# THE WRITINGS OF THE ROMAN LAND SURVEYORS 

# INTRODUCTION, TEXT, TRANSLATION AND COMMENTARY 

BRIAN CAMPBELL



SOCIETY FOR THE PROMOTION OF ROMAN STUDIES JOURNAL OF ROMAN STUDIES MONOGRAPH NO. 9

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For Karen

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First published in 2000 by
The Society for the Promotion of Roman Studies
Senate House, Malet Street, London WC1E 7HU
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The support of the RICS Research Foundation is gratefully acknowledged

British Library Catalogue in Publication Data A catalogue record for this book is available from the British Library

ISBN 0-907764-28-2

The cover picture shows land division at Tarracina as depicted in the codex Palatinus Vaticanus Latinus 1564 (9th century a.d.)

Printed in Great Britain by
Stephen Austin \& Sons Ltd Caxton Hill Hertford SG13 7LU

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|  | ABBREVIATIONS |
| :--- | :--- |
|  |  |
|  | R. Cagnat et al. (eds), L'Année épigraphique (Paris, |
| AE | 1893-) |
|  | Abbott, F. F., and Johnson, A. C., Municipal Adminis- |
|  | tration in the Roman Empire (Princeton, 1926; repr. |
|  | New York, 1968) |

Dilke, $R L S$
Dilke, $A N R W$ (1974)

Dilke, GRM
EJ
Gargola, Lands

Guillaumin, Balbus

Hinrichs, Institutionen
$I G$
IGR

ILLRP
ILS

Jones, $L R E$

Keppie, CVSI
Lachmann, Feldmesser
$M W$

Millar, ERW
Misurare

Josephson, Casae Litterarum Josephson, A., Casae Litterarum. Studien zum Corpus Agrimensorum Romanorum (Uppsala, 1950)
Dilke, O. A. W., The Roman Land Surveyors. An Introduction to the Agrimensores (Newton Abbot, 1971) Dilke, O. A. W., 'Archaeological and epigraphic evidence of Roman land surveys', ANRW II. 1 (1974), 564-92
Dilke, O. A. W., Greek and Roman Maps (London, 1985)

Ehrenberg, V., and Jones, A. H. M., Documents Illustrating the Reigns of Augustus and Tiberius (ed. Stockton, D. L.) (Oxford, 1976)
Gargola, D. J., Lands, Laws, and Gods. Magistrates and Ceremony in the Regulation of Public Lands in Republican Rome (Chapel Hill and London, 1995)
Guillaumin, J.-Y., Corpus Agrimensorum Romanorum II: Balbus. Présentation systématique de toutes les figures. Podismus et textes connexes. Extraits d'Epaphrodite et de Vitruvius Rufus; la mesure des jugères. Introduction, traduction et notes (Naples, 1996) Hinrichs, F. T., Die Geschichte der gromatischen Institutionen. Untersuchungen zu Landverteilung, Landvermessung, Bodenverwaltung und Bodenrecht im römischen Reich (Wiesbaden, 1974)
Inscriptiones Graecae (Berlin, 1873-)
Cagnat, R., et al. (eds), Inscriptiones Graecae ad Res Romanas Pertinentes, vols 1,3,4, (Paris, 1906-27)
Degrassi, A. (ed.), Inscriptiones Latinae Liberae Rei Publicae, vols I-II, I ${ }^{2}$ (Florence, 1957-63; 1965)
Dessau, H. (ed.), Inscriptiones Latinae Selectae (Berlin, 1892-1916)
Jones, A. H. M., The Later Roman Empire 284-602, 2 vols (Oxford, 1964)

Keppie, L. J. F., Colonisation and Veteran Settlement in Italy 47-14 B.C. (Rome, 1983)
Blume, F., Lachmann, K., and Rudorff, A., Die Schriften der römischen Feldmesser, 2 vols (Berlin, 1848-52, repr. Hildesheim, 1967)
McCrum, M., and Woodhead, A. G., Select Documents of the Principates of the Flavian Emperors Including the Year of Revolution, A.D. 68-96 (Cambridge, 1961)
Millar, F. G. B., The Emperor in the Roman World (31 BC-AD 337) (London, 1977)
Misurare la terra: centuriazione e coloni nel mondo romano (Comune di Modena et al.) (Modena, 1983)

| Moatti, $A P T$ | Moatti, C., Archives et partage de la terre dans le monde romain ( $I I^{e}$ siècle avant-Ir siècle après J.-C), Collection de l'École Française de Rome 173 (Rome, 1993) |
| :---: | :---: |
| Mommsen, 'Bodenrecht' | Mommsen, T., 'Zum römischen Bodenrecht', Hermes 27 (1892), 79-117 = Ges. Sch. V (1908), 85-120 |
| OGIS | Dittenberger, W. (ed.), Orientis Graeci Inscriptiones Selectae (Leipzig, 1903-5) |
| $O L D$ | Oxford Latin Dictionary, ed. Glare, P. G. W. (Oxford, 1982) |
| Pais, Colonizzazione | Pais, E., Storia della colonizzazione di Roma antica. I Prolegomeni. Le fonti: i libri imperiali regionum (Rome, 1923) |
| Piganiol, Documents | Piganiol, A., Les documents cadastraux de la colonie romaine d'Orange, Gallia Suppl. 16 (Paris, 1962) |
| Salmon, $R C R$ | Salmon, E. T., Roman Colonization under the Republic (London, 1969) |
| $S E G$ | Hondius, J. J. E., et al. (eds), Supplementum Epigraphicum Graecum (Leiden, 1923-) |
| Sherk, RDGE | Sherk, R. K., Roman Documents from the Greek East. Senatus Consulta and Epistulae to the Age of Augustus (Baltimore, 1969) |
| Sherk, 'Military Maps' | Sherk, R. K., 'Roman geographical exploration and military maps', $A N R W$ II. 1 (1974), 534-62 |
| Souter, Later Latin | Souter, A., A Glossary of Later Latin to 600 A.D. (Oxford, 1949) |
| Sylloge ${ }^{3}$ | Dittenberger, W. (ed.), Sylloge Inscriptionum Graecarum ${ }^{3}$ (Leipzig, 1915-24) |
| Thomsen, Italic Regions | Thomsen, R., The Italic Regions from Augustus to the Lombard Invasion $=$ Classica et Mediaevalia, Dissertationes IV (Copenhagen, 1947) |
| Thulin, 'Die Handschriften' | Thulin, C., 'Die Handschriften des Corpus Agrimensorum Romanorum', Abhandlungen der königl. preussischen Akademie der Wissenschaften, philosophisch-historische Klasse, Anhang II (Berlin, 1911) |
| Thulin, 'Humanistische Handschriften' | Thulin, C., 'Humanistische Handschriften des Corpus agrimensorum Romanorum', RhM 66 (1911), 417-51 |
| Thulin, CAR | Thulin, C., Corpus Agrimensorum Romanorum I. 1 (Leipzig, 1913, repr. Stuttgart, 1971) |
| Warmington | Warmington, E. H. (ed.), Remains of Old Latin. Archaic Inscriptions, Loeb vol. IV (Cambridge, Mass. and London, 1940; repr. 1993) |

## PREFACE

The humble purpose of this book is to make the writings of the Roman land surveyors (agrimensores) more accessible to historians, archaeologists, and anyone interested in the ancient world. I am particularly concerned with what the writers had to say, and what they thought was important about the theory of land survey and the nature of land division in the Roman world. Although my work is, therefore, based firmly on the surveying texts, that is not to underestimate the importance of investigation, by archaeology and aerial photography, into the remains of ancient surveyors' work on the ground. Significant advances have been made since the end of the Second World War in the identification and recording of possible Roman field-systems, and burgeoning interest is indicated by a project funded by the European Community to study the development and persistence of ancient cadastral surveys. New publications are frequent, and some very recent works though listed in the bibliography appeared too late for detailed discussion. In addition, the related topic of the mapping of the ancient world is being enthusiastically pursued by the Classical Atlas Project. under the direction of Professor Richard Talbert.

In my translation I have attempted to give a clear and faithful rendering that can be enjoyed by those with no Latin. However, it must be said that although this is not a literal translation, the attempt to convey the sense of the original has produced English that is sometimes rather inelegant. While I have not sought to impart greater coherence to the texts than they have in reality, I have tried to be consistent in translating technical terms and repetitious phraseology, even though the authors themselves may not always have aimed at consistency. Some technical words or phrases for which there is no convincing equivalent in English have been left in Latin, and are explained in the Glossary. A Latin text is printed, and, although an apparatus criticus has been omitted, significant textual problems are discussed in the Commentary, which is also intended to make the historical context comprehensible to non-specialists and to demonstrate the value of the writings for historians of the Roman world.

In the long preparation of this book I have acquired many debts. I must first mention Professor Fergus Millar, from whose suggestion the idea for a study of the agrimensores developed, and who has awaited its appearance with patience and undiminished interest. I was fortunate to have the help of the late Professor Oswald Dilke, who offered enthusiastic support over many years; he read much of an early draft of the translation, and answered numerous questions that must have seemed simple-minded. The shape of the present work owes much to his guidance and his pioneering work on Roman land survey: Many other scholars have courteously offered assistance from their own specialist skills, or supplied research material: Dr F. T. Hinrichs, Dr Tony Naco, Dr Mauro de Nardis, Dr John Patterson, Dr John Peterson, and above all Professor J. J. Wilkes, who generously made available his own notes and collection of epigraphic evidence relating to land disputes. Dr Raymond Davis was a frequent source of advice for the translation of obscure Latin, and Dr John Curran patiently contributed to many discussions about land survey. Professor Frederick Williams diligently read the proofs. My greatest debt, however, is to Professor Michael Crawford, who, with his usual hospitality, provided a friendly and learned forum for discussion in London, offered ideas and advice over several years,
and read and commented on the entire text. Without his encouragement I should scarcely have had the confidence to complete this work on the agrimensores. Naturally I alone am responsible for all flaws in the final version.

Visits to sites in France and Italy, and to the Vatican Library in Rome, were funded by a Personal Research Grant from the British Academy and by grants from the Research Fund of the Queen's University of Belfast. Queen's University also made a grant from the Publications Fund to cover the cost of the preparation of the maps. I wish to record my gratitude to both these institutions for their generosity.

It is a pleasant task to thank the Council of the Society for the Promotion of Roman Studies for undertaking the publication of this work, and Dr Lynn Pitts for smoothing the way to the presentation of a difficult typescript.

Finally, although much to his relief I did not consult him directly about the agrimensores, I take this opportunity to pay a personal tribute to Professor Peter Brunt for his stimulating guidance, support, and friendship over the years since he supervised my DPhil thesis.

## ACKNOWLEDGEMENTS

## LATIN TEXT

B. G. Teubner for permission to use the Latin text printed at pp. 2-162, which originally appeared in Corpus Agrimensorum Romanorum I.1, edited by C. Thulin (Leipzig, 1913; repr. Stuttgart, 1971).

## PLATES

Mrs Margaret Dilke for permission to use Plate I.
The Crown Copyright Section, Ministry of Defence for permission to use Plates II-V. The British School at Rome for permission to use Plate VI.

## PART I. INTRODUCTION

## INTRODUCTION

The Corpus Agrimensorum Romanorum is a collection of manuals on land survey in the Roman world, which, after its original compilation, probably in the fifth century A.D., subsequently acquired additional material. The texts preserved in the Corpus were written by different authors, deal with many aspects of land survey, are of widely differing dates, and exhibit a notable variety of interests and approaches. Since they were edited and excerpted in transmission, and we do not know the criteria on which the compilation was made, or the nature of material omitted, it is difficult to establish if there was at one time a uniform and comprehensive account of the principles of land survey.

Modern editors have been selective. Lachmann (Feldmesser) omitted a fragment attributed to Epaphroditus and Vitruvius Rufus, ${ }^{1}$ a text on the layout and fortification of military camps mistakenly attributed to Hyginus Gromaticus (= Hyginus 2), ${ }^{2}$ and several related mathematical texts. ${ }^{3}$ The edition of Thulin (CAR), of which only the first volume appeared, covers Frontinus, Agennius Urbicus, Commentum (Commentary), Hyginus 1, Siculus Flaccus, Hyginus 2. ${ }^{4}$ A new series of texts and translations under the auspices of the European Commission Direction Générale XII, Science, Recherche et Développement, Unité XII-B-1 (COST G2 Paysages antiques et structures rurales: techniques et archéoenvironnement) deals with individual authors, notably Frontinus, Siculus Flaccus and Hyginus 2. ${ }^{5}$

My own treatment has also been selective, although my intention is to include in one volume the better-known texts (as covered by Thulin), the Liber Coloniarum, and most of the excerpts from named or anonymous authors included in Lachmann (Feldmesser). My principal criterion is the usefulness of the texts to historians, archaeologists, and those interested in general aspects of ancient technology. I have excluded some purely technical accounts of the measurement of area, some excerpts from the Late Empire that add little new, and some repetitive material relating to boundary markers, although I have attempted to give a representative picture of a subject clearly of great interest to surveyors. ${ }^{6}$

[^0]
## 1. THE TEXT ${ }^{7}$

Thulin argued that all the extant manuscripts of the Agrimensores were derived from one archetype (probably containing the technical treatises, the Liber Coloniarum, and the Lex Mamilia), on the grounds that their texts had in common many disturbances, additions, and gaps, and that all manuscripts containing the text of Hyginus 2 shared certain peculiarities in its arrangement. His arguments still stand, though recently some doubt has been cast on them by Toneatto. ${ }^{8}$ The earliest extant manuscript of this presumed archetype is at the Herzog August Bibliothek, Wolfenbüttel (Aug. $2^{\circ} 36$. 23). It probably dates from the sixth century A.D. and is in two parts. One part (A) is accompanied by illustrations and is perhaps slightly later than the other (B), which is unillustrated, though both manuscripts are closely related, and A seems to be a continuation of, or supplement to, B. ${ }^{9}$ The manuscript, which was once owned by Erasmus, passed into the hands of Joannes Arcerius of Utrecht, from whom it was acquired by Peter Scriverius, who used it for his edition of 1607; the manuscript was subsequently designated 'Arcerianus'. Two copies of the manuscript dating from the sixteenth century are important for editors, since the original continued to suffer damage and to lose leaves. One (V) (Rome, Biblioteca Vaticana: lat. 3132) completed by the Vatican scriptor, Zanchi, copied the Arcerianus in the order AB. ${ }^{10}$ The other (J) (Jena, Universitätsbibliothek: Cod. fol. 156) attempted to combine A and B in a single version with no repetition. ${ }^{11}$ Both V and J reproduce the illustrations found in A .

In the mid-sixth century a different collection of surveying texts was assembled from which the treatise De Munitionibus Castrorum and the excerpt of Vitruvius Rufus

[^1]were omitted. The text was rearranged and expanded to include extracts from laws, and works on the technical application of surveying ascribed to 'authors' (auctores). Then, $c$. mid-seventh century, further material was added from Isidore of Seville. ${ }^{12}$ The outcome of these recensions was an illustrated manuscript ( P ) (Rome, Biblioteca Vaticana: Pal. lat. 1564), from the early ninth century. ${ }^{13}$ Another important manuscript of the late ninth century (G) (Wolfenbüttel, Gud. lat. 105) is a copy of a copy of P (preserving the illustrations), and is cited when leaves of P are missing. ${ }^{14}$ Two later texts are manuscript (p) (Brussels 10615-729, twelfth century), a copy of P with no illustrations, and (Si) (Sichardus' edition of the Codex Theodosianus, Basle, 1528), which relates to part of Frontinus, the Commentum de Controversiis, and some legal extracts.

A third group of manuscripts is classified by Thulin as codices mixti, because they contain material extracted from both recensions. ${ }^{15}$ He noted F, of the ninth century (Florence, Biblioteca Medicea Laurenziana: 29.32), and E of the eleventh century (Erfurt, Wissenschaftliche Bibliothek: Amplon. Q. 362), to which can be added a twelfth-century manuscript (British Library, Add. 47679). ${ }^{16}$ These fragmentary manuscripts contain material and uncoloured illustrations, which comprise two books, one of which was seemingly copied from a manuscript reflecting the recension $A / B$, the other from a manuscript reflecting the recension P; therefore they do not appear to be part of a separate recension. Despite the corrupt and disorganized nature of the manuscripts FEH, this compilation has a certain value, in that the original texts used were independent of manuscripts $\mathrm{A} / \mathrm{B}$ and P , and in some cases less corrupt.

One further fragment of a manuscript (C) (Berlin, Staatsbibliothek der Stiftung Preussischer Kulturbesitz: lat. f. $2^{\circ} 641$, ff. 1-14), probably dating from the tenth century, also combines material from different sources in preserving two versions of the Casae Litterarum, one associated with A and the other with P. ${ }^{17}$

Finally, it is worth noting three other groups of manuscripts: X containing eighteen MSS (tenth to fourteenth centuries), Y containing four MSS (tenth to twelfth centuries), and Z containing two MSS (ninth to tenth centuries), which are used by editors to supplement the main manuscripts. The background is the compilation in the eighth or ninth century of texts to facilitate the teaching of geometry, including Boethius' translation of part of Euclid, and some extracts from the Agrimensores. This Ars Geometriae was subsumed under Boethius' name and was subsequently expanded with further gromatic material and extracts from Cassiodorus. In this tradition was sometimes preserved material not included in the main manuscripts of the Agrimensores. ${ }^{18}$

The Latin text employed for this translation and commentary incorporates my own editorial decisions and collations for certain passages, but is obviously heavily indebted to my predecessors: Thulin, CAR for pp. 2-162; Lachmann, Feldmesser for pp. 164-230; 240-74; Josephson, Casae Litterarum for pp. 232-8.

[^2]
## 2. THE ILLUSTRATIONS ${ }^{19}$

Among the oldest manuscripts of the Corpus Agrimensorum Romanorum, A and P contain illustrations, and although these are similar in some respects, they represent different traditions. In addition, MSS J and V have illustrations copied from A (though V has some variations), while G contains illustrations copied from P. Usually the illustrations occur as an integral part of the text at the appropriate point, but in MS P illustrations relating to the Commentum (T 51-70 = C 51-75) are collected in a body, the Liber Diazographus, at the end of the text. In some places there is a discrepancy between text and illustration, or inaccurate labelling within the illustration. ${ }^{20}$

Thulin included in his edition ( $C A R$ ) black and white photographs of the manuscript illustrations, extracted in the main from $A$ and $P$. In my edition, the illustrations (based mostly on the the line drawings in Lachmann (Feldmesser), which were taken largely from A and G) have been grouped together at pp. 277-316, although some that are entirely erroneous or duplicative have been omitted.

The illustrations relate to most of the topics expounded in the main surveying texts, and can be divided roughly into the following groups, though there is a degree of overlap: the layout and appearance of measured and divided land, including related areas such as subseciva, compascua, and praefecturae, ${ }^{21}$ the plotting, direction, and layout of limites, ${ }^{22}$ boundary stones designating centuriae; ${ }^{23}$ the marking of boundaries, and the designation of individual farms with special problems or features; ${ }^{24}$ the territory and topographical features of individual communities and associated buildings; ${ }^{25}$ the territory and related topographical features of several communities; ${ }^{26}$ astronomy, geometry, and measurement. ${ }^{27}$ Illustrations accompanying the later texts (not included in Thulin, $C A R$ ) contain types of boundary stones, examples of shapes of land for measuring exercises, examples of tombs and boundary marking trees, models of estates described in the Casae Litterarum. ${ }^{28}$

[^3]There are two categories of illustration: first, straightforward diagrams (in a monochrome of brownish red), which are schematic and use clear geometric shapes to support the text, ${ }^{29}$ second, pictorial representations; these are often in colour, which has been well preserved in the manuscripts and which is employed as follows: roadsbrown or red, or sometimes green; buildings-pale brown, yellow, or grey; roofs-red; wooded hills--green; mountains-mauve or brown; water--blue. In this second category there are purely pictorial illustrations, based on the description of a location, or a situation in the text, and also illustrations in which a diagrammatic base has been combined with pictorial representations of items in the text.

What are the likely sources for all these illustrations? In respect of those in the form of simple diagrams, there seems to be a connection with the land survey maps, reports, and field notation methods, which are frequently mentioned in the Corpus Agrimensorum Romanorum. ${ }^{30}$ The fragment of a surveyor's map from Augusta Emerita (Mérida) in Spain simply depicts the outline of the centuriae with their size annotated, the river Ana, and the territory of a neighbouring community, Lacimurga. ${ }^{31}$ The surviving map of the landholdings at Arausio (Orange) is a record of the land's legal status and the tax obligations of the landholders. But, in so far as it is comparable to surveyors' maps, it depicts the limites, the centuriae with their map designations, roads, and the course of the river Rhône. ${ }^{32}$ Therefore, there appears to be some similarity between diagrammatic representations in the Corpus, and this kind of map, in the depiction of centuriae, other types of land, and rivers, and in the annotation of relevant information. ${ }^{33}$

Pictorial representations appear to have some connection with aspects of the Roman artistic and professional tradition, namely, topographic landscape painting and chorographic cartography. In the former, typical features are a birdseye view and an absence of human figures, and these are common in the manuscript illustrations. In the latter, the basic ground plan and layout of the map could include topographical details that were thought typical of the region, presented in pictorial form. ${ }^{34}$ Vegetius had this in mind in his advice to a military commander:

First he should have itineraries of all regions in which war is being waged written out in the fullest detail, so that he may learn the distances between places by the number of miles and the quality of roads, and examine short-cuts, by-ways, mountains and rivers, accurately described. Indeed, the more conscientious generals reportedly had itineraries of the

[^4]provinces in which the emergencies occurred not just annotated but illustrated as well, so that they could choose their route when setting out, by the visual aspect as well as by mental calculation. ${ }^{35}$

An example of this kind of itinerary survives in the 'Peutinger Table', a thir-teenth-century copy of an original dating from the third or fourth century A.D., depicting the known world from Britain to India in terms of its road system; mountains and rivers are also illustrated, and towns appear as pictorial vignettes. ${ }^{36}$ There is also the famous fragment of a parchment shield cover found at Dura-Europus, dated c. A.D. 260 , which depicts ships on a blue sea and a layout of roads with vignettes of cities. ${ }^{37}$

In the surveying texts, the most striking and detailed illustrations of a map are in P , each extending over two facing pages (Thulin, figs 135a; 136a $=\mathrm{C}$ Ills 133; 135). Against the background of a land division grid, the illustrations show cities, connecting roads, farms, topographical features including woods, rivers, and mountains, and contain explanatory inscriptions. Despite the fact that the context for these illustrations is apparently the need for the surveyor to complete accurate maps and records (C 159.43-6; 161.26-8 = T 165.19-166.2; 167.14-15 = L 203.2-4; 204.14-15), they are not closely based on reality. ${ }^{38}$

Moreover, they certainly go well beyond what we know of surveyors' maps. Indeed it is reasonably clear that pictorial and artistic representations owe little if anything to such maps. It is a plausible reconstruction of the development of the manuscript illustrations to suggest that the earliest were purely diagrammatic and partly influenced by surveying maps. Later, where appropriate, these were augmented, and the additional material was influenced in different ways by the traditions of landscape painting and chorographic cartography, though diagrammatic elements remained. In some instances, however, the original diagram was completely supplanted by a picture. It is also possible that new illustrations were added purely for artistic reasons (see below).

The use of illustrations in technical manuals and textbooks seems appropriate and desirable, and Vitruvius mentions how an architect should be capable of producing coloured drawings. ${ }^{39}$ In the text of Frontinus there may be a reference to accompanying illustrations through the word similitudo ( $\mathrm{C} 3.11 ; 13=\mathrm{T} 1.13 ; 16=\mathrm{L} 3.5 ; 4.1$ ). Furthermore, in the text of Hyginus 2 (C 153.32ff. = T 157.18ff. = L 194.17ff.), the use of sic may also suggest that illustrations had been included with the original text. ${ }^{40}$ But this is not certain, and in any case a later editor may have added illustrations and emended the text. So, it is impossible to say how many illustrations went back to the original authors, how many were added at the recension of the manuscripts, and how many were added when the Arcerianus was written in the sixth century, or sub-

[^5]sequently. ${ }^{41}$ It is also true that existing illustrations could be stylistically changed by further copying. Indeed the addition of pictorial elements to the manuscripts may owe much to the development in the third century of the parchment or vellum codex instead of the papyrus roll, since this offered a smoother surface for drawing. On stylistic and iconographic grounds, Carder contended that the cityscape and mountain vignettes in the illustrations are to be dated between the fourth and the sixth century A.D. (though some of the mountain scenes may be earlier), and that they belong probably to the earliest recension of the manuscripts and the subsequent completion of the Arcerianus. ${ }^{42}$

Since we cannot with certainty date the illustrations, it is difficult to be sure about their overall purpose. Simple monochrome diagrams were presumably intended to clarify the complicated technicalities of surveying. It is for example an arduous task to explain the methods of measuring shadows (C 149.32ff. $=\mathrm{T} 152.4 \mathrm{ff} .=\mathrm{L} 188.14 \mathrm{ff}$ ), or designating centuriae with their position and number in a land division scheme ( C $139.1 \mathrm{ff} .=\mathrm{T} 136.11 \mathrm{ff} .=\mathrm{L} 171.14 \mathrm{ff}$. ), without using diagrams. If the original purpose of many of the surveying treatises was didactic, ${ }^{43}$ to provide instruction for prospective surveyors or those in charge of them, the positioning of the diagrams in the text at the appropriate point would be very helpful. In the text of Urbicus, where the illustrations are placed in the manuscripts at the end of paragraphs, they can be seen as providing a kind of visual summary.

Those maps containing pictorial representations may have been aimed at the teaching of general principles. They were not necessarily intended to be accurate in every detail, but instead offered an entertaining model for the recording of typical and unusual features, which might be based on a real location. ${ }^{44}$ In one sense, they expressed an interpretation of how earlier surveyors could have arranged land settlements and dealt with problems, and how that might be properly recorded. This kind of material would accustom surveyors to the examination and preparation of maps and records.

We should also recognize that later scribes and artists, who added elaborate pictorial representations, may have aimed primarily to demonstrate their artistic prowess, by beautifying the manuscripts, and to enhance the reputation of their scriptorium. It is indeed possible that in the Renaissance the elegantly illustrated but extremely difficult and obscure manuscripts of the Agrimensores survived and were copied precisely because they appealed to the eye of rich collectors and patrons.

[^6]
## 3. THE AUTHORS

## FRONTINUS

MS A has the heading: INC. IVLI FRONTINI DE AGRORVM QVALITATE FILICITER; MS P: IVLI FRONTINI DE AGRORVM QVALITATE. At C $15.21=\mathrm{T}$ $18.11=\mathrm{L} 34.13$, MS A has: IVLI FRONTONIS LIB. EXP. FELICITER; MS P has nothing, while F has: IVLI FRONTINI SICVLI EXPLICIT LIBER PRIMVS. Despite some variations in spelling and F's muddle over Siculus, it is clear that the compilers believed one Julius Frontinus to be the author of this treatise (the title was probably inserted by the compiler), and that this existed as an independent entity. He is usually identified with the well-known Sextus Julius Frontinus who had a distinguished career that included provincial governorships, military command, and the curatorship of the water-supply of Rome, and culminated in a third consulship, as ordinarius with Trajan in A.D. $100 .{ }^{45}$ By the standards of Roman administration, Frontinus was highly experienced in both military and civil affairs, and had a wide range of interests. He wrote didactic manuals on the management of the water-supply in Rome, Greek and Roman military science (no longer extant), and the military stratagems employed by commanders. ${ }^{46}$ Frontinus was a cultured man who knew how to relax at his villa at Formiae in literary discussions with Martial. It was here that Aelian, a Greek writer on the phalanx formation, also turned up seeking advice and guidance. ${ }^{47}$

Now, the standard concordance of Frontinus assumes without argument that the author of the surveying writings is identical with the author of the Strategemata and De Aquis, but arbitrarily takes no account of material from Frontinus that may have been preserved by Urbicus. ${ }^{48}$ Handbooks of Latin literature make the same assumption. ${ }^{49}$ However, in respect of managing the aqueducts and researching military strategy, Frontinus was dealing with activities that were recognizably part of the upperclass responsibilities of serving the emperor in the administration and in army commands. They belonged to the category of tasks assigned by the emperor that

[^7]'demanded special attention'. ${ }^{50}$ But land survey is different, since the evidence suggests that throughout the imperial period surveyors tended to come from outside the upper classes. ${ }^{51}$ Yet in places Frontinus writes as if giving advice to other surveyors. There is no other evidence that he was involved with surveying, and we should not assume, because there are unexplained gaps in his career, which in itself is not unusual in senatorial office-holding, that he held any post that required a knowledge of surveying. ${ }^{52}$ On the other hand, it might be argued that during his time as Curator Aquarum he became interested in surveying, which in some ways was relevant to the construction and layout of aqueducts. Yet in the De Aquis it is notable that he does not mention surveying procedures. Indeed it has been observed that the De Aquis expresses an administrator's view, rather than that of an engineer or technician. ${ }^{53}$

It remains conceivable that Frontinus wrote for the general guidance of governors or other officials who might have to employ surveyors, since he believed that responsible office-holders should know their work and not be in the hands of their subordinates. ${ }^{54}$ But this does not explain the section containing a complicated technical explanation of the measurement of horizontal distances in rough terrain (C $13-15=\mathrm{T} 15-19$ ). It is not out of place, therefore, to suggest that during the compilation of surveying treatises, other technical and related material, such as the $D e$ Aquis, may have been considered for inclusion. In these circumstances it is possible that an anonymous fragmentary treatise was mistakenly ascribed to Frontinus by a compiler or copyist who knew that he had written a work on a similar technical subject. If Frontinus is not the author, then we lose some evidence for the status and development of surveying at the end of the first century A.D. Nevertheless, the text, which is coherently expressed and unlikely to be later than the second century A.D., remains good evidence for surveying practices.

For the work of Frontinus we have (i) the text that appears under his name in the manuscripts (C 3-15 = T 1-19). This may be an epitome of a longer version, and it is unclear what has been omitted or how far the surviving text has been altered; (ii) parts of Frontinus' work that may be embedded in the text of later commentatorsthe De Agrorum Qualitate and De Controversiis of the anonymous Commentum, which cites Frontinus by name and quotes verbatim passages from (i), and the $D e$ Controversiis of Urbicus, who does not mention his sources but follows themes in (i), and has some verbal similarities with material there. ${ }^{55}$ Urbicus also has a list of land disputes very similar to that in Frontinus, and there are clear distinctions within his treatise in respect of language and subject matter between subjects of his own analysis and those copied from another source. ${ }^{56}$ Lachmann argued that Urbicus used Frontinus as a major source and to a large extent quoted his text directly. ${ }^{57}$ This is too sweeping, but it remains probable that much of Urbicus' work does go back to

[^8]Frontinus, although he almost certainly also used other sources that we can neither identify nor date, and there is no way of knowing how far the text of Frontinus he used represented Frontinus' original words. ${ }^{58}$

From this unpromising material it is difficult to recover the framework of Frontinus' work on land survey. Lachmann believed that it comprised two books, the first consisting of De Agrorum Qualitate and De Controversiis (L 1-26), the second containing De Limitibus, De Arte Mensoria, and material from Urbicus which in Lachmann's view came directly from Frontinus (L 26-58). ${ }^{59}$ However Thulin's more cautious approach is preferable. In his printed text of Frontinus he included only the material cited by the manuscripts under Frontinus' name (T 1-19 = C 3-15). ${ }^{60}$ This single book perhaps contained two sets of linked themes, in the first of which a general discussion of types of land establishes the context for an account of land disputes (C 3-9 = T 1-10); in the second a general description of limites introduces methods of land measurement in difficult terrain (C $9-15=\mathrm{T} 10-19$ ). ${ }^{61}$

What can we say of the character and influence of Frontinus' writings? ${ }^{62}$ Frontinus set out a straightforward definition of three types of land related to the likely activities of a surveyor. He might have to survey land in preparation for an entire settlement, or establish, or be able to recognize, perimeter boundaries, or recognize and deal with the possible consequences of land that had been left unsurveyed. His general and unemphatic treatment suggests that he was not attempting to establish any formal technical vocabulary. Frontinus then develops the notion that disputes can arise from all these types of land. There are two crucial defining features-site and area - and on this basis fifteen types of dispute are set out almost in note form (though this section may have been abbreviated subsequently), in which Frontinus summarizes the circumstances of each dispute, what it concerned, in some cases the procedure for resolving it, and cases where due legal process was involved ahead of the surveyor. The purpose of this was, in my view, very general, to set out the parameters of the surveyor's role, either in resolving disputes or in giving advice to a judge. But there was potentially a wider general readership of people interested in law and life in rural communities. ${ }^{63}$

[^9]In respect of limites, Frontinus outlines their origins and association with the practices of soothsaying. He then sets out the names given to limites and their derivation, which introduces a description of land division into centuriae, the principles of orientation, and the wide variations in surveying. This is followed by a detailed exposition of the science of land measurement, in which Frontinus emphasizes the importance of practical experimentation. Since the shape of land boundaries is frequently awkward for the surveyor, a detailed step-by-step procedure is expounded, but so concisely that it seems that Frontinus is addressing people who knew the basic principles, or merely characterizing the difficulties inherent in surveying.

The character and tone of Frontinus' work are explanatory; he establishes a context, outlines general definitions, and provides something of a history of land survey, with examples from both Italy and the provinces, and a quotation from Varro. Although this might be useful to surveyors, there is nothing essentially didactic here except for the section on land measurement (C 13-15 = T 15-19), which, despite its defects, is more detailed in its exposition of technicalities. In any case, we are certainly not in a position to claim that there is an indisputable difference between the work of Frontinus and that of other surveying writers. ${ }^{64}$ Indeed there is a broad similarity in approach and subject matter.

Among later writers (apart from Urbicus and the Commentum), Hyginus 1 and Siculus Flaccus exhibit some thematic correspondences with Frontinus and have generally similar explanations, e.g., the definition of divided and allocated lands, ${ }^{65}$ aspects of boundaries and boundary marking, ${ }^{66}$ subseciva, ${ }^{67}$ territorial rights, ${ }^{68}$ the derivation of the word limes and its use, ${ }^{69}$ centuriae, ${ }^{70}$ harmful river action. ${ }^{71}$ Hyginus 2 shows more evidence of having had direct access to at least part of Frontinus' work in some form. In several instances there is not only a thematic correspondence but also a very close similarity of language and terminology. This is, however, confined to short passages or phrases, and again relates to key issues: the principles of the orientation of temples, ${ }^{72}$ the reasons for the orientation of settlements, ${ }^{73}$ the derivation of the terminology of surveying, ${ }^{74}$ the names of limites, ${ }^{75}$ definitions of land left outside land division schemes. ${ }^{76}$

[^10]To conclude, it is impossible to say either that Frontinus established a systematic technical vocabulary for surveying, or that he influenced later writers to any significant degree. There is not enough material clearly ascribed to Frontinus to judge these points, and we do not know what other writings about surveying were in circulation when he wrote. So, it is possible that Frontinus was copying another source, now lost, and that this source may have been used by later writers. Or parts of Frontinus' text may have circulated combined with other works. Moreover, in respect of key issues we should expect certain methods and approaches to be commmonplace in technical treatises of this kind, e.g., the setting out of general definitions and the exposition of technical points, combined with examples taken from practical experience. Frontinus' role in land survey and his contribution to its study, though seemingly impressive, remain shadowy.

## AGENNIUS URBICUS

MS A alone has the heading: INC. AGENI VRBICI DE CONTROVERSIIS $A G R O R V M(\mathrm{C} 17=\mathrm{T} 20=\mathrm{L} 59)$, while MSS AB have the subscript: $A G E N I$ VRBICI LIB. EXPLICIT (EXP. A) (C $49=\mathrm{T} 51=\mathrm{L} 90$ ). Now, Urbicus' name has been ascribed to the Commentum (transmitted in manuscripts Gp); this was probably done by copyists because the Commentum ends with a passage taken from Urbicus. The subscript to the first part of the Commentum (T 58.14: EXPLICIT COMMENTVM DE AGRORVM QVALITATE. INCIP. DE CONTROVERSIIS) confirms that the Commentum was anonymous, and that it should not be ascribed to Urbicus. The surviving text of Urbicus' work is preserved in MSS AB, and at C $17-35=\mathrm{T} 20-38=\mathrm{L}$ 59-77, MS B is the sole authority, with only a short fragment (C 29.46-31.14 = T 32.18-33.11) appearing in MS P. The manuscripts have suffered serious damage, with some pages out of order and others missing. Consequently, the text printed by Thulin is largely based on modern philological judgements, and owes much to the order established by Lachmann. ${ }^{77}$

Nothing is known about Urbicus except what we can recover from his treatise. The style, vocabulary, and syntax of those sections that seemingly come directly from Urbicus and are notably different from the approach of other surveying writers suggest a late Latin author. His work is quoted and adapted by the Commentum, which may be datable to the fifth or sixth century A.D., ${ }^{78}$ and a recent study has suggested that there are correspondences between Urbicus' work and the law relating to land

[^11]disputes as it stood in the fourth century. ${ }^{79}$ Although no certainty is possible, we may tentatively date Urbicus to the late fourth or early fifth century.

Urbicus' purpose seems to be didactic, offering instruction for the practitioner on the principal aspects of survey. His account of the skill (ars) of surveying had included land division and boundary marking, and the discussion of land disputes was to be the completion of this ( $\mathrm{C} 21.41-23.4=\mathrm{T} 25.3-14=\mathrm{L} 64.11-23$ ). Urbicus knew something of the history of the theoretical exposition of surveying material, and comments on the lengthy existing discussions about disputes by the professores ( $\mathrm{C} 21.39-40=\mathrm{T}$ $25.1-2=\mathrm{L} 64.8-9$ ). In his research Urbicus had used Frontinus and Hyginus 1, but it is impossible to say what version of their text he used and what other sources may have been available to him. ${ }^{80} \mathrm{He}$ expounds the categories and conditions of land disputes and attaches a theoretical vocabulary to the procedures they involved. If we accept the textual reconstruction of Lachmann and Thulin, Urbicus appears to argue from a general, theoretical discussion of categories to a detailed itemization of the various disputes and their principal characteristics. So, he begins with the general importance of reason in nature, which allows things to be organized in a proper order. Then, the basis of land disputes is found in types of landholding, and Urbicus begins with a sweeping account of land, starting with the universe and ending with the territory of the Roman Empire, types of landholding in Italy and the provinces, and some of the potential difficulties associated with them. He concludes by reminding surveyors of the need to study the law.

Urbicus then introduces land disputes through a general reflection on the importance of geometry. This was probably followed by a list of types of dispute (now lost), and a statement of the qualities needed in a surveyor when he has to adjudicate or present material in court. ${ }^{81}$ Integrity and professionalism of the highest order are required and an impartiality that rejects the advances of interested parties. This perhaps offers a hint at the high professional status of land surveyors in the Later Empire. Urbicus now moves to a detailed account of individual disputes, beginning with boundary and site, which, like Frontinus, he considers to be the two fundamental elements in all disputes, though he associates them with a dispute over boundary stones. ${ }^{82}$ For Urbicus an important point is the distinction between the responsibilities of surveyors and lawyers (though he urged all surveyors to be familiar with the law), and it is clear that even in a case decided in the normal process of the law the surveyor might have a role to play as a witness or adviser. His readers were presumably likely to encounter such problems.

[^12]At this point Urbicus moves to theoretical definitions of the categories of disputes, the conditions pertaining to them, and the procedures involved. In his view, disputes fell into categories, and each category had certain conditions or characteristics that helped to explain its origins and context. These conditions were instrumental in determining the procedure to be followed. ${ }^{83}$ In this section, which tends to obscurity, Urbicus uses a technical vocabulary unlike that in Frontinus or any other surviving author. ${ }^{84}$

Next Urbicus returns to the nature of individual land disputes, seemingly following the list set out in Frontinus (with small changes in the order). ${ }^{85}$ The key points that Urbicus emphasizes are: the recognition of the nature of the dispute and the methods for defining its subject, the nature of the land in which it occurs, and the identity of those involved; the recognition of what the proper procedure is, where there is a role for a surveyor, and how that relates to the responsibilities of a lawyer. In the case of subseciva, the context of the dispute is given through its history. In this section Urbicus extends the fairly brief treatment of individual disputes in the surviving text of Frontinus. He may have been using a different version of that text, or perhaps introduced material gleaned from other unknown sources. ${ }^{86}$

In summary, it is difficult to estimate Urbicus' place in the history of land survey. His theorizing hardly represented a step forward or a sensible systematization. Indeed the obscure terminology associated with it seems to have been superimposed on surveying material, and not to have grown naturally from it. We cannot tell if this approach was typical of the period or to what extent, if any, it influenced surveyors. In my view, it is unlikely that practising surveyors would have found Urbicus' theoretical analysis relevant or helpful. It seems like a misguided attempt to intellectualize a basically straightforward technical subject in a way that was notably absent in the down-to-earth work of earlier writers. Perhaps he was trying to give added respectability to the subject, or merely to increase his own standing in intellectual or pedagogic circles by finding a role for himself and adding something of his own thoughts. ${ }^{87}$ In respect of the impact of his work, it is interesting that the author of the anonymous Commentum, who had read a version of Urbicus, is confused by the theoretical approach and muddles the technical terminology. ${ }^{88}$

[^13]
## THE COMMENTUM

As argued above, the Commentum or 'Commentary' on the first two sections of Frontinus' text (dealing with types of land and land disputes), was mistakenly attributed to Agennius Urbicus. ${ }^{89}$ Its anonymous author may have been writing in the midfifth or early sixth century A.D., and was characterized by Thulin as a Christian schoolmaster. ${ }^{90}$ The basis for this is weak. At C $71.35-6=\mathrm{T} 68.17-18=\mathrm{L} 23.12-13$, the author mentions the development of the 'most holy Christian religion', but this may be a later interpolation from a Christian source. Furthermore, although in the introduction he states how important it is for the young to learn things properly, this does not necessarily mean that he was a schoolmaster. He may be simply expressing his view of what education and young men should be like.

The anonymous commentator used a text of Frontinus close to that preserved in the Arcerianus manuscript, and also cited a significant amount of material from Hyginus 1 (especially in the section on land disputes), with material from Urbicus, Siculus Flaccus, and a little from Hyginus 2 and Balbus. His method is to quote verbatim (especially from Frontinus and Hyginus 1) and then make generally brief explanatory comments. Some of his analysis is feeble, as when he discusses how to define a large block of land ( $\mathrm{C} 51.13-16=\mathrm{T} 52.5-10=\mathrm{L} 1.20-4$ ), and sometimes naïve, as when he accepts a false reading of altitudinem for latitudinem in the original text of Frontinus, and then attempts to produce an explanation of altitudinem (C $53.10-14=$ T $53.19-54.2=\mathrm{L} 3.10-16$ ). Moreover, as noted above, he misunderstands the significance of Urbicus' technical vocabulary, ${ }^{91}$ and is also prepared to rework earlier writings to suit his own point of view. So, he ascribes the appropriation of sacred land to the development of Christianity, rather than to the density of population, as Urbicus suggested (C 71.35-6 = T 68.17-19 = L 23.12-14). Consequently the commentary is unreliable, and the criticism of Frontinus for insufficiently precise definitions rings hollow (C 59.6-10 = T 58.23-7 = L 9.20-3).

Nevertheless, it seems that the author had a serious purpose, to educate surveyors in key issues, among which land disputes had a central position. His intention was to set out more clearly surveying topics, which, in his view, had been treated obscurely by earlier writers ( $\mathrm{C} 51.2-5=\mathrm{T} 51.7-10=\mathrm{L} 1.7-10$ ). And in support of this he arranged illustrations and diagrams in a separate volume, the Liber Diazografus. ${ }^{92}$ So the Commentum may provide some evidence of a demand for guidance in land survey in the Late Empire, and in this case the method of providing instruction was to write a short commentary on well-established earlier works, to which little original material was added ${ }^{93}$ The author asserts the importance of land surveyors in contemporary society, and the significant role they had to play in assessing and measuring the land,

[^14]and in monitoring land disputes. In this capacity they might serve as the agents of the emperor himself ( $\mathrm{C} 57.39-41=\mathrm{T} 58.10-13=\mathrm{L} 8.26-9$ ).

## HYGINUS 1 AND 2

The manuscripts contain two apparently separate treatises under the name Hyginus: (C 77-101 = T 71-98 = L 111-34; 281-4), hereafter Hyginus 1; (C 135-63 = T 131-71 = L 166-208), hereafter Hyginus 2.

MS B has the heading: INC DE LIMITIB. HYGINI (C 77.1 = T 71.1-2 = L 111.8) and the subscript: DE LIMITIB. HYGIN EXP FELICITER (C $101.3=\mathrm{T} 98.5$ $=\mathrm{L} 134.13$ ). There is no reason to doubt that this is a self-contained treatise that includes several sections, although at C 79.24 and 91.17 the titles were added by Thulin. He also held that a passage located in MS B among fragments of Urbicus with the title Agrorum quae sit inspectio (printed separately by Lachmann-L 281-4), belonged to Hyginus 1, and placed it at C $79.39=\mathrm{T} 74.24$. However, this attribution must remain very doubtful. ${ }^{94}$

From internal references it is clear that Hyginus 1 was writing around A.D. 100. ${ }^{95}$ He was a professional surveyor; he refers to opus nostrum, ${ }^{96}$ and mentions his system of expressing measurements 'whenever I conducted a survey' (C $89.32=\mathrm{T} 85.4=\mathrm{L}$ 122.3). He had substantial field experience, which included investigations in Samnium and Cyrene (C 97.39; $89.43=\mathrm{T} 95.2 ; 85.17=\mathrm{L} 131.17$; 122.15-16), and had consulted maps and laws, which, where appropriate, he quotes and analyses in detail (C 85-7= T 81-2 = L 118-19); he also refers to the writings of jurists, and imperial edicts, ${ }^{97}$ and had taken account of the traditional practices of land survey handed down (C 81.41-2 $=\mathrm{T} 77.1-2=\mathrm{L} 283.5-6$ ). Hyginus 1 writes not just to inform people about surveying, but to offer instruction and practical guidance and tips to working surveyors. ${ }^{98}$

Hyginus 1 establishes the context by looking at the basic structure of land survey, the correct designation of limites and land division units, and the distribution of land (C 77-9 = T 71-3 = L 111-13). He then offers some general, common sense advice on recognizing land boundaries and the difficulties involved, before setting out the differing shapes of land (C79-83 = T 74-8 = L 114-15; 281-4)..$^{99}$ This introduces a brief characterization of the categories of land-arcifinales and occupatorii, quaestorii, vectigales, and finally divided and allocated lands, which take up most of his attention (C $83-5=\mathrm{T} 78-81=\mathrm{L} 115-18$ ). He then notes points of particular interest in divided and allocated lands, most importantly jurisdiction, and rights associated with the width assigned to rivers and limites, and existing constructions like aqueducts and tombs (C 85-9 = T 81-4 = L 118-21). In general, although the surveyor had to

[^15]follow certain rules, there was great scope for the use of personal initiative, and he cites an example of the innovative work in Pannonia of a reservist (evocatus) and surveyor (C $89.13-27=T 84.8-26=$ L 121.7-24). Finally, Hyginus 1 examines the problems of measurements in a non-Roman form (C $89-91=\mathrm{T} 85-6=\mathrm{L} 122-4$ ). This study of categories of land and related features, leads on to the topic of land disputes, which occupies the rest of the treatise (C $91-101=\mathrm{T} 86-98=\mathrm{L} 123-34$ ). Hyginus 1 divides the disputes into six broad categories-rivers, boundaries and markers, site, area, subseciva, the law of territories-to which rights-of-way are appended.

Hyginus 1 has much detailed advice to give the surveyor, but the general principles of good survey work are clearly delineated: to know the background and history of the land in question and neighbouring properties; to recognize any local practices; to seek appropriate evidence, particularly laws and other written documentation, but avoid excessive reliance on it; therefore to use personal observation; to keep a proper record of decisions and make survey maps; to respect the law and note the distinction between the responsibilities of surveyors and lawyers.

In respect of the second Hyginus, the manuscript headings are confused and corrupt: A (110) has: INC. HYGYNI CONSTITVTIO ('There begins the Constitutio of Hyginus') and (161) EXP. KYGYNI GROMATICI CONSTITVTIO FELICITER ('There ends with good fortune the Constitutio of Hyginus Gromaticus'). B (207) has: INC. LIB. HYGINI GROMATICVS ('There begins the Book on Surveying by Hyginus'), and (288) LIBER HYGINI GROMATICVS EXP. ('There ends the Book on Surveying by Hyginus'). B also has a subscript, which apparently relates to a lost book: LIBER GROMATICVS HYGINI DE DIVISIONIB. AGRORVM EXPLICIT ('The Book on Surveying by Hyginus about Land Division ends'). MS P ( $82^{\mathrm{V}}$ ) has: INC. KYGENI AVGVSTI LIBERTI DE LIMITIBVS CONSTITVENDIS ('There begins the Book on the Establishment of Limites by Hyginus, Freedman of Augustus'), but ends inconsistently with (108): EXPLICIT LIBER HYGENI CROMATICVS ('There ends the Book on Surveying by Hyginus'). ${ }^{100}$

The general import of the manuscript headings indicates a book on surveying by Hyginus (designated Hyginus 2 in this work). Only one muddled heading suggests Hyginus Gromaticus, although that name was rather misleadingly adopted by Lachmann and Thulin and other scholars to distinguish the author of this treatise from Hyginus 1. ${ }^{101}$ The general opinion is that Hyginus 1 and Hyginus 2 are distinct, ${ }^{102}$

[^16]but even if Hyginus 2 cannot be identified with any extant author, the value of his treatise for the study of land survey remains high, with its coherent and succinct analysis of several key areas. The only datable reference is to the work of the poet Lucan (A.D. 39-65), but in my view Hyginus 2 was writing no later than the second or third century.

His approach is partly descriptive and historical, and partly didactic, offering guidance and advice to surveyors. He invokes the evidence of his personal investigations, he cites examples from Italy and the provinces, he discusses various contending views and gives his own opinion. There are three crucial themes: the establishment of limites, which are the fundamental instrument of land division, the dimensions of centuriae, and the consistent designation of the land division system. To illustrate examples of this kind of work, Hyginus 2 examines the type of settlements established, the best methods of performing land division, and the importance of following recognized principles. He then deals with how a surveyor should record on the bronze map a completed settlement and all relevant features of the land, the method of land distribution by lot, and the need to keep full records both in the settlement and in the emperor's record office in Rome. As it now stands, the treatise ends with an apparently new scheme devised by Hyginus 2 for the survey of ager arcifinius subject to rent. ${ }^{103}$

## SICULUS FLACCUS

MS P (29r) (C $103.1=\mathrm{T} 98.6=\mathrm{L} 134.14)$ has the heading: $S A E C V L I$ FLACCI DE CONDICIONIBVS AGRORVM, corrected to SICVLI by MS G' ('The Book of Siculus Flaccus on the Categories of Land'), and (44"): EXPLICIT SAECVLI FLACCI LIBER ('Here ends the Book of Siculus Flaccus'). MS E, which along with F, contains only C 103.24-105.2 = T 99.12-100.12 = L 135.23-136.18 of Siculus Flaccus' text, has (35): INCIPIT SICVLI FLACCI DE CONDICIONIBVS AGRORVM LIBER ('Here begins the Book of Siculus Flaccus on the Categories of Land').

Siculus Flaccus refers to a decision of Domitian, and although there is no further indication of his date, there is some reason to think that he was writing in the second century A.D. ${ }^{104} \mathrm{He}$ refers to 'our (surveying) profession' (C $103.3=$ T $98.9=\mathrm{L} 134.17$ ) and clearly had conducted investigations personally, using maps and other public records. ${ }^{105}$ Siculus Flaccus' treatise is amongst the most coherently argued and competently written of extant surveying material. He establishes the context by describing the history and practice of land survey, but the underlying intention is to give guidance to surveyors and so to improve the standing of the profession. He has high ideals of accuracy and integrity that will protect the surveyor from error. He explains the origins of land categories and settlements, and goes on to a major discussion of three categories of land: occupatorii or arcifinales, quaestorii, divided and allocated lands. This takes him to boundary marking, limites and centuriae, the recognition and

[^17]recording of all significant features in a community's territory, and likely disputes (although this is not treated as a separate section). Siculus Flaccus, who likes to cite other views and then present his own, sets out firm principles in the conduct of a survey: use personal observation; be aware of local customs and variations in practice; do not trust blindly in the evidence of maps and documents, important as these are; in disputes, accept that the key point is the agreement of landholders; at all times recognize the role of the surveyor in ensuring fair play for the individual.

It is clear that we do not have the full texts of the principal extant surveying writers. In particular, we miss proper prefaces and conclusions, where the writers could have explained their purpose in writing and set their work in a clear context. What is more, we do not know how much has been lost, or altered by epitomators, or what other treatises these authors wrote. We cannot even establish a clear chronological relationship between the writers. Therefore, it is difficult to establish common characteristics and principles in their works, and some crucial questions remain obscure, notably the extent to which Roman surveyors developed a specific technical vocabulary, and a systematic approach to key issues and a uniform application of professional expertise. ${ }^{106}$

In one sense land survey was bound to be an imprecise profession, especially given the technical limitations of the ancient world, and the writers themselves recognize that there would be many variations in practice, some of them erroneous. Now, at the start of De Agrorum Qualitate Frontinus defines categories of land in terms of their survey, using the phrases mensura comprehensus or mensura continetur seven times ( $\mathrm{C} 3.4-23=\mathrm{T} 1.4-2.8=\mathrm{L} 1.4-5.5$ ). But the terms are interchangeable, and commonly used in the sense of 'embrace' or 'enclose' ${ }^{107}$ There is not enough evidence of Frontinus' writing to demonstrate that they are used in any real technical sense. Frontinus (C 3.3-7 = T 1.3-7 = L 1.3-2.2) also uses qualitas and condicio to refer respectively to 'types' of land and 'characteristics' or 'forms' of survey within one of those types of land. But these Latin words, like their English equivalents, are virtually interchangeable. Such commonplace, inherently vague expressions cannot be described as technical vocabulary, and the evidence of their usage in later writers suggests that qualitas took its connotation from the context and the object it described, ${ }^{108}$ while condicio loosely defined 'form' or 'characteristic' or 'category'. ${ }^{109}$ Only Urbicus seems interested in a precise and consistent technical vocabulary, and his is so complicated and formulaic that he seems out of touch with reality. ${ }^{110}$ In general, the vocabulary of the surveying writers is straightforward and non-technical, but in any case we lack the

[^18]detailed linguistic and chronological evidence to judge the exact significance of words in particular contexts.

It is difficult, therefore, to detect the development in surveying writings of systematic methods of analysis based on accepted procedures and an established order of topics. Now, it is true that in Frontinus, Hyginus 1, and Urbicus, discussion of land disputes is preceded by an explanation of types or categories of land. ${ }^{111}$ But this is surely a sensible way of establishing the context, and need not indicate a significant internal rationalization of the subject. In respect of land disputes, Frontinus notes that the substance of most disputes was subsumed under boundary and site, and then goes on to list fifteen types of dispute ( $\mathrm{C} 5.5-12=\mathrm{T} 4.2-11=\mathrm{L} 9.2-11$ ). This arrangement is followed by Urbicus, but Hyginus 1 lists only six types of disputes, including boundary and site, although he does not single these out for special mention (C 91.18-20 = T 86.20-87.2 = L 123.17-124.2). Perhaps here we have a sign of systematization of material, in the scaling down of Frontinus' categories, and the concentration on disputes that were possibly regarded as more important for surveyors. But in my view Hyginus 1 is merely adopting a different approach to setting out the same material, since his six categories of dispute include therein much of the subject matter discussed in Frontinus, and he gives a great deal of attention to boundary (C 93.12-95.39 = T $89.1-92.16=\mathrm{L} 126.3-129.11$ ) and site ( $\mathrm{C} 95.40-97.31=\mathrm{T} 92.17-94.15=\mathrm{L}$ 129.12-131.9). So, although it is entirely possible that some systematization in the analysis and coherent presentation of the subject of land survey took place in the imperial period, it is impossible to document this process from the extant texts, which in the first instance must be approached as individual entities.

## BALBUS

MS BJ have the correct title: INC. LIB. BALBI AD CELSVM EXPOSITIO ET RATIO OMNIVM FORMARVM; GP erroneously have IVLIVS FRONTINVS CELSO. ${ }^{112}$ This treatise is in the form of a letter addressed to one Celsus, in which Balbus recounts how he had accompanied 'our most holy emperor' on a military expedition involving conquests in Dacia. This might fit either Domitian, in whose reign there was a series of campaigns against the Dacians, Quadi, and Marcomanni between A.D. 85 and 92, or Trajan, who, after defeating the Dacians, created a new province in A.D. 106. Attempts have been made to identify Balbus and Celsus with men prominent in the Domitianic or Trajanic era, notably Q. Iulius Balbus, suffect consul in 85, or the similarly named suffect consul of 129 (PIR ${ }^{2}$ I 199-200); and Publius Iuventius Celsus T. Aufidius Hoenius Severianus (PIR ${ }^{2}$ I 882), a famous legal expert who followed his father P. Iuventius Celsus as head of the Proculian school of jurists (Digest 1.2.2.53), and who was governor of Thrace in 114 and consul on two occasions, the second as ordinarius in 129. He was then proconsul of Asia possibly in 129/30; another possibility is Ti. Iulius Candidus Marius Celsus (PIR ${ }^{2}$ I 241), suffect consul in 86 and ordinarius in 105, who would fit a Domitianic or Trajanic date. He was governor of Galatia and Cappadocia at an uncertain date, possibly c. 88-91.

[^19]But in my view this is misguided, because it is difficult to accept that either Balbus or Celsus was of such high rank. Balbus writes as a practising surveyor who was asked by the emperor to perform routine tasks of road building and military surveying, after which he was permitted to leave his post for a time (C 205.23-36 = L 92.12-93.10). This does not sound like the career of a high-ranking senator. Furthermore, he refers to 'our profession', and to his writing of a book to instruct people in the skills of surveying (C 205.40-207.4 = L 93.13-94.2). Celsus too is seen not merely as an interested patron, but as an expert in surveying matters, although there may be an element of conventional politeness here. So, the book brings him material 'all of which is already known to you' (C $205.8=\mathrm{L} 91.9-10$ ), and his opinion is regarded as valuable for improving Balbus' work. Yet surveyors were usually men outside the highest social orders, and it may be better to accept that both these men are otherwise unknown, and that Balbus was a practising surveyor, probably in the late first or early second century A.D., and Celsus an acknowledged expert in the skill.

