

# 12 · Maps in the Service of the State: Roman Cartography to the End of the Augustan Era

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Whereas the Greeks, particularly in Ionia in the early period and at Alexandria in the Hellenistic age, made unparalleled strides in the theory of cosmology and geography, the Romans were concerned with practical applications. This contrast is sometimes exaggerated, yet it can hardly be avoided as a generalization when seeking to understand the overall pattern of cartographic development in the classical world as well as its legacy for the Middle Ages and beyond. Roman writers did not attempt to make original contributions to subjects such as the construction of map projections or the distribution of the *climata*; most cartographic allusions in the literary texts—as well as the surviving maps—are connected with everyday purposes. Whether used for traveling, for trade, for planning campaigns, for establishing colonies, for allocating and subdividing land, for engineering purposes, or as tools of the law, education, and propaganda to legitimize Roman territorial expansion, maps ultimately were related to the same overall organizational ends. In cartography, as in other aspects of material culture, ideas first nurtured in Greek society were taken over and adapted to the service of the Roman state.

It is not only by chance, therefore, that it is in three particular applications of mapping—road organization, land survey for centuriation, and town planning—that Roman maps, or descendants of them, have survived. In the first two Rome was preeminent both in accuracy and in output. Such extant maps, while more numerous than those surviving from ancient Greece, are nevertheless only a tiny fraction of the numbers that were originally produced in the Roman period. The value of the media used—many were cast in metal or painted or carved on stone—contributed directly to their demise. The metals were melted down, and the stones were reused for other purposes in the less organized way of life that followed the fall of Rome. But despite the many gaps in our knowledge arising from such factors, Roman mapping is sufficiently distinctive—in both its impulses and its products—to be treated as a series of discrete chapters in the cartographic history of the classical period.

## ETRUSCAN BEGINNINGS

While it is traditionally accepted that Rome owed most

of its cartographic knowledge to Greek influences, we cannot rule out the possibility that it may have received independent ideas and practices from Etruscan concepts of cosmology and orientation and even of land division and survey.<sup>1</sup> It was disputed in antiquity, and it is still disputed, whether the Etruscans came to central Italy from Asia Minor or were indigenous. From their homeland in Etruria they expanded southward, and also northeastward into the Po valley (fig. 12.1). By about 500 B.C. they had developed a considerable empire, but it declined owing to Gallic invasions, internal disputes, and the expulsion of their Tarquin dynasty from Rome. The Etruscans were a literate people, well versed in Greek mythology, though their non-Indo-European language is still only partly understood.<sup>2</sup> Artistic and religious, with a respect for divination and a great concern for the afterlife, they had also a practical side that left its imprint on town planning, drainage, tunneling, and administration. The best example of Etruscan planning is Marzabotto, in the northern Apennines, where the rectangular grid pattern of streets is reminiscent of Greek colonies in the West. One may conjecture that their interest in cosmology was reflected in the planning of towns and temples, and certainly the architectural and building skills required in these developments—as with other early societies<sup>3</sup>—may have required simple instruments and measurement, similar to those used in mapping, even where there is no evidence that maps were drawn as part of the design process.

Likewise it may be noted that a number of aspects of Etruscan culture required accuracy in orientation.<sup>4</sup> There may have been a different usage according to whether sky or earth was involved. The elder Pliny writes: “The Etruscans . . . divided the heaven into 16

1. The standard work is Massimo Pallottino, *The Etruscans*, ed. David Ridgway, trans. J. Cremona (London: Allen Lane, 1975).

2. Giuliano Bonfante and Larissa Bonfante, *The Etruscan Language: An Introduction* (Manchester: Manchester University Press, 1984).

3. This will be discussed in relation to south Asia in volume 2 of the present *History*.

4. Carl Olof Thulin, *Die etruskische Disciplin* . . . 3 pts. (1906–9; reprinted Darmstadt: Wissenschaftliche Buchgesellschaft, 1968), pt. 2, *Die Haruspicin*, index s.v. “Orientierung”; Pallottino, *Etruscans*, 145 and fig. 5 (note 1).

parts: (1) from north to east, (2) to south, (3) to west, (4) the remainder from west to north. These parts they then subdivided into four each, and called the eight eastern subdivisions 'left,' the eight on the opposite side 'right.'"<sup>5</sup> This implies that when, for example, a soothsayer was divining from lightning, he would face south. Evidently lightning on the left was considered lucky by the Etruscans, especially if it was visible in front of the soothsayer as well as behind him. It is possible that this division into sixteen parts led later to sixteen-point wind roses as against twelve-point ones.

before the rise of Rome. Against this, literary statements have to be treated with caution: in the case of the extant Etruscan temples, many face to the south, rather than to the west as was apparently held by Varro.

There is one exception, albeit extremely difficult to interpret, to this complete lack of map artifacts surviving from Etruscan culture. This is the Bronze Liver of Piacenza, an unusual religious relic known for over a century, which incorporates a maplike image on part of its surface. This bronze representation, 12.6 centimeters long, of a sheep's liver was found in 1877 between Set-

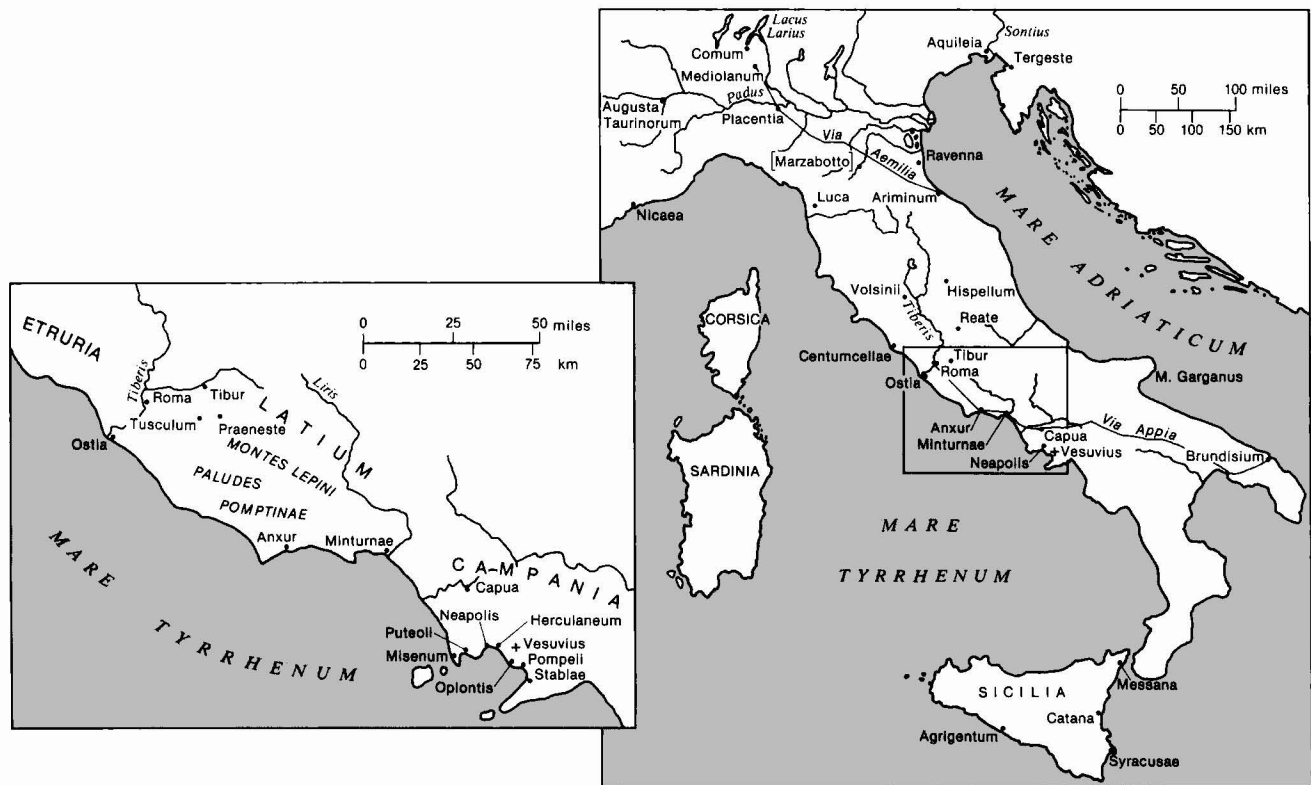


FIG. 12.1. PRINCIPAL PLACES ASSOCIATED WITH MAPS IN ANCIENT ITALY AND SICILY.

When we come to land division, however, Etruscan orientation seems to have been west-facing. Frontinus says: "The origin of centuriation, as Varro observed, is in the Etruscan lore, because their soothsayers divided the earth into two parts, calling that to the north 'right' and that to the south 'left.' They reckoned from east to west, because the sun and moon face that way (*eo spectant*); just as some architects have written that temples should correctly face west."<sup>6</sup> If we accept that some form of centuriation—a system of surveying land in rectangular parcels—was already being practiced in the Etruscan period,<sup>7</sup> then a corollary might be that the land survey methods so characteristic of Roman society, and giving rise to the *agrimensores*, also had their beginnings

in the Museo Civico, Piacenza (figs. 12.2 and 12.3).<sup>8</sup> There are no grounds for doubting its genuineness; it dates from about the third century B.C. and has been called a map by some scholars

5. Pliny *Natural History* 2.55.143, author's translation; for an English edition see Pliny *Natural History*, 10 vols., trans. H. Rackham et al., Loeb Classical Library (Cambridge: Harvard University Press; London: William Heinemann, 1940–63).

6. Frontinus *De limitibus* (On centuriation), in *Corpus Agrimensorum Romanorum*, ed. Carl Olof Thulin (Leipzig, 1913; reprinted Stuttgart: Teubner, 1971), 10–15, quotation on 10–11, author's translation; O. A. W. Dilke, "Varro and the Origins of Centuriation," in *Atti del Congresso Internazionale di Studi Varroniani* (Rieti: Centro di Studi Varroniani, 1976), 353–58.

7. O. A. W. Dilke, *The Roman Land Surveyors: An Introduction to the Agrimensores* (Newton Abbot: David and Charles, 1971), 33–34, and for a definition of centuriation, 15–16.

8. G. Körte, "Die Bronzeleber von Piacenza," *Mitteilungen des Kaiserlich Deutschen Archäologischen Instituts, Römische Abteilung* 20



FIG. 12.2. THE BRONZE LIVER OF PIACENZA. A religious relic of the third century B.C., this representation of a sheep's liver has a maplike image on part of its surface. This artifact can be most easily explained as a form of cosmological map.

Size of the original: 7.6 × 12.6 cm. By permission of the Museo Civico, Piacenza.

in this century. Its top side consists of protuberances modeled schematically on those of a sheep's liver and of a flat section divided into boxes representing zones. Each of these has its Etruscan inscription with the name of a deity.<sup>9</sup> The convex underside is divided into two sections, inscribed only with the Etruscan words for sun and moon. The liver was clearly associated with the *disciplina Etrusca*, the art whereby their soothsayers divined the will of the gods by inspecting entrails. A parallel has been drawn with a Chaldean terra-cotta liver in the Budge collection of the British Museum.<sup>10</sup>

On the right of the Piacenza liver's upper side is a pyramid representing the *processus pyramidalis* of the liver. Unlike the left half, the flat part of which has a radial subdivision, under the pyramid are roughly rectangular boxes, that some scholars have associated with the *cardines* and *decumani* of centuriation,<sup>11</sup> considered by Varro to have Etruscan origins.

In other respects the segmented images suggest a cosmological representation of part of the heavens. Martianus Capella, the fifth-century A.D. author of the encyclopedic work *De nuptiis Philologiae et Mercurii*, tells us that the ancients divided the soothsayer's view of the

heavens into favorable and unfavorable areas, each represented by particular deities, whose Roman equivalents he gives.<sup>12</sup> Many of those on the Piacenza liver can indeed be equated, such as Tin to Jupiter, Uni to Juno, Fufluns to Liber, Maris to Mars. But attempts to make Martianus's scheme tally with that of the liver have not

(1905): 348–77; Thulin, *Die etruskische Disciplin* (note 4); Massimo Pallottino, *Saggi di Antichità*, 3 vols. (Rome: G. Bretschneider, 1979), 2:779–90.

9. Etruscan lettering, based on early Greek, is quite legible; it is written from right to left. Nevertheless, in Otto-Wilhelm von Vacano, *The Etruscans in the Ancient World*, trans. Sheila Ann Ogilvie (London: Edward Arnold, 1960), 22, and in Tony Amodeo, *Mapline* 14 (July 1979), the Piacenza liver is illustrated in such a way that most of the inscriptions are upside down. James Welland, *The Search for the Etruscans* (London: Nelson, 1973), 146–47, reverses the diagram so that the writing looks as though it were from left to right.

10. London, British Museum, Budge 89-4-26. 238.

11. See Pallottino, *Etruscans*, 164 (note 1), for reference to *cardo* and *decumanus* in Etruscan sacred space.

12. Martianus Capella *De nuptiis Philologiae et Mercurii* 1.45 ff.; see *The Marriage of Philology and Mercury*, trans. William Harris Stahl and Richard Johnson with E. L. Burge (New York: Columbia University Press, 1977); vol. 2 of the series *Martianus Capella and the Seven Liberal Arts*.

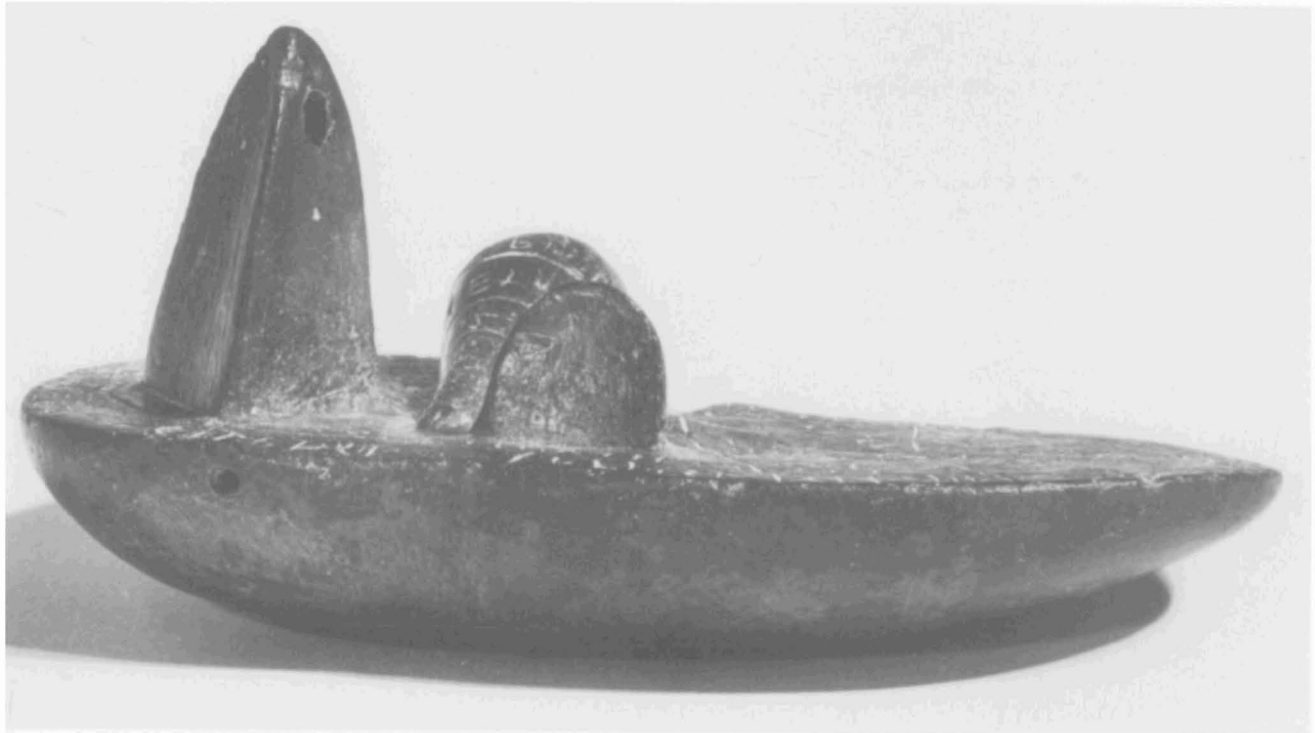


FIG. 12.3. THE BRONZE LIVER OF PIACENZA, SIDE VIEW.

Height of the original: 6 cm. By permission of the Museo Civico, Piacenza.

been entirely satisfactory: it suits Martianus's text best to postulate north at the top, whereas the convex side with "sun" and "moon" suggests west at the top.<sup>13</sup> One must say, therefore, that the liver has a not entirely agreed upon place in the history of religious cartography. But if it cannot be ignored in any attempt to understand Etruscan ways of representing space, it also points to the cosmological use of mapping, whatever its practical foundation, as the dominant motive behind such a representation.

#### GEOGRAPHICAL AND CADASTRAL MAPS FROM THE REPUBLICAN PERIOD

Rome, thought by the ancients to have been founded in 753 B.C.,<sup>14</sup> developed as a pastoral community on a salt route from the mouth of the Tiber to the hinterland. For two and a half centuries it was ruled by kings, several of whom had strong Etruscan links; the potential influence on Rome of Etruscan concepts of cosmology and orientation has already been discussed. During the early years of the Republican period that followed, Rome also came into contact with the Greek maritime trading colonies of southern Italy, and the long struggles of Rome against Carthage in the third and second centuries B.C. vastly widened her horizons.

The nature of Roman territorial expansion exerted a strong influence on the type of maps it was eventually to generate. Unlike the Greeks—whose cartographic expertise came mainly from theoretical formulations, celestial observations, and maritime explorations—the Romans first expanded by land, and we may conjecture that their earliest rudimentary plans may have been of the small maritime defense colonies set up with land allocations in the fourth century B.C. or of main roads such as the Via Appia, leading in the first place (312 B.C.) to Capua. These roads were provided with milestones, and at a later stage guides to a number of them were compiled in the form of itineraries.

Not until the second century B.C. do we hear of the first two Roman maps. One was concerned with the annexation of Sardinia from the Carthaginian empire; the other was a land survey map relating to Campania and arising from the appropriation and redistribution

13. Pallottino, *Saggi di Antichità*, 2:779–90 (note 8), considers that the axis of the liver was not north-south but perhaps NNW-SSE, corresponding to the orientation of a particular temple.

14. The date may be relevant to the interpretation of the time scales of the history of cartography, since the system of chronology based on years B.C. is comparatively recent. Since 753 B.C. was year 1, conversion is effected by subtracting from 754; e.g., 100 B.C. is A.U.C. 654 (*ab urbe condita*, from the foundation of the city). This chronology has not been adopted here.

of lands after Capua had sided with Hannibal. These earliest allusions in textual sources immediately identify the distinctive nature of Roman mapping. It was both political and practical in character and, above all, was concerned in various ways either with geographical expansion or with the organization and exploitation of settled lands thus brought under political control.

#### GEOGRAPHICAL MAPS

The earliest mention of a Roman map is attributed to Tiberius Sempronius Gracchus, father of the Gracchi.<sup>15</sup> We are told that in 174 B.C., after his victory in Sardinia, he dedicated to Jupiter, in the temple of Mater Matuta in Rome, a tablet (*tabula*) consisting of a map (*forma*) of Sardinia. On this was an inscription, perhaps originally in Saturnian verse, and pictures of the battles the general had fought. Matuta, whose temple was in the Forum Boarium, was originally a dawn goddess but came to be associated with the deified Greek heroine Leucothea, regarded as a goddess of seas and harbors. The religious connotation is important. By displaying images symbolizing the conquered land, the Romans wished to propitiate appropriate deities. In the same way, personifications of large rivers in enemy countries were carried in triumphal processions, so that Jupiter and other deities might favor Roman military exploits. One should not think of such maps as containing conventional cartographic detail; they were pictorial maps, perhaps with brief sentences recording the victories.<sup>16</sup> We learn that in 164 B.C. a Greek *topographos* (topographical writer or landscape illustrator), Demetrius of Alexandria, was living in Rome. This suggests that there were already a few specialized artists skilled in executing such maps, which, despite the comparatively early date, contained a strong element of propaganda.

Maps may also have been used by writers in helping to compile the histories of the same period, though we have no proof. For example, Cato the Elder (234–149 B.C.) wrote his *Origines*, a work on the origins of Italian cities and tribes, now lost except for fragments, between 168 and 149 B.C. In one fragment he says that the length of Lake Larius (Lake Como) is sixty Roman miles;<sup>17</sup> but this hardly justifies the statement that he must have had a map available.<sup>18</sup>

A more convincing example comes to us from the late Republic, during which period Varro's encyclopedic interests over a long life (116–27 B.C.)<sup>19</sup> may lead us to guess he was very familiar with maps. He sets the scene of his *De re rustica* at the temple of Tellus (Mother Earth)<sup>20</sup> and gives his speakers names associated with the land. They are said to be *spectantes . . . pictam Italiam*, literally "looking at Italy painted" on a wall of this temple or of its portico. This must surely be a map of Italy, not a painting of a personification of it. After

they have seated themselves, the philosopher among them goes on: "The world was divided by Eratosthenes in an essentially natural way, towards north and towards south. There is no doubt that the northern part is healthier than the southern and likewise more fertile."<sup>21</sup> He then compares Italy with Asia Minor and discusses the regions of Italy from the point of view of farming. Again one assumes he was pointing to the map and that such maps were used—as the Greek sources have also indicated—as a regular aid to teaching.<sup>22</sup>

An even more potent force in the development of Roman cartography was, however, geopolitical. There can be little doubt that by the late Republican period Roman rulers and their advisers had come to recognize the value of geographical maps in both administration and propaganda. In particular, it is in this light that the truly imperial scheme initiated by Julius Caesar (100–44 B.C.)—to undertake a survey of the known world—can be interpreted. Even if this was not accompanied by maps and was not completed until the Augustan era, its raw materials were drawn upon for Agrippa's world map.

Caesar's project is known to us from three late sources: first, the *Cosmographia Iulii Caesaris*; second, an anonymous *Cosmographia*;<sup>23</sup> and third, the Hereford world map in which Caesar or Augustus, enthroned, is shown delivering a mandate for the survey of the world (fig. 12.4; see also below, pp. 207 and 309). In 44 B.C., we are told in the *Cosmographia Iulii Caesaris*, four geographers were appointed to measure the four quarters of the earth; if we may believe the ancient sources, they

15. Livy [*History of Rome*] 41.28.8–10, in *Livy*, 14 vols., trans. B. O. Foster et al., Loeb Classical Library (Cambridge: Harvard University Press; London: William Heinemann, 1919–59).

16. Roger Ling, "Stadius and the Beginnings of Roman Landscape Painting," *Journal of Roman Studies* 67 (1977): 1–16, esp. 14 and nn. 54–55.

17. Cato the Elder *Origines* 2, fr. 7; see *Originum reliquiae in M. Catonis praeter librum de re rustica quae extant*, ed. H. Jordan (Leipzig: Teubner, 1860), 10, and *Servius Commentary on Virgil's Georgics* 2.159, in vol. 3 of *Servii Grammatici qui feruntur in Vergilii carmina commentarii*, 3 vols., ed. Georg Thilo and Hermann Hagen (Leipzig: Teubner, 1881–1902; reprinted Hildesheim: Georg Olms, 1961).

18. See the comment by Jacques Heurgon in his edition of Varro's *De re rustica: Economie rurale: Livre premier* (Paris: Belles Lettres, 1978), 102.

19. Varro was a prolific author and editor, but only two works have survived substantially: *Rerum rusticarum libri III* and *De lingua Latina libri XXV* (books 5–10 preserved in full).

20. Varro *De re rustica* 1.2.1 (note 18).

21. Varro *De re rustica* 1.2.3 (note 18). author's translation.

22. See pp. 254–56.

23. *Cosmographia Iulii Caesaris* and *Cosmographia*, both in *Geographi Latini minores*, ed. Alexander Riese (Heilbronn, 1878; reprinted Hildesheim: Georg Olms, 1964), 21–23 and 71–103, respectively. For a translation of the former see O. A. W. Dilke, *Greek and Roman Maps* (London: Thames and Hudson, 1985), 183.



FIG. 12.4. CAESAR'S EDICT ON THE HEREFORD WORLD MAP. Augustus Caesar—whose seal is on the order—is seen ordering a survey of the whole world in this detail from a thirteenth-century *mappamundi*, but the three geographers to whom he is seen entrusting this order belong to the tradition of Julius Caesar's survey.

each took from twenty-one and a half to thirty-two years to complete their work. The names of the geographers are all Greek, and they were probably freedmen.<sup>24</sup> The periods of work and years of completion do not tally, but the discrepancies are not immediately apparent in the texts, since the year of completion for each was expressed not in years after the foundation of Rome but in names of consuls, the customary method in classical times. The delimitation of the four regions can, however, be guessed at from the anonymous *Cosmographia*: the East is all to the east of Asia Minor; the West is all Europe except Greece, Macedonia, and Thrace; the North contains these three regions (Greece perhaps because it was conquered by Macedonia) and Asia Minor; and the South is Africa. The definition of *provincia* (province) is inconsistent with legal status at any period, and the term is made to extend outside the empire. Per-

Size of the original detail: 26.8 × 33 cm. From a facsimile, by permission of the Dean and Chapter of Hereford Cathedral.

haps the geographers' names and work periods are derived from documents of the Julian period,<sup>25</sup> together with the fourfold division, though Caesar's definitions, if they are his, are somewhat different from those of Varro, who divided the inhabited world into two, Europe and Asia-Africa.

One of the few surviving geographical maps of the pre-Augustan period, a recent chance find,<sup>26</sup> may have been associated with Caesar's Gallic campaigns. A block

24. *Cosmographia Iulii Caesaris* 1 (note 23).

25. One manuscript of the *Cosmographia Iulii Caesaris*, Rome, Biblioteca Apostolica Vaticana, Vat. Pal. 73, actually associates that treatise with the measuring of the world instituted by Julius Caesar; and the texts of other manuscripts of the Julian period also imply such a link.

26. Pierre Camus, *Le pas des légions* (Paris: Diffusion Frankelve, 1974), front cover, and for plan of fort, 62.

of local sandstone, with maximum length and width fifty-six by forty-seven centimeters and thickness on average fourteen centimeters, was found in 1976 near the center of the Roman camp of Mauchamp, between Juvincourt and the river Aisne, and is now at Brie Comte Robert (fig. 12.5). It has apparently been worked with a chisel on the sides and will stand up with north roughly at the top. If it is a map of Gaul, as the finder claimed, the western coastline is recognizable, while the other sides could be thought to follow the frontiers of Gaul. Three holes made in a line could represent the Gallic religious centers of Puy de Dôme, Autun, and Grand.



FIG. 12.5. THE STONE "MAP OF GAUL" FROM THE ROMAN CAMP AT MAUCHAMP, FRANCE. Claimed to be a map of Roman Gaul, and perhaps associated with Caesar's Gallic campaigns, the western coastline of the province is clearly recognizable. The three prominent, equally spaced holes—approximately in a straight line from southwest to northeast—may represent the Gallic religious centers of Puy de Dôme, Autun, and Grand.

Size of the original: 56 × 47 cm. By permission of the heirs of the late Pierre Camus, Brie Comte Robert, France.

#### AGRIPPA'S WORLD MAP

The surveys and measurements ordered by Caesar, but according to our source put in hand only in the year of his death, were thus largely carried out during the reign

(27 B.C. to A.D. 14) of his successor, the emperor Augustus. Presumably they took the form largely of itineraries measured along the road network of the empire; and they were used, as mentioned, in the compilation of Agrippa's map. Although this world map, like so many other maps from the classical period, is known to us only from literary texts, some authorities claim it is the most important map in Roman cartography.<sup>27</sup> On the basis of statements by a number of ancient and medieval writers, it is believed to be the prototype for a succession of later world maps such as the thirteenth-century Hereford *mappamundi*.<sup>28</sup>

Political developments under Augustus favored the compilation of such a map. The establishment of the principate, or system of supreme control under an emperor, which effectively took place in 27 B.C., had important results for literary and scientific output. Augustus, often through his ministers, saw to it that as much of this as possible was aligned with his propaganda extolling Rome, the empire, and its leader. As part of the settlement of veterans after the long period of civil wars, Augustus set up colonies, settlements with smallholdings, numbering twenty-eight in Italy and over eighty in the provinces, though some of each were refounded rather than founded in the true sense. To encourage trade inside and outside the Roman Empire and to promote the establishment of colonies, he was clearly keen that a world map should be drawn up and publicly displayed. The man to whom this task was allotted was well connected. M. Vipsanius Agrippa (b. ca. 63 B.C.) had been the admiral of Octavian (later Augustus) at the battle of Actium, 31 B.C., at which Antony and Cleopatra were routed; and after the establishment of the principate he became Augustus's right-hand man, marrying as his third wife Augustus's daughter Julia and being expected to succeed him as emperor.

The world map of Agrippa was set up in the colonnade named after him, Porticus Vipsania, in what is now the Via del Corso area of Rome. This colonnade is also sometimes referred to as the Porticus of the Argonauts. When Agrippa died the work was completed first by Agrippa's sister, Vipsania Polla, then by Augustus.<sup>29</sup> The elder Pliny (A.D. 23/24–79) expresses surprise that the

27. Armando Cortesão, *History of Portuguese Cartography*, 2 vols. (Coimbra: Junta de Investigações do Ultramar-Lisboa, 1969–71), 1:148. See also James J. Tierney, "The Map of Agrippa," *Proceedings of the Royal Irish Academy* 63, sec. C, no. 4 (1963): 151–66. Dilke, *Greek and Roman Maps*, pp. 41–54 (note 23).

28. Gerald R. Crone, *Maps and Their Makers: An Introduction to the History of Cartography*, 5th ed. (Folkestone: Dawson; Hamden, Conn.: Archon Books, 1978). See also chap. 20 below.

29. Dio Cassius *Roman History* 55.8.4 says that it was not yet completed in 7 B.C.; see *Dio's Roman History*, 9 vols., trans. Earnest Cary, Loeb Classical Library (Cambridge: Harvard University Press; London: William Heinemann, 1914–27), vol. 6.

map gave the length of the southern Spanish province of Baetica as 475 Roman miles and its breadth as 258.<sup>30</sup> That, he says, was correct only earlier, when its boundaries extended as far as Carthago Nova (Cartagena). He adds: "Who would believe that Agrippa, who was very careful and took great pains over this work, should, when he was going to set up the map to be looked at by the citizens of Rome, have made this mistake, and together with him the deified Augustus? For it was Augustus who, when Agrippa's sister had begun building the portico, carried it out from the intention and notes (*commentarii*) of M. Agrippa."<sup>31</sup> This comment ascribes to the emperor rather more personal attention to the map than seems likely. He was happy for his name to be linked with a work of potential propaganda, but apart from his association with the large obelisk sundial with a grid on the gnomonic projection recently excavated in Rome,<sup>32</sup> had not the same interest in scientific research as had Julius Caesar.

The dimensions of the map are not known, but it must have been rectangular, not circular.<sup>33</sup> It is thought that its height may have been between two and three meters, and its width greater. Like the later Ptolemy and Peutinger maps, it very likely had north at the top.<sup>34</sup> Whether the map was carved in or painted on marble is disputed.

It is thought from several passages of Pliny's *Natural History*, in addition to the mention of notes, that Agrippa's map was accompanied by a commentary. Detlefsen argued against such a supposition, but Gisinger supported it.<sup>35</sup> In the *Natural History* we are told: "Agrippa calculates this same distance [the length of the Mediterranean], from the Straits of Gibraltar to the Gulf of Iskenderun, as 3,440 miles, but I am inclined to think there is a mistake in this, since he also gives the distance from the Straits of Messina to Alexandria as 1,350 miles."<sup>36</sup> The word "also" in the final clause of this passage suggests a second Agrippa source, and the verb *existimavit* (thought), more suited to a text than to a map, is used twice elsewhere of Agrippa. Moreover, much of the information on the west coast of Africa attributed to Agrippa concerns animals and is hardly suitable for inclusion in an official map.<sup>37</sup> Another such informative passage credits him with writing that the whole Caspian coast from the river Casus consists of very high cliffs, which prevent landing for 425 miles.<sup>38</sup> Since Agrippa died while composing the map, however, the commentary may have been incomplete, and relevant extracts may have been incorporated in the map.

The chief writer who quotes Agrippa as a source is the elder Pliny. He lists him among his sources both for the geography of the Roman Empire and for areas outside it, sometimes quoting him by name, sometimes not. He implies that by his time (the *Natural History* was

completed in A.D. 77) Agrippa's map may well have been out of date in certain respects. For example, just after Agrippa's measurement of Media, Parthia, and Persis, he mentions the town of Charax in Mesopotamia.<sup>39</sup> This is said to have been originally 1¼ miles from the Persian Gulf, on which it was placed by Agrippa; by the time Juba was writing, it was said to be 50 miles inland; by Pliny's time it was 120 miles inland.

Two later treatises clearly indebted to Agrippa are the *Divisio orbis terrarum* and the *Dimensuratio provinciarum*;<sup>40</sup> their measurements sometimes agree, sometimes disagree with those given by Pliny. Similarly, the Irish writer Dicuil (fl. 814–25), although he gives as his authorities the elder Pliny and the mapmakers of Theodosius II, also mentions the "Chorographia" of Augustus, that is, Agrippa's map, as the first to give the threefold division of the world into Europe, Asia, and Africa.<sup>41</sup> From the evidence of these treatises Detlefsen calculated that there were twenty-four regions of the

30. Pliny *Natural History* 3.1.16 ff. (note 5).

31. Pliny *Natural History* 3.2.17 (note 5), author's translation.

32. Pliny *Natural History* 36.14.71–72 (note 5). The sundial excavated was a post-Augustan restoration using Augustan material. Edmund Buchner, "Horologium Solarium Augusti: Vorbericht über die Ausgrabungen 1979/80," *Mitteilungen des Deutschen Archäologischen Instituts, Römische Abteilung* 87 (1980): 355–73, and subsequent reports in this periodical; idem, *Die Sonnenuhr des Augustus: Nachdruck aus RM 1976 und 1980 und Nachtrag über die Ausgrabung 1980/1981* (Mainz: von Zabern, 1982). See review by Andrew Wallace-Hadrill in *Journal of Roman Studies* 75 (1985): 246–47.

33. Konrad Miller, *Mappaemundi: Die ältesten Weltkarten*, 6 vols. (Stuttgart: Roth, 1895–98), 6:145–47, imagined it as being circular, but that would hardly have been suited to a colonnade.

34. It could well, however, have been south, as supposed by F. Gisinger, "Geographie," in *Paulys Realencyclopädie der classischen Altertumswissenschaft*, ed. August Pauly, Georg Wissowa, et al. (Stuttgart: J. B. Metzler, 1894–), suppl. 4 (1924): cols. 521–685, esp. col. 645. This was a classical as well as nonclassical (e.g., Arabic) orientation for world maps. See Ferdinando Castagnoli, "L'orientamento nella cartografia greca e romana," *Rendiconti della Pontificia Accademia Romana di Archeologia* 48 (1975–76): 59–69.

35. D. (S. D. F.) Detlefsen, *Ursprung, Einrichtung und Bedeutung der Erdkarte Agrippas*, Quellen und Forschungen zur Alten Geschichte und Geographie 13 (Berlin: Weidmann, 1906); Gisinger, "Geographie," col. 646 (note 34). The best analysis is by A. Klotz, "Die geographischen Commentarii des Agrippa und ihre Überreste," *Klio* 24 (1931): 38–58, 386–466.

36. Pliny *Natural History* 6.38.207 (note 5), author's translation.

37. Pliny *Natural History* 5.1.9–10 (note 5).

38. Pliny *Natural History* 6.15.39 (note 5).

39. Pliny *Natural History* 6.31.137–38 (note 5). This was the home of the geographer Isidorus (not to be confused with Isidore of Seville).

40. *Divisio orbis terrarum* and *Dimensuratio provinciarum*, both in Riese, *Geographi Latini minores*, 15–20 and 9–14, respectively (note 23).

41. Dicuil *De mensura orbis terrae* (On the measurement of the earth) 1.2; see *Liber de mensura orbis terrae*, ed. and trans. James J. Tierney, *Scriptores Latini Hiberniae*, no. 6 (Dublin: Dublin Institute for Advanced Studies, 1967).



TABLE 12.1 Ancient Measurements for Sicily in Roman Miles

Source	East Coast	South Coast	North Coast	Circumference
Agrippa (in Pliny, <i>Natural History</i> , 3.86)	—	—	—	618 <sup>a</sup>
Strabo 6.2.1, sea distance	159	over 165 <sup>b</sup>	263	—
Strabo 6.2.1, land distance	168	—	235 <sup>c</sup>	—
Pliny, <i>Natural History</i> 3.87, land distance	186 <sup>d</sup>	200	142 <sup>e</sup>	—

<sup>a</sup>Detlefsen proposed emending to 528. For manuscript readings see Pliny, *Naturalis historiae libri XXXVII*, ed. Carolus Mayhoff (Leipzig: Teubner, 1906), vol. 1. The Loeb text is not reliable on these.

<sup>b</sup>Four stages add up to 165 miles, but there should be a fifth to reckon in. Strabo also has figures in stades from Posidonius.

<sup>c</sup>By Via Valeria.

<sup>d</sup>Emended by some editors to 176.

<sup>e</sup>Emended by some editors to 242.

world on Agrippa's map.<sup>42</sup> When Strabo quotes as his source "the chorographer," with entries not in stades but in Roman miles, it has usually been thought that he too refers to Agrippa. This certainly suits the time when Strabo was in Rome, but the measurements do not always agree. Table 12.1, giving in Roman miles the varying estimates of coastal lengths for Sicily, illustrates these discrepancies. Since Ptolemy distorts the shape of Sicily, we may imagine that Agrippa did so in like fashion. Pliny's figure of 200 miles for the south coast of Sicily corresponds to the figure of 1,600 stades given by Agathemerus; and he need not have turned to Agrippa in this case. But there is always the possibility that Strabo was drawing on the measurements instituted by Julius Caesar. The complicated relationship between these various writers and the maps they used seems to confirm that Agrippa's map inaugurated a new line of world maps. But so many are the anomalies in our evidence for the stemma that we must also conclude that many of the links in the chain of its transmission are now lost to us forever.

Either Agrippa's map or his notes or both had measurements of length and breadth, in Roman miles, for each region. Such measurements are reported by the elder Pliny, writing some eighty years later, and in eighteen cases he specifically cites them as coming from Agrippa—more probably from the map than from the notes. It is evident that some of these measurements had been very roughly rounded off. Thus Britain is cited as being 800 Roman miles long and 300 wide; Ireland, 600 by 300 miles. When, on the other hand, we come to Gaul, which from Caesar's Gallic Wars onward was much better known, we find Gallia Narbonensis given as 370 by 248 miles, the rest as 420 by 313.<sup>43</sup> In the case of India, the measurement 3,300 by 1,300 miles foreshadows the figures we may deduce from Ptolemy's coordinates—much too short from north to south. It is feasible to reconstruct the possible appearance of Agrippa's world map, and this is being attempted.<sup>44</sup> But there must always be serious doubts about the accuracy of such reconstructions, since the data are extremely frag-

mentary. Agrippa clearly did not record latitudes and longitudes, and we cannot always trust the figures preserved in the Pliny manuscripts, while later sources are far less reliable. Sea distances are particularly unreliable, since near coasts they may have been measured either from cape to cape or following the indentations of coastlines.

Despite its obvious failings, Agrippa's world map represented new work of a practical Roman type, which must often have been based on data from the extensive network of Roman roads. It lasted, was probably revised, and may have been available in copies erected elsewhere. The practice of erecting a world map on a city colonnade seems to have persisted right down to the late empire. Much later, for example, the rhetorician Eumenius, born about A.D. 264, wrote of the school at Augustodunum (Autun) in Gaul, the rebuilding of which he was lavishly subsidizing after war damage: "Let the boys and girls see on the colonnades all the lands and all the seas . . . the points where rivers rise and where they have their mouths, and the extent of bays."<sup>45</sup> Finally, in assessing the map's influence on cartographic practice in the Roman world, it may be noted that revisions to the "monuments of the ancients" carried out as late as the fifth century A.D. on the orders of Theodosius II are also thought to have been based upon Agrippa's map (see p. 259).

#### CADASTRAL MAPS

The first Roman land survey map recorded can be dated to 170–165 B.C. The historian Granius Licinianus tells us that Publius Cornelius Lentulus, consul suffectus 162 B.C., when he was urban praetor, had been authorized by the Senate to reclaim state land in Campania, the

42. Detlefsen, *Ursprung der Erdkarte Agrippas*, 21–22 (note 35).

43. The figure 420 is far too small.

44. By John H. Bounds, Sam Houston State University, Texas.

45. Eumenius *Oratio pro instaurandis scholis* 20.2, author's translation; see 9(4) in *XII [Duodecim] Panegyrici Latini*, ed. R. A. B. Mynors (Oxford: Clarendon University Press, 1964), 242.

whole of which had been occupied by private individuals.<sup>46</sup> He therefore bought up for the state 50,000 *iugera* (12,600 hectares) of land and had a map of this area incised on bronze and affixed to the Atrium Libertatis (Hall of Freedom) in Rome. Granius adds that Sulla later (82–79 B.C.) “corrupted” this map, that is, presumably had it considerably changed for political ends. The Atrium Libertatis<sup>47</sup> was a building near the Curia (senate house) particularly associated with slaves and freedmen. This map, since it resulted from a cadastral survey, is likely, except in its material, to have been similar to the cadastral maps of the Roman colony of Orange (Arausio), see below pp. 220–25. The centuriation of Campania is in places well preserved on the land,<sup>48</sup> reflecting mainly later allocations such as those under Gracchus’s sons and under Julius Caesar. Inscribed centuriation stones have been found showing that, at least in the allocations by the Gracchi, the survey was carried out carefully.

The state’s acceptance of the value of maps was also reflected in the archival provision made for their preservation. In 78 B.C., during the late republic, a Roman state record office, the *tabularium*, was constructed on the slopes of the Capitoline, in what are now the substructures of the Palazzo dei Conservatori. It was this building that, among other things, served as the repository of land surveyors’ bronze maps, one copy of which was kept centrally and one locally. Whether these were destroyed, like the tablets in the temple of Jupiter, in the civil war of A.D. 69 is uncertain.<sup>49</sup> At least none has survived. The maps seem in some cases to have been accompanied by a ledger called *liber aeris*, which literally means “book of bronze”: it denoted not the substance of the ledger but the fact that it was a commentary on a bronze map. An interesting advantage of bronze as a material was that when revision was necessary, requiring an extension of the map, a new piece could be hammered on to the side.<sup>50</sup> Since centuriation was widespread in Italy and many of the other areas under Roman rule, the number of plans could have been immense.

In the cadastral maps recording centuriation, just as in geographical maps, the Roman rulers saw a vital tool of government, in this case underpinning an orderly system of land registration. It may be noted that Julius Caesar was, according to the *Corpus Agrimensorum*, the founder of the fully organized system of Roman land surveying.<sup>51</sup> This system came to be far more developed in Augustus’s principate.

Throughout the Augustan period, maps were thus becoming more and more essential to Rome’s highly law-based type of society. A formula of the second half of the second century B.C. emphasizes the legally binding character of land maps. The agrarian law of 111 B.C., referring to a law of the Gracchan period, mentions that

any land in Italy that a land commissioner had given, assigned, abandoned, or entered should be entered on *formae* or *tabulae*.<sup>52</sup> Here we may presume that *formae* (also called *formae publicae*) refer to maps, *tabulae* to land registers. From whenever such maps were legally recognized, they would be turned to as evidence of areas held by private individuals or corporate bodies.

Many of the same considerations apply in the case of aqueduct plans. A highly organized water supply, with legal involvement, must have given surveyors plenty of scope for preparing plans; and fragmentary evidence for this is available from the first century B.C. Roman aqueducts served primarily for town water supplies, but if the supply was sufficient they could also be used for irrigation. For this purpose landowners could apply for a time allocation, as we learn from Frontinus and the Digest (Roman treatise on jurisprudence). Outlets called *calices*, literally “cups,” were inserted at an appropriate angle so that water could be turned on and off at the correct times.<sup>53</sup> To explain the timing of the allocations, an inscribed plan would be drawn. One such refers to the Aqua Crabra near Croce del Tuscolo (Tusculum), east of Frascati (fig. 12.6).<sup>54</sup> The inscription adjacent to the plan lays down the number of hours a day when landowners, including C. Julius Caesar (presumably the dictator), could draw water. Another inscription, now

46. Granius Licinianus [*Handbook of Roman History*] 28; see *Grani Liciniani quae supersunt*, ed. Michael Flemisch (Leipzig: Teubner, 1904), 9–10. There is a useful contribution on this section in Robert K. Sherck, “Roman Geographical Exploration and Military Maps,” in *Aufstieg und Niedergang der römischen Welt*, ed. Hildegard Temporini (Berlin: Walter de Gruyter, 1972–), 2.1 (1974): 534–62, esp. 558–59. But he is probably incorrect in including this among military maps: Lentulus’s office was civilian.

47. Samuel Ball Platner, *A Topographical Dictionary of Ancient Rome*, rev. Thomas Ashby (London: Oxford University Press, 1929), 56–57. It was later used for the first public library in Rome, set up by C. Asinius Pollio.

48. Julius Beloch, *Campanien*, 2d ed. (Breslau, 1890; reprinted Rome: Erma di Bretschneider, 1964), pl. 12; Ferdinando Castagnoli, *Le ricerche sui resti della centuriazione* (Rome: Edizioni di Storia e Letteratura, 1958), 13–14; Dilke, *Roman Land Surveyors*, 144 (note 7).

49. Suetonius *The Deified Vespasian* 8.5; book 8 of *De vita Caesarum* (The lives of the Caesars), in *Suetonius*, 2 vols., trans. J. C. Rolfe, Loeb Classical Library (Cambridge: Harvard University Press; London: William Heinemann, 1913–14).

50. Hyginus Gromaticus *Constitutio limitum* (On setting up centuriation), in *Corpus Agrimensorum*, 131–71, esp. 167, lines 3–5 (note 6).

51. Dilke, *Roman Land Surveyors*, 37 (note 7).

52. *Corpus Inscriptionum Latinarum* (Berlin: Georg Reimer, 1862–), 1.2.1 (1918), 455–64, no. 585; C. G. Bruns, *Fontes iuris Romani antiqui*, 7th ed. (Tübingen: Mohr, 1909), no. 11, para. 7.

53. J. G. Landels, *Engineering in the Ancient World* (London: Chatto and Windus, 1978), 47.

54. *Corpus Inscriptionum Latinarum*, 6.1 (1876): 274, no. 1261 (note 52).

lost, from Tibur (Tivoli) had three lines left blank for what was obviously a similar plan.<sup>55</sup>

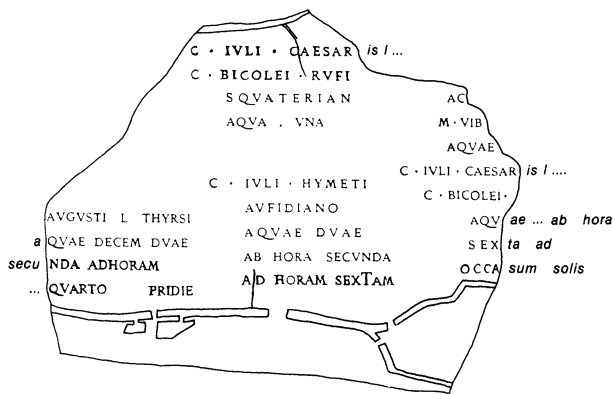


FIG. 12.6. THE INSCRIPTION ON THE TUSCULUM AQUEDUCT. An example of an annotated plan designed to specify the times at which landowners might tap water from the aqueducts shown at top and bottom. After the *Corpus Inscriptionum Latinarum* (Berlin: Georg Reimer, 1862–), 6.1 (1876), no. 1261.

Such plans were also used for engineering purposes. From the middle of the second century A.D. comes a long aqueduct inscription from Saldæ (Bejaia) in North Africa, written with poor grammar in the first person by a retired legionary, Nonius Datus. His specialty was that of *librator*, leveler; and he explains how, after having been robbed by brigands, he managed to save a tunnel, serving a watercourse, where the digging from two directions had failed to meet. He explains: “I carried out the work following the map I had given to the procurator Petronius Celer.”<sup>56</sup> It is clear from this inscription that though Nonius Datus had a very sketchy idea of Latin grammar, he was able to draw an aqueduct plan (*forma*) and to work out from it, perhaps by Heron’s method (pp. 230–32), the correct drilling directions for the tunnel.

55. *Corpus Inscriptionum Latinarum*, 8.1 (1881): 448, no. 4440 (note 52).

56. Author’s translation of Nonius Datus; inscription to be found in *Corpus Inscriptionum Latinarum*, 8.1 (1881): 323, no. 2728 (note 52).

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