CRAWFORD 1974, p. 578, note 5.

[97] WOLTERS 1999, p. 90-95, esp. 95.

[98] WOLTERS 1999, p. 107-112. His argument involves modern estimates of average numbers of coins which could be struck from single dies as well as estimates of the time it might have taken to cut a Roman coin die. The author aims at demonstrating that the production capacity of the Roman mint was very high.

[99] See note 86 above.

[100] Thus WOLTERS 1999, p. 93.

scalptor in a numismatic context, there are several good reasons for believing that the *signatores* were certainly not responsible for cutting the dies, but were involved in the coining process itself.

First, the epigraphic context. It would be rather strange to find Trajanic die-cutters, who – in the tradition of their illustrious Greek forebears like Phrygillos, Kimon and Euainetos – may have regarded themselves mainly as artists, mentioned in CIL VI, 44 in the company of *suppostores* and *malliatores* who admittedly did the dirty work in the mint. While the dedication to Hercules seems particularly appropriate for labourers, as has been remarked repeatedly, [101] it would be odd for artists, especially bearing in mind the existence of a parallel dedication – in the same group of inscriptions – to Apollo, the patron of the arts.

Second, there is the linguistic problem. Despite affirmations to the contrary in the modern numismatic literature, [102] it is – from a philological perspective – hardly possible to attribute the meaning "person who engraves dies" to the word *signator* in this particular case, in view of its usual sense and semantic context. [103] Principally, the term designates a person who affixes a seal *(signum)* to a legal document and thereby acts as a 'witness'. [104] This basic difficulty is frequently disregarded, but it has not altogether escaped scholars. In a circumspect contribution, Hans Ulrich Instinsky correctly drew attention to the analogy between the production (and use) of seals and of coin dies. „Der *scalptor* stellt das Siegel her, der *signator* ist es, der damit siegelt." [105] He then logically proposed that „die *signatores* […] diese [*i.e.* the coin dies] führen, um damit den Münzen ihre Bilder aufzuprägen wie ein Siegel" – but surprisingly failed to make the decisive step of identifying the *signatores* with the mint-workers who did just that and were involved in the coining process. [106] Instead, Instinsky preferred to interpret their role as purely administrative: „sie

[101] See, for example, Hirschfeld 1905, p. 186 and Wolters 1999, p. 93. Of course, Trajan's specific devotion to Hercules must be remembered as well: Instinsky 1962, p. 46.

[102] R.-Alföldi 1958/59, p. 39; R.-Alföldi 1978, p. 32; Wolters 1999, p. 94f.

[103] It is also impossible linguistically (as well as structurally, by the way) that the *signatores* were "quality checkers of some sort", as Beckmann 2012, p. 407 tentatively proposed.

[104] See the lexica: In Georges 1995 (s.v. *signator*), the first meaning given is „Untersiegler", the second is „Geldpräger" (with reference just to CIL VI, 44). Similarly, the *Oxford Latin Dictionary* (Glare 1982; s.v. *signator*) translates as "witness to a document, esp. to a will" (citing many literary references); the word *signator* in CIL VI, 44 is tentatively ("perh.") – and doubtless too specifically – rendered as "official responsible for the stamping of bars of assayed metal in a mint". In general, see the excellent and exhaustive article "Signum" in RE by Wenger 1923; esp. col. 2362 for *signator* („der Siegelnde"). R.-Alföldi 1978, p. 32 (on the *signatores*: „jene Werkleute, die »beschreiben, aufzeichnen« ") may consequently be seen to be in error.

[105] Instinsky 1962, p. 50.