The treatise, which is accompanied in the manuscripts by geometrical drawings, deals with technical terms for units of measurement, and the definition of lines, angles, and shapes in the context of surveying. The word forma in the title must mean 'shape', 'figure', or 'measurement', not 'map', which is the usual meaning in surveying texts. The treatise is incomplete and fragmentary, and in its present form its subject matter is of limited interest. Nevertheless, it is of considerable significance in that firstly it shows us something of the creation of a kind of textbook on surveying and the dissemination of technical information, and secondly demonstrates the practical value of surveying on a military campaign, in road building, river crossing, and the tactical planning of military operations. According to Balbus, who, of course, was unlikely to minimize his role, he was virtually indispensable to the emperor and occupied a high position of trust, although it seems that he was not a serving soldier.

## THE BOOK OF COLONIES (LIBER COLONIARVM)

Preserved under the title (MS A82) (C $165.1=\mathrm{L}$ 209.1) INCIPIT LIBER AVGVSTI CAESARIS ET NERONIS, the so-called 'Book of Colonies' is an anonymous compilation of short entries on Italian communities, arranged geographically by region. The manuscripts have different presentations of the material, but the overall picture of the regional layout of Italy seems to correspond most closely with that of the early to mid-fourth century A.D., and suggests that the compiler of the original text was working at that time. ${ }^{113}$ Subsequently some parts of the Liber were re-edited and re-arranged, probably to make the work consistent with regional boundaries in the late fourth century. This section, (printed by Lachmann under the heading of Liber Coloniarum II), contains a limited amount of new material, which seems to come from a genuinely old tradition. ${ }^{114}$ In addition to the Italian material in the Liber, there is a

[^20]section dealing with Dalmatia, and there were possibly in existence other catalogues covering different provinces.

The main source for the Liber Coloniarum was probably the Liber Augusti Caesaris et Neronis mentioned in the title. This is likely to be a commentary produced under the auspices of Augustus and his adopted son, the future emperor Tiberius. ${ }^{115}$ We may assume that it embraced all of Italy. Not only did Augustus reorganize the regions into which Italy was divided, he also founded many colonies and took a great personal interest in the mechanisms of land survey. ${ }^{116}$ It is reasonable that a record produced in his reign of land allocations in the territories of Italian communities remained a fundamental reference work in the future. Then other material was added piecemeal. The Triumvirs, and the emperors Nero, Vespasian, Titus, Nerva, Trajan, Hadrian, Antoninus Pius, Lucius Verus, Marcus Aurelius, and Commodus are mentioned. The Liber also refers to a commentary of Claudius Caesar, which may mean the emperor Claudius, or possibly Tiberius before he became emperor. ${ }^{177}$ Furthermore, a ‘Book of Balbus' is cited (C 177.9; $189.4=\mathrm{L} 225.14 ; 239.15$; he is said to have lived in the time of Augustus), which is usually identified with the work of the surveyor of that name who may have been active in the late first, or early second century a.D., and wrote a treatise on shapes and measurement (see above, p. xxxix). The Liber may be right, however, to associate Balbus with the time of Augustus, and it is perfectly possible that there were two surveyors of this name operating about one hundred years apart. ${ }^{118}$ The fourth-century compiler of the Liber seems to have used several epitomes, which were probably of differing levels of quality, and some of which may have been incomplete. He attempted to combine these into a single volume, but without consistency of content or presentation. ${ }^{119}$

Therefore, although the Liber has immense potential value as an independent source for the history and nature of land settlement in Italy from the late Republic to the second century A.D., we cannot be sure how epitomators treated early material, how much has been left out, and how reliable is the additional source material. Moreover, the geographical coverage of the Liber is restricted to areas no further north than Tuscia and Picenum. It represents Italia Suburbicaria (i.e. the more southerly of the two dioceses established by Diocletian), whereas the Augustan work had probably dealt with all of Italy. Apart from this, as a list of colonial settlements it is incomplete, and definitions of communities are not always reliable. For example, in the section on Campania, although there is much accurate information on colonies in existence in the first century b.C., there are also many communities listed as colonies which are either incorrectly or doubtfully designated. ${ }^{120}$ As to the founders of the colonies, although there is much useful information, the Liber does not deal with any foundations before the Gracchi and often does not trace the history of a settle-

[^21]ment. So, for example, the colony of Minturnae is apparently ascribed to Caligula, but there is no reference to earlier activity there. ${ }^{121}$

Mommsen had grave doubts about the historical value of the Liber and how it could be used. ${ }^{122}$ But other scholars, notably Pais and Thomsen, have attempted to rehabilitate its reputation, Pais arguing in particular that in some cases that have excited the suspicion of modern commentators, the Liber was referring to the despatch of individual colonists, not the establishment of a formal colony. It is now generally agreed that the Liber is a valuable resource, but that it can be exploited only with cautious and detailed examination of each entry. This reduces its value as an independent source for those scholars researching the development of individual towns in Italy. Archaeology must be adduced in support, and this brings its own problems. ${ }^{123}$

However the main line of my enquiry is different, and the Liber has much to offer in respect of the science of land survey, the recording of land division, boundary marking, and the organization of settlements. I am prepared to accept that the editors or compilers of the Liber, even if sometimes in error as to the status or foundation of a settlement, were likely to preserve routine details of survey procedure that had been recorded. And even if invented or altered, such details were likely to be consistent with what was thought to be surveying practice. So, the importance of the Liber can be fully realized only if it is read and analysed in the context of other treatises on the methods of land survey, to which it is clearly related. The inclusion of the Liber in this edition is designed to facilitate this.

In the Liber, communities in the various regions are designated in different ways. In Lucania they are described as praefecturae with the name in an adjectival form. In the regions of the Bruttii, Apulia, Pars Piceni, and Picenum, the word land (ager) is used, with the community's name in adjectival form. In Calabria and Sicily the land is described as territorium, while each community appears in adjectival form, or as a noun. In Tuscia and Valeria, ager is sometimes employed with an adjectival form of the community, or there is specific mention of status, colony or municipium, combined with the name of the town, usually as a noun. In Campania communities are listed alphabetically in substantive form, generally with the designation of colony or oppidum. Therefore, the designations of the Liber, with their emphasis on ager and territorium, confirm the work's essential emphasis on survey and land allocations within communities.

The information contained in the Liber is mainly of the type that would interest surveyors. There is frequent reference to the measurement, orientation, and definition of limites, and the descriptive adjectives applied to them. The establishment and recognition of limites were central to surveying procedure and the creation of centuriae, the most common units of land division, which also appear frequently in the Liber, with their dimensions and the number of iugera enclosed. A very important feature among the information available to the compiler for many communities, was the presence of a servitude or right-of-way, attached to a public main road. This was certainly asso-

[^22]ciated with the significance of limites as thoroughfares, since they had to be of a certain width and passable. The multifarious practices of surveying are also illustrated by reference to land division into strips, so that in the same settlement land was often occupied in different ways. Moreover, the existing layout of the land could at any time be changed by the arrival of fresh settlers.

Boundary marking is perhaps the most common theme in the Liber, and this presumably indicates the crucial importance of the establishment of clear boundaries that could be recognized by subsequent surveyors. So, the size, type, and appearance of boundary stones are described, and frequently also the distances between them, the significance of which is treated in considerable detail. Other methods of boundary marking are also listed, including boundaries established privately by individuals. Indeed in its more detailed entries the Liber gives a reasonable topographical description of a community's territory, including (apart from land division details) mountains, plains, land belonging to shrines, areas for sacrifice, military roads, and land left outside the divided area.

As noted above, the compiler of the Liber was unwilling or unable to provide a detailed history of communities after the original foundation, although in many entries the founder is named. However, this in itself gives a panorama of Roman history, including the Gracchi, Sulla, Caesar, the Triumvirs, Augustus, and emperors down to the late second century A.D. (the period from 47 b.C. to Augustus is most extensively covered). The compilation illustrates how settlements frequently took place as a result of personal initiative, and how that was bound up with political events in Rome. It is no accident that when settlers are named in the Liber, they are nearly always veteran soldiers. From Sulla onwards distribution of land was made largely to satisfy the soldiers of military dynasts or emperors.

It is not clear what purpose the Liber had in the form in which it was eventually published. Its information was largely out of date, and the designations of the status of communities no longer mattered in the fourth century. There are few details of ownership, and the topographical descriptions are in the main not clear enough to permit identification on the ground. Now, it may be significant that in some places the Liber offers specific guidance directly to surveyors, that there is an appeal to the doctrina of earlier writers on surveying, and that sources are cited and cross-references employed. ${ }^{124}$ It is possible that the Liber was intended to serve partly as a kind of teaching manual, which offered general guidance on surveying practice by using evidence from real towns. If so, we have an illustration of the salient features of surveying that, in the opinion of the fourth-century compiler, needed to be taught and recorded. Boundary markers and the precise demarcation of boundaries, the formal layout and orientation of limites, land division, whether in centuriae or in strips, and rights-of-way account for most of the technical and repetitive terminology in the Liber.

[^23]However, it is also possible that the interest in named Italian towns, if not mere antiquarianism, hints at community rivalry in the fourth century, when the regions of Italy were reorganized and local communities strove to prove that they had a founder, an independent existence, territorial integrity, and a distinguished pedigree. The Liber could act as a kind of accreditation.

## MISCELLANEOUS TEXTS

The Corpus also contains a curious selection of texts, including an incomplete treatise that appears under the name of Marcus Junius Nipsus, who cannot otherwise be identified. It is of uncertain date, though probably belonging to the Late Empire, and deals with the measurement of limites and centuriae, geometrical shapes, and the methods for estimating the width of a river. ${ }^{125}$ Apart from this, the most coherent treatise is the Casae Litterarum, five lists (though containing much revision, reworking, and interpolation) of estates, their land, and their principal topographical features, identified by the letters of the alphabet. ${ }^{126}$ We might be tempted to think that these are real examples, part of some official record of estates, and supplied with key letters for ease of reference. On the other hand, the information seems too obscure (even with maps), generalized, and limited for this purpose. It is more likely that the Casae Litterarum was a school exercise offering instruction in surveying. ${ }^{127}$ It allowed pupils to summarize the layout of an estate, familiarize themselves with technical terms, and produce a map with appropriate notations; the capital letters could serve as a device to aid the memory.

Other works in the Corpus range from a work on agriculture purportedly by the Carthaginian Mago, and an alleged prophecy of the Etruscan nymph Vegoia, which probably should be dated to the first century b.C., to extracts from laws and imperial constitutions, and fragments generally ascribed to 'authors' (auctores), some anonymous, some named (although it is unlikely that much trust can be placed in the names), with an emphasis on boundary stones. This type of material tells us little about surveying in the Later Empire, except that the subject was apparently popular and that there was a demand for literature on surveying, either for self-instruction or because of general interest. So, unconnected extracts were grouped together from any available source, even though they were not necessarily properly integrated or even consistent. They seem particularly to provide practical examples, aids to recognition in the demarcation of boundaries, and precise technical terms, and are sometimes supplemented by diagrams.

[^24]
## 4. ORIGINS, DEVELOPMENT, AND STATUS OF SURVEYING

A complex, technical subject such as surveying as practised in ancient Rome will certainly have emerged by trial and error and the absorption of various influences from many different sources. Practices will have been frequently adapted to fit the particular problems of an emerging, and later dominant, city-state in Italy. It is natural to suppose that Rome's most powerful and accomplished neighbours, Etruria and the Greek colonies of southern Italy, were particularly influential.

However, it is very difficult to document direct Etruscan influence on Roman surveying. Frontinus ascribed to Varro the notion that limites originated in Etruscan learning ( $\mathrm{C} 9.28-9=\mathrm{T} 10.20-1=\mathrm{L} 27.13-14$ ). But Varro was not necessarily right, and Frontinus goes on to ascribe to the Romans the detailed development of the use of limites. The fact that some surveying terminology may have been derived or borrowed from the Etruscans does not mean that the Romans were following Etruscan surveying practices. Indeed it is surely significant that archaeological investigation of Etruscan sites has shown little clear sign of the regulated land division so typical of Roman methods. It is true that the Romans attached great importance to the religious significance of boundaries and that there was probably some connection between surveying and augury. However, although Roman religious observances may well have been influenced by the Etruscans, this does not prove that there was a corresponding Etruscan influence on Roman methods of land division. ${ }^{128}$

Geometry was developed as a science by the Greeks, but the practical element inherent in its meaning ('land measurement') was also important, though it was commonly held that they had learnt it from the Egyptians. ${ }^{129}$ The establishment of colonies overseas provided the opportunity for more extensive lands, and also imposed the need to divide land equally into measured plots. For example, between the colonies of Metapontum and Heraclea in southern Italy land division systems based on the drawing of straight lines have been identified, producing a series of rectangular plots; a similar arrangement can be seen at Chersonesos in the Crimea. ${ }^{130}$ Furthermore, under the Ptolemaic dynasty in Egypt, detailed maps and land records were kept for taxation purposes, and also for the settlement of veteran soldiers. This must have involved relatively sophisticated surveys. ${ }^{131}$

Nevertheless, we know little of how Greek surveyors went about their business or analysed problems, because we lack the kind of literary evidence provided for Roman

[^25]surveying by the texts compiled in the Corpus Agrimensorum Romanorum. It is therefore difficult to estimate how much direct influence Greek surveying practice had on the development of the skill in Rome, since features held in common may have developed independently. The Romans went their own way in developing a land division system built around two wider central limites intersecting at right angles, the creation of square centuriae, sophisticated methods for designating the layout, and detailed boundary marking techniques. Furthermore, the Romans surpassed other peoples in the extent of the land divided, the number of people settled, and the change in the pattern of landholding, all accomplished by one central organizing authority, either the government of the Republic, or military dynasts, or the emperors. Finally, a striking point is the degree to which Roman surveyors were expected to know the law, their involvement in the analysis of land disputes, and their role in giving advice to a judge.

The Romans observed and took what they wanted from other peoples, adapting it to suit changing conditions. They may even have borrowed from Carthage, since the work of the Carthaginian agricultural writer Mago was translated into Latin, and a short extract appears under his name in the Corpus (C $255-7=\mathrm{L} 348-50$ ). ${ }^{132}$ But in the end the Romans devised a system of land division and allocation that was distinctly their own, and that was accomplished through the developing expertise and confidence of surveyors. Significantly, our writers do not dwell on the origins of surveying methods. Instead, they present land survey as something that emerged naturally in a purely Roman context, as a result of widespread conquest in the early period, then the need for more land for citizens and veteran soldiers, and the response of the state to these problems.

The history of this development in land survey is lost to us. However, the terminology associated with survey appears in Roman literature with increasing frequency from the end of the first century b.c. Earlier, Plautus (late third/early second century B.c.) had clearly expected his audience to be familiar with the technical terms of the surveyor's job. He had the Prologue in the Poenulus (48-9) establish the parameters of the plot:

I shall now demarcate its areas (regiones), boundaries (limites), and confines (confinia); I have been appointed its surveyor (finitor).

Cicero resorted to a surveying metaphor in referring to the objectionable Lucius Decidius Saxa, who had been made tribune of the plebs by Caesar; he had been a measurer of military camps (castrorum metator), now he was ambitious to measure out Rome itself with his measuring rod (decempeda) (Phil. 11.12; 14.10). ${ }^{133}$ Ovid, living in an age when many new settlements were being founded, emphasized the role of surveyors in establishing fair boundaries in an uncertain environment. He described the age of Saturn before human civilization had spread to the world, when:

[^26]No one cut through the earth with the mighty ploughshare/ and the surveyor (mensor) did not mark out the land with any boundary (limes).

He was evidently thinking of the foundation of a new settlement and traditional ploughing of the first furrow marking out its confines. ${ }^{134}$ That limites were commonly recognized as balks, or as some kind of boundary marker, can also be seen from Statius' account of road making:

The first task is to start furrows/ and cut out the borders (limites) of the road/ and with deep excavations hollow out the ground. ${ }^{135}$

Increasingly surveyors earned respect and recognition as professionals. It is difficult to trace this process, though we can identify a number of factors contributing to it: the demand for surveyors to cope with the expansion in colonial settlement; ${ }^{136}$ the measurement of land for taxation purposes as Rome conquered more territory; road building; the related skill of military surveying, associated with the introduction of properly planned camps and forts; the developing professional status of other activities that could be followed with honour by those outside the upper classes. ${ }^{137}$ In his De Architectura, Vitruvius is at pains to emphasize the professional standing of the architect and the various intellectual disciplines that he had to master in his training (1.1.1-12). He seems to be making a case for the intellectual respectability of architecture, which he describes as a great profession adorned with many different accomplishments (1.1.11). Vitruvius had benefited from the munificence of a powerful patron, Augustus himself (1, preface). Surveying may also have inspired the interest of men of note. A late anonymous treatise, the Demonstratio Artis Geometricae, mentions a letter of Julius Caesar about the origins of the skill of land survey, which is set in the context of his extensive colonial settlements (L 395.15-396.6). If it is correct that the distinguished senator Frontinus wrote about surveying practices, ${ }^{138}$ that would indicate that the upper classes considered this activity to be an appropriate subject for study, although their interest was presumably non-specialist and not professional.

The professional status of surveying is implicitly recognized by Columella (midfirst century A.D.), in response to a question from a friend about a method for measuring land, which he thought was closely connected with agricultural practice:

I replied that this was the duty not of a farmer but of a surveyor (mensor), especially since not even architects, who have to understand the principles of measurement, deign to calculate the area of completed buildings designed by them... ${ }^{139}$

[^27]Columella believed that professions had their own sphere of activity, and that there were certain tasks that should be undertaken only by a surveyor with appropriate training. In imperial decisions, surveyors were viewed as men with specific professional expertise, who would be employed where appropriate. So, Vespasian wrote to the magistrates and councillors of the Vanacini in Corsica, announcing that he was sending a surveyor (mensor) so that his procurator could establish the boundaries of disputed land. ${ }^{140}$ Similarly, in Pliny's letters from Bithynia, mensores are seen as part of an experienced professional group with special skills and training, just like architects and engineers. ${ }^{141}$

The tombstone inscription of Lucius Aebutius Faustus from Eporedia (Ivrea) in northern Italy, shows the career of one professional surveyor; a dismantled groma, the main tool of the surveyor's skill, is carved on the stone:

Lucius Aebutius Faustus, freedman of Lucius (Aebutius), of the tribe Claudia, surveyor (mensor), member of the Board of Six (sevir), set up this monument while still alive for himself and his wife Arria Aucta, freedwoman of Quintus (Arrius), and their children, and the freedwoman Zepyra. ${ }^{142}$

Professional pride in his achievements, and the technical mastery of his subject, are apparent in the long inscription set up in A.D. 152 by Nonius Datus, veteran and reservist of Legion III Augusta in Africa, to celebrate his assistance over a period of fifteen years with the planning, measuring, and building of a water-channel for the town of Saldae (modern Bejaia or Bougie) in Mauretania Caesariensis. Several procurators of Mauretania had approached his commanding-officer for help, since Datus was apparently the only person in both provinces who was competent to give advice. The procurator, Porcius Vetustinus, pointed out that the water-channel was a large enterprise, which 'could not be completed without the attention of Nonius Datus, who dealt with the matter carefully and conscientiously.... ${ }^{143}$

The professional role and standing of surveyors in the third century A.D. are clearly demonstrated by the heading in the Digest, 'Concerning the Establishment of Boundaries'. Ulpian refers to the responsibility of a provincial governor (and presumably any magistrate) to ensure that when boundaries had been disturbed, no person should interfere with the property of another, and that the boundaries should be demarcated again by surveyors. Indeed, it was the duty of the responsible official in cases involving boundaries to send surveyors, and through them settle the dispute justly. A surveyor could also be employed privately by one of the parties involved in

[^28]a land dispute. ${ }^{144}$ Moreover, under the Digest heading 'If a surveyor makes a false statement in respect of area', it is stated that the praetor was entitled to grant an action 'on the facts' (in factum) against a surveyor, since people should not be subject to deception in respect of any of the tasks normally carried out by surveyors, for example, in a definition of boundaries, or the establishment of precise dimensions of an area for a purchaser or vendor, or in a case where a surveyor had been appointed by a court to adjudicate. ${ }^{145}$ Ulpian goes on to describe why an action (for fraud) in factum is appropriate. Originally surveyors did not hire out professional services; their activities were regarded more as a favour to individuals, and any remuneration was therefore honorary. Consequently, they were not contractually liable and could not be sued under the law of contract relating to leasing or hiring. Later, although the law had not been changed, it was widely recognized that surveyors normally did take fees, and the praetor could presumably take this into account when considering actions in factum. All this suggests that originally surveyors were not held to be a professional group; men presumably took on surveying tasks informally, and it was probably comparatively rare for a surveyor to be employed officially to state his opinion. Later, however, they were recognized as professionals with a specific sphere of responsibility, who could be held accountable for failing to reach accepted standards of integrity and competence, even though the law was slow to catch up with this development. ${ }^{146}$

In this context we can better understand the surveying writers' insistence on their professional integrity and competence. Hyginus speaks of 'the integrity of our profession' (fides professionis nostrae-C $95.38=\mathrm{T} 92.14-15=\mathrm{L} 129.9-10$ ), Siculus Flaccus of 'our profession' (professio nostra), which could be expected to know about categories of land in Italy (C $103.3=$ T $98.8-9=\mathrm{L} 134.16-17$ ), Hyginus 2 of the potential scope of 'our profession' (professio nostra-C $161.36=168.7-8=\mathrm{L}$ 205.7-8). Furthermore, Urbicus, probably using Frontinus or another earlier source, pointed out that landholders, when confronted with a frank assessment of their case by a mensor, often tried to force him to act against the integrity of his profession (sinceritas artis). ${ }^{147}$

Despite the increasing professional status of surveying, it was not considered an appropriate occupation for senators or equites. In the Republic, those with ultimate responsibility for land distribution were commissioners of senatorial rank, usually three in number and serving for up to three years (tresviri coloniae deducendae). They were mostly appointed by the senate, and might include ex-consuls. ${ }^{148}$ The three commissioners appointed by the law of Tiberius Gracchus in 133 B.c. consisted of Tiberius himself, his brother Gaius, and his father-in-law Appius Claudius, usually described on surviving boundary stones as 'three men for adjudicating and distributing land'.

[^29]According to the agrarian bill proposed by Publius Servilius Rullus in 63 b.c., which was sucessfully opposed by Cicero, there were to be ten commissioners holding office for five years, with a supporting adminstrative staff including two hundred surveyors (finitores) of equestrian rank. Cicero, insofar as his hostile testimony can be trusted, is scathing about the decemviri roaming through the world with imperium, surrounded by this picked body of youthful surveyors. But the emphasis Cicero places on the status of these surveyors indicates that it was exceptional. ${ }^{149}$

In the imperial period, about forty-one non-military surveyors are known by name from Italy and the provinces. ${ }^{150}$ Of these, eleven are freedmen (including seven imperial freedmen), nine are certainly slaves (including six imperial slaves). Of those of uncertain status, most are probably of servile origin, though some can possibly be registered as freemen. ${ }^{151}$ It is clear that the practitioners of surveying remained men of low degree. So, the placing of boundary stones at Thugga in Africa was carried out by one Tiberinus, 'freedman of the emperor, in charge of the surveyors'. ${ }^{152}$ Even if a surveyor were a freeman, there was a distinction between the man of high status who made the decision, and the surveyor who provided the evidence on which the decision was based, as we see in an inscription from Bordj Medjana in Mauretania Sitifensis, concerning the allocation of land to colonists 'on the instructions of Axus Aelianus, $v(i r) e($ gregius $)$, procurator of the Emperor of the private account, through Caelius Martialis, land surveyor. ${ }^{153}$ Furthermore, although we cannot tell what kinds of distinctions may have existed within the surveying profession, it is legitimate to speculate that, whereas slaves carried out the more routine practical tasks of measuring, other surveyors with more training and education and a higher social status took charge of major projects and were consulted on sensitive matters in respect of the giving of advice on law, jurisdiction, and boundaries to those empowered to make decisions.

In the main, surveyors who were not slaves will have acted as private individuals hiring out their services as required, although some may have received a retainer from local communities to devote at least part of their time to civic business. There is one example of a freeman working as a 'surveyor in the public service' (mensor publicus). ${ }^{154}$

[^30]But there is little sign that proconsuls or procurators normally had surveyors attached to their office. Pliny in Bithynia, and the procurators in Mauretania Caesariensis, clearly did not have surveyors readily available. ${ }^{155}$

In the army, surveyors seem usually to be ordinary soldiers ranking among the imтииеs, and attached to legions, praetorian cohorts, and auxiliary units. ${ }^{156}$ Here too, decisions were taken by men of higher status, as in the establishment of the territory of Ardea on the authority of Antoninus Pius, 'through the decision of Tuscenius Felix, senior centurion for the second time, after Blesius Taurinus, soldier of the sixth praetorian cohort, land surveyor, had drawn up the boundaries'. ${ }^{157}$

This text, and the inscription of Nonius Datus, ${ }^{158}$ show that military surveyors could be seconded to assist in civilian projects in Italy and the provinces. There is also evidence for the involvement of military surveyors in the settlement of boundary disputes, and in land division. ${ }^{159}$ This was presumably possible when military duties permitted. But army surveyors will have been busy. They were responsible for ensuring that military camps were laid out efficiently. ${ }^{160}$ Within the regulated space bounded by the outer defence wall with its four gates, they established straight roads intersecting at right angles; these created orderly blocks of accommodation, with a defined amount of space for each unit. There was a set location for the headquarters building and the assembly area, which was to be accessible for all the troops. This central position where the surveying instrument (ferramentum or groma) was set up, was called the locus gromae, and from here roads led to the four gates of the camp. ${ }^{161}$ By the end of the first century A.D. most permanent camps had already been built, but there was a continuing need for marching-camps and new forts. It is a reasonable hypothesis that surveyors were also involved in plotting the course and layout of roads built by the army, and in completing the measurement of distances made public by the prominent milestones. ${ }^{162}$ It follows that they were likely to have contributed their surveying and

[^31]measurement skills to the drawing up of military maps. A tantalizing inscription records one [T]enatius [P]rimio, a soldier of the fourth praetorian cohort, who is described as '[ch]orographiar. [ite]m caelatori'. ${ }^{163}$ This may mean 'land surveyor' and 'engraver', which could refer to the surveyor's duty of engraving the map of land settlements and other records on bronze. Military surveyors would also be involved in surveying the territory attributed to legions in the provinces and adjudicating its boundaries, and were doubtless required to assist in the foundation of new military colonies. The only clear evidence for this appears in Hyginus 1 (C 89.13-27 = T 84.8-26 = L 121.7-24), where in Pannonia a reservist (evocatus) arranged for the distribution of land and drew up detailed records, probably for the colony of Poetovio founded by Trajan.

It is difficult to discover what status and official position surveyors held in the Later Empire, amid the increasing bureaucratic structure and regimentation of the state, and the compulsion upon individuals to perform certain functions. In Diocletian's edict on tariffs, a geometra was entitled to charge a tuition fee of 200 denarii per month for each pupil. This was the same sum as that charged by grammarians, though architects could charge only 100 denarii. However, in the context, a geometra was surely a teacher of geometry, not a surveyor, ${ }^{164}$ although geometry teachers may have contributed to instruction in some of the measuring skills associated with surveying. A decision of Constantine addressed to the Count of Asia in A.D. 330, concerning the regulation of boundaries, confirms the established and recognized role of the agrimensor in the measurement of land and the demarcation of boundaries. ${ }^{165}$ But the best illustration of the continuing importance of the role of land surveyors in the Late Empire is provided by Cassiodorus, writing in the sixth century A.D. In his view, other sciences were theoretical academic subjects whose professors had few students:

> But the land surveyor is entrusted with the adjudication of a boundary dispute that has arisen, in order to put an end to wanton arguing. He is a judge, at any rate of his own skill; his lawcourt is deserted fields. You might think him crazy, seeing him walk along tortuous paths. If he is looking for evidence among rough woodland and thickets, he does not walk like you or me; he chooses his own way, he explains his statements, puts his learning to the proof, decides disputes by his own footsteps, and like a gigantic river takes areas of countryside from some and gives them to others. ${ }^{166}$

To Cassiodorus surveyors appeared as masters of a complicated skill that had great practical relevance, searching for evidence on the ground, measuring, explaining, and settling disputes. Although their work seemed a little odd to non-specialists, they were inseparably bound up with continuing change in the countryside and the rights of landholders.

[^32]The education of Roman surveyors remains a mystery. In a society that did not have an organized system of education, or recognized professional qualifications for individual jobs, it is likely that men wishing to learn surveying skills went to wellestablished surveyors to learn from them the practical skills required. In the army, surveyors attached to a legion were doubtless responsible for teaching trainees. Skills like orientation, sighting and plotting lines, accurate measurement, boundary marking, and the recognition of boundary stones and other markers, could perhaps best be acquired by watching surveyors at work.

It is difficult to estimate what part in this was played by the writings of the Agrimensores. ${ }^{167}$ Even if later compilers aimed to put together a textbook, the original texts were not merely didactic but also aimed to entertain, to give a quasi-historical account of landholding and surveying, and to propagate the intellectual basis of the subject. We may surmise, in the light of Vitruvius' comments on architecture, ${ }^{168}$ that a general education was the usual starting-point; surveyors would need to be not only literate, but also aware of relevant history, and competent in mathematics and the basic principles of geometry; they would also need to be proficient in the skills of consultation, collation, and analysis of documentary and other material from various sources. Some of this could doubtless be absorbed from the texts, as they have come down to us. Similarly, the rudiments of the legal background of landholding, the disputes likely to be encountered, and a knowledge of the relevant areas of the law, could also be acquired from the Agrimensores and other books. Indeed, this might be regarded as the most significant of the surveyor's professional activities, in that his role in assisting a judge to adjudicate disputes, and his association with Roman law, would increase the prestige and standing of the profession.

[^33]
## 5. LAND DIVISION IN ROMAN HISTORY ${ }^{169}$

Although surveyors were extensively occupied in surveying land for the government, local communities, and individuals, possibly their most demanding and prominent role was to divide and distribute land for colonial settlements, and to monitor subsequent landholding arrangements. By concentrating on the founding of colonies or the augmentation of existing communities, surveying writers illustrate for the historian both the expansion of Roman power, and important political, social, and economic developments in the late Republic and the early imperial period.

In the early Republic, the Latin colonies, which, though containing many Romans, were founded outside Roman territory, were essentially military settlements whose purpose was to guard roads and passes in strategic locations, and act as bastions of Roman influence. From c. 338 b.c. colonies of Roman citizens had been set up in Roman territory to guard the sea approaches to Italy, and after c. 177 b.c. all colonies consisted of citizens, often had large complements (up to about 5,000 settlers), and received substantial allocations of land. ${ }^{170}$ After the Gracchi, new foundations frequently had economic or political motives, and tended to be established within the land of Italian communities allied to Rome. Sulla may have settled up to 80,000 veterans, and communities that had opposed him suffered most:

In most of them he settled his own soldiers so as to have strongholds throughout Italy, and transferring their land and possessions, he allocated them to his troops. He therefore made them loyal to him even after his death. As they could not be secure about their property unless all Sulla's measures were secure, they championed him even when he was dead. ${ }^{171}$

In the late Republic politics predominated, and great efforts were expended in settlements that consisted mainly of veteran soldiers discharged by the military dynasts; between 59 and 14 в.C., perhaps up to 350,000 people were settled. ${ }^{172}$ Before the Battle of Actium in 31 b.C., these vast schemes often involved widespread confiscation of land and disruption of established patterns of landholding. The period of dislocation and great bitterness during the civil wars after Caesar's death finds most poignant expression in Virgil's first Eclogue:

[^34]Is some blaspheming soldier to own these acres I have tilled so well,/ is an outsider to reap these fields of corn? Look at the pitch of misery to which civil war/ has brought Roman citizens. To think that we sowed our fields for men like this to reap! ${ }^{173}$

After Actium Augustus brought peace and order, and an end to violent confiscations. He expended 860 million sesterces in the purchase of land in Italy and the provinces for the settlement of veteran soldiers. Presumably he also had available conquered land in the provinces. This will certainly have been a period of great activity in land division and allocation, and surveyors will have been busy throughout Italy, the Transpadana, and in many provinces. Although the settlements were political, to satisfy the discharged soldiery and ensure the emperor's popularity with the army, strategical, economic, and social motives were still important. ${ }^{174}$ Augustus took a personal interest in the survey and distribution of land, encouraged the precise demarcation of allocations and the keeping of records, and defined jurisdiction between colonies, which had been newly founded or reinforced, and existing communities. His influence here, as in so many other aspects of Roman life, was immense. ${ }^{175}$

Augustus' successors continued to settle veteran soldiers and to found new communities. Only in the reign of Hadrian did the practice apparently come to an end, though probably no colony was founded in Italy after Vespasian. ${ }^{176}$ Emperors acquired the glory, even though they delegated administrative responsibility to others. So; in a.d. 71 Publius Babullius Sallu[vius Ru]fus, military tribune of Legion XXII Deiotariana, procurator of the emperor, was sent 'to divide the land for the veterans who were led under his charge(?) to the colony Flavia Prima at Paestum' ${ }^{177}$ The name of the colony, which should probably be interpreted to mean 'first in loyalty to the Flavian dynasty', emphasizes the personal association of emperor and colonists. We find the same imperial interest in the despatch by Trajan of veterans to Cyrene, probably after the Jewish revolt in 115, though the colony may have been completed by Hadrian:

In honour of Lucius Gavius Fronto..., chief centurion of Legion III Cyrenaica and camp prefect of Legion XV Apollinaris..., honoured with the grant of a public horse by the Emperor, and with military decorations, entrusted by the divine Trajan with three thousand legionary veterans to found a colony at Cyrene.... ${ }^{178}$

The personal responsibility of the emperor in finding land for his veterans was recognized by some legionaries settled in Deultum in Thrace by Vespasian, when the council of their new community decided to approach the imperial legate Avidius Quietus to act as patron-'Since we have served in Legion VIII Augusta and after

[^35]completion of our [twenty-five years] of service [have been settled] by the most revered emperor in the colony of Deultum.....$^{179}$

Emperors could, of course, influence the development of settlements through their position as a source of redress or assistance for communities and individual Roman citizens. They could make a gift of land to a community, change the status of groups of people within a community's territory, or restore land to public ownership. ${ }^{180}$ They were frequently asked to adjudicate in land disputes, and their response was normally to ask a provincial governor or other official to investigate, with the help of a surveyor if necessary. ${ }^{181}$ But emperors were autocrats, and their decisions could dramatically alter the pattern of landholding. When Vespasian boldly decided to reclaim subseciva (land left unallocated in the original settlement), or encourage communities to do so, he caused great uproar and distress throughout Italy. Eventually the pressure of complaints from deputations of aggrieved landholders persuaded him to intermit his decision. But Titus took the matter up again, and uncertainty seems to have continued for a number of years before Domitian with equal decisiveness confirmed existing landholders in their occupation of subseciva. ${ }^{182}$

Our usual literary sources provide useful details of the foundation of colonies, even the numbers of colonists, but little on how colonies were laid out and land distributed. And in the late Republic our evidence is usually presented as part of a political analysis. The broad trends of colonial foundation are adumbrated in the writings of some of the main authors in the Corpus Agrimensorum Romanorum, who provide an interesting and very different viewpoint.

Colonial founders had both extensive responsibilities and wide-ranging powers, and surveyors were closely associated with everything they did. Because surveyors were not mere map-makers, but had to decide boundaries, distribute individual allocations, personally lead settlers to their plots, make maps and records of all transactions, and adjudicate disputes, as individual advisers and subsequently as professional practitioners, they were at the centre of activities crucial to Roman political, economic, and social life. The writings of surveyors in the Corpus in my view contain assembled lore of earlier surveyors, and represent the opinion of an increasingly professional group outside the upper classes and free from many of their prejudices. We get a fresh and vivid account of Roman aggrandizement and changes in landholding patterns, as well as examples of how Romans analysed and expounded technical material. But above all there is an exceptionally detailed description of the theory and conduct of land division set in a carefully presented historical context. This is invaluable evidence for the site and layout of Italian communities, and the shape and dimensions of land division systems, in which straight balks or roadways (limites) intersected at right angles to form squares or rectangles (centuriae), which could then be subdivided for distribution. ${ }^{183}$ The intention was to divide land into visibly equal plots, even though this will not always have been convenient, in that settlers might prefer smaller

[^36]plots in different locations, and needed access to pasture and woodland, which often had to be some distance from their farms. What is more, as surveying writers point out, subsequent changes of ownership by sale and inheritance could produce a pattern of landholding that was difficult to disentangle.

The precise information provided by the Agrimensores has stimulated scholars to pursue by archaeology and other means the identification of Roman field-systems on the ground. Confirmation for the methods described by the writers, and the terminology they use, can be found in surviving boundary stones, ${ }^{184}$ inscriptions recording boundary disputes, ${ }^{185}$ the land records at Veleia and Ligures Baebiani, ${ }^{186}$ in the fragmentary surveyor's map from Augusta Emerita in Spain, ${ }^{187}$ and in the massive inscription from Arausio (Orange). ${ }^{188}$ Here a colony had been established for veterans of Legion II Gallica, perhaps in 35 b.C., on the territory of the local Gallic tribe, the Tricastini. In A.D. 77 Vespasian decided that land originally given to the settlers but subsequently appropriated by private individuals should be restored, and ordered a map of the settlement to be made. It was set up by the local community and the surviving portions show the detailed work of the land surveyors, depicting centuriae, the river Rhône and other geographical features, roads, various types of land and its status, and the amount of rents where appropriate. The public display of this map emphasizes the responsibility that surveyors had for making accurate assessments, and also the importance of landholding within small communities. All this helps to show that the writings of the Agrimensores were relevant to survey in the field in the imperial period.

However, the most striking advance in the identification of Roman field-systems in Europe and North Africa has come through aerial photography, much of which originated from surveillance work in the Second World War. The photographs create an evocative impression of the grand scale and wide sweep of Roman land systems, and the visible presence of Rome even when buildings have perished. ${ }^{189}$ However, while photographs can show the underlying pattern of land division, they need to be complemented by careful work on the ground. Since, according to the surveying writers, limites commonly had a length of 20 actus (about 706 m ), or one of a small number of variations of this, lines of such dimensions can be traced using maps and onsite investigation; for ancient limites are sometimes preserved to the present day through roads, crossroads, paths in continuous usage, hedges and old stone walls used to mark boundaries, and particularly drainage ditches, for example, in the Po valley. Systems can sometimes be reconstructed from inscribed boundary stones discovered on site, because of the regularity of Roman surveying. There is also confirmation in the presence of the sites of ancient farm buildings near the presumed limites. Then

[^37]there is the evidence of place-names persisting into medieval and modern times, which reflect terminology from land survey. For example, at Hispellum land division can be traced near the modern road from Foligno to Bevagna, where there are place-names such as 'Perticani' from pertica (surveyor's measuring rod), and 'Limiti' from limites. ${ }^{190}$ The most fruitful and convincing approach in the identification of ancient fieldsystems is an integrated exploitation of local records, maps, place names, archaeology, field survey, and aerial photography.

Modern observers cannot fail to be impressed by the physical evidence of how the Romans arranged Italy and their subject territories to suit their political, economic, and social interests, and how land division into centuriae became the vehicle for agrarian change. It has been noted that the colonization of the Transpadane region was a vast undertaking for land surveyors, which brought about in a coherent way a significant change in the social and economic conditions of the region. ${ }^{191}$ Recent investigations in Spain have shown how, especially in the south and east of the peninsula, and on the island of Mallorca, field-systems were laid out as Roman control was consolidated and colonies established after the final pacification by Augustus. A great sweep of Roman activity has been identified at Augusta Emerita in Lusitania, Carmo and Corduba in Baetica, Ilici in Tarraconensis, and in the same province, near Basti, at Murcia, between the modern towns of Jumilla and Yecla, and possibly near Castellón de la Plana. ${ }^{192}$

Even more dramatically, the wonderful aerial photographs published by John Bradford in 1957 illuminate the carefully planned dissection of Dalmatia by the Romans, at Pola (Pl. III), Iader (PI. IV), Salona, Tragurium, and on the islands of Ugljan and Pharia. The division of the land was an instrument of Roman imperial-

[^38]ism, associated with conquest and settlement. Pola was perhaps founded as a colony by Octavian during the campaigns of $35-33$ b.c., while Salona, which was a colonial foundation of Julius Caesar, was probably strengthened by Octavian with the addition of fresh settlers. Salona's territory stretched along the coast as far as Tragurium and included the islands of Solentia and Pharia, which were also carefully divided by limites. The foundation of the colony at Iader is most likely the work of Octavian c. 33 B.C., and an inscription describes him as 'father of the colony'. ${ }^{193}$ These extensive field-systems represent an immense amount of work carried out by surveyors, and in some cases a notable technical achievement because of difficulties of terrain and the awkward configuration of the land. Moreover, the systems are exceptionally well preserved, so that even some internal subdivisions of the centuriae can be traced. ${ }^{194}$

Elsewhere, Tunisia in North Africa has the most spectacular and extensive signs of Roman land division. At one time it was argued that many of the remains belonged to a single, massive system. Aerial photography and archaeology have modified this view. Instead we have a picture of progressive Roman exploitation. ${ }^{195}$ There is an area in northern Tunisia near Carthage which perhaps goes back to the Gracchan colony of Iunonia, or possibly the Caesarian colony at Carthage. This stretched south along the line of the Fossa Regia, which demarcated the old province of Africa, established in 146 b.C. At Enfida there seem to be at least five networks with different orientations. In the central coastal zone, around Hadrumetum, two areas of centuriation with different orientations have been identified. In southern Tunisia the land division system has been reconstructed from surviving, inscribed boundary stones, which were set up by Legion III Augusta, working under the proconsul of Africa, Gaius Vibius Marsus, in A.D. 29-30. This was presumably a response to the long guerrilla war fought against the Numidian leader Tacfarinas, who had repeatedly attacked the province until he was killed in 24 . According to Tacitus, he had approached Tiberius asking for lands, and some of the land divided by Marsus may have been given to the disaffected followers of Tacfarinas. Some may have gone to veterans or Roman settlers. It is possible, however, that the scheme was pre-emptive, designed to secure the area for future settlement or to symbolize Roman control. A land division system in western Tunisia, near Ammaedara, appears to be separate from that in the south, since it has a different orientation, and may belong to a later period, after Ammaedara had ceased to be the headquarters of the III Augusta.

Changes in climate and topography, continuous habitation and land use, the adaptation of Roman methods by later peoples, and the lack of a clear archaeological context, often make the dating of identified Roman field-systems hazardous. Unfortunately, it is precisely on this point that the texts in the Corpus offer little help. Most of them belong to the second century A.D., or later, and do not set the methods

[^39]of land division they describe in a clear chronological context. So, for example, it is impossible to discover from surveying writers when land division by limites and centuriae developed, or its relation to other methods of dividing land.

It is notoriously difficult to establish on the basis of field studies when the division of land into centuriae of 20 by 20 actus, containing 200 iugera, was first introduced, but it now seems unlikely that it was in use in the fourth or early third century b.c. The earliest indication of this system is possibly at Ariminum, which was founded as a Latin colony in 268 b.C., where the line of the surrounding field-system is aligned with the plan of the town, which perhaps suggests that they originated at the same time. ${ }^{196}$ However, the division of land into squares constructed on a smaller scale may have existed from much earlier. We hear that the Roman state sold off conquered land to its citizens in squares of fifty iugera, and this must go back to an early period of substantial conquest in Italy. ${ }^{197}$ Furthermore, at Suessa and Sinuessa in Campania there were squares of 8 by 8 and 16 by 16 vorsus respectively; the vorsus was an old Oscan unit of measurement, and these land divisions may be pre-Roman. But we cannot exclude the possibility that the Romans learnt from and copied the practices of other Italic peoples. ${ }^{198}$

It is doubtless right that land division in centuriae of two hundred iugera ( 20 by 20 actus) belongs mainly to the period of large-scale foundations, with substantial amounts of land and many settlers, in the mid-Republic and later. The triumvirs were principally interested in satisfying their soldiers, and confiscations of land were frequent. By contrast, Augustus, once established, aimed to keep strict control, preserve peace and order, and protect property rights. He may have inclined to settlements on a smaller scale, of 16 by 16 or 15 by 15 actus. ${ }^{199}$ Indeed, when Hyginus 2 emphasizes the flexibility that land surveyors needed to display in marking out the land for a new settlement, this surely gives us a hint of the situation at the end of the Republic, when there were many settlements in the territory of existing communities, and, under the influence of Augustus, a need for a conciliatory approach and a blending in with existing inhabitants. ${ }^{200}$

A further problem is the relative dating of land division systems based on centuriae, and those apparently based on less sophisticated methods, such as division in strips lengthwise (strigatio) or breadthwise (scamnatio). Land division of this type, though it certainly existed from the early period, was not necessarily a primitive system. It required a survey and proper measurements, units of consistent size, and a fixed orientation; the amount of land and the number of settlers needed to be correlated, and the land units had to be suitable for subdivision and allocation. All these principles were present in land division by centuriae. It is possible that centuriae were established when large amounts of land had to be distributed or perhaps when a large extent of flat terrain was available. Land division by centuriae may also have depended on the availability of sufficient resources and facilities (including enough surveyors) to

[^40]cope with more extensive structures. There is no reason to doubt that land division by strips persisted as a way of allocating land in certain circumstances, and remained as an alternative to centuriae. So, Hyginus 2 could suggest that strigatio and scamnatio might be employed for the survey of land subject to rent, which had not been divided and allocated. ${ }^{201}$

In conclusion, throughout Roman history the drawing of lines on the ground (and subsequently on maps) was important in order to demarcate territorial boundaries, city boundaries, public land, imperial estates, and private property. The massive land division schemes, which still leave their mark across Europe and North Africa, symbolized Roman power and conquest, and proclaimed that the Romans had complete disposal of the land and property of defeated peoples, which could be distributed to the victorious citizens of Rome, or to her valiant soldiers, or returned to the previous occupants. ${ }^{202}$ But their symbolic significance should not be over-stated. The Romans had other ways of impressing the vanquished, and the most visible signs of their domination were the presence of soldiers and officials. They divided land, not to put roadways or balks on the ground or lines on a map, but to make it available for their own benefit, to assess tax and to exploit their subjects. And, of course, the marking out of territory implied no limits upon Roman aggrandizement and expansion.

The careful organization and detailed planning of land division and distribution allowed and encouraged the allocation of equal amounts to settlers of equal rank (though they could also accommodate preferential grants to favoured groups or individuals), and made it easier to maintain records, manage and improve the land with drainage and other facilities, and establish precedents for dealing with difficulties. The whole mechanism of land division and the work of surveyors, confirmed the importance of boundaries and property rights, guaranteed by the 'authority of the limites', as expressed in an inscription from Latium about disputed land claimed by the city of Ostia. ${ }^{203}$ Throughout the Republic and the imperial period, however much the scale of distributions changed, the principles of land settlement remained conservative, maintaining the ethos of the self-governing community, with its urban centre and rural hinterland containing small self-sufficient farms, larger estates producing for profit, and communal pasture and woodland. ${ }^{204}$ Centuriation was the crucial prerequisite for the distribution or re-distribution of land in a disciplined way, and through it the Romans skilfully and constructively managed and exploited the economic resources of the territories they conquered or appropriated, introducing more manpower and sometimes new initiatives, and imposing a distinct Roman framework on Italian and provincial communities. So the process of Romanization was advanced, the development of local communities enhanced, and the classic city-state culture of the ancient Mediterranean area perpetuated.

[^41]
## PART II. TEXT AND TRANSLATION

## CORPVS AGRIMENSORVM ROMANORVM

In the text and translation, the following use of brackets has been observed:
[ ] = words of doubtful authenticity;
$\rangle=$ material added by editors;
() = explanatory comments or expansions of meaning by the translator;
$\}=$ Latin equivalents of words or phrases used by the translator.
Single letters or small groups of letters printed in italics in the Latin text indicate minor corrections by an editor. Obeli ( $\dagger \dagger$ ) indicate serious corruption of the text.

## IVLI FRONTINI

DE AGRORVM QVALITATE

Agrorum qualitates sunt tres: una agri diuisi et adsignati, altera mensura per extremitatem conprehensi, tertia arcifini, qui nulla mensura continetur.

Ager ergo diuisus adsignatus est coloniarum. Hic habet condiciones duas: unam qua plerumque limitibus continetur, alteram qua per proximos possessionum rigores adsignatum est, sicut in Campania Suessae A〈u〉runcae. quidquid autem secundum hanc condicionem in longitudinem est delimitatum, per strigas appellatur; quidquid per latitudinem, per scamna (Ill. 1). ager ergo limitatus hac similitudine decimanis et cardinibus continetur (III. 2). ager per strigas et per scamna diuisus et adsignatus est more antiquo in hanc similitudinem, qua in prouinciis arua publica coluntur (Ill. 3).

Ager est mensura conprehensus, cuius modus uniuersus ciuitati est adsignatus, sicut in Lusitania Salma n$\rangle$ ticensibus aut Hispania citeriore Pala $\langle\mathrm{n}\rangle$ tinis et in conpluribus prouinciis tributarium solum per uniuersitatem populis est definitum. eadem ratione et priuatorum agrorum mensurae aguntur (Ill. 4). hunc agrum multis locis mensores, quamuis extremum mensura conprehenderint, in formam in modum limitati condiderunt (Ill. 5).

Ager est arcifinius, qui nulla mensura continetur. finitur secundum antiquam obseruationem fluminibus, fossis, montibus, uiis, arboribus ante missis, aquarum diuergiis et si qua loca ante a possessore potuerunt optineri. nam ager arcifinius, sicut ait Varro, ab arcendis hostibus est appellatus: qui postea interuentu litium per ea loca quibus finit terminos accipere coepit. in his agris nullum ius subsiciuorum interuenit (III. 6).

Subsiciuum est, quod a subsecante linea nomen accepit [subsiciuum]. subsiciuorum genera sunt duo: unum quod in extremis adsignatorum agrorum finibus centuria expleri non potuit (Ill. 7); aliud genus subsiciuorum, quod in mediis adsignationibus et integris centuriis interuenit. quidquid enim inter IIII limites minus quam intra clusum est fuerit adsignatum, in hac remanet appellatione, ideo quod is modus, qui adsignationi superest, linea cludatur et subsecetur (Ill. 8). nam et reliquarum mensurarum actu quidquid inter normalem lineam et extremitatem interest subsiciuum appellamus (Ill. 9).

Est et ager similis subsiciuorum condicioni extra clusus et non adsignatus; qui si rei publicae populi Romani aut ipsius coloniae, cuius fine circumdatur, siue peregrinae urbis, aut locis sacris aut religiosis aeque ad populum Romanum pertinentibus datus non est, iure subsiciuorum in eius qui adsignare potuerit remanet potestate (IIl. 10).

[^42]
## JULIUS FRONTINUS ${ }^{1}$

## TYPES OF LAND ${ }^{2}$

There are three types of land: firstly, land that has been divided and allocated; secondly, land that has been contained in a survey throughout its extent; thirdly, land of uncertain boundary \{arcifinius\}, which is not contained in any survey.

Accordingly, land that has been divided and allocated is that belonging to colonies. This has two categories. In one, the land is generally contained within limites; in the other, the land has been allocated by means of the nearest straight line boundaries \{rigores\} of holdings, for example, in Campania at Suessa Aurunca (Sessa). ${ }^{3}$ Any land of this category bounded lengthwise is said to be by strigae, and any bounded breadthwise, by scamna. ${ }^{4}$ Land that has received limites is contained as illustrated ${ }^{5}$ within decumani and kardines. Land has been divided and allocated by strigae and scamna according to long-established custom, as illustrated, in the way in which public arable land in the provinces is cultivated.

Land has been contained in a survey whose entire area has been allocated to a community, as for example in Lusitania in the case of the people of Salmantica (Salamanca), or in Nearer Spain in the case of the people of Palentia (Palencia). Moreover, in some provinces land subject to tax has been defined for communities on the basis of its entire area. ${ }^{6}$ The land of private individuals is also surveyed on the same principle. In many places, surveyors, although they have included (only) its outer boundary in a survey, have entered this land on the map in the form of land that has received limites.

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 \{arbores ante missae\}, ${ }^{7}$ watersheds, and if by any chance places could be acquired by a landholder earlier (i.e. with properly recorded boundaries). 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. In this kind of land, rights relating to subseciva have no place.

Subsecivum is what has derived its name from the line that cuts it away $\{$ subseco $\}$. 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. For whenever the amount of land allocated was less than that enclosed within four limites, the name subsecivum is retained, because the area left over from the allocation is marked off and cut away by a line. ${ }^{8}$ In addition, in the conduct of other surveys (i.e. not involving centuriae) whatever land lies between right-angled lines and the outer boundary, we call subsecivum.

There is also land similar in status to subseciva, not enclosed and not allocated. If this land has not been granted to the res publica of the Roman people, or to that of the colony by whose territory it is surrounded, or of a native city, or to the sacred and religious places that also belong to the Roman people, by the law relating to subseciva it remains under the control of the person who has the right to allocate it. ${ }^{9}$
ager extra clusus est $\langle e t\rangle$ qui inter finitimam lineam et centurias interiacet；ideoque extra clusus，quia ultra limites finitima linea cludatur（Ill．11）．

## DE CONTROVERSIIS

Materiae controuersiarum sunt duae，finis et locus．harum alterutra continetur quidquid ex agro disconuenit．sed quoniam in his quoque partibus singulae controuersiae diuersas habent condiciones，proprie sunt nominandae．ut potui ergo conprehendere，genera sunt controuersiarum XV：de positione terminorum，de rigore， de fine，de loco，de modo，de proprietate，de possessione，de alluuione，de iure terri－ torii，de subsiciuis，de locis publicis，〈de locis relictis et extraclusis，，de locis sacris et religiosis，de aqua pluuia arcenda，de itineribus．

De positione terminorum controuersia est inter duos pluresue uicinos：inter duos， an rigore sit ceterorum siue ratione［s］；inter plures，trifinium faciat an quadrifinium． de horum positione cum constitit mensori，si secundum proximi temporis possessionem non conueniunt，diuersas attiguis possessoribus faciunt controuersias，et ab integro alius forte de loco alius de fine litigat（Ill．12）．

De rigore controuersia est finitimae condicionis，quotiens inter duos pluresue ter－ minos ordinatos siue quae alia signa secundum legem Mamiliam intra quinque pedes agitur（Ill．13）．

De fine similis est controuersia［nec dubium est quin supra de finis condicione dixerim］；nam et eadem lege continetur et de quinque pedum agitur latitudine，sed de fine，quidquid per flexus，quibus arcifinii agri continentur，ut per extrema 〈a〉rui aut promuntoria aut summa montium aut fluminum cursus aut locorum natura $\langle\mathrm{m}\rangle$ agitur quam supercilium appellant（Ill．14）．

De loco controuersia est，quidquid excedit supra scriptam latitudinem，cuius modus a［d］petente［m］non proponitur．haec autem controuersia frequenter in arcifiniis agris uariorum signorum demonstrationibus exercetur，ut fossis，fluminibus，arboribus ante missis，aut culturae discrimine（Ill．15）．

De modo controuersia est in agro adsignato：agitur enim de antiquorum nominum propria defensione；ut si $\mathbf{L}$ ．Titius dextra decimanum tertium，citra cardinem quartum，acceperit sortis suae partes tres siue quod huic simile，quartam habeat in quacumque proxima centuria：huic enim uniuersitati limes finem non facit，etiam si publico itineri seruiat．nam et in ceteris agris de modo fit controuersia，quotiens ［re］promissioni modus non quadrat（Ill．16）．

De proprietate controuersia est plerumque，〈quom〉 ut in Campania cultorum agrorum siluae absunt in montibus ultra quartum aut quintum forte uicinum． propterea proprietas ad quos fundos pertinere debeat disput［i］atur（Ill．17）．est et pas－ cuorum proprietas pertinens ad fundos，sed in commune；propter quod ea conpascua multis locis in Italia communia appellantur，quibusdam prouinciis pro indiuiso

[^43]Land not enclosed is 〈also〉 what lies between the（outer）boundary line and the centuriae；and it is called＇not enclosed＇because it is bounded by the（outer）bound－ ary line beyond the limites．

## LAND DISPUTES ${ }^{10}$

There are two causes of disputes：boundary and site．Any disagreement that arises from land is confined to one of these．But since even in these categories indi－ vidual disputes have different characteristics，each dispute must be specifically defined．As far as I have been able to establish，there are fifteen different types of dispute：the position of boundary markers，a straight line boundary \｛rigor\}, boundary，site，area，ownership（of land），possession（of land），alluvial land，territorial juris－ diction，subseciva，public places，places omitted and not enclosed，sacred and religious places，control of rain water，rights of way．

A dispute about the position of boundary markers arises between two or more neighbours；between two，it concerns whether a boundary marker fits into the line or the plan of the other markers；between more，it concerns whether the boundary marker makes a trifinium or a quadrifinium．When a surveyor is certain about the posi－ tion of these markers，if they do not tally with the most recent possession of the land， then they create various disputes between the adjoining landholders，and they go to law anew，one perhaps with regard to the site，another with regard to the boundary．

A dispute about a straight line $\{$ rigor $\}$ is of a character relating to a boundary whenever it is conducted between two or more co－ordinated boundary markers or any other indicators within five feet（of a boundary），under the Lex Mamilia．${ }^{11}$

As regards a boundary，there is a similar kind of dispute．${ }^{12}$ Indeed it is bound by the same law and the case is conducted in respect of a width of five feet．But bound－ ary disputes also occur by reason of the curving boundaries by which ager arcifinius is contained，such as the edges of cultivated land，or promontories，or mountain tops， or river beds，or that feature of terrain called a terrace $\{$ supercilium $\} .^{13}$

A dispute about site concerns whatever lies outside the width defined above（i．e． by the Lex Mamilia），whose area is not set out by the plaintiff．This kind of dispute is frequently conducted in ager arcifinius using the evidence of a variety of landmarks， like ditches，rivers，trees previously planted，or difference in cultivation．${ }^{14}$

A dispute about area arises in allocated land．For the claim is over a personal defence based on earlier titles．Consider this example：L．Titius received three portions of his allocation or something similar to this on the right－hand side of the third decumanus and on the near side of the fourth kardo，and has a fourth portion in some adjacent centuria．For this whole unit of property the limes does not establish a bound－ ary，even if it serves as a public right of way．Furthermore，in other types of land too， a dispute about area arises when the area does not match the terms of the under－ taking．${ }^{15}$

A dispute over ownership generally occurs 〈when〉，as for example in Campania， woods belonging to cultivated fields are separate，in the mountains，perhaps more than four or five neighbouring properties away．${ }^{16}$ Consequently，the dispute concerns which farms ought to have ownership of the woods．There is also the ownership of pasture land，which belongs to the farms but in common．Because of this，in many areas of Italy this pasture land is referred to as common \｛communia\}, and in some provinces
（Ill．18）．nam et per hereditates aut emptiones eius generis controuersiae fiunt，de quibus iure ordinario litigatur．

De possessione controuersia est，de qua ad interdictum，hoc est iure ordinario，lit－ igatur．

De alluuione fit controuersia fluminum infestatione．haec autem multas habet condiciones（figure lost）．

De iure territorii controuersia est de his quae ad ipsam urbem pertinent，［siue quod intra pomerium eius urbis erit，quod a priuatis operibus optineri non oportebit． eum dico locum quem nec ordo nullo iure a publico poterit amouere］．habet autem condiciones duas，unam urbani soli，alteram agrestis，quod in tutelam rei fuerit adsig－ natum urbanae；［urbani quod operibus publicis datum fuerit aut destinatum］．huius soli ius quamuis habita 〈o〉ratione diuus Augustus de statu municipiorum tractauerit， in proximas urbes peruenire dicitur，quarum ex uoluntate conditoris maxima pars finium coloniae est adtributa，aliqua portio moenium extremae perticae adsignatione inclusa；sicut in Piceno fertur Interamnatium Praetuttianorum quandam oppidi partem Asculanorum fine circum dari．［quod si ad haec reuertamur，hoc conciliabulum fuisse fertur et postea in municipii ius relatum］．nam non omnia antiqua municipia habent suum priuilegium．［quidquid enim ad coloniae municipiiue priuilegium pertinet，terri－ torii iuris appellant．sed si rationem appellationis huius tractemus，territorium est quidquid hostis terrendi causa constitutum est］．

De subsicivis controuersia est，quotiens aliqua pars centuriae siue tota non est adsignata et possidetur．aut quidquid de extremitate perticae possessor proximus aliusue detinebit，ad subsiciuorum controuersiam pertinebit（III．19）．

De locis publicis siue populi Romani siue coloniarum municipiorumue con－ trouersia est，quotiens ea loca，quae neque adsignata neque uendita fuerint 〈um〉quam， aliquis possederit；ut alueum fluminis ueterem populi Romani，quem uis aquae inter－ posita insula exclusae proximi possessoris finibus reliquerit；aut siluas，quas ad popu－ lum Romanum multis locis pertinere ex ueteribus instrumentis cognoscimus，ut ex proximo in Sabinis in monte Mutela（Ill．20）．nam et coloniarum aut municipiorum similis est condicio，quotiens loca，quae rei publicae data adsignata fuerint，ab aliis obtinebuntur，ut subsiciua concessa（Ill．21）．

De locis relictis et extraclusis controuersia est in agris adsignatis．relicta autem loca sunt，quae siue locorum iniquitate siue arbitrio conditoris［relicta］limites non acceperunt．haec sunt iuris subsiciuorum（Ill．22）．extraclusa loca sunt aeque iuris subsiciuorum，quae ultra limites et intra finitimam lineam erint；finitima autem linea aut mensuralis est aut aliqua obseruatione aut terminorum ordine seruatur．multis

[^44]as equivalent to undivided land \{pro indiviso $\}.{ }^{17}$ Inheritance or purchase also lead to disputes of this kind, which are conducted under the process of civil law.

A dispute over possession of land is conducted with reference to the interdictum, that is, under the normal legal process.

A dispute over alluvial land occurs because of the harmful action of rivers. This dispute has many different characteristics.

A dispute about territorial jurisdiction concerns areas that belong to a town itself, [including anything inside the formal boundary \{pomerium\} of that town which should not be occupied by private buildings. I refer to that place which not even the town council should be able by any legal means to remove from public ownership.] Now (the dispute) has two categories; one relates to land in the town, the other to land in the countryside, which was allocated to the town to support the urban fabric. [Land in the town is that which was granted or set aside for public buildings.] Although the divine Augustus in a speech delivered about the status of municipia dealt with the question of rights over this land (i.e. both types above), these rights are sometimes regarded as extending in scope to include the nearest towns, the greatest part of whose territory in accordance with the founder's wishes was allocated to a colony, and some part of whose walls was included in the allocation of the most distant part of its land. This is said to have occurred in Picenum when part of the town of Interamnia Praetuttiorum (Teramo) was surrounded by the territory of Asculum (Ascoli Piceno). [Indeed to revert to this point, this is said to have been a conciliabulum, and later to have been granted the status of a municipium.] Not all the old municipia have their own special rights. [For whatever relates to the special right of a colony or municipium, they describe as part of its territorial jurisdiction. Though if we examine the reasoning behind this term, a territory is something established for the purpose of terrifying the enemy. ${ }^{18}$

A dispute over subseciva occurs when some or all of a centuria has not been allocated and is possessed. Or if an adjacent landholder or someone else occupies any land from the edge of the allocated area, this also comes under disputes involving subseciva.

A dispute concerning public places belonging either to the Roman people, or a colony, or a municipium, occurs when someone takes possession of these places, which have never been allocated or sold. For example: an old river bed belonging to the Roman people, which the current, forced out of its course by an island in the way, has added to the land of the nearest landholder; or forests, which in many places we know from ancient records to belong to the Roman people, for example, nearby in the territory of the Sabines at Mount Mutela. ${ }^{19}$ Similar considerations apply to colonies and municipia whenever places that have been given and allocated to the community are taken over by others, as if they were subseciva granted (to them).

A dispute concerning places that have been left out and not enclosed occurs in allocated lands. Places left out are those which, because of the roughness of the terrain or through a decision of the founder, did not receive limites. These come under the law relating to subseciva. Places not enclosed, which also come under the law relating to subseciva, are those that lie beyond the limites and inside the boundary line (of the whole survey). This boundary line is either measured or marked out by some observed feature or a line of boundary stones. Indeed in many areas a huge quantity
enim locis adsignationi agrorum inmanitas superfuit，sicut in Lusitania finibus Augustinorum．

De locis sacris et religiosis controuersiae plurimae nascuntur，quae iure ordinario finiuntur，nisi si de locorum eorum modo agitur；ut lucorum publicorum in montibus aut aedium，quibus secundum instrumentum fines restituuntur；similiter locorum rel－ igiosorum，quibus secundum cautiones modus est restituendus．habent enim et moe－ silea iuris sui hortorum modos circum iacentes aut praescriptum agri finem．

De aquae pluuiae transitu controuersia est，in qua si collectus pluuialis aquae transuersum secans finem in alterius fundum influit，et disconuenit，ad ius ordinarium pertinebit：quod si per ordinationem finis ipsius agitur，exigit mensoris interuentum［et controuersia tollitur］．

De itineribus controuersia est quae in arcifiniis agris iure ordinario finitur，in assignatis mensurarum ratione．omnes enim limites secundum legem colonicam itineri publico seruire debent：sed multi exigente ratione per cliuia et confragosa loca eunt， qua iter fieri non potest，et sunt in usu agrorum eorum locorum，ubi proximus pos－ sessor［est］，cuius forte silua limitem detinet，transitum inuerecunde denegat，cum itineri limitem aut locum limitis debeat（Ill．23）．

Est et controuersiae genus quod ad solum non pertinet，de arborum fructibus， earum quae in fine sunt siue intra，nec ullam ad radicem habent controuersiam，quo－ tiens inclinatae in alterutram partem fructum iactauerunt，inter adfines mouent dispu－ tationem（IIl．24）．

## 〈DE LIMITIBVS〉

Limitum prima origo，sicut Varro descripsit，a［d］disciplina［m］Etrusca［m］；quod aruspices orbem terrarum in duas partes diuiserunt，dextram appellauerunt 〈quae〉 septentrioni subiacere $\langle t\rangle$ ，sinistram quae a meridiano terra $\langle\mathrm{e}\rangle$ esse $\langle\mathrm{t}\rangle\langle\mathrm{ab}$ oriente ad〉 occasum，quot eo sol et luna spectaret，sicut quidam †carpiunt architecti delubra in occidente $\langle\mathrm{m}\rangle$ recte spectare scripserunt．aruspices altera［m］linea［m］a septentrione ad meridianum diuiserunt terram，〈et〉 a me［ri］dia［no］ultra antica，citra postica nom－ inauerunt．

Ab hoc fundamento maiores nostri in agrorum mensura uidentur constituisse rationem．primum duo limites duxerunt；unum $a b$ oriente in occasum，quem uocauerunt decimanum；alterum a meridiano ad septentrionem，quem cardinem appel－ lauerunt．decimanus autem diuidebat agrum dextra et sinistra，cardo citra et ultra．

Quare decimanus a decem potius quam a duobus，cum omnis ager eo fine in duas diuidatur partes？ut duopondium［et duouiginti］quod dicebant antiqui，nunc dicitur dipondium［et uiginti］，sic etiam duo［de］cimanus decimanus est factus（Ill．25）．Kardo nominatur quod directus a kardine［m］caeli est．［nam sine dubio caelum uertitur in septentrionali orbe］．
of land was left over from the allocation of plots，for example，in Lusitania in the ter－ ritory of the colonists of Augusta Emerita（Mérida）．${ }^{20}$

Innumerable disputes arise concerning sacred and religious places．These are decided under the normal legal process，unless the dispute also concerns the area of the places involved，for example，in the case of public groves on mountains，or temples to which land is being restored according to the foundation document，and similarly in the case of religious places whose area has to be restored according to the relevant provisions．In addition，tombs include within their legal control the gardens sur－ rounding them，or a designated domain．${ }^{21}$

There is a dispute concerning the passage of rain water，which，if accumulated rain water cuts across a boundary，floods into a neighbour＇s farm，and causes dis－ agreement，will belong to the normal legal process．${ }^{22}$ However if the dispute involves the alignment of the boundary itself，it requires the intervention of a land surveyor， ［and the dispute is settled］．

A dispute concerning rights of way，which is dealt with by the normal legal process in ager arcifinius，in allocated lands requires surveying skills．For according to the law of a colony all limites ought to serve as public rights of way．${ }^{23}$ But many limites，because of the demands of the overall plan，run through uneven or woody areas，which are impassable for a road，and are indeed used as fields in those places where an adjacent landholder，whose wood perhaps occupies a limes，impudently pre－ vents passage，although he ought to provide a limes or its equivalent width for a right of way．

One category of dispute which has nothing to do with land，relates to the pro－ duce of fruit trees that stand on a boundary or just inside．There is no dispute in respect of their roots，but when the trees overhang and drop their fruit on the other side（of a boundary），they cause disputes between neighbours．

$$
\langle\text { LIMITES }\rangle^{24}
$$

Varro ascribes the origins of limites to Etruscan learning，in that soothsayers divided the world into two parts：looking 〈from east to〉 west because the sun and the moon faced in that direction，they called＇right＇that area 〈which〉 lay in the north and ＇left＇that which lay in the south；similarly some $\dagger \ldots \dagger$ architects have noted that tem－ ples should correctly face west．The soothsayers divided the land with another line from north to south，and，looking from the middle，the far side of the line they called ＇antica＇，the near side＇postica＇．${ }^{25}$

From this basis our ancestors seem to have worked out a methodology of land measurement．First they established two limites，one stretching from east to west， which they called the decumanus，the other stretching from south to north，which they called the kardo．So，the decumanus divided the land into＇right＇and＇left＇，the kardo into＇this side of＇and＇beyond＇．

Why therefore is decumanus derived from ten $\{$ decem $\}$ and not two，since by this line all the land is divided up into two parts？Our ancestors spoke of duopondium and this in modern parlance has become dipondium（a sum of two asses or a length of two feet）．In the same way what was once referred to as duocimanus has now become decumanus（or decimanus）．The kardo gets its name because it is drawn from the pivot of the universe．［Without doubt the universe turns on the northern part of the earth．］${ }^{26}$

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Postea hoc ignorantes non nulli aliud secuti，ut quidam agri magnitudinem，qui qua longior erat，fecerunt decumanum．quidam non ortum spectant，sed ita aduersi sunt，ut sint contra septentrionem；ut in agro Campano qui est circa Capuam，ubi est kardo in oriente $\langle\mathrm{m}\rangle$ et decumanus in meridianum（IIl．26）．

Ab his duobus omnes agri partes nominantur．reliqui limites fiebant angustiores et inter se distabant par $[t]$ ibus interuallis．qui spectabant in oriente $\langle\mathrm{m}\rangle$ ，dicebant pror－ sos：qui dirigebant in meridianum，dicebant［et］transuersos．

Haec uocabula in lege，quae est in agro Vritano in Gallia，item in quibusdam locis adhuc permanere dicuntur（Ill．27）．limites autem appellati transuersi $s\langle u n t\rangle$ a limo，［id est］antiquo uerbo［transgressa］；a quo dicunt poetae＇limis oculis＇；item limum cinc－ tum，quod purpuram transuersam habeat，et limina ostiorum．alii et prorsos et tran－ suersos dicunt limites a liminibus，quod per eos in agro intro et foras eatur．hi ab incolis uariis ac dissimilibus uocabulis a caeli regione aut a loci natura sunt cognom－ inati：in alio loco sicut in Vmbria circa Fanum Fortunae，qui ad mare spectant mar－ itimos appellant，alibi qui ad monte $\langle\mathrm{m}\rangle$ montanos（Ill．28）．

Primum agri modum fecerunt quattuor limitibus clausum［figuram similem：］， plerumque cent＜en〉um pedum in utraque parte（quod $\mathrm{Gr}\langle$ 人 $\rangle$ eci plethron appellant，Osci et Vmbri uorsum），nostri centenum et uicenum in utraque parte；cuius ex iIII unum latus，sicut diei XII horas，XII menses anni，XII decempedas esse uoluerunt．IV actibus conclusum locum primum appellatum dicunt fundum（IIl．29）．Hi duo fundi iuncti iugerum definiunt．deinde haec duo iugera iuncta in unum quadratum agrum effici－ unt，quod sint in omnes partes actus bini in hunc modum（Ill．30）．quidam primum appellatum dicunt sortem et centies ductum centuria $\langle\mathrm{m}\rangle$ ．sunt qui centuriam maiorem modum appellant，ut Cremonae denum et ducenum．sunt qui minorem，ut in Italia tri－ umuirale $\langle\mathbf{m}\rangle$ iugerum quinquagenum．nam et omnes in subsiciuis extremae centuriae， quae non sunt quadratae，in eadem permanent appellatione．

Optima［e］ergo ac rationalis agrorum constitutio est，cuius decimani ab oriente in occidentem diriguntur，kardines a meridiano in septentrionem．

Multi mobilem solis ortum et occasum secuti uariarunt hanc rationem．sic uti〈que〉 effectum est，ut decimani spectarent ex qua parte sol eo tempore，quo men－ sura acta est，oriebatur．et multi，ne proximae coloniae limitibus ordinatos limites mit－ terent，exacta conuersione di $\langle s\rangle c r e u e r u n t$ ．et sic per totum orbem terrarum est unaquaeque limitum constitutio，ubi proxima ．．．（Ill．31）．

Sunt et aliae limitum condiciones，quae ad solum non pertinent［，hoc est ad artem nostram］．solum autem quodcumque coloniae est adsignatum，id uniuersum per－ tica appellatur：quidquid huic uniuersitati adplicitum est ex alterius ciuitatis fine，［siue

[^45]Subsequently several（surveyors），in ignorance of this fact，followed another approach，for example，the dimensions of the land，and established the decumanus where it was longer．Some do not face the east but have turned so that they face north， for example，in the ager Campanus in the area of Capua，where the kardo faces east and the decumanus south．${ }^{27}$

From these two basic lines all sections of the land get their names．The remain－ ing limites were made narrower and were equidistant from one another．The limites facing east they called＇straight ahead＇$\{$ prorsi $\}$ ，while those running south they called ＇transverse＇$\{$ transversi $\}$ ．

This terminology is said still to persist in the law which is in force in Gaul in the ager Uritanus，and in several other places．${ }^{28}$ Now，limites transversi were called after the ancient word limus（oblique）．Poets use this meaning in the phrase＇with a side－ long glance＇．Similarly，there is the garment known as limus cinctus，which has a purple stripe running across it．Moreover there is the threshold \｛limen\} of a doorway. Some argue that both straight ahead and transverse limites are derived from thresholds because we enter or leave a field by way of them．These（limites）have been given dif－ ferent and multifarious names by local inhabitants，after a region of the heavens or a natural feature．In another locality，for example，in Umbria in the vicinity of Fanum Fortunae（Fano），they call limites facing the sea＇maritime＇\｛maritimi\}, and elsewhere those facing a mountain＇belonging to the mountain＇\｛montani\}. ${ }^{29}$

Firstly they enclosed an area of land within four limites usually of one hundred feet in both directions，which the Greeks call a plethron，the Oscans and Umbrians a vorsus．In our day they employ dimensions of 120 feet by 120 feet．They wanted one of the four sides to consist of twelve ten－foot measurements，just as there are twelve divisions in the day and twelve months in the year．The area enclosed by four actus they say was first called a fundus．Two of these units joined together make a iugerum． Then two of these iugera joined together make a piece of land which is square，because its dimensions on all sides consist of two actus（ 240 feet），like this．Some people say that the first unit is called an＇allocation＇\｛sors\} and, multiplied one hundred times, a centuria．Indeed there are some who give the name centuria to a bigger area，for example，at Cremona where it contains 210 iugera．Others attribute the word to a smaller area，for example，in Italy centuriae established by triumvirs have fifty iugera．${ }^{30}$ Also，all the outer centuriae which are not square－shaped and lie among subseciva，are nevertheless still called centuriae．

The best division of land based on rational principles is achieved by directing the decumani from east to west and the kardines from south to north．

Many have followed the variable rising and setting of the sun and altered this principle．Indeed they have arranged it so that the decumani faced from the part（of the heavens）where the sun was rising at the time when the survey was carried out． Moreover，many surveyors，in order to avoid aligning their limites with those of the nearest colony，effected a complete reversal and then established boundaries（i．e．they reversed the orientation）．Thus throughout the entire world there is an individual establishment of limites，where 〈it is〉 nearest ．．．

There are other characteristics of limites，which are not relevant to land，［that is， to our skill］（of surveying）．Now，whatever land has been allocated to a colony is in its entirety called pertica；whatever is added to this entire piece of land from the
solidum siue cultellatum fuerit，］praefectura appellatur（IIl．32）．

## 〈DE ARTE MENSORIA〉

Principium artis mensoriae in agendi［s］positum est experimento．exprimi enim locorum aut modi ueritas sine rationa［bi］libus lineis non potest，quoniam omnium agrorum extremitas flexuosa et inaequali［s］cluditur finitione，quae propter angulorum dissimilium multitudinem numeris suis manentibus et cohiberi potest et extendi：nam soli mobile［m］habent spatium et incertam iugerum enuntiationem．sed ut omnibus extremitatibus species sua constet et intra clusi modus enuntietur，agrum quo usque loci positio permittet rectis lineis dimetiemur：ex quibus proximam quamque extremi－ tatium obliquitatem per omnes angulos facta normatione conplectimur，et coh $\langle a\rangle$ er－ entem mensuralibus statutis certo praecenturiato spatio simile $\langle m\rangle$ futurae tradimus formae：modum autem intra lineas clusum rectorum angulorum ratione subducimus． subiectas deinde extremitatium partes，ad rec $\left\langle\right.$ ta ${ }^{2}$ tangentium nostrarum postula－ tionum，podismis suis ad〈a〉eramus，et adscriptis spatio suo finibus ipsam loci red－ dimus ueritatem．

Haec ubique una ratione fieri multiplex locorum natura non patitur，oppositis ex alia parte montibus，alia flumine aut ripis aut quadam iacentis soli uoragine，cum pluribus confragosorum locorum iniquitatibus，saepe et culturis，propter quae maxime ad artis copia $\langle\mathrm{m}\rangle$ est recurrendum．debet enim minima quaeque pars agri in potestate esse mensoris et habit［ur］a rectorum angulorum ratione sua postulatione constringi． itaque maxime prouidere debemus，quo usu ferramenti quidquid occurrerit transea－ mus；adhibere deinde metiundi diligentiam，qua［e］potius actus incessus limitationis effectum laterum longitudine［s］aequ［e］et；ferramento primo ut $\langle\mathrm{i}\rangle$ et omnia momenta perpenso dirigere，oculo ex omnibus corniculis extensa ponderibus et inter se conparata fila seu neruias ita perspicere，donec proxima $\langle\mathrm{m}\rangle$ consumpto alterius uisu solam intuea－ tur；tunc dictare moetas，et easdem transposito interim extrema meta ferramento re－ prehendere eodem momento quo tenebatur，et coeptum rigorem ad interuersuram aut ad finem perducere．omnibus autem interuersuris tetrantis locum perpendiculus osten－ dat．

Cuiuscumque loci mensura agenda fuerit，eum circumire ante omnia oportet，et ad omnes angulos signa ponere，quae normaliter ex rigore cogantur；posito deinde et perpenso ferramento rigorem secundum proximo lateri dictare，et moetis conlocatis respectis in alteram partem rigorem mittere，qui，cum ad extremum peruenerit，paral－ lelon primi rigoris excipiat．
territory of another community，［either unbroken ground or ground that has required levelling］，is called a praefectura．${ }^{31}$

## 〈THE SCIENCE OF LAND MEASUREMENT〉 ${ }^{32}$

The foundation of the science of land measurement lies in practical experience， since the truth about sites or area cannot be expressed without lines that can be geo－ metrically measured．For the perimeter of all land is defined by a curving and uneven boundary，which，because of its large number of angles of different sizes，can be reduced or extended while the complement of angles remains the same；moreover，they （the angles）have a variable area of land and no clear specification of the number of iugera enclosed．${ }^{33}$ But in order that，in the case of all perimeters，the type of each should be settled and the area of enclosed land specified，we shall measure the land with straight lines as far as the lie of the site permits：starting out from these we embrace each successive，irregular perimeter by dropping a perpendicular to each cor－ ner；then we transfer to the intended map（each irregular perimeter）expressed in fixed elements of measurement，as if it were a clear rectangular area：we calculate the area enclosed inside the lines by a measurement based on right angles．We then calculate， with their dimensions in feet，the attached parts of the perimeters that join the straight lines of our（first stage）of calculation，and when the boundaries have been assigned their proper area，we produce a true account of the site．${ }^{34}$

The many different types of terrain mean that this approach cannot be univer－ sally applied in the same way，since in one spot there might be mountains in the way，in another a river or embankments or a quagmire，with frequent unevennesses in broken ground，often also areas of cultivated land，as a result of which we must have recourse particularly to our professional skill．For every piece of land，even the smallest，ought to be within the capabilities of the surveyor，and to be enclosed on the basis of the appropriate hypothesis with the application of the principle of right angles．Therefore we especially ought to consider in advance how we may use the ferramentum to surmount whatever we come across；then we must exhibit the great－ est care in measuring，especially so as to ensure that the execution of the course of this measuring may co－ordinate the results from the sides with the length．${ }^{35}$ We must first use the ferramentum，and aim with it when it has been carefully balanced in respect of every movement，and sight from every projection along the threads or strings，when they have been made taut by weights and aligned with one another， until one sees the closest alone，while the next disappears from the field of vision．${ }^{36}$ Then we should fix the marks $\{$ metae $\}$ ，and pick them up in turn，having meanwhile moved the ferramentum from the last mark，and，keeping it in the same position as it was before，continue the straight line we have begun up to a turn or up to the end．At all turns let the plumb line（of the ferramentum）indicate the point of inter－ section．

When any site has to be surveyed，first of all the surveyor should make a circuit and at all angles place markers，which are to be joined up at right angles by means of a straight line $\{$ rigor $\}$ ；when the ferramentum has been positioned and balanced he should fix a second rigor on the next side；when the marks have been positioned and back－checked he should draw a rigor on the other side，which when it has reached its end（i．e．its mark）should constitute a line parallel to the first rigor．${ }^{37}$

Sed si in rigore dictando quaedam deuitanda incurrunt，ualles，loca confragosa， arbores quas propter moram aut fructum succidere non oportet，item aedificia，mace－ riae，petrae aut montes et his similia，haec quacumque ratione optime poterint men－ suram accipere debebunt．

Si fuerit ergo uallis quae conspectum agentis exsuperet，per ipsam moetis ad fer－ ramentum adpositis erit descendendum．cuius rigoris incessum ut sescontrario aeque－ mus，adf［l］icta ante linea ad capitulum perticae aequaliter ad perpendiculum cultellare debemus，tum permensum rigorem extendere linea in qua cultellatum locum perpen－ diculus adsigna［n］t．nam quotiens sine linea cultellamus，〈cum〉 conspectum moetarum excedimus，et festinantes ex eo loco iterum rigorem conspicimus，tunc in illa perti－ carum quamuis exigua conuersione non minus fit dispendi quam si iacent［ia］．

〈Ali〉quam conpressiorem autem uallem et ultra quam prospici poterit euadendae difficultatis causa lic〈et〉 transire，in ulteriorem partem dictare moetas ne minus tres， quibus reprehensis transposito ferramento respicere priores oporteat，et perpenso coep－ tum rigorem quo usque res exegerit perducere．

Cultellandi ratio quae sit，saepe quaeritur，cum propensi soli spatium consumma－ mus，ut illam cliuorum inaequalitatem planam esse cogamus，dum mensurae lateribus inseruimus（Ill．33）；［cultellamus ergo agrum eminentiorem et ad planitiae redigimus aequalitatem］．hanc nobis ipsa seminum natura monstrauit：omnis enim illa soli inae－ qualitas re colligi non poterit，nisi quod e terra quidquid nascitur in aëre rectum ex［t］istit et illam terrae obliquitatem crescendo adterit，nec maiorem numerum occu－ pat quam si ex plano nascatur．quod si monti ordinata semina nascerentur omnia， secundum loci naturam metiremur：cum non idem，hoc est totidem arborum ordines， capiat，quod pares ei［us］in campo limites，recte cultellabitur．

But if in fixing a rigor, several obstacles intrude that need to be avoided valleys, broken ground, trees that should not be cut down because of the consequent delay or because of the fruit they produce, also buildings, dry-stone walls, rocks, or mountains and similar things, all these ought to be surveyed in the best way possible.

In the case of a valley which is too big for a surveyor to see across, he will have to go down through it by fixing markers according to the ferramentum. In order that we may co-ordinate the course of the rigor with its opposite number (on the other side of the valley), when a cord $\{$ linea $\}$ has been first attached to the top of the measuring rod \{pertica\} we must measure the horizontal distance consistently with the perpendicular and extend the measured rigor with the help of the cord, on which the plumb-line indicates each levelled segment (i.e. where the horizontal distance had been measured). For whenever we measure horizontal distances without a cord, when we lose sight of the markers, and then as we hurry from the spot, catch sight of the rigor again, in that shift in the alignment of the measuring rods, even though it is small, there is just as much distortion as if they are lying flat on the ground. ${ }^{38}$

Now, in the case of a narrower valley to the farther side of which a surveyor can sight, in order to deal with any problem, he can cross over to the other side and fix at least three markers. When these have been picked up again after the ferramentum has been transported across, he should back-sight the markers fixed earlier and, with it (the ferramentum) carefully balanced, extend as far as the situation requires the rigor that has been begun. ${ }^{39}$

It is often asked what are the principles of measuring horizontally \{cultellatio\} when we are calculating the extent of sloping ground, so that we can reduce its uneven slopes to the horizontal while we are including it in the units of a survey. [Therefore, we measure horizontal distances across projecting land and reduce it to the levelness of a flat surface.] The nature of plants shows us this (principle). For all this uneven ground could not in fact be calculated but for the fact that whatever grows from the earth comes up straight into the air and by growing compensates for the ground's slope, and does not occupy a greater space than it would if it were growing from level ground. If all plants grew in alignment with a mountain, we could measure according to the nature of the terrain. Since this (i.e. the mountain) does not contain the same, that is, as many rows of trees as equivalent limites on level ground, we shall be right in measuring horizontally. ${ }^{40}$

## AGENNI VRBICI

DE CONTROVERSIIS AGRORVM

aduersantur，ne quid in rerum natura finitum esse uideatur．ac si rationis actum uniuersaliter adprehendere［t］proponimus，ut ab initio quodam ad certa $\langle\mathrm{m}\rangle$ finium dispositionem procedit et exigit ornatum，silentio transire neque $o$ ．

Si enim uox，quam uaria uerborum significatione［m］diuidimus，naturalis est，uerborum significatio naturaliter sui exigit institutionem．ipsa quoque litterarum initia necessariam habent substitutionem．nisi enim constet linearum illam figurationem capere nomen et esse aliquid， itemque similiter certas uocis distinctiones certa significatione seruari，numquam scripturae ullius ordo ad notitiam mentis admittetur．et si ad numeros respiciamus et non putemus esse unum neque duo pluraue，〈et〉 a primo ad secundum tertiumque distantias non substituamus， nullius ordinis modo＜numero〉rum rationalium gradus distinguamus．$\langle\mathrm{s}\rangle$ et quid pluribus fatiga－ mur exemplis？si ad rationem homo pertinet，et rationis nexus humana tangitur prouidentia，ad quam puta［n］tur peruenire ne quidem institutus quisquam mortalium potuisse，de contrario falsa persuasione decipimur，et naturaliter inesse nobis etiam sapientiam credimus．custos est disciplina，nisi fallor，infantia〈e $\rangle$ ：quae cum ita naturalia ad notitiam mentis admittit［ur］，［a］ut sint，in quae dirigi possi［u］t animus，alia procul et semotior $\langle\mathrm{e}\rangle$ ratione［m］continet［ur］；ad quae cognoscenda ne uulgaribus abducamur opinionibus，ratio non deerit．

Ac $\langle\mathrm{si}\rangle$ instituamus adposita $\langle\mathrm{s}\rangle$ disputationes in trac $\langle\mathrm{ta}\rangle$ tum aut ordine［m］persequamur， quam multa praecedunt，quibus ad hanc disputand $a m$ materia $\langle\mathrm{m}\rangle$ instrui debeamus！tali enim operatione［m］naturae regimur，ut uniuersa，ad quae pertinemus aut quae ad nos pertinent，sen－ sibus nostris uelut confusa offerantur ipsa［quo］que animi $\langle\mathrm{s}\rangle$ didicerimus dinoscere，quid quod id ipsum，quod quid est a $\langle u t\rangle$ quale，prius qua $\langle\mathrm{da}\rangle \mathrm{m}$ in parte uidemus，nec statim totam partis proprietatem cernimus，nisi in singulas portiones auocatum undique uisum direximus，ut relicta

# AGENNIUS URBICUS ${ }^{1}$ 

LAND DISPUTES

they are opposed, in order that nothing in the natural world may appear capable of being brought under control. And if we propose to obtain complete understanding of the act of Reason, I am unable to pass over in silence how from a particular beginning it proceeds to a clear disposition of objectives and requires preparation. ${ }^{2}$

If speech, which we distinguish through the different meaning of words, is a natural thing, the meaning of words naturally requires its own system. Likewise, even the beginnings of writing involve a link between signified and signifier (they must be written consistently). For unless it is agreed that a particular arrangement of lines (in a letter) has a name and actually is something (a letter of the alphabet), and similarly that the distinctive variations in speech have a definite meaning, never will the coherence of any act of writing be grasped by the mind. Moreover, if we look at numbers and do not recognize that there is a number One, or a number Two or more, and do not adopt the differences between the first and the second, and the third, we cannot establish in any kind of order the position of consistent numbers. But is there any need to tire ourselves out with further examples? If man has an affinity with Reason, and the whole juncture of Reason (and man) is touched by human Providence (i.e. Providence looks after mankind), to which it is reckoned that no mortal man, even one who has been well-educated, can attain, (it follows that) on the other hand it is by false ideas that we are deceived into believing that wisdom is naturally inherent within us. Unless I am mistaken, disciplined training is the guardian of childhood; it admits natural things to the understanding of the mind in such a way that (we realize that) there are things to which the mind can be directed, while it keeps other things far off and characterized by more recondite reasoning. The reasoning process will not fail us for the understanding of these things and for ensuring that we are not diverted by common opinions. ${ }^{3}$

If we introduce related discussions into our treatment of the subject and examine them in order, very many preliminaries are necessary, with which we ought to be equipped for the discussion of this material! For we are subject to the working of nature in such a way that all things with which we have an affinity, or which have an affinity with us, are offered to our senses in a rather confused way, and we have learned to distinguish these very things with our minds. As to the nature of any one thing, namely, what it is and what its substance is, we see this first in some part of it, but do not immediately discern the entire character of the part, unless we have directed our gaze, turned away from the wide view, to individual aspects, so that by leaving aside our preoccupation with total size, the mind may be gradually led to an
magnitudinis occupatione paulatim ad notitiam rei animus inducatur．eadem ratione etiam ceterae intellectus qualitates tenentur．per quas 〈ad〉 aliud opus festinantibus satis dilucid $a$ exis－ tit probatio，capacitatem rerum generi humano esse concessam，quarum multitudine［m］onera－ mur．at in uniuersa distringimur，ut ad certa et electa nisi elaborato studiorum iudicio peruenire nequeamus．ut enim nec ferrum 〈in〉 genere secare potest，nisi ad secandum habilem acceperit figuram，sic animus naturalium capax rerum，nisi certo disciplinae ordine［m］a〈di〉utus， subtilioribus indiget argumentis．quam ob rem inter praecipua honestarum amore artium conpun（g）ere animum et bonae mentis instrumentis fundare debemus．si quidem secundum cognitas mihi artes huius partis si［n］t aut experimenti copia，perferendi quoque suffeceri［n］t facultas，poterit labor［ar］i nostro non inter minim〈ar〉um utilitatium profectus locus uindicari．

Quoniam itaque de controuersiis meminimus agrorum，hae quot partibus dividantur et in quot genera possessionum aut quas habea〈n〉t qualitates，tractemus．

Quom autem quaerendum uideatur，quid sit ager et ubi sit，ad ordinem mundi partesque reuocamur．mundus autem，uti［n］Stoici decer〈n〉unt，unus esse intelligitur：sed qualis quantus， geometricis spectaminibus aperitur．eo enim elementorum natura terrae aequilibratur．huius ter－ rae pars die［i］fulget，pars nocte fuscatur．diuiditur，ut supra diximus，in quattuor partes． quarum una inter Atlanticum et e（o〉um mare meridiano ac septentrionali clauditur Oceano， habitabilis atque cognita：appellatur a Graecis oecumene．reliqu $\langle a e$ ig）itur habitabilis ratione colliguntur．contraria autem pars parti 〈isti〉 finitur Oceano Atlantico atque eoo et inter merid－ ianum et australem cohibetur Oceanum：appellatur ant $\langle 0\rangle$ ecumene．post Oceanum septentri－ onalem atque australem duae terreni partes meridiano diffinduntur Oceano：quarum Graeci austro prop［r］iorem antictonon（i．e．áv $\left.\nu \iota \chi \vartheta \begin{array}{l}o ́ v \\ \nu \\ \nu\end{array}\right)$ appellauerunt；alteram prop［r］iorem septen－ trioni antipodon（i．e．à $\nu \tau \iota \pi o ́ \delta \omega \nu$ ），quoniam emisperiou aliud latus optinet et ad rationem hab－ itabilis $\langle\mathrm{t}\rangle$ etartemorii contrariis ambulantium gressibus premit［tit］ur．〈o〉ecumene autem，hoc est habitabilis et cognita terreni portio，ad notitiam spatiorum incrementis redigitur umbrarum． huius latitudinem definit orientis occidentisque dimensio，altitudine $\langle\mathrm{m}\rangle$ septentrionalis facit kardo：intra haec spatia termina［n］tur utroque Oceano．tripertita region $u$ m diuisione［m］distin－ guitur，Europa Libya atque Asia．Europam a Libya Gallicum Tyr（r）enum Egeum，hoc est intestinum，mare diuidit，Asia $\langle\mathrm{m}\rangle$ ab Europa $\langle\mathrm{Ta}\rangle$ nais，a Lib $\langle$ ya Nilus．ex his argument）aliter inclinamentorum condicio cognoscet〈ur〉，intra quae ager imperii Romani spatioso fine diffun－ ditur，cuius controuersias generaliter exsequi proposuimus．

Ager est $\dagger$ finiruris
non praetermittimus nomina consent $(\mathbb{i})$ entia condicionibus possessionum．
understanding of the thing. By the same reasoning also, other facets of the understanding are grasped. There is a sufficiently clear demonstration for those hastening on to some other task by means of these facets, that a capacity for understanding things has been granted to mankind, things whose sheer quantity is a burden to us. But we are distracted into (trying to understand) everything, with the result that we are unable to accomplish specific and chosen things except through careful use of study. So, just as iron by its nature is not able to cut unless it has received a shape suitable for cutting, similarly the mind, which has the capacity to understand the natural universe, will lack the more subtle reasoning processes unless it is assisted by a fixed, disciplined order. Therefore, above all we must stimulate our mind with a love of noble arts and strengthen it with the instruments of a sound intellect. If through the skills known to me I should have a supply of examples for dealing with this subject, and if I should also have the capacity for carrying on with it, through my work I shall be able to lay claim to a position marked by the usefulness of its achievements.

Since we are discussing land disputes, we shall treat the number of groups and the number of kinds of landholding into which they are divided, and the types they have.

Since it seems right that we should enquire what land is and where it is, we are recalled to the disposition and parts of the universe. The universe, as the Stoics declare, is deemed to be one, but its nature and size are revealed by the observations of geometry. For this is how the nature of the elements is maintained in equilibrium with the earth. Part of this earth gleams with daylight while part is obscured by night. It is divided, as I said above, into four parts, of which one is enclosed between the Atlantic and the eastern sea by the equatorial and northern Ocean; it is inhabitable and is known, and is called by the Greeks the 'occupied place' \{oecumene\}. The remaining parts are therefore defined on the basis of the extent to which they are inhabitable. The part opposite that one (i.e. the oecumene) is bounded by the Atlantic Ocean and the eastern sea and is contained within the equatorial and southern Ocean. It is called antoecumene. Beyond the northern and the southern Ocean, two (further) parts of the earth are divided by the equatorial Ocean. Of these, the Greeks gave the name antictonon to the one closer to the south, and to the other, closer to the north, the name antipodon, ${ }^{4}$ since it occupies the other side of the hemisphere, and is pressed upon by the footsteps of those walking on the other side in the manner of an inhabited quarter. The oecumene, that is, the inhabitable and known part of the earth, is brought within our knowledge of distance by the lengthening of shadows. ${ }^{5}$ The measurement of east and west defines its breadth, the northern axis establishes its topmost point. Within these distances it is bounded by both Oceans. It is marked by a division of the land into three regions: Europe, Libya, and Asia. The Gallic, Tyrrhenian, and Aegean Seas, that is internal seas, divide Europe from Libya; the river Tanais (the Don) divides Asia from Europe, and the Nile divides Asia from Libya. From this, the sloping plane of the heavens will be recognized and demonstrated, within which the land of the Roman Empire spreads out over an extensive area; disputes concerning this land I have proposed to examine according to categories.

Land ${ }^{6}$
45 ................. we do not omit the names belonging with the categories of landholdings.

Prima enim condicio possidendi haec extat per Italiam；ubi nullus a［iu］ger est trib－ utarius，sed aut colonicus aut municipalis，aut alicuius castelli aut conciliabuli，aut saltus priuati．

At si ad prouincias respiciamus，habent agros colonici quidem iuris，［habent et colonicos stipendiarii］qui sunt in［com］munes，habent［em］et coloni（co＞s stipendiarios． habent autem prouinciae et municipales agros aut ciuitatium peregrinarum，et stipen－ diarios，qui nexum non habent neque possidendo ab alio quaeri possunt．possidentur tamen a priuatis，sed alia condicione［m］：et ueneunt，sed nec mancipatio eorum legit－ ima potest esse．possidere enim illis quasi fructus tollendi causa et praestandi tributi condicio〈ne〉 concessum est．uindicant tamen inter se non minus fines ex aequo ac si priuatorum agrorum．etenim ciuile est debere eos discretum finem habere，quo unus quisque aut colere se sciat oportere aut ille qui iure possidet possidere．nam et con－ trouersias inter se tales mouent，quales in agris inmunibus et priuatis solent euenire． uidebimus tamen an interdicere quis possit，hoc est ad interdictum prouocare，de eius modi possessione［m］．

Multa enim et uaria incidunt，quae ad ius ordinarium pertinent，per prouincia－ rum diuersitatem．nam cum in Italia ad aquam pluuiam arcendam controuersia［m］non minima concitetur，diuerse in Africa ex eadem re tractatur．quom sit enim regio aridis－ sima，nihil magis in querella habe〈n〉t quam siquis inhibuerit aquam pluuiam in suum influere：nam et $\mathrm{ag}\langle\mathrm{g}\rangle$ eres faciunt $\langle\mathrm{et}\rangle$ excipiunt et continent eam，ut ibi potius con－ sumatur quam abfluat．

In omnibus his tamen agris superius nominatis quot genera controuersiarum exerceantur， tractare incipiamus．nam et qualia sint et quot status habeant generales，diligenter intueri debe－ mus．

Etenim ad artificium defendendi plurimum prode erit，si persecuti［hu］ius omni［s］ diligentia fuerimus．non enim a qualibet parte［m］adgrediendum est in controuersia［m］ sed dispiciendum，cui postulationi absolutio proxima sit，ne inplicatione［m］aliqua et iudicem inpediamus et controuersiam faciamus obscuriorem．nihil puto deformius esse quam 〈cum〉 de eius modi causis inperiti idoneas uolunt exhibere aduocationes．quaecumque autem in artificio generaliter 〈e〉ueniunt，colligi utcumque possunt：reliqua omnia sunt infinita． in quantum potero tamen a generalibus specialia argumentis tractabo，cum ab exiguo quid〈em〉 exemplo secund〈um loc〉orum natura $\langle\mathrm{m}\rangle$ colligere possint，quid potissimum sequi debea $\langle\mathrm{n}\rangle \mathbf{t}$ ．

Quamquam non ignorem，in〈ter〉 professores inmodice controuersiarum quaestione $\langle\mathrm{m}\rangle$ fre－ quenter agitata $\langle\mathrm{m}\rangle$ ，necessariam studii exercitationem huius quoque partis existimaui．uno enim libro instituimus artificem，alio de arte disputauimus，cuius tripertitionem 〈s〉ex libris，ut puto， satis conmode sumus executi．exigit enim［p］ars scientiam metiundi，cui datur libri tertia pars， quam quinto et sexto libro continuabimus．et de adsignationibus et partitionibus agrorum et de finitionibus terminorum 〈h〉actenus deputato artis mensoriae ordine meminimus：superest nunc

The first category of landholding occurs in Italy, of a kind where no land ${ }^{7}$ is liable to tribute, but belongs to a colony, or a municipium, or some castellum, or conciliabulum, or private estate.

But if we consider the provinces, they contain lands of colonial status, which are exempt from taxes; they have in addition colonial lands which do pay taxes; moreover the provinces also contain lands belonging to municipia or to non-Roman communities, ${ }^{8}$ also (in general) lands subject to tax, which are not subject to nexum, and cannot be acquired by anyone else by usucapio. They are, however, possessed by private individuals, but on different legal terms. These lands are also sold, but there cannot be mancipatio governed by lex in their case. ${ }^{9}$ For those individuals are permitted to take possession of the land as for the purpose of reaping the harvest and on condition of payment of the land tax. Nevertheless, they lay claim to boundaries among themselves just as if they were (the boundaries) of private lands. For it is proper for them to be obliged to have a demarcated boundary, so that each person knows that it is right for him to cultivate, and the legal possessor knows that he possesses. They engage with one another in the kinds of dispute that occur in lands not subject to tax and privately owned. Nevertheless, we shall see whether anyone can use an interdictum, that is appeal to an interdictum, concerning possession of this type.

Many different cases occur, which relate to the normal legal process, because of the diversity of the provinces. For instance, in Italy no small dispute is provoked over keeping out rain water, ${ }^{10}$ whereas in Africa a dispute on the same matter takes a quite different direction; because it is a very dry region, a person has no greater reason for complaint than if someone prevents rain water from flowing onto his property. Indeed they build dykes and catch and keep the water, so that it can be used there rather than flow away.

Let us begin to examine as many kinds of dispute as may arise in all these lands mentioned above. For we ought to analyse carefully the nature of these disputes and how many general conditions they have.

Now it will greatly benefit our technique in speaking in (someone's) defence, if we have studied the law with every care. We should not intervene in a dispute using any method of approach, but must examine which proposition is most likely to be vindicated, lest by some intricacy we both impede the judge and make the dispute even more obscure. ${ }^{11}$ I think that nothing is more unseemly than when inexperienced men wish to exhibit appropriate advocacy in cases of this kind. Whatever emerges under categories in a profession, can be defined in some way. All remaining elements are unspecified. As far as I can, however, I shall deal with specific points by beginning from categories, since they (surveyors) can work out from even a simple example, according to the nature of the sites, those things that they ought especially to pursue.

Although I am not unaware that the question of disputes has been frequently and excessively debated by experts, I thought that practice in the study of this aspect too was essential. In one volume I have dealt with the practitioner, in another I have examined the art, the threefold division of which I have satisfactorily expounded, I think, in six books. The art requires the science of measuring, to which the third part of the volume is devoted, and I shall continue the discussion in books five and six. Up to this point in my planned order of the science of measuring, I have discussed the allocation and division of land and the marking of boundaries. It remains now for
ut de controuersiis disputem．quae pars，quamuis quarta sit uniuersitati（s），seiungitur，quoniam communis est $c u m$ aliis artibus et priuatae disputationis exigit $\mathrm{cu}\langle\mathbf{r a}\rangle \mathrm{m}$ ．qua $\langle\mathrm{m}\rangle$ ita capere ac persequi poterimus，si anticipalia quoque，quibus init $\langle i\rangle$ a substituuntur，non praetermiserimus．

Omnium igitur honestarum artium，quae siue naturaliter aguntur siue a $\langle\mathrm{d}\rangle$ naturae imita－ tionem proferuntur，materiam optinet rationis artificium geometria，principio ardua ac difficilis incessu，delectabilis ordine，plena praestantiae，effectu insuperabilis．manifestis enim rationi［bu］s executionibus declarat $\langle r a t\rangle i o n a l i u m$ materiam，ita ut geometria $\langle\mathrm{m}\rangle$ ine［o］sse artibus aut arte $\langle\mathrm{s}\rangle$ ex geometria esse intelligat〈ur〉．si enim rationis incrementa tractamus arte，simplicibus ac pla－ nis solidisque adhibita $\langle\mathrm{m}\rangle$ etiam 〈ante〉 nomen potestate $\langle\mathrm{m}\rangle$ cognoscimus：quin et geometrica analogia aut $\langle\mathrm{h}\rangle$ armonica aut arithmetica，［a］ut contraria aut quinta aut sexta et ceteros ordines， exercemus；ut non tantum artificiorum，uerum etiam omnium rerum qualitates probabiliter ostendat．sed quoniam tant［um］a naturalium rerum magnitudo exercitatioris acuminis exigit curam，non facile geometria uulgari tangitur opinione［m］et ad intellectum sui nisi quos ad nat－ uralem philosophiam proue $\langle\mathrm{h}\rangle$ at admitti $\langle\mathrm{t}\rangle$

Prius quam de transcendentia controuersiarum tractare incipia $m$ ，status earum exponendos existimo，quoniam in priore［m］parte［m］libri sequentium rerum ordo absolute de his disputari inhibuit．reddendum itaque hic locum tam necessariis partibus existimo．

Omne genus controuersiarum ex quadam materiali bipertitione generatur．constat autem haec bipertitio aut in fine aut in loco，non sine illa controuersia quae de positione terminorum praescribitur．Quem admodum unum extra positum est，quo separato a cetero numero duo primum numera $\langle\mathrm{n}\rangle$ tur，in hoc quoque numero controuersiarum de positione terminorum ad unius omnino condicionem respicit，et quamuis sit origo quaedam litium，min－ ime tamen adiungi materialibus controuersiis uidetur posse，quoniam singulariter omnium litium anticipalis existit，et si querella eius ad solum descendit，desin $\langle i\rangle t$ controuersia e $\langle$ sse $\rangle$ de positione terminorum；finis enim incipit esse aut loci．ergo legitimi materiales status controuer－ siarum hi duo uidentur ex［i］stare，de fine aut de loco：reliquae controversiae，quaecumque sunt， ex hac materia oriuntur et aut ordine［m］mensurarum aut partibus iuris ad status generales priuatos reuoca $\langle n\rangle$ tur．namque in ordine controuersiarum haec quoque materia $1 i\langle t i\rangle s$ locum suum optinet．

De fine subtilior exigitur disputatio，quae a rigore nullo modo distat nisi specie．De quibus est diligentius disputandum：quotiens enim de fine aut de rigore dicimus，non p［l］usilla quaestio oritur，una $\langle\mathrm{m}\rangle$ pluresue lineas sentiamus；ne praeterea lex Mamilia fini latitudinem

[^46]me to talk about disputes. Although this section makes up the fourth part of the whole, it is separate, since it shares certain features with other professions and requires individual treatment, which I shall be able to undertake and carry through if indeed I do not omit the preliminary material, which takes the place of an introduction.

Of all distinguished arts, which are either practised in conformity with nature, or are arranged in imitation of nature, geometry has as its substance the art of reasoning; at the start, it (geometry) is demanding and difficult to make progress in, but subsequently becomes rewarding, is full of achievement, and unsurpassable in its accomplishment. With clear demonstrations of reason, it indicates the material of rational enquiry, so that it is understood that geometry is in all arts, or that all arts arise from geometry. For if we examine the development of reason through an art, by means of simple and plane and solid figures, we recognize the power (of geometry) applied even before (we recognize) the name (i.e. of geometry). Indeed we work through the sense of proportion inherent in geometry or (musical) harmony or arithmetic, as in respect of numbers in proportion, such as fifths and sixths, and the other ordinal numbers, so that it (geometry) plausibly demonstrates the characteristics not only of the arts but of all things. But since the immense magnitude of natural things requires the application of highly-practised mental sharpness, geometry is not easily grasped by common ways of thinking, and admits to its understanding only those whom it directs to natural philosophy. ${ }^{12}$

Before I begin to deal with the 'progression' $\{\text { transcendentia }\}^{13}$ of land disputes, I think that their conditions should be set out, since in the first part of this book the sequential order of topics prevented me from discussing these fully. I think that space should be made here for these essential elements.

Every kind of dispute arises from a twofold division of substance. And this twofold division consists of either boundary or site, though not without that dispute, which is set out as preliminary, concerning the position of boundary markers. Just as the number one is set apart, and when it has been separated from the other numbers, only then can the number two first be counted, so in the number of land disputes, a dispute about the position of boundary markers corresponds to that of the number one; and although it is the origin of disagreements, it seems that it cannot at all be included in disputes of substance, since separately it is the preliminary of all disagreements. If a dispute involving this point comes to involve land, it ceases to be a dispute about the position of boundary markers; instead it begins to be a dispute about boundary or site. So, these seem to be the two legitimate substantive conditions of land disputes, that is boundary and site. ${ }^{14}$ The other disputes, whatever they are, arise from these matters of substance, and, by the procedure of surveying or by means of different aspects of the law, are brought back within their individual general conditions. Now, in the list of disputes this basic matter of disagreement likewise has its own place.

A rather complicated discussion is called for with reference to a boundary, which in no way differs from a rigor except in appearance. We must discuss them carefully, for whenever we speak of a boundary or a rigor, no trifling enquiry begins, whether we should recognize one or more lines, or whether the Lex Mamilia may not prescribe
praescribat．de qua lege iuris periti adhuc habent quaestionem，neque antiqui sermo－ nis sensus proprie explicare possunt，quini pedes latitudinis dati sint，an in tantum quinque．uide［n］tur tamen his，quinque pedum esse latitudinem，ita ut dupondium et semi－ $\mathrm{sse}\langle\mathrm{m}\rangle$ una quaeque pars agri finem pertinere patiatur．

Ergo si corpus habet finis，aliter sentire debemus $a c\langle\mathrm{si}\rangle$ singularem tantum linea $\langle\mathrm{m}\rangle$ intuea－ mur．in omni enim genere disterminationis，cui uel singularis linea interueniat et ex uno duas diuidat partes，ipsius mediae lineae sec［u］tura singularem habet contemplationem，sed efficit duas partes horum locorum diuisorum，et si proprius sentire uelimus，triplex incipit esse con－ templatio rei diuisae，（non duplex）．uidebimus tamen an tota si［n］t corporalis．nam quidquid terreni est divisum，sequitur ut et omnino corporale esse constet．inter uersuras autem duas illud genus lineamenti quod mensura distrinxit，quom ex inferiore parte terreno finiatur，etiam si gra－ ciliter，in modum tamen sulci，per supplementum aëris conspicitur．secundum rationem quorun－ dam philosophorum aut geometrarum［non duplex］illud quoque quod aëre［s］distinguit（ur） corporale esse decernitur．nunc quem admodum

〈Falsa pro〉positio est，cum controuersia alium habeat statum generalem et alio ad litem deducatur．uera propositio est cum per stat〈um〉 generalem controuersia［m］ad litem deducitur． ex falso ergo in uerum transcendentia est，cum a quolibet alio statu ad generalem statum con－ trouersia reuocatur．ex uero in falsum transcendent〈ia〉 fit，cum relicto generali［s］statu［s］quoli－ bet alio statu controuersia instruitur．

Ex non stante propositione in［te］stante $\langle\mathrm{m}\rangle$ transcendunt controuersiae，quotiens loci de quo agitur specialia argumenta nulla existunt，neque ullum finitimae similitudinis mo $\langle n u\rangle m e n-$ tum，sed tantum aboliti finis querella exponitur，et excipiens extantium argumentorum quadam expositione defenditur．nam nec uno genere，sed et si proximi［ae］tas aliqua naturalis fuit，quae similitudine $\langle\mathrm{m}\rangle$ finis adferre possi［ n$] t$ ，in illam quoque uelut extantium argumentorum oppor－ tunitas aptatur．ex re stant $\langle\mathrm{e}\rangle \mathrm{i}\langle\mathrm{n}\rangle$ non stante $\langle\mathrm{m}\rangle$ fit transcendentia，cum certus agro $\langle$ rum $\rangle$ finis， qui aut loci natura aut terminorum distinctione firmatus est，relinquitur et per uanas demon－ strationes controuersiae includitur．hoc modo controuersiae plerumque ab ambitio\｛sis〉 posses－ soribus proximis mouentur．euenit autem，ut eius modi demonstrationes，〈ni〉si ratione defenda $\langle\mathrm{n}\rangle$ tur，interibiles fiant；si contra pro ueris habeantur，ut interibilis inprudentia iudican－ tium fia［n］t uidelicet finitio．

A quocumque autem controuersia\｛e〉 de agris mouentur，effectus habent aut coniunctiuos aut disiunctiuos aut spectivos aut expos［c］it（iuos）aut reciperat〈iuos）．coniunctiuus est effectus， quotiens consentientibus angulis exploratus agrorum finis ad modum rationis accipit determi－ nationem inlaeso utriusque agri［ $[\mathrm{s}]$ solo：$\langle\mathrm{hoc}\rangle$ genus finitionis plerique inter $\langle\mathrm{se}\rangle$ conuenientes
a width for the boundary．Legal experts are still discussing this law and are unable to explain properly the meaning of the archaic language，that is，whether five plus five feet of width（i．e．five feet on each side of the boundary）should be allocated，or five feet only．These people，however，think that five feet constitutes the（total）width，so that each piece of land allows the boundary to stretch to a width of two and a half feet．${ }^{15}$

Therefore if a boundary has substance，we ought to think about it in a different way than if we were considering a mere single line．In every type of boundary de－ marcation，in which even a single line comes into play and splits off two parts out of one，the line in the middle which effects the division is considered as a single thing but makes two parts of the sites that have been divided，and if we wish to examine it more closely，our consideration of the thing divided begins to be threefold 〈not twofold〉． However we shall see if the entire thing has solidity．Whatever earthly thing is divided， it follows that it is agreed that in its entirety it has solidity．Between two angles，that type of line which measurement has laid out，when it forms a boundary at the lower level with something earthy，even though it is very thinly traced，nevertheless，in the manner of a furrow，it is seen by its（imagined）extension through the air above． According to the thinking of several philosophers and geometricians even that which is separated by the air is deemed to be solid．${ }^{16}$ Now，as to how

It is a false proposition when a dispute has a condition relating to its own type but is brought to law under another condition．It is a true proposition when a dispute is brought to law through a condition relating to its own type．It is a progression \｛transcendentia\} from falsehood to correctness when a dispute is brought from some other condition to a condition relating to its own type．A progression from correct－ ness to falsehood occurs when a condition relating to its own type is abandoned and a dispute is based on some other condition．${ }^{17}$

Disputes progress from a non－established proposition to an established one，when no specific pieces of evidence exist in respect of the place under dispute，nor any sign of a similarity in boundary；only a complaint about the destruction of a boundary is put forward，and on the other side（the case）is defended by an exposition of existing general evidence．This is not confined to one type（of evidence），but if there is a natural adjacent area which can show a similarity in boundary，the available existing evidence is fitted to that．A progression from an established proposition to a non－ established one occurs when a definite land boundary，which has been established by the nature of the terrain or a system of boundary markers，is abandoned and brought to dispute by means of worthless declarations．Disputes of this kind are frequently begun by ambitious adjacent landholders．But it happens that declarations of that kind，unless they are skilfully supported，are ephemeral．If，on the other hand，they are taken as true，the boundary will evidently be ephemeral，through the ignorance of those deciding the case．

Land disputes，by whomever they are begun，have a procedure which is either conjunctive，or disjunctive，or investigative，or explanatory，〈or subjective $\rangle,{ }^{18}$ or recu－ perative．A conjunctive procedure occurs whenever a land boundary has been inspected，the angles tally，and it is demarcated according to a proper system without loss to the land of either party．Most parties prefer to carry out and confirm this kind
potius quam iudices sortient〈es〉 factum consignare malunt；disiunctiuus est effectus，cum deter－ minatio alterius partis solum desecat et ita［ae］qualitate $\langle\mathrm{m}$ 〉 agri diuersam 〈dis〉simili solo appli－ cat，ut plerumque euenit $\langle\mathrm{ut}\rangle$ ex prato siluae aliquid adiungatur aut ex silva fine distincto adplicetur ad pratum，et similiter per alias agrorum qualitates．spectiuus est effectus，cum est demonstratio finitimis argumentis ex maxima parte fundata，ita ut et dubii $i\rangle s$ quoque locis aspectum praebeat finitionis．namque animum non tantum ratione orationis intrauit，sed etiam contemplandi potestate confirmat．expositiuus est effectus controuersiae quotiens finitimorum argumentorum caret demonstratione et partium magis exigit narrationes，per quas exponendum sit quo［d in］rigore termini desi〈n〉t，aut persuadendum iudici，etiam si loci natura finitimam exhibeat similitudinem，quomodo sint reponendi．subiectiuus est effectus controuersiae，cum relinquitur status generalis et alio quolibet statu controuersia defenditur．reciperatiuus est effec－ tus controuersiae，quotiens a trifinia aut quadrifinia 〈aut〉 ex quolibet alio finis loco in excipi－ entem terminum rectura dirigit et per incessum definitionis loca quaedam alteri fundo adquirit； aut quotiens solum aufer［e］t et eius loco reddit［us］utrique fundo，effectus quasi reciperatiuus existit．

Per hos effectus omnium controuersiarum status inuicem habent transcendentia〈s $\rangle$ aut nec－ essarias aut que［e］untes aut neque［e］untes，saepe interibiles．cum enim status generalis adsump－ tiuus primae controuersiae，quae est de positione terminorum，in rigorem aut in finem transcendit，e（s）t quidem necessarius causa argumentorum，sed in illo genere controuersiae nequiens habetur：at si uere de fine agatur et omnino termin $\langle a t\rangle u s$ distinctio ei desit，manifeste transcendentia eius non tantum nequiens sed interibilis apparet．eadem ratione in ceteris con－ trouersiis haec transcendentia adficitur，ut aut non necessaria aut nequiens 〈aut〉 interibilis appareat．secunda controuersia de rigore，initialis status pertinentis ad materiam，$\langle\mathrm{cum}\rangle$ tran－ scendit in controuersiam quae est loco tertio de fine，status materialis，speciem，non condi－ cionem，mutat neque materia〈lis〉 efficit〈ur〉．secunda controuersia de rigore，status initialis， quom transcendit in controuersia〈 m$\rangle$ quae est loco 〈quarto de loco〉 materialis，transcendentia eius non necessaria efficitur．secunda 〈tertia quarta quom in〉 controuersiam quae est loco quinto de modo，status effectiui，transcendunt

〈De positione terminorum〉
secundum locorum natura $\langle\mathrm{m}\rangle$ mouet causas．
Si uero in alio loco terminus translatus est usurpandi finis causa［m］，numquam non utique locum desicauit：non enim cito quisquam propter exiguam partem ter－ minum mouet．erit in prouidentia［m］mensoris secundum angulorum finitimorum posi－
adjudicators. A disjunctive procedure occurs whenever the fixing of a boundary cuts off the land of one party and so attaches a different type of farmland to contrasting land; so, for example, it often happens that something is added to a wood from a meadow, or from a wood with a marked boundary something is added to a meadow, and similarly in other types of land. An investigative procedure occurs whenever the exposition is to a large extent based on evidence related to boundaries, so that even in locations of doubtful character it provides the appearance of a boundary. For it not only enters the mind with the skill of oratory but also strengthens it through the power of reflection. The procedure of a dispute is explanatory whenever it lacks an exposition based on evidence relating to boundaries and requires instead a presentation by the parties, who must explain on which rigor the boundary markers are missing, or who must persuade a judge how they are to be put back, even if the nature of the terrain shows a similarity (in boundaries) in neighbouring property. The procedure of a dispute is subjective whenever its general condition is abandoned and the dispute is pursued under some other condition. The procedure of a dispute is recuperative whenever from a trifinia or quadrifinia, or from some other part of a boundary, a straight line runs to the next boundary marker, and by the action of extending the boundary line, acquires some places for one farm (at the expense of the other); alternatively, a virtual recuperative procedure exists whenever it (the boundary) cuts off some land and in its place returns some to both farms.

Through these procedures the conditions of all disputes in turn undergo progressions, which are either necessary, or possible, or impossible, and often ephemeral. When the condition, defined as generalis assumptivus, of the first dispute, which is about the position of boundary markers, changes to one concerning a rigor or a boundary, that is necessary because of the evidence needed, but in that kind of dispute is considered impossible (i.e. the status generalis assumptivus does not apply in disputes about rigor or boundary). But if a dispute is indeed about a boundary, and the boundary demarcation is entirely lacking, clearly its progression is not only impossible but ephemeral. This progression is affected by the same reasoning in the other disputes, with the result that it appears either not necessary or impossible or ephemeral. The second dispute, concerning a rigor, belongs to the status initialis pertaining to a material object; but when it progresses to the dispute listed third, concerning a boundary, which belongs to the status materialis, it changes its appearance, not its character, and does not become material. The second dispute, about a rigor, belonging to the status initialis, when it progresses to the dispute listed fourth, that is, a dispute about site, which belongs to the (status) materialis, its progression is not made necessary. The second, third and fourth disputes, when they progress to the dispute listed fifth, concerning area, belonging to the status effectivus ${ }^{19}$

〈Concerning the position of boundary markers ${ }^{20}$
brings about litigation according to the nature of the sites.
But if, in another location, a boundary marker has been moved in order to seize land, invariably it has cut off the place (i.e. leaving the land in the hands of the usurper). No one readily moves a boundary stone for just a small quantity (of land).
tionem arbitrari，in quantum sit terminus translatus et qua ratione sit in locum suum restituendus．

Facillimum est inperitia $\langle\mathrm{m}\rangle$ artificis aliusue retundere non putant $\langle\mathrm{is}\rangle$ rationem inesse ordini：nam et frequenter euenit，ut inperitia mensorum［an］audacia〈m〉 posses－ soribus praebeat．numquam non concurrentium inter se finium anguli，non tantum recti uerum etiam hebetes aut acuti，habe［a］nt aliquam rationem；in qua $\langle\mathrm{m}\rangle$ ，si non dis－ simulemus，facile quod inperiti turbauerunt artificio restituemus．

Haec controuersia moti termini null $\langle i\rangle$ us in se aliae controuersiae statum recipit：est enim anticipalis et quasi comminatio quaedam litium，declarans aut loci aut modi futura $\langle\mathrm{m}\rangle$ con－ trouersia〈m＞．

De rigore controuersia est status initialis pertinentis ad materia $\langle\mathrm{m}\rangle$ operis；nec sine prioris controuersiae comparatione．nam cum de rigore agatur，potest fieri ut ante motus sit terminus： ideoque haec secunda controuersia［m］prioris quoque controuersiae capax apparet；quamquam et sine prioris controuersiae interuentu［m］priuatim de rigore controuersia suscitari possit：nec enim omnibus locis agrorum，aut capientibus aut non capientibus，termini ponuntur．

Refer［en］t in quo agro agatur．si limitatus est，aut ordo limitis ordinati desider－ atur aut subrunciui aut linearis aut interiectiui rigoris incessus．at si in agro arcifinio si［n］t，qui nulla mensura continetur sed finitur aut montibus aut uiis aut aquarum diuergiis aut notabilibus locorum naturis aut arboribus，quas finium causa agricolae relinquunt et ante missas appellant，aut fossis aut quodam culturae discrimine

〈De fine〉
agetur．cum enim loci sit tanta iniquitas，et aut praerupta aut abrupta，quae aut ruere aut minui possent，uetus consuetudo est terminos relatis pedibus in solido agro ponere． quamquam non era［n］t necessarium，cum ipsa loci natura talis esset，ut neque inferi－ orem uicinum admittere $\langle t\rangle$ in partem superiorem neque superiori descensu $\langle m\rangle$ ullo modo praeberet．sed 〈di〉ligentes agricolae propter inpudentium uicinorum consue－ tudinem parum se tutos credunt，nisi ita fundauerint agros，ut etiam aliquid extra men－ surarum ordinem faciant．

In superciliis autem maioribus non defuerunt qui ita finem seruari uellent，ut quatenus attingere unus quisque possessor posset，eatenus［u］possidere $\langle t\rangle$ ．uidebimus an aliquam rationem sint secuti，cum sit totum supercilium superioris agri fundamen－ tum nec，si subruatur，possit sine iniuria superioris fieri．ideoque magis certior ratio illa uidetur，ut fundamento tenus in agro arcifinio possessio seruari debeat，si termini desint．
bouring angles, how far a marker has been moved and by what principle it should be restored to its proper place. ${ }^{21}$

It is very easy to undermine the inexperience of a surveyor or someone else who does not appreciate that there is a system in the line (of boundary markers). ${ }^{22}$ Indeed it often happens that the inexperience of surveyors lends audacity to landholders. The angles at which boundaries meet one another, not only right angles but also obtuse and acute, are never without some system. If we do not turn a blind eye, we shall through our skill easily restore to this system whatever unskilled people have disturbed.

This dispute involving the movement of a boundary marker does not subsume the condition of any other dispute. For it is preliminary and a kind of threat of litigation, indicating that the dispute will be over either site or area.

With regard to a straight line \{rigor\}, a dispute belongs to the status initialis, which relates to the substance of the survey; indeed it is not unrelated to the dispute mentioned above, since, although a dispute concerning a rigor is being conducted, it is possible that a boundary marker has been moved earlier. So, this second dispute appears also to encompass the previous dispute, although a dispute can be initiated independently about a rigor without the occurrence of the earlier dispute. For boundary markers are not placed in all parts of estates, either those capable or those incapable of receiving them.

The type of land in which a dispute occurs is important, that is, if it has received limites, or if the layout of regulated limites is lacking, or the extension of the straight line \{rigor\} which is subruncivus or linearis or interiectivus. But if the dispute occurs in ager arcifinius, which is not contained within a survey, but is bounded by mountains, or roads, or watersheds, or natural landmarks, or trees that the farmers leave in order to mark the boundary and call 'previously planted' \{ante missae\}, or ditches, or some difference in cultivation

〈Concerning boundaries〉
will be conducted. ${ }^{23}$ When a site is extremely uneven, and there are either precipitous or steep areas that might tumble down or be reduced in size, the old practice is to move back and place the boundary stones on firm ground. Now this was not essential, since the terrain was such that it did not allow a neighbour on the lower ground to encroach on the higher, or provide any way down (onto the property of a neighbour) for the man on the upper ground. But careful farmers, because of the practices of their shameless neighbours, think that they are insufficiently secure unless they have put their land on a firm basis, in such a way that they even do something beyond normal surveying practice (i.e. in marking boundaries).

However on larger terraces \{supercilia\} there were some who wanted a boundary to be observed on the basis that each landholder should possess as much (land) as he could (physically) reach. We shall see if they have followed any principle in this view, since the entire terrace is the base of the higher ground, and if it is undermined, that cannot happen without loss to the higher ground. So, it seems to be a more dependable principle that in ager arcifinius possession of land should be recognized as far as the base (of a terrace), if there are no boundary markers. ${ }^{24}$

Frequenter inter se possessores propter loci difficultatem totum supercilium，quod aug［ent］er（etur〉 ipso subiacente，inferioribus cesserunt，et contenti fuerunt terminos per summum iugum disponere，nullam secuti rationem．haec tamen si occurrunt，non quasi noua intueri debebimus．

Plurimis deinde locis terminos sacrificales non in fine ponunt，sed ubi illud sacri－ ficii potius opportunitas suadet，hoc est loci conmoditas，in quo sacrificium abuti con－ mode possint．hos terminos non statim finitimos obseruare debebimus，etiam si non longe a fine positi fuerint：frequenter enim uiae finiunt，iuxta quas arbores solent esse laetiores，sub quas defigere terminos sacrificii causa possessores consuerunt．uerum tamen multi non tantum sacrificii sequuntur consuetudinem sed etiam rationem，et ipso fine defigunt：propter quod adimi fides sacrificalibus palis in totum non debet．

## （De loco）

$\dagger$ haberi ordinem legis Mamiliae excessum plurimum，praecipue in $\mathrm{ag}\langle\mathrm{r}\rangle$ is arcifiniis sed nec minus id adsignatis．cum enim modum loci nulla forma praescribit et controuer－ sia oritur，nullo alio statu［m］ad litem deduci debet，quam ut de loco agatur；solent quidam per inprudentiam mensores arbitros conscribere aut sortiri iudices finium regundorum causa，quando in re praesenti plus quidem quam de fini［um］regundo agatur．si（c＞fit ut $\operatorname{pos}\langle t\rangle$ sent $\langle e n t\rangle i a m$ inritum sit et rescindi possit，quod aut iudex aut arbiter pro－ nuntiauerint，neque ullum commissum faciat qui sententia $\langle\mathrm{m}\rangle$ non sit secutus，quando de alia re iudicem aut arbitrum sumpserint．

De［hoc］loco，si possessio petenti firma est，etiam interdicere licet，dum cetera ex interdicto diligenter peraguntur：magna enim alea est litem ad interdictum deducere， cuius est executio perplexissima．si uero possessio minus firma est，mutata formula iure Quiritium peti debet proprietas loci；iudicari praeterea，si locus de quo agitur aut ter－ minis aut arboribus aut aliquo argumento finem aliquem agri declaret et a continua－ tione soli quasi quibusdam argumentis eximatur．

Ne praeterea $\langle\mathrm{t}\rangle$ nos，illud etiam tractare debemus，si arbores finitimas habet et locus est fere siluester，quo in genere est possessio minus firma，decernatur ideo．quod si silua caedua sit，post quintum annum parcissume repetatur．qui autem appellent arbores notatas，scire debemus idioma regionis．qui〈dam〉plagatas uocant quas finis declarandi causa denotant，$u t$ in Brittiis，alii in Piceno stigmatas，in aliis regionibus insignes aut notas．

Si uero pascua sit et dumi ac loca paene solitudine derelicta，multo minorem

Landholders have often by agreement ceded an entire terrace to those occupying the land below, because of difficulties of terrain, since it (the terrace) was increased in size by the land beneath it, and were happy to place boundary markers along the top of the ridge, following no principle. If we encounter this we should not regard it as unusual.

Then, in a large number of places people set up sacrificial markers, not on a boundary, but in a locality where suitability for the conduct of sacrifice recommends it, that is, the convenience of a place where they can perform sacrifice conveniently. We should not immediately note these markers as indicating a boundary, even if they have been placed not far from a boundary. For frequently roads mark a boundary, and near them there are usually rather luxuriant trees, under which landholders have normally placed markers to indicate an area for sacrifices. However many follow not only a custom relating to sacrifice, but also a principle (of surveying), and place the markers on a boundary itself. Therefore faith in the stakes used to mark out sacrificial areas should not be entirely abandoned.
<Concerning site〉.
$\dagger$ the procedure of the Lex Mamilia has been significantly transgressed $\dagger$, ${ }^{25}$ especially in ager arcifinius but also in allocated lands. When the area of a site is not laid down by any map, and a dispute arises, it should be brought to law under no other condition than that of disputes involving site. Some people through ignorance are in the habit of enrolling surveyors as arbiters or drawing lots for judges to establish boundaries, when in the matter in question more is at stake than the establishment of a boundary. So, the outcome is that, after the judgement, whatever the judge or arbiter has decided is invalid and can be revoked, and someone who has not complied with the judgement is not committing an offence since the parties had recourse to a judge or arbiter on a quite different question. ${ }^{26}$

With regard to site, if the plaintiff has well-founded possession, it is indeed possible to proceed by interdictum, provided that all other matters are properly executed in accordance with the interdictum. For it is a big gamble to involve a legal case in the interdictum procedure, the execution of which is extremely complex. However, if possession is rather less well-founded, then by a different formulation, in accordance with the ius Quiritium, claim ought to be laid to ownership of the site; moreover, we should also decide if the site under dispute has any land boundary indicated either by markers or by trees or by any other evidence, and if it may be detached from inclusion in a property by certain arguments of this kind. ${ }^{27}$

We should not forget that we must deal also with the following case, namely, if the site has trees nearby and indeed is virtually covered in woods, in which circumstances possession is less well-founded, a decision should be reached on that basis. ${ }^{28}$ For if the wood is suitable for chopping down, it may be claimed back only with great difficulty after five years. We ought to know the terminology of a region in respect of what people may call marked trees. Some describe as plagatae trees that they mark in order to denote a boundary, as happens among the Bruttii, while others, for example in Picenum, call such trees stigmatae; in other regions they call them 'denoted' \{insignes $\}$ or 'marked' \{notae $\}$.

If however a site consists of pasture land, scrub land, and places that have been left uninhabited and almost abandoned, these offer much less secure proof of
possessionis habent fidem．propter quod $\langle\mathrm{m}\rangle$ inime de his locis ad interdictum iri debet．
De quibus autem locis ad interdictum ire possunt，〈sunt〉 fere culta，quae posses－ sionem breuioris temporis testimonio adipiscuntur，$u$ t aru $a$ aut uineae aut prata aut aliud aliquod genus culturae haec tamen cum in demonstratione allegabuntur，etiam si partes qua〈e〉dam proximae et in〈ter〉iacentes culturae fuerint propria $\langle\mathrm{e}\rangle$ ，non eri［n］t satis illa sui generis agro adsignare，sed circuire oportebit totum fundum et ita fidem obligare，ne demonstratione neglegenter soluta appareat．

De modo controuersia 〈est〉 status effectiui：ante enim locus est ibi quam modus nomine－ tur：aeque recipiens ante dictarum controuersiarum omnes status，sed ut superius significaui irritos et non necessarios．haec controuersia frequenter in agris adsignatis exercetur：agitur enim，ut secundum acceptam eius ueter（a）ni，qui in illud solum deductus est，modus restituatur；aut si quando praescribtus est lege aliqua agri modus．

Quom autem in adsignato agro secundum formam modus spectetur，solet tempus inspici et agri cultura［e］．si iam excessit memoria［m］abalienationis，solet iuris formula ［non silenter］interuenire et inhibere mensores，$\langle\mathrm{n}\rangle \mathrm{e}$ tales controuersias concipia $\langle\mathrm{n}\rangle \mathrm{t}$ ， neque quietem tam longae possessionis inrepere $\langle\mathrm{si}\rangle \mathrm{ni}\langle\mathbf{t}\rangle$ ．si et memoria sit recens et iam modus secundum centuriam conueniat et loci natura indicetur et cultura，nihil in－ pediet secundum formas decernere：lex enim modum petiti［s］definite praescribit，cum ante quam mensura agri agatur modus ex forma pronuntiatus cum loco conueniat．hoc in agris adsignatis euenit．nam si aliqua lege uenditionis exceptus sit modus neque adhuc in mensuram redactus，non ideo fide carere debebit，si nostra demonstratio eius in agro non ante finiri potuerit quam de sententia loc［ut］us sit designatus．
in hac controuersia，quod $i\langle n\rangle$ ter priuatos tractatur．
Nam inter res publicas non mediocriter eius modi controuersia solet exerceri， quam frequenter coloniae habent cum coloni $\langle i\rangle s$ aut municipiis aut saltibus Caesaris aut priuatis．nam et supra dictae controuersiae omnes euenire et rebus publicis possunt．nec enim refert，cuius si［n］t solum aut cuius iuris，ad mouendam controuersiam：tunc autem habe［n］t differentia $\langle\mathrm{m}\rangle$ ，prout $\mathrm{a} b$ i $u$ dice tractatur．

Obseruari in hac controuersia $\langle a\rangle$ mensore debebit $\langle 1$ ineis，dum in similitudinem dissimile interueniat；quoniam nulla potest ueritas adprobari，si illi qui〈d uel exiguum falsi interueniat．ueritas enim habere debet suam similitudinem per omnia momenta：falsum siquid est，multa uarietate confunditur．et habent in se，cuius formam redigit，cum modus in $\langle$ dis〉crimine est．［p］ars triplici adtestatione firmatur：habere enim debet in se primu $\langle\mathrm{m}\rangle$ locum，deinde modum，deinde speciem．at si inter〈res publicas〉 agatur au〈t〉 rem
possession. Therefore least of all in the case of these sites should we resort to an interdictum.

With regard to those sites where it is possible to resort to an interdictum, they are generally cultivated areas where possession is acquired on the evidence of a brief period of time, such as ploughed fields, vineyards, meadows, or any other kind of cultivation. However, when these sites are adduced in the pointing out of boundaries \{demonstratio\}, even if some parts of them adjacent to and indeed lying between the cultivation belong to the property, it will not be enough to assign them to land of their own type; rather it will be appropriate to go round the whole farm and so guarantee agreement, lest it appears to have been negligently detached from the demonstratio. ${ }^{29}$

With regard to area, a dispute belongs to the status effectivus. For the site exists there before any area can be specified; similarly this dispute includes all the conditions of disputes mentioned above, but as I also pointed out earlier they are irrelevant and not necessary (in this case). This dispute is often set in motion in allocated lands; for the purpose of the legal action is that the area should be restored in accordance with the plot received by that veteran who was settled as a colonist on that land; or if an area of land was ever defined in some law, (restoration should be on that basis). ${ }^{30}$

Since in allocated land, the area is scrutinized according to a map, the length (of possession) is normally examined and the type of cultivation of the land. If the occasion of a legal transfer of property has already been forgotten, legal procedure normally intervenes and prevents surveyors from initiating disputes of this type, and does not permit them to disrupt the settled peace of such lengthy possession. If the recollection (of the transfer) is recent, and the area at this stage tallies in accordance with the centuria, and is revealed by the layout of the site and the cultivation, there is nothing to prevent a decision in accordance with the maps. ${ }^{31}$. For the law precisely defines the area of what is claimed, since, before a survey of the land can be carried out, the area declared on the basis of the map should conform with the site. This occurs in allocated lands. Now, if in some contract of sale the area has been excluded and not yet brought under survey, then if our demonstration of it on the ground could not be finished before the site was designated in accordance with a (judge's) decision, it should not on that account lack credibility. ${ }^{32}$

## in this dispute, because it occurs between private individuals.

A dispute of this kind is normally pursued vehemently by communities; colonies frequently have it with colonies, or municipia, or imperial or private estates. Now, the disputes discussed above can all also occur for communities. For it does not matter in the initiation of a dispute who owns the land or in what jurisdiction it is. However, there is a distinction depending on how it is heard by a judge. ${ }^{33}$

In this dispute the surveyor will need to pay attention to (boundary) lines until some inconsistency obtrudes on consistency. For no truth can be demonstrated if even the tiniest morsel of falsehood obtrudes. For the truth ought to have its own consistency at all stages. If something is untrue, it is confounded by all kinds of inconsistencies. And they (the lines) contain within them (material) from which he (the surveyor) reproduces a map, when an area is in dispute. Surveying skill is confirmed by a threefold attestation; for it (the attestation) ought to have in it first the site, then the area, and finally the shape $\{$ species $\} .{ }^{34}$ Now, if the dispute is between $\langle$ communi-
publicam et Caesarem，instrumentis forte ueteribus continebitur，ut solet，adaeratio； ne falsa ueris dissimilia sint，sed persuasione similia fiant，hoc est falsa pro ueris adprobentur． in conparatione tamen hoc interest，quod falsa persuadendo adprobentur ueris，qua $\langle\mathrm{e}\rangle$ adpro－ batio in promptu［m］est et quodam modo in prima acie fertur，falsis latentius hoc uera adprobentur．ita ut si conparare quis uelit hominis probationem et statuae；cum autem hominem omnibus bibere et ambulare constet，siquis inquirere uelit ann〈e〉 uiuat，non potest illi non ab ipsis probationibus persuaderi，ideo quo〈d〉 bibat，quod ambulet，quod loquatur；at 〈in〉 statua $\langle d i u\rangle$ multumque mens infri〈 $\mathbf{n}\rangle$ genda est，ut similitudo ueritatis animam habere uideat〈ur〉， de cuius simulatione est profecta．

〈ad lu〉cum Feroniae Augustinorum iugera M．haec in discrimen si uenerunt，omnia supra dicta conuenienter habere debent，ut illa si $\langle\mathrm{n}\rangle \mathrm{t}$ ，quae secundum forma $\langle\mathrm{m}\rangle$ pro－ ponuntur．geminus in prouinciis modus ab alio possidetur，ab alio ne quidem simplex．quem admodum autem fieri soleat，tractare non alienum iudic［i］o．potest enim fieri，ut illa mille iugera secundum ordinationem mensoris a luco quidem incipiant，at in diuersa［m］ regione［m］．quod falsum manifesto apparet：sed in demonstratione inperitis obscurissi－ mum est dinoscere，an secundum formam regio conueniat praesens，si $\langle\mathbf{u}\rangle$ t aquae dif－ fusae regiones pareant et argumentis aut arborum aut aliarum rerum careant；sicut in Africa，ubi spatiositas et inundatio camporum eius modi controuersias facillime in errorem deducit．quod si eadem mille iugera，in eodem sane loco 〈quo〉 forma indic［t］at，cohibitis angulis［nihil deest］in re praesenti minoribus lineamentis deformen－ tur，ut modum non expleant，sequitur falsum futurum，quando nihil amplius demon－ strationi quam locus conueniat，et specie disconueniente，uelut $\dagger \ldots$ adscripta $\dagger$ ，modus item disconueniat．aut si in eodem loco uelim eadem mille iugera aliis lineamentis describere，conuenient quidem mille iugera，et ad lucum Feroniae esse conueniet，sed specie disconueniente inter peritos manifeste falsum apparebit．

Memineram et superius，ut aliquid uerum adprobari possit，minime ei quicquam falsi posse interuenire．nam et haec expositio declarat，〈ut〉，quamuis duae consentiant partes，ab una dissentiente uincantur，neque uerum esse possit，nisi illis quoque tertia pars illa consenserit． conuenire autem omnino in restitutione formarum omnia debent，ut secundum signa in formis nominata locus quicumque erat restituatur，aut artificio signorum loca requirantur，si eri $\langle\mathrm{n}\rangle$ t，ut frequenter euenit，turbata．〈ea〉 docere nos angulorum posi－ tiones poterint．sic erit，ut et artis sinceritas seruetur et ordo ueteris adsignationis non praetermittatur．
ties), or between a community and the emperor, perhaps, as often happens, a calculation of area will be included in old documents. (We must take care) lest falsehood should be unlike truth but become like it through persuasion, that is, falsehood be demonstrated in place of truth. However in a comparison, there is this difference,
namely that, through persuasion, falsehood may be demonstrated in place of truth, a demonstration which is in full view and is, in a way, borne in the leading battle line, while truth may be demonstrated in place of falsehood in a way that attracts less attention than this. So, if someone wants to compare the demonstration of what is a man and what is a statue, since everyone would agree that a man drinks and walks, if someone wants to discover whether the man has life, he cannot fail to be persuaded by this very evidence, that is, because he drinks, because he walks, because he talks. But in the case of a statue, the mind has to be put under tremendous and lengthy pressure (to accept) the possibility that this copy of the truth (i.e. the statue) may seem to have life, from a simulation of which it originated. ${ }^{35}$

If these thousand iugera 〈at the grove〉 of Feronia of the Augustan settlers have come into dispute, they ought to have in agreement all the features mentioned above, so that they should be precisely those that are being proposed on the basis of the map. ${ }^{36}$ In the provinces one person possesses a double portion of land, while another does not possess even a single portion. I do not consider it inappropriate to examine how this normally comes about. For it might be the case that those thousand iugera conforming to the arrangement of a surveyor do indeed begin at the grove (of Feronia), but in a different locality. This of course is an obvious form of error, but in a demonstratio it is very difficult for unskilled people to discover whether a locality in its present appearance tallies with a map, if localities appear as scattered sheets of water, and lack the visible proof of trees or other things. In Africa, for example, the huge area and the flooding of the plains very easily lead to mistakes in this kind of dispute. But, if these same thousand iugera, in the same site as the map indicates, should have a changed appearance on the spot, with reduced angles and shorter boundaries, so that they cannot make up their full area, it follows that there will be an error, because nothing except the site tallies with the demonstratio, and since the overall shape does not tally, as if $\dagger \ldots \dagger$ had been written, the area also does not tally. ${ }^{37}$ Or, if I should claim to be recording the same thousand iugera in the same site, but with different boundaries, the thousand iugera will tally, and their position at the grove of Feronia will tally, but the shape will not tally and so it will seem an obvious error to skilled surveyors.

I did point out above that if something is to be proved true, not even the smallest element of falsehood can intrude on it. And this description indicates that although two items agree, they are defeated by a single one if it does not tally, and the proposition cannot be true unless the third item also agrees with the first two. ${ }^{38}$ So, everything ought to tally in every respect in the reconstitution of the maps so that every site, whatever it was, is restored according to the markers specified on the maps, or if, as frequently happens, sites have been disturbed, that they may be searched for using the device of the markers. For they (the markers) will be able to show us where the angles are. This will bring it about that the integrity of the profession is main-

De proprietate［mundi］controuersia est status effectiui：efficitur enim ex omnibus ante dic－ tis controuersis．sed quarum status in hac propositione inriti habentur，dixi et supra．

De proprietate agitur plurimum iure ordinario，neque est hic mensurarum inter－ uentus，nisi cum quaeritur，quatenus agatur．

Proprietas 〈non〉 uno genere uindicatur．
$\mathrm{E} t$ sunt plerumque agri，ut in Campania in Suessano，culti，qui habent in monte Massico plagas siluarum determinatas；quarum siluarum proprietas ad quos pertinere debeat uindicatur．nam et formae antiquae declarant ita esse adsignatum，quoniam solo culto nihil fuit siluestre iunctum quod adsignaretur．

Relicta sunt et multa loca，quae ueteranis data non sunt．haec uariis appellation－ ibus per regiones nominantur：in Etruria communalia uocantur，quibusdam prouinciis pro indiuiso．haec fere pascua certis personis data sunt depascenda tunc，cum agri adsignati sunt．haec pascua multi per $\langle$ in〉potentiam inuaserunt et colunt：et de eorum proprietate solet ius ordinarium moueri non sine interuentu mensurarum，quoniam demonstrandum est，quatenus sit adsignatus ager．

Nam per emptiones quasdam solet proprietas quarundam possession $u \mathrm{~m}$ ad ＜priu－ atas〉 personas pertinere．quae iure magis ordinario quam mensuris explicantur．

Nunc ut ad publicas personas respiciamus，coloniae quoque loca quaedam habent adsignata in alienis finibus，quae loca solemus praefecturas appellare．harum praefec－ turarum proprietas manifeste ad colonos pertinet，non ad eos quorum fines sunt deminuti． solent et priuilegia quaedam habere beneficio principum，ut longe et semotis locis saltus quosdam reditus causa acceperint．quorum proprietas indubitate ad eos pertinet， quibus est adsignata．alia beneficia etiam quaedam municipia acceperunt et priuatae personae， quae de principibus illis temporibus bene meruerunt．

In hac controuersia plus potestatis habet ius ordinarium quam ars mensoria．ab eo enim statu lis incipit，〈ut〉 de proprietate agatur，non de loco：mensura autem nihil amplius quam secundum formam locum declarat．in hac autem controuersia ars mensurarum locum secundum habet，quoniam prius alii uacandum est，an agenda sit mensura（Ill．34）．

De possessione controuersia est 〈status〉 effect $\mathbf{i}\rangle$ ui，quoniam primum possessio tempore efficitur，deinde，ut ad solum respiciamus，omnes ante dictas controuersias capit：si enim solum cogitemus，ut legitima possessio inpleri possit，indubi〈ta〉te locus definiatur necesse est．et de hac controuersia plurimum interdicti formula litigatur．de qua et in superiore parte meminimus： ideoque non puto eam iterum retractandam（IIl．35）．

[^47]A dispute concerning ownership belongs to the status effectivus. It is produced from all the disputes mentioned above. I have mentioned above those disputes whose conditions are held to be irrelevant in this proposition. ${ }^{39}$

Disputes concerning ownership are most often conducted according to normal legal procedure, and there is no role here for surveying unless the investigation concerns the (physical) extent of ownership.

Ownership is claimed in more than one way.
Often there are cultivated lands, for example, those in Campania in the territory of Suessa, which have on Mount Massicus areas of woodland with fixed boundaries. The ownership of these woodlands is claimed in respect of those to whom it ought to belong. For old maps show that the allocation took place in this way, since there was no woodland adjacent to the cultivated land that could be allocated. ${ }^{40}$

In addition, many areas were left over which were not granted to veteran soldiers. These are given different names in different regions; in Etruria they are called 'common land'; in some provinces 'equivalent to undivided land' \{pro indiviso $\}$. In general, this pasture land was given to certain individuals for pasturing at the time when the lands were allocated. Many have taken over this pasture land arbitrarily and cultivate it. The normal legal process is usually invoked concerning the ownership of these lands, but not without the assistance of surveying, since the extent of the land allocation has to be demonstrated.

Now, it often happens that through certain purchases the ownership of several holdings belongs to $\langle$ private〉 individuals. Such matters are settled more by the normal legal process than by surveying.

Now, to turn our attention to publicae personae, ${ }^{41}$ colonies too have certain areas which have been allocated in the territory of another community, and these areas we normally call praefecturae. Ownership of these praefecturae clearly belongs to the colonists, not to those whose territory has been reduced. Moreover, they (colonies) normally have some privileges by the gift of emperors, in that they have received in far-distant places some tracts of land in order that they might have the yield from them. The ownership of these clearly belongs to those to whom it was allocated. Indeed some municipia and private individuals received other privileges, which they earned from emperors at the time. ${ }^{42}$

In this type of dispute the normal legal process has more weight than the surveying profession. For litigation begins under the condition in which ownership, not the site, is at issue. Surveying reveals nothing more than the site according to the map. So, in this dispute the surveying profession has second place since the way should be left open for another to decide first if a survey needs to be conducted. ${ }^{43}$

Concerning possession of land, a dispute belongs to the status effectivus, since at first possession is achieved by passage of time, and then, if we consider the land, it involves all the disputes mentioned above. For if we think about the land, in order that legitimate possession can be completed, the site must be defined without doubt. In this dispute litigation is conducted largely through the procedure of the interdictum. I mentioned this in an earlier section and therefore do not think that it needs to be

De subsiciuis controuersia est status effectiui，quoniam subsiciua nominari aut sentiri sine quadam loci latitudine［m］aut modo non possunt．ideoque manifeste apparet supra dictarum controuersiarum status in 〈his habere〉 locum．

Subsiciuorum autem genera sunt duo；unum quod extremis adsignatorum agrorum finibus centuria［ru］m non explet．aliud etiam integris centuriis interuenit．de quo maximae con－ trouersiae agitantur．cum autem adsignatio in agro adsignato fieret，non potuit omnis modus intra IIII limites ueteranis adsignari．in ea remansit aliquid，quod a subsecante linea nomen accepit subsiciuum．in his subsiciuis quidam iterum miserunt quibus agri adsignarentur，quidam et subsiciua coloni $\langle i\rangle s$ concesserunt．ideoque semper hoc genus controuersiae a rebus publicis exercentur．per longum enim tempus atti［n］gui posses－ sores uacantia loca quasi incitante otiosi 〈soli〉 opportunitate［m］inuaserunt et per longum tempus inpune commal lea〉uerunt．horum subsiciuorum multae res p．etiam si sero mensuram repetierunt，non minimum aerario publico contulerunt．pecuniam etiam quarundam coloniarum imp．Vespasianus exegit，quae non haberent subsiciua concessa：non enim fieri poterat，ut solum illud，quod nemini erat adsignatum，alter－ ius esse posset quam qui poterat adsignare．non enim exiguum pecuniae fisco contulit uenditis subsiciuis．sed pos $\langle t\rangle q u a m$ legationum miseratione commotus est，quia quassabatur uniuersus Italiae possessor，intermisit，non concessit．aeque et Titus imp． aliqua subsiciua in Italia recollegit．praestantissimus postea Domitianus ad hoc ben－ eficium procurrit et uno edicto totius Italiae metum liberauit．

Haec controuersia numquam a priuatis exercetur（IIl．36）．
De alluuione controuersia est status effectiui：efficitur enim subinde et per tempora mutatur．in hac controuersia plurimum sibi uindicat ius ordinarium．agitur enim de eo solo quod alluat flumen，et subtiles intro ducuntur quaestiones，an ad eum pertinere debeat，cui in altera ripa recedente aqua solum creuit；hic qui aliquid agri sui desiderat transire et possidere illud debeat，quo $\langle\mathrm{d}\rangle$ flumen reliquit．nisi quod illud subtilissime profertur，quod is solum $\langle\mathrm{a}\rangle$ misit，non statim transire in alteram ripam，sed abductum esse $\langle e\rangle t$ elotum．et illud，contra uicinum longe dissimilem agrum habere，quod hic forte cultum et pingue solum amiserit，apud illum autem harenae，lapides et limum abluuio inuectum remanserit．illud praeterea，quod finem illis semper aqua fecerit et nunc quoque facere debeat．

Sunt et multa，de quibus subtiliter tractatur：sed nec uno tantum genere per allu－ uionem flumina possessoribus iniurias faciunt．sicut $\mathrm{Pa} d \mathrm{dus}$ relicto alueo suo per cuius－ libet fundum medium inrumpit et facit insulam inter nouum et ueterem alueum．ideo de hac re tractatur，ad quem pertinere debeat illud quod reliquerit，cum iniuriam prox－ imus possessor non mediocrem patiatur，per cuius solum amnis publicus perfluat．nisi

[^48]Concerning subseciva，a dispute belongs to the status effectivus，since subseciva cannot be specified and recognized unless the site has a certain breadth and area．So it is clear that the condition of the disputes discussed above 〈has〉 a role 〈here〉．${ }^{45}$

There are two types of subseciva：one，where a centuria on the outer boundaries of allocated lands is not completed；and one which occurs within whole centuriae．It is this type which produces the greatest disputes．When the allocation was taking place in allocated lands，not all the area of land enclosed by four limites（i．e．a centuria） could be allocated to the veterans．Some land remained（unallocated）in it（the centuria），and got the name subsecivum from the line which cut it off $\{$ subseco $\}$ ．Some （of the founders）sent out more settlers to whom land was to be allocated in these subseciva；others granted the subseciva to colonies．Therefore this type of dispute is always pursued by communities．For，over a long period of time，neighbouring land－ holders encroached on unoccupied land，as if the availability of the idle ground had prompted them，and over a long period of time attached it to their land with impunity．${ }^{46}$ Even if many communities were late in reclaiming the area of these sub－ seciva，they made no small contribution to their treasury．Indeed the emperor Vespasian demanded money from several colonies on the grounds that they had not had the subseciva（which they were exploiting）granted to them；for it was impossible that that land，which had not been allocated to anyone，could belong to anyone other than the person who had the power to allocate it．By selling off the subseciva，he brought no small amount of money to the treasury．Subsequently，however，he was moved by the distress of delegations，because all the landholders in Italy were in turmoil，and intermitted his ruling，but did not yield（i．e．revoke the policy entirely）． Similarly the emperor Titus repossessed some subseciva in Italy．Later the excellent emperor Domitian speedily conferred this benefaction and with one edict freed all Italy from fear．${ }^{47}$

This dispute is never pursued by private individuals．${ }^{48}$
A dispute about alluvial land belongs to the status effectivus，for it happens repeatedly and in the course of time changes．In this dispute the normal legal process arrogates the greatest role to itself．The dispute concerns the soil that a river deposits， and complex questions are thereby produced，namely，whether it should belong to the person on the opposite bank whose land has been augmented on the retreat of the river water，or whether the man who lost some of his land should cross over and take possession of that soil that the river deposited．But against this is raised a very subtle point，namely，that the soil that one man lost does not immediately cross over to the other bank，but is removed and washed away（by the river）．And，on the other hand， the neighbour receives a very different type of soil，because，while the former lost soil that was perhaps cultivated and fertile，the latter was left with a residue of sand， stones，and mud washed up by the flood water．There is the further point，namely， that the river always marked the boundary between them，and should also do so now．${ }^{49}$

There are indeed many aspects subject to minute analysis；but there is more than one type of alluvial activity through which rivers inflict loss on landholders．For ex－ ample，the river Po，leaving its bed，bursts through the middle of someone＇s farm and makes an island between its old and new course．In this case the question concerns who should own the soil that it deposited，since the nearest landholder is suffering no
quod iuris periti aliter interpretantur，et negant illud solum，quod solum p（opuli） R （omani）coepit esse，ullo modo usu capi $\mathrm{a}[\mathrm{t}]$ quoquam mortalium posse．et est uerisimile．ita neuter possessor excedere finem illum ueteris aquae ullo iure potest aut debet．hae quaestiones maxime in Gallia to $\langle\mathrm{ga}\rangle$ ta mouentur，quae multis contexta flu－ minibus inmodicas Alpium niues in mare transmittit et subitarum regelationum repentina［s］inundatione［s］patitur iniurias．

Quaeritur tamen，qualia quanta sint flumina，in quibus alluuio obseruari debeat． nam et iure continetur，nequis ripam suam in iniuria $\langle\mathrm{m}\rangle$ uicini munire uelit．

Multa flumina et non mediocria in adsignationem mensurae antiquae ceciderunt： nam et deductarum coloniarum formae indicant，ut multis fluminibus nulla latitudo sit relicta．sequitur in his fluminibus artem mensoriam aliquem locum sibi uindicare， quando exacto limite accepta finiatur，qua［e］uel aqua〈m〉 uel agrum uel utrumque habere debeat unus．fuit enim fortasse tunc ratio non simplex，qua deberet quis quid deductorum etiam 〈a〉quae accipere．primum quod exiguitas agrorum conditorem ita suadebat．deinde 〈quod〉 non erat ingratum possessori proximum esse aquae com－ modo．tertio quod，si sors ita tulerat，aequo animo ferendum habebat．in his agris exig－ itur fere mensura secundum postulationem aeris formarumque．quo pertica cecidit， eatenus acceptae designantur．

Videbimus an inter mensores et iuris peritos esse de hoc quaestio debeat，cursum an perticam metiam〈ur〉，si qua usque potuit ueteranis est adsignatum．scio in Lusitania，finibus Emeritensium，non exiguum per mediam coloniae perticam ire flu－ men Anam，circa quod agri sunt adsignati qua usque tunc solum utile uisum est． propter magnitudinem enim agrorum ueteranos circa extremum fere finem uelut ter－ minos disposuit，paucissimos circa coloniam et circa flumen $\mathrm{A}\langle n a m\rangle$ ：reliquum ita remanserat，ut postea repleretur．nihilo minus et secunda et tertia postea facta est adsignatio：nec tamen agrorum modus diuisione uinci potuit，sed superfuit inadsigna－ tus．in his agris cum subsiciua requirerentur，inpetrauerunt possessores a praeside prouinciae eius，ut aliquam latitudinem An $\langle a e\rangle$ flumini daret．quoniam subsiciua quae quis occupauerat redimere cogebatur，iniquum iudicatum est，ut quisquam amnem publicum emeret aut sterilia quae alluebat：modus itaque flumi〈ni〉 est constitutus．hoc exempli causa re［i］gerendum existimaui．nam et in Italia Pisauro flumini latitudo est adsignata eatenus，qua usque adlauabat．

De iure territorii controuersia est status iniectiui．inicitur enim solo quaedam con－ trouersia e persona：tum praecipue qui（d）quid est illud de quo agitur，aut locus aut modus，gen－ eralem statu $m\langle a\rangle$ iure ordinario trahit，etiam si multis locis mensurarum exigat interuentum．
small loss, as a river which is public property is flowing through his land. However, legal experts take a different view and argue that in no circumstances can that ground that has begun to be the ground of the Roman people be acquired by usucapio by any mortal man. And it is reasonable: neither landholder by any right whatsoever can or ought to go beyond that boundary established by the old course of the river. These disputes are very prevalent in Gallia Togata, which, criss-crossed by many rivers, carries the huge snows of the Alps to the sea, and suffers damage through the unexpected flooding that accompanies sudden thaws. ${ }^{50}$

However, there is debate about the type and size of rivers in which alluvial activity should be recognized. There is also a legal provision, in case anyone wants to buttress his bank of the river to the detriment of his neighbour. ${ }^{51}$

Many not insubstantial rivers have fallen within the allocations of an old survey. Moreover, the maps of colonies that were founded show how, for many rivers, no width was set aside. It follows that in the case of these rivers, the surveyor's profession claims some place for itself in deciding, when the limites have been completed and each allocation is being demarcated, how an individual settler should have water or land or both. Perhaps in those days there was no single reason why any of the colonists had also to receive any part of the river. Firstly, because a shortage of land persuaded the founder to proceed in this way; secondly, because it was not unwelcome for a landholder to be adjacent to the boon of a water supply; thirdly, because if the lot had turned out that way, he had to put up with it with equanimity. In these lands, a survey is normally called for in accordance with the requirement of the bronze records and of the bronze maps. For the allocations are marked out as far as the surveyor's rod measured. ${ }^{52}$

We shall consider if there should be a debate between surveyors and legal experts about this, namely, whether we should measure along the river's course or along the line of the land division, if land was allocated to the veterans as far as it could be. ${ }^{53}$ I know that in Lusitania in the territory of (Augusta) Emerita, the substantial river Ana flows right through the middle of the colony's territory, and lands were allocated around it as far as the soil appeared usable at that time. Because of the huge extent of the lands, the founder settled veterans for the most part round the outer boundary just like boundary markers, but very few round the colony itself and round the river Ana; the residue remained to be filled up later. Notwithstanding the fact that a second and third allocation took place, the quantity of land could not be exhausted by distribution and an amount remained unallocated. In these lands, when subseciva were being claimed back, the landholders obtained an undertaking from the governor of that province to designate a specific width for the river Ana. Since individuals were being compelled to buy back the subseciva that they had occupied, it was judged unfair that anyone should buy the river, which was public property, or unfertile land which the river had deposited. So, a limit was assigned to the river. I thought that I ought to collect this evidence by way of an example. Indeed in Italy a width was assigned to the river Pisaurus at the furthest point to which it ever flowed. ${ }^{54}$

A dispute concerning territorial jurisdiction belongs to the status iniectivus. For a dispute is thrust upon the land by a person; then especially, whatever the source of the dispute, either site or area, it acquires a general condition from the normal legal process, even if it requires the intervention of surveying in many places. This dispute
haec enim controuersia non tantum inter res publicas sed et inter rem p．et priuatos exercetur，nec tantum iure ordinario sed et arte mensoria conponitur．

Inter res p．autem controuersiae eius generis mouentur，ut quaedam sui territorii iuris esse dicant，quamuis sint intra alienos fines，munificentiam quoque coloniae aut municipio ex his locis deberi defendant．sed $\langle\mathrm{h}\rangle$ aec quaedam coloniae aut beneficio conditorum perceperunt，ut Tudertini，aut postea apud principes egerunt，ut Fanestres， ut incolae，etiam si essent alienigenae，qui intra territorium colerent，［alii h］omnibus ［h］oneribus fungi in colonia［m］deberent．hoc Fanestres nuper inpetrauerunt，Tudertini autem beneficio habent conditoris．

Inter res p．et priuatos non facile tales in Italia controuersiae mouentur，sed fre－ quenter in prouinciis，praecipue in Africa，ubi saltus non minores habent priuati quam res $p$ ．territoria：quin immo multi saltus longe maiores sunt territoriis：habent autem in saltibus priuati［s］non exiguum populum plebeium et uicos circa uillam in modum municipiorum． r （es）p（ublicae）controuersias de iure territorii sole $\langle n\rangle t$ mouere，quod aut indicere munera dicant oportere in ea parte soli，aut［em］legere tironem ex uico， aut uecturas aut copias deuehendas indicere，aliquando et ex quadam parte soli；quamuis alium statum generalem controuersiae accipere debeant，quae de loco non exiguo mouentur．res tamen publicae cum priuatis si agunt，quasi iure territorii solent uindicare，et hunc statum generalem constituunt eis locis quae loca res p．adserere conantur．eius modi lites non tantum cum priuatis hominibus habent，sed et plerumque cum Caesare，〈qui〉 in prouincia non exiguum possidet．

Non est dubium necessarias esse mensuras in eius modi controuersia，〈quae〉 quamuis alio nomine appellatur，locorum tamen facit quaestionem（IIl．37）．

De locis publicis controuersia est aeque status iniectiui．sunt autem loca publica com－ plura，sed ex his quaedam loca priuata $\langle\mathrm{m}\rangle$ exigunt defensionem：et quamuis haec loca diuersis appellationibus contineantur，unam tamen habent controuersiae condicionem．

Sunt autem loca publica haec，quae inscribuntur ut SILVAE ET PASCVA PVBLICA AVGVSTINORVM．haec uidentur nominibus data；quae etiam uendere possunt．

Est alia inscriptio，qua〈e〉 diuersa significatio〈ne〉 uidetur esse，in quo loco inscribitur SILVA ET PASCVA aut FVNDVS SEPTICIANVS COLONIAE AVGVS－ TAE CONCORDIAE．haec inscriptio uidetur ad personam coloniae ipsius pertinere〈ne〉que ullo modo ab〈a〉lienari posse a re［i］publica［e］．item siquid in tutelam aut tem－ plorum publicorum aut balneorum adiungitur．

Habent et res p．loca suburbana inopum funeribus destinata，quae loca culinas
is carried on not only between communities, but also between a community and private individuals, and is settled not only by the normal legal process but also by surveying skill.

Disputes of this kind between communities are initiated so that they may argue
that certain areas belong to the jurisdiction of their territory, even though they are within the territory of another community, and claim that the yield from these places is due to their colony or municipium. However, some colonies, either through the generosity of the founders, like the people of Tuder, or subsequently by appeal to emperors, like the Fanestres, gained this (concession), namely, that the inhabitants who dwelt inside their territory, even if they belonged to another community, should be liable for the performance of all obligations in the colony. The Fanestres have gained this right recently, the people of Tuder hold it through the generosity of their founder. ${ }^{55}$

It is not easy for disputes of this type between communities and private individuals to arise in Italy. But they often occur in the provinces, especially in Africa, where private individuals have estates no less extensive than the territory belonging to communities. Indeed many estates are far bigger than territories. ${ }^{56}$ Moreover, private individuals have on their estates a not insubstantial population from the lower orders, and villages scattered around their country house $\{$ villa\} rather like municipia. Communities normally initiate a dispute about the law relating to territories, because they claim the right either to impose taxes on that piece of land, or to levy recruits from a village, ${ }^{57}$ or to impose the provision of facilities for travel or the transport of troops, ${ }^{58}$ sometimes from a certain piece of land. Although disputes which start over a substantial site ought to be included in a different general condition, nevertheless, when communities go to law with private individuals, they normally assert their claim as though by the law relating to the territory, and they establish this general condition for those places, which the communities are trying to claim. Communities have lawsuits of this type not only with private individuals, but often also with the emperor, who owns no small amount of land in a province. ${ }^{59}$

Undoubtedly a survey is needed in a dispute of this kind, which, although it goes under a different name, nevertheless involves a question of sites. ${ }^{60}$

A dispute concerning public places also belongs to the status iniectivus. There are many public places but out of these some places require a separate defence. Although these public places are included under various names, they fall into one condition of dispute.

Public places are those inscribed (on a map), for example, 'the woods and public pastures of the Augustan colonists'. These seem to have been granted by name; they can even be put up for sale.

There is another inscription which seems to have a different implication; in this case there is inscribed: 'wood and pasture land' or 'the farm of Septicius of the colony
Augusta Concordia'. ${ }^{61}$ This inscription seems to apply to the very being of the colony itself, and (the property) cannot in any way be alienated by the community. The same applies if anything is assigned (to the community) for the upkeep of public temples or baths.

Communities have places on the outskirts of town intended for the funerals of the poor, and they call these places culinae. They also have places set aside for the
appellant．habent et loca noxiorum poenis destinata．ex his locis，cum sint suburbana， sine ulla religionis reuerentia solent priuati aliquid usurpare et hortis suis adplicare．de his locis，si r．p．formas habet，cum controuersia mota est，ad modum＜mensor〉 locum restituit：sin autum，utitur testimoniis et quibuscumque potest argumentis．

De locis relictis et extra clusis controuersia est status iniectiui：manifestum est enim de loco agi，sed per aliam personam．loca autem relicta et extra clusa non sunt nisi in finibus coloniarum，ubi adsignatio peruenit usque qua cultum fuit，quatenus ordinatio $\langle n e\rangle$ centuriarum intermissa finitur．ultra autem siluestria fere fuerunt et iuga quaedam montium，quae uisa sunt finem coloniae non sine magno argumento facere posse．ergo fines coloniae inclusi sunt montibus．propter quod haec loca，quod adsignata non sint， relicta appellantur；extra clusa，quod extra limitum ordinationem sint et tamen fine cludantur．haec plerumque proximi possessores inuadunt et opportunitate loci inuitati agrum optinent．cum his controuersiae a rebus publicis solent moueri．

De locis sacris et religiosis controuersia est aeque status iniectiui：agitur enim de locis， sed cum aut sacra aut religiosa nominentur，statum generalem a iure ordinario accipiunt． primum enim quaeritur，an ea loca ullo modo usu capi possint：deinde，quatenus possint，secundum locum habent mensurae．

Locorum autem sacrorum secundum legem populi Rom．magna religio et custo－ dia haberi debet：nihil enim magis in mandatis etiam legati prouinciarum accipere solent，quam ut haec loca quae sacra sunt custodiantur．hoc facilius in prouinciis seru－ atur：in Italia autem densitas possessorum multum inprobe facit，et lucos sacros occu－ pant，quorum solum indubitate p．R．est，etiam si in finibus coloniarum aut municipiorum．de his solet quaestio non exigua moueri inter r．p．et priuatos．

Sed et inter res publicas frequenter eius modi contentio agitatur de his locis，in quibus conuentus fiunt maiores et aliquod genus uectigalis exigitur．

Nam et de aedibus sacris，quae constitutae sunt in agris，mutata tantum persona similes tamen oriuntur quaestiones；sicut in Africa inter Adrumentinos et Tysdritanos de aede Mineruae，de qua iam multis annis litigant．

Sunt et loca sacra，quae re uera priuatis finibus rei p．col〈on〉i debent．haec plerumque interuent $u$ longae obliuionis casu a priuatis optinentur，quamquam in tab－ ulariis formae eorum plurimae extent．haec maxime aut in loco urbis aut suburbanis locis a priuatis detinentur（Ill．38）．
punishment of criminals. ${ }^{62}$ Private individuals without any respect for religious feeling are in the habit of appropriating parts of these places, since they are on the outskirts of town, and adding them to their own gardens. When a dispute has been initiated about these places, if the community has maps, the surveyor restores the place to its
proper area. But if there are no maps, then he makes use of pieces of evidence and any other proof he can (use).

Concerning places that have been left out and not enclosed, a dispute belongs to the status iniectivus. For it is clear that the dispute concerns a site, though it is conducted by a different party (i.e. different in respect of the dispute about site discussed at C 31.16). Places that have been left out and not enclosed exist only in the territories of colonies, where the allocation reaches as far as the land was cultivated, and indeed is terminated at the point where the formation of the centuriae was discontinued. Beyond this there were usually woods and mountain ridges, which seemed capable of providing an extremely authoritative boundary for the colony. So, the territory of the colony was enclosed by mountains. Therefore these places, because they were not allocated, are called 'left out' and 'not enclosed' because they are outside the framework of the limites and yet are included within the boundary. The nearest landholders often encroach on these places, and, prompted by the availability of the place, appropriate the land. It is with these men that disputes are normally initiated by communities.

Concerning sacred and religious places, a dispute also belongs to the status iniectivus. The dispute is about sites, but since they are called sacred or religious, they take their general condition from the normal legal process. The first question is whether such places can be acquired in any way by usucapio; then, inasmuch as they can be so acquired, survey has second place.

According to legislation of the Roman people, the great religious aura and guardianship of sacred places must be preserved; even provincial governors normally receive no more important exhortation in their instructions than that those places which are sacred should be safeguarded. ${ }^{63}$ This is more easily maintained in the provinces. In Italy, however, the multitude of landholders act with a great deal of dishonesty, and they appropriate sacred groves, whose land undoubtedly belongs to the Roman people, even if they are within the territories of colonies or municipia. Concerning these places no small dispute normally arises between a community and private individuals. ${ }^{64}$

But a disagreement of this type also frequently occurs between communities, con-
cerning those places where large gatherings take place and some kind of tax is exacted. ${ }^{65}$

Moreover, similar disputes arise concerning sacred temples which have been built in fields, with a change only in the party involved; for example; in Africa the dispute between the people of Hadrumetum and the people of Thysdrus over the temple of Minerva, about which they have been at law for many years. ${ }^{66}$

There are also sacred places which in reality the colonists are under an obligation to return to the land owned separately by the community itself. ${ }^{67}$ Generally these places through long neglect are appropriated opportunistically by private individuals, although in record offices numerous maps of them may exist. They are held by private persons, mostly either within the area of a city or on its outskirts.

De aqua pluuia arcenda controuersia est status iniectiui: per quodcumque enim solum transit, ad ius ordinarium magis respicit condicio eius quam ad mensuras; nisi si per extremitatem finis uadat: propter quod statum generalem etiam alium accersire debet et quasi geminatione quadam defendi, quod et per finem eat et sit lis de pluuia arcenda. haec controuersia per regiones uari $\langle i\rangle s$ generibus exercetur, sed quasi ad eandem respicit condicione $\langle\mathrm{m}\rangle$. in Italia aut quibusdam prouinciis non exigua est iniuria, si in alienum agrum aquam inmittas; in prouincia autem Africa, si transire non patiaris.

Eiusdem condicionis est controuersia de cloacis ducendis et fos $\langle\mathrm{s}\rangle$ is caecis. quod totum, nisi per finem agatur, ad ius ordinarium pertinet (III. 39).

De itineribus controuersia est status iniectiui: inicitur enim loco quaestio, et defenditur populo quod forte a priuatis possidetur. haec quaestio multipliciter tractatur.

Nam in agris centuriatis excipitur limitum latitudo causa itineris. sed cum illi recturas suas per qualiacumque loca extendant, hoc est qua ratio dictauit, per cliuia et montuosa, qua iter nullo modo fieri potest, quae loca fortasse possessori siluae causa sint utilia, horum loco non inique, per quae possit loca commode iri, iter commutant.

Nam quae sit condicio itinerum, non exigua iuris tractatio est. agitur enim, utrumne actu\{s〉 sit an i[n]ter $\langle a n\rangle$ ambitus. per quae loca quid liceat populo, iure continetur.

Satis, ut puto, dilucide genera controuersiarum exposui: nam et simplicius enarrare condiciones earum existimaui, quo facilius ad intellectum peruenirent. nunc quem admodum singulae tractari debeant persequendum est. respicio enim quantum sit quod mensori iniungatur, et puto diligentius exequenda quae ad prouidentiam pertinenti〈a> sunt artificis. difficillimus autem locus hic est, quod mensori iudicandum est; sed nec minus ille exactus, quod est aduocatio praestanda. quamquam diuersa sint et longe inter se discernere debeant, prudentiam tamen eandem artifices habere debent et qui iudicaturi sunt et qui aduocationes sunt praestituri. in iudicando autem mensor[em] bonum uirum et iustum agere debet neque ulla ambitione aut sordibus moueri, seruare opinionem et arti et moribus. omnis illi artifici ueritas custodienda est, exclusis illis similitudinibus, quae falsae pro ueris subiciuntur. quidam enim per imperitiam quidam per inpudentiam peccant: totum autem hoc iudicandi officium et hominem et artificem exigit egregium. erat aequissimum et in aduocatione[m] eandem fidem exhiberi in controuersiam a mensoribus. sed hoc possessores aequo animo ferre non possunt: nam cum his ueritas exposita est, aduersus

A dispute about keeping away rain water belongs to the status iniectivus. Whatever piece of ground the water runs across, the condition of this dispute relates more to the normal legal process than to surveying. But if the water runs along the edge of a boundary, then the case should acquire a different general condition and be pursued in a double way, as it were; that is, because the water runs along a boundary and because there is also a disagreement about keeping off rain water (i.e., there are two potential sources of dispute and methods for resolving the dispute). This dispute takes different forms in the regions, but relates to virtually the same condition. In Italy or in certain provinces, it is a serious offence if you divert water onto someone else's land, but in the province of Africa, if you prevent water from crossing their land.

A dispute about the laying of sewers and concealed ditches comes under the same condition. All this is a matter for the normal legal process unless the dispute involves a boundary.

Concerning rights of way, a dispute belongs to the status iniectivus. The question involves a site, and that land, which is perhaps possessed by private individuals, is claimed by a community. This dispute is dealt with in a number of ways.

Now, in lands divided into centuriae, the width of the limites is set aside in order to provide a right of way. But since the limites extend their straight lines through any type of location, that is, wherever the scheme dictated, across slopes and mountainous terrain, where it is completely impossible to make a road, but which could perhaps be of use to a landholder for a wood, in place of these locations they (landholders) not unreasonably move the road to locations through which a route can easily be followed.

There is considerable legal discussion over the definition of rights of way. The question concerns whether it is a right of driving \{actus $\}$, or a right of way $\{$ iter $\}$, or a right of going round a building \{ambitus\}. It is within the remit of the law as to what public rights of way are due through which areas. ${ }^{68}$

I think that I have set out sufficiently clearly the types of land dispute; I decided to describe their conditions more straightforwardly so that they could be more easily understood. Now I must discuss how individual disputes should be treated. I am considering how much there is that may be enjoined upon the surveyor, and I think that I should examine with especial care those points that are relevant to the forethought of the professional. It is a very difficult role when the surveyor has to adjudicate. But when a case has to be presented in a law court, that is a no less demanding role. Although they are different roles and ought to have substantial distinctions between them, nevertheless professional men should have the same good sense, both those who are going to adjudicate and those who are to present a case in court. In adjudicating the surveyor should conduct himself as a good and just man, and not be influenced by ambition or greed; he should lay up a reputation for his professional skill and character. Complete truthfulness must be preserved by the professional, with the exclusion of those counterfeits, which, as untruths, are inserted in place of the truth. Some make mistakes because of inexperience, others because of lack of judgement. But all this duty of adjudication demands an outstanding man and an outstanding professional. Now, it was entirely reasonable that in presenting a case the same honesty be exhibited by surveyors in respect of a dispute. But landholders cannot accept this with
sinceritatem artis facere cogunt. multa sunt in professione quae generaliter pro ueris offerantur, multa quae specialiter, quaedam quae argumentaliter. coniecturaliter etiam mentiri artifices coguntur.
(surveyors) to act against the integrity of their profession. In a profession there are many points that are presented in general terms in place of the truth, many specifically, and some as a proof. Professionals are compelled even to invent things as part of a conjecture. ${ }^{69}$

## 〈COMMENTVM DE AGRORVM QVALITATE〉

Suscepimus qualitates agrorum tractandas atque plano sermone et lucido exponendas，et uolumus ut ea quae a ueteribus obscuro sermone conscripta sunt apertius et intellegibilius exponere ad erudiendam posteritatis infantiam et quo dulcius possit disciplinam appetere quam timere．nam primaeuae aetati quam sint radices amarissimae litterarum，scientes litteras non ignorant：ideoque ita planum facimus iter，ut exeuntes a prioribus studiis litterarum，in his secundis ac liberalibus uenientes，disciplinam hanc uelut suauitatem quandam post amari－ tudinem concupiscant．

Iam nunc ergo pergamus exponere．＇Agrorum qualitates tres esse＇Iulius Frontinus ostendit dicens＇unam agri diuisi et assignati＇．uideamus qui sit ager diuisus et assignatus．sine dubio uideo alicuius formam agri magnam，quae diuisa est atque assignata in tempore．et nisi esset quaedam materialis agri forma，quomodo poterat diuidi？an totum mundum aut prouinciam totam unius possumus agri，qui sit diuisus，qualitatem accipere？atquin hoc ita intellegere omnino mihi uidetur absurdum，eo quod subiungit continuo idem Frontinus＇altera mensura per extremitatem conprehensi＇．uideo ergo illum agrum，qui dum in se ducenta et eo amplius iugera contineret，postea iussu principum intercisiuis limitibus 〈est〉 distributus quinquagenis iugeribus uel amplius，ut qualitas locorum inuenta est．quae intercisiones per trifinia et quadrifinia siue interuenientium uel interpositorum ratione signorum cernuntur esse dispositae．alteram quali－ tatem dicit mensuram per eiusdem agri extremitatem conprehensam．iuxta hunc agrum，de quo locuti sumus，uidemus confinem esse modum mensura conprehensum subseciui，qui frequenter in extremitatibus assignatorum agrorum incidens mensurali linea cernitur conprehensus．de hoc inferius suo loco apertius disputabimus．nam quidam centuriam uolunt intellegi＇mensuram＇dic－ tam＇per extremitatem conprehensam＇．quod et ipsud potest accipi，quia etsi centenis hominibus duocentena iugera data legimus，quorum propter numerum sit appellata centuria，legimus in quibusdam locis ab uno mille et trecenta iugera fuisse possessa．＇Tertiam arcifinii agri qualitatem＇assignat．＇arcifinius ager ab arcendis hostibus＇nuncupatur，sicut paulo inferius sub－ sequens lectio manifestat．hic et occupatorius ager dicitur eo quod in tempore occupatus est a uictore populo，territis exinde fugatisque hostibus；quia non solum tantum occupabat unus quisque，quantum colere praesenti tempore poterat，sed quantum in spe colendi habuerat ambiebat．fines uero his signis inter se diuidebant，fossis manu factis，arboribus ante missis，flu－ minum interuenientium cursu［s］，iugis quoque montium，quae ex eo nomine accipiuntur，quod

## $\langle C O M M E N T A R Y \text { ON TYPES OF LAND }\rangle^{1}$

I have undertaken that the types of land should be examined and set out in straightforward and clear language, and I wish to expound more clearly and intelligibly subjects that writers of earlier times treated in obscure language, in order to educate the youth of the future, and in order that they can more agreeably seek, rather than fear, learning. Although learning the elements of the alphabet is very bitter to the young, once they know the alphabet they are not ignorant; therefore we make the road so level that, leaving their earlier study of the alphabet and coming upon this second liberal study, they covet this learning like a kind of sweetness after bitterness.

Let us now proceed to expound this subject. Julius Frontinus pointed out that there 'are three types of land', saying, 'firstly land that has been divided and allocated' (C $3.3=\mathrm{T} 1.3-4=\mathrm{L} 1.3-4$ ). Let us see what divided and allocated land is. Undoubtedly I see a large block of land, which at some time has been divided and allocated. And unless there was some material block of land, how could it be divided? Or can we take the entire world or an entire province as one type of land, which might be divided? But it seems entirely absurd to me to understand this in this way, because Frontinus immediately adds 'secondly land that has been contained in a survey throughout its extent' (C $3.4=\mathrm{T} 1.4=\mathrm{L} 1.4$ ). Therefore, I see that the land that contained within its confines two hundred or more iugera was afterwards distributed on the orders of the emperor by intermediate limites in lots of fifty iugera or more, as they established the nature of the locality. These intermediate limites are perceived to have been laid out by means of trifinia or quadrifinia or by a system of intervening or interposed markers. He says that there is a second type (of land) where its outer boundary has been enclosed by survey. Next to this land, which I have discussed, I see that there is an adjacent area of subsecivum, enclosed by survey. This occurs frequently on the edges of allocated land and is perceived to have been enclosed by a measured line: I shall discuss this more fully below in its own place. Now, some people wish the phrase 'contained in a survey throughout its extent' to be understood as referring to a centuria. This can be accepted, because, although we read that two hundred iugera were given to every hundred men, and because of this number it was called a centuria, we read that in some places one man possessed 1,300 iugera. ${ }^{2} \mathrm{He}$ establishes 'a third type consisting of land of uncertain boundary \{arcifinius ager\}'. This is designated as 'arcifinius ager from driving away the enemy' (C 3.27-8 $=\mathrm{T} 2.12-13=$ L 6.1-2), as a later passage a little below makes clear. Moreover, this is also called occupatorius ager from the fact that at one time it was occupied by the victorious people after the enemy had been terrified and driven from there. Each person occupied not only as much land as he could currently cultivate, but coveted as much as he had the hope of cultivating. ${ }^{3}$ They divided the land among themselves by the following markers: man-made ditches, trees previously planted, the bed of rivers flowing across, mountain ridges $\{i u g a\}$, which get their name from the fact that they are yoked
continuatione ipsa iugantur, superciliis nec non itineribus uel diuergiis; quae aut loci natura aut sollers procurauit antiquitas.
'Ager ergo diuisus assignatus est coloniis' siue municipiis, uni cuique possessioni modum secundum terrae qualitatem. 'Hic ager habet condiciones duas, unam qua plerumque limitibus continetur, alteram qua per proximos possessionum rigores assignata est'. limes ergo est quodcumque in agro opera manuum factum est ad obseruationem finium. rigor uero suae rectitudinis naturalis nomen accepit. 'Quidquid autem secundum hanc condicionem in longitudinem est delim(it)atum, per strigas appellatur, quidquid per altitudinem, per scamna'. strigatus ager est, qui a septentrione in longitudinem in meridiano decurrit, scamnatus autem, qui eo modo ab occidente in orientem crescet. et altitudinem hanc secundum idioma artis uoluit Frontinus in orientem intellegi. nam dum superficiales nunc qualitates tantum modo uel mensuras exponat, quomodo nos possumus soliditatis corpus aduertere, in quo altitudo aut crassitudo ponatur? 'Ager ergo limitatus hac similitudine decimanis et cardinibus continetur'. ergo hic ager, quem in hac similitudine asserit contineri decimanis atque cardinibus, in re praesenti considerari poterit.
uero a meridianum in septentrione $(\mathrm{m}\rangle$ duxerunt. quidam uero ex aduerso eos asserunt constitutos. nam et alibi limites facti sunt ab his, qui solis ortum et occasum secuti sunt. quos fefellit ratio geometriae mihi tamen, sicut Higenus constitui decreuit limites, ita rationabile uidetur, ut decumanus maximus in orientem crescat et cardo maximus in meridianum. 'Ager per strigas et per scamna diuisus et assignatus est more antiquo in hac similitudine, qua in prouinciis arua publica coluntur'. ager ergo, siue per strigas siue per scamna diuisus sit, siue quocumque alio ordine succedenti, assignatus est more antiquo atque antiquo arbitrio in hac similitudine, qua in diuersis prouinciis arua publica coli perspicimus. nam quod publica arua coli dicit, ne ammiremini. nam ideo publica hoc loco eum dixisse aestimo, quod omnes etiam priuati agri tributa atque uectigalia persoluant. nam paulo inferius dicit 'eadem ratione et priuatorum agrorum mensurae aguntur', ut apertius ostenderet publicum cum priuato esse consortem, quia dum priuatus laborat in proprio, et tributum publico et sibi alimonia arua excolendo procurat.
'Ager est mensura conprehensus cuius modus uniuersus ciuitati est assignatus'. istius agri mensuram in unum modum quodammodo uideo conprehendi. nunc hic modus uniuersalis sagacius a nobis inuestigari debet. uidemus igitur modum per terminos territoriales et limitum cursus et titulos, id est inscriptis lapidibus, plerumque fluminibus nec non aris lapideis, claudi territorium atque diuidi ab alterius territorio ciuitatis. idcirco quidquid intra hunc modum est mensura diuisum, suae constat ciuitati modis omnibus assignatum. 'sicut in
$\{$ iugare $\}$ together in a continuous line ( $\mathrm{C} 95.11-13=\mathrm{T} 91.12-13=\mathrm{L} 128.11-12$ ), terraces $\left\{\right.$ supercilia\}, and also roads or watersheds. ${ }^{4}$ These markers are those that the layout of the location or ingenious men of old produced.
'Land that has been divided and allocated (has been granted to) colonies' (C 3.6-7 $=\mathrm{T} 1.6=\mathrm{L} 2.1$ ) or municipia, with an area for each landholder according to the nature of the land. 'This land has two categories. In one, the land is generally contained within limites; in the other, the land has been allocated by means of the nearest straight-line boundaries \{rigores\} of holdings' (C 3.7-9 = T 1.6-9 = L 2.1-3.2). A limes therefore is anything man-made on the land for the purpose of marking boundaries. A rigor gets its name from its own inherent straightness. 'Any land of this category bounded lengthwise is said to be by strigae, and any bounded by depth, by scamna'. ${ }^{5}$ Strigatus ager is land that runs from north to south lengthwise, scamnatus is land that in this way runs from west to east. Frontinus, in accordance with the terminology of surveying, wished this (word) 'depth' to be understood as 'facing east'. Since at this point he expounds only general types or measurements, how can we examine a solid body in which there is depth or thickness? 'Land that has received limites is contained, as illustrated, within decumani and kardines' (C 3.11-12 = T 1.13-14 = L 3.5-6). So this land, which he claims is enclosed according to the illustration by decumani and kardines, can be considered now. They drew the decumanus limes, as Hyginus describes, from west to east, and laid out the kardo from south to north. But some say that they were established in the opposite direction. For elsewhere limites were established by those who followed the rising and setting of the sun. Geometrical science deceived them. ${ }^{6}$ However, it seems sensible to me that, just as Hyginus determined that limites should be established, the decumanus maximus should run towards the east and the kardo maximus towards the south. 'Land has been divided and allocated by strigae and scamna according to long-established custom, as illustrated, in the way in which public arable land in the provinces is cultivated' (C 3.12-14 = T 1.14-16 $=$ L 3.6-4.2). The land therefore, whether it was divided by strigae or scamna, or by some other subsequent method, was allocated by ancient custom and ancient decision, as illustrated, in the way in which in different provinces we see that public arable land is cultivated. You should not be surprised that he talks about the cultivation of public land. I think that he mentioned public land at this point because all land, even that which is privately owned, pays taxes and rents. Now, a little later he says: 'the land of private individuals is also surveyed on the same principle' (C 3.19-20 $=$ T $2.3-4=$ L 5.2-3), in order to show more clearly that public land has something in common with private, because a private individual, while he works on his own holding, provides both tax for the state and food for himself by cultivating the land.
'Land has been contained in a survey whose entire area has been allocated to a community' (C $3.15-16=$ T $1.18-19=\mathrm{L} 4.3-4$ ). I understand that the survey of this land is encompassed within one area in some way. Now this entire area requires to be intelligently examined by me. I see therefore that an area is marked off by means of territorial boundary markers, the path of the limites, and inscriptions, that is, inscribed stones, and often by rivers and stone altars, and that a territory is enclosed and divided off from the territory of another community. ${ }^{7}$ So, whatever land within this area has been divided by means of survey, it is agreed that it has been allocated to its own community with all its parts, 'for example in Lusitania in the case of the people

Lusitania Salmaticensibus'. Lusitania prouinciae nomen est. Salmaticenses enim uicani proprie nuncupantur. ita et 'in Hispania citeriore Palatinis et conpluribus prouinciis tributarium solum per uniuersitatem populis est definitum. eadem ratione et priuatorum agrorum mensurae aguntur. hunc agrum multis locis mensores, quamuis extremum mensura conprehenderi $n\rangle$, in formam in modum limitum condiderunt'. formarum quinque sunt genera: unum quod ex flexuosa linea continetur, alterum quod ex flexuosa et rationalibus, tertium quod ex circumferentibus, quartum quod ex circumferentibus et rectis, quintum quod ex rectis. horum sunt species infinitae. hunc ergo agrum ne in formis uideamus tantum modo conditum, continuo subiungit 'in modum limitum', ut sciamus plenissime non posse formam cuiuslibet agri sine limitum rectura subsistere. sed praeuidere formam diligentius ammonemur, ut originem cuius interfuerit limitis efficaciter praedicemus, seu d. m. seu k. m., quinti quoque atque quintarii, nec non et illos in omnibus demonstrare, qui solis ortum et occasum secuti sunt; ut nostra professio coram artificibus integra et omnem ueritatem indagans approbetur.
'Est ager arcifinius qui nulla mensura continetur'. hic est de quo superius diximus, qui et arcifinius et occupatorius nominatur. 'Finitur ergo secundum antiquam obseruationem fluminibus, fossis, montibus, uils, arboribus ante missis, aquarum diuergiis, et per ea loca quae antiquitus a possessore potuerunt obtineri'. mensura ergo hunc agrum minime actum esse conspicimus sicut ceteros agros: 'interuentu uero licium postea, per ea loca quibus nunc finitur, ex arbitrio terminos accepit. in his autem agris nullum ius subseciuorum interuenit'. recte ergo subseciuum interuenire non potuit, quia mensura actus non est, de quo remanere aut subsecari aliquid potuisset.
'Subseciuum est quod a subsecante linea nomen accepit subseciuum. horum subseciuorum duo sunt genera; unum quod in extremis assignatorum finium centuria expleri non potuit'. Hoc inuenitur $L$ et $L X$ contineri iugeribus, et quamuis exigua parte minus fuerit inuentum dimidio centuriae, subseciuum dicitur. ita tamen si spatium maius fuerit, nomen centuriae non carebit. nam haec subseciua et concessa plerumque inueniuntur et reddita, aliqua assignata: nam et censum quaedam pro suo modulo susceperunt. secundum illam uero maiorem assignationem subseciuum maius centum iugera dictum est, subseciuum minus $L$ iugera nuncupatum.
'In extremis uero assignatorum finium' ut sit assignatum, aut quae sit extremitas, uideamus. extremitas finitima linea est, quae interuenit aut per iter publicum, quod transcendi non potest 'secundum legem colonicam, quia omnis limis itineri publico seruire debet'; aut per limites siue
of Salma $\langle n\rangle$ tica' ( $\mathrm{C} 3.16=\mathrm{T} 1.18-2.1=\mathrm{L} 4.4-5$ ). Lusitania is the name of a province; the people of Salma $\langle\mathrm{n}\rangle$ tica are mentioned appropriately as living in a community. The same is true 'in Nearer Spain in the case of the people of Palantia. Moreover, in some provinces the land subject to tax has been defined for communities on the basis of its entire area. The land of private individuals is also surveyed on the same principle. In many places, surveyors, although they have established (only) its outer boundary in a survey, have entered this land on the map in the form of land that has received limites' (C $3.17-22=\mathrm{T} 2.1-7=\mathrm{L} 4.5-5.5$ ). There are five types of shape: one which is enclosed by a curving line; another by a curving line and also measured lines; a third by circular lines; a fourth by circular and straight lines; a fifth by straight lines. Of all these types there are countless different varieties. In case we should see this land as merely inserted on maps, Frontinus immediately adds in the form of land that has received limites', so that we may fully understand that it is not possible for the map of any land to exist without the straight lines of the limites. ${ }^{8}$ But we are advised to examine the map very carefully so that we may efficiently predict the starting point of each limes involved, either the decumanus maximus or the kardo maximus, or the fifth limes and the quintarius, and (we are also advised) in all cases to point out those limites that have followed the rising and setting of the sun, in order that our profession should win approval among practitioners for its integrity and search for total truth. ${ }^{9}$
'Land known as arcifinius is land that is not contained in any survey' (C $3.23=$ T $2.8=\mathrm{L} 5.6$ ). This is land which I mentioned above, which is called both arcifinius and occupatorius. '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' (C $3.23-6=$ T $2.9-12=$ L $5.6-9$ ). Therefore we see that this land has in no way been subject to survey like other land; however, 'subsequently this land began to acquire boundary markers' as a result of decisions, 'because of the occurrence of legal disputes in the places where it ends' now. 'In this kind of land rights relating to subseciva have no place' (C 3.29-30 $=\mathrm{T} 2.13-15=\mathrm{L}$ $6.2-4$ ). Therefore subsecivum cannot properly have any place because an area has not been established by survey, from which anything could have remained, or been cut away.
'Subsecivum is what has derived its name from the line that cuts it away. There are two types of' these 'subseciva, one when on the outer boundaries of allocated lands a centuria could not be completed' ( $\mathrm{C} 3.31-3=\mathrm{T} 2.16-19=\mathrm{L} 6.5-7.1$ ). This is found to be enclosed within blocks of fifty or sixty iugera, and is called subsecivum even though it is found to be only a small amount less than half a centuria. If, however, the area is greater than this, it will not lack the name centuria. For these subseciva are generally found to have been granted and returned, while some have been allocated. Some have even received a census valuation in accordance with their area. In respect of a larger allocation, an area of more than a hundred iugera is called subsecivum, one less than fifty iugera is also described as subsecivum. ${ }^{10}$
'On the outer boundaries of allocated lands' (C $3.32=$ T $2.18=\mathrm{L} 6.7$ ): let us see how it was allocated and what the outer boundary is. The outer boundary is a boundary line that lies along either a public right of way, which cannot be crossed according to the law of the colony, because every limes ought to serve as a public right of
terminos aliaque signa, quibus territoria finiuntur; aut ubi insoluta loca remanserunt. haec autem sunt loca quae insoluta dicuntur, quae aut in saxuosis et sterelibus locis sunt aut in paludibus, ubi nulla potuit exerceri cultura, quia, dum non esset quod excoli potuisset, nullis necesse fuit limitum regulis obligari. propterea et soluta loca uocata sunt. 'Aliud genus subseci- uorum, quod in mediis assignationibus et integris centuriis interuenit. quicquid enim inter quattuor limites minus quam intra clusum est fuerit assignatum, in hac remanet appellatione'. bene igitur et recte subseciuum uocari debet, quicquid inter quattuor limites fuerit assignatum minus quam intra eisdem potuit claudi limitibus, quia unus quisque limis centuriae suae modum claudens adductus est. at ubi omnes IIII aequis mensuris centurias continentes uno in loco conuenerunt, sicut in subsequenti libello nostro designauimus, quem diazografum nuncupauimus, 〈et〉 poterit agnosci, et minus clauserunt agri spatium quam quod centuriae singulae, quibus seruitutem praestabant, poterant continere, subseciuum iuste meruit appellari, 'ideo quod is modus qui assignationi superest, linea claudatur et subsecetur. nam et reliquarum mensurarum actu[s] quicquid inter normalem lineam et extremitatem interest subseciuum appellatur'. de hoc superius disputauimus. normalis linea mensuralis dicitur; extremitas uero, ubi, centuria ut expleretur, transiri non potuit.
'Est ager similis subseciuorum condicioni extra clusus et non assignatus; qui si r. p. populi Rom. aut ipsius coloniae cuius fine circumdatur, siue peregrinae urbi, aut locis sacris et religiosis aeque ad populum Romanum pertinentibus, datus non est, iure subseciuorum in eius qui assignare potuerit remanet potestatem'. in ambiguo uidetur hic ager et uelud indefinite remansisse: si enim his omnibus supra dictis datus non est, utique in assignantis remanet potestate. hunc agrum Frontinus ita remansisse testatus est. sed uideamus, ne forte postea iussu principis alicui datus sit, qui terram metiri denuo praeceperit, sicut Caesaris Augusti temporibus factum est. nam alia subseciua Vespasianus uendidit, alia autem quae remanserunt Domitianus donauit atque concessit. propterea hic ager succedentibus huc usque temporibus ita, hoc est in ambiguo, non potuit remanere. qui si remansit, in eius potestate profecto qui assignare potuerit, hoc est qui acceperit a principe assignandi licentia $\langle\mathrm{m}\rangle$. nam agri mensor omnis doctus centurias delimitare potest ac suis redintegrare limitibus, assignare autem nullo modo potest, nisi sacra fuerit praeceptione firmatus.
way, ${ }^{11}$ or along limites, or along boundary markers or other symbols, by which territories are demarcated; or where places have remained uncultivated. These places described as uncultivated occur in rocky and barren areas, or in marshes, where no cultivation could be carried on; since there was nothing that could be cultivated, there was no need to enclose (the area) with a fixed pattern of limites. Therefore these places are called unbounded. 'The second type of subseciva is that which occurs in the middle of allocated lands and within completed centuriae. For, whenever the amount of land allocated was less than that enclosed within four limites, the name subsecivum is retained' (C 3.33-6 = T $2.19-3.1=\mathrm{L} 7.1-5$ ). The name subsecivum should be given properly and appropriately whenever the area of land allocated within four limites was less than that which could be enclosed between the same four limites, because each limes has been drawn enclosing the area of its own centuria. But when all four limites enclosing centuriae with equal dimensions have met in one location, as I have shown〈and〉 as can be noted in the next book, which I have called 'Diazografus', ${ }^{12}$ and have enclosed a lesser area of land than the individual centuriae for which they provided a legal servitude (right of way) could have enclosed, the name subsecivum can be justly applied, 'because the area left over from the allocation is marked off and cut away by a line. In addition, in the conduct of other surveys (i.e., not involving centuriae), whatever land lies between right-angled lines and the outer boundary, is called subsecivum' (C $3.36-9=$ T $3.1-5=\mathrm{L} 7.5-8$ ). I discussed this above. He is referring to a right-angled line obtained by measurement. The outer boundary is the line that could not be crossed in order to complete a centuria.
'There is also land similar in status to subseciva, not enclosed and not allocated. If this land has not been granted to the res publica of the Roman people or to that of the colony by whose territory it is surrounded, or of a native city, or to the sacred and religious places that also belong to the Roman people, by the law relating to subseciva it remains under the control of the person who has the right to allocate it' (C 3.40-4 = T $3.6-12=\mathrm{L} 8.1-6$ ). This land seems to be in an uncertain position and to have remained imprecisely defined, as it were. For if the land was not granted to all the people mentioned above, it remains in the power of the person responsible for allocation. Frontinus has declared that this land remained in this position. But let us examine this, in case the land was possibly granted later to someone by order of the emperor, who instructed that the land should be surveyed again, as happened in the time of Caesar Augustus. Now, Vespasian sold off some subseciva, while Domitian granted and bestowed (on the possessors) other subseciva that remained. ${ }^{13}$ Therefore in later times this land could not remain in this position, that is, of uncertainty. If the land did so remain, it assuredly remained in the power of the person who had the right to allocate it, that is, the person who received from an emperor the permission to allocate it. Every skilled land surveyor can demarcate centuriae and restore them according to their own limites, but in no respect may he allocate them unless he has received authority by imperial command.

## INCIP. DE CONTROVERSIIS

Suscepimus quoque tractandos controuersiarum status cum diuino praesidio.
'Materiae, inquit, controuersiarum sunt duae, finis et locus. harum condicio alterutra continetur. sed quoniam singulae controuersiae diuersis condicionibus obligantur, proprie nominandae sunt. genera autem controuersiarum, ut ait Frontinus, sunt numero $X V^{\prime}$. sed quia his generibus species non dedit, et quia secundum regulam dialecticam neque genus sine specie neque sine genere species potest dici, omnino dixit inproprie: nos tamen suum illi idioma relinquentes ad intellegendas eas atque exponendas, sicut promisimus, transeamus.
'De positione terminorum controuersia est inter duos pluresue uicinos; inter duos, an in rigore sit positus terminus citerorum, siue rationis; inter plures, trifinium facit an quadrifinium'. cum ergo possessor inuenerit terminum in possessione sua aliter formatum aut aliter positum quam ceteri qui in ea possessione sunt, aut 〈non〉 inscriptum ut adsolet, agit de eo, in qua sit positus ratione, seu ipse trifinium faciat siue ab alio lineam procedentem excipiat: dumque uicinus possessor huic extiterit ambiguitati contrarius, magna inter utrosque controuersia agitatur. solent enim hae[c] controuersiae de conportionalibus nasci terminibus, nam si de eorum latere linea quasi ex artificis manu composita uideatur exire atque in unius termini angulum inpingere qui in limite est positus, in istis, ut ait Frontinus, uelud instantium argumentorum oportunitas controuersialis aptatur. hoc enim plerumque potest in limitibus inueniri. nam si ueteranus, filiis suis unam possessionem diuidens in tres aut quattuor portiones, terminos uoluit interesse, potuit quiddam tale contingere, ut ex multis quicumque respiceret angulum illius termini, qui in maximo est limite constitutus. hos siquidem terminos, qui intra possessionum fines inueniuntur, conportionales appellauit antiquitas. 'Qui si secundum pristini temporis possessionem non conueniunt, diuersas attiguis possessoribus controuersias generabunt. sed alius forte de loco, alius de fine litigat'. uidendum hoc diligenti cura. et circuiri agrum ante omnia oportet, de quo intentio uertitur. et redintegrato suis fundo limitibus per maximorum limitum rationem, tum de conportionalium terminorum positionem, quos uice tabellarum antiqui intercidendis portiunculis inter filios suos defigebant, integra $a b$ artifice ratio proferatur.

De rigore atque de fine licet similem posuerit controuersiam unamque eis condicionem esse firmauerit, tamen credo inter eas aliquid posse differri. rigor enim naturalis est. qualiscumque enim rigor interuenit constituentibus limites, rarioribus locis terminos posuerunt. et seruari iubetur rigor, si inuentus fuerit de triginta pedum latitudine, ut ne ab utroque possessore

## (COMMENTARY) ON LAND DISPUTES BEGINS

I have also undertaken with God's help to deal with the categories of dispute.
He says: there are two causes of disputes: boundary and site. Any characteristic (of a dispute) is confined to one of these. ${ }^{14}$ But since individual disputes involve dif-
ferent characteristics, each dispute must be specifically defined. There are fifteen different types of dispute, as Frontinus says. But because he did not give subdivisions to these types, and because, according to the process of reasoning, neither can a type be mentioned without a subdivision nor a subdivision without a type, he spoke entirely inappropriately. However, leaving him with his own way of putting things, let us pass on as promised to understanding and expounding the disputes.
'A dispute about the position of boundary markers arises between two or more neighbours; between two, it concerns whether' a positioned boundary marker 'fits into the line or the plan of the other markers; between more, it concerns whether the boundary marker makes a trifinium or a quadrifinium' (C 5.13-16 = T 4.12-15 = L 10.1-3). Therefore when a landholder discovers that a boundary marker in his holding is differently shaped or differently positioned in relation to the other markers which are in that holding, or that it is not inscribed in the usual way, he engages in dispute about it, in respect of the plan according to which it was positioned, whether it makes a trifinium itself, or meets a line proceeding from another marker. Since the neighbouring landholder opposes this doubtful point, a great dispute is carried on between them. These disputes normally arise about markers inside the boundary of a property \{conportionales\}. Now, if a line seems to run from one side of them as if it had been laid out by the hand of a surveyor, and impinges on the corner of a boundary marker which has been placed on a limes, in these cases according to Frontinus, there is great scope for a dispute, in as much as there is pressing evidence. ${ }^{15}$ This can generally be discovered in the case of limites. If a veteran soldier, in dividing up one holding into three or four portions for his sons, wanted boundary markers to lie between (the portions), something like this could happen, namely, that out of many (boundary markers) someone would pay attention to the corner of that marker which was positioned on the largest limes. Indeed men of old referred to those markers found inside the boundaries of landholdings specifically as conportionales. If these do not tally with the earlier occupation of the land, then they will create various disputes between adjoining landholders; but one goes to law with regard to the site, another with regard to the boundary. ${ }^{16}$ We must examine this with great diligence. It is correct first of all to make a circuit of the land on which a question hangs. When the land has, been restored with its own limites, according to the plan of the main limites, then a surveyor should produce a new plan concerning the position of the internal boundary markers, which men of old fixed in the ground to divide off small allotments between their sons, instead of using wooden boards. ${ }^{17}$

Although he (Frontinus) classified a straight line $\{$ rigor $\}$ and boundary $\{f i n i s\}$ as similar disputes, and affirmed that there was one category for them, nevertheless I believe that it is possible to make a distinction between them. For a rigor is a natural element. For whatever sort of rigor appeared when the surveyors were establishing limites, (for that reason) they set up boundary markers more infrequently. And it is ruled that a rigor should be preserved if it is found to be thirty feet wide, so that it may not
tangatur: quod si plus de $X X X$ pedibus patuerit, iam collis est. quod exigit ut superior possessor in planum usque descendat et sibi defendat omnem deuexum locum. hoc enim lex propter malignitatem inferioris possessoris instituit, ne aut arando aut fodiendo superioris possessoris terras inuaderet.

Termini quoque quibusdam locis positi sunt, ut ab uno ad unum dirigantur, per pedes a CCCXX et supra usque ad CCCCLXXXX et infra hoc si licet. nam Tiburtini distant a se in pedibus a $C C X L$ et supra usque ad $D C L X$ et infra. quod si spissiores non sunt, riparum et rigorum cursus seruabunt; harum tamen quae per multa milia pedum recturas separationesue agrorum ab initio suo usque ad occasum custodiunt. et ne eas ripas aut rigores sequendos obseruarent quae intra corpus agri nascuntur et in suo latere decidunt, lex limitum eas praedamnauit. ne id aliquando sequamini, quod maior potestas limitum recturarumue cursus non confirmat. sed si conuentionis causa ea partes inter se conseruanda censuerunt, non recturae imputandum, sed concurrenti definitioni fides est adhibenda.

De fine enim lex Manilia quinque aut sex pedum latitudinem praescribit, quoniam hanc latitudinem uel iter ad culturas accidens occupat uel circumactus aratri. quod usu capi non potest: iter enim non, qua ad culturas peruenitur, capitur usuls] sed id quod in usu biennio fuit. finis enim multis documentis seruabitur, terminibus, et arboribus notatis, et fossis, et uiis, et riuis, et uepribus, et saepe normalibus, et ut comperi aliquibus locis inter arua marginibus quibusdam tamquam puluinis, saepe etiam limitibus, item petris notatis. quae in finibus sunt, pro terminibus habebitis. si arboribus notatis fines obseruabuntur, uidendum quae partes arborum notatae sint. notae enim in propriis arboribus a foras ponuntur, ut arbores liberas in parte a nota relinquat. si communes sunt arbores mediae notantur et ad utrumque pertinent. nam si fossa erit finalis, uidendum utrum unius an utriusque sit partis, et si in extremo fine facta; itemque utrum publica an uicinalis. si iugis montium, quae ex eo nomine accipiuntur, quod continuatione ipsa iugantur. haec autem omnia genera finitionum putato in uno agro posse sine dubio repperiri.

De loco si agitur, quae res hanc habet quaestionem, ut nec ad formam nec ad ullum scripturae reuertatur exemplum, nisi tantum hunc locum hinc dico esse, et alter e contrario similiter quaeret, ex similitudine fere culturae comparationem accipit. ${ }^{\vee}$ id est si silua, cuius sit aetatis par
be touched by either landholder. If it is more than thirty feet wide, it is a hill. This requires that a landholder on the higher ground come right down to the level ground and claims for himself all the sloping area. For the law has established this because of the wickedness of landholders on the lower ground, to prevent them from impinging, by ploughing or digging, on the land of the landholder on the higher ground. ${ }^{18}$

Moreover, boundary markers have been set up in some places so that they are stretched out in a row one after the other, with intervening gaps of 320 feet or more, up to 480 feet or less, if possible. Tiburtine boundary stones are 240 feet or more apart from one another, up to 660 feet or less. If the markers are not closely spaced, the course of banks and rigores will suffice. However, some of these preserve straight line divisions and separations between lands over many thousands of feet, from where they start to where they end. And in case they (surveyors) reckoned that they should recognize those banks or rigores which arise inside a body of land and fade out within it, the law relating to limites has ruled them out in advance, in case we should ever follow any course that the greater authority of the limites and the direction of the straight lines do not confirm. But if the interested parties have decided that these (i.e banks or rigores) should be recognized by them in order to come to an agreement, we should not (on that account) impute any fault to the straight line, but rather authority should be given to the additional definition (of the boundary). ${ }^{19}$

With regard to boundary, the Lex Mamilia defines a width of five or six feet, since this width is taken up either by a right of way for those travelling to cultivated fields, or by the space needed to turn a plough. This land cannot be acquired by usucapio. For a right of way, because it leads to cultivated areas, is not subject to usucapio [but that occurs after two years of use]. A boundary will be demarcated by many indicators, by markers, and marked trees, and ditches, and roads, and rivers, and thorn bushes, and often by lines forming right angles, and, as I have discovered in some places, by raised borders between fields like balks, and often indeed by limites, and also by inscribed rocks. If these have been placed on a boundary you will consider them as markers ( $\mathrm{C} 93.12-22=\mathrm{T} 89.1-15=\mathrm{L} 126.3-18$ ). If boundaries are recognized by means of marked trees, we must note what parts of the trees have been marked. Marks on trees belonging to a particular property are placed on the side away from the property, so that the mark leaves the trees untouched on the side facing the owner's property. If the trees stand between two properties and are owned by both, they are marked on both sides and belong to both properties (C 93.40-5 $=$ T 90.19-24 $=\mathrm{L}$ 127.18-23). If a ditch serves as a boundary, we must see if it belongs to one party or to both parties, and if it has been built on a boundary edge ( $\mathrm{C} 95.4-5=\mathrm{T} 91.5-6$ $=\mathrm{L} 128.5-6$ ), and if it is a public or local (ditch). ${ }^{20}$ A boundary (is sometimes recognized) by means of the upper slopes of mountains $\{i u g a\}$, which get their name from the fact they are yoked \{iugare\} together in an unbroken series (C 95.11-13 = T $91.12-13=\mathrm{L} 128.11-12$ ). It must be considered that all these types of boundary demarcation can undoubtedly be found on one piece of land. ${ }^{21}$

If there is a dispute about site, and the enquiry has the following procedure, namely, that there is no reference to a map or any written evidence, merely a statement by one party: 'I declare that this site begins here', while the other party makes a similar statement opposing this, in this case a comparison is made on the basis of similarities in types of cultivation. ... If it is wooded, (you should establish) what age
caesurae et aetas arborum, ut solent relinqui quas ante missas uocant, et siluarum quoque aetates an sint pares. si uineae, similes erunt in comparatione; an ordines aequidistantes, an pari constitutione, et an simile genus uitium constabit. tamen rem magis esse iuris quam nostri operis, quoniam fere usu capiuntur loca quae biennio possessa fuerint. respiciendum erit ne, quem admodum solemus uidere quibusdam regionibus particulas quasdam in mediis aliorum agris, numquid simile huic interueniat. quod in agro diuiso accidere non potest, quoniam continuae possessiones et assignantur et redduntur. et his forte incidit ut tale quid committeretur, ut locus pro loco, ut continua sit possessio. ita, ut dixi, in assignatis fieri non potest. ${ }^{\vee}$ solent quidam complurium fundorum suorum domini duos aut tres agros uni uelle contribuere, terminos qui finiebant singulos agros relinquere $\vee$ praeterea cui contributi sunt. uicini non contenti suis finibus tollunt terminos, quibus possessio eorum finitur, et eos qui inter fundos unius domini sunt sibi defendunt. ita et haec despicienda erunt.

De modo quaestiones fere in agris diuisis et assignatis nascuntur, item quaestoriis et uectigalibus subiectis, quoniam scilicet in aere scripturae modus conprehensus est. quod semper erit ad formam respiciendum. et hoc si duobus possessoribus conueniat ali[o]qui $\langle d\rangle$ ex modo illo, qui aere scriptura continetur, forma liquebit, etiam si dominus aliquid uendidisset. namque hoc comperi in Samnio, ut agri quos diuus Vespasianus ueteranis assignauerat, eos ab ipsis quibus assignati erant iam aliter possideri. quidam enim emerunt aliqua loca adieceruntque suis finibus et ipsud, uel uia finiente uel flumine uel alio quolibet genere: sed nec uendentes ex acceptis suis aut ementes adicientesque ad acceptas suas certum modum taxauerunt, sed ut quisque modus aliqua, ut dixi, aut uia aut flumine aut aliquo genere finiri potuit, ita uendiderunt emeruntque. ergo ad aes commodi reuocari potest, si ${ }^{v}$ duobus, inter quos controuersia est, conuenerit. in eis autem, qui uectigalibus subiecti sunt, proximus quisque possessioni suae iunxit. ${ }^{\vee}$ nam soliti erant antiqui in conductiones et in emptiones ${ }^{\vee}$ modum conprehendere atque ita cauere: FVNDVM ILLVM, IVGERA TOT, IN SINGVLIS IVGERIBVS, tantum itaque si in ea regione agitur, ubi haec erit consuetudo, aut cautiones scilicet aut emptiones intuendae erunt. inter quos disputabitur acta utriusque mensura: si nihil ad cautionem conueniat, ne utrius possessio modum cautione conprehensum impleat, magna erit rei confusio, quaerendumque tunc quomodo in uniuersa regione magis opinione quam mensura modum complecti soliti sint.
'De proprietate controuersia est plerumque ut in Campania cultorum agrorum siluae absunt in montibus ultra quartum aut quintum forte uicinum'. nam ubi mons fuit proximus asper seu
the trees are, if their age is appropriate for felling, as (some) trees are according to custom left standing, which are called 'previously planted', and whether the ages of the woods are the same. If there are vines, there is a similar comparison to establish whether the rows are equidistant, in a comparable condition, and of a similar type of vine. However, it is clear that this dispute is a matter for the law rather than our profession, since places that have been occupied for two years are normally acquired by usucapio. Nevertheless, we shall have to consider the fact that we commonly see in some regions small parcels of land in the middle of other people's holdings, in case some (parcel) similar to this should lie (in the middle). This cannot happen in allocated lands since contiguous holdings are allocated and granted. If something like this occurs accidentally, one piece of land (is exchanged) for another so that there is a contiguous holding. So, as I said, this cannot happen in allocated lands. Certain owners of several farms normally want to join two or three fields to one, and leave the boundary markers which used to demarcate the individual fields, except for the one to which the fields were joined. The neighbours, not content with their own land, remove the boundary markers by which their own holding was demarcated, and claim as theirs the markers which lie between the farms of the single owner. Therefore we shall have to be on the look-out for this ( $\mathrm{C} 95.40-97.20=\mathrm{T} 92.17-94.2=\mathrm{L} 129.12-130.19$ ).

Disputes about area usually arise in divided and allocated lands, and similarly in quaestorian lands, and in lands subject to rent, since of course the area is included on the bronze map and in the written record. This question must always be examined in relation to a map. (And we must also watch out for the following point), namely, if in the case of two landholders, there is a measure of agreement in respect of parts of the area written down in the bronze record; and the map ... (?) even though one owner has sold something. ${ }^{22}$ For I discovered this fact in Samnium, namely, that lands which the divine Vespasian had allocated to veterans were still occupied by the people to whom they had been allocated, but in a different way. For some had bought certain sites and added that (area) to their own land, making a boundary by means of a road, or a river, or any way at all. But neither those who sold part of their holdings, nor those who bought and added something to theirs, worked out a definite area, but sold or bought in so far as each area could be demarcated, as I have pointed out, by some road, or river, or any other method. How, therefore, can we resort to the bronze map if, 〈in respect of holdings), there is agreement between the two men who are in dispute ${ }^{23}$ Now, in lands subject to rent every adjacent landholder has added something to his holding. ... men of old were accustomed in renting and buying ... to include the area with the following provision: such and such farm, so many iugera, so much for individual iugera. Therefore, if there is a dispute in a region where this practice is followed, we must examine either the provisions or the contracts of sale. A survey is made of the land of each of those involved in dispute. If nothing tallies with the provision, that is, if the holding of neither party occupies the area included in the provision, the question will be very confused, and we must then consider if in some way in the whole region their custom is to encompass an area more by estimation than by surveying (C 97.32-99.14 = T 94.16-96.7 = L 131.10-132.20).
'A dispute over ownership generally occurs when, as for example in Campania, woods belonging to cultivated fields are separate, in the mountains, perhaps more than four or five neighbouring properties away' (C $5.40-2=$ T $6.3-5=\mathrm{L} 15.1-3$ ). Now,
sterelis, super quo fundi constitui nequiuerunt aut forte aquae inopia habitatio hominibus prorsus negata est, siluae tamen dum essent glandiferae, ne earum fructus perirent, diuiso monte particulatim datae sunt proprietates quaedam fundis in locis planis et uberibus constitutis, qui paruis finibus stringebantur. nam et in Suessano culti sunt, qui habent in monte Marico plagas siluarum determinatas, quarum proprietates 'ad quos fundos pertinere debeant, discutiatur'. nam et formae antiquae declarant ita esse. respiciendum erit et illud, sicut dixi superius, quem admodum solemus uidere quibusdam regionibus particulas in mediis aliorum agris. hoc argumentum prudentiae est quam professionis. uidendum quoque quoniam 'est et pascuorum proprietas pertinens ad fundos, sed in commune; propter quod ea conpascua multis locis communia appellantur, quibusdam prouinciis pro indiuisa'. haec fere pascua certis personis data sunt depascenda, sed in communi: quae multi per potentiam inuaserunt et colunt. de eorum proprietate ius ordinarium solet moueri, atque interuentu mensurarum demonstratur ut sit assignatus ager. 'Nam per emptiones uel hereditates huius generis controuersiae fiunt'. quaedam loca feruntur ad personas publicas attinere nam personae publicae etiam coloniae appellantur. quae habent assignata in alienis finibus quaedam loca, quae solemus praefecturas appellare. harum praefecturarum proprietates manifeste ad colonos pertinent, non ad eos quorum fines sunt diminuti. solent et priuilegia quaedam habere beneficia principum, quod longe et semotis locis saltos quosdam reditus causa acciperunt. quae proprietas ad eos quibus data est indubitate pertinet. sunt et aliae proprietates quae municipiis a principibus sunt concessae.
'De possessione fit controuersia quotiens de totius fundi statum per interdictum, hoc est iure ordinario, litigatur'. hoc non est disciplinae nostrae iudicium sed apud praesidem prouinciae agitur, et ex lege restituitur possessio cui poterit adtineri. in his secundum locum habet disciplina nostra, sicut lex ait: nisi de possessionis statu quaestio fuerit terminata, non licet mensori praeire ad loca.

De alluuione obseruatio est, si haec in occupatoriis agitur agris. quidquid uis aquae abstulerit, repetitionem nemo habet, quae res necessitatem ripae muniendae iniungit, ita tamen ut sine alterius damno quicquam fiat. ${ }^{v}$ si uero in diuisa et assignata regione tractabitur, nihil amittet possessor, quoniam formis per centurias certus cuique modus ascriptus est. circa Padum autem cum ageretur, quod flumen torrens et aliquando tam uiolentum decurrit, ut alueum mutet et multorum late
where there was a rough or barren mountain nearby on which farms could not be established, or where, because of a shortage of water, men were prevented from settling, nevertheless, since there were acorn-bearing woods, so as to prevent the loss of their fruit, the mountain was divided and rights of ownership were granted individually to farms situated in level and fertile areas, which were confined within narrow boundaries. There are farmlands in the territory of Suessa which have on Mount Maricus (= Massicus) areas of woodland with fixed boundaries. The ownership of these woodlands is disputed in respect of those farms to which it ought to belong. For old maps show that this is the case (C $37.8-12=\mathrm{T} 39.8-12=\mathrm{L} 48.16-19$ ). We must also consider this point, as I mentioned above, namely, that we commonly see in some regions small parcels of land in the middle of other people's holdings (C 97.6-8 $=\mathrm{T}$ $93.7-9=\mathrm{L} 130.3-5$ ). This is a demonstration of legal knowledge rather than the surveyor's profession (C 97.12 = T $93.14-15=\mathrm{L} 130.10-11$ ). We must also consider why: 'there is also the ownership of pasture land, which belongs to the farms but is held in common. Because of this, in many areas this pasture land is referred to as "common", and in some provinces as "equivalent to undivided land"' (C 5.43-7.1 = T $6.7-10=\mathrm{L}$ 15.4-7). This pasture land was given to certain individuals for pasturing, but in common. Many have taken over this pasture land arbitrarily and now cultivate it. The normal legal process is normally invoked concerning the ownership of these lands, and the intervention of surveying shows how the land was allocated. ${ }^{24}$ 'Inheritance or purchase also lead to disputes of this kind' (C 7.1-2 = T 6.11-12 = L 16.1-2). Certain places are said to belong to legál persons \{personae publicae\}. Legal persons are also called colonies. They have certain areas that have been allocated in the territory of another community, which we normally call praefecturae. Ownership of these praefecturae clearly belongs to the colonists, not to those whose territory has been reduced. Moreover, they (colonies) normally have certain privileges by the gift of emperors, in that they have received in far distant places certain tracts of land in order that they might have the yield from them. The ownership of these clearly belongs to those to whom it was granted (C $37.25-33=\mathrm{T} 40.1-10=\mathrm{L} 49.7-13$ ). There are other rights of ownership, which were granted by the emperors to municipia. ${ }^{25}$
'A dispute over possession of land', whenever it concerns the position of an entire farm, 'is conducted with reference to an interdictum, that is, under the normal legal process' (C $7.3-4=\mathrm{T} 6.13-14=\mathrm{L} 16.3-4$ ). This is not a matter for our profession to decide, but is conducted before the governor of the province, and in accordance with the law possession is restored to the person for whom it may be proper. In these matters our profession has second place, just as the law says; a surveyor is not permitted to go to the location before the enquiry about the status of the possession has been completed. ${ }^{26}$

The following is the practice with regard to alluvial land, if this dispute is conducted in agri occupatorii. No one has any legal redress in respect of whatever the force of the water has removed. This makes it essential to shore up the bank, but in such a way that anything done should not cause loss to any other party. But if the dispute occurs in a region that has been divided and allocated, the landholder will lose nothing, since throughout the centuriae a definite area has been recorded on the maps for each person. Now, when there was a dispute in the area of the Po, because the river surges down sometimes in such a raging torrent that it changes its course and
agros trans ripa $(m)$, ut ita dicam, transferat, saepe etiam insulas efficit. at Cassius Longinus, uir prudentissimus, iuris auctor, hoc statuit, ut quicquid aqua lambiendo abstulerit, id possessor amittat, quoniam scilicet ripam suam sine alterius damno tueri debet; si uero maiore ui decurrens alueum mutasset, suum quisque modum agnosceret, quia non possessoris neglegentia sed tempes- tatis uiolentia abreptum apparet; si uero insulam fecisset, a cuius agro fecisset, id possideret; aut si ex communi, quisque suum reciperet. scio enim quibusdam regionibus, cum assignarentur agri, adscriptum aliquid per centurias flumini. hoc autem prouidit auctor diuidendorum agrorum, ut quotiens tempestas fluuium concitasset, non per regionem excedens alueum uagaretur, sed sine iniuria cuiusquam deflueret. hos tamen agros, id est hunc omnem modum, qui flumini adscriptus est, R. P. quibusdam uendidit.

Haec quaestiones maxime in Gallia to $\langle g a\rangle t a$ mouentur, quae multis contexta fluminibus inmodicas Alpium niues in mare transmittit et subitarum regelationum repentinas inundationes patitur. aliquibus locis impetrauerunt possessores a praeside prouinciae ut aliquam latitudinem flumini daret. nam et in Italia Pisaurum flumini latitudo est assignata eatenus quo usque alluebat.
'De iure territorii controuersia est', cum quidam priuatorum aut 'pomerium eius urbis' 'priuatis operibus' inuerecunde uult peruadere aut auare de locis publicis, hoc est 'ad ipsam urbem pertinentibus', quidam priuatorum usurpare temptauerit. pomerium autem urbis est quod ante muros spatium sub certa mensura demensum est. sed et aliquibus urbibus et intra muros simili modo est statutum propter custodiam fundamentorum. 'quod a priuatis operibus optineri non oportebit. hic locus est qui a publico nullo iure poterit amoueri. habet autem condiciones duas, unam urbani soli, alteram agrestis; urbani soli, quod in tutela rei urbanae assignatum est, agrestis, quod publicis operibus datum est aut destinatum'. in tutela rei urbanae assignatae sunt siluae, de quibus ligna in reparatione publicorum moenium traherentur. hoc genus agri tutelatum dicitur. nam aliquarum urbium 'maxima pars finium coloniae est adtributa'. coloniae sunt quae ex eo nomine accipiuntur, quod Romani in eisdem ciuitatibus colonos miserunt. illarum ergo urbium maxima finium pars data est coloniis, quae in remotiora loca et longe a mari positae uidebantur, ut numerus ciuium, quem multiplicare diuus Augustus conabatur, haberet spatia, in quae subsistere potuisset. nam et 'in Piceno fertur inter montium Praecutianorum quandam partem oppidi Asculanorum fine circum dari. sed hoc conciliabulum fuisse et postea fertur in municipii ius relatum. nam 〈non〉 omnia antiqua municipia habent suum priuilegium'. ut Tudertini qui apud principes egerunt ut Fanestres ${ }^{\vee}$ incolae, ${ }^{\mathrm{v}}$ si essent alieni-
carries across its bank, so to speak, the land of many people over a wide area, and often even creates islands, Cassius Longinus, a very wise man and legal expert, decided that a landholder should lose whatever soil the river gradually eroded since he ought to look after his own stretch of river bank without inflicting any loss on a third party. But if the river had surged down with unusual force and changed its course, everyone should claim his own area of land since it had obviously been swept away not through the carelessness of the landholder but by the vehemence of the storm. If, however, the river had created an island, he decided that the person from whose land it had been fashioned should possess it; on the other hand, if the island had been fashioned out of land owned in common, each person should recover his own portion. I know that in several regions when land was being allocated, throughout the centuriae something was set aside for the river. The man responsible for the land division ensured in this precise way that whenever a storm stirred up the river so that it burst its banks, it did not spread over all the region, and that the flood would not inflict harm on anyone (C 91.21-93.1 $=\mathrm{T} 87.4-88.9=\mathrm{L} 124.3-125.9$ ). ${ }^{27}$ However the government (of a community) sold off this land to some people, that is, all the land that had been set aside for the river ( $\mathrm{C} 93.5-7=\mathrm{T} 88.13-15=\mathrm{L} 125.14-16$ ).

These questions are very prevalent in Gallia Togata, which, criss-crossed by many rivers, carries the huge snows of the Alps to the sea, and suffers damage through the unexpected flooding that accompanies sudden thaws. In some places landholders have obtained an undertaking from the governor of the province to designate a specific width for the river. And in Italy a width was allocated to the river Pisaurus as the fullest that it ever attained. ${ }^{28}$

A dispute about territorial jurisdiction occurs when some private individual wishes improperly to impinge on the pomerium of a city with private works, or greedily tries to usurp land from public areas, that is, areas belonging to the city itself. ${ }^{29}$ The pomerium of a city is a space measured out with definite dimensions in front of the walls. Moreover, in some cities a space of similar area is established inside the walls in order to protect the foundations. 'Which should not be occupied by private buildings' (C $7.8-9=$ T $7.3-4=\mathrm{L} 17.1-3$ ). This is a place that cannot by any legal means be removed from public ownership. Now, it has two categories; one relates to land attached to the town, the other to land in the countryside; land attached to the town is what was allocated to support the urban fabric. Land in the countryside is what was granted or set aside for public works. ${ }^{30}$ In order to support the urban fabric, forests were allocated, from which wood could be brought for the repair of city buildings. This type of land is called 'given over for support'. The greatest part of the territory of some cities has been granted to the colony. Colonies are settlements that get their name from the fact that the Romans sent colonists to those communities. Therefore the greatest part of the territory of those cities was granted to the colonies, which seemed to have been situated in remoter areas far from the sea, so that the citizens, whose numbers Augustus was trying to increase, could have space in which to live. Moreover, it is said that in Picenum part of the town of Interamnia Praetuttiorum was surrounded by the territory of Asculum. This is said to have been a conciliabulum, and later to have been granted the status of a municipium. Now, ' $\langle$ not $\rangle$ all the old municipia have their own special rights', as for example the Tudertini who gained from the emperors ... or for example the Fanestres ... inhabi-
genae, qui intra territorium incolerent, honoribus fungi in colonia [non] deberent. sed Fanestres hoc postea impetrauerunt, ut eis liceret et fungi honoribus territorii. aeque iuris controuersia agitatur, quotiens propter exigenda tributa de possessione litigatur; cum dicat una pars in sui eam fine territorii constituta〈m〉, et altera e contrario similiter quaeret. haec autem controuersia territorialibus est finienda terminibus. nam inuenimus saepe in publicis instrumentis significanter inscripta territoria ita ut EX COLLICVLO QVI APPELLATVR ILLE, AD FLVMEN ILLVD, ET PER FLVMEN ILLVD AD RIVVM ILLVM aut VIAM ILLAM, ET PER VIAM ILLAM AD INFIMA MONTIS ILLIVS, QVI LOCVS APPELLATVR ILLE, ET INDE PER IVGVM MONTIS ILLIVS IN SVMM $V M$, ET PER SVMMVM MONTIS PER DIVERGIA AQVAE AD LOCVM QVI APPELLATVR ILLE, ET INDE DEORSVM VERSVS AD LOCVM ILLVM, ET INDE AD COMPETVM ILLIVS, ET INDE PER MONVMENTVM ILLIVS AD locum unde primum coepit scriptura esse. saepe enim quorundam aut monumenta aut fossae aut quorundam sacellorum aut fontium, unde riui fluminaque incipiunt, obseruantur fines territoriorum. 'Si autem rationem appellationis huius tractemus, territorium est quidquid hostis terrendi causa constitutum est.'

De iure subseciuorum subinde quaestiones mouentur. subseciua autem ea dicuntur quae assignari non potuerunt, id est, cum sit ager centuriatus in loca culta quae in centurias erant, cum 'centuria expleri non potuit', subseciuum appellauit. haec aliquando auctor diuisionis aut sibi reseruauit, aut aliquibus concessit aut R. P. aut priuatis personis; quae subseciua quidam uendiderunt, quidam uectigalibus certo tempore locant. inspectis igitur perscrutatisque omnibus condicionibus inueniri poterit quid sequi debeamus. nam Domitianus per totam Italiam subseciua possidentibus donauit, edictoque hoc uniuersis notum fecit. leges itaque semper curiose legendae interpretandaeque erunt.
'De locis publicis siue populi Romani siue coloniarum municipiorumue controuersia est, quotiens ea loca, quae neque assignata neque uendita fuerint', 'ab aliis obtenebuntur, ut subseciua concessa'. multis enim locis comperimus loca publica repperiri, 'ut ex proximo in Sabinis in monte Mutela', qui nunc a priuatis operibus obtinetur. nam et regione Reatina itidem sunt loca P. R.

Loca autem quae sint publica uideamus. sunt siluae de quibus lignorum copia in lauacra publica ministranda caeduntur. sunt et loca publica quae in pascuis sunt relicta quibuscumque ad urbem uenientibus peregrinis. sunt in suburbanis loca publica inopum destinata funeribus, quae loca culinas appellant: sunt et loca noxiorum poenis destinata. ex his locis, cum sint suburbana, sine ulla religionis reuerentia solent priuati aliquid usurpare atque hortis suis applicare. sunt autem
tants who dwelt inside their territory, even if they belonged to another community, should [not] be liable for the performance of duties in the colony. But the Fanestres gained this afterwards, namely, that it should be granted to them that (the inhabitants) should perform their duties in the territory. ${ }^{31}$ A dispute about jurisdiction also occurs when people go to law about possession of land in respect of the exaction of tribute; when one party claims that possession is established within the confines of its territory and the other opposes this by making a similar claim. This dispute should be concluded by means of territorial boundary markers, for we often find in public documents territories distinctively designated as follows: 'From the small hill called such and such, to such and such a river, and along that river to such and such a stream or such and such a road, and along that road to the lower slopes of such and such a mountain, a place which has the name such and such, and from there along the ridge of that mountain to the summit, and along the summit of the mountain along the watersheds to the place called such and such, and from there down to such and such a place, and from there to the cross-roads of such and such a place, and from there past the tomb of such and such to' the place from which the description began. For often some people's tombs, or ditches, or certain shrines or fountains, from which streams and rivers begin, are recognized as territorial boundaries. ${ }^{32}$ 'If we examine the reasoning behind this term, a territory is something established for the purpose of terrifying the enemy' (C 7.24-6 = T $8.4-6=\mathrm{L} 20.1-2$ ).

Disputes frequently arise about the law relating to subseciva. Subseciva is the name given to land that could not be allocated, that is, when the land was divided into centuriae, some (un)cultivated areas that lay within centuriae, when the centuria could not be completed, he called subseciva. ${ }^{33}$ Sometimes the man responsible for the allocation kept these subseciva for himself, or granted them to others, either to communities or to private individuals. Some people sold these subseciva, others continue to let them for a rent for a specific period. By examining and analysing all the circumstances we can discover what course of action we ought to follow (C 99.18-25 = T $96.11-20=$ L 132.24-133.8). Domitian granted subseciva throughout all Italy to those in possession of them, and by edict made this known to all ( $\mathrm{C} 99.29-32=\mathrm{T}$ $97.4-6=\mathrm{L} 133.12-14$ ). Therefore, the regulations must always be carefully scrutinized and interpreted.
'A dispute concerning public places belonging either to the Roman People, or a colony, or a municipium, occurs when those areas, which have never been allocated or sold' (C $7.31-3=\mathrm{T} 8.12-14=\mathrm{L} 20.7-9$ ); 'are taken over by others, as if they were subseciva granted to them' (C $7.39=\mathrm{T} 9.1-2=\mathrm{L} 21.5-6)$. In many places I have discovered that public places are being found 'for example, nearby in the territory of the Sabines at Mount Mutela' (C $7.36-7=T 8.19-20=\mathrm{L} 21.3$ ), which now are being occupied by private works. Moreover, in the region of Reate there are places belonging to the Roman people. ${ }^{34}$

Let us examine what public places are. They are forests from which quantities of wood are cut down to supply the public baths. There are also public places that have been left for pasture and for any outsiders coming to the city. ${ }^{35}$ There are places on the outskirts of town intended for the funerals of the poor, and they call these places culinae. They also have places set aside for the punishment of criminals. Private indi-
loca publica coloniarum, ubi prius fuere 'conciliabula', et 'postea sunt in municipii ius relata'. sunt et alia loca publica quae praefecturae appellantur. nam et 'pomeria' urbium, de quibus iam , superius suo loco disputauimus, publica loca esse noscuntur. multis modis loca publica dici possunt, sed dum diuersis condicionibus constringuntur, non possunt nisi sua suis locis incedere. nam et ubi 'uis aquae' 'aluei' Tiberis 'populi Romani' tantum modo 'insulam' fecit, locus est publicus. 'siluae' etiam sunt iuxta hoc alueo suis circum datae terminibus, quae casalia non utuntur.
'De locis relictis et extra clusis controuersia est in agris assignatis. relicta autem ea loca sunt quae siue iniquitate locorum assignari nequiuerunt, siue ex uoluntate conditoris, hoc est mensoris, relicta limites minime acceperunt'. dicuntur et ea relicta loca quae uis aquae obtinuit. haec loca et insoluta uocantur et 'iuris subseciuorum' esse noscuntur. 'Extra clusa loca sunt aeque iuris subseciuorum, quae ultra limites et ultra finitima linea erunt. finitima autem linea aut mensuralis est, aut aliqua obseruatione aut terminorum ordine seruatur.' ergo fines coloniae inclusi sunt montibus. propterea haec loca, quod assignata non sint, relicta appellantur; et extra clusa, quod extra limitum ordinationes sint et tamen fine cludantur. haec plerumque proximi possessores inuadunt et oportunitate loci irritati agrum obtinent. cum his controuersiae a rebus publicis solent moueri.
'De locis sacris et religiosis controuersiae plurimae' 'iure ordinario finiuntur.' si enim loca sacra aedificabantur, quam maxime apud antiquos in confinio constituebantur, ubi trium uel quattuor possessionum terminatio conueniret. et unus quis possessor donabat certum modum sacro illi ex agro suo, et quantum donasset scripto faciebat, ut per diem sollemnitatis eorum priuatorum agri nullam molestiam inculcantis populi sustinerent. sed et siquid spatiosius cedebatur, sacerdotibus templi illius proficiebat. in Italia autem multi crescente religione sacratissima Christiana lucos profanos siue templorum loca occupauerunt et serunt. sed hoc ideo existimaui dicendum, ut magisterium suum si uult mensor ostendere, modum concessum fano illi demonstret. 'Locorum autem religiosorum' similis est condicio. et his namque 'secundum cautionem modus restituebatur' antiquitus. nam sanctum est plerumque ut incorruptum, et a sanciendo sanctum dicitur; religiosum a religando mentes, ne male agant homines. sacrum autem proprie dei est. [religiosum enim vel a relinquendo.] profanum autem quod, dum sanctum fuisset, postea in usu hominum factum, hoc est extra fano, extra sanctuario, profanum dictum est. 'Moesilea uero habent iuris sui hortorum modum circum iacentem uel praescriptum agri
places, since they are on the outskirts of town, and adding them to their own gardens (C $43.45-45.3=\mathrm{T} 47.1-5=\mathrm{L} 55.8-12$ ). There are also public places belonging to colonies, which were originally conciliabula, and afterwards were raised to the status of a municipium. There are other public places called praefecturae. Moreover, the pomeria of cities, which I have discussed above in their own place, are recognized as public places. Public places can be expressed in many ways, but although confined within different categories, each one must be treated on its own terms. Where the force of water in the Tiber's bed, which belongs to the Roman people, has made an island, this place is public property. Indeed there are woods close to this bed demarcated by their own boundary markers, which are not used as part of a (private) estate. ${ }^{36}$
'A dispute concerning areas that have been left out and not enclosed occurs in allocated lands. Areas left out are those which, because of the roughness of the terrain', ( $\mathrm{C} 7.40-2=\mathrm{T} 9.3-5=\mathrm{L} 21.7-22.2$ ) could not be allocated, or on the wishes of the founder, that is, the surveyor, were left out and did not receive limites. ${ }^{37}$ Places are also described as left out when the force of a river current has claimed them. These places are also called unbounded and are recognized as coming under the law relating to subseciva. 'Places not enclosed, which also come under the law relating to subseciva, are those that lie beyond the limites but inside the boundary line (of the whole survey). This boundary line is either measured or marked out by some observed feature or a line of boundary stones' (C $7.43-6=\mathrm{T} 9.6-10=\mathrm{L} 22.2-6$ ). So, the territory of the colony was enclosed by mountains. Therefore these places, because they were not allocated are called 'left out'; and 'not enclosed' because they are outside the framework of the limites and yet are bounded by the (outer) boundary line. The nearest landholders often encroach on these places, and, prompted by the availability of the place, appropriate the land. It is with these men that disputes are normally initiated by communities ( $\mathrm{C} 45.15-20=\mathrm{T} 47.16-22=\mathrm{L} 56.5-11$ ).
'Innumerable disputes arise concerning sacred and religious places. These are decided under the normal legal process' (C 9.3-4 = T 9.13-14 = L 22.9-10). If sacred buildings were being erected, in ancient times as far as possible they were established on a common boundary, where the boundaries of three or four holdings met. Each landholder gave a fixed amount of his land for that religious building and made a written record of the amount he had bestowed, so that on festival days the fields of these private individuals should incur no damage from people trampling over them. If a more extensive area of land was granted, it was to the profit of the priests of that temple. Now, in Italy, as the most holy Christian religion increases, many people have taken over pagan groves or sites attached to temples, and now sow them. I thought that this should be stated, so that if a surveyor wishes to display his learning, he can point out the area that was granted to the shrine. Religious places are in a similar category. And according to the provision their area was restored to these as of old. The word 'holy' \{sanctus\} means something pure, and it comes from the action of consecrating \{sancire\}. The word 'religious' comes from binding \{religare\} minds so that men do not do evil. 'Sacred' refers to whatever is specifically of the god. 'Profane' refers to something that once was holy but later was converted for human use, that is, outside a shrine or outside a sanctuary, and is called profane. ${ }^{38}$ But 'tombs include within their legal control the gardens surrounding them or a des-
finem．＇nam lucos frequenter in trifinia et quadrifinia inuenimus，sicut in suburbanis et circa publica itinera constitutum esse perspicimus．
＇De aquae pluniae transitu controuersia est，in qua si collectus pluuialis 〈a〉quae transuersum secans finem alterius fundi influit，si aqua ex pluuia collecta riuum fecerit per longinquitatem temporum，et ut solet uideri，ripam ex utraque parte mediam＇secans＇erexerit，et hoc intra＇fines alterius＇；dumque riuus ille limite includitur，possessor uicini agri calumniose sibi uelit fines ad riuum usque defendere，non mediocris exinde controuersiae genus exoritur．sed hoc＇mensoris＇ est peritia finiendum．
＇De itineribus controuersia est，quae in arcifiniis agris iure ordinario finitur，in assignatis mensurarum ratione＇．＇sed multi limites exigente ratione per cliuia et confragosa loca eunt qua iter fieri non potest，et sunt in usu agrorum in eis locis，ubi proximus possessor est，cuius forte silua limitem detinet，et transitum inuerecunde denegat，cum itineri limitem aut locum limiti debeat＇． Nam plerumque uia，dum cum limite currit，etiam si uicinalis est aut lignaria aut pri－ uata，finem praestat．regammante uero uia uel limite，dum a se utri $\langle\mathrm{m}\rangle$ que discesserint， desi〈ni〉t uia finem praestare $\langle e t\rangle$ erit controuersia：sed inspectio artifici $\langle\mathrm{s}\rangle$ eam finiet．

Satis，ut puto，dilucide genera controuersiarum uel primum agri qualitatem exposui．nam et simplicius enarrare condiciones earum existimaui，quo facilius ad intellectum peruenirent．nunc quem admodum singula pertractari debeant persequendum est，uel quod sint status earum，id est iniectiuus expositiuus subiectiuus reciperatiuus assumptiuus initialis materialis effectiuus．sunt enim viII．ex his omne genus controuersiarum exoritur．iniectiuus ergo status est generalis：nam siue de possessione siue de fine controuersia nascatur，per hoc repetitio iusta iniustaque inici－ tur．expositiuus est status controuersiae，quotiens finitimorum argumentorum caret demonstra－ tionem et partium magis exiget narrationem，per quam exponendum sit，quo sint genere terminandae，aut persuadendum iudici，etiam si loci natura finitimam exhibeat similitudinem ${ }^{\mathrm{v}}$ ． subiectiuus status est controuersiae，cum relinquitur status generalis et alio quolibet statu con－ trouersia defenditur．reciperatiuus est status，quotiens non a trifinia aut quadrifinia sed ex quoli－ bet alio finis loco incipientis termini recturam dirigit，et per incessum definitionis loca quaedam alteri fundo adquirit aut solum auferet et eius loco redditur．assumptiuus primae controuersiae sta－ tus est，qui est de positione terminorum，in rigorem aut in finem transcendit．initialis controuer－ siae status de rigore pertinens ad materiam transcendit in controuersiam，quae est loco tertio de fine，status materialis ${ }^{\vee}$ non condicionem mutat neque materia efficit．materialis status est
or quadrifinia, just as we see that (tombs) have been built in the suburbs and beside public roads. ${ }^{39}$
'There is a dispute concerning the passage of rain water, which, if accumulated rain water cuts across a boundary, floods into a neighbour's farm ...' (C 9.10-11 = T $9.21-2=\mathrm{L} 23.7-24.1$ ); (the dispute occurs) if the accumulated rain water has made a stream over a long period, as is often seen, by cutting through the middle of the bank and has created a flood, what is more inside someone else's land. Since this stream is encompassed by that boundary $\{$ limes $\}$, the owner of the neighbouring land wishes by false pretences to claim for himself the land right up to the stream, and from this arises a type of not insignificant dispute. But this should be settled by the skill of a surveyor. ${ }^{40}$
'A dispute concerning rights of way, which is dealt with by the normal legal process in ager arcifinius, in allocated lands requires surveying skills' (C 9.15-16 = T $10.5-6=\mathrm{L} 24.4-5$ ). 'But many limites, because of the demands of the overall plan, run through uneven or woody areas, which are impassable for a road and are used as fields in those places where the adjacent landholder, whose wood perhaps occupies a limes, impudently prevents passage, although he ought to provide a limes or its equivalent width for a right of way' (C 9.17-22 = T $10.8-13=\mathrm{L} 24.7-12$ ). Generally when a road runs beside a limes, even if it is a local road, or made of wood, or private, it serves as a boundary. But if the road or limes bends away, then provided that both elements have parted company from one another, the road ceases to mark a boundary and there will be a dispute. But an examination by a surveyor will settle the boundary.

I think that I have set out sufficiently clearly the types of land dispute and firstly the types of land; I decided to describe their categories more straightforwardly so that they could be more easily understood. Now I must discuss how individual disputes should be treated ( $\mathrm{C} 47.28-30=\mathrm{T} 49.26-50.1=\mathrm{L} 89.25-9$ ), and what their conditions are, that is, iniectivus, expositivus, subiectivus, reciperativus, assumptivus, initialis, materialis, effectivus. For there are eight. Every type of dispute arises from these. Iniectivus belongs to a general condition, since, whether a dispute develops about possession or boundary, a claiming back, just or unjust, is introduced through this condition. ${ }^{41}$ The condition of a dispute is expositivus whenever it lacks a definition based on evidence relating to boundaries, and requires instead a presentation by the parties, who must explain by what method the boundary is to be established, or who must persuade the judge, even if the nature of the terrain shows a similar type of boundary ... ${ }^{42}$ The condition of a dispute is subiectivus whenever its general condition is abandoned and the dispute is pursued under some other condition. The condition of a dispute is reciperativus whenever not from a trifinia or quadrifinia, but from some other part of an initial boundary, a straight line runs to the next boundary marker, and by the action of extending the boundary line, acquires some places for one farm (at the expense of the other); alternatively, it cuts off some land and in its place returns some $\ldots$ (C $27.9-20=\mathrm{T} 29.7-18=\mathrm{L} 69.3-15$ ). ${ }^{43}$ When the condition assumptivus of the first dispute, which is about the position of boundary markers, changes to one concerning a rigor or a boundary $\ldots$ (C $27.23-5=\mathrm{T} 29.22-4=\mathrm{L} 69.19-21$ ). ${ }^{44}$ The condition of a dispute is initialis when it refers to a rigor and pertains to a material object; when it progresses to the dispute listed third, concerning a boundary, ... it does not change
ex quo omnes controuersiae incipiunt, de loco dum taxat. nam transcendentiam non habet de hoc effectiuus, sed dum consummatus fuerit nascitur. nam effectiuus est cum de loco litigatur et idoneas partes ad litigium aduocationes instituunt.

Respicio etenim quantum sit quod mensoris prouidentiae iniungatur; $v$ sed nec minus aduocatis. quorum ars licet diuersa sit ${ }^{\vee}$, prudentiam tamen et simplicitatem eandem habere debent et qui iudicaturi sunt et qui aduocationes sunt praestaturi. in iudicando autem mensor bonus uir et iustus agere debet, nulla ambitione aut sordibus moueri, seruare opinionem et arte et moribus. omnis illi artificii ueritas custodienda est, exclusis illis similitudinibus quae falsae pro ueris subiciuntur. quidam enim per imperitiam, quidam per inprudentiam peccant. totum autem hoc iudicandi officium hominem bonum iustum sobrium castum modestum et artificem egregium exigit. ${ }^{v}$ hoc autem possessores aequo animo ferre non possunt: nam cum his ueritas exposita fuerit, aduersus sinceritatem artis facere cogunt. multa sunt enim in professione quae generaliter pro ueris offerantur, multa quae specialiter, quaedam quae argumentaliter. quaedam coniecturaliter etiam mentiri artifices coguntur.
its character and does not become material. ${ }^{45}$ The condition called materialis is that from which all disputes begin, insofar as it deals with site. The condition effectivus has no progression from this, but $\dagger$ continues until it has been completed. For the condition effectivus is one in which there is a dispute about site, and the parties establish suitable advocacy for the legal case $\dagger .{ }^{46}$

I am considering how much there is that may be enjoined upon the foresight of the surveyor ... and no less for advocates. Granted that their skills are distinct ... they should have the same good sense and straightforwardness, both those who are going to adjudicate and those who are to present a case in court. In adjudicating the surveyor should conduct himself as a good and just man, and not be influenced by ambition or greed; he should lay up a reputation for his professional skill and character. Complete truthfulness must be preserved by the professional, with the exclusion of those counterfeits, which, as untruths, are inserted in place of the truth. Some make mistakes because of inexperience, others because of lack of judgement. But all this duty of adjudication demands a good, just, restrained, moral, sober man, and an outstanding professional. ... landholders cannot accept this with equanimity. For when the truth has been set before these people, they put pressure on (surveyors) to act against the integrity of their profession. In a profession there are many points that are presented in general terms in place of the truth, many specifically, and some as a proof. Professionals are compelled even to invent things as part of a conjecture (C $47.30-49.4=\mathrm{T} 50.1-51.3=\mathrm{L} 89.29-90.21$ ). ${ }^{47}$

## HYGINI（1）

## DE LIMITIBVS

Limites lege late patere debent secundum constitutionem，qui agros diuidi iusserint．non quia modus ullus ex mensura limitibus adscribitur：solum lex obseruari debet．maximus decimanus et cardo plus patere debent siue ped．xxx，siue ped．xv， siue ped．XII，siue quot uolet cuius auctoritate fit．ceteri autem limites，qui subrunciui appellantur，patere debent ped．viII．

In maximo autem decimano＜et cardine〉 lapidem ponis，et inscribis DECV－ MANVS MAXIMVS et CARDO MAXIMVS．forma autem sic scribi debebit：DEX－ TRA DECVMANVM et SINISTRA，CITRA CARDINEM et VLTRA．lapides ne minus duodrantales poni oportet，altos ped．III．inscribi sic debent，ut dextra decumanum 〈spectanti ad occidentem scriptura sursum uersus sit〉 D．D．I：quae pars〈ad cardinem spectat k．k．I，sic〉 erit inscriptura sursum uersus，ut ad septentrionem spectanti sit K．K．I．similiter dextra decumanum ultra cardinem sic inscribis，ut D．D． I spectanti ad occidente $\langle\mathrm{m}\rangle$ scriptura su $\langle\mathrm{r}\rangle$ sum uersus sit：quae pars ad cardinem spec－ tat u．k．I，sic inscribi debet，ut inspectanti meridie $\langle\mathrm{m}\rangle$ scriptura sursum uersus si $\langle\mathrm{t}\rangle$ VLTRA CARDINEM PRIMVM．sinistra autem［d］d．I k．k．I sic inscribi debe［n］t sursum uersus，ut spectanti orientem $\langle$ sit $\rangle$ SINISTRA D．I：quae autem pars a $\langle\mathrm{d}\rangle$ car－ dinem 〈spectat〉，sic inscribi debet，ut septentrionem spectan $t i$ sit［totum］sursum uer－ sus inscriptum C．K．I．ultra autem sic inscribi debet ut，quae pars ad decimanum spectat，spectanti orientem sursum uersus sit inscriptum S．D．I：quae pars a $\langle\mathrm{d}\rangle$ car－ dinem spectat，sic inscribi debet，ut meridie $\langle m\rangle$ spectanti sit inscriptum ultra cardinem primum V．K．I．

Quintum quemque limitem diligenter agi oportet，et praecidere mensura car－ dinem，ut quadraturae diligenter cludi possint，lapidem autem in quintarios poni oportet，reliquos autem roboreos．

Solet de hac re esse disputatio，ut，si inscribatur D．M．et K．M．，ille qui a max－ imo proximus 〈est〉 dicatur inscribi oportere siue DEXTRA siue SINISTRA D．V．$K$ ． siue PRIMVM siue SECVNDVM．quaestio ergo haec est，utrum qui proximus max－ imo est secundus inscribi debeat an［ultra］primus．ultra primum autem inscribi debet ideo，quod hic qui maximus dicitur et primus est．ita idem capit hic．qui ultra primum autem inscribitur，et secundus est et nouum 〈us〉que ultra solum obseruare debet．

[^49]
## HYGINUS（1）

## LIMITES

By law limites must have a width in accordance with the decision of those who ordered the lands to be divided．This is not because any size is assigned to limites as a result of the survey；only the law requires to be observed．The decumanus maximus and kardo maximus ought to be wider（than the other limites），either thirty，or fifteen， or twelve feet，or as wide as the person by whose authority it（the land division）is being carried out，wishes．The other limites however，which are called subruncivi，must be eight feet wide．

On the decumanus maximus and kardo maximus you set up a stone and inscribe it： ＇decumanus maximus and kardo maximus＇．And the map ought to be inscribed in the fol－ lowing way：＇to the right of the decumanus＇and＇to the left（of the decumanus）＇；＇on the near side of the kardo＇and＇beyond（the kardo）＇．You should erect stones measuring not less than $3 / 4$ foot，three feet high．They ought to be inscribed as follows，for example：to the right of the decumanus，〈as one looks towards the west should be inscribed verti－ cally D．D．I；the part of the stone that 〈faces the kardo K．K．I〉 will be inscribed ver－ tically（as follows）：K．K．I，as one looks towards the north．Similarly，to the right of the decumanus and beyond the kardo you inscribe as follows：D．D．I should be inscribed vertically，as one looks towards the west．The part of the stone facing the kardo V．K． I，should be inscribed as follows：it should be inscribed vertically＇beyond the first kardo＇， as one looks towards the south．However，to the left of D．I．K．K．I the stone should be inscribed vertically as follows：＇to the left of D．I＇，as one looks towards the east．The part of the stone which 〈faces〉 the kardo should be inscribed as follows：it should be inscribed vertically C（K）．K．I，as one looks towards the north．Now，beyond the kardo should be inscribed as follows，namely，that the part of the stone which faces the decumanus should be inscribed vertically S．D．I，as one looks towards the east．The part of the stone that faces the kardo should be inscribed as follows；there should be inscribed：beyond the first kardo V．K．I，as one looks towards the south．${ }^{1}$

Every fifth limes must be carefully laid out and intersect the kardo by measure－ ment，so that squares can be effectively completed．${ }^{2}$ A stone marker should be erected on the quintarii；the other markers should be wooden．

There is often a discussion about this point，namely，if we inscribe DM and KM， it may be said that the limes next to a main one should be inscribed either＇to the right＇or＇to the left of the decumanus，beyond the kardo＇，and either＇first＇or＇second＇． The question therefore is whether the limes next to a main one should be inscribed ＇second＇or＇first＇．In fact it ought to be inscribed as＇beyond the first＇，because the limes described as＇the main＇\｛maximus\} is also the first. So, the main limes also constitutes the first．The limes inscribed as＇beyond the first＇is therefore the second，and ought to continue marking new ground as＇beyond the first＇．${ }^{3}$

Sed quacumque parte inscribis，siue ultra siue citra，siue dextra siue sinistra，men－ sura territorii usque fieri debet secundum legem diui Augusti QVA FALX ET ARATER IERIT．in forma generatim enotari debebit LOCA CVLTA et INCVLTA， SILVAE．

Mensura peracta sorte〈s〉 diuidi debent，et inscribi nomina per decurias［per homines denos］，［s］et in forma［s］sec［t］ari denum hominum acceptae，ut quot singuli accipere debent［decem］in unum coniungantur；et in sortem inscribi SORS PRIMA ［I］D．D．I ET SECVND $V M$ ET III ET IIII CITRA CARDINEM ILLVM，quo usque mensura expleri decem hominum debebit，id est in quot centuriis．igitur omnem sortem ponere debent，in qua totius perticae modus adscriptus erit．similiter［h］omnium decu－ riarum nomina in sortibus inscripta esse，qua parte quae aut quota sors modum habeat，utrum ultra et dextra，utrum sinistra et ultra，aut citra；deinde ex decuriis， antequam sortes tollant，singulorum nomina in pittaciis et in sorticulis．et id $\langle\mathrm{eo}\rangle \mathrm{ipsi}$ sortientur，ut sciant quis primo aut quoto cumque loco exeant．haec sortitio ideo nec－ essaria est，nequis queri possit，se ante debuisse sortem tollere et［in］meliorem fort－ asse potuisse incidere agri modum，aut sit disceptatio，quis ante sortem tollere debeat， cum omnes in aequo sint．

## 〈DE CONDICIONIBVS AGRORVM〉

Territorii［aeque］iuris controuersia agitatur，quotiens propter exigenda tributa de possessione litigatur，cum dicat una pars in sui eam fine territorii constituta $\langle\mathrm{m}\rangle$ ，et altera e contrario similiter．quae res［haec autem controuersia］territorialibus est finienda terminibus，nam inuenimus saepe in publicis instrumentis significanter inscripta territoria ita ut EX COLLICVLO QVI APPELLATVR ILLE，AD FLV－ MEN ILLVD，ET PER FLVMEN ILLVD AD RIVVM ILLVM aut VIAM ILLAM， ET PER VIAM ILLAM AD INFIMA MONTIS ILLIVS，QVI LOCVS APPEL－ LATVR ILLE，ET INDE PER IVGVM MONTIS ILLIVS IN SVMMVM ET PER SVMMVM MONTIS PER DIVERGIA AQVAE AD LOCVM QVI APPELLATVR ILLE，ET INDE DEORSVM VERSVS AD LOCVM ILLVM，ET INDE AD COM－ PITVM ILLIVS，ET INDE PER MONVMENTVM ILLIVS AD locum unde primum coepit scriptura esse．

Quotiens quid inter uicinos extiteri［n］t quaestionis，ab agrimensori〈bu〉s prompt $\langle i\rangle$ us hoc quaerendum．

Primum antiqui $\langle\mathrm{s}\rangle$ mens $u$ ris quemadmodum tenueri $\langle\mathrm{n}\rangle \mathrm{t}$ aut teneant，ostendant uicinae possessiones，quae sine lite possideri uidentur，ut quaera［n］tur quo genere

But wherever you are inscribing, either 'beyond' or 'on the near side of' or 'on the right' or 'on the left', the survey of the territory must be conducted in accordance with the legislation of Augustus, 'as far as the scythe and plough shall have gone'. ${ }^{4}$ On the map you must note separately 'areas cultivated and uncultivated', 'woods'.

When the survey has been completed the lots $\{$ sortes $\}$ should be apportioned. The names (of the colonists) should be inscribed in tens, and the allocations of every ten men should be carved on the map so that all the land which each (of the ten) ought to receive is joined in one. On each lot should be inscribed, for example, 'First lot, D. D. (to the right of decumanus) I or the second (decumanus) or III or IV, on the near side of this or that kardo', as far as is required to complete the area of land of each group of ten men, that is, the number of centuriae in which their land is situated. Therefore they should place all the lots in the draw, on which will have been written the entire area of the community's territory (i.e. when added together). Similarly, the names of all the groups of ten should be inscribed on lots, to see in what location which lot, or which lot in the order (they are drawn), should have its area of land, either beyond (the kardo) and to the right (of the decumanus), or to the left (of the decumanus) and beyond (the kardo), or on the near side (of the kardo). Then from the groups of ten, before they draw the lots, the names of individuals (should be written) on counters and tickets. Therefore, they will make this draw themselves so as to know who comes out first, or in whatever order. This drawing of lots is essential in case someone might complain that he ought to have made first draw of the lots and could perhaps have chanced upon a better area of land, or in case there is a dispute over who should make first draw of the lots, since they are all equal. ${ }^{5}$

A dispute about territorial jurisdiction occurs whenever there is litigation about possession of land because taxes have to be collected. One party claims that possession is established within the boundaries of its territory, while the other makes a similar claim in contradiction. This question should be settled by means of territorial boundary markers, for we often find in public documents territories distinctively designated as follows: 'From the small hill called such and such, to such and such a river, and along that river to such and such a stream or such and such a road, and along that road to the lower slopes of such and such a mountain, a place that has the name such and such, and from there along the ridge of that mountain to the summit, and along the summit of the mountain along the watersheds to the place that is called such and such, and from there down to such and such a place, and from there to the cross-roads of such and such a place, and from there past the tomb of such and such to' the place from which the description began. ${ }^{7}$

Whenever any kind of disagreement has arisen between neighbours, the following ought to be rapidly investigated by land surveyors. ${ }^{8}$

Firstly, neighbouring properties, which are apparently held without any legal dispute, should be used to show to what extent men have occupied or do occupy land in relation to the old survey, so that we can examine in what way the boundary mark-
definitio uicinorum perseuera［n］t．eadem quasi magistra sit eorum，quae［est］in quaes－ tione［m］sunt：considerent，si cauis，si superciliis，cliuis，marginibus，ante missis arboribus，ita ut ipsa，uicinitas terminatur，ut et his quae in quaestionem ueniunt praestet exemplum．

Sed si caua defecerit aut＜supercilium，cliuus，m）argo，arbores ante missae，solent termini occurrere．qui lapides qua $[\mathrm{m}]$ longiores sunt quam qua latiores，sequendi，hoc est aut si cursum dirigunt lineare $\langle\mathrm{m}\rangle$ aut si gamma faciunt $\langle\mathrm{et}\rangle \operatorname{tran}\langle\mathrm{s}\rangle$ uersi opponun－ tur，ut quam longitudinem fecerint，hanc ut limitem sequantur．

Sed ipsa positio terminorum pro regionibus inmutatur：aut Tiburtini usque ad finem ex ordine［m］de omni parte dolati；nam si superior pars tantum dolata est et inferior subtus inpolita derelicta，cippus nominandus est monumentalis esse，non ter－ minalis 〈aut〉 silices pro sua natura ponuntur igniferique［aut］lapides，［a］ut de Tiburtinis dictum est，per longitudinem．

Iudicant $\langle\mathrm{i}$ si〉 petrae naturales occurrunt，ipsae naturales petrae pro signis haben－ tur：sed de ipsis excepta $\langle\mathrm{e}\rangle$ aut decus habent aut linea $\langle\mathrm{s}\rangle$ ．

Sub terminis signa solent $\langle e s s e\rangle$ ，quae sunt in imo posita，eaqu［a］e exquiri iube $\langle\mathbf{n}\rangle \mathrm{t}$ ， qui artes ediderunt．

Ante missae uero arbores solent etiam plagatam antiquitus $\dagger$ inflexuosam $\dagger$ simi－ lem corticibus ostendere［m］cicatricem：licet hae terebris foratam etiam，tornatis intro missis，sicut scriptum a ueteribus，habere dicantur．

Sunt etiam et coronae plerumque $\langle\mathrm{e}\rangle$ uepribus quae limitibus seruiunt；quarum et initium considerari oportet et finem et，ut diximus，aliorum locorum similitudo uici－ norum si talibus definitur．

Solent etiam arbores oliuarum，quotiens in utroque agro sunt uel utriusque uici－ nae，ordines non habere ad unam lineam constitutos：ut cum sibi 〈non〉 consentiunt lineae，utriusque agri dominium sui iuris esse testentur．

Sunt et caesurarum et culturae discrimina，quae cum discripseri$\langle n\rangle t$ ，non unius qualitatis possessionem ostendunt sed diuidi omnia pollicentur．

Diuergia aquarum etiam pro limitibus occurrunt．
Saepe etiam euenit，ut in aliis possessionibus nec ad proxima coniunctis in medio alterius agro seu siluae seu pascuae seu uineae oliueti castaneti aliquid occurrat；quo〈d＞ cum sui iuris aliquis uindicet，directum signis defossis aut terminis sequitur inspector； haec enim uetustas illi quae indagare〈 t$\rangle$ iniunxit．

Nam de qualitatibus，antiquitati（bu）s，possessionibus，territori $\langle i\rangle s$ ，terminibus， signis et his similibus considerandum est，ab origine［m］quemadmodum tenuerint ［coeperint］：deinde aliquid usque ad nostram aetatem descenderit aut permaneat，opus est exquiri．

[^50]ing between neighbours persists．This should be a kind of instructress in respect of the matters involved in the dispute．They（surveyors）should bear in mind that，if the neighbouring properties are demarcated by hollows in the ground，terraces，slopes， banks，or trees planted previously，as in the original definition of boundaries，this may also provide a precedent for the case under dispute．

However，if neither hollow，〈terrace，slope，b〉ank，nor trees planted previously are present，then boundary stones normally come to our attention．These stones must be followed in the direction where they are longer rather than where they are broader， that is，if they make a straight line，or if they make a（letter）gamma and are set at right angles，surveyors should follow their lengthwise direction as（marking）the limes．

But the actual layout of boundary stones changes according to the region．For example，Tiburtine stones are set right up at the boundary in a row，and are carved over their entire surface；for if only the upper part has been carved and the lower part has been left unfinished，it should be described as a stone denoting a tomb \｛cippus\}, not as a boundary stone．${ }^{9}$ 〈Again〉，flintstones，and also volcanic stones，are placed in their natural state lengthwise，as I mentioned with regard to Tiburtine stones．

If the surveyor encounters natural rocks when making an examination，these natural rocks are held to be markers；but selected numbers of them have either an X mark \｛decus\} or straight lines carved on them.

There are normally marks underneath boundary stones，which have been placed on their base，and the teachers of the skill of surveying instruct us to look for them．

Trees planted previously normally reveal a $\dagger$ curving $\dagger$ ，scar－like incision on the bark made long ago；indeed they are said to have this mark bored into them by a drill with the insertion of wooden pegs，as the ancient authorities wrote．${ }^{10}$

There are also hedges，generally made from thorn bushes，which serve to mark limites．We must examine the beginning and end of these hedges，and，as I have said， a similarity in neighbouring locations，if the boundary is demarcated by such methods．

When olive－trees grow in each of two fields or in（the fields of）each of two adjoining properties，they often do not form continuous straight rows；therefore，since the rows of trees are $\langle n o t\rangle$ in harmony they should prove that control over each field is vested in separate individuals．${ }^{11}$

There are differences both in felled trees and in cultivated areas，which，when they （surveyors）have discovered them，indicate that possession is not of a uniform type， but suggest that everything is divided（among several people）．${ }^{12}$

Watersheds also serve to mark limites．
Moreover，it often happens that in other holdings not connected to the neigh－ bouring properties，in the middle of someone else＇s land，there is a portion of a wood or pasture land or a vineyard or an olive grove or a chestnut grove．When someone asserts his claim to ownership of this，the person making the examination follows a straight line by uncovering boundary markers or stones．For men of old have imposed upon him these points that he should seek out．${ }^{13}$

Now，with regard to types of land，ancient practices，holdings，territories，bound－ ary stones，markers and similar things，we must examine in what way men have occu－ pied（land）from the start；then our task is to discover if something has come down or persisted to our time．

Qualitas in has species diuiditur，ut extremitati（bu）s concludentibus aut quadrata sit aut circa flexa aut cuneata aut triangularis aut modo curuis anfracta in flexuram， modo in rectum dirigentibus lineis porrecta，modo artiore［m］latitudine［m］longior， modo minore［m］longitudine［m］prolixior．quorum plera［s］que mensuris conprehen－ duntur．

Ex antiquitate［m］recipiunt hoc［est］，ut et nominibus uetustis utantur，ut uecti－ galis ager uirginum Vestae，〈et〉 aris templis sepulchris et his similibus．quin etiam usui ［hoc est incepto et incrementis］artis ordinem naturalium rerum substituunt et geo－ metricae exercitationi subducunt saepe；cred $o$ ，ut uetustatem reserue $\langle\mathrm{n}\rangle \mathrm{t}$ speciebus．

Ali［a］qua quoque cum de agri qualitate［m］aut incurui aut angularis excurrunt et a［d］directis lineis discerpuntur，subsiciua appellantur，hoc est quae a subsecantibus lineis remanent，natura $\langle\mathrm{m}\rangle$ extremitatum seruantia quae cum uel $\langle\mathrm{ut}\rangle$ communis iuris aut publici essent，possessionibus uicinis tunc Domitianus imp．profudit，hoc est ut eis line $\langle\mathrm{is}\rangle$ arcifinalem uel occupatoriam licentia $\langle\mathrm{m}\rangle$ tribueret．

Arcifinales agri dicuntur qui arcendo，hoc est prohibendo，uicinum nomen accep－ erunt．

Occupatorii uero ideo hoc［est］uocabulo utuntur，quod，uicini urbium populi seu possessores，cum adhuc nihil limitibus terminaretur，praesumptione certaminis cum de locis aduersum se repugnantes agerent，quo usque pulsi uel cedere〈n〉t uel restitisse〈nt〉， uictoriae terminus fieret，uictos aut praesidium collis aut riui interstitium aut fossae munimen resistere pateretur et hoc genere naturae aut cursus docti securae perpetui－ tatem possessionis efficerent．

Quaestorii autem dicuntur agri，quos populus Romanus deuictis pulsisque hostibus possedit，mandauitque quaestoribus ut eos uenderent．quae centuriae nunc appellantur，id est plinthides，hoc est laterculi．eosdem in quinquagenis iugeribus quadratos cluserunt limitibus，atque ita certum cuique modum uendiderunt．quibus agris sunt condiciones uti p．R．〈praestituit；；quod etiam praestitutum obseruant． uetustas tamen longi temporis plerumque paene similem reddidit occupatorum agro－ rum condicionem：〈notum est〉 $\mathrm{n}\langle o n\rangle$ uniuersos paruisse legibus quas a uenditoribus suis acceperant．

Vectigales autem agri sunt obligati，quidam $r(e i) p$（ublicae）$p$（opuli）$R$（omani）， quidam coloniarum aut municipiorum aut ciuitatium aliquarum．qui et ipsi plerique ad populum Romanum pertinentes ex hoste capti partitique ac diuisi sunt per cen－ turias，ut adsignarentur militibus，quorum uitute capti erant，amplius quam destinatio modi quamue［ro］militum exigebat numerus：qui superfuerant agri，uectigalibus subiecti sunt，alii per annos 〈quinos〉，alii uero mancipibus ementibus，id est condu－

The types（of land）are divided into the following groups，namely，through its enclosing outer boundaries it may be square－shaped，or circular，or wedge－shaped，or triangular，or at one point bending and curving，at another stretching ahead in a straight line，at one point longer than it is broad，at another wider than it is long． Most of these are encompassed by surveys．

From the past people adopt the following point，namely，they use old titles，as in the land of the Vestal Virgins which yields revenue，and in the case of altars，temples， tombs，and such like．Indeed，for the employment of skill，that is，its beginning and development，they even substitute the existing order of the natural world，and often detract from the practice of geometry，in order，in my opinion，to preserve the mere appearance of antiquity．${ }^{14}$

Certain areas that protrude beyond the type of land which is curved or has angles， and are divided off by straight lines，are called subseciva，that is，pieces of land that remain when the boundary lines have cut them off and retain the character of peri－ pheral areas．Although these subseciva for instance belonged to communities or the state，the emperor Domitian generously granted them to the neighbouring landhold－ ings，so that in effect，in accordance with the boundary lines，he conferred rights asso－ ciated with ager arcifinalis or ager occupatorius．${ }^{15}$

Agri arcifinales are said to be lands that got their name from the action of ward－ ing off \｛arcere\}, that is, driving away a neighbour.

Agri occupatorii get their name in the following way，namely that neighbouring townspeople or landholders，when nothing was yet being demarcated by limites，had the presupposition that in battle when they were fighting against one another in dis－ putes over sites，the physical boundary of victory would be wherever one side retreated to when defeated or wherever it had succeeded in making a stand；and that the pro－ tection of a hill or the barrier of a stream or the shelter of a ditch would allow the defeated side to make a stand，and that guided by this type of natural（obstacle）or a river，they would achieve the secure and permanent possession of their land．${ }^{16}$

Agri quaestorii are those lands that the Roman people took over after the enemy had been conquered and evicted，and instructed the quaestors to sell．${ }^{17}$ They are now called centuriae，that is，plinthides or laterculi．These lands they enclosed within limites in squares of fifty iugera each，and in this way they sold a definite area to each per－ son．For these lands there are regulations，as the Roman people 〈provided；and indeed they abide by this provision．${ }^{18}$ However，the passage of many years has gener－ ally reduced them to a condition virtually similar to that of agri occupatorii．For it is known that not everyone complied with the rules that they had received from the people who sold the land to them．${ }^{19}$

Lands yielding revenue $\{$ vectigales $\}$ are legally liable，in some cases to the Roman state，in others to the government of colonies or municipia or other communities．The majority of those lands belonging to the Roman people were captured from the enemy，apportioned，and divided up into centuriae so that they could be allocated to the soldiers by whose bravery they had been captured；they were more extensive than the designated area（for each colonist）or the number of soldiers required；lands left over were made subject to rent，some for a period of $\langle$ five $\rangle$ years，others for one hun－
centibus in annos centenos，plures uero finito illo tempore iterum ueneunt locanturque ita ut uectigalibus est consuetudo．

In quo tamen genere agrorum sunt aliquibus nominatim redditae possessiones，〈qui〉 id habeant inscriptum［que］in formis，quantum cuique eorum restitutum sit．hi agri qui redditi sunt，non obligantur uectigalibus，quoniam scilicet prioribus dominis redditi sunt．

Mancipes autem，qui emerunt lege dicta ius uectigalis，ipsi per centurias locauerunt aut uendiderunt proximis quibusque possessoribus．in his igitur agris quaedam loca propter asperitatem aut sterilitatem non inuenerunt emptores．itaque in formis locorum talis adscriptio，id est IN MODVM CONPASCVAE，aliquando facta est，et TANTVM CONPASCVAE；quae pertinerent ad proximos quosque possessores， qui ad ea attingunt finibus suis．quod［que］genus agrorum，id est conpascuorum，etiam nunc in adsignationibus quibusdam incidere potest．

Virginum quoque Vestalium et sacerdotum quidam agri uectigalibus redditi sunt locatim．quorum agrorum formae，ut comperi，plerumque habent quendam modum adscriptum：sed in his extremis lineis conprehensae sunt formae sine ulla quidem norma rectoque angulo．solent uero et hi agri accipere per singula lustra mancipem： sed et annua conductione solent locari．

Diuisi et adsignati agri sunt qui ueteranis aliisue personis per centurias certo modo adscripto aut dati sunt aut redditi quiue ueteribus possessoribus redditi com－ mutatique pro suis sunt．hi agri leges accipiunt ab his qui ueteranos deducunt，et ita propriam obseruationem eorum lex data praestat．

In his agris［sed］et subsiciua sunt；et aliquando compascua，sicut in his qui uecti－ galibus seruiunt，et in hoc genere sunt；quaedam autem uectigalia，quae intra perticam in eam regionem conprehensa sunt．aut siquid superfuit quod non adsignaretur，reseru－ atum aut redditum relocatum［q］ue est cuiquam coloniae．hi autem quibus adsignati sunt，deducebantur intra centuriationem：et quae superfuerant subsiciua his concessa sunt，id est eorum rei publicae，ex quorum territorio sumpserant agros，ita ut in eos quos donauerant r．p．agros，et in eos qui redditi erant ueteribus possessoribus，iuris dictio salua esset eis，ex quorum territorio sumpti erant agri．

Ergo omnium coloniarum municipiorumque leges semper respiciendae erunt， itemque exquirendum nequid post legem datam aliquid，ut supra dixi，commentariis aut epistulis aut edictis adiectum est aut ablatum．

Sed et haec meminerimus in legibus saepe inueniri，cum ager est centuriatus ex alieno territorio paratusque ut adsignaretur，inscriptum QVOS AGROS，QVAE LOCA QVAEVE AEDIFICIA，INTRA FINES puta ILLOS ET INTRA FLVMEN ILLVD，INTRA VIAM ILLAM，DEDERO ADSIGNAVERO，IN EIS AGRIS IVRIS DICTIO COHERCITIOQVE ESTO COLONIAE ILLIVS，cuius ciuibus agri adsignabuntur．uolunt quidam sic interpretari，quidquid intra fines supra memoratos
dred years when lessees procured, that is, leased them. But a large number (of these lands), after the appointed time has elapsed, are put on sale again and leased out, as is the practice with land yielding revenue. ${ }^{20}$

However in this type of land there are holdings that have been given back to cer-
tain named individuals, who have it written down on maps how much has been returned to each of them. These lands that have been handed back are not subject to rent, seeing that they have been given back to their previous owners.

The lessees who bought the right to collect the rents due according to the conditions imposed, themselves rented this out by centuriae or sold it to some of the adjacent landholders. In these lands (i.e. subject to rents), therefore, some places did not find any buyers (i.e. lessees) because of rough or infertile terrain. So, on the maps of these sites the following notation has sometimes been made, namely, 'for an area of common pasture', or 'so much common pasture'; these areas should therefore belong to those adjacent landholders whose boundaries touch them. This type of land, that is, common pasture, can still occur nowadays in certain allocations.

Moreover, certain lands of the Vestal Virgins and priests are rented out by contract. The maps of these lands, as I have established, generally have an area written in. But in these lands the maps are enclosed by peripheral lines with no pattern or right angles. Normally these lands receive a lessee every five years; but it is also common practice for them to be leased on an annual basis. ${ }^{21}$

Divided and allocated lands are those that have been granted or returned to veteran soldiers or other people in centuriae, with a specific area written down, or that have been returned to previous landholders or exchanged for their own. These lands receive conditions from the men who settle the veterans, and the law that has been issued (lex data) provides for an appropriate application of them in each case. ${ }^{22}$

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In these lands there are in addition subseciva; and occasionally areas of common pasture also occur in this type of land, just as in that subject to rents. There are also certain lands subject to rent, which were included inside the allocated area in that region. If any land was left over that could not be allocated, it was set aside, or returned, or relet to some colony. The men to whom lands were allocated were settled within the area that had been divided into centuriae; any subseciva left over were granted to the following people, that is, to the community of those from whose territory land had been taken, so that in respect of those lands that communities had handed over and those that had been returned to previous landholders, jurisdiction was retained by those from whose territory the lands had been taken. ${ }^{23}$

Therefore we must always pay attention to the laws of all the colonies and municipia, and we must also enquire if, after the law was issued, anything was added or removed in commentaries \{commentarii\}, letters $\{$ epistulae $\}$, or edicts $\{$ edicta $\}$, as I mentioned above.

But at the same time let us keep in mind that the following words are often found in laws, when land (taken) from another community has been divided up and prepared for allocation; the wording is: 'with regard to those lands, those sites, those buildings, within', say, 'this or that boundary and this or that river and this or that road, which I shall have granted and allocated, over these lands let jurisdiction and right of enforcement belong to that colony' to whose citizens the lands will be allocated. Some people want to interpret this to mean that whatever lies within the boundaries men-
fuerit，id iuris dictioni［s］coloniae accedat．quod non debet fieri．neque enim 〈ac〉cep－ tum aliud defendi potest iuris dictioni［s］coloniae，quam quod datum adsignatumque erit．alioquin saepe et intra fines dictos et oppidum est aliquod；quod cum in sua condi－ cione remaneat，〈e〉idem est in id ipsum ius，quoi ante fuit：ita illa interpretatione oppidum ciuesque coloniae pariter adsignaret．sed nec fuisse $\langle t\rangle$ necesse in legibus ita complecti QVOS AGROS，QVAE LOCA QVAEVE AEDIFICIA，si uniuersa regio， quae cancellata erat，coloniae iuris dictioni accederet：dixisset enim INTRA FINEM ILLVM ET FLVMEN ILLVD ET VIAM ILLAM IVRIS DICTIO COHERCITIO－ QVE ESTO COLONIAE ILLIVS．ita excipitur id quod non adsignatum est uocaturque subsiciuum．ergo，ut saepius repetam，hoc ait，QVOS AGROS，QVAE LOCA QVAEVE AEDIFICIA DEDERO ADSIGNAVERO，IN EIS IVRIS DICTIO COHERCITIOQVE ESTO［COLONORVM］COLONIAE ILLIVS，quoius ciuibus adsignati erunt agri．item quidam putauerunt，quod iam supra quidem dixeram，sed iterum repetendum arbitror，ut eis agris，qui redditi sunt ueteribus possessoribus，iuris dictio esset coloniae eius，cuius ciues agros adsignatos accipiebant．non autem uidetur； quoniam 〈ait〉，ut dixi，in lege QVOS AGROS，QVAE LOCA QVAEVE AEDIFICIA DEDERO ADSIGNAVERO，IN EIS IVRIS DICTIO COHERCITIOQVE ESTO， quo ueterani deducti sunt，quibus hi agri adsignati sunt．alioqui $\langle n\rangle$ ，cum ceteros pos－ sessores expelleret et pararet agros quos diuideret，quos dominos in possessionibus suis remanere passus est，eorum condicionem mutasse non uidetur：nam neque ciues colo－ niae accedere iussit．

Hoc quoque aspiciendum erit，quod aliquibus locis inueni，ut cum ex alieno ter－ ritorio sumpsisse〈t $\mathbf{t}$ agros quos adsignaret，proprietatem［quidem］daret scilicet cui adsignabat，sed territorio，intra quod adsignabat，ius non auferret．sunt quoque quaedam diui Augusti edicta，quibus significa［n］t，quotiens ex alienis territoriis agros sumpsisset et adsignasset ueteranis，nihil aliud ad coloniae iuris dictionem＜pertine）at quam quod ueteranis datum adsignatumque sit．ita non semper quidquid centuriatum erit ad coloniam accedit，sed id tantum quod datum adsignatumque fuerit．sunt nihilo minus quaedam municipia，quibus extra murum nulla sit iuris dictio．

Fluminum autem modus in aliquibus regionibus intra centurias exceptus est，id est adscriptum FLVMINI TANTVM，quod alueus occuparet．aliquibus uero region－ ibus non solum quod alueus occuparet，sed etiam agrorum aliquem modum flumini adscripsit，quoniam torrens uiolentior excedit frequenter circa alueum centurias．Illud uero obseruandum，quod semper auctores diuisionum sanxerunt，uti quaecumque loca sacra，sepulchra，delubra，aquae publicae ac uicinales，fontes fossaeque publicae uici－ nalesque essent，item siqua conpascua，quamuis agri diuiderentur，ex omnibus eiusdem
tioned above belongs to the jurisdiction of the colony. But that should not be the case. For no land that has been received, other than that which has been granted and allocated, can be claimed as belonging to the jurisdiction of a colony. In any event, there is often a town within the boundaries mentioned, and, since it remains in its existing legal status, jurisdiction over this town lies with whoever had it before. On the interpretation mentioned above, the founder would be allocating the town along with its citizens to a colony. But it would not have been necessary to include in the laws the phrase, 'those lands, those places, those buildings', if the entire area that had been divided was to come under the jurisdiction of a colony. Rather he would have said, 'within this or that boundary and this or that river and this or that road, let jurisdiction and right of enforcement belong to that colony'. So, excluded from this is any land that is unallocated and called subsecivum. Therefore, to repeat it again, the wording runs, 'those lands, those sites, those buildings, which I shall have granted and allocated, over them let jurisdiction and right of enforcement belong to that colony' to whose citizens the lands shall have been allocated. Some people have held the view, as I have already mentioned above but think ought to be repeated again, that in respect of those lands that were returned to previous landholders, jurisdiction should belong to that colony whose citizens received the allocated lands. However this does not seem to be true. For, as I pointed out, he (the founder) says in the law, 'those lands, those sites, those buildings, which I shall have granted and allocated, over them let jurisdiction and right of enforcement belong' where the veterans, to whom these lands have been allocated, were settled. Moreover, when the founder was expelling the other landholders and preparing the lands for division, he does not seem to have changed the legal status of those owners whom he permitted to remain on their holdings; for he did not order them to become citizens of the colony.

The following situation, which I have discovered in several places, will also have to be examined, namely, when the founder had taken lands from the territory of another community in order to allocate them, he naturally granted ownership to each person to whom he allocated land, but he did not remove jurisdiction from the territory within which he was making the allocations. There are also several edicts of the divine Augustus, in which he makes clear that whenever he had taken land away from the territory of another community and had allocated it to veterans, nothing other than whatever was granted and allocated to the veterans should belong to the jurisdiction of the colony. Therefore, it is not always the case that whatever land has been divided passes to (the jurisdiction of) a colony, but only what has been granted and allocated. Nevertheless, there are some municipia that have no jurisdiction outside their walls.

In some regions the width of rivers within centuriae has been excluded, that is, a note has been made, 'so much for the river', in respect of the width occupied by its bed. Indeed in some regions he (the founder) ascribed to a river not only the width occupied by its bed, but also an area of the adjoining fields, since when a river is in full spate it often floods the centuriae around its bed. ${ }^{24}$ We should note the practice that men responsible for land division have always sanctioned, namely, that whatever sacred places, tombs, shrines, public and local aqueducts, ${ }^{25}$ fountains, public and local ditches, were in existence, and also whatever common pasture land there was, should always be of the same legal status in every respect as they had been before, no mat-
condicionis essent cuius ante fuissent．adiectumque ius，ut et limites，id est decumani et cardines，aperti populo essent．et statuerunt decimanos et cardines maximos paten－ tiores ceteris esse，quintarios autem et subrunciuos minime patentes，non minus tamen quam 〈qua〉 uehiculo iter agi possit．in quibusdam regionibus cum limites late patere iuberent，modus eorum limitum in adsignationem non uenit．saepe enim et uiarum publicarum per centurias modus exceptus est．item sanxerunt，sicubi limites in aedifi－ cium aliquod inciderint，is cuius aedificium esset daret iter populo idoneum per agrum suum，quod semper esset peruium．in quorundam uero uillis，qua limites transeunt， ianuae sunt semper patentes praestantesque populo iter．

Nuper ecce quidam euocatus Augusti，uir militaris disciplinae，professionis quoque nostrae capacissimus，cum in Pannonia［m］agros ueteranis ex uoluntate et lib－ eralitate imperatoris Traiani Augusti Germanici adsignaret，in aere，id est in formis， non tantum modum quem adsignabat adscripsit aut notauit，sed et extrema linea unius cuiusque modum comprehendit：uti acta est mensura adsignationis，ita inscripsit lon－ gitudinis et latitudinis modum．quo facto nullae inter ueteranos lites contentionesque ex his terris nasci potuerunt．namque antiqui plurimum uidebantur praestitisse，quod extremis in finibus diuisionis non plenis centuriis modum formis adscripserunt．paret autem quantum hoc plus sit，quod，ut supra dixi，singularum adsignationum longi－ tudinem inscripseri［n］t，subsiciuorumque［m］qu $\langle a\rangle e$ in ceteris regionibus loca ab adsig－ natione discerni non possunt，$\langle$ posse $\rangle$ effec〈er〉it diligentia et labore suo．unde nulla quaestio est，quia，ut supra dixi，adsignatione $\langle\mathrm{m}\rangle$ extrema quoque linea demonstrauit．

Hoc quoque non praetermittam，quod plerisque locis inueni，ut modum agri non iugerum sed aliquo nomine appella〈re〉nt，ut puta quo in Dalmatia uersus appellant． idem uersus habet $p$ ．$\overline{\text { IIIIDCXL }}$ ．ita iugero sunt uersus numero III？ego autem quo－ tiens egeram mensura $\langle\mathrm{m}\rangle$ ，ita renuntiabam，IVGERA TOT，VERSVS TOT；ut，si forte controuersia esset uersum habere pedes VIIIDCXL，in iugeribus tamen fides constaret． in prouincia quoque Narbonense uaria sunt uocabula：alii appellant libram，alii par－ allelam；in Spania centurias．ita si［c］，ut dixi，in consuetudine alicuius regionis inuen－ imus，［sicut］uidetur ita renuntiandum IVGERA TOT，VERSVS TOT，siue LIBRAE TOT，siue quod aliud uocabulum aliquo modo comprehensum fuerit．ita cum iugera adscripta fuerint，licet peregrinis uocabulis possit 〈agi〉 aliquid，iugerum nobis ratio sui fidem seruabit．

Neque hoc praetermittam，quod in prouincia［m］Cyrenensium conperi．in qua agri sunt regii，id est illi quos Ptolomeus rex populo Romano reliquit；sunt plinthides，〈id est〉 laterculi quadrati uti centuriae，per sena milia pedum limitibus inclusi，habentes singuli laterculi iugera numero $\infty$ CCL；lapides uero inscripti nomine diui Vespasiani
ter how the lands were being divided．Furthermore，there was an additional right，that limites，that is，decumani and kardines，should afford a right of way to the people，and they decided that the decumanus maximus and kardo maximus should be wider than the others，that the quintarii and the subruncivi should be least wide，but not less how－ ever than the space needed to travel in a vehicle．${ }^{26}$ In certain regions，since they instructed that the limites should be wide，the width of those limites was not included in the allocation．For in addition，the width of public roads passing through centuriae was often excluded．They also laid down that wherever limites came in contact with any building，the owner of that building should give to the people an appropriate right of way through his land，which should always be kept open．Indeed in the farm build－ ings of some people，where the limites pass through，doors are always left open，pro－ viding a right of way for the people．${ }^{27}$

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．Indeed surveyors of old seemed to have made a substantial contribution，in that，on the outer boundaries of land division，they noted down on maps the area of incomplete centuriae．So，it is clear how much this area is greater（than the area of allocated land），because，as I said above，he（the soldier in Pannonia）wrote down the length of individual allocations and by his dili－ gence and hard work made it possible to distinguish subseciva，which in other regions could not be distinguished from the allocated area．Therefore there is no argument， because，as I said before，he made the allocation clear at the outer boundary line too．${ }^{28}$

I shall not omit to mention the following situation，which I have discovered in several places，namely，that people were expressing an area of land not in iugera but in some other form，as for example in Dalmatia they have the name versus．A versus contains 8,640 （square）feet．So，in a iugerum there are $31 / 3$ versus（ 28,800 square feet）． However，whenever I conducted a survey I used to express measurements as follows： ＇so many iugera，so many versus＇．Then，if there was a dispute whether a versus had 8,640 feet，confidence could nevertheless be placed in the iugera．In the province of Gallia Narbonensis various terms are in use．Some refer to a libra，others to a parallela；in Spain they talk about centuriae．Therefore if，as I said，we find that this is the custom of some region，it is right that we should express ourselves as follows： ＇so many iugera，so many versus＇，or＇so many librae＇，or whatever other terminology has been included in any way．So，when the iugera have been recorded，even if some－ thing can be 〈done〉 using local terminology，a system involving iugera will be in－ herently reliable for us．

Moreover，I shall not omit to mention something I discovered in the province of Cyrene．Here there are royal lands，that is，lands that King Ptolemy bequeathed to the Roman people．They are plinthides，〈that is〉，square blocks of land \｛laterculi\} like centuriae，enclosed by limites of 6,000 feet；each block of land has 1,250 iugera．There are stones inscribed with the name of the divine Vespasian with the following clause，
sub clausula tali，OCCVPATI A PRIVATIS FINES：P．R．［P］RESTITVIT．praeterea pes eorum，qui Ptolomeicus appellatur，habet monetalem pedem et semunciam．ita iug（eribus）$\infty$ CCL，quae eorum mensura inueniuntur，accedere debet pars［x］xximi，et ad effectum iterum pars xxiliI：et erunt uniuerso effectu monetali pede iug． $\infty$ CCCLVI？？hunc igitur modum quattuor limitibus mensura s．s．inclusum uocamus medimna．quo app［ell］aret medimnon eorum mensura iugerum habere $I$ ，monetali autem mensura $I^{-}$s．

Item dicitur in Germania in Tungris pes Drusianus，qui habet monetalem pedem et sescunciam．

Ita ubicumque extra fines legesque Romanorum，id est，ut sollicitius proferam， ubicumque extra Italiam aliquid agitatur，inquirendum et de hac ipsa condicione dili－ genter praemoneo，nequid sit quod praeterisse uideamur．

Hae［c］sunt condiciones agrorum quas cognoscere potui．

## 〈DE GENERIBVS CONTROVERSIARVM〉

Nunc de generibus controuersiarum perscribam，quae solent in quaestione $\langle\mathrm{m}\rangle$ deduci．sunt autem haec de alluuione atque abluaione，de fine，de loco，de modo，de iure subsiciuorum，de iure territorii．［Item genera controuersiarum．］

De alluuione obseruatio haec est：［non］quod de occupatoriis age［re］tur agris，［sed］ quidquid uis aquae abstulerit，repetitionem nemo habebit．quae res necessitatem ripae muniendae iniungit，ita tamen ne alterius damno quicquam faciat qui ripam muniet． si uero in diuisa et adsignata regione tractabitur，nihil amittet possessor，quoniam formis per centurias certus cuique modus adscriptus est．

Circa Padum autem cum ageretur，quod flumen torrens et aliquando tam uio－ lentum decurrit，ut alueum mutet et multorum late agros trans ripam，ut ita dicam， transferat，saepe etiam insulas efficiat，［ad］Cassius Longinus，prudentissimus uir，iuris auctor，hoc statuit，ut quidquid aqua lambiscendo abstulerit，id possessor amittat， quoniam scilicet ripam suam sine alterius damno tueri debet；si uero maiore ui de－ currens alueum mutasset，suum quisque modum agnosceret，quoniam non possessoris neglegentia sed tempestatis uiolentia abreptum apparet；si uero insulam fecisset，a cuius agro fecisset，is possideret；aut si ex communi，quisque suum reciperet．

Scio enim quibusdam regionibus，cum adsignarentur agri，adscriptum aliquid per centurias et flumini．quod ipsum prouidit auctor diuidendorum agrorum，ut quotiens tempestas concitasset fluuium，quo［d］excedens［alpes］alueum per regionem uagaretur，

[^51]'land occupied by private individuals: he restored it to the Roman people'. ${ }^{29}$ Moreover, their measurement of one foot, which is called the Ptolemaic foot, is equivalent to one Roman foot plus $1 / 24$. So, in 1,250 iugera, which are found among their units of measurement, $1 / 24$ of the total must be added. Then to this total we must add
another $1 / 24$; the total in Roman measurements will be $1,3561 / 3$ iugera. ${ }^{30}$. This area, therefore, enclosed by four limites with the measurement system described above, we call medimna. From which it appears that a single medimnon in their measurements contains one iugerum, or in Roman measurements one iugerum plus $1 / 12$ and $1 / 5 / 6$ of a iugerum. ${ }^{31}$

Similarly, in Germany the Tungri talk about a 'Drusian' foot, which is the equivalent of $11 / 8$ Roman feet. ${ }^{32}$

Therefore, wherever anything is being done outside the territory and laws of Rome, that is, to express this more carefully, anywhere outside Italy, I urgently advise that we should investigate this aspect, in case there should be anything we appear to have overlooked.

These are the categories of land that I have been able to discover.

## $\langle\text { TYPES OF DISPUTE }\rangle^{33}$

Let me now examine the types of dispute that normally come under enquiry. These concern the deposition and erosion of land by rivers, boundary, site, area, the law relating to subseciva, and territorial jurisdiction.

The following is the practice with regard to alluvial land: if the dispute concerns ager occupatorius, no one has any legal redress in respect of whatever the force of the water has removed. This makes it essential to shore up the bank, but the person who shores up the bank must not do anything to cause loss to another party. But if the dispute occurs in a region that has been divided and allocated, the landholder will lose nothing, since throughout the centuriae a definite area has been recorded on the maps for each person.

Now, when there was a dispute in the area of the Po because the river surges down sometimes in such a raging torrent that it changes its course and carries across its bank, so to speak, the land of many people over a wide area, and often even creates islands, Cassius Longinus, a very wise man and legal expert, decided that a landholder should lose whatever soil the river gradually eroded, since he ought to look after his own stretch of river bank without inflicting any loss on another party. But if the river had surged down with unusual force and changed its course, everyone should claim his own area of land (i.e. according to the map), since it had obviously been swept away not through the carelessness of the landholder but by the vehemence of the storm. If, however, the river had created an island, he decided that the person from whose land it had been fashioned should possess it; on the other hand, if (the island had been fashioned) out of land owned in common, each person should recover his own portion.

I know that in several regions when land was being allocated, throughout the centuriae something (i.e. an area of land) was set aside even for the river. The man responsible for the land division ensured in this precise way that whenever a storm had stirred up the river, so that it burst its banks and spread all over the region, the
sine iniuria cuiusquam deflueret；cum uero ripis suis curreret，proximus quisque utere－ tur modum flumini adscriptum．nec erat iniquum，quoniam maiores imbres aliquando excedere aquam iubent ultra modum flumini adscriptum et proximos cuiusque uicini agros inundare．dictos tamen agros，id est hunc omnem modum qui flumini per cen－ turias ascriptus erat，res publica populi quorundam uendidit：in qua regione si de allu－ uione age［re］tur，magnae quaestiones erunt，ut secundum 〈a〉es quidquid uenditum est restituatur emptori．

In quaestoriis uectigalibus agris fere eadem obseruatio est quae et in adsignatis， quoniam secundum formas disputa［n］tur．

De fine si age［re］tur quae res intra pedum quinque aut sex latitudinem quaes－ tionem hab［er］et quoniam hanc latitudinem uel iter culturas accedentium occupat uel circumactus aratri；quod usu capi non potest：iter enim non，quia ad culturas per－ ueniatur，capitur usu［id est quod in usu biennio fuit］．〈finis enim multis documentis seruabitur，in quo intuendum $\rangle$ ，utrum terminibus，aut arboribus notatis，aut fossis，aut uiis，aut riuis，aut iugis montium，aut diuergiis 〈a〉quarum，aut，ut solet，uepribus，aut superciliis，aut rigoribus et saepe normalibus，aut，ut conperi aliquibus locis，inter arua marginibus quibusdam tamquam［puluini sunt ex glar $\langle\mathrm{e}\rangle \mathrm{a}$ Tib $\langle\mathrm{e}\rangle$ ris limites constituti］ puluinis，saepe etiam limitibus．item petras notatas，quae in finibus sunt，pro terminis habebitis．his enim fere generibus solent fines obseruari．［in quo intuendum．］

Si terminibus finem ui〈des〉 deri$\langle\mathrm{gi}\rangle$ ，quales sint termini，considerandum est．solent plerique lapidei esse．at uide $e$ quo lapide，quoniam quique consuetudines fere per regiones suas habent．alii ponunt silice $\langle o\rangle s$ ，alii Tiburtinos，alii enchor $\langle i\rangle$ os，alii pere－ grinos，alii autem politos et scriptos，alii aut robure $\langle 0\rangle$ s aut ex certa materia ligneos， quidam etiam hos quos sacrificales 〈uocant〉．et obserua［n］t sua〈m〉 quaeque regio，ut dixi，consuetudinem，uti conueniat fides．item solent etiam terminos scribere litteris singularibus．quidam etiam numeros per ordinem scribunt，quidam et signa defodiunt pro terminis．quidquid ergo fuerit［pro］loco termini et obserue［n］tur，custodiri debe－ tur，ut ab uno ad unum derigatur；et si notae sunt，a nota ad notam：saepe enim plures et in uno rigore sunt．quidquid fuerit et quem admodum cumque obseruari solitum fuerit，ita erit derigendum；quoniam，ut dixi，extrem $u$ s finis intra quinque aut sex〈pedes〉 quaestionem habet：nam intra ped $u \mathrm{~m}$ vr possessionem usu nemo capit；itinera saepe ad culturas peruenientibus tam latum locum occupant，aut in arat［r］is intra tot pedes aratrum circum arat．

Si arboribus notatis fines obseruabuntur，uidendum quae partes arborum notatae sint．notae enim in propriis arboribus a foris ponuntur，ut arbores liberas in parte $\mathrm{s}\langle u\rangle \mathrm{a}$ nota relinquat．si communes sunt arbores mediae，notantur utrimque，$u \mathrm{t}$ 〈notae〉 ad utrumque pertineant，et ut appareant esse communes．et in hoc genere finitionis

[^52]flood would not inflict harm on anyone．Furthermore，when the river was flowing within its banks，the adjacent landholders could use the area of land set aside for the river．This was not unjust，since unusually heavy storms sometimes force the water to flow beyond the width set aside for the river and to flood the nearest fields of all the neighbours．However，the government of one community has sold off the land mentioned，that is，all the area throughout the centuriae that had been set aside for the river．In this region，if there is a dispute involving harmful river action，there will be substantial arguments that，according to the bronze map，whatever was sold should be restored to the purchaser．${ }^{34}$

In quaestorian lands yielding revenue，${ }^{35}$ virtually the same kind of practice can be followed as in allocated lands，since disputes are based on maps．

In disputes about boundaries，whatever lies within five or six feet of the bound－ ary is called in question，since this width is taken up either by a right of way for those travelling to the cultivated fields，or by the space needed to turn a plough．This land cannot be acquired by usucapio．For a right of way，because it leads to cultivated areas，is not subject to usucapio．〈A boundary will be recognized by many indicators， and in this we must observe〉 whether by markers，or marked trees，or ditches，or roads，or rivers，or the ridges of mountains，or watersheds，or，as is customary，by thorn bushes，or terraces，or straight lines often forming right angles，or，as I have dis－ covered in some places，by raised borders between the fields like balks，or often indeed by limites．In addition，you should regard as boundary stones marked natural stones occurring on boundaries．Boundaries are usually recognized in these ways．${ }^{36}$

If you see that a boundary is fixed by markers，you must examine the type of marker．Generally they are made of stone．But note what kind of stone，since people have practices peculiar to their own region．Some use flint，others Tiburtine stone， others local stone，others non－native stone，others finished and inscribed stones，oth－ ers oak or wood of a specified type；indeed some use those（markers）that they 〈call〉 ＇sacrificial＇．But as I said，each region follows its own practice so that a trustworthy method can be agreed upon．Similarly they normally inscribe the markers with dis－ tinctive letters．Some even inscribe them with numbers in order，others fix emblems in the ground in place of markers．Whatever does duty as a boundary marker and is rec－ ognized as such，must be preserved so that the boundary can be marked out from one to the next；and if there are tokens，from one token to the next．For often there are many even in one straight line（boundary）．Whatever the boundary marker is，and in whatever way it has normally been recognized，the boundary must be demarcated accordingly．For，as I have said，an outer boundary within a distance of five or six feet is called in question，since no one can gain possession by usucapio within a dis－ tance of six feet．Rights of way for those travelling to cultivated areas often take up this width，or in ploughed fields it takes this amount of space for a plough to turn．

If boundaries are recognized by means of marked trees，we must note what parts of the trees have been marked．Marks on trees belonging to a particular property are placed on the side away from the property，so that the mark leaves the trees untouched on the side facing the owner＇s property．If the trees stand between two properties and are owned by both，they are marked on both sides，so that the marks belong to both parties and make it clear that the trees are owned in common．In this type of bound－ ary definition the boundary must be marked out in the same way（i．e．from one tree
similiter dirigendum est．sunt et illae arbores aliquando loco finitionis，quae ante mis－ sae dicuntur．et omnia genera quae insunt finitionum－ut puta in uno agro esse omnia－persequenda erunt．

Nam si fossa erit finalis，uidendum utrum unius aut utrius［que sit］partis，et si in extremo fine facta；
itemque 〈uia〉 utrum publica aut uicinalis aut duum communis aut priuata alterius；
item riuis si obseruabitur finis，utrum naturalis sit riuus aut ex fossis arcessita aqua riuum fecerit，et utrum priuatus obseruari aut communis debeat；
［si］iugis autem montium，quae ex eo nomine accipiuntur，quod continuatione ipsa iugantur；
nam et his quae summis montibus excelsissima sunt diuergia aquarum，ex quo summo loco aqua in inferiorem partem diuergit；
si uepribus，a［u］t quali $\langle\mathrm{bu}\rangle \mathrm{s}$ ，priuatis aut communibus；
superciliis，quae loca sunt ex plano in breui cliuo deuexa intra pedes altitudinis $x x x$ ：alioquin iam collis est．quae obseruationem hanc habe $\langle\mathrm{n}\rangle \mathrm{t}$ ，ut $\langle\mathrm{ex}\rangle$ eis superior possessor in planum usque descendat et sibi defendat omnem locum deuexum；
si rigoribus，cuiusque rigores obseruantur，et an normales．quod saepe in agris adsignatis inueni［un］tur：et aliquando unus quisque rigor inter multos uicinos finem facit；
si marginibus，quae res oculorum est，nequid malignitate exaretur，similiter nequid a uicinis accersiri possit，［a］ut marginibus coepti finitique loci inueniri possint；
si limitibus，quod fuerit ex communibus，a medio，ex priuatis，ab extremis rigor obseruandus constituendusque．
$\langle$ Sed consuetudines usque〉 region $\langle u m n\rangle$ obis intuendae，nequid noui a nobis fieri uideatur：ita enim fides professioni［s］constabit，si maxime secundum morem regionis et nosmet quaestiones tractauerimus．

De loco si agitur quae res hanc habet quaestionem，ut nec ad formam nec ad ullum scripturae reuertatur exemplum，sed tantum＇hunc locum［nam］hinc dico esse＇， et alter ex contrario similiter．quae res ex similitudine fere culturae comparationem accipit：si incultus erit，id est si silua，cuius sit aetatis；et si par caesurae aetas，nequid

[^53]to the next）．Sometimes those trees called＇planted previously＇serve in place of a boundary．${ }^{37}$ All types of boundary present－and imagine that they are all found on one piece of land－must be examined．

Now，if a ditch serves as a boundary we must see if it belongs to one party or to both parties，and if it has been built on a boundary edge．${ }^{38}$

Similarly，in the case of a road，we must establish if it is a public or local \｛vicinalis\} road, and if it is shared between two people or is for the private use of one.

Similarly，if a boundary is recognized by means of a stream，we must establish if it is a natural stream or if it has been artificially created by water fetched from ditches， and if it should be recognized as belonging to one person or as shared．
（A boundary is sometimes recognized）by means of the ridges of mountains $\{i u g a\}$ ，which get their name from the fact that they are yoked \｛iugare\} together in an unbroken series．
（A boundary is also recognized）by means of watersheds，which are at a very great height on the tops of mountains；from this topmost point water flows down in two directions to lower ground．

If（a boundary is recognized）by means of thorn bushes，（we must establish）what type they are，and if they are owned privately or in common．
（A boundary is also recognized）by means of terraces \｛supercilia\}, which are places where the ground slopes down for a short distance from a level surface，with－ out exceeding a height of thirty feet；otherwise it is a hill $\{$ collis $\}$ ．In respect of ter－ races，the following practice is observed；the landholder on the higher ground may descend from them to the level ground and claim all the sloping area as his．${ }^{39}$

If（a boundary is recognized）by means of straight lines \｛rigores\}, (we establish) who owns the rigores recognized as boundaries，and whether they are at right angles． This is often found in allocated lands，and sometimes one single straight line marks a boundary between many neighbours．

If（a boundary is recognized）by means of raised borders，this is a matter for inspection by the naked eye in case anything might be fraudulently ploughed up，and similarly in case any land might be improperly added by neighbours；（our purpose is to ensure）that those places whose boundaries are begun and terminated by raised borders can be identified．

If（a boundary is recognized）by means of limites，in the case of limites forming a communal boundary，the straight line is to be recognized and established from the middle（of the limes），in the case of limites forming a private boundary，from the edge （of the limes）．${ }^{40}$

But we must watch out 〈for the practices of〉 different regions in case we seem to be doing something unusual．For our profession will retain its integrity if we also con－ duct our investigations principally according to the practice of the region．

If there is a dispute about site，and the enquiry has the following procedure， namely，that there is no reference to a map or any written evidence，merely a state－ ment by one party＇I declare that this site starts from here＇，while the other party makes a similar statement opposing this，in this case a comparison is made on the basis of similarities in types of cultivation．If the land is uncultivated，that is，if it is wooded，（you should establish）what age the trees are；and if their age is appropriate for felling；and that they are not trees left standing，according to custom，which are
arbores，ut solent，relictae，quas ante missas uocant，et siluarum quoque aetates an sint pares．et si uineae，similiter in comparatione：an ordines aequidistantes，an pari condi－ cione，et an simili s（int）genere uitium．

Constabit tamen rem magis esse iuris quam nostri operis，quoniam saepe usu capi－ untur loca quae in biennio possessa fuerint．respiciendum erit tamen，quem admodum solemus uidere quibusdam regionibus particulas quasdam in mediis aliorum agris，neq－ uis similis huic interueniat．quod in agro diuiso accidere non potest，quoniam con－ tinuae possessiones et adsignantur et redduntur；et si forte incidit tale aliquid， commutatur locus pro loco，ut continua sit possessio．ita，ut dixi，in adsignatis fieri non potest．argumentum itaque prudentiae est quam professionis．

Praeterea solent quidam complurium fundorum continuorum domini，ut fere fit， duos aut tres agros uni uillae contribuere et terminos qui finiebant singulos agros relinquere：desertisque uillis ceteris praeter ea $\langle\mathrm{m}\rangle$ ，cui contributi sunt，uicini non con－ tenti suis finibus tollunt terminos，quibus possessio ipsorum finitur，et eos，quibus inter fundos unius domini fines obserua〈 $\mathbf{n}\rangle$ tur，sibi defendunt．ita et haec respicienda erunt．

Item quidam curant in extremis finibus fundorum suorum ponere per circuitum aliquod genus arborum，ut quidam pinos aut fraxinos，alii ulmos，alii cypressos，item alii soliti sunt relinquere qualecumque genus in extremo fine intacta $\langle\mathrm{s}\rangle$ ，ex quibus neque frondem neque lignum neque cremium caedant．ita et hoc obseruandum．

Praeterea consuetudines finitionum inspecta $\langle\mathrm{e}\rangle$ cum fuerint，nouitas habet suspi－ cionem．ut puta si terminus finem faciet per alium tractum，quare subito ad aliud genus finitionis transeatur，aut ad fossam aut ad ueprem aut uiam aut genus quod appellamus supercilium aut arbores quae ante missae sunt，suspicio est．si（c）tamen constabit fides．．．

De modo quaestiones fere in agris diuisis et adsignatis nascuntur，item quaestoriis， ［et］uectigalibus subiectis，quoniam scilicet in aere 〈et〉 in scriptura modus conprehen－ sus est．quod semper erit ad formam．

Respiciendum et hoc，si duobus possessoribus conueniat aliquid ex modo illo，qui aere et in scriptura formae continetur，licet dominus aliquid uendidit．namque hoc comperi in Samnio，uti quos agros ueteranis diuus Vespasianus adsignauerat，eos iam ab ipsis quibus adsignati erant aliter possideri．quidam enim emerunt aliqua loca， adieceruntque suis finibus et ipsum，uel uia finiente uel flumine uel aliquo［d］libet genere：sed nec uendentes ex acceptis suis aut ementes adicientesque ad acceptas suas certum modum taxauerunt，sed ut quisque modus aliqua，ut dixi，aut uia aut flumine aut aliquo genere finiri potuit，ita uendiderunt emeruntque．ergo ad aes quomodo
called 'previously planted'; and whether the ages of the woods are the same. If there are vines, there is a similar comparison to establish whether the rows are equidistant, in a comparable condition, and of a similar type of vine. ${ }^{41}$

However it will be agreed that this dispute is a matter for the law rather than our work, since places which have been possessed for two years are often acquired by usucapio. Nevertheless, we shall have to consider the fact that we commonly see in some regions small parcels of land in the middle of other people's holdings, in case some (parcel) similar to this should lie (in the middle). This cannot happen in allocated lands, since contiguous holdings are allocated and restored. If something like this occurs accidentally, one piece of land is exchanged for another so that there is a contiguous holding. So, as I said, this possibility cannot happen in allocated lands. This is a demonstration of legal knowledge rather than the surveyor's profession.

Furthermore, as generally happens, the owners of several contiguous farms normally attach two or three fields to one farmhouse and leave (in place) the boundary markers that used to demarcate the individual fields. When the other farmhouses were abandoned, except the one to which the fields were attached, the neighbours, not content with their own land, remove the boundary markers by which their own holding is demarcated, and claim as theirs the markers by means of which the boundaries between the farms of the single owner are recognized. Therefore we shall have to be on the lookout for this.

Some people take care to plant on the outer boundaries of their farms a particular type of tree along the perimeter, for example, some plant pine or ash, others elm, others cypress; similarly others normally leave untouched whatever type of tree is on the outer boundary, and from them cut neither foliage, nor firewood, nor kindling. So, we must also take note of this.

Moreover, when practices in marking boundaries have been examined, any novelty excites suspicion. If, for example, markers constitute a boundary along one stretch of land, and then there is a sudden change to another type of boundary, either to a ditch, or thorn bushes, or a road, or to the type that we call a terrace, or trees that have been previously planted, this is suspicious. Trust, however, will be established as follows ... ${ }^{42}$

Disputes about area usually arise in divided and allocated lands, and similarly in questorian lands subject to rent, ${ }^{43}$ since of course the area is included on the bronze map and in the written record. This (dispute) will always take place in relation to a map.

We should also watch out for the following point, namely, if in the case of two landholders there is any agreement in respect of the area (of their land) entered in the bronze map and in the map notation, even though one owner has sold part (of his property). For I discovered this fact in Samnium, namely, that those lands that the divine Vespasian had allocated to veterans were still occupied by the people to whom they had been allocated, but in a different way. For some had bought certain sites and added that (area) to their own land, marking a boundary by means of a road, or a river, or any other way. ${ }^{44}$ But neither those who sold part of their holdings, nor those who bought and added something to theirs, worked out a definite area, but sold or bought in so far as each area could be demarcated, as I have pointed
perueniri potest，si ad possessiones，sicut dixi，duobus，inter quos controuersia est， conuenerit？

In eis autem qui uectigalibus subiecti sunt，fere proximus quisque possessioni［s］ suae iunxit．ita ex hoc genere agrorum magnae quaestiones ．．．emptionis siue con－ ductionis ad se pertinere probauerint，ut fere fit：nisi utra pars hoc faciat，pene〈s＞pos－ sessorem remanebit．solent uero modum quidam in locationibus agrorum comprehendere，atque ita cauere，FVNDVM ILLVM，IVGERA TOT，IN SINGVLIS IVGERIBVS TANTVM．ita si in ea regione age［re］tur，ubi haec erit consuetudo，ad cautiones scilicet respiciendum erit．inter quos disputabitur acta utriusque mensura：si nihil ad cautionem conueniat，id est neutrius possessio modum cautione comprehen－ sum inpleat，magna erit rei confusio，quaerendumque nequid in uniuersa regione magis opinione quam mensura modum complecti soliti sint．item quidam uendentes ementesque agros soliti sunt modum cautione［m］complecti；quod ipsum uidendum， nequid，ut supra dixi，opinione，non mensura，modum taxent．

De iure subsiciuorum subinde quaestiones mouentur．subsiciua autem ea dicuntur quae adsignari non potuerunt，id est，cum sit ager centuriatus，aliqua inculta loca quae in〈tra〉 centurias erant，non sunt adsignata．haec ergo subsiciua aliquando auctor diui－ sionis aut sibi reseruauit，aut［alicui，id est aut］aliquibus concessit aut r（ebus）p（ubli－ cis）aut priuatis personis；quae subsiciua quidam uendiderunt，quidam uectigalibus certo tempore locant．inspectis ergo perscrutatisque omnibus condicionibus inueniri poterit，quid sequi debeamus．

Sed et illud memi $\langle$ ne）rimus．cum diuus Vespasianus subsiciua omnia，quae non uendidissent aut aliquibus personis concessa essent，sibi uindicasse［n］t，itemque diuus Titus a patre［m］coe［m］ptum hunc r［ed］itum teneret，Domitianus［imp．］per totam Italiam subsiciua possidentibus donauit，edictoque hoc notum uniuersis fecit cuius edicti uerba，itemque constitutiones quasdam aliorum principum itemque diui Neruae， in uno libello contulimus．

De iure territoriorum paene omnem percunctationem tractauimus，cum de condi－ cionibus generatim perscriberemus．de quibus quid possimus aliud suadere，quam ut leges，ut supra dixeram，perlegamus，et ut interprete $\langle\mathrm{n}\rangle$ tur secundum singula momenta？ utrum suis condicionibus remaneant fines ab antiquis obseruati，an aliquid adiectum〈a〉ut ablatum sit；et quomodo obseruata sint territoria，aliquando summis montium iugis et diuergiis aquarum，aliquando limitibus perductis，aliquando ipsius diuisionis derectione．ita，ut diximus，leges semper curiose perlegendae interpretandaeque erunt per singula uerba．et［si］ita uim legum perscrutanda［ru］m suadeo，ac si［c］，ut ita dix－ erim，per articulamenta membrorum pertemptari solent corpora．

De uia e $\langle t\rangle$ actu et itinere et ambitu et accessu et riuis et uallibus fossis fontibus saepe mouentur contentiones．quae omnes partes non nostra〈m〉 sed forensis officii，id

[^54]the bronze map, if, as I said, it tallies in respect of the holdings of the two men who are in dispute?

Now, in lands subject to rent, nearly every adjacent landholder has added something to his holding. So, in this type of land great disputes ... they can demonstrate that the land belongs to them ... of purchase or renting, as often happens. ${ }^{45}$ Unless one of the parties does this, the land will remain with the person who possesses it. Indeed some people while letting land commonly include the area and make the following provision: 'such and such farm, so many iugera, so much for individual iugera ${ }^{4} .{ }^{46}$ Therefore, if there is a dispute in a region where this practice is followed, naturally we must examine the provisions. A survey is made of the land of each of those involved in dispute. If nothing tallies with the provision, that is, if the holding of neither party occupies the area included in the provision, the question will be very confused, and we must consider if in the whole region their custom is not to encompass an area more by estimation than by surveying. Similarly, certain people when selling or buying land normally include the area in the provision, and we must examine this very point, in case, as I said above, they define the area by estimation and not by surveying.

Disputes frequently arise from the law relating to subseciva. Subsecivum is the name given to land that could not be allocated, that is, when the land was divided into centuriae, some uncultivated areas which lay within centuriae were not allocated. Sometimes the man responsible for the allocation kept these subseciva for himself, or granted them to others, either to communities or to private individuals. Some people sold these subseciva, others let them for a rent for a specific period. By examining and analysing all the circumstances, we can discover what course of action we ought to follow.

But let us recall the following point. Although the divine Vespasian had claimed for himself all subseciva that they (communities or individuals) had not sold, or that had not been granted to anyone, and the divine Titus maintained this practice begun by his father, Domitian granted subseciva throughout the whole of Italy to those in possession of them, and by edict made this known to all. I have included in a single book the text of this edict, some decisions of other emperors, and those of the divine Nerva. ${ }^{47}$

As regards territorial jurisdiction, I dealt with nearly every line of investigation when I was writing separately about the categories of land. What else can I advise about this other than that, as I said above, we should read the laws carefully and that they should be interpreted according to each individual point? (We should check) whether land noted down by the ancients remains in the same categories, or whether anything has been added or taken away; how territories were demarcated, sometimes by mountain ridges and watersheds, sometimes by the extension of limites, sometimes by the line of the land division itself. ${ }^{48}$ So, as I have said, the laws must always be carefully scrutinized and interpreted word by word. Indeed I urge that the authority of the law should be analysed in the same way, so to speak, as the human body is normally probed in the joints of its limbs.

Disputes often arise about public roads, right of way for driving cattle, right of passage, right of way round buildings, right of access, streams, valleys, ditches, and fountains. ${ }^{49}$ All these situations require not our services but the intervention of the
es $(t\rangle$ iuris ciuilis, operam exigunt: nos uero tunc eis interuenimus, cum aut derigendum aliquid est quaestionibus aut, si forma aliqua aliquid notatum inuenitur, repetendum est.
legal process, that is, the civil law. We take part in these (disputes) when something has either to be demarcated by investigation, or recovered, if something is discovered written on a map.

## SICVLI FLACCI

## DE CONDICIONIBVS AGRORVM

Condiciones agrorum per totam Italiam diuersas esse plerisque etiam remotis a professione nostra hominibus notum est；quod etiam in prouinciis frequenter inuen－ imus．accidit autem，ut ex similibus causis similes haberent condiciones．ciuitates enim， quarum condiciones aliae sunt，coloniae dicuntur，municipia，quaedam praefecturae： habent uocabulorum differentias：qua〈r＞e uero non liceat earum diuersas esse con－ diciones？regiones autem dicimus，intra quarum fines singularum coloniarum aut municipiorum magistratibus iu（ri）s dicendi cohercendique est libera potestas．ergo haec uocabula non sine causa acciderunt．quidam enim populi pertinaciter aduersus Romanos bella gesserunt，quidam experti uirtutem eorum seruauerunt pacem，quidam cognita fide et iustitia corum se eis addixerunt et frequenter aduersus hostes eorum arma tulerunt．leges itaque pro suo quisque merito acceperunt：neque enim erat ius－ tum，ut his，qui totiens ammisso periurio rupere pacem ac bellum intulere Romanis， idem praestari quod fidelibus populis．

Primum ergo referendum est，appellationes ut fierent coloniae 〈aut municipia〉 aut praefecturae．

Municipia quidam putant a munitionibus dicta；alii a munificentia，eo quod munificae essent ciuitates．

Coloniae autem inde dictae sunt，quod［populi］Romani in ea municipia miserint colonos，uel ad ipsos priores municipiorum populos cohercendos，uel ad hostium incursus repellendos．colonias autem omnes maritimas appellauerunt，uel quod mari in his deduceretur，uel，quod pluribus placet，maritimas appellari existimant ideo， quod Italia ab Alpibus in mare porrigatur a〈c〉 tribus lateribus exteras gentes intuea－ tur．a Sicilia usque ad Galliam omne litus Africae est contrarium：rursus a Leucopetra pars，quae ad mare attingit Macedoniae，ad aliquam Epiri partem spectat： Hadriaticum uero litus Illyricum contra se habet．in his ergo litoribus Romani colonos miserunt，ut supra diximus，qui ora $\langle\mathbf{s}\rangle$ Italiae tuerentur．

Aliae deinde causae creuerunt，．．．Gracchus colonos dare municipiis uel ad sup－ plendum ciuium numerum，uel，ut supra dictum est，ad cohercendos tumultus qui subinde mouebantur．praeterea legem tulit，nequis in Italia amplius quam ducenta iugera possideret：intellegebat enim contrarium esse m［in］orem，maiorem modum pos－ sidere quam qui ab ipso possidente coli possit．

Vt uero Romani omnium gentium potiti sunt，agros ex hoste captos in uictorem populum partiti sunt．alios uero agros uendiderunt，ut Sabinorum ager qui dicitur

## SICULUS FLACCUS ${ }^{1}$

## CATEGORIES OF LAND

Most people, even those who have no association with our profession, know that throughout the whole of Italy there are different categories of land. We frequently find
this in the provinces too. Now, it happened that lands had similar categories for similar reasons. For communities that belong to different categories are called colonies, or municipia, or some are praefecturae. They have different names; so, why should they not belong to different categories? Now, we talk of regions inside whose confines there is an unfettered right for the magistrates of individual colonies or municipia to exercise jurisdiction and enforcement. Therefore these names did not occur without a reason. For some peoples waged war stubbornly against the Romans, while others, having encountered their valour, maintained peace; others, when they recognized their good faith and fairness, surrendered themselves to them and frequently fought against their enemies. So, each community received laws as it deserved; for it was not just to extend the same treatment to peoples who had frequently broken their oath, disrupted the peace and made war on Rome, as to loyal peoples.

Therefore we must first consider how communities came to be called colonies, 〈or municipia,${ }^{2}$ or praefecturae.

Some think that municipia are called after fortifications \{munitiones\}; others think that the word is derived from 'dutifulness' \{munificentia\}, because the communities performed their duties. ${ }^{3}$

Colonies were so named because the Romans sent colonists to those municipia, either to coerce the actual inhabitants of the municipia, or to repel enemy invasions. Now, they called all the colonies 'maritime', either because the colonists were taken to them by sea, or, as most people accept, they think that they are called 'maritime' because Italy stretches out from the Alps into the sea, and on three sides faces foreign peoples. From Sicily to Gaul the whole shoreline of Africa lies opposite; again, the area from Leucopetra (Rhegium) stretching to the Macedonian Sea faces some part of Epirus; the Adriatic coast has Illyricum opposite it. The Romans sent out colonists along these coasts, as I said above, to protect the shores of Italy. ${ }^{4}$

Then other reasons multiplied, ... ${ }^{5}$ Gracchus to assign colonists to municipia, either to supplement the number of citizens, or, as I said above, to suppress the sedition that was being repeatedly fomented. Moreover, he passed a law to prevent anyone in Italy from possessing more than two hundred iugera, for he realized that it was a harmful custom that anyone should possess a greater area of land than could be cul-

5 tivated by the possessor himself. ${ }^{6}$

As the Romans became the masters of all nations, they divided up among the victorious people land captured from the enemy. But, they sold other land, for example, the land of the Sabines, which is called 'quaestorian'; by establishing limites they
quaestorius，eum limitibus actis diuiserunt，et denis［quibusdam］quibusque actibus lat－ erculis quinquagena iugera incluserunt，atque ita per quaestores populi Romani uen－ diderunt．postquam ergo maiores regiones ex hoste captae uacare coeperunt，alios agros diuiserunt adsignauerunt：alii ita remanserunt，ut tamen p（opuli）R（omani）〈terri〉toria essent；ut est in Piceno，in regione Reatina，in quibus regionibus montes Romani appellantur．nam sunt p（opuli） R （omani）〈terri〉toria，quorum uectigal ad aer－ arium pertinet．

De municipiis itaque tractandum est．Prima origo oppidorum，quae ciuitates dic－ tae sunt，municipia ex causa supra dicta nominata sunt．accidit autem $\langle u t\rangle$ insessarum ［earum］gentium populi saepe muta〈re＞nt sedem in Italia［m］et in prouinciis，ut Fryges in Latio，ut Diomedes cum Graiis in Apulia，ut Macedones in Libye［m］．Tyrreni qui dicuntur Etrurii 〈in〉 Galliae，in Asiae finibus socii Gallorum insedere et multas［quas Frigiis Diomedis fines．quae etiam socii］constituere ciuitates．atque in eas partiti sunt hi［ciues dicunt quidem ultro citroque aut bello reppulisse aut indig（e）nas］，praemen－ sumque quod uniuersis suffecturum uidebatur solum．territis fugatisque inde ciuibus， territoria dixerunt．contra hoc aliud，de quo suo loco referemus．singuli［s］deinde ter－ ram，nec tantum occupauerunt quod colere potuissent，sed quantum in spe $\langle\mathrm{m}\rangle$ colendi reseruauere．［hi ergo agri occupatorii dicuntur．arcendo enim uicinos hanc appella－ tionem finxit．］itaque hi agri a quibusdam soluti appellantur：soluti autem non sunt， quorum fines deprehendi possunt et finiuntur．［quos quidam arcifinales uocant．］hi autem arcifinales dicuntur．condiciones autem agrorum uariae sunt ac diuersae，quae aut casibus bellorum aut utilitatibus populi Romani aut ab iniustitia，ut dicunt，inae－ quales sunt．

Occupatorii autem dicuntur agri，quos quidam arcifinales uocant，［hi autem arci－ finales dici debent．］quibus agris uictor populus occupando nomen dedit．bellis enim gestis uictores populi terras omnes，ex quibus uictos eiecerunt，publicauere，atque uni－ uersaliter territorium dixerunt，intra quos fines iuris dicendi ius esset．deinde ut quisque uirtute colendi quid occupauit，arcendo［uero］uicinum arcifinale［m］dixit．

Horum ergo agrorum nullum 〈est〉 aes，nulla forma，quae publicae fidei posses－ soribus testimonium reddat，quoniam non ex mensuris actis unus quisque modum accepit，sed quod aut excoluit aut in spem colendi occupauit．quidam uero posses－ sionum suarum priuatim formas fecerunt，quae nec ipsos uicinis nec sibi uicinos oblig－ ant，quoniam res est uoluntaria．

Hi tamen finiuntur terminis et arboribus notatis et ante missis et superciliis uepribus uiis et riuis et fossis．in quibusdam uero regionibus palos pro terminis obseru－ ant，alii iliceos，alii oleagineos，alii uero iuniperos．alii congeries lapidum pro terminis obseruant，et scorpiones appellant，quidam in specie $\langle\mathrm{m}\rangle$ maceriarum congerunt lapi－ des et attinas appellant，obseruantque pro terminis．haec tamen omnia genera fini－
divided it up, enclosing fifty iugera in parcels measuring ten actus square $(=1,440,000$ square feet), and in this way sold it off through the agency of the quaestors of the Roman people. Afterwards as larger areas captured from the enemy began to become available, they divided up and allocated some of the land; other land remained, but in such a way that it was the territory of the Roman people, for example, in Picenum in the region of Reate, where there are mountains called 'Roman'. They are the territories of the Roman people and the rent from them belongs to the public treasury. ${ }^{?}$

Now we must deal with municipia. The earliest towns, which were called communities \{civitates\}, were given the name municipia for the reason mentioned above. However, it happened that the people of settled nations often migrated, both in Italy and in the provinces, for example, the Trojans in Latium, Diomedes with the Greeks in Apulia, the Macedonians in Libya. The Tyrreni, who are also called Etruscans, settled and established many communities in (the land of) Gaul, and allies of the Gauls (did so) in the land of Asia. ${ }^{8}$ These people were divided among these communities, and a quantity of land was measured in advance that appeared to suffice for everyone. Since the citizens (of these communities) had been terrified \{territi\} and driven away, they called these lands territories \{territoria\}. There is a different interpretation (of this word), which I shall discuss in its proper place. Then, individuals took over not merely as much land as they could cultivate, but also set aside as much as they hoped to be able to cultivate in the future. [Therefore these lands are called occupatorii. From the act of keeping away neighbours he coined this name. ${ }^{9}$ Indeed some people call lands of this kind 'unbounded' \{soluti\}. However lands are not unbounded if their boundaries can be established and are demarcated [which some people call arcifinales]. These lands are in fact called arcifinales. The categories of land are indeed complex and diverse, with an inequality resulting from the chances of war, or the self-interest of the Roman people, or injustice, as people say.

Land described as 'occupied'. \{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. ${ }^{10}$

There is no bronze record, no map of these lands 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.

However, these lands 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 scorpiones; others heap up stones to give the appearance of walls, which they call attinae and also recognize as boundary markers. All these ways of marking bound-
tionum non solum in diuersis pluribusue regionibus，uerum etiam in uno agro inueniri possunt．nam ubi supercilia naturalia finem praestant，deficientibus eis necesse est aut terminum aut arbores aut aliquid ex supra dictis generibus obseruari．quidquid autem horum fuerit，ex conuenienti ad conuenientem［uiderit similiter］rectus finis obseruari debebit．

Maxime autem intuendae erunt consuetudines regionum，et ex uicinis exempla sumenda．in quibusdam enim regionibus alii terminos siliceos ponunt，alii diuersarum materiarum：quidam uero curant inuehere qualescumque peregrinos lapides，ut mani－ festum sit，ex industria terminos finales positos：quidam etiam politos，alii uero inscriptos，alii etiam numeris enotatos ponunt，alii tantum modo in coxis uel ＜m〉inimis，alii in longioribus spatiis，conplures alii etiam aequalibus interuallis．in quibusdam uero regionibus in uersuris omnibus binos posuerunt ita，ut suos quisque rigores intueretur．ergo，ut supra dixi，consuetudines regionum maxime intuendae sunt．

Inspiciendum erit et illud，quoniam sepulchra in extremis finibus facere soliti sunt et cippos ponere，ne aliquando cippi pro terminis errorem faciant：nam in locis saxu－ osis et in sterilibus etiam in mediis possessionibus sepulchra faciunt．omnia ergo，ut supra diximus，diligenti cura exquirenda erunt，ut et secundum consuetudinem regionum et fidem terminorum finis constet．

Aliquando etiam petras occurrentes in finibus notatas inuenimus，et quasdam，si perseueret rigor，notas habentes，in uersuris uero gammas，［sed et］spectantes suos rig－ ores．aliquas etiam decus（s）atas inuenimus．

Quibusdam autem placet et uidetur，utique sub omnibus terminis signum inueniri oportere［t］．quod ipsud uoluntarium est．si enim essent certae leges aut consuetudines aut obseruationes，semper simile signum sub omnibus terminis inueniretur：nunc，quo－ niam uoluntarium est，aliquibus terminis nihil subditum est，aliquibus uero aut cin〈er〉es aut carbones aut testea aut uitrea fracta aut asses subiectos aut calce $\langle\mathrm{m}\rangle$ aut gypsum inuenimus．quae res tamen，ut supra diximus，uoluntaria est．carbo autem aut cinis quare inueniatur，una certa ratio est，quae apud antiquos est quidem obseruata， postea uero neglecta：unde aut diuersa aut nulla signa inueniuntur．cum enim termi－ nos disponerent，ipsos quidem lapides in solidam terram rectos conlocabant proxime ea loca，in quibus fossis factis posituri eos erant，et unguento uelaminibusque et coro－ nis eos［c］or［o］nabant．in fossis autem，in quibus eos posituri erant，sacrificio facto hos－ tiaque inmolata atque incensa facibus ardentibus，in fossa cooperti sanguinem instillabant，eoque tura et fruges iactabant．fauos quoque et uinum aliaque，quibus consuetudo est Termini［s］sacrum fieri，in fossis adiciebant．consumptisque igne omnibus dapibus，super calentes reliquias lapides conlocabant atque ita diligenti cura
aries can be found not only in many different regions, but even in one stretch of land. For when natural terraces provide a boundary but then fade out, boundary stones, or trees, or any of the methods mentioned above must be recognized (as marking the boundary). But whichever of these is employed, a proper boundary should be recognized as passing from one agreed marker to another. ${ }^{11}$

We must pay especial attention to the practices of the regions and take examples from the neighbours (i.e. compare what is done in properties adjacent to a disputed area). For in certain regions some people set up flint boundary stones, others use different material. Some indeed take care to import some sort of non-native stones, so that it is obvious that the stones were set up deliberately as boundary markers. Some use finished, others inscribed stones; some even set up stones marked with numbers; others merely place the stones at projecting bends, ${ }^{12}$ or at very short intervals, others at longer intervals; many others place them equidistantly. In some regions people placed two stones at all the turns, so that each one faced its own boundary line. Therefore, as I said above, we must pay especial attention to the practices of the regions.

We must also watch out that, since men have customarily placed tombs on the edge of their land and set up marker stones \{cippi\}, these stones are not sometimes mistaken for boundary stones. Moreover, in rocky and infertile places they erect tombs even in the middle of holdings. Everything therefore, as I said before, must be examined with great care, so that the boundary is established in accordance with both the practice of the regions and the evidence of the boundary markers.

Sometimes we find appearing on a boundary natural rocks that have been marked, some of which, if the boundary runs on straight, have lines, while those at bends have marks like a (letter) gamma facing their own boundary lines (i.e. facing the two directions in which the boundary runs). In addition we find some rocks marked with a cross $\{$ decus $\} .{ }^{13}$

Some people approve and commend the idea that a token should be found underneath all boundary stones. This practice however is voluntary. For if there were definite rules or practices or observances, a similar token would always be found underneath all boundary stones. As it is, since it is a voluntary practice, nothing at all is placed underneath some stones, while under others we find ashes, or charcoal, or pottery, or broken glass, or small coins thrown down, or limestone, or gypsum. However, this practice, as I said before, is voluntary. Now, as to why carbon or ash are found, there is one definite principle, which was observed by men of old and afterwards abandoned; from then on different tokens are found, or none at all. For when they were setting out boundary stones, they placed the stones themselves upright in close-packed earth close by those places in which, once ditches had been dug, they were going to position them, and adorned them with oil, fillets, and garlands. In the ditches where they were going to position the stones, they performed a sacrifice by offering and then burning a victim with flaming torches, and with veiled heads poured the blood drop by drop into the ditch and threw incense and grain on top. Honeycombs and wine and other objects that were customarily used in conducting the sacred rite of Terminus they also threw into the ditch. ${ }^{14}$ When all the offerings had been consumed by the fire, they placed the stones on the glowing remains, and in this way with meticulous attention established them authoritatively. In addition, they scat-
confirmabant. adiectis etiam quibusdam saxorum fragminibus circum calcabant, quo firmius starent. tale ergo sacrificium domini, inter quos fines dirimebantur, faciebant. nam et si in trifinium, id est in eum locum quem tres possessores adstringebant, si termini ponerentur, omnes tres sacrum faciebant: quotque alii in confinio domini erant, omnes ex conuenientia terminos ponebant et sacrum faciebant, terminos autem conuenientia possessorum confirmabat. nam in quibusdam regionibus iubemur uertices amphorarum defixos inuersos obseruare pro terminis.

Ergo conuenientia, ut supra diximus, possessorum terminos consecrat. qui, ut ante dixeramus, omnibus angulis coxisque positi esse debent. in quibusdam uero regionibus saepe per longum spatium et inter multos possessores rigores dumique finem faciunt, ut aliquando tantum modo per singulorum possessorum spatia, id est a capite usque ad caput, positi inueniuntur termini, hoc est a fine incipiente usque ad finem deficientem, unde alterius possessionis finis incipiat obseruari. quidam uero in mediis spatiis plures interpositos habent. quorum si quisquam per longum spatium moueatur, inter longum tractum et inter plures possessores rigor durare debet: qui si non est, totae regioni errorem quendam incuti[t], nec ei tantum, intra cuius fines <terminus) motus est, calumniam intro duci[t] sed ultro citroque confundi[t] fines necesse est.

Illa omnia, quae supra diximus, quae ad terminos lapideos pertinent, siue signa subdita requirantur, siue notae aut litterae aut numeri, quam maxime secundum consuetudinem regionum omnia intuenda sunt: tamen et noui[li]tates hae quae manu fiunt fidem habere debent, quoniam intellegitur ea industria conuenientiaque possessorum fieri. si uero pali lignei pro terminis dispositi sunt, aut congeries lapidum aceruatim congestae sint, quos scorpiones appellant, aut in effigie $\langle\mathrm{m}\rangle$ maceriarum, quae attinae appellantur, aut uertices amphorarum defixi, aut petrae naturales notatae, aliudue quod loco termini obseruari uidebitur, ex consuetudine regionis et ex uicinis exempla sumenda sunt.

Supercilia, de quibus mentionem habui, si finem facient, intuendum erit, in quantum spatium deuexitas supercilii extendatur, ne mons supercilium sit: intra paucos enim pedes supercilia uocabula accipiunt. quae tamen usque in planitiam ex superiori uergunt, ad superiores possessores pertinent. quidquid enim inferior possessor in solo suo agit, damno superioris fit. siue aret siue fodiat, detrahit pendentes ex superiori terras. si uero congerat aut adiciat quid, ad superiora non ascendit. ita haec causa efficit, ut superioribus possessoribus usque in planitia $\langle\mathrm{m}\rangle$ supercilia cedantur.

[^55]tered several fragments of rock around and then trampled them down to make the stones stand more securely. So, this kind of sacrifice was made by the owners between whom the land was being divided. And if the boundary stones were being set up at a trifinium, that is, the place at which three landholders had their boundaries meet, all three conducted the sacrifice. All other owners who had a common boundary, set up boundary stones by agreement and conducted a sacrifice; the agreement of the landholders confirmed the stones (as marking the boundary). ${ }^{15}$ Moreover in some regions we are required to recognize as boundary markers the tops of wine jars turned upside down and fixed in the ground.

So, as I said above, it is the agreement of landholders that sanctifies boundary stones. They must be placed, as I said before, at all angles and convex bends. In some regions, straight lines \{rigores\} and briar bushes often demarcate a boundary for a considerable distance and between numerous landholders, as boundary stones are sometimes found to have been placed only at the extent of the land of individual landholders, that is, from one defining point (of a boundary) to the other, or in other words, from the start of a boundary to its finish, from which point we can recognize the start of the boundary of another holding. ${ }^{16}$ But some have more boundary stones interspersed throughout the mid-sections (of their boundaries). If any of these is moved a large distance, nevertheless a straight boundary \{rigor $\}$ should persist over a large expanse of land and between numerous landholders. If this is not so, a fault must be imputed to the entire region, and an unfounded claim should not be brought solely against that person inside whose land the <boundary stone〉 has been moved; rather boundaries in both directions must be called in question.

All the points mentioned above which apply to boundary stones, namely whether we should look for buried tokens or incised marks or letters or numbers, all these must be examined as far as possible in accordance with the practice of the regions. Nevertheless, those unusual examples (of boundary demarcation) that are done deliberately, ought to have authority, inasmuch as it is recognized that they are done with a purpose and with the agreement of landholders. ${ }^{17}$ If wooden stakes have been set out in place of boundary stones, or if stones have been heaped up into piles, which they call scorpiones, or arranged in the shape of dry-stone walls, which are called attinae, or if the tops of wine jars have been stuck into the ground, or if natural rocks have been marked, or if there is anything else which seemingly is to be recognized as a boundary marker, we should accept types (of boundary marking), both in accordance with the practice of the region and in accordance with the neighbours.

If terraces, which I mentioned above, form a boundary, we must observe how far the downward slope of the terrace extends, lest the terrace should in fact be a hill. For the definition 'terrace' applies only within a few feet. However, land which slopes down from high to level ground belongs to the landholders on the upper ground. For whatever the landholder on the lower ground does on his own land, is done to the disadvantage of the man on the higher ground. Whether he ploughs or digs, he brings down the land that belongs to the (landholder) above. But if he builds up anything or adds anything (to his land) it does not belong to the higher ground. Therefore, for this reason, the terraces right down to the level ground are granted to the landholders on the upper slopes. ${ }^{18}$

Si arbores finales obseruabuntur，uidendum erit quae sint arborum genera．nam quidam in finibus naturales qualescumque arbores intactas finales obseruant：quidam cunctis excisis arborum generibus unum tantum genus in finibus relinquunt，quo man－ ifestius apparea $\langle\mathrm{n}\rangle \mathrm{t}$ finales．alii diuersas hoc animo serunt，ut materiae differentia argu－ mento sit：quidam ex conuentione in ipsis finibus commune〈s〉 serunt．aliqui priuatim intra suum solum in extremis finibus ponunt；et，ut supra diximus，diuersa arborum genera：alicubi enim pinos inuenimus，alicubi cypressos，alibi fraxinos aut ulmos aut populos quaeque alia ipsis possessoribus placuerunt．et si inter culta in finibus aut prope fines，disponuntur spissi［orib］us et disconuenientes ordinibus arbustorum，si tamen arbusta sint．quae si communes sunt，semper utrimque intactas quidam ser－ uant，quidam durantibus stirpibus earum summas frondes ac uirgulta communiter cae－ dunt．si propri$\langle a\rangle e$ alterius partis sint，ut domino libuit aut caedit aut remittit：ex quibus tamen saepe et materia〈m〉 deiciunt et alias substituunt．hoc etiam in com－ munibus arboribus saepe accidit：si enim utrisque possessoribus conueniat，ut finales arbores deiciant aut ut pretio taxent aut alterna sibi sorte habeant substituantque in deiectarum locum alias，aut si nihil placuerit substitu［t］i，differentiae［ae］qualitatum indicio erunt．

Si uero notatae arbores in regionibus finales obseruabuntur，intuendae sunt notae． si enim communes sint mediae，utrimque notatae per totas esse debebunt．si partium frondes spectant in alios fines，plagis，id est latis cicatricibus，signatae inueniri debent， ut intellegantur eorum esse dominorum，in quas partes integrae e［run］t intactae reser－ uabuntur．signantur autem utrimque，id est ex utraque possessione，intra pedes quinos， ut legis Mamiliae commemorationem habeant．in uersuris quae notatae sunt，aut decus in eis inueniuntur aut gammae，ut manifestum sit，uersura $\langle\mathrm{s}\rangle$ suis signis obseruari debere．

Quidam satis putant omissas intactasque pati crescere，si magnitudine ceteras superent．de qua argumentum capere quaestui ducimus：$\langle\mathrm{si}\rangle$ ceterae dissimiles sunt， uidetur aliquod his testimonium per eas praestari．

Praeterea siue in cultis siue in siluosis et in incultis locis agatur，respiciendum erit， utrum hae quae finales uidebuntur arbores habeant in alterutra［m］parte［s］similes． quae utrimque tales habeant，una re uidebuntur，si notatae sint．si uero altera pars habet，quo loco deficient，ibi fines uidebuntur esse：hae autem ipsae eius partis uide－ buntur esse［finales］，in qua similes eis erunt．si neutra parte illis aliae similes et illae solae uideantur，finales communesque esse uidebuntur．si autem，ut saepe fit，unus

If trees are recognized as marking a boundary, we shall have to see what kind of tree they are. Some people recognize as boundary markers whatever trees have been left untouched and are growing naturally on the boundary. Others cut down all other types of tree and leave one kind only on the boundary, so that they more obviously stand out as boundary markers. Others plant different kinds of tree, with the intention that the difference in type of wood should serve as a proof (of the boundary). Others plant by agreement on the actual boundaries trees shared by both parties. Some people plant trees privately on their own soil on the boundary edge. And, as I mentioned above, they use different types of tree; in some places we find pine, elsewhere cypress, elsewhere ash, or elm, or poplar, or whatever other types of tree suited the landholders themselves. If trees are among cultivated fields, ${ }^{19}$ on a boundary or close to it, they are positioned so that they are more thickly-packed and out of line with tree plantations, if there are any plantations. If the trees are shared by both parties, some always keep them untouched on both sides, ${ }^{20}$ while some jointly cut down the highest branches and shoots, although the trunk of the tree remains. If the trees are the property of one party, the owner prunes them or leaves them as suits him. However, out of these (trees) they often cut down entire trees and replace them with others. Indeed this often happens in the case of trees shared by both parties; if both landholders agree to cut down trees which demarcate boundaries, either to fix a price for them, or share them among themselves (i.e. one landholder claims one tree while the other claims the next, and so on), and substitute others in the place of those cut down, or if they decide not to replace them, differences in the types of tree will act as a proof (of the boundary).

If marked trees are recognized in the regions as demarcating boundaries, we must examine the marks. If the trees are shared, and between two properties, they all should be marked on both sides. But if the trees relate to the land of one of two parties, they ought to be found marked with gashes, that is, broad scars, so that they can be recognized as belonging to the owners in those quarters where they have been left clear and unmarked. Otherwise, trees are marked on both sides, that is, in respect of each property, within five feet (of a boundary), in order to comply with the Lex Mamilia. ${ }^{21}$ Trees which have been marked at bends (in a boundary) are found to have an X \{decus\} or marks like a (letter) gamma on them, to make it clear that bends ought to be recognized by their own symbols.

Some people think that it is enough to allow trees to grow without interfering with them or putting marks on them, if they surpass other trees in size. With regard to this question, I hold that it is advantageous to get proof; if the other trees are of a different type, then it seems true that some supporting evidence is provided by them for those (larger) trees marking the boundary. ${ }^{22}$

Moreover, whether a dispute occurs in cultivated or wooded and uncultivated areas, we shall have to consider if trees that appear to demarcate a boundary have similar trees only on one side of them. Those that have similar trees on both sides, can be identified as boundary trees only if they have been marked. ${ }^{23}$ If one property has trees, where they fade out should be taken as the boundary; these trees should be taken as belonging to the property in which there are similar trees. If there are no other trees similar to them in either property and they seem to be the only examples (of that type), then they should be seen as boundary-marking trees that are shared. If,
possessor diuersum utrisque partibus genus arborum per omnem finium suorum ambitum posuerit，ut inter alios agros quo［s］que confines sibi，non solum inter eum cum quo controuersia erit，finem faciat，diligenti cura uidendum erit，ne proprias alterius arbores partis communes suspicemur．quidam tamen quotiens circa extremos fines suos alicuius generis arbores disponunt，quae significanter differentes ab ceteris possint extremos fines demonstrare，incidunt per errorem［enim］intra uicinorum fines． de qua re diligentius aspiciendum erit，ut possessores suos fines teneant，ne alienos lacessiant．

Viae autem si finem faciunt，adtendendum erit quales uiae et quomodo．nam et saepe incidunt in finibus，et saepe trans uiam aliquas possessores particulas habent． quaedam ergo uiae aliquando fines transeunt possessionum．quarum tamen non omnium una eademque est condicio．nam sunt uiae publicae［regales］，quae publice muniuntur et auctorum nomina optinent．nam et curatores accipiunt，et per redemp－ tores muniuntur．nam et in quarundam tutela $\langle\mathrm{m}\rangle$ a possessoribus per tempora summa certa exigitur．uicinales autem［uiae］，de publicis quae deuertuntur in agris et saepe ipsae ad alteras publicas perueniunt，aliter muniuntur，per pagos，id est per magistros pagorum，qui operas a possessoribus ad eas tuendas exigere soliti sunt．aut，ut com－ perimus，uni cuique possessori per singulos agros certa spatia adsignantur，quae suis inpensis tueantur．etiam titulos finitis spatiis positos habent，qui indicent，cuius agri quis dominus quod spatium tueatur．ad omnes autem agros semper iter liberum est． nam aliquando deficientibus uicinalibus uiis per agros alienos iter praestatur．qui〈dam〉 etiam conueniunt specialiter uti seruitutem praestent his agris，ad quos necesse habent transmittere per suum．nam et his uerbis conprehenditur ITA VT OPTIMVS MAX－ IMVSQVE EST．nam et aquarum ductus solent per alienos agros iure transmittere． itaque，ut diximus，uiae saepe necessario per alienos agros transeunt；quae non uniuerso populo itinera praestari uidentur，sed eis ad quorum agros per eas uias per－ uenire necesse est．hae［c］ergo de uicinalibus solent nasci．nam et communes uiae［quae］ ex uicinalibus nascuntur；quae aliquando inter binos possessores in extremis finibus， pari utri$\langle\mathrm{m}\rangle q u e$ modo sumpto，communique inpensa，iter praestant．priuatae itaque uiae ad finitiones agrorum non pertinent，sed ad itinera eis praestanda：quae sub exceptione nominari in emptionibus agrorum solent．ergo uiae publicae et uicinales et communes in finibus incidunt：non enim finium causa diriguntur，sed itinerum．ita tam fas est finem facere quam et transire uiam．

Vepres si finem facient，uidendum quales，et 〈an〉 tantum modo in extremis finibus sint，quoniam per neglegentiam colentium et in mediis agris solent esse uepres；et［ut］ an manu satae sint．nam etsi regio quaedam uirgulta non habeat，quae tutelam uineis
however, as often happens, one landholder has planted, throughout the entire circuit of his boundaries, a type of tree distinct from those on either side, so that he demarcates a boundary with all other land bordering his, and not only with the person with whom there is a dispute, we must take very great care that we do not take as shared trees, trees that belong to one or other of the parties. Some people, however, whenever they plant trees of a particular type around the boundary edge of their property, which, by being noticeably different from other trees, serve to demarcate the boundary edge, stray by mistake into the land of their neighbours. In this matter we shall have to take great care that landholders can safeguard their own land without infringing on that of others. ${ }^{24}$

When roads demarcate a boundary, we shall have to examine what kind of roads and how (they mark the boundary). Now, roads often occur on boundaries and landholders often have some parcels of land on the other side of a road. Some roads, therefore, sometimes cut across the boundaries of landholdings. However, not all these roads have the same characteristics. There are public thoroughfares, which are maintained at public expense and bear the name of the men who initiated them. They have curators and are maintained by contractors. For the maintenance of some roads a set sum is regularly exacted from landholders. By contrast, local roads, which turn off the public highways into the fields and often lead back to other public highways, are maintained in a different way, by pagi, that is, by the officials of the pagi, who normally demand labour from the landholders for their upkeep. Or, as I discovered, set lengths of road running through individual fields, are assigned to each landholder, which they are to maintain at their own expense. They even have inscriptions erected at specified intervals, recording which owner of which piece of land is responsible for which length (of road). ${ }^{25}$ There is always right of way to all lands. Sometimes, for lack of local roads a right of way is provided through another person's land. Indeed some landholders make a specific agreement to concede a servitude \{servitus $\}$ in respect of those fields, to gain access to which they are obliged to allow a right of way through their land. It is also expressed in these words: 'in the best possible condition'. ${ }^{26}$ Moreover, water channels normally give a legal right of way across the land of others. So, as I said above, roads often have to cross other people's land. These seemingly do not provide rights of way for everyone, but only for those who must go by that route to get to their own land. These roads normally start from local roads. In addition, shared roads start from local roads. Sometimes they provide a right of way between two landholders on their boundary edges, with each surrendering an equal amount of land for the road and sharing the expense. So, private roads are not relevant to the demarcation of the boundaries of lands, but only to the provision of a right of way to them. In purchases of land, these roads are usually specifically mentioned under a limiting clause. So, public highways, local roads, and shared roads occur on boundaries; that is to say, they are not laid out to demarcate boundaries but to provide rights of way. Therefore it is as permissible to make a boundary (with a road) as it is to use a road as a right of way.

If thorn bushes constitute a boundary we must note what kind of bush, whether they exist only on the boundary edges, since usually there are also thorn bushes in the middle of the fields because of the cultivators' neglect, and whether they were planted by hand. Even if a particular region does not have shrubs that could provide
aut hortis praestent, adferuntur ex peregrinis regionibus et seruntur. et arbores in uepribus solent ante missae inueniri.

Si fossis fines obseruabuntur, inspiciendum utique $\langle i\rangle \mathrm{n}$ om[i]nibus, regionum quae sit consuetudo, et uidendum quales fossae, ne, siquis agrorum siccandorum causa fos- sas fecerit, finales esse uideantur. nam et intellegi potest aliquando ex ipsarum fossarum positione, utrum propriae an finales sint, quoniam transuersae quaedam aut obliquae a finibus recedunt. ita ut supra dictum est, ex ipsorum locorum necessitate et ex ipsarum positione colligi debebit, quae sint finales. aliae tamen quae finales sunt, cum uidentur esse communes, inspiciendum erit an ita sit. nam quidam in extremis finibus in solo suo faciunt fossas et ex superioribus uicinisque agris defluentes aquas excipiunt, ne inferiores terrae laborent. ita quod in solo suo quis fecerit, non statim communes sed circa fines esse uidebuntur. respiciendum (hoc) quoque erit. nam et in aliis lateribus similiter fines obseruabuntur. sed et proprias qui faciunt ad expediendas aquas, aliquid soli sui extra fossam solent relinquere. aliquando etiam terminos extra fossam positos inuenimus, qui et ipsas fossas et soli relicti partes decernant cuius domini sint. quidam uero etiam arbores ante missas finales extra fossas habent, et in controuersiam saepe deducuntur, quod credatur fossas finem facere debere. propter quod, sicut in aliis generibus finitionum, sic et in hoc quoque consuetudines regionum intuendae erunt. †etenim dum terminis aut arboribus fines obseruari consuetudo sit, non oportere fossas, quae prope fines erunt, finales obseruari; si uero substructionibus et maceriis finientur agri, uidere quales substructiones et maceriae, quoniam quidam congestionibus lapidum, ripis, substructionibus terras, ne dilabantur, excipiunt. ita si ad tutelam terrarum extruantur, uidendum an et finitiones praestare debeant. nam quidam transuersas et obliquas macerias ripis substructionibus factas uolunt uideri finales. quod ex ipsa facie aliquando intellegitur; si enim proprias quis faciat in terris suis ad sustinendos seruandosque agros suos, non posse eos esse finales; nam quaedam, quae fines praestant, maiori opere extructae inueniuntur quam eae, quae priuatae sunt. nihilo minus et in hoc genere finitionum consuetudines regionum intuendae erunt. sed et ex ipsorum locorum 〈qualitate〉 aliquando aliquid colligi potest. si enim non expetent terrae, quarum sustinendarum causa uideatur maceria esse facta, poterit finalis uideri. sed in planis locis si saxuosus sit ager, repurgatur, et ex congestione maceriae fiunt. ita et ex ipsius loci qualitate aliquid colligi potest. si enim non sit ager saxuosus, cuius repurgandi causa congestio in speciem maceriae facta uideatur, poterit uideri finalis. ergo, ut saepe diximus, quaedam ex consuetudine regionum, quaedam ex natura loci colligi possunt.
protection for vineyards or gardens, they are brought in from outside regions and planted. In addition, trees previously planted are normally found in the midst of thorn bushes.

If boundaries are recognized by means of ditches, we must examine, as in everything, what the practice of the regions is, and find out what sort of ditches, in case, if someone has built ditches to drain his land, these might be regarded as boundary ditches. Sometimes we can work out from the position of the ditches themselves whether they are privately owned or mark a boundary, since some transverse or oblique ditches diverge from boundaries. Therefore, as I said above, on the basis of the requirements of the sites themselves and the position of the ditches themselves, ${ }^{27}$ we shall have to decide which ditches demarcate boundaries. However, in the case of other ditches that mark a boundary, when they appear to be shared, we shall have to examine if this is so. For some people build ditches on their own land on their boundary edge and catch water flowing down from neighbouring higher land, to prevent the lower ground from being damaged. Therefore, as regards what someone has built on his own land, ditches should not immediately be viewed as shared, but to be 'round about' the boundary. So we shall also have to look out for this. Moreover, in other quarters boundaries will be recognized in a similar way. But those people who dig their own ditches to channel water normally leave some of their land beyond the ditch. Sometimes we even find boundary markers placed beyond a ditch, which indicate who owns both the ditch itself and the areas of land that have been left. Indeed some have trees previously planted as boundary markers beyond the ditches, and they are often a source of dispute because it is believed that the ditches ought to mark the boundary. Therefore, as in other types of boundary so in this too, the practices of the regions will have to be examined. For if it is the practice for boundaries to be marked by means of markers or trees, (it should be noted that) it is not right that ditches which are near boundaries should be accepted as marking a boundary. ${ }^{28}$ But if lands are demarcated by embankments or dry-stone walls, we must note what kind of embankments or walls, since some people employ piles of stones, banks, and embankments to shore up earth in case it collapses. So, if they are constructed as a support for earth, we must see if they ought also to serve to mark a boundary. For some people want dry-stone cross walls or angled walls, built on banks and embankments, to be seen as marking a boundary. We can sometimes work this out from their actual appearance; for if someone builds private walls on his own land specifically to look after and protect his own fields, they cannot serve to demarcate a boundary. ${ }^{29}$ Now, those walls erected to provide a boundary are found to be built on a grander scale than those that are private. None the less, in this kind of boundary too, the practices of the regions will have to be observed. Occasionally something can be deduced from the nature of the sites themselves. Consequently if there is no earth for whose support a dry-stone wall might seemingly have been built, we can conclude that it is to mark a boundary. But in level sites, if the land is stony, it is cleaned up, and from the piles of stones drystone walls are built. So, something can be deduced from the 〈nature〉 of the site itself. Consequently, if land, which might be cleaned seemingly by heaping stones into the shape of a dry-stone wall, is not in fact stony, it (the wall) can be seen as demarcating a boundary. Therefore, as I have often said, something can be deduced from the practice of the regions, and something from the nature of the site.

Nam et de fossis idem sentimus．si enim non sit necessitas agri siccandi nec in uicinis fossae inueniantur，possunt uideri finales，non interuenientibus querellis，quibus ambigatur，secundum regionum consuetudinem esse finales．sed si in regione non sit consuetudo fossis finem obseruari，ea ergo，quae quasi nouum exemplum afferre uide－ buntur，intuendum utrum ex necessitate loci agros siccent an finem praestent．

Maceriae quoque，et quae ex congestione lapidum fiunt et quae manu instruun－ tur，non semper aut terrarum excipiendarum causa aut repurgandi agri aut finem prae－ standi fiunt．aliquando enim per magnum spatium aut uiuaria aut pomaria aut uineas aut oliueta aut arbusta maceriis supra dictis includunt et ab incursionibus bestiarum defendunt．ita diligenter omnia exquiri debebunt，ne qua ratione fallamur．

Riuis si fines obseruabuntur，qui non semper singulorum agrorum extremitates ambire possunt，sed per aliquod spatium lateribus quibusdam possessionum finem praestare，intuendum erit an sit consuetudo ultro citroque riuorum aliquas partes agrorum possideri ab his，qui trans riuum contrarios agros habebunt．quidam enim riui ab origine，id est a capite，donec in mari defluant，fines possessionibus praestant， quidam uero ultro citroque transmittunt possessores．quod ipsud requirendum erit an ［quod］in consuetudine regionum sit．comperimus enim quibusdam locis per omnem tractum riui finem aliquas particulas agrorum ab eis，qui econtrarios trans riuum habent agros，emptas iunctasque eis agris，qui riuo finirentur．quod ipsud non debet nocere exemplo，quoniam emptae particulae aliis agris iungantur．ita transeundi riui non debet haec condicio confundere possessores．quod etiam in fossarum condicione euenire potest，itemque uiarum．

Riuus autem quotiens finem facit，appellatur RIVO RECTO［curuoque］．qui si alicuius terras minutatim ex alia parte abstrahat et alii contrario relinquat，quod uocant abluuionem et alluuionem，repetitio finium ha $\langle\mathbf{u}\rangle$ d datur：inducit enim necessi－ tatem riparum tuendarum．quod iuste uidetur prospectum，ut terrae possessoribus saluae sint，etiam publicae utilitatis causa．quod $\langle\mathrm{si}\rangle$ ui $[\mathrm{m}]$ tempestatum riui torrentes subito alueum cursu〈m〉que mutent，iustum，ut nostra fert opinio，erit ut aluei ueteris fines suos quisque obtineat．

In aliquibus regionibus ita fines inter possessores ordinati sunt，ut rigores durent per longum tractum；incidentesque in uiis aut riuis aut in 〈sub〉structionibus aut rig－ oribus aliisque finitionum generibus deficient supra dicti rigores：inde in quo inciderint genere fines obseruabuntur，donec et illud ipsud genus aliquo［d］incidat，quo finiantur agri．ergo et rigores et uiae et riui et substructiones alii aliis incidentibus inter se

Moreover I hold the same view about ditches. If there is no necessity of draining the land, and ditches are not found in the neighbouring properties, then ditches can be taken as marking a boundary, provided that no objections occur that might call in question the fact that, in accordance with the practice of the regions, they do mark a boundary. However, if in the region it is not the practice to recognize boundaries by means of ditches, then we must see if those (ditches) that seemingly offer a new precedent, are draining the land according to the requirements of the site, or if they are in fact providing a boundary. ${ }^{30}$

Dry-stone walls, both those which grow out of piles of stones, and those that are deliberately constructed, do not always exist for the purpose of shoring up earth or clearing stony land or marking a boundary. For sometimes over a large area people enclose game reserves, orchards, vineyards, olive groves, and plantations with the walls mentioned above and protect them from the incursions of wild beasts. Therefore everything will have to be carefully examined in case we make a mistake in any of our analysis.

If boundaries are recognized by means of streams, which cannot always flow round the edges of individual fields, but can provide a boundary over a certain distance for some sides of properties, we shall have to see if there is a custom for some pieces of land to be owned on both sides of streams, by those people who have land opposite on the other side of the stream. Some streams from their source, that is, their head, provide boundaries for properties until they flow into the sea. Other streams however, flow with different landholders on each side. We shall have to consider this very point, to see if it is the usual practice in the regions. For I have discovered that in some places, along a whole stretch of a stream serving as a boundary, ${ }^{31}$ some parcels of land had been bought by people who owned land opposite on the other side of the stream, and joined to the land bounded by the stream. The fact that the parcels of land which have been purchased are joined to the other land should not overturn our basic contention (i.e. streams can often form the boundary between properties). So, this situation of having to cross a stream should not disturb landholders. Indeed the same kind of thing can happen in the case of ditches and also in the case of roads.

Whenever a stream marks a boundary it is referred to as: 'a proper stream' \{rivus rectus $\}{ }^{32}$ If a stream gradually removes someone's land from one place and deposits it on the land of someone opposite, a process called erosion and alluviation, no claim for a return of land is entertained; ${ }^{33}$ for it introduces the requirement of shoring up the banks. This indeed seems a proper precaution, to ensure that land remains intact for landholders, and also for the public good. But if, because of violent storms, streams turn into torrents and suddenly leave their bed and course, it is right in my view that everyone retains his boundaries as marked out by the old river bed.

In some regions boundaries are marked out between landholders in such a way that straight lines \{rigores\} extend over a long stretch of land. When they come upon roads, or streams, or embankments, or (other) straight lines, or other types of boundary, the rigores mentioned above will fade out. From then on the boundaries will be recognized by means of the type of boundary that the rigores have come upon, until that type itself comes upon some other type by which lands may be demarcated. Therefore rigores and roads and streams and embankments come upon one another and follow on from one another in turn (as boundaries). Moreover, if there are con-
inuicem succedunt．nam et in ipsis generibus sicubi coxae sunt，terminos inuenimus frequenter．sed et petras naturales，quae in finibus incidunt，saepe notatas inuenimus．

Omnia autem finitionum genera，quae in occupatoriis agris uidentur inueniri posse，in quaestoriis et diuisis et assignatis agris frequenter inueniuntur，quoniam emendo uendendoque aut cambiando mut $\langle\mathbf{u}\rangle$ andoque similia finitionum genera in－ ueniri possunt．sed et unius agri extremitas potest multis finiri generibus，cum ex uno latere finiatur terminis，ex alio arboribus，$\langle e x\rangle$ alio supercilio，ex alio riuo，quaeque alia obseruabilia in finibus sunt．ita non uno genere，quasi lege data，fines obseruabuntur． quae etiam in omnibus agrorum condicionibus euenire possunt．

Illud uero inuenimus aliquibus locis，ut inter arua uicini arguantur confundere fines eoque usque aratrum perducere，ut in finibus solidum marginem non relinquant， quo discerni possint fines．

Sed et in uineis aliisque culturarum generibus simile quid inueniatur．si enim duo possessores extremis finibus ui〈ne〉as habent，cum fodiunt，finem solidum relinquunt． nam et signa defodiunt［propter quaestorios agros］．

Praeterea et in multis regionibus comperimus quosdam possessores non continuas habere terras，sed particulas quasdam in diuersis locis，interuenientibus compluri［m］um possessionibus；propter quod etiam complures uicinales uiae sint，ut unus quisque pos－ sit ad particulas suas iure peruenire．sed et de uiarum condicionibus locuti sumus． quorundam agri seruitutem possessoribus ad particulas suas eundi redeundique prae－ stant．quorundam etiam uicinorum aliquas siluas quasi publicas，immo proprias quasi uicinorum，esse comperimus，nec quemquam in eis caedendi pascendique ius habere nisi uicinos quorum sint；ad quas itinera saepe，ut supra diximus，per alienos agros dantur．

## DE QVAESTORIIS AGRIS

Quaestorii dicuntur agri，quos ex hoste captos p．R．per quaestores uendidit．hi autem limitibus institutis laterculis quinquagenum iugerum effectis uenierunt．quem modum decem actus in quadratum per limites demensi efficiunt；unde etiam limites decumani sunt dicti．

Horum uero agrorum paene iam oblit $\langle t\rangle$ erata sunt signa：nam aliquibus locis etiam lapides，qui in limitibus denis actibus emensi〈s＞positi erant，interciderunt，et lim－ ites ipsi，id est rigores，non parentibus lapidibus difficile inueniuntur．paene iam itaque fit，ut $\langle\mathrm{ad}\rangle$ occupatoria $\langle\mathrm{m}\rangle$ condicione $\langle\mathrm{m}\rangle$ recidant．in quibus alia similia in finibus obseruabuntur．

Limites autem ab liminibus uocabula acceperunt，quoniam limina introitus exi－ tusque locis praestant，limites agris similiter introitus exitusque．qui in agris diuisis et assignatis semper peruii esse debebunt tam itineribus quam et mensuris agendis．cum ergo omnes limites a mensura denum actuum decimani dicti sint，hi qui orientem occi－ dentemque intuentur，qui＜que〉 meridianum et septentrionem tenent，unum uocabulum
vex bends anywhere in these types of boundary, we often find boundary stones. In addition we find that natural rocks, which occur on boundaries, have often been marked.

All types of boundary that seemingly can be found in agri occupatorii are also frequently found in quaestorian and in divided and allocated lands, since through buying and selling or exchanging and commuting land similar types of boundary can be found. ${ }^{34}$ Indeed, the edge of one field can be demarcated by many types of boundary, since on one side it may be demarcated by markers, on another by trees, on another by a terrace, on another by a stream, and whatever other things are to be recognized on boundaries. Therefore boundaries will not be recognized by only one method of demarcation, as if in accordance with a law which had been issued. These (methods of boundary demarcation) can occur in all categories of land.

In some places I have discovered that neighbours are alleged to be obscuring the boundary between fields, and ploughing up to the point where they leave no firm balk on the boundary, by which boundaries might be recognized.

Something similar may be found in vineyards and other types of cultivation. For if two landholders have vineyards on the edge of their land, when they are digging they leave a solid boundary. Moreover, they also fix markers in the ground. ${ }^{35}$

In addition, I have discovered that in many regions some landholders do not have contiguous land, but parcels of land in different places separated by the holdings of several people. Because of this, there are several local roads so that each man can have access by right to his own parcels of land. However, I have already discussed the categories of roads. The land of some people enjoins a servitude $\{$ servitus $\}$ to provide a right of way for landholders to and from their parcels of land. I have discovered that certain woods, which are in a sense public property, are in the hands of the neighbours, indeed are in a sense the property of these neighbours, and that no one except those who are adjacent to the woods has the right to cut down trees or pasture there. As I said above, rights of way to these are often granted through the land of others.

## QUAESTORIAN LANDS

The name 'quaestorian' is given to lands that, after their capture from the enemy, the Roman people sold through the agency of the quaestors. They went on sale after limites had been established, making squares of fifty iugera. They produce this area of land by measuring out ten actus square ( 1,200 by 1,200 feet) by means of the limites, and because of this the limites are called decumani. ${ }^{36}$

The markers of these lands have now been almost effaced. In some places even the stones, which had been placed on the limites for every measured stretch of ten actus, have disappeared, and the limites themselves, that is, the straight lines \{rigores $\}$, can be found only with difficulty, if the stones are not visible. Therefore, it happens that they revert virtually to the category of 'occupied' land. In these lands other similar markers will be observed on boundaries. ${ }^{37}$

Limites are called after thresholds $\{$ limina $\}$, since thresholds provide entry to and exit from places, and limites in the same way provide entry to and exit from fields. ${ }^{38}$ Limites in divided and allocated lands should always be passable, both for rights of way and also for conducting a survey. Since all limites are called decumani because their length is ten actus, those facing east and west, and those pointing south and
illis erat：decumani nuncupabant／（ur）matutini et uespertini et meridiani et septen－ trion〈al〉es［cardinem］．alii uero ob regionum positionem et naturam appellauerunt maritimos et montanos．postea uero cum agri diuiderentur et assignarentur，decimani quidem uocabulum permansit，ut hi qui orientem occidentemque intuentur decimani dicerentur：hi uero qui meridianum et septentrionem，quoniam cardinem mundi tener－ ent，cardines sunt appellati．

Et omnes limites dirimunt agros centuriasque designant．qui，ut supra diximus，in agris diuisis et assignatis semper peruii esse debebunt et itineribus et mensuris agendis．

Centuriis，quarum mentionem nunc facimus，uocabulum datum est ex eo，〈quod〉 cum antiqui［Romanorum］agrum ex hoste captum uictori populo per bina iugera par－ titi sunt，centenis hominibus ducentena iugera dederunt：et ex hoc facto centuria iuste appellata est．

Ergo in quaestoriis agris adhuc in regionibus quibusdam manentibus lapidibus， quibus limites inueniri possunt，aliqua uestigia reseruant〈ur〉．sed，ut supra diximus， emendo uendendoque aliquas particulas ita confuderunt possessores，ut ad occupato－ riorum condicionem reciderint．tamen，ut supra diximus，in aliquibus et lapides et rig－ ores aliqui enueniuntur et fines praestant．

## DE DIVISIS ET ASSIGNATIS

Diuisi et assignati agri 〈non〉 unius sunt condicionis．nam et diuiduntur sine assig－ natione et redduntur sine diuisione．diuiduntur ergo agri limitibus institutis per cen－ turias，assignantur uiritim nominibus．

Ergo agrorum diuisorum，qui institutis limitibus diuisi sunt，formae uarias appel－ lationes accipiunt．quidam 〈in〉 arbore〈 i$\rangle \mathrm{s}$ tabulis，alii in aenis，alii in membr〈an〉is scripserunt．et quamuis 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．hi tamen quidquid instituerunt curandum erit ut fide aestimetur，nequis uoluntario finem proferat．illa tantum fides uideatur，quae aereis tabulis manifestata est．quod si quis contra dicat，sanctuarium Caesaris respici solet． omnium enim agrorum et diuisorum 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．

Causam autem diuidendorum agrorum bella fecerunt．captus enim ager ex hoste uictori militi ueteranoque［est］assignatus hostibus pulsis aequalis in modo manipuli datus est．nec tamen omnibus personis uictis ablati sunt agri；nam quorundam digni－ tas aut gratia aut amicitia uictorem ducem mouit，ut ei $\langle\mathrm{s}\rangle$ concederet agros suos． itaque limitibus actis cum centuriae eximerentur，eorum，quorum nomina continent，

[^56]north, had a specific designation; they were called decumani 'of the morning' and 'of the evening', and 'of the south' and 'of the north'. Others have called limites 'maritime' or 'mountain', according to the position and layout of the regions. Afterwards, when lands were being divided and allocated, the word decumanus remained, in so far as those limites facing east and west were called decumani; but those facing north and south were called kardines, since they occupied the axis $\{$ kardo $\}$ of the world.

All limites divide up the land and demarcate centuriae. As I said above, in land which has been divided and allocated, they must always be passable for rights of way and for conducting a survey.

Centuriae, which I have just mentioned, received this name because, when the ancients divided land captured from the enemy among the victorious people in lots of two iugera, they gave two hundred iugera to every one hundred men \{centeni\}; from this action the centuria properly got its name. ${ }^{39}$

So, in agri quaestorii, since in certain regions the stones still exist by which the limites can be found, some traces (of the original division) are preserved. But, as I said above, by buying and selling some pieces of land, the landholders have confused things to the extent that the lands have reverted to the category of 'occupied'. However, as I said above, in some lands both the boundary stones and some straight lines \{rigores \} are found and provide boundaries.

## DIVIDED AND ALLOCATED LANDS

Divided and allocated lands do not belong to only one category. Sometimes they are divided without any allocation, or sometimes restored without any division. Lands are divided up into centuriae by the establishment of limites, and are allocated to individuals by name.

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. ${ }^{40}$ 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. ${ }^{41}$ 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.

Wars created the motive for dividing up land. For land captured from the enemy was allocated to the victorious soldiery and veterans, and, after the defeat of the enemy, was granted in equal amount in proportion to the unit. But not all conquered peoples were deprived of their lands. For the status, or influence, or friendship of some persuaded the victorious commander to grant their own lands to them. So, after the limites had been established and the centuriae were being drawn out (by lot), ${ }^{42}$ the lands of those whose names the centuriae contained were recorded, that is, how much
agri notabantur，quantum in quaque centuria haberent．inscriptiones itaque in cen－ turiis sunt tales：DEXTRA aut SINISTRA DECIMANVM TOTVM，VLTRA CITRA［q］ue CARDINEM TOTVM ASSIGNATVM ILLI TANTVM；inde suscrip－ tum est nomen，cui concessum est，inscriptione tali，REDDITVM ILLI TANTVM． praeterea scriptum est et REDDITVM ET COMMVTATVM PRO SVO．quod ideo fit，quoniam particulas quasdam agrorum in diuersis locis habentes duo，quibus agri reddebantur，ut continuam possessionem haberent，modum pro modo secundum boni－ tatem taxabant；et in locum eius，quod in diuerso erat，maiorem partem accepit itaque， sicut supra diximus，qui hanc inscriptionem accepit，id est REDDITVM COMMV－ TATVM PRO SVO．

Inscriptiones ergo diligenti cura intuendae erunt，ut sciamus quantum dati assig－ nati si［n］t，quantum redditi，et quantum commutati，qua computatione facta quanto minus fuerit，quam centuriae modus esse debet，subseciuum uocatur．subseciuorum uero genera sunt duo．unum est quod a subsecante linea mensura $\langle\mathrm{e}\rangle$ quadratum excedet．alterum est autem quod subsecante assignationes linea［e］etiam in mediis cen－ turiis relinquetur．euenit hoc autem ideo，quoniam militi ueteranoque cultura assig－ natur：si quid e $\langle n i\rangle m$ amari et incerti soli est，id assignatione non datur．

Inscriptiones in centuriis frequenter inuenimus tales，DATVM ASSIGNATVM singulis personis certum modum，aliquando uero compluribus unum modum．de qua re diligenter inquirendum erit，utrum aequaliter modus ille pluribus ascriptus diui〈di〉 deb $\langle\mathrm{e}\rangle a \mathrm{at}$ ，an aliquibus personis et alicui plus debeatur．non enim omnibus aequaliter datus，sed et secundum（gradum）militiae et modus est datus．manipulus ergo singu－ las acceptas accipient，aliqui gradus singulas et dimidias，aliqui binas．pluribus ergo， ut supra diximus，personis 〈in〉aequaliter assignatur modus．sed nec singulis acceptis modi［s］per omnes regiones aequalitas est；nam secundum bonitatem agrorum com－ putatione facta acceptas partiti sunt：melioris itaque agri minorem modum acceperunt．

Ergo acceptiones in centuriis，ut coeperamus，explicandae sunt．diximus enim DATVM ASSIGNATVM compluribus aliquando unum modum adscribi；sed et REDDITVM SVVM aliquando pluribus personis unus modus adscribitur．quae an ali－ quando aliter partiri debeant，inde colligere poterimus，ut respiciamus professiones：si enim quibus agri sui reddantur，iussi professi sunt，quantum modum quoque loco possiderent．praeterea inuenimus suscriptiones tales，$\langle u t\rangle$ DATVM ASSIGNATVM adscriptum sit，subiectum REDDITVM SVVM uni aut duobus pluribus［q］ue personis， e［s］t modus nullus adscriptus；quod，〈ut〉 nostra fert opinio，quod datum assignatum， computatum sit：reliquum quidquid erit ex centuria，eius eorumue erit，quorum nom－ ina sine modo inueniuntur．aliquando integras plenasque centurias binas pluresue con－

[^57]they had in each centuria. Therefore, in the centuriae notations like this appear: 'To the right or left of decumanus such and such, beyond or on the near side of kardo such and such, so much has been allocated to such and such'. Then the name of the person to whom the land was granted is written in the following way: 'So much restored to such and such'. Moreover, there is also noted down: 'Restored and exchanged for his own land'. This comes about because two men, to whom lands were being restored, had some parcels of land in different locations, and in order to have an unbroken holding, they assessed the relative areas of the parcels of land in respect of their quality. So, in place of a piece of land which was in a separate location, the man who, as I pointed out above, received the following notation, namely, 'Restored and exchanged for his own land', received a larger portion (at his main holding).

Notations will therefore have to be carefully scrutinized so that we know the quantity of granted and allocated land, the quantity of restored land, and the quantity of exchanged land. When this has been added up, the amount by which this total is less than the area of the centuria ought to be, is called subsecivum. There are two kinds of subsecivum; one is whatever land falls outside the square (of the allocated centuriae) because it is cut off by the line of the survey; the other is what is left over, even in the middle of the centuriae, by the line drawn to divide off the allocations. This comes about because cultivable land is allocated to soldiers and veterans; therefore any infertile ground, or ground of dubious quality, is not included in the allocation. ${ }^{43}$

In the centuriae we often find notations like this: a certain area of land 'granted and allocated' to individuals, or sometimes one area of land to several people. We must examine this matter carefully to see if that area allocated to several people should be equally divided, or if a greater share should be given to some people, or to some person. For land was not distributed equally to everyone, but an area (of land) was granted according to military $\langle$ rank $\rangle$. Rank and file soldiers therefore will receive a single allocation, some ranks one and a half allocations, some ranks double allocations. So, as I said above, for many people an <un〉equal area of land is allocated. Furthermore, the size of individual allocations is not the same in all regions; for they divided the allocations by making a calculation on the quality of the land; so people got a smaller quantity of the better land. ${ }^{44}$

Now, I must explain the allocations in the centuriae, as I had begun to do. For I said that the phrase 'granted and allocated' sometimes means that a single area of land is allocated to several people; moreover, the phrase 'his own land restored' sometimes means that a single area of land is allocated to several people. We can establish which (allocations) ought sometimes to be divided up differently, if we examine the declarations, that is, if those to whom their own lands are being returned have made, as instructed, a declaration of the quantity and location of the land they possessed. ${ }^{45}$ Moreover, I have found notations appended as follows, for example, 'granted and allocated' has been written, and added below 'his own land was restored', to one or two or more people, with no area noted down. In my opinion, in this case the area of land granted and allocated should be calculated, and whatever land is left over out of the total area of the centuria, belongs to the person or persons whose names are found with no area of land noted down. Sometimes we find that two or more entire, complete, and contiguous centuriae have been granted to one name; from this we under-
tinuas uni nomini redditas inuenimus；ex quo intellegitur REDDITVM SVVM，LATI FVNDI：〈hi〉 per continuationem seruantur centuriis．

Inscribuntur quaedam EXCEPTA，quae aut sibi reseruauit auctor diuisionis et assignationis，aut alii concessit．inscribuntur et COMPASCVA；quod est genus quasi subseciuorum siue loca，quae proximi quique uicini，id est qui ea contingunt，pas－ cua．．．illud uero．．．auctores diuisionis assignationisque leges quasdam colonis describunt，$u$ t qui agri delubris sepulchrisue publicisque solis，itiner $a$ uiae actus ambi－ tus ductusque aquarum，quae publicis utilitatibus seruierint ad id usque tempus，quo agri diuisiones fierent，in eadem condicione essent，qua ante fuerant，nec quicquam utilitatibus publicis derogauerunt．

In quibusdam regionibus fluminum modus assignationi cessit，in quibusdam uero tamquam subseciuus relictus est，aliis autem exceptus inscriptumque FLVMINI ILLI TANTVM．ut in Pisaurensi comperimus DATVM ASSIGNATVMQUE ut VETER－ ANO，deinde REDDITVM SVVM VETERI POSSESSORI，FLVMINI PISAVRO TANTVM，IN QVO ALVEVS；deinceps et ultra ripas utrimque aliquando adscriptum modum per omnes centurias，per quas id flumen decurret．quod factum auctor diui－ sionis assignationisque iustissime prospexit：subitis enim uiolentisque imbribus ex－ cedens ripas defluet，quo $\langle a\rangle d$ etiam ultra modum sibi adscriptum egrediatur uicinorumque uexet terras．cum ergo possessores hoc incommodum patiantur adsidui－ tate tempestatum，contentoque flumine alueo ripisque suis aequum uideatur iniuriam passos subsequi terras usque ad alueum fluminis，has tamen terras Pisaurenses publice uendiderunt，quas credendum est proximos quosque contingentes eas emisse uicinos．

Limitum quoque modus in quibusdam regionibus per amplum spatium exceptus est，in quibusdam uero modo assignationis cessit．ergo centuriae limitibus clausae，qui a limit〈ation〉ibus excipiuntur：a［d］praescripta lege latitudine 〈enim〉 actae incipiant mensurae oportet［et］centuriarum；in his quibus non excipiuntur［ad praescripta lege latitudinis］，ab linea mensurali per limitem omnis modus in mensuram centuriae cadit． qui tamen，ut supra diximus，semper［in］itineribus 〈et〉 mensuris agendis pervii oportet ut sint．spatium autem，intra quod sors［solum］uersari debeat，quasi dignationes dat： decimano uero et cardini maximis maximus latitudines modus praescribi debet，deinde quintam quamque centuriam includenti per decimanos cardinesque；〈qui〉 cum uiginti et quinque centurias includant，saltus appellatur．quibusdam regionibus，cum in ipsis incidant uillis，portas domini uillarum faciunt ianuasque inponunt et seruos huic nego－ tio ad transmittendum populum applicant，quoniam utilissimum iter populo seruari debeat．datur autem uia a possessoribus，ut limites occupent；hac tamen condicione， ut si $\langle u\rangle$ illae in limitibus positae sint，id est limites in quibus incidunt，$\langle$ red $\rangle$ dant per

[^58]stand 'his own land was restored, estates'; these estates exist in an unbroken stretch in the centuriae.

Some places are listed as 'set aside' \{excepta\}, which the man who conducted the division and allocation either reserved for himself or granted to someone else. Some places are marked as 'common pasture land' \{compascua\}; this is a type of land like subseciva, or a place where all the closest neighbours, that is, those whose property adjoins it, pasture ... But that $\ldots{ }^{46}$ the authors of the division and allocation lay down certain laws for the colonists, so that those lands that served shrines, tombs, and public areas, and those rights of pathway, public rights of way, rights of way for driving cattle, rights of way round buildings, and water channels, that served the public interest up to the time when the division of the land was taking place, should remain in the same status as they had before; therefore they inflicted no loss on the public interest. ${ }^{47}$

In some regions the area of rivers was included in the allocation. In some it was omitted, just like subsecivum; in others an area was excluded with the notation: 'so much for this or that river'. For example, in the territory of Pisaurum I discovered: 'granted and allocated' for instance 'to a veteran', then, 'his own property restored to the previous possessor', 'so much for the river Pisaurus, in which the bed'. Then, even beyond the river banks on both sides an area is sometimes written in, throughout all the centuriae through which that river flows. In doing this the author of the division and allocation exercised a most equitable foresight. For the river, swollen by sudden and violent storms, breaks its banks and flows over the land, going even beyond the area assigned to it and damaging the land of its neighbours. Since landholders suffer this inconvenience through a succession of storms, it seems fair that when the river has again been confined within its own bed and banks, those who suffered any loss should trace the extent of their land right up to the bed of the river. However, the Pisaurenses officially sold off this area of land, and we must suppose that it was bought by the nearest neighbours, who had lands adjoining it. ${ }^{48}$

In certain regions the area occupied by the limites, amounting to a considerable distance, has been excluded; in others it is included in the area of the allocation. ${ }^{49}$ Therefore, the centuriae are bounded by limites which are excluded from the measured area, $\langle$ for $\rangle$ it is right that the measurement of centuriae, when executed, should begin from the width prescribed by law (for limites). ${ }^{50}$ With regard to those (centuriae) where the limites are not excluded, all the area from the measured line, including the width of the limes, falls within the measured area of the centuria. ${ }^{51}$ It is right that limites, as I said above, should always be passable for rights of way and for conducting surveys. The width (of the limites) inside which an allocation ought to be shaped, confers a kind of status. Indeed, the greatest width ought to be laid down for the decumanus maximus and kardo maximus, and after them for the limes that marks off every fifth centuria along both decumani and kardines. ${ }^{52}$ When the limites mark off twenty-five centuriae, this is called a saltus. In some regions when the limites encroach on actual farm buildings, the owners of the farm buildings construct gates, install doors, and position slaves beside them with the task of allowing people a passage through, since a serviceable right of way ought to be maintained for the people. Now, a right of way is granted by landholders on the understanding that they may occupy the limites, but on this condition, namely, if farm buildings have been situated on limites, that is,
agros suos iter populo，dum non deterius quam per $\langle u\rangle i l l a s$ transeant．sed quaedam ita positae sunt，ut quantumcumque de limite deflectere uelint，incommodum iter patiantur：ita necessario per ipsas transeunt uillas．limitem autem non puto quemquam occupare debere colendo，ut per agrum iter reddere mallet：alioquin deflexus illi，qui de limite detorquentur，multo maiorem occupant modum．

Centuriae autem non per omnes regiones ducenta iugera obtinent：in quibusdam ducentena dena inuenimus，in quibusdam ducentena quadragena．ita diligenti cura et haec erunt respicienda，quoniam et limitum non aequale spatium inter lapides sit oportet，si amplius quam ducentena iugera centuriae habent．ut puta si habet centuria iugera CCXL，si $\langle n\rangle t$ oportet per decimanum aut cardinem ab lapide ad lapidem actus xXIIII，et per alterum limitem actus xx ：［aut］tot enim actus，quorum numeri per dec－ imanum ac per cardinem dati inter se multiplicati，facient cccclxxx．itaque diligenter id scrutandum，quanta per decimanum et quanta per cardinem spatia inter lapides obseruari debeant．comperimus in quibusdam perticis cum centuria $\langle\mathrm{e}\rangle$ ducenta iugera haberent，non uiginti actus aequaliter per limites inter lapides datos：in Beneuentano actus uiginti quinque per decimanos，et actus sedecim per cardines；qua mensura iugera ducenta quidem includuntur，centuriae quadratae non exprimuntur．

Illud praeterea comperimus，deficiente numero militum ueteranorum agro qui ter－ ritorio eius loci continetur，in quo ueterani milites deducebantur，sumptos agros ex uicinis territoriis diuisisse et assignasse；horum etiam agrorum，qui ex uicinis populis sumpti sunt，proprias factas esse formas．id est suis limitibus quaeque regio diuisa est， et non ab uno puncto omnes limites［f］acti sunt，sed，ut supra dictum est，sua〈m〉 quaeque regio formam habet．quae singulae praefecturae appellantur ideo，quoniam singularum regionum diuision $i$ alios praefe（ce）runt，uel ex eo quod in diuersis region－ ibus magistratus coloniarum iuris dictionem mittere soliti sunt．ac tamen omnes quarum coloniarum ciues acceperunt，eius perticae appellabuntur：ergo praefectura illa dicitur，cuius territorio ager sumptus fuerit，pertica illa tamquam colonia，ubi ciuis deductus fuerit．nec tamen semper uniuersa territoria，quotiens ager coloniae defecit， uicinis auferuntur，sed solum quod assignare necesse fuit；quod ipsum legis praescrip－ tio declarat．aliquando uero $\langle$ si〉 inlimitatus ager etiam ex uicinis territoriis sumptus non suffecisset，et auctor diuisionis assignationisque quosdam ciues coloni $\langle i\rangle$ s dare uelit 〈et〉 agros eis assignare，uoluntate $\langle m\rangle$ sua $\langle\mathrm{m}\rangle$ edicit commentariis aut in formis extra limi－ tationem，MONTE ILLO，PAGO ILLO，ILLI IVGERA TOT，aut ILLI AGRVM ILLVM，QVI FVIT ILLIVS．hoc ergo genus fuit assignationis sine diuisione；quo－ niam，ut supra dictum est，agri diuiduntur limitibus structis per centurias，assignantur
limites on which they encroach, the owners must provide a right of way for the people through their land, provided that the route is no more difficult than that through the farm buildings. But some farm buildings are situated in such a way that, over the distance for which the owners want to divert people from a limes, the right of way they provide is unsuitable. So, people have to pass through the actual farm buildings. I do not think that anyone should take over a limes for cultivation, on the grounds that he prefers to offer a right of way through a field; besides, diversions that curve away from a limes take up a much greater area of land. ${ }^{53}$

Centuriae do not contain 200 iugera in all regions. For in some we find 210, in others 240 . So this matter also will have to be carefully examined, since it follows that limites will not be of an equal length between the boundary stones if centuriae have more than 200 iugera. For example, if a centuria has 240 iugera, it follows that there will be 24 actus from stone to stone along one limes, either the decumanus or kardo, and 20 actus along the other. These actus, when the numbers given for the length of the decumanus and kardo have been multiplied together, will produce a total of 480 (square actus). ${ }^{54}$ So, we must examine this point carefully, namely the size of the intervals that ought to be noted between the boundary stones along both the decumanus and the kardo. I have discovered that in some lands that had been divided, although the centuriae contained 200 iugera, they had not been given equal lengths of 20 actus between the marker stones, along the limites. In the territory of Beneventum there are 25 actus along the decumani, and 16 along the kardines. Nevertheless, 200 iugera are enclosed by this type of measurement, but square centuriae are not thereby produced. ${ }^{55}$.

I have also discovered that when the quantity of land contained in the territory of the place in which veteran soldiers were being settled as colonists was insufficient for the number of veterans, they divided and allocated lands taken from neighbouring territories. And maps were specifically made for these lands that were taken from neighbouring peoples. That is, each region was divided by its own limites, and the limites were not all drawn from one point, but, as I said above, each region has its own map. ${ }^{56}$ Each of these regions (where land was taken from another community) is called a praefectura, because other people were put in charge of \{praeficere\} the division of each region, or because in different regions magistrates of colonies were habitually sent to exercise jurisdiction. ${ }^{57}$ However, all the lands the citizens of these colonies received will be described as (part of) the pertica; therefore, praefectura is the name given to an area from whose territory land has been taken, and pertica is the equivalent of a colony, where citizens have been settled. However, it was not always the case that their entire territory was confiscated from neighbouring communities whenever the land for a colony was inadequate, but only what was necessary for allocation. The provision of the law makes this particular point clear. But sometimes, 〈if〉 land with no limites, which had been taken from neighbouring communities, did not prove sufficient, and the author of the division and allocation wanted to give some citizens to the colonies and allocate land to them, ${ }^{58}$ he declared his intention in public records or maps (referring to land) outside the measured area, for example, 'at such and such a mountain, in such and such a pagus, so many iugera to such and such', or 'to such and such, such and such land which belonged to such and such'. This was a kind of allocation that took place without any land division. Because, as I pointed out above, land is divided by establishing limites to form centuriae, and is allocated to individu-
uiritim nominibus．sunt uero diuisi nec assignati，ut etiam in aliquibus regionibus com－ perimus，quibus，ut supra diximus，redditi sunt agri：iussi professi sunt quantum quoque loco possiderent．aliquibus uero ita contigit，ut iussi aestimatione facta prof－ iterentur；quibus secundum aestimationem pecunia data est，pulsique agris suis sunt， ueteranusque uictor eo deductus est．

Illud uero quod saepe respicimus，quod similitudines culturarum comparemus， potest quidem fieri ut similes conuenientesque culturae etsi〈sit〉 una facies，plures tamen domini．nam cum pulsi essent populi $\dagger$ potestatique locupletiorum fuissent lati fundi，qui unius ager fuisse［n］t，pluribus personis hic diuisus et assignatus est．ita qua－ muis ille habuerit culturae faciem，quem plures domini acceperunt，erit quidem inter plures similis facies；tamen quisque suum secundum acceptas habere debebit．item con－ trario euenit，ut quod pluribus assignatum est ad unum perueniat dominum，et quam〈uis〉 dissimiles sint culturae，ut etiam finitiones appareant quae erant inter eos， id est quibus assignati erant agri，tamen［quoniam］，ut saepe inuenimus，uni foco ter－ ritoria compluri［m］um acceptarum adtribuantur．nihil ergo nocere debebunt uarietates et dissimilitudines culturarum；ex quibus，ut nostra fert opinio，nascuntur saepe con－ trouersiae：et aes respicitur，id est quas quique acceptas defendant，quibusque personis redditum aut commutatum sit pro suo．

Saepe etiam unius eiusdemque nominis duo domini acceptam sibi defendunt．quae res quamuis sit confusa，tamen modus minor in possessione maiorem modum sequitur． aliquando autem monumenta eorum，quibus assignati sunt agri，aut uocabula uillarum agrorumque quamuis iusta uidentur，tamen，ut supra et saepe commemorauimus， potuerunt aliquando aliqui aliquem numerum，id est aliquantas particulas，remisisse aut uendidisse．

Euenit aliquando，ut in Nolano comperimus，idem，quom diuisio non ab uno puncto concessit，sed ex diuersis limitibus，qui oblique inter se concurrunt．ergo uiden－ dum est qua significantia linearum regio dinosci possit，ut intellegi possit DEXTRA aut SINISTRA DECIMANVM DEXTERIOREM aut DEXTRA aut SINISTRA DECIMANVM SINISTERIOREM．

Praeterea dicitur et＇aes miscellum＇．ita eueni［un］t ut qui a diuo Iulio deducti erant，temporibus Augusti militiam repetissent；consumptisque bellis uictores 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．quod tamen hac suspicione nos inuenimus sic 〈esse〉．cum data assignata nos computaremus et excederent centuriae modum，reuersi ad originem pri－ mam assignationis inuenimus postea adiecta esse nomina in hac condicione，qua supra opinati sumus．
als by name. But land has sometimes been divided and not allocated, as I have discovered in certain areas, where, as I said above, land has been given back. As instructed, people declared the extent and location of the land they possessed. Indeed it happened that some people, as instructed, made their property returns on the basis of a valuation; money was given to them in accordance with the valuation, ${ }^{59}$ they were removed from their land, and the victorious veteran soldiery was settled there.

In respect of that point of which we often take account, namely that we should compare similarities of cultivation, it can sometimes happen that cultivated lands are similar and harmonious, and that, even though there 〈is〉 a uniform appearance, there are nevertheless several owners. When the population had been expelled and the estates of the rich had been divided up(?), what had been the land of one man was now divided and allocated to several people. So, whatever appearance there had been of cultivation in this land, which several owners received, that appearance will remain the same throughout the property of several people. ${ }^{60}$ However, each man should keep his own property according to the allocations. Sometimes the opposite happens, so that land previously allocated to several people comes into the hands of a single owner. Although the nature of the cultivation is different, indeed to the extent that there are still visible the boundaries that used to exist between them, that is, the people to whom the land had previously been allocated, nevertheless the land of several allocations should now be counted as belonging to a single household, as we have often discovered. Therefore variations and dissimilarities in cultivation should not prejudice (a case). In my opinion, disputes frequently arise out of them; the bronze map is consulted, that is, in respect of which allocations individuals might claim (as theirs), and to which people land has been restored, or exchanged for their own.

Two owners often claim a portion of land under one and the same entry. However confused this matter is, nevertheless, in respect of possession, the smaller area (of land) follows the larger. ${ }^{61}$ Sometimes, although the records of those people to whom the lands were allocated, or the names of estates and fields, seem to be correct, nevertheless, as I have often pointed out above, at some time anyone could have surrendered or sold any amount, that is, some parcels (of this land).

At times there was a similar occurrence (i.e. the matter was confused), as I discovered in the territory of Nola, whenever the land division did not begin from one point, but used limites with a different orientation, which intersected at an angle. ${ }^{62}$ We must therefore consider how the location can be discerned by the indications of the boundary lines, so that we can understand 'to the right' or 'to the left of the right hand decumanus' or 'to the right' or 'to the left of the left hand decumanus'.

Furthermore, there is the term 'interpolated map' \{aes miscellum \}. 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. ${ }^{63}$ 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. I discovered that this was the case through the following clue. When I was calculating the plots of land that had been granted and allocated, and they exceeded the area of the centuria, I went back to the earliest record of the allocation and discovered that names had been added afterwards, in the circumstances about which I expressed my view above.

Subseciuorum mentio repetenda est．auctores enim diuisionis assignationisque ali－ quando subseciua re〈bu〉s publicis coloniarum concesserunt：aliquando in condicione illorum remanserunt．quae quidam，id est coloni，sibi donata uendiderunt，aliqui uecti－ galibus proximis quibusque adscripserunt，alii per singula lustra locare soliti per mancipes reditus percipiunt，alii in plures annos．quae ex monumentis publicis cognosci possunt．

Collegia sacerdotum itemque uirgines habent agros et territoria quaedam etiam determinata et quaedam aliquibus sacris dedicata，in eis etiam lucos，in quibusdam etiam aedes templaque．quos agros quasue territoriorum formas aliquotiens comper－ imus extremis finibus conprehensas sine ulla mensurali linea，modum tamen inesse scriptum．

Praeterea cum ex aliis territoriis ager sumptus est，et subseciua et uacuae cen－ turiae，quae in assignationem non ceciderant，redditae sunt eis，ex quorum territorio agri sumpti erant．quae et ipsi aut uendiderunt aut uectigalibus subiect $a$ habuerunt； sicut et aliarum rerum publicarum comperimus，ut supra commemorauimus．non enim omnis ager centuriatus in assignationem cecidit，sed et multa uacua relicta sunt．quo－ rum ea condicio est quae subseciuorum．de quibus Domitianus finem statuit，id est possessoribus ea concessit．

Subseciuorum diximus hanc condicionem esse factam，quod siluae et loca aspera in assignationem non uenerunt．comperimus uero in aliquibus regionibus et pascua et siluas assignatas esse，adscriptumque in formis ita，ILLI［ET ILLE TOT］SILVAS ET PASCVA，IVGERA TOT．

Territoria inter ciuitates，id est inter municipia et colonias et praefecturas，alia flu－ minibus finiuntur，alia summis montium iugis ac diuergiis aquarum，alia etiam lapidibus positis praesignibus，qui a priuatorum terminorum forma differunt；alia［e］ etiam inter binas colonias limitibus perpetuis diriguntur．de quibus，id est territoriis， si quando quaestio mouetur，respiciuntur leges ciui〈tati〉bus datae，id est coloniis municipiisque et praefecturis．nam inuenimus saepe in publicis instrumentis signifi－ canter descripta territoria：uocabulis enim aliquorum locorum comprehensis incipiunt ambire territoria．

Illud uero quod compertum est，pluribus municipiis ita fines datos，ut cum pulsi essent populi，et deducerentur coloni［ae］in unam aliquam electam ciuitatem，multis， ut supra et saepe commemorauimus，erepta sunt territoria，et diuisi sunt complurium municipiorum agri，et una limitatione comprehensa sunt：facta est pertica omnis，id est omnium territoriorum，coloniae eius in quae coloni［a］deducti sunt．ergo fit ut plura territoria confusa unam faciem limitationis accipiant．aliquibus uero auctores diuisionis reliquerunt aliquid agri，id est quibus abstulerunt，quatenus haberent iuris dictionem：aliquos intra muros cohibuerunt．itaque，ut frequenter iam nimis diximus， leges datae coloniis municipiisque intuendae erunt，nam et compluribus locis certos

[^59]I must discuss subseciva again. For the authors of the division and allocation sometimes granted subseciva to the governments of colonies; sometimes they remained in that status. But some communities, that is, the colonists, sold off the subseciva that had been given to them; some attached them to adjoining land in return for a rent; some normally lease them out for individual five-year periods, and enjoy the return through the lessees, while others lease them out for longer periods. This can be discovered from the public records.

The colleges of priests and also the Vestal Virgins have lands and territories, of which some have also been demarcated, and some reserved for certain holy rites; in them they also have groves, and sacred buildings and temples in some. With regard to these lands and the maps of these territories, I have discovered several times that they have been enclosed on their boundary edges without any measured line, although the area has been written in (on the map). ${ }^{64}$

Furthermore, when land was taken from other territories, both the subseciva and the unallocated centuriae, which had not come within the scope of the allocation, were returned to those from whose territory the lands had been taken. They then sold these off or kept them rented out, just as I discovered in the case of other communities, as I mentioned above. For not all divided land fell within the scope of the allocation, and many areas were left unallocated. The status of these areas is like that of subseciva. In respect of subseciva, Domitian resolved to end (this status), that is, he granted them to those who occupied them. ${ }^{65}$

I have pointed out that this status of subseciva came about because woods and rough ground did not come into the allocation. But I discovered that in certain regions both pasture land and woods were allocated, and that it was recorded on the maps as follows: 'to such and such, woods and pasture, so many iugera'.

Territories are demarcated between communities, that is, between municipia, and colonies, and praefecturae, sometimes by rivers, or by the tops of mountain ridges and watersheds, or even by the placing of conspicuous stones, which differ in shape from the stones used to mark private boundaries; indeed sometimes between two colonies the boundary is marked by continuous limites. If a question arises about these, that is, about territories, the laws granted to the communities are examined, that is, to colonies, and municipia, and praefecturae. I have often discovered in public records that territories are distinctively described; for the description begins to go round the territory with the names of several locations included. ${ }^{66}$

What is established is that boundaries were fixed for many municipia in the following way; when the inhabitants had been expelled, and the colonists were being settled in one chosen community, territories were confiscated from many people, as I have often mentioned above, the lands of several municipia were divided, and everything was included within one set of limites. So, in this way the colony's entire area of land \{pertica\} was created, that is, it consists of all the territories in which were installed the members of that colony. Therefore, the result is that several territories brought together receive the outline of one set of limites. But the authors of the division left some land in the hands of certain people, namely those from whom they had confiscated it, and allowed them to exercise jurisdiction over this; others they confined inside the walls of their town. ${ }^{67}$ Therefore, as I have already said very often, the laws granted to colonies and municipia will have to be examined, since in several places they
dederunt fines, intra quos iuris dictionem habere deberent. cum non potuerit uniuersus ager in assignationem cadere propter aut asperitatem locorum aut praerupta montium, quamuis excederent fines lege datos, tamen, quoniam uacabant, concessi sunt his quorum finibus sumpti erant, nec tamen iuris dictio concessa est. saepe etiam r. p. ager donatus est. si quando tamen, ut supra diximus, quaestio de his moueatur, leges coloniarum ac municipiorum respiciendae erunt.

Sed et pagi saepe significanter finiuntur: de quibus non puto quaestionem futuram, quorum territoriorum ipsi pagi sint, sed quatenus territoria. quod tamen intellegi potest uel ex hoc, magistri pagorum quod pagos lustrare soliti sunt, uti trahamus quatenus lustrarent. si uero de ipsis pagis quaestionem quis moueat, amplae rei negotium mouebitur. respiciendum tamen, ut saepe diximus, $\langle a\rangle$ quibus ex utrimque locantur. nam et quotiens militi praetereunti aliiue cui comitatui annona publica praestanda est, si ligna aut stramenta deportanda, quaerendum quae ciuitates quibus pagis huius modi munera praebere solitae sint. praeterea et regiones solent etiam diuersa sacra facere: ita uidendum erit, qualiter pagis sacra faciant.

Gracchanorum et Syllanorum limitationum mentio habenda est. in quibusdam etiam regionibus, ut opinamur, isdem lapidibus limitibusque manentibus post assignationes posteriores, duces facti sunt. quibusdam autem, limitibus institutis, alii lapides sunt positi, etiam eis manentibus, quos Gracchani aut Syllani posuerunt. de qua re diligenter intuendum erit, ut eos lapides eosque limites comprehendamus, qui postremo per auctores diuisionis positi sunt.

Praeterea cum auctores assignationis diuisionisque, non sufficientibus agris coloniarum, quos ex uicinis territoriis sumpsissent, et assignauerunt quidem futuris ciuibus coloniarum, sed iuris dictio eis agris, qui assignati sunt, penes eos remansit, ex quorum territorio sumpti erant. quod ipsud diligenter intuendum erit et leges respiciendae.

[^60]granted definite boundaries inside which they ought to exercise jurisdiction. When not all the land could fall within the scope of the allocation, because of rough terrain or precipitous mountains, even though this land went beyond the boundaries established by law (i.e. for the extent of the municipium), nevertheless, because it was unallocated it was granted to the people from whose territory it had originally been taken; but jurisdiction was not granted. ${ }^{68}$ Indeed the land was often granted to the community. If, as I said above, a question arises over these matters, the laws of the colonies and municipia will have to be consulted.

Moreover, pagi (districts) are often demarcated in a distinctive way. In their case I do not think that questions will arise over which territories the pagi themselves belong to, but over the extent of the territories. But this can be discerned for example from the fact that, because the officials of the pagi normally conduct a purification of the districts, we can accordingly draw our conclusion from the area they cover with the purification. ${ }^{69}$ But if someone raises a question about the pagi themselves, then a substantial case will be initiated. We must consider, as I have often said, by which men on both sides (i.e. in the communities in dispute) land is rented out. Furthermore, when corn has to be provided at the community's expense for a passing soldier or someone else on escort duty, or if wood or straw have to be produced, we should enquire which communities with which accompanying pagi normally provide services of this kind. ${ }^{70}$ In addition, regions normally perform different religious observances; so, we shall have to see how they perform religious observances in the pagi. ${ }^{71}$

I must mention the Gracchan and Sullan land divisions. In certain regions, in my opinion, since the same boundary stones and limites remained even after later allocations, they were made guides (for the division of the land). In other regions however, when the limites were established, other boundary stones were set in position, even though those set up by the Gracchans or Sullans survived. We shall have to consider this matter carefully so that we can apprehend those stones and those limites that were finally established by the authors of the land division. ${ }^{72}$

Moreover, since the authors of the allocation and division, when the lands of the colonies proved insufficient, had taken some lands from neighbouring territories, undoubtedly they also allocated them to the intended citizens of the colonies; nevertheless, legal jurisdiction in respect of these lands that were allocated remained under the control of those from whose territory they had been taken. ${ }^{73}$ This question will have to be carefully examined and the laws scrutinized.

## HYGINI（2）

## CONSTITVTIO 〈LIMITVM〉

Inter omnes mensurarum ritus siue actus eminentissima traditur limitum consti－ tutio．est enim illi origo caelestis et perpetua continuatio，cum quadam latitudine［m］ recturae diuidentibus ratio tractabilis，formarum pulcher habitus，ipsorum etiam agro－ rum speciosa designatio．constituti enim limites non sine mundi ratione，quoniam decumani secundum solis decursum diriguntur，kardines a poli axe．unde primum haec ratio mensurae constituta ab Etruscorum haