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Roman Cadastral Plans (*formae*)

Definition, Evidence, and Boundary Representation

ABSTRACT: By adopting a multidisciplinary and comparative approach, integrating archaeological and epigraphical evidence with the information provided by the writings of the Roman land surveyors (*Gromatici veteres*), this article investigates the nature of the Roman cadastral plans (*formae*), their function, and the depiction of internal boundaries and external borders in them. It addresses fundamental questions regarding the surviving material evidence, the accessibility of the *formae*, and the specific role played by supplementary records, such as the *tabulae aeris* and the *libri aeris*.

The authors argue that Roman *formae* were sophisticated multimodal tools where graphic conventions, such as orthogonal grids and curving lines, directly corresponded to the legal status of land, whether centuriated or not (e. g., *subseciva*, *agri occupatorii* or *arcifinii/-ales*). While public bronze *formae* served as authoritative evidence for the state, the article highlights the overlooked category of private, unofficial maps used by single individuals to manage unsurveyed land. This work offers the first comprehensive overview of the evidence for Roman *formae* and introduces new interpretations by identifying the bronze tablet from *Ilici* as a potential *tabula aeris* and proposing a pottery fragment from the Iberian Peninsula as a possible surviving example of a private *forma*.

KEYWORDS: Roman Cadastral Plans (*formae*), Land Surveying, Centuriation, Borders and Boundaries, Latin Epigraphy

1. Introduction. [F. L., A. S.]

Combining textual annotations and drawings, cadastral maps are an ideal example of the use of multimodality in documents from Antiquity.¹ Usually considered a sub-

¹ An oral version of this paper was presented at the “Internationale historisch-geographische Tagung ‘Grenzen in der Antike’”, which was held at the University of Trier on July 25th–27th 2024. We are very grateful to some of the participants for their fruitful comments during the conference and to the anonymous peer-reviewers, who provided us with helpful feedback on a previous version of this article. Translations not otherwise credited are by the authors. This article is part of the two-year PRIN 2022 PNRR project ‘Mapping and Annotating Plots (MAP): the Multimodality of Cadastral Plans in Antiquity (Babylonia and Rome)’ (CUP: H53D23010280001; Cod. P2022SH5BM), which was based at both the Ca’ Foscari University of Venice and the University of Urbino and funded by the European Union – Next Generation EU (PNRR m4.C2.1.1). The “International Workshop ‘Mappe catastali nel mondo romano: vecchie questioni e nuove prospettive – Cadastral Plans in the Roman World: Old Issues and New Perspectives’”, which was held at the University of Urbino on February 20th–21st 2025 (for an account of the event see SANSONE 2025 and

group of cartography, ancient cadastral plans have been studied for their significance for map-making and mapping the world in the Greek and Roman eras, and beyond.²

As for the Roman *formae* in particular, a great deal of scholarship provided so far crucial information for our knowledge of them by offering general overviews,³ or focusing on a case-by-case basis.⁴ And yet, some recent works have shown the potential of a comprehensive and comparative study of the whole evidence. For example, by examining the engraving technique of the two surviving bronze *formae* from Verona, Alfredo Buonopane underlined the importance of comparing similar sources for a better chronological assessment of the documents.⁵ Giuliana Cavalieri Manasse and Giovannella Cresci Marrone stressed the added-value of a multidisciplinary approach encompassing inscriptions, literary texts, and archaeological finds to a full historical understanding of the Roman *formae*.⁶ Some of the surviving Roman cadastral plans have recently been considered as a coherent group by Anouk Vermeulen, who emphasized their similarities and differences.⁷

Following this approach, this article aims to set all the documents in their historical context and to compare them with what is known from the writings of the Roman land surveyors (*Gromatici veteres*). The aim is to offer for the first time a comprehensive overview of the Roman cadastral plans in light of the archaeological, epigraphical, and literary evidence.

More specifically, in the section entitled ‘Roman Public *formae* and Boundaries’, Franco Luciani provides a definition of *forma* by comprehensively reviewing the references in the writings of the *Gromatici veteres*. He then offers a general overview on the surviving evidence of Roman public cadastral plans and focuses on the depiction of internal boundaries and external borders to emerge, by also examining a possible surviving example of a supplementary document related to a *forma* (*tabula aeris*). The numerous – and very interesting – illustrations or miniatures accompanying the manuscripts containing the writings of the *Gromatici veteres* are not taken into account in this article, as they seem not to be always realistic and are different from the proper *formae*.⁸

TRIVELLATO/GATTO 2025), whose proceedings are in preparation for publication (LUCIANI/SANSONE forthcoming), is among the other outcomes of the MAP research project.

- 2 DILKE 1987a, 209–11; DILKE 1987b, 212–25; HÄNGER 2001, 27–36; WHITTAKER 2004, 69; TALBERT 2008; TALBERT 2012. Cf. also BRODERSEN’s very skeptical appraisal of all evidence for Roman maps and their use: BRODERSEN 1995.
- 3 Fundamental works are: CASTAGNOLI 1943 = CASTAGNOLI 1993; CHOUQUER/FAVORY 2001; CONSO 2021, II, 162–99.
- 4 See, for example, PIGANIOI 1962; SÁEZ FERNÁNDEZ 1990; CLAVEL LÉVÊQUE 1993; ASSÉNAT 1994–1995; CHRISTOL/LEYRAUD/MEFFRE 1996; CHRISTOL/LEYRAUD/MEFFRE 1998; CAVALIERI MANASSE 2000; CRESCI MARRONE / CAVALIERI MANASSE 2015; CAVALIERI MANASSE / CRESCI MARRONE 2017.
- 5 BUONOPANE 2015.
- 6 CRESCI MARRONE / CAVALIERI MANASSE 2015.
- 7 VERMEULEN 2019.
- 8 On this point see the fundamental and detailed remarks of CASTAGNOLI 1943, 98–118 = CASTAGNOLI 1993, 716–32, and DILKE 1987b, 222; cf. also NICOLET 1991, 156: “the true *formae* [...] must therefore have been closer in appearance to the model of the Orange inscription than to the miniatures”. On the illustrations from the manuscripts of the *Gromatici veteres*, see also DILKE 1967, CHOUQUER/FAVORY 2001, 279–87, and BARGNESI 2012, who offers a *status quaestionis* and suggests the idea that the illustrations in the man-

In the section entitled ‘Roman Private *formae* and Boundaries’, Alfredo Sansone addresses a lesser-studied aspect of Roman cadastral mapping: the *formae* created by private individuals for personal use. He then discusses a specific case-study – a fragment of pottery from the Iberian Peninsula bearing an inscribed text and a possible depiction of *limites* – that has been identified as a Roman cadastral plan. If the latter hypothesis is correct, which is by no means certain, it may be identified as a private *forma*.

By discussing all this bulk of evidence, the paper intends to address – or at least contribute to the discussion of – the following research questions concerning the Roman *formae*:

- what is a *forma* and which are the surviving examples of the *formae*?
- How were internal boundaries and external borders depicted on the *formae* and what were they used for?
- What was the role of the supplementary documents, such as the *tabulae aeris* and the *libri aeris*?
- To what extent were the *formae* publicly and readily accessible?
- How could the *formae* be updated?

2. Roman Public *formae* and Boundaries [F.L.]

2.1 What is a *forma*?

In the Roman world, land and cadastral surveying played a crucial role: acquiring information on citizens’ assets was essential for military and tax purposes and to ascertain their class and legal qualification to hold offices.⁹ Citizens’ assets mainly consisted of country estates located within the territory that was granted to every Roman city well beyond the urban area, whether a colony or a *municipium*, both in Italy and in the provinces.¹⁰ Information on land properties was collected by land surveyors,¹¹ under the supervision of the magistrates with census-related duties,¹² and recorded on documents that were kept in public archives.¹³

The writings of the Roman land surveyors (*Gromatici veteres*), composed at various times between the first and the fourth/fifth centuries CE and collected together by the sixth century CE, constitute the most important sources on the processes of land

uscripts of the *Gromatici veteres* must have been closer to geographical maps; he then argues that *formae*, instead, were substantially different.

9 LO CASCIO 2001.

10 LEVEAU 1993.

11 For an overview of Roman land surveying and its main actors, see DILKE 1971; CAMPBELL 2000, xlv–lxi; GUILLAUMIN 2005, 1–57.

12 For censors in Rome, see SUOLAHTI 1963; for the local magistrates responsible for conducting a census every five years (*quinquennales*), see HAECK 2005.

13 MOATTI 1993; RODRÍGUEZ-ALMEIDA 2002, 4.

surveying and territorial organization under the Empire.¹⁴ Several passages from these works also offer valuable insights into both the nomenclature and the material aspects of the Roman cadastral plans (*formae*).

According to Siculus Flaccus, who wrote a treatise *On the Categories of Land* (*De condicionibus agrorum*) in the second century CE,¹⁵ or, better, in the late third or early fourth century CE,¹⁶ Roman cadastral plans were usually called *formae* and made of wood, parchment, and bronze.¹⁷ However, bronze must have been one of the most used materials, if as made explicit by Hyginus in his work *On the Limits and Categories of Land* (*De limitibus et de condicionibus agrorum*), written in the early second century CE,¹⁸ the term for bronze – *aes* – was even used as a synonym for the *forma* itself.¹⁹

In total, six documents corresponding to what is described by the Roman land surveyors for the *formae* survive, dating from the first century BCE to the first century CE. A brief overview of each is presented in the following section.

14 The most recent editions of – all or some of – the writings of the Roman land surveyors are: CAMPBELL 2000; GUILLAUMIN 2005; GUILLAUMIN 2010; GUILLAUMIN 2014; LINDERMAN 2022; LINDERMAN 2025.

15 CAMPBELL 2000, xxxvii.

16 GUILLAUMIN 2010, xxxvi.

17 Sic. Flacc. *grom.* 118.16–24 THULIN: *Ergo agrorum divisorum, qui institutis limitibus divisi sunt, formae varias appellationes accipiunt. Quidam <in> arbore<i>s tabulis, alii in aenis, alii in membr<an>is scripserunt. Et quavis una res sit forma, alii dicunt perticam, alii centuriationem, alii metationem, alii limitationem, alii cancellationem, alii typon, quod, ut supra diximus, una res est, forma. Quidam formas, quorum mentio habita est, in aere scalpserunt, id est in aereis tabulis scripserunt* (“Moreover, maps of divided lands, which have been divided by the establishment of limites, have different names; some inscribed them on wooden tablets, others on bronze, others on parchment. And although the map is one element, some refer to the pertica, others centuratio, others metatio, others limitatio, others cancellatio, others typon, which, as I said above, constitutes one element, the map. Some people, as I mentioned above, engraved the maps on bronze, that is, they inscribed them on bronze tablets”; translated by CAMPBELL 2000, 121); Sic. Flacc. *grom.* 118.24–119.6 THULIN: *Hi tamen quidquid instituerunt curandum erit ut fide aestimetur, nequis voluntario finem proferat. Illa tantum fides videatur quae aereis tabulis manifestata est. Quod si quis contra dicat, sanctuarium Caesaris respici solet* (“However, we shall have to ensure that whatever these people have established is assessed on the basis of evidence, in case someone moves a boundary forward of his own accord. The only evidence should be whatever is laid down in the bronze tablets. But if anyone raises an objection, it is normal to turn to the emperor’s record office”; translated by CAMPBELL 2000, 121).