[106] This step was taken by Lafaurie 1972, p. 270, but unfortunately, his overall reconstruction of the coining process is still incorrect, see note 122 below.

könnten diejenigen sein, die verantwortlich den ordnungsgemäßen Einsatz der Stempel, ihre richtige Koppelung, ihren Wechsel und was sonst damit zusammenhängt tätigen und überwachen". [107]

This was an error just at the last turn. Still, Instinsky's interpretation was expressly endorsed by Robert Göbl in his textbook *Antike Numismatik*. [108] Instinsky had arrived at his interpretation just through philological reasoning. In the present writer's opinion, it is possible to see what the job of the *signatores* really was if one also takes the two most notable Roman imperial depictions of coining scenes as preserved on numismatic objects into account. One of them is a Late Roman contorniate type documented in three specimens (from the same pair of dies), showing Nero's head on the obverse. [109] We will not discuss the complex reverse of this type, to be dated between *c.* AD 355 and 410, [110] in detail here. [111] It shows no fewer than six people; three of them, pictured in the centre, are in the process of striking coins, as has already been recognized by Sabatier in the mid-19th century. [112] The depiction of this working team has a close parallel on an imperial *tessera* in the Vienna coin cabinet [113] *(figs 7 and 7a, p. 122)* – an iconic piece of numismatic science, illustrated on the title-page of the first volume of Ernest Babelon's *Traité des monnaies grecques et romaines* (1901).

This *tessera* [114] shows, on one side, the three *Monetae* in a building which has been identified by Filippo Coarelli [115] as the Roman mint on the *Mons*

[107] Instinsky 1962, p. 50. Already Jongkees 1943, p. 187 had rejected the equation between *signatores* and *scalptores* and toyed with the idea that the *signatores* may primarily have had administrative duties.

[108] Göbl 1978, vol. 1, p. 168: „Daher sind die *signatores* für den richtigen Einsatz, die richtige Koppelung und die Funktionskontrolle der Stempel verantwortlich. […] Die *signatores* haben daher auch mit dem Stempelschnitt nichts zu tun. [… Der *signator*] bürgt […] mit seinem von ihm zu verantwortenden Stempel für das richtige Produkt", with notes 639 and 640.

[109] Alföldi & Alföldi 1976, p. 45, no. 156 (Vatican, Paris & London) and pl. 52, 4-6. Alföldi & Alföldi 1990, p. 170f., reverse no. 116 (pl. 260, no. 6). Cp. also Alföldi 1942/43, vol. 1, p. 115f. (and vol. 2, pl. xiv, no. 7) as well as Mittag 1999, p. 299 (and pl. 24, no. 116). An enlarged illustration of this type is provided by van Heesch 1992, p. 105; it is also illustrated, *inter alios*, by Göbl 1980, pl. ix, no. 5.

[110] It belongs to the 'regular' series of contorniates (obv. Nero viii); for the date see Mittag 1999, pp. 31-33 and 217-219.

[111] See Woytek *(in preparation)*.

[112] Sabatier 1860, p. 122-124.

[113] Inv. no. mk ro 32.652; 7.34 g; ↑↑; ∅ 25 mm. The object is made of bronze and shows, on both sides, remains of ancient silvering, as already reported by Mowat 1909, p. 109.

[114] Published only as late as 1892 by Adrien de Belfort, who did not grasp the significance of the reverse – he did not recognize that it depicted a coining scene (p. 175f.).

[115] Coarelli 1994, p. 59. For the suggestion that it is a mint building, see already Mowat 1909, p. 109.

Caelius. On the other side, three people striking coins are depicted under a garland – an artistic convention indicating that we are dealing with an interior scene. The *tessera* does not bear an inscription and has, consequently, been assigned to many different phases of the Roman imperial period. While Robert Mowat believed it to be Augustan for stylistic reasons, [116] Coarelli dated it "della fine del I o degli inizi del II secolo". [117] Others opted for later dates, for the second/ third or even the third/fourth centuries AD, [118] and they may well be right. [119] Thus, there was perhaps no big time gap between the scenes on the *tessera* and on the contorniates, [120] although this remains, for the moment, a matter of speculation. The first correct (and at the same time admirably succinct) description of the scene on the *tessera* was given by Adrien Blanchet (1899, p. XX): « Cette tessère nous permet de comprendre l'opération du monnayage: Un des personnages place les flans entre les deux coins; le second tient le coin supérieur au-dessus du flan; enfin le *malleator* frappe, et les pièces de monnaies s'amoncellent à ses pieds. » [121]

Fig. 7 – Tessera, Kunsthistorisches Museum Wien, Münzkabinett, inv. no. MK RO 32.652 (7.34 g, ↑↑)

Two points are crucial for our purpose. First, the two images, though completely different in their overall character, show striking structural and iconographic similarities as far as the depiction of the three workmen is concerned – their positioning in relation to each other, their dress, the posture of the figure on the right, the fact that this man is sitting on a sort of 'sofa', on which he rests his elbow etc. This may imply that the scene was a typical one and the

[116] MOWAT 1909, p. 109. See also HAAG 2009, p. 48-49 (no. 13b): „Zeit des Augustus".

[117] COARELLI 1994, p. 59. For a similar dating, see R.-ALFÖLDI 1978, p. 31.

[118] VERMEULE 1954, p. 33: second/third century AD; VAN HEESCH 1992, p. 106: third/fourth century AD.

[119] In ALFÖLDI & ALFÖLDI 1990, p. 171, note 3, Elisabeth Alföldi-Rosenbaum reports that Robert Göbl informed her *(per litteras)* that in his view the *tessera* dated to the late third century AD at the earliest, due to the depiction of the architecture on the obverse. Already in 1914, Babelon critizised the date proposed by Mowat as being much too early (BABELON 1914, p. 292, note 1).

[120] See ALFÖLDI & ALFÖLDI 1990, p. 171: „jedoch spricht die Architekturdarstellung der Vs. mit den drei *monetae* dafür, daß die *Tessera* mit der Kontorniaten-Rs. gleichzeitig sein könnte und sicherlich nicht wesentlich früher hergestellt wurde".

[121] BLANCHET was closely followed by BABELON 1901, cols 904f.: « L'une des deux figures assises place le flan sur la pile, l'autre maintient le trousseau verticalement posé sur le flan ».

rendering of the group quite accurate and faithful. There is nothing to suggest that we are dealing here with representations specifically of the production of large bronze coins or medallions, as Jean Lafaurie (1972, p. 270) surmised, whereas 'normal' coins of smaller module would have been struck by just one moneyer who held the upper die, hammered and put in the blanks himself. [122] Second, despite many erroneous descriptions of the *tessera*, [123] which threatened to obscure the evidence, it must be stressed that a strict division of labour between the three members of the team is evident in both depictions. One man wields the hammer, one handles the flans/coins (without tongs!) and the exclusive responsibility of the one sitting on the right seems to have been to hold and position the upper die. [124]

The numismatic evidence may be seen to prove conclusively that coin production was the work of teams of three highly specialized workmen at the mint of Rome in the later imperial period. In many trades, traditions were strong in pre-industrial societies, and often basic working routines hardly changed over the centuries. This may well be true for Roman coin production, too, and Late Antique coining routine may have been essentially the same as in the High Principate. Since the Trajanic inscription CIL VI, 44 attests the existence of precisely three groups of manual workers, I propose to identify the three workers on the *tessera* accordingly: the hammerer as a *malliator*, the one handling the coins and blanks as a *suppostor* and the one responsible for holding and placing the upper die and thus litterally "stamping" the coins as a *signator*. [125]

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[122] Unfortunately, this assumption mars Lafaurie's overall reconstruction of Roman coin production, although he was one of the few to recognize that the *signator* was not an engraver: « Bien loin d'être un graveur […] c'est le personnage qui signe, met la marque de l'autorité sur le flan. … Les *signatores* ne peuvent être que les employés qui signent, au nom de l'État, les flans qui, de ce fait, deviennent des monnaies. … Ce sont les monnayeurs. » (1972, p. 270).

[123] Mowat 1909, p. 109; Lafaurie 1972, p. 270; Göbl 1978, vol. 2, p. 275 (description of no. 3598: calls the man on the right „Geldzähler (?)"); Wolters 1999, p. 104.

[124] Both Lafaurie 1972, p. 270 and Wolters 1999, p. 104, note 239 expressed the view that the upper die is being held by both of the seated men, on the *tessera*, but enlarged digital images of the surprisingly precise image (like the one in *fig. 7a*) show that this is in all probability not the case. While the man on the right is holding the upper die by means of a rod-shaped object (a pair of tongs?), the right forearm of the man in the middle terminates in an object of about semicircular shape. In view of the fact that nine dots = 'coins' are depicted immediately beneath his forearm, one might be tempted to conjecture that he is shown handling a coin. This is in accordance with the depiction on the contorniate, see Mittag 1999, p. 299: „Ein Mann hält einen Münzschrötling auf den Vorderseitenstempel, ein zweiter, der nach links liegt, hält den Rückseitenstempel, ein dritter hält in der erhobenen Rechten einen Hammer".

[125] This simple solution has been suggested by Göbl 1980, p. 108 – who, however, contradicted himself on this very problem on p. 106 of the same contribution, where he mistakenly identified the *signator* as a man counting coins.

Our solution ties in well both with the social structure of the three groups as attested in the Trajanic inscription and with the numerical relationship between them. The highest responsibility was doubtless with the *signatores*, the group with the highest percentage of freedmen which is listed first. They had to make sure that the right dies were used, that they were not broken and were working properly, that hybrid couplings were avoided and that the dies were positioned correctly. But their job was also physically quite demanding, since they were constantly lifting and lowering the upper die (and presumably therefore had to rest their elbows on the armrest of their bench). For the *suppostores*, concentration was of course key, but life was easier physically, since the coins they were handling were very light. Only the hammer-wielders – lowest in rank, for the major part slaves and listed last – seem to have had a more exhausting job than the *signatores*, since they were constantly moving their arms and upper body. Accordingly, the relays or shift changes [126] will probably have occurred with a different frequency for each single position, with the *malliatores* being replaced more frequently than the *signatores*, while the *suppostores* could work the longest shifts: this may explain why the names of just 11 *suppostores*, but of 17 *signatores* and no less than 32 *malliatores* are attested (see table 1).

In the dedication CIL VI, 44, these three groups of workers declare their affiliation to the *moneta Caesaris nostri*. This general designation should be taken to encompass all the three metals, and it fits well with the title of Felix as given in the same inscription, *viz. optio et exactor auri argenti aeris* – a title doubtless modelled on the traditional title of the *IIIviri monetales*. Things are complicated, however, by the dedication of the *officinatores* mentioned above (CIL VI, 43) who specifically call themselves workers of the gold and silver mint of the emperor: *officinatores monetae aurariae argentariae Caesaris n*(ostri). The bronze is not mentioned here, and therefore this epigraphic document has, since Mommsen's days, [127] often been cited in support of the theory that there was an organizational or at least a local separation between the production of coinage in precious metals and in bronze in the imperial period. [128] The omission of the *aes* in CIL VI, 43 is indeed *prima vista* puzzling – perhaps a parallel dedication by the '*officinatores monetae aerariae*' simply got lost? [129] On the other hand, it is true that other epigraphic documents (mostly of uncertain date) do seem to indicate some autonomy of units striking either precious or base metals as well. An inscription already quoted above was set up by *offici-*

[126] See R.-Alföldi 1958/59, p. 37; Coarelli 1994, p. 63.

[127] See his note to the inscription in CIL VI, 1 (published 1876), p. 8.

[128] On this discussion, see Wolters 1999, p. 90f. (and p. 96, note 199), who leaves open the possibility that under Trajan only gold and silver were coined in the minting establishment on the Caelian Hill, whereas bronze coins might have been produced on the Capitol.

[129] See Göbl 1978, vol. 1, p. 167.

natores et nummulari officinarum argentariarum, [130] another text mentions a *superpositus numulariorum auri monetae*, [131] a third one a man working at the smelter *auri et argenti moneta*(e). [132] Be that as it may, numismatic scholarship has recently produced evidence which indicates that the Roman mint structure still seems to have been quite coherent.

That the minting of gold and silver was closely integrated under Trajan is evident from the die-links between *aurei* and *denarii*, as well as between half-*aurei* and *quinarii*, which are to be observed quite frequently. [133] New evidence is provided by 'provincial' coins. It has become clear in recent years that under the Flavians, as well as especially under Nerva and Trajan, the Roman mint not only struck imperial coins, but also produced regional coinages in silver and bronze which were then shipped to various eastern provinces. [134] Stylistic analysis has put it beyond reasonable doubt that in the early years of Trajan's reign, one engraver cut obverse dies both for imperial *aurei* and for Syrian tetradrachms with Greek legends. [135] Within the provincial production of the Roman mint, an important die-link was observed by Richard McAlee. He noticed that a silver tetradrachm for Syria (of 'Rome style' and with a ↑↓ die axis, just as the imperial pieces), dated to Trajan's second consulship, was struck from the same obverse die that was used for an *orichalcum* coin with Greek legends of a type found in different eastern provinces of the Roman empire, especially in Syria and in Cyrene. [136] Although a die was, of course, a portable object, the most natural interpretation of this die-link seems to be that in AD 98/99, provincial coinages in both silver and *aes* were struck in Rome at the same minting establishment. If the latter is to be identified with the Roman mint on the Caelian Hill – a hypothesis that suggests itself, also in the light of the engraver identity highlighted above –, this die link would indicate that both silver and bronze coins were struck at this mint. The conjecture based on the inscription *CIL* VI, 43, according to which only gold and silver were struck there, would thus be disproved.

Not all of the famous inscriptions of the Trajanic period were set up by employees of the mint, however: *CIL* VI, 791 is a fragmented dedication to Victoria Aug., which is tied to the group through the same consular dating (AD 115).

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[130] *CIL* VI, 298.

[131] *CIL* VI, 8461.

[132] *CIL* VI, 8456. For *CIL* XIV, 3642 see below.

[133] See, *e.g.*, WOYTEK 2010A, vol. 2, plates 138-140, 143-144, 149, 151 etc.

[134] CARRADICE & COWELL 1987; BUTCHER & PONTING 1995; BUTCHER 2004, p. 81-88; WOYTEK 2010B, 2011A & 2011B.

[135] MCALEE 2007, p. 188f., with fig. 20A. For similarities between the obverses of imperial and provincial bronzes of Trajan, see WOYTEK 2011B, p. 158.

[136] MCALEE 2007, p. 189: nos 434 (rev.: eagle on palm branch) and 498A (rev.: legend in two lines in wreath). For the *orichalcum* coinage see ASOLATI *et al.* 2009 and WOYTEK 2011A, p. 438f.

It was paid for by five *conductores* (contractors) of the *flatura argen*(taria) *monetae Cae*(saris), the silver smelter of the mint, four of which are Ulpii – doubtless Trajanic freedmen. [137] Hence, the Roman state apparently did not have the flans for the silver coins prepared at the mint in Trajan's time, but rented production out to private individuals. The fact that they were imperial *liberti* makes it clear, however, that the state maintained some form of control in this case and doubtless monitored the activities at the *flatura* closely. Entrepreneurship of this kind in connexion with coin production is also attested in two other undated epigraphic documents which Mommsen (1887, p. 38) tentatively attributed to the third century AD. Again, the evidence is to some extent controversial.

CIL VI, 8455 is the gravestone of *P. Calvius Sp. f. Iustus mancips officinarum aerariarum quinqu*{a}*e item flaturae argentariae.* For Mommsen (who followed Borghesi on this point), it was evident that the *officinae* mentioned here were divisions of the mint, and that consequently the silver smelter is to be interpreted in a numismatic context, too. Maria R.-Alföldi, [138] however, pointed out that the mint is nowhere mentioned here and proposed that Calvius Iustus may have been a contractor of some other workshops processing bronze and of silver smelting works not connected with the production of coin blanks. Although this cannot be ruled out completely, I think that, on balance, it is quite probable that this *manceps* was a contractor associated with the mint as well, especially in the light of a somewhat mysterious fragmentary inscription from Tibur: CIL XIV, 3642 was set up (again!) by an imperial freedman who is styled [man]*ceps* (a)*erariae mo*[ne]*tae*.

Both the general uncertainties surrounding the activities of Calvius Iustus and the fact that we cannot date his inscription with confidence of course reduce its value for the reconstruction of the organization of the Roman imperial mint. Still, it is intriguing to see that the number of *officinae* which he had leased was five, and we may remember in this context that the Trajanic dedication to Victoria was by five contractors of the silver smelter of the mint. [139] This game of numbers leads us to the final problem we will treat here: Is it possible to provide a reliable reconstruction of the Roman mint's inner organization before the introduction of *officina* marks in the mid-third century?

Theoretically, with the abundant and precisely dated epigraphic material discussed above at our disposal, the Trajanic period should be the ideal phase to look at, in order to answer this question or at least to test pertinent hypotheses. As outlined *supra*, it is not evident from the inscriptions that the mint was rigorously divided into a precise number of sub-unities in Trajan's rule.

[137] On the status of these men, see MOMMSEN 1887, p. 39, note 8.

[138] R.-ALFÖLDI 1958/59, p. 44f., note 47.

[139] This apparent parallelism has already been pointed out by DUNCAN-JONES 1994, p. 109, note 67.

Officinae are nowhere mentioned, only 16 *officinatores* (plus the *optio et exactor* Felix and his deputy Albanus), and despite Robert Carson's contention in his article on 'System and Product' (1956, p. 234) it is not too plausible that all of them were heads of separate workshops – according to most scholars, there can hardly have been that many. [140] This is also the impression one gets when analyzing Filippo Coarelli's thoroughly hypothetical reconstruction of the structure of Trajan's mint as having had no less than 17 *officinae* in total. [141] Similarly, Robert Göbl's efforts to juggle with the figures preserved in the inscriptions until he was able to press them into the scheme of six *officinae* as attested for the production of *antoniniani* in AD 248 do not really help find a solution to our problem. [142]

Numismatists specifically looking at Trajan's imperial coinage also came to widely differing conclusions regarding the mint's possible division into *officinae*. Paul-André Besombes suggested that the two main legend varieties of Trajanic precious metal coins of the COS V period (AD 103-111), *viz.* IMP TRAIANO AVG GER DAC P M TR P COS V P P (obv.) / SPQR OPTIMO PRINCIPI (rev.) and IMP TRAIANO AVG GER DAC P M TR P (obv.) / COS V P P SPQR OPTIMO PRINC (rev.) were used by two different *officinae*. [143] Philip V. Hill, on the other hand, made out the activity of five to seven *officinae* in Trajan's time. [144]

Besombes is demonstrably wrong, [145] since the two legend varieties he took to have been used concurrently were minted successively. [146] At the core of the entire question is, of course, a problem of definition: What was an *officina*, and how are we to recognize the mint's inner structure from the coins it produced? Numismatic orthodoxy on this point derives from the observation that in AD 248 each of the *officinae* used a different reverse type: "The number of *officinae* operating at any given time is therefore suggested by the number of principal reverse types in each issue." (HILL 1970, p. 2). Of course, the new evidence regarding the production of provincial coins in Rome in the High Principate, side by side with imperial issues, begs the question: what about the coins struck for the east and their reverse types? How do they fit into this overall picture? Furthermore, the frequent obverse die-links between imperial coins

[140] R.-ALFÖLDI 1958/59, p. 42; WOLTERS 1999, p. 92. Apart from that, Carson may be seen to contradict himself here, since on p. 239, he assumes that the Trajanic mint had six *officinae*.

[141] COARELLI 1994, p. 65 (one *officina* for gold, four for silver and twelve for bronze).

[142] GÖBL 1978, vol. 1, p. 167f., and vol. 2, Tabelle 3. Göbl does not even refrain from postulating the existence of three reserve *malliatores*.

[143] BESOMBES 2008, p. 17f.

[144] HILL 1970, p. 3.

[145] WOYTEK 2009, p. 433f.

[146] WOYTEK 2010A, p. 34f.

with different reverse types [147] have to be explained by the assumption that all the *officinae* shared a common pool of obverse dies. [148] Aside from that, the classic model of *officina*-theory proposes that the single workshops produced coins in all three metals. [149] But there are issues with this assumption. As mentioned above, what little epigraphic evidence we have indicates that there were separate *officinae* for the different metals. [150] Finally, we have no idea what an *officina* looked like; it has already been observed that the equation 'anvil = *officina*', though often repeated, cannot be correct, since the output attributed to single *officinae* frequently requires production on more than one anvil. [151]

It is evident that the entire concept is fraught with problems. Thus, William E. Metcalf, in reviewing a monograph by Robert Carson, understandably remarked: "Even the fullest discussions […] fail, in the reviewer's opinion, to establish that the subdivisions, if they existed before the time of Philip, have any meaning for us, unless we are content with the equation reverse type = *officina*". [152] Still, it can be rewarding to search for numerical patterns among the ranges of coin types produced by the Roman mint in certain periods, as Metcalf himself has shown. When studying the Trajanic silver coinage of Caesarea in Cappadocia – which was apparently for the most part produced in Rome, as we know today –, he noticed that for the drachms and didrachms of the COS VI period five types were always struck in parallel, and cautiously suggested that the coin production was organised in "a kind of *officina* system". [153]

[147] As illustrated for Gordianus III by Göbl 1978, vol. 2, pl. 174.

[148] Göbl 1978, vol. 1, p. 169 (with reference to a contribution by C.H.V. Sutherland). This is a mere hypothesis, but many scholars take it for granted: cp. also Hill 1970, p. 2 with note 3.

[149] Paradigmatically Carson 1962, p. 7 ("it is […] likely that each *officina* had a sub-section for each metal or perhaps struck the different metals in turn") and Göbl 1978, vol. 2, pls 174-175.

[150] For this reason, Hill 1970, p. 5 acknowledged: "It is […] probable that there existed a separate set of *officinae* for the bronze, varying from time to time." Even Göbl 1978, vol. 1, p. 167 described for the Trajanic period „Offizinen, die damals jedenfalls noch getrennt nach Metallen gearbeitet haben" (without, however, modifying his theory of a total of six).

[151] Göbl 1978, vol. 1, p. 166.

[152] Metcalf 1991, p. 104, on Carson 1990. Metcalf quotes Clay 1979, p. 23, note 6: "The usual assumption that the different reverse types were produced by different *officinae* within the mint is still far from proven and in many cases seems to me to hinder rather than to advance our understanding of the coinage. The dies showing the different reverse types were certainly engraved by one and the same group of artists; the same obverse dies, as is well known, were frequently employed with two or more different reverse types; the number of simultaneous reverse types not infrequently rose or fell; and the volume of the coinage was not always divided equally among the different reverse types. What do we gain, then, by speaking of '*officinae*' rather than of 'simultaneous reverse types'?"

[153] Metcalf 1996, p. 59.

The same pattern of a division into five types in successive groups of silver coins emerged in the structural analysis of some periods of Trajan's imperial coinage. A comparison of the *denarii* minted after Trajan's designation to the consulate for the sixth time, in autumn 111, with the *denarii* produced in the immediately preceding and subsequent periods is most instructive in this respect. The COS V DES VI *denarii* are all rather rare. [154] There are five reverse types, each one with a short supplementary legend identifying the reverse type, in addition to the inscription SPQR OPTIMO PRINCIPI in the round: AET(ernitas) AVG(usti), Victory (with a shield inscribed DACICA), PAX, PIET(as) and VESTA. The five very same reverse types (with the same supplementary legends) were used on *denarii* after Trajan had entered upon the sixth consulship, on January 1st, 112; just the final part of the obverse legends was changed from COS V DES VI to COS VI P P. [155] Furthermore, the very same set of *denarius* reverses also appears in the group of coins struck before Trajan was designated to the consulate for the sixth time, in the year 111, when the legend still showed the date COS V. [156] Apparently, five *denarius* types were struck in parallel in these three periods; curiously enough, the types are attested in similar numbers today, within each period, and were therefore obviously produced in more or less the same quantities. [157]

There are also some other instances in Trajan's coinage where this division into five types may be observed. [158] Recently, Martin Beckmann came across the figure five as well, in a die-study of the COS V *aurei* (AD 103-111), but in a different form. He observed that at some point of this period, five parallel die-chains of *aurei* emerge which "share some of the same types, but never the same dies" (Beckmann 2011, p. 174) and proposed that this might indicate production of *aurei* in five separate workshops. [159] It is easy to see that this hypothesis involves a concept of *officinae* which is completely different from the classic one – and different from the situation we find in the mid-third century AD: Trajanic gold *officinae* as sub-units of the mint striking parts of issues which are not defined by their typology at all, but which are varied in their type content (and not distinguishable from the products of other *officinae*). In any case, none of the divisions described above can be traced in the Trajanic coin

[154] Woytek 2010a, nos 375, 377-380.

[155] Woytek 2010a, nos 388-392.

[156] Woytek 2010a, nos 344, 346-348, 350.

[157] See, *e.g.*, the numbers of specimens attested for Woytek 2010a, nos 375, 377-380 (see p. 620): 14 – 13 – 10 – 14 – 13. For Woytek 2010a, nos 388-392 the numbers are: 14 – 20 – 18 – 13 – 19.

[158] For examples, see Woytek 2010a, p. 53f.

[159] "The branching of the die-link chain late in Series 4 into five individual but concurrent chains suggests that production was now localized in five distinct workshops. These workshops drew on a common type repertoire, but shared no dies between them" (Beckmann 2011, p. 177).

issues from the beginning to the end of his reign. Often the behaviour of Trajanic reverse types is completely unpredictable, and Beckmann could not document a similar branching of the die chain into five parallel chains for other periods of Trajan's reign.

*

To sum up: On the evidence currently available, we cannot tell the precise background of the grouping into five types or into five clusters of coins occasionally observed in Trajan's coinage. Thus, it has to be stressed that the evidence presented above must in no way be taken as a conclusive proof that a total of five *officinae* operated under Trajan at the mint of Rome – instead of two, six, seven, seventeen or any other figure that has been suggested in the past. At most, one might think about the pattern being indicative of a (temporary) operation of five *officinae* for silver or gold, in line with the inscriptional evidences discussed above which point to a competence of *officinae* for single metals only. But we are in the realm of speculation here: only future research may bring clarification.

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PLATE

Fig. 1A = Rev. fig. 1 @ 200%

Fig. 2A = Rev. fig. 2 @ 200%

Fig. 3A = Obv. fig. 3 @ 200%

Fig. 5A = Obv. fig. 5 @ 200%

Fig. 6A = Obv. fig. 6 @ 200%

Fig. 7A = Rev. fig. 7 @ 300%