18 CAMPBELL 2000, xxxv; GUILLAUMIN 2010, vii.

19 Hyg. *grom.* 84.8–16 THULIN: *Nuper ecce quidam evocatus Augusti, vir militaris disciplinae, professionis quoque nostrae capacissimus, cum in Pannonia[m] agros veteranis ex voluntate et liberalitate imperatoris Traiani Augusti Germanici adsignaret, in aere, id est in formis, non tantum modum quem adsignabat adscripsit aut notavit, sed et extrema linea unius cuiusque modum comprehendit: uti acta est mensura adsignationis, ita inscripsit longitudinis et latitudinis modum. Quo facto nullae inter veteranos lites contentionesque ex his terris nasci poterunt* (“Recently when an imperial reservist, a man of military training but also very skilled in our profession, was allocating lands in Pannonia to veterans, according to the wishes and generosity of the emperor Trajan Augustus Germanicus, he wrote down and recorded on bronze, that is, on the maps, not only the (total) area that he was allocating, but also at the end of the boundary line included the area of each settler; so, when the survey of the allocation was completed, he wrote down the area, listing the length and breadth. Therefore, no disputes and litigation could occur among the veterans about these lands”; translated by CAMPBELL 2000, 89).

2.2 Roman Public *formae*: The Surviving Evidence

2.2.1 The 'Cadastre B' from Verona (after 89 BCE) (Fig. 1)²⁰



Fig. 1: The 'Cadaastre B' from Verona (AE 2016, 534 bis a = EDR163203); Verona (Italy), Soprintendenza Archeologica del Veneto – Nucleo Operativo, inv. IG VR 83608.

²⁰ AE 2016, 534 bis a = EDR163203; current location: Verona (Italy), Soprintendenza Archeologica del Veneto – Nucleo Operativo, inv. IG VR 83608. Specific studies on this *forma* are: CRESCI MARRONE / CAVALIERI MANASSE 2015; CAVALIERI MANASSE / CRESCI MARRONE 2017, 73–80.

It is a fragmentary bronze tablet (h.: 17.7 cm; w.: 12 cm; d.: 0.2 cm) with an engraved grid forming at least seven fragmentary squares. Four of these squares (II, IV–V, VII) contain an inscribed Latin text (letters h.: 0.4 cm), and three (II, V–VI) are intersected by four engraved lines – one slightly curving and three relatively straight – oriented differently from the grid. The tablet was found in Verona in 1999, during the excavation of the cryptoporticus of the local Capitolium.

Square II:

----- / [---]VIII (scil. *iugera*) (*semis*) (*uncia*), / [---] (scil. *iugera*) (*semis*) (*triens*); / [---]XIX (scil. *iugera*) (*semis*) (*sextans*); / [---]+cis V (scil. *iugera*) (*quadrans*) (*semuncia*); / [---]li Argen(---) V (scil. *iugera*) (*semis*) (*quincunx*) (*semuncia*).

...; (of) ..., (at least) eight (*iugera*) and a half and one-twelfth/one ounce; (of) ..., ... (*iugera*) and a half and one third; (of) ..., (at least) 19 (*iugera*) and a half and one sixth; (of) ... *cis* (?), five (*iugera*) and a quarter and a twenty-fourth; of ... *lus Argen* ..., five (*iugera*) and a half and five ounces and a twenty-fourth.

Square IV:

[---]I (scil. *iugera*) (*semis*) / [---] (*sextula*?) / [---]X (scil. *iugera*) (*semis*) (*triens*) / -----?

...; (of) ..., ... (*iugera*) and a half ... and one seventy-second (?); (of) ..., ... (*iugera*) and a half and one-third ...

Square V:

Bituci, IIII (scil. *iugera*) (*triens*) (*semuncia*); / *Vindilli*, XXIII (scil. *iugera*); / *Segomari*, III (scil. *iugera*) (*quadrans*); / *Dusti*, XIX (scil. *iugera*); / *Caç[i]ri Meteli*, XXXV (scil. *iugera*) (*sextans*); / *Surus(is?) Talusacr(i?)*, XXVI (scil. *iugera*) (*semis*); / *Samoiali*, XLVII (scil. *iugera*) (*sextans*) (*semuncia*).

Of *Bitucius*, four (*iugera*) and one-third and a twenty-fourth; of *Vindillus*, 23 (*iugera*); of *Segomarus*, three (*iugera*) and a quarter; of *Dustus*, 19 (*iugera*); of *Cacirius Metelus*, 35 (*iugera*) and one sixth; of *Surusis* (?) *Talusacer* (?), 26 (*iugera*) and a half; of *Samoialus*, 47 (*iugera*) and one-sixth and a half.

Square VII:

[---]VI (scil. *iugera*) (*semis*) [---] / [---]X vel V[---] (scil. *iugera*) [---?] / -----?

...; (of) ..., (at least) six (*iugera*) and a half ...; (of) ..., ... (*iugera*) ...

The document can safely be interpreted as a *forma agrorum* of an unknown part of the Roman territory surrounding the city of *Verona*. However, it represents a sort of census map that should not be understood as a land division aimed at allocating plots, but rather as a reliable picture of land ownership in a particular sector of the territory and at a specific point in time.²¹

The graphic conventions (i. e. the centuriation grid), the language (i. e. Latin), and the system of units of measurement (i. e. the *iugerum* and its submultiples) are those used by the Romans. However, the nomenclature of the landowners is clearly pre-Roman, with Celtic names in the genitive case. The absence of any reference to *decumani* and *kardines* suggests that a complete land survey through centuriation has presumably not been conducted or completed yet.

Such a *forma* would have been functional for the political and administrative reorganization of the cities and their territories in Northern Italy, which took place after the granting of Latin citizenship to the Transpadani in 89 BCE through the so-called *Lex Pompeia de Transpadanis*.²² Major settlements, like *Verona* itself, became Latin colonies and needed to register the estates of all their dwellers, now Latin citizens, in order to precisely determine the composition of the resident population and, among them, identify those who met the economic (and social) requirements to hold local offices: if elected, the latter could even become Roman citizens through the *ius adipiscendae civitatis Romanae per magistratum*.²³

As ‘Cadaastre B’ attests, the resident population of early 1st-century BCE *Verona* and its territory certainly included indigenous individuals (of Celtic origin), who were granted Latin citizenship in 89 BCE. Their estates were not particularly large (between 1.5 and 12 hectares), so it is doubtful whether they met the requirements to hold local offices. Alongside them, one should imagine the presence of some Latin immigrants, more or less recently settled in the area, who possibly had greater chances of being among the first local magistrates of the “newborn” Latin colony of *Verona*. Their (presumably larger) estates, located in a different portion of the territory, must have been registered in the lost part of ‘Cadaastre B’.

21 For this issue see in particular MAGANZANI 2015.

22 On this law, see now SANCHEZ/ELLART 2025, with previous bibliography.

23 See now GAGLIARDI 2023, with previous bibliography.

2.2.2 The 'Cadastral' from Verona (after 42 BCE) (Fig. 2)²⁴



Fig. 2: The 'Cadastral' from Verona (AE 2000, 620 = EDRo85137); Verona (Italy), Soprintendenza Archeologica del Veneto – Nucleo Operativo.

It is a fragmentary bronze tablet (h.: 15 cm; w.: 24 cm; d.: 0.35 cm) with a hole in the upper left corner, in which an engraved grid forming eleven surviving fragmentary squares is depicted; four of them (squares VII–IX, XI) contain an inscribed Latin text (letters h.: 0.4 cm). It was found in Verona, during the excavation of the local Capitulum.

Square VII:

D(extra) d(ecumanum) I u(ltra) k(ardinem) III: / C(ai) Corneli Agatho(nis) / CLXXIII (scil. *iugera*) (*sextans*) (*semuncia*) (*sextula*).

To the right of *decumanus I* beyond *kardo III*: of Gaius Cornelius Agatho, 173 (*iugera*) and one sixth and a twenty-fourth and one seventy-second.

Square VIII:

D(extra) d(ecumanum) II u(ltra) k(ardinem) III: / C(ai) Minuci T(iti) f(ili) / CXXXVIII (scil. *iugera*) (*dextans*); / *M(arci) Clodi Pulchri / XXXVI* (scil. *iugera*) (*semuncia*).

To the right of *decumanus II* beyond *kardo III*: of Gaius Minucius son of Titus, 139 (*iugera*) and a ten-twelfth/ten ounces; of Marcus Clodius Pulcher, 36 (*iugera*) and a twenty-fourth.

²⁴ AE 2000, 620 = EDRo85137; current location: Verona (Italy), Soprintendenza Archeologica del Veneto – Nucleo Operativo. Specific studies on this *forma* are: CAVALIERI MANASSE 2000; CAVALIERI MANASSE / CRESCI MARRONE 2017, 65–73.

Square IX:

D(extra) d(ecumanum) III u(ltra) k(ardinem) III: / M(arci) Magi M(arci) f(ili) CXII (scil. iugera) (uncia) / (semuncia) (duella); / P(ubli) Valeri LII (scil. iugera) (bes) (sextula).

To the right of *decumanus III* beyond *kardo III*: of Marcus Magius son of Marcus, 112 (*iugera*) and a twelfth/one ounce and a twenty-fourth and a thirty-sixth; of Publius Valerius 52 (*iugera*) and two-thirds and a seventy-second.

Square XI:

[D(extra) d(ecumanum)] III [u(ltra) k(ardinem) II]: / - - - - -

[To the right of *decumanus*] III [beyond *kardo II*]: ...

The document is another example of a *forma agrorum* of a part (val d'Illasi) of the Roman territory surrounding the city of *Verona*. Like 'Cadastré B', it also represents a census map that should be understood as a reliable picture of land ownership in a specific sector of the territory and at a particular point in time, and not as a land division aimed at allocating plots.

In this case, not only are the graphic conventions (i.e. the centuriation grid), the language (i.e. Latin), and the system of units of measurement (i.e. the *iugerum* and its submultiples) those used by the Romans, but the nomenclature of the landowners also follows the traditional naming-convention for Roman citizens, with the *tria nomina* system, all in the genitive case. Since most of their *gentilicia* belong to families attested in the area of *Verona* as far back as the early to mid-1st century BCE (e.g., *Clodii*, *Cornelii*, *Magii*, *Valerii*) – whose members were among the first local magistrates – and their estates were not small (ranging from 13 to 43 hectares), it is possible to assume that they were mostly members of the local elite.²⁵ Moreover, the fact that *decumani* and *kardines* are mentioned and used as reference points for locating the estates of the landowners means that a proper land survey through centuriation had indeed been carried out in that specific area.

'Cadastré A' is therefore more recent than 'Cadastré B' and should be dated to a period after both the granting of Roman citizenship to the inhabitants of Northern Italy in 49 BCE and the incorporation of the province of Cisalpine Gaul into Italy in 42 BCE. 'Cadastré A' may thus refer to a period in which *Verona* became a *municipium* of Roman citizens, a significant administrative change that most likely initiated the actual land surveying process through the centuriation of the territory surrounding the city.

25 CAVALIERI MANASSE / CRESCI MARRONE 2017, 70–3.

2.2.3 Fragmentary *forma* from the Iberian Peninsula (Augustan or Flavian age) (Fig. 3)²⁶



Fig. 3: Fragmentary *forma* from the Iberian Peninsula (AE 1993, 1018a–d = HEp 4, 983); Ronda (Spain), Museo de Ronda, inv. 0537.

It is a fragmentary bronze tablet (h.: 5.5 cm; w.: 8.5 cm; d.: 0.2 cm) with an engraved grid forming six surviving fragmentary rectangles; three of them (rectangles I–III) contain an inscribed Latin text (letters h.: 0.3–0.3 cm), which is also present on the edge of the tablet, outside of the grid. A winding line is depicted both outside the grid and within the rectangles, as well as a straight line that crosses at least two rectangles transversally. The date, place, and circumstances of the discovery are unknown.

Outside the grid:

[---]++ (?) / Ana. // *Laci(ni)murcen(sium scil. fines) vel Laci(ni)murcen(ses)*.

--- (the river) Ana. (Territory) of the *Lacinimurgenses* or *Lacinimurgenses*.

Rectangle I:

[CC]LXXV (scil. *iugera*).

275 (*iugera*).

²⁶ AE 1993, 1018a–d = HEp 4, 983; current location: Ronda (Spain), Museo de Ronda, inv. 0537. Specific studies on this *forma* are: SÁEZ FERNÁNDEZ 1990; SÁEZ FERNÁNDEZ / PÉREZ PÁZ 1993; GORGES 1993; CLAVEL LÉVÊQUE 1993, 175–82.

Rectangle II:

CCLXXV (scil. *iugera*).275 (*iugera*).

Rectangle III:

CCLXX / V (scil. *iugera*).275 (*iugera*).

The document is a *forma agrorum* of a centuriated area of Roman Spain, which bordered on the territory of the inhabitants of the city of *Laci(ni)murga* (*Lusitania*),²⁷ as indicated by the text engraved outside the grid. The winding line represents a river, readily identifiable as the *Ana* (modern Guadiana), thanks to the inscription that serves as a caption engraved beneath its course. The surviving rectangles correspond to the *centuriae*, and the inscriptions within three of them record their respective surface areas, namely 275 *iugera* each.

The straight line crossing at least two *centuriae* transversally may represent either a road or a second watercourse.²⁸ More recently, however, it has been suggested that it may depict the legal limit of the *Ana*'s riverbed, i. e. the boundary of a strip of land along the watercourse subject to periodic flooding.²⁹ Consequently, since part of the land within those *centuriae* could not be allocated in its entirety, the area between the transverse line and the outline of the *centuriae* would have been a *subsecivum*, i. e. "land unsuitable for allocation to settlers".³⁰

It remains uncertain whether the centuriated territory depicted in this *forma* belonged to a detached portion (*praefectura*) of the territory of the colonies of *Ucubi* (*Baetica*),³¹ or of *Augusta Emerita* (*Lusitania*),³² or instead to a sector of the territory of *Metellinum*, also known as *colonia Metellinensis* (*Lusitania*).³³ The dating of the document is likewise debated, with scholarly opinion divided between the Augustan age³⁴ and the Flavian period.³⁵ The presence of an inscription marking the boundaries between the

27 On the city and, in particular on its toponym, which is attested as both *Lacimurga* and *Lacinimurga*, see ESPAÑA-CHAMORRO 2018.

28 SÁEZ FERNÁNDEZ 1990, 206.

29 HETTINGER 2017; HETTINGER 2022, 151–62. The river is mentioned in the anonymous commentary on Frontinus' treatise on land dispute, as some issues arose with regard to the land next to the watercourse of the *Ana*: see Ag. Urb. *grom.* 44.3–23 THULIN.

30 For this definition see CAMPBELL 2000, 502.

31 SÁEZ FERNÁNDEZ 1990, 225; CLAVEL-LÉVÊQUE 1993, 179; GORGES 1993, 21–2; SÁEZ FERNÁNDEZ 1994, 105–6; CORTÉS-BARCENA 2015, 125 n. 35.

32 ARIÑO GIL / GURT I ESPARRAGUERA 1994, 63–4; HETTINGER 2017, 191–3; HETTINGER 2022, 157–8.

33 CLAVEL-LÉVÊQUE 1993, 179–82; EDMONDSON 2011, 39.

34 SÁEZ FERNÁNDEZ 1990, 225–7.

35 ARIÑO GIL / GURT I ESPARRAGUERA 1994, 63–6; HETTINGER 2017, 195; HETTINGER 2022, 157.

Lacinimurgenses and the inhabitants of the colony of *Ucubi*, dating to 73 CE,³⁶ may argue for an interpretation of the *forma* as a Flavian cadastral map of a centuriated area located within a *praefectura* of the colony of *Ucubi*.

Since this *forma* records boundaries and geographical features of the centuriated land, along with information about the overall surface of some *centuriae* located on the edge of the centuriated area, but does not name landowners or indicate the extent of their individual holdings, it may have been functional for other related documents that provided detailed information on landownership within those specific *centuriae*.³⁷

2.2.4 The 'Orange Cadastres' (77 CE) (Fig. 4)³⁸

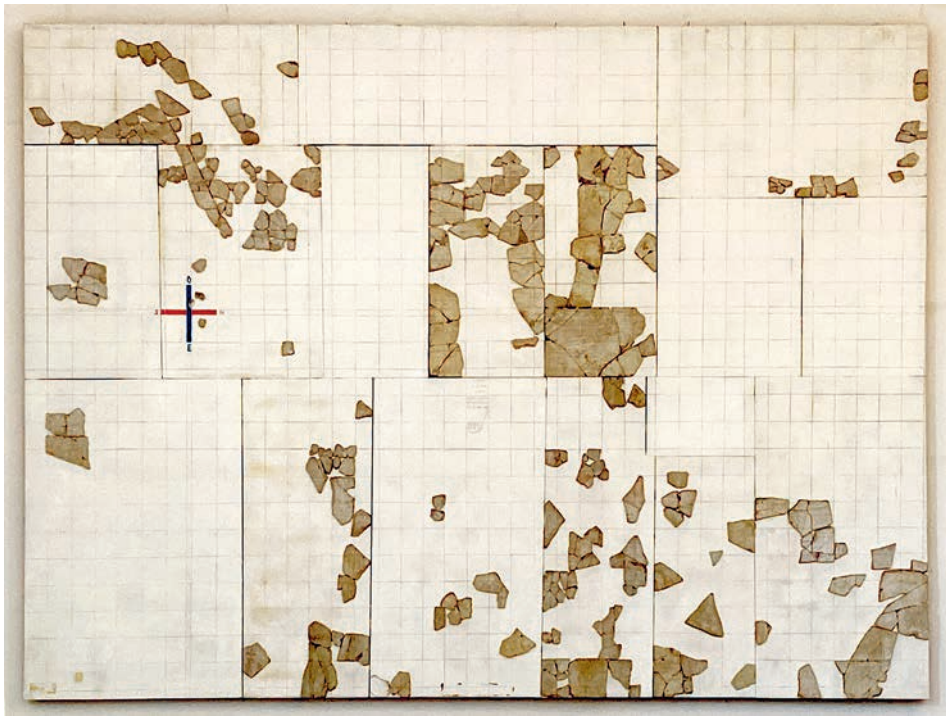


Fig. 4: The 'Orange Cadastres (A-B-C)' (CIL XII, 1244; CIL XII, 1244a = AE 1951, 77; AE 1955, 83a; AE 1956, 85 = AE 1986, 475; AE 1998, 899–902); Orange (France), Musée d'Art et d'Histoire.

36 AE 1986, 323 = CIL II²/7, 870.

37 SÁEZ FERNÁNDEZ 1990, 207.

38 CIL XII, 1244; CIL XII, 1244a = AE 1951, 77; AE 1955, 83a; AE 1956, 85 = AE 1986, 475; AE 1998, 899–902; current location: Orange (France), Musée d'Art et d'Histoire. Specific studies on these *formae* are: PIGANIOL 1962; VAN BERCHEM 1966; CHOUQUER 1983; ASSÉNAT 1994–1995; CHRISTOL/LEYRAUD/MEFFRE 1996; CHRISTOL/LEYRAUD/MEFFRE 1998.

A huge number of marble fragments, discovered in and north of the Roman theatre at Orange from 1856 onwards, record three land registers (Cadastrues A, B, and C) pertaining to the territory of the Roman colony of *Arausio* (*colonia Firma Iulia Secundanorum Arausio*) in *Gallia Narbonensis*, now Orange (France). The three cadastral plans depict the centuriation of the territory of *Arausio*, by using rectangles in Cadastre A, nearly square rectangles in B, and squares in C; Latin inscriptions and topographical features, such as rivers, islands, and roads, are present in many squares and rectangles. Two of the largest fragments of Cadastre A (h.: 25 cm; w.: 17 cm; d.: 3.7 cm; h.: 29.5 cm; w.: 19 cm; d.: 3.7 cm; letters h.: max 1.7 cm) include the following inscription (Fig. 5):³⁹



Fig. 5: Fragment of the 'Orange Cadastre A' (PIGANIOL 1962, 108–111 no. 7); Orange (France), Musée d'Art et d'Histoire.

First rectangle:

[*S(inistra) d(ecumanum) III c(itra) k(ardinem) I*] / - - - - - / *inus*.

To the left of *decumanus III* beyond *kardo I*: ... *inus*.

Second rectangle:

[*S(inistra) d(ecumanum) III u(ltra) k(ardinem) I*]: / *ext(ributario)*, *XC*[- - -]; / *Ernag(in-enses)*, *C*[- - -]

39 PIGANIOL 1962, 108–11 no. 7.

To the left of *decumanus III* beyond *kardo I*: withdrawn from tribute-paying status (lands), (at least) 90 (*iugera*); ... the inhabitants of *Ernaginum*, (at least) 100 (*iugera*).

Third rectangle:

[*S(inistra) d(ecumanum) II*] *c(itra) k(ardinem) I*: / [*ext(ributario)*], *CLXII s(emis)*; *rel(iqua)*, *CC/[XXX s(emis)]*; *a(era) V*, (*denarios*) *LXX/[II, aer(a)] s(emis)*; *emit* / [---] *artius A*/[---] *rinus*; *r(eliqua)*, *VII aq(ua)*.

To the left of *decumanus II* beyond *kardo I*: withdrawn from tribute-paying status (lands), 162 (*iugera*) and a half; remaining (to the colony), 230 (*iugera*) and a half; (the tariff is) 5 asses (per *iugerum*), (for a total rent of) 72 *denarii* and half an as; [---] *artius A*[---] *rinus* bought ...; 7 (*iugera*) are left with water.

Fourth rectangle:

S(inistra) d(ecumanum) II u(ltra) [k(ardinem) I]: / *ext(ributario)*, *CCCVI s(emis)*; *v[endita?]*, / *XXVI (denariis) XVI / Atilia Ver[a]*; / *XXXIII (dodrans)*, (*denariis*) *XXI*[---] / [---] *us Lucaniu[s; ---] [a]/qua*.

To the left of *decumanus II* beyond *kardo I*: withdrawn from tribute-paying status (lands), 306 (*iugera*) and a half; *Atilia Vera* (bought) 26 (*iugera*) (that were) sold for 16 *denarii*, [---] *us Lucanius* (bought) 33 (*iugera*) and three quarters/three ounces (that were sold) for 21 *denarii* (and one as and a half?); (33 *iugera* and three quarters/three ounces?) are left with water.

Fifth rectangle:

[*S(inistra) d(ecumanum)*] *I c(itra) k(ardinem) I* / *ext(ributario)*, *CCCXXX*[---] / [---] *XI s(emis)*; *a(era) IIII* [---] / [---] *R*[---].

To the left of *decumanus I* beyond *kardo I*: withdrawn from tribute-paying status (lands), (at least) 330 (*iugera*); (remaining to the colony?), (at least) 11 (*iugera*) and a half; (the tariff is) 4 asses (per *iugerum*); ...

Sixth rectangle:

S(inistra) d(ecumanum) I u(ltra) [k(ardinem) I]: / *ext(ributario)*, *CCCX*[---] / *X*; *a(era) V*, *I*[---] / *Cassius* [---].

To the left of *decumanus I* beyond *kardo I*: withdrawn from tribute-paying status (lands), (at least) 310 (*iugera*); (remaining to the colony?), (at least) 10 (*iugera*); (the tariff is) 5 asses (per *iugerum*), (for a total rent of 3?) *denarii* (and 10 asses?); *Cassius* ...

A monumental inscription, engraved on three long marble slabs (h.: 38.5 cm; w.: 443 cm; d.: 3.4–6.6 cm; letters h.: 6–6.6 cm) that were found in Orange in 1951, accompanied the three land registers: it states that, in 77 CE, the emperor Vespasian ordered that a cadas-

tral plan (*forma agrorum*) be displayed to record the annual revenue coming from the land that was public and had been illegally occupied.⁴⁰

The Roman colony of *Arausio* (*colonia Firma Iulia Secundanorum Arausio*), now Orange, was founded in the province of *Gallia Narbonensis* east of the Rhone River shortly after 36 BCE, in order to settle veterans of the Second Gallic Legion. The land surrounding the colony was generously surveyed and assigned, with some plots left unallocated to settlers (*subseciva*) and considered as public; one can imagine that one or more *formae* were probably created already at that time. More than a century later, when Vespasian issued an edict to reclaim *subseciva* to be sold and/or rented for the benefit of the imperial treasury, the cadastral map was revised and updated, as undue appropriation of land was widely detected. The three maps (Cadastres A, B, and C) show the extensive territory of *Arausio*, including the boundaries of the centuries, and indicate the legal status of the land plots within each *centuria*, the names of the legitimate owners, and the exact amount of the annual land tax, if the land was actually taxed.

2.3 Internal Boundaries and External Borders in the Roman Public *formae*

This section specifically focuses on the depiction of geographical, agrarian, and administrative bounds in the Roman cadastral maps.

As is well known, each Roman civic territory was precisely bounded by external borders: the area enclosed within these borders fell under the jurisdiction of the city's magistrates.⁴¹ Within a Roman civic territory, there were also internal boundaries that marked, for example, the limits of a centuriation and its square/rectangular plots, in which individual possessions were to be found, or separated private fields from one another or from public land (*ager publicus*). All these elements – namely, civic territories, external borders, and internal boundaries – could be depicted on the *formae publicae agrorum*, as they served as crucial reference points for recording the legal status of the land and for marking allocations. Incidentally, as argued in the mid-sixth-century CE commentary on Frontinus' treatise *On Land Quality* (*De agrorum qualitate*), a "map (*forma*) of any land cannot exist without the straight lines of the *limites*".⁴² In this passage, the anonymous commentator clearly refers to the rectilinear axes of a centuriation (*decumani* and *kardines*): such lines, which served as boundaries in the sense that they divided the land into equal-sized blocks for distribution, were of primary interest in the *formae*, given the cadastral function of such documents.⁴³

⁴⁰ AE 1952, 44 = AE 1963, 197 = AE 1999, 1023.

⁴¹ On this topic, see LUCIANI 2019, 64–5.

⁴² Ps. Agenn. *agr. qual.* 55.22–23 THULIN: *non posse formam cuiuslibet agri sine limitum rectura subsistere* (translated by CAMPBELL 2000, 55). See also the translation proposed by GUILLAUMIN 2014, 5: "la *forma* d'une terre quelconque ne peut exister sans le trace rectiligne des *limites*".

⁴³ AS PETERSON 2006, 161 argues, "the author of the *Commentum* is stating a fact", but with no "exaggeration", in my opinion: the *formae* always depicted a centuriated land, so the *limites* must always be present.

Depiction of the orthogonal grid formed by the straight *limites* (*decumani* and *kardines*) is attested in all surviving examples of *formae* ('Cadastre B' and 'Cadastre A' from Verona, the fragmentary bronze slab from the Iberian Peninsula, and the Orange cadastres), even when, as in the case of 'Cadastre B' from Verona, the territory had not yet been officially surveyed.

Other lines, distinct from the straight, orthogonal *limites* of the centuriation, are present in the surviving *formae*. In the Orange cadastres, oblique lines crossing various *centuriae* have been identified as depictions of roads (see Fig. 5). A similar interpretation has been proposed for the oblique line running parallel to the river *Ana*, which cuts across at least two squares in the fragmentary bronze example from the Iberian Peninsula (see Fig. 3). However, as noted above,⁴⁴ such an oblique line has also been identified as a *subsecans linea*, i. e., the depiction of the boundary of a *subsecivum*, which is described in detail by Frontinus in his treatise *On the Types of Land* (*De agrorum qualitate*), written between the late first century CE and the early third century CE at the latest:⁴⁵

Subsicivum est, quod a subsecante linea nomen accepit. Subsicivorum genera sunt duo: unum quod in extremis adsignatorum agrorum finibus centuria expleri non potuit; aliud genus subsicivorum, quod in mediis adsignationibus et integris centuriis intervenit.

Subsecivum is what has derived its name from the line that cuts it away (*subsecans*). There are two types of *subseciva*, one when on the outer boundaries of allocated lands a centuria could not be completed; the second type of *subsecivum* is that which occurs in the middle of allocated lands and within completed *centuriae*.⁴⁶

If this interpretation is correct, the fragmentary *forma* from the Iberian Peninsula would also attest to the depiction of an internal boundary, i. e. the one of a *subsecivum*.

Similar lines, distinct from the straight, orthogonal *limites* of the centuriation yet still identifiable as boundaries, are also present in 'Cadastre B' from Verona, where four segments intersect the straight, orthogonal lines of the centuriation: the first is a slightly curving line, while the other three are relatively straight but oriented differently from the *kardines* and the *decumani* (see, e. g., Fig. 1).

This depiction may equally correspond to what is described about *subsecivum* by Frontinus in the excerpt cited above. However, a passage by Balbus, a Roman land surveyor who wrote a treatise on surveying in the late first or the early second century CE,⁴⁷ may also be relevant:

44 See footnote 29.

45 GUILLAUMIN 2014, 5: "nous verrons ce livre écrit le plus vraisemblablement entre 78–82"; CAMPBELL 2000, xxviii: "the text [...] is coherently expressed and unlikely to be later than the second century A. D."; LINDERMAN 2025, 32: "ergibt sich für Iulius Frontinus damit ein Zeitraum Ende des 1., Anfang des 2. Jhs bis höchstens zum Anfang des 3. Jh."

46 Front. *grom.* 2.16–21 THULIN (translated by CAMPBELL 2000, 3).

47 CAMPBELL 2000, xl: "Balbus was a practising surveyor, probably in the late first or early second century

Extremitatum genera sunt duo, unum quod per rigorem observatur, alterum quod per flexus. Rigor est quidquid inter duo signa veluti in modum lineae rectum perspicitur; per flexus, quidquid secundum locorum naturam curvatur, ut in agris arcifiniis solet.

There are two types of boundary, one that is recognized by means of a ‘*rigor*’, the other by a curving line. A ‘*rigor*’ is whatever is seen to stretch straight between two points in the form of a line. A curving boundary is when the line curves according to the nature of the terrain, as normally happens in *ager arcifinius*.⁴⁸

The *ager arcifinius* – also known as *ager arcifinalis* – was a portion of land without a formal survey, whose boundaries were formed by natural elements, as is made clear by Frontinus:

Ager est arcifinius, qui nulla mensura continetur. Finitur secundum antiquam observationem fluminibus, fossis, montibus, viis, arboribus ante missis, aquarum divergiis et si qua loca ante a possessore potuerunt optineri.

Land known as *arcifinius* is land that is not contained in any survey. It is bounded according to long-standing practice by rivers, ditches, mountains, roads, trees previously planted, watersheds, and if by any chance places could be acquired by a landholder earlier (i. e. with properly recorded boundaries).⁴⁹

As a result, such an area had an irregular shape,⁵⁰ and curving lines (*flexus*) were thus more suitable than straight lines (*rigores*) to marking its boundaries: this may well be the case of the space bounded by a series of line segments and a relatively curving line depicted in the ‘Cadastré B’ from Verona. It seems possible that, within the territory of *Verona* after 89 BCE, as depicted by ‘Cadastré B’, there was at least one area clearly bounded by natural features – such as a mountain, a hill, a wood, or a marsh – that was potentially uncultivable and possibly not subject to private ownership. This possibility becomes even more plausible when considering that, at the time, the territory of *Verona* had not yet been centuriated, and ‘Cadastré B’ did not depict a properly surveyed portion of land.

In other *formae*, curving lines are used to depict rivers: it is the case of the Orange cadastrés – where an island within the riverbed is depicted – and the fragmentary *forma* from the Iberian Peninsula – where, as noted above, the river can easily be recognized as such, also thanks to the inscription serving as a caption.

A. D.”; GUILLAUMIN 2005, 42: “Balbus a écrit une *Expositio et ratio omnium formarum* au tout début du II^e s. (entre 102 et 106, semble-t-il)”.

48 Balb. *Ad Cels.* 208.1–13 CAMPBELL (translated by CAMPBELL 2000, 209).

49 Front. *agr. qual.* 1.18–20 THULIN (translated by CAMPBELL 2000, 3).

50 PANIAGUA 2012, 84.

Besides internal boundaries, external borders could also be depicted in the *formae*. The only surviving example appears in the fragmentary *forma* from the Iberian Peninsula. As discussed above, it remains unclear whether this *forma* referred to the territory of the colonies of *Augusta Emerita* or *Metellinum* (*colonia Metellinensis*) in *Lusitania*, or to that of *Ucubi* in *Baetica*. In any case, the inscription *LACIMVRGEN*, which may be expanded as *Laci(ni)murgen(sium* scil. *fines*) or *Laci(ni)murgen(ses)*, indicates the presence of the territory of a neighbouring city – namely, *Laci(ni)murga*, a city in *Lusitania* that became a Latin *municipium* under Julius Caesar.⁵¹ In this case, the epigraphic mention of the border primarily served to visually distinguish the centuriated area of the colony depicted in the *forma* – whether *Augusta Emerita*, *Metellinum*, or, most likely *Ucubi* – from a neighbouring territory that belonged to another community. At the same time, it provided the reader with a useful point of reference for the orientation of the depicted territory.

In addressing the research questions outlined above, a straightforward initial observation is that in the Roman public *formae*, the boundaries of each *centuria* – which contained the allocated plots of cultivable land – were consistently depicted using straight, orthogonal lines, effectively replicating the layout of the centuriation itself.

Other types of boundaries – such as those of the *subseciva*, i. e. portions of land that remained unallocated – could be depicted using oblique lines that run independently of the orthogonal grid of the centuriation. By contrast, the boundaries of the *agri arcifinii* or *arcifinales* – areas located within the centuriation that had not been surveyed – were depicted with curving lines that reflected the irregular shapes of those regions.

As for the external borders, these were likely not depicted in a visual sense, but rather indicated through inscriptions naming a neighbouring community, as seen in the case of the fragmentary *forma* from the Iberian Peninsula.

The status of each portion of land – whether individual plots allocated to settlers, *subseciva*, *agri arcifinii*, or territories belonging to other cities – was thus crucial in determining how boundaries and borders were depicted. In this way, the status of each land parcel could be immediately recognized. In this respect, a close correspondence emerges between what is depicted in the surviving *formae* and the classifications of land types found in the writings of Roman land surveyors.

Further information, such as full lists of landowners – possibly including additional details about land allocations within a settlement and/or public land that was rented out that could not be accommodated on the map itself – and indications of the boundaries between the plots of land within each *centuria*, were likely recorded in supplementary written documents, known as *scriptura*, *commentarii*, *tabulae aeris*, and *libri aeris*, which are mentioned in several passages from the writings of the *Gromatici veteres*.⁵²

51 ESPAÑA-CHAMORRO 2018.

52 For *scriptura* see Hyg. *grom.* 3.23 GUILLAUMIN: *De modo quaestiones fere in agris divisīs et adsignatis nascuntur, item quaestoriis vectigalibus subiectis, quoniam scilicet in aere <et> in scriptura modus comprehensus est. Quod semper erit ad formam respiciendum. Inspiciendum et hoc, si duobus possessoribus conveniat aliquid ex modo illo, qui aere et in scriptura formae continetur, licet dominus aliquid vendidit* (“Les controverses sur la superficie surgissent dans les terres divisées et assignées et aussi dans les terres questoriennes soumises à

Since these documents contained no depictions of land, *limites*, or natural features, they should not be regarded as proper *formae*. The *libri aeris* are generally understood to have been documents written on papyrus or parchment, intended to be sent to Rome, while the *tabulae aeris* may also have consisted of bronze tablets archived locally alongside the bronze *forma*.⁵³

A bronze tablet from *Ilici (Hispania Citerior)*,⁵⁴ which contains no map but records a list of names – each followed by a land measurement – beneath a heading indicating the quality of the land and its position within the centuriation (Fig. 6), may be an example of a *tabula aeris* – perhaps a bronze copy of a wooden writing tablet that was part of a (?) *liber aeris* itself:

Sicci iug(era) CXXX et traiect(us): / ex l(imite decumano) V, (cardine) III, iug(era) VI s(emis) et ex / l(imite decumano) IIII, (cardine) III, iug(era) VI s(emis) h(ominibus) X; / superest iug(era) XL; in sin(gulos) iug(era) XIII: / C(aius) Annius C(ai) f(ilius) Gal(eria) Seneca, Icos(i); / C(aius) Aufustius C(ai) f(ilius) Gal(eria), Icosi; / C(aius) Tettius C(ai) f(ilius) Sca(p-tia), Praeneste; / M(arcus) Marius M(arci) f(ilius) Gal(eria), Vibone; / L(ucius) Aemilius L(uci) f(ilius) Hor(atia), Ulia; / P(ublius) Horatius P(ubli) f(ilius) Quir(ina), Malaca; / C(aius) Marius C(ai) f(ilius) Vet(uria), Corduba; / / L(ucius) Valerius L(uci) f(ilius) Fal(erna), / Aurelia Cariss(a); / L(ucius) Fabius L(uci) f(ilius) Gal(eria), / Icosi; / Q(uintus) Fufius Q(uinti) f(ilius) Mae(cia), / Baciarius (sic).

redevance, parce qu'une superficie mesurée figure sur le bronze et dans les documents cadastraux. Cela devra toujours être examiné selon la forma. Il faut aussi examiner le cas où c'est avec deux possesseurs à la fois que cadre une certaine partie de telle superficie définie sur le bronze et dans le document cadastraux, mais dont le propriétaire a cependant vendu une certaine partie"; translated by GUILLAUMIN 2010, 27–8). For the *commentarii* see Sic. Flacc. *grom.* 119.2–3 THULIN: *Quod si quis contra dicat, sanctuarium Caesaris respici solet. Omnium enim agrorum et divisorum et assignatorum formas, sed et diuisionum et <assignmentum> commentarios, et principatus in sanctuario habet. Qualescumque enim formae fuerint, si ambigatur de earum fide, ad sanctuarium principis reuertendum erit* ("But if anyone raises an objection, it is normal to turn to the emperor's record office {sanctuarium}. For the imperial government keeps in the sanctuarium maps of all divided and allocated lands, and also registers of land divisions and allocations. So, whatever the maps are like, if there is a dispute about their trustworthiness, we shall have to turn to the sanctuarium of the emperor"; translated by CAMPBELL 2000, 121). For the *libri aeris* and the *tabulae aeris* see Hyg. *lim. grom.* 165.10–16 THULIN: *Omnes aeris significationes et formis et tabulis aeris inscribemus, data adsignata, concessa, excepta, reddita commutata pro suo, reddita veteri possessori, et quaecumque alia inscriptio singularum litterarum in usu fuerit, et in aere permaneat. Libros aeris et typum perticae totius lineis descriptum secundum suas determinationes adscriptis adfinibus tabulario Caesaris inferemus. [...] Et quidquid aliud ad instrumentum mensurum pertinebit, non solum colonia sed et tabularium Caesaris manu conditoris subscriptum habere debebit* ("We shall write down all the mapping definitions on the maps and bronze tablets: given and allocated, granted, excepted, returned, exchanged for his own property, returned to the previous possessor, and whatever other abbreviated notations may have been in use and remain on the map. We shall place in the emperor's record office the mapping registers and a map of the entire territory sketched out with lines, according to its established boundaries, with a note of the neighbours. [...] As regards anything else that is relevant to the documentation used by surveyors, not only the colony, but also the emperor's record office, ought to hold a copy personally signed by the founder"; translated by CAMPBELL 2000, 159).

53 DILKE 1971, 114; MOATTI 1993, 31–48; CAMPBELL 2000, 397–8; CONSO 2021, 175 n. 229.

54 AE 1999, 960 = HEp 9, 27.



Fig. 6 Bronze tablet from Ilici (AE 1999, 960 = HEP 9, 27); Elche (Alicante), Museo Monográfico, inv. LA-2102.

130 iugera of dry land and fords: from the fifth *limes* (*decumanus*) and the third *kardo* six iugera and a half and from the fourth *limes* (*decumanus*) and the third *kardo* six iugera and a half to ten men; 40 iugera remain; (total:) 13 iugera per person: Gaius Annius Seneca son of Gaius, of the tribe *Galeria*, from *Icosium*; Gaius Aufustius son of Gaius, of the tribe *Galeria*, from *Icosium*; Gaius Tettius son of Gaius, of the tribe *Scaptia*, from *Praeneste*; Marcus Marius son of Marcus, of the tribe *Galeria*, from *Vibo* (*Valentia*); Lucius Aemilius son of Lucius, of the tribe *Horatia*, from *Ulia* (*Fidentia*); Publius Horatius son of Publius, of the tribe *Quirina*, from *Malaca*; Gaius Marius son of Gaius, of the tribe *Veturia*, from *Corduba*; Lucius Valerius son of Lucius, of the tribe *Falerna*, from *Aurelia Carissa*; Lucius Fabius son of Lucius, of the tribe *Galeria*, from *Icosium*; Quintus Fufius son of Quintus, of the tribe *Maecia*, from *Baliares* (islands).

This document likely reflects an allocation of land by lots to veterans following Caesar's victory in Spain, possibly during the Second Triumvirate or the Augustan period.⁵⁵

The text of this inscription is very similar to what Hyginus says about the information that must be written in the *aeris libri* as a result of a sortition (*sortitio*) of portions of land to single recipients:

Quod in aeris libris sic inscribemus: TABVLA PRIMA. D(extra) D(ecumanum) XXXV V(ltra) K(ardinem) XLVII. L(ucio) TERENTIO L(uci) FILIO POL(LIA) IVGERA LXVI (semis),

⁵⁵ OLESTI VILA 2006.

G(aio) NVMISIO G(ai) F(ilio) STE(LLATINA) IVGERA LXVI (*semis*). P(ublio) TARQVIN-IO CN(aei) F(ilio) TER(ETINA) IVGERA LXVI (*semis*). Eodem exemplo et ceteras sortes.

We shall write this down as follows in the bronze records (*aeris libri*): First Entry (*tabula prima*): to the right of *decumanus* XXXV beyond *kardo* XLVII. To Lucius Terentius son of Lucius, of the tribe *Pol(lia)*, 66⅔ *iugera*; to Gaius Numisius son of Gaius, of the tribe *Ste(l-latina)*, 66⅔ *iugera*; to Publius Tarquinius son of Gnaeus, of the tribe *Ter(etina)*, 66⅔ *iugera*. We shall record the remaining lots in the same way.⁵⁶

The bronze tablet from *Ilici* thus records a text that is analogous to the one that, according to Hyginus, should be inscribed in the first *tabula* of the *aeris libri*, which seems to imply that there may have been bronze copies of the *libri aeris*, but this issue needs to be explored more in detail elsewhere.⁵⁷ In any case, the *limites* (*decumanus* and *kardo*) are referred to in order to locate the assigned land and, in this respect, they served as internal boundaries.

Although *libri aeris* and *tabulae aeris* should not be interpreted as proper *formae*, they were an integral part of the *forma* and must always be consulted together with it in the event of a land dispute.⁵⁸ This is why the depiction of and the reference to both the internal boundaries of a centuriated land and the external borders of a civic territory played a crucial role in both the cadastral plan (*forma*) and the supplementary documents (*libri aeris* and *tabulae aeris*) respectively. After all, as stated in a previously cited passage by Siculus Flaccus,⁵⁹ the information recorded in the bronze *forma* was the sole authoritative evidence of both the perimeter and the legal status of a given piece of land.

3. Roman Private *formae* and Boundaries [A. S.]

3.1 Siculus Flaccus and the ‘Privately Made Maps’

The existence of private *formae* is currently attested only by the following excerpt from Siculus Flaccus’ work *On the Categories of Land* (*De condicionibus agrorum*):

Horum ergo agrorum (scil. occupatoriorum vel arcifinalium) nullum <est> aes, nulla forma, quae publicae fidei possessoribus testimonium reddat; quoniam non ex mensuris actis unus quisque miles modum accepit, sed quod aut excoluit aut in spem colendi occupavit. Quidam uero possessionum suarum privatim formas fecerunt, quae nec ipsos vicinis nec sibi vicinos obligant, quoniam res est voluntaria.

⁵⁶ Hyg. *lim. grom.* 163.19–164.4 THULIN (translated by CAMPBELL 2000, 159).

⁵⁷ On this, see SANSONE 2026.

⁵⁸ See also NICOLET 1991, 155.

⁵⁹ See footnote 17 above.

There is no bronze record, no map of these lands (scil. *agri occupatorii* or *arcifinales*) which could provide any officially recognized proof for landholders, since each of them acquired a quantity of land not by virtue of any survey, but simply whatever he cultivated, or occupied in the hope of cultivating. Indeed some privately made maps of their holdings, which are not binding on them in respect of their neighbours, or on their neighbours in respect of them, since the matter is voluntary.⁶⁰

So far, modern scholarship has devoted little or no consideration to this reference to the *privatim formae factae*,⁶¹ and no possible surviving example has been identified yet. The aim of this section is to first examine in detail this passage, and others related to it, with specific attention to the type of land that was depicted in the private *formae* and its boundaries; then, it tries to bring a small pottery sherd that has been identified as a fragmentary Roman cadastral plan into the category of the private *formae*, although this cannot be anything but a hypothesis.

It is possible to infer that private *formae*, like public ones, also depicted internal boundaries in order to delimit the extent of each landowner's individual possessions; however, such an arrangement, being voluntary, was not binding, as was the case, on the contrary, for a public survey.

Siculus Flaccus specifies that these maps were made by private individuals for the depiction of a specific category of land, namely the *agri occupatorii* also known as *agri arcifinii/-ales*.⁶² These were newly acquired lands, that were the result of war conquests, according to an ancient *modus operandi* dating back to the early Republican era.⁶³ They were therefore *agri* previously owned by local people who had been driven out by Roman soldiers: the latter occupied this newly conquered land in a provisional way, before it was divided and allocated by the central administration as required.

According to the etymology proposed by Varro and cited by Frontinus in his treatise *On the Types of Land* (*De agrorum qualitate*), the adjective *arcifinius* (and thus *arcifinalis*, too) derived from the verb *arcere*, which indicated the act of removal:

60 Sic. Flacc. *grom.* 102.9–13 THULIN (translated by CAMPBELL 2000, 105). The fact that this excerpt is the only attestation to this practice does not imply that it must be considered as less reliable: the work of Siculus Flaccus, along with those of Frontinus and Hyginus, is generally considered one of the most trustworthy among the writings of the Roman land surveyors (cf. CAPOGROSSI COLOGNESI 2006, 586). The absence of official cadastral maps for the *ager occupatorius* is in any case confirmed by Hyg. *grom.* 87.4–11 THULIN: *quod de occupatoriis age[re]tur agris, [sed] quidquid uis aquae abstulerit, repetitionem nemo habebit* ("if the dispute concerns *ager occupatorius*, no one has any legal redress in respect of whatever the force of the water has removed"; translated by CAMPBELL 2000, 91). See also the following remark by CAMPBELL 2000, 366: "landholders living in *ager occupatorius* or *arcifinalis* cannot reclaim lost land because there are no maps, whereas in allocated lands there are maps".

61 Brief mentions of the private maps are in: NICOLET 1991, 155; CHOUQUER/FAVORY 2001, 45; CONSO 2021, II, 183. On this passage in general, see CASTAGNOLI 1943, 1943, 94,54 = 1993, 712,54; BOTTERI 1992, 51; CASTILLO PASCUAL 1993, 183–4, 190; CHOUQUER/FAVORY 2001, 349–50; CONSO 2021, II, 166, 168.

62 On this debated equivalence cf. BOTTERI 1992, 45–5; CASTILLO PASCUAL 1993, 145–51; CAMPBELL 2000, 472–3; CHOUQUER/FAVORY 2001, 106–8; HERMON 2006, 183–92; CAPOGROSSI COLOGNESI 2006, 585–9; ROSELAAR 2010, 88–119.

63 Cf. BOTTERI 1992, 47–50; 54; CHOUQUER/FAVORY 2001, 107.

Nam ager arcifinius, sicut ait Varro, ab arcendis hostibus est appellatus: qui postea interventu litium, per ea loca quibus finit terminos accipere coepit.

According to Varro, *ager arcifinius* has been given its name from the idea of driving away (*arceo*) the enemy. Subsequently this land began to acquire boundary markers because of the occurrence of legal disputes in the places where it ends.⁶⁴

A different and suggestive etymology is proposed by Castillo Pascual,⁶⁵ according to whom one should consider the fusion of the terms *arcus* – ‘arc/bow’ – and *finis* – ‘border’. The word *arcifinius/-alis*, which would be a technical surveying term in Castillo Pascual’s view, may thus refer to plots of land whose boundaries were marked by natural features and therefore could not be straight, but rather curved and undulating. This interpretation would be supported by the abovementioned Balbus’s reference to *extremitates per flexus*, i. e. curvilinear boundaries that were typical of the *agri arcifinii/-ales*.⁶⁶

On this basis, it is easier to understand the equivalence proposed by Siculus Flaccus between the *ager occupatorius* and the *ager arcifinius/-alis* a few lines before he speaks of private *formae*:

Occupatorii autem dicuntur agri, quos quidam arcifinales vocant, [hi autem arcifinales dici debent]. Quibus agris victor populus occupando nomen dedit. Bellis enim gestis victores populi terras omnes, ex quibus victos eiecerunt, publicavere, atque universaliter territorium dixerunt, intra quos fines iuris dicendi ius esset. Deinde ut quisque virtute colendi quid occupavit, arcendo [vero] vicinum arcifinale[m] dixit.

Land described as ‘occupied’ (scil. *ager occupatorius*), which some call *arcifinalis*, [these ought to be called *arcifinales*] is land to which a victorious people has given the name by occupying it. For after wars had been fought, the victorious peoples confiscated all lands from which they had expelled the conquered, and generally gave the name ‘territory’ to them, with the intention that there should be a right of jurisdiction within their confines. Then, whatever land a man occupied through his skill in cultivation, he called *arcifinalis* from the action of keeping off (*arcere*) neighbours.⁶⁷

64 Frontin. *grom.* 2.12–14 THULIN (translated by CAMPBELL 2000, 3). According to LINDERMAN 2025, 134, the phrase *Nam ager arcifinius, sicut ait Varro, ab arcendis hostibus est appellatus* would be a gloss that was incorporated into the text.

65 CASTILLO PASCUAL 1993, 146–7.

66 See above footnote 48. Cf. also MORRIS 2018, 123–4.

67 Sic. Flacc. *grom.* 102.1–2 THULIN (translated by CAMPBELL 2000, 105). Cf. also Hyg. *grom.* 78.7–11 THULIN: *Arcifinales agri dicuntur qui arcendo, hoc est prohibendo, vicinum nomen acceperunt. Occupatorii vero ideo hoc [est] uocabulo utuntur quod, vicini urbium populi seu possessores, cum adhuc nihil limitibus terminaretur* (“Agri arcifinales are said to be lands that got their name from the action of warding off {*arcere*}, that is, driving away a neighbour. Agri occupatorii get their name in the following way, namely that neighbouring towns people or landholders, when nothing was yet being demarcated by limites” translated by CAMPBELL 2000, 83). See also CAPOGROSSI COLOGNESI 2006, 585–6, who argues that there is almost always a strict connection between *ager occupatorius* and *ager arcifinius*. Contra CASTILLO PASCUAL 1993, 149, who speaks of two “entidades de naturaleza distinta”.

Every *ager occupatorius*, not having been artificially divided and containing no formal allocations, must necessarily have been an *ager arcifinius/-alis*, i. e. a land with curvilinear borders defined solely by the natural features of the landscape.⁶⁸

Originally, the *ager occupatorius* was closely linked to the war conquest: Roman soldiers were by necessity the first to have direct contact with the newly conquered lands.⁶⁹ They occupied them for cultivation purposes hoping that their momentary possession would one day be recognised as an official ownership by the authority.⁷⁰ To gain this result, they would themselves make a private map delimiting the portion of land each of them had occupied, depicting boundaries and distinctive elements as in a proper public *forma*. After all, it is well established that soldiers, especially those of a high rank, could be particularly experts in the field of land surveying and often involved in the measurement and division of the *agri* and their representation on the cadastral plan.⁷¹ Moreover, the *agri occupatorii* or *arcifinii/-ales* were delimited by the same means used for the *agri divisi et adsignati*, so there was no different skill required; this is what Siculus Flaccus says in this respect:

Hi (i. e. agri occupatorii vel arcifinii/-ales) [...] finiuntur terminis et arboribus notatis et ante missis et superciliis vepribus viis et rivis et fossis. In quibusdam vero regionibus palos pro terminis observant, alii iliceos, alii oleagineos, alii vero iuniperos, alii congeries lapidum pro terminis observant, et scorpioes, quidam in speciem maceriarum congerunt lapides et attinas appellant, observantque pro terminis.

[...] these lands [i. e. *agri occupatorii vel arcifinii/-ales*] are demarcated by boundary stones, and trees that have been marked, and trees that have been previously planted, and terraces, and thorn bushes, and roads, and streams, and ditches. In some regions they recognize wooden stakes as boundary markers; some use holm-oak, others the wood of the olive-tree, others juniper. Some recognize piles of stones as boundary markers, calling them *scorpioes*; others heap up stones to give the appearance of walls, which they call *attinae* and also recognize as boundary markers.⁷²

68 Cf. CAMPBELL 2000, 469; ROBY 2014, 41. As demonstrated by BOTTERI 1992, 45–55, it is likely that the category of *ager occupatorius* was the result of an ancient method of land acquisition, consistent with “the violent context of early Roman history” (CAMPBELL 2000, 472). The gloss on the passage from Sic. Flacc. *grom.* 102.1–2 THULIN [*hi autem arcifinales dici debent*] would seem to suggest that, during the imperial age, it was more correct to technically designate this type of *ager* as *arcifinius/-alis*, perhaps because the *occupatio* was no longer practiced in the same forms as in the Republican age. However, it seems that the *agri arcifinii/-ales* shared some features with the *agri occupatorii*, namely the absence of agrarian division.

69 Cf. also CHOUQUER/FAVORY 2001, 107: “L’occupation concerne des terres que les armées romaines ont conquises”.

70 Cf. BOTTERI 1992, 47.

71 CHOUQUER/FAVORY 1993, 257–8; PIKULSKA 2004, 207; ROSADA 2010, 128–9; MAYER I OLIVE 2012, 302–9. Siculus Flaccus (Sic. Flacc. *grom.* 119.39 THULIN) states that the very practice of land division is a consequence of war: *causam autem dividendorum agrorum bella fecerunt captus* (“wars created the motive for dividing up land”; translated by CAMPBELL 2000, 121).

72 Sic. Flacc. *grom.* 102.16–103.4 THULIN (translated by CAMPBELL 2000, 105, 107).

Soldiers probably hoped that the depiction of boundaries of those lands on a private map would further guarantee the recognition of their right to continue cultivating them because of their permanent possession. It is difficult, in any case, to imagine that the newly acquired land was mainly left at the disposal of the most enterprising soldiers or individuals for a long time, if only for tax reasons.⁷³ André Délèage admitted that the *agri occupatorii* passed to the status of *agri divisi* over time: for example, this was the case of the *ager Campanus*,⁷⁴ which became *ager publicus populi Romani* in 211 BCE, but its official public *forma* was created for the first time in 165 BCE.⁷⁵

As Siculus Flaccus states, the privately made *formae*, precisely because they were the result of a free and voluntary initiative (*res [...] voluntaria*) on the part of those who occupied these lands, had no legal value (*nulla <est> forma, quae publicae fidei possessoribus testimonium reddat*) for the central administration, which could easily disregard them. Moreover, these plans did not exert any coercive constraint on the other neighbouring individuals who had similarly taken possession of available portions of the *ager occupatorius* (*privatim formas fecerunt, quae nec ipsos vicinis nec sibi vicinos obligant*).

However, it is not impossible to assume that private *formae* may have also been taken into account in the event that land surveyors would be called upon to draw up the official public *formae*. Instead of starting from scratch with new points of reference, they may have exploited the work already done, also because, as already mentioned, the soldiers might have possessed enough technical skills in surveying to make their privately made *formae* sufficiently accurate and reliable. This does not necessarily mean that such an initial organisation of the land was then strictly followed in possible later and more official *formae*. On the contrary, it is fair to assume that changes were made, also as a corrective to individuals who could easily have claimed excessive amounts of land and/or reserved for themselves exclusive access to specific services, such as water sources.

The non-official status of such private *formae* likely implies that they were made on perishable material, which explains why none of them have come down to us. The exact material of the private *formae* is unknown, nor is it known where they were archived. When referring to the privately made *formae*, Siculus Flaccus does not offer any information on these issues. However, considering that private cadastral plans had no legal value, it is possible to assume, that they were made of substances other than bronze – which was the material of official documents *par excellence* – and that they were then kept in domestic archives. They may have been depicted on easy-to-use supports, such as wooden tablets, parchment sheets, materials that are already mentioned by Siculus Flaccus also for the public *formae*.⁷⁶

Despite pottery surfaces never having been mentioned by the *Gromatici veteres* as possible supports for *formae*, they may well have been employed for private and unoffi-

73 Cf., e. g., App. BC 1.7. On this, see also ROSELAAR 2010, 90–1.

74 DÉLÈAGE 1934, 184–5. Cf. also HINRICHS 1974, 128–31; ROSELAAR 2010, 90–1, 116 about the state dependence on information provided by private individuals to clarify the condition of land in the *ager Campanus*.

75 Cic. leg. agr. 2.30.82; Gran. Licin. 28.29–37 CRINITI. Cf. MANZO 2002a, 152–9; MANZO 2002b, 33–39; ROSELAAR 2010, 116–7.

76 Sic. Flacc. *grom.* 118.16–24 THULIN. Cf. footnote 17.

cial cadastral plans, given the great ease with which this type of writing support could be accessed, especially in a rural context.

There is information on depictions of possible shapes, plans, or maps on some pottery artefacts, although they can hardly be linked with land surveying. For example, the interpretation of some geometric figures painted on a pottery vase from *Clunia* (*Hispania Citerior*) is highly conjectural and difficult to prove.⁷⁷ A possibly more intriguing case is that of a clay block known to have been in the possession of the Museum of Grenoble by the end of the 19th century, on which a complexly structured *ante cocturam* plan was engraved.⁷⁸ Unfortunately, the artefact went missing as early as the 1980s,⁷⁹ and it is not possible to know the characteristics of the depicted plan in more detail, nor whether it was a rural or urban landscape. Several other plans drawn on clay tiles dating to the early Christian era were found in Ohrid (*Dalmatia*), but they represent top view buildings, not land.⁸⁰ Analogously, a clay tile from *Aguntum* (*Noricum*), dated to the third century CE,⁸¹ also depicts a portion of an urban layout, always provided that the artefact is authentic, which has long been questioned.⁸²

Only one more example, which is presented in the following section, may instead be linked to some passages from the writings of the Roman land surveyors.

3.2 The Fragment of Pottery from Soto Galindo: An Example of a Private *forma*?

It is a fragment of overpainted pottery (Fig. 7) from the countryside area of Soto Galindo (in the territory of the Roman city of *Vareia*),⁸³ which is now kept in a private collection in Madrid.⁸⁴

The first editor of the document – Marc Mayer i Olive – dated the artefact between the late first century BCE and the early first century CE and put forward the hypothesis that the *graffiti ante cocturam* pertained to the plan of a property – or rather, to a preliminary copy of one to resolve borders disputes.⁸⁵ At any rate, the material led Mayer i Olive to exclude the alleged plan having any official value.⁸⁶

77 The vase is published by GÓMEZ-PANTOJA 2010, and the interpretation is in MAYER I OLIVE 2023, 11.

78 DAREMBERG/SAGLIO 1896, 1250–1: “Le musée de Grenoble possède un gros bloc de terre cuite, sur lequel on a gravé, avant la cuisson, un plan assez compliqué”.

79 Cf. BREIN 1980, 23; ALZINGER 1985, 150.

80 BITRAKOVA GROZDANOVA 1975, 37–8 Abb. 8a; ALZINGER 1985, 151.

81 Cf. ALZINGER 1977, 37–41; MOSCATI 1978, 53–6; MÜLLER 2020, 1–18 on the status of the research.

82 For a recent discussion on the alleged forgery of the document, but not definitive in my personal opinion, see TEICHMANN 2022, 31–48.

83 CRUZ LABEAGA MENDIOLA 1976, 142–53; CRUZ LABEAGA MENDIOLA 1997, 179–85; CRUZ LABEAGA MENDIOLA 2000, 234–6.

84 This makes it impossible to check the object by autopsy.

85 MAYER I OLIVE 2023, 11: “Podría por tanto tratarse de la representación de la ubicación de una propiedad, sea como mero ejercicio, sea como pro-memoria o bien incluso como documento para una disputa o controversia de límites”.

86 MAYER I OLIVE 2023, 14: “Evidentemente, si pensamos en lo que nos dice el gromático Higino en su *De limitibus constituendis*, nos faltaría la indicación de los cardines, por lo que difícilmente podemos pensar en



Fig. 7: Fragment of pottery from Soto Galindo (Mayer i Olive 2023); Madrid (Spain), private collection (photo from Mayer i Olive 2023, 16).

The assumption that it is an example of a draft of an official *forma* does not find any basis in the Roman land surveyors' writings, as such a preparatory work of this kind is never mentioned in any of them. On the contrary, if identifying the lines and marks engraved on this fragment of pottery as a cadastral depiction is actually correct, it may not be impossible that the artefact would correspond to one of the privately made *formae* of the *agri occupatorii* or *arcifinalii*/-les mentioned by Siculus Flaccus.⁸⁷

la reproducción de un documento oficial. Aunque se trata de un elemento cerámico y estos, especialmente las ánforas, se utilizan a veces para este tipo de delimitaciones, no creemos que el objeto al que pertenecía el fragmento que analizamos pudiera tener esta finalidad explicitándola en sus paredes”.

⁸⁷ Among his hypotheses, MAYER I OLIVE did not exclude the possibility that the fragment of pottery bore an engraved depiction of a private property: see MAYER I OLIVE 2023, 11.

During the late first century BCE and the early first century CE, the territory surrounding the findspot of the artefact – an area characterized by the substantial presence of villas specialized in the production of pottery⁸⁸ – appears to have had all the characteristics of an *ager occupatorius* or, better *arcifinius/-alis*. The site of *Vareia* was strongly affected by the presence of the Roman army between the late Republican age and the early Empire. Because of the alliance with Pompey, the pre-Roman site of *Vareia*, located near La Custodia, was attacked by Sertorius in 76 BCE.⁸⁹ Later, perhaps because of the damage caused by this war, the settlement was abandoned, and a new one – very close to the findspot of the pottery sherd (Soto Galindo) – was built in the Augustan age, around 8.5 km further south, near Logroño. A *vexillatio* of the *Legio IIII Macedonica* was quartered there during the Cantabrian wars (29–19 BCE), as is confirmed by inscriptional evidence.⁹⁰ The presence of Roman soldiers was crucial for the reorganisation of the territory during and after the end of the wars.⁹¹

The chronology proposed by Mayer i Olive for the fragment of pottery mentioned above appears to be consistent with the period of such military operations, which first led to the building of a new Roman city – *Vareia* – after the Sertorian wars and then to the prolonged presence of soldiers who occupied the surrounding area and started building villas during the Augustan age. This is even more interesting when one considers, as already stated, that soldiers were often employed in the operations linked to land surveying and the definition of boundaries.

It might be useful at this point in the discussion to consider again the previously quoted passage from Balbus about the two types of boundaries – *extremitates*.⁹² As for the boundaries *per flexus*, which had a curvilinear form to adapt to the territory, Balbus states that they were typical of the *ager arcifinius/-alis*. The *limites* engraved on the fragment of pottery from Soto Galindo actually appear to be curving lines. If this is indeed a depiction of an *ager non divisus*, the surviving text engraved on the vase fragment cannot be understood as indicating the coordinates of a centuriated field (*decumanus* or *kardo*).⁹³

Assuming that the main interest of the soldiers who occupied portions of land in the area surrounding the city of *Vareia* and the area of Soto Galindo during the Augustan age was exploiting all the possible economic resources, it is not impossible that, besides

88 See CRUZ LABEAGA MENDIOLA 1997, 175–85; CRUZ LABEAGA MENDIOLA 1999–2000, 175–236.

89 Liv. Per. 91. Cf. PINA POLO 2009, 195–214; ARMENDÀRIZ MARTÍIJA 2022, 277–85; ARMENDÀRIZ MARTÍIJA 2023, 335–46; CALONGE MIRANDA 2023, 97–109.

90 AE 1976, 337; AE 1997, 912. Cf. CALONGE MIRANDA 2023, 99.

91 For the role played by the *Legio IIII Macedonica* in the management and control of the new area conquered by Rome see MORILLO CERDÁN 2000, 609–24; MORILLO CERDÁN 2002, 67–94; MARTÍN HERNÁNDEZ ET ALII 2020, 145–6.

92 See footnote 48.

93 Contra MAYER I OLIVE 2023, 13–4, who proposed transcribing the texts as follows: SD/XXXI (Text A); S X/SDX (Text B). He suggested expanding the possible abbreviations as *s(inistra) d(ecumanum)* and *s(ubsecivum)*. However, the reading is not easy nor univocal, and this interpretation thus remains highly doubtful.

agriculture and farming, the production of bricks, tiles, and pottery was also one among the most immediately available activities. Using a fragment of pottery for depicting land that was not officially divided and allocated – but only occupied for private purposes – may well have been an easy option for soldiers to produce a provisional cadastral survey. In this respect, the depiction on the fragment of pottery from Soto Galindo may hypothetically be considered as an example of the privately made *formae* mentioned by Siculus Flaccus.

However, this cannot be considered as the only, certain and unambiguous, interpretation of the document, especially given our awareness of the impossibility of checking the object by autopsy and defining the exact location of the finding with absolute confidence. It thus remains a hypothesis, and it cannot even be ruled out that the marks engraved on the fragment of pottery were merely a text exercise made in a workshop.

4. Conclusion [F. L., A. S.]

The evidence of Roman cadastral plans is limited, but the surviving examples give the idea of a certain variety. Besides the public and official *formae*, usually engraved on bronze tablets, there were private and unofficial ones, presumably engraved on less durable material.

As for public *formae*, a small but significant group of them survived: bronze ‘Cadastre B’ and ‘Cadastre A’ from Verona, a fragmentary bronze tablet from the Iberian peninsula depicting a centuriated area bordering with the territory of the inhabitants of *Laci(ni) murga*, and the ‘Orange Cadastres’, which are probably a marble copy of some originals on bronze. These *formae*, which combined mapping representations with textual information, served to show and register possession of landowners in a particular sector of the territory of a city. The map depicted both natural geographic elements (e.g. rivers) and anthropogenic features (e.g. roads, centuriation, boundaries, and borders) of the area, whilst the text recorded names of the landowners, the dimensions of land parcels and the type of land (e.g. *subseciva*, *agri reddit*i etc), but also served as a caption for describing natural elements (e.g. rivers). In terms of representation of internal boundaries, the *limites* of the centuriation, i.e. the *decumani* and *kardines* that bounded the single *centuriae*, were always depicted by means of horizontal and perpendicular lines; other internal boundaries were drawn by means of broken or oblique curving lines, according to the type of land (e.g. *subseciva* and *agri arcifinii* or *arcifinales*). Hyginus refers to the only one – and quite exceptional – case of a bronze *forma* recording a land allocation to soldiers in Pannonia under Trajan, in which the *ensor* – an individual with military background – engraved on the bronze not only the total area of land, but also the boundary line marking the perimeter of each settlers’ lots:

Nuper ecce quidam evocatus Augusti, vir militaris disciplinae, professionis quoque nostrae capacissimus, cum in Pannonia[m] agros veteranis ex voluntate et liberalitate imperatoris Traiani Augusti Germanici adsignaret, in aere, id est in formis, non tantum modum quem adsignabat adscripsit aut

notavit, sed et extrema linea unius cuiusque modum comprehendit: uti acta est mensura adsignationis, ita inscripsit longitudinis et latitudinis modum. Quo facto nullae inter veteranos lites contentionesque ex his terris nasci potuerunt.

Recently when an imperial reservist, a man of military training but also very skilled in our profession, was allocating lands in Pannonia to veterans, according to the wishes and generosity of the emperor Trajan Augustus Germanicus, he wrote down and recorded on bronze, that is, on the maps, not only the (total) area that he was allocating, but also at the end of the boundary line included the area of each settler; so, when the survey of the allocation was completed, he wrote down the area, listing the length and breadth. Therefore, no disputes and litigation could occur among the veterans about these lands.⁹⁴

No similar practice is attested on any of the surviving examples of *formae*. As for the external borders, they could simply be depicted by adding to the line of the outer boundary the inscription bearing the name of a neighbouring community, as it happens in the fragmentary bronze tablet from the Iberian peninsula. Detailed descriptions of the boundaries of the single plots of land within the *centuriae* – together with references to their denominations and the names of past and present owners etc. – must have been included elsewhere, e. g. in supplementary documents, such as the *tabulae aeris* and the *libri aeris* that are mentioned in some passages of the *Gromatici veteres*. Such additional documents, engraved on wood, parchment, and – perhaps – bronze, integrated the information provided by the *formae* and must be consulted together with maps.⁹⁵ The *tabulae aeris* and the *libri aeris* are much more difficult to recognize, and in this paper, for the first time, it has been proposed to identify the bronze tablet from *Ilici* as a possible example of a *tabula aeris* or a copy of it.

As for private *formae*, they were made on perishable – or less durable than bronze – material by single individuals to mark the boundaries of land that was not (yet) surveyed, such as the *agri occupatorii* or *arcifinii/-ales*, which they occupied. Their existence is only attested by a passage from Siculus Flaccus, unless one wants to recognize an example of one of them in a fragment of pottery, whose interpretation as a *forma* still remains conjectural and open to discussion. One can assume that they were kept in the private houses of the individuals who had produced them and that they were used as a map attesting (temporary) properties, although they had no official value.

To sum up, Roman cadastral plans were used for: a) registering land possession; b) declaring land status; c) localizing and delimiting land; and d) settling land controversies. Reconstructing internal boundaries and external borders of a portion of land through the *forma* and the relevant additional documents played a crucial role in the event that a dispute arose: indeed, what was registered on the bronze cadastral plans

94 Hyg. *grom.* 84.8–16 THULIN (translated by CAMPBELL 2000, 89). Cf. also GUILLAUMIN 2010, 16, who translates *extrema linea unius cuiusque modum comprehendit* as “il a [...] dessiné le périmètre entourant la superficie de chacun”.

95 See also NICOLET 1991, 155.

was always the proof of the perimeter and the legal status of a particular portion of land. Siculus Flaccus informs us that maps of all divided and allocated lands (*omnium [...] agrorum et divisorum et assignatorum formae*) and registers of land divisions and allocations (*divisionum et <assignationum> commentarii*) were kept in the imperial archive (*sanctuarium principis*), i. e. the one in Rome.⁹⁶ The so-called ‘Tavola di Esterzili’, a bronze slab that records a decree of March 18th 69 CE by the proconsul of Sardinia, Lucius Helvius Agrippa, about a land dispute between two local communities, i. e. the *Galillenses* and the *Patulcenses Campani*, confirms that relevant documentation (*tabula ad eam rem pertinentem*) was stored in the imperial archive (*tabularium principis*); at the same time, however, it also attests that a *forma*, presumably made of bronze, was also present locally (*in provincia*).⁹⁷ Both maps and written supplementary documents were thus prepared in duplicate, one copy kept in Rome, the other in the local city.⁹⁸

The surviving examples of public *formae* clearly fall in this category of maps that were kept locally. And yet, some points still remain unclear:

1. Accessibility. It is still impossible to be clear as to whether *all* the surviving examples of public *formae* were intended to be displayed publicly, as it seems in the case of ‘Cadastre B’ and ‘Cadastre A’ from Verona (not to mention the ‘Orange Cadastres’, which were a monumental marble version of a *forma*), or rather to serve as archival documents to be consulted when needed, as perhaps in the case of the fragmentary bronze cadastral plan from the Iberian Peninsula, in which the text can appear upside-down according to the angle of vision, and no information other than the total amount of *iugera* within each *centuria* is mentioned. If such *formae* were *all* fixed and displayed, were they all sufficiently readable and understandable? Conversely, would it be possible to assume that at least *some* of them were stored in the local archive to be consulted only in the case of a land dispute without being necessarily displayed publicly?
2. Updating. Could the *formae* be modified and updated? Two cases – one certain, the other supposed – are attested for the first century BCE:

96 Sic. Flacc. *grom.* 119.2–3 THULIN: *Quod si quis contra dicat, sanctuarium Caesaris respici solet. Omnium enim agrorum et divisorum et assignatorum formas, sed et diuisionum et <assignationum> commentarios, et principatus in sanctuario habet. Qualescumque enim formae fuerint, si ambigatur de earum fide, ad sanctuarium principis reuertendum erit* (“But if anyone raises an objection, it is normal to turn to the emperor’s record office {*sanctuarium*}. For the imperial government keeps in the sanctuarium maps of all divided and allocated lands, and also registers of land divisions and allocations. So, whatever the maps are like, if there is a dispute about their trustworthiness, we shall have to turn to the sanctuarium of the emperor”; translated by CAMPBELL 2000, 121).

97 CIL X, 7852, lines 13–17: [...] *Et postea Caecilius Simplex vir clarissimus ex eadem caussa aditus a Galillensibus dicentibus tabulam se ad eam rem / pertinentem ex tabulario principis adlaturos pronuntiaverit humanum esse / dilationem probationi dari et in Kalendas Decembres trium mensum spatium dederit in/tra quam diem nisi forma allata esset se eam quae in provincia esset secuturum* (“... And later on, when Caecilius Simplex, a very illustrious man, on account of the same case was approached by the Galillenses, pleading that they would produce a document pertaining to their situation from the Archive of the Princeps, proclaimed that it would be humane for an evidentiary adjournment to be granted and gave them a period of three months, until the Kalends of December, on which day, if the map was not produced, he would observe the one which was in the province”; translated by MORRIS 2018, 134).

98 See also DILKE 1987b, 216, and MOATTI 1993, 50.

- a) Siculus Flaccus speaks of the term *aes miscellum* – ‘interpolated map’ – defining a *forma* that was not falsified, but rather corrected and updated, as in the case of the cadastral map of a colony founded by Julius Caesar, whose name is unfortunately not explicitly mentioned.⁹⁹ The men settled as colonists took up military service again under Augustus, and some of them died. In the *forma*, in some *centuriae* were recorded the names both of those who had originally been settled in the colony and of those who afterwards took their place.
 - b) Annarosa Gallo recently interpreted the Sulla’s alleged ‘corruption’ of the 165 BCE *forma agrorum* of the *ager Campanus* as an operation of updating a too old map rather than a damage or a falsification of it.¹⁰⁰
- ‘Hyginus 2’ or ‘le Gromaticque’ suggests that changes like these were technically made possible by hammering and welding on a small piece of bronze to the *forma*.¹⁰¹ In this respect, however, a question arises: how often could a *forma* be updated?

With regard to these two points, a key role was probably played by the *tabulae aeris* and the *libri aeris*: as mentioned above, by providing further information that could not enter in the map, also because it was simply not conceived for recording it,¹⁰² such supplementary documents must have been essential to a fully understanding of the *forma* itself – and even to its possible – and easier – updating. However, only further findings and studies, especially if focused on the materiality of all cadastral documentation and the historical development of the use of the *formae* in the Roman era, may add valuable new input to the discussion and thereby contribute to providing answers to these (and other) issues.

99 Sic. Flacc. *grom.* 126.26–127.1 THULIN: *Praeterea dicitur et ‘aes miscellum’. Ita eveni[un]t ut qui a divo Iulio deducti erant, temporibus Augusti militiam repetissent; consumptisque bellis victores terras suas repetierunt; in locum tamen defunctorum alii agros acceperunt. Ex quo fit ut his centuriis inueniantur et eorum nomina, qui deducti erant, et eorum, qui postea in locum successerunt* (“Furthermore, there is the term ‘interpolated map’. It happened that men settled as colonists by the divine Julius Caesar took up military service again under Augustus. When the wars were over, as victors they reclaimed their lands; however, others received land in place of those soldiers who had died. Consequently in these *centuriae* are found the names both of those who had originally been settled as colonists, and of those who afterwards took their place”; translated by CAMPBELL 2000, 129).

100 GALLO 2025. On the episode, see Gran. Licin. 28.29–37 CRINITI.

101 Hyg. *grom.* 167.3–5 THULIN: *Quicumque modus limitem excedit, commallioli debet et sic in aere incidi* (“Whatever quantity of land exceeds what is enclosed by the limites, should be ‘welded on’ and in this way entered on the map”; translated by CAMPBELL 2000, 161). See also DILKE 1987a, 210.

102 On the ‘schematic’ function of the Roman *forma*, which was in between a real representation and an abstract conception of the space, see MORRIS 2018, 131–2, 138.

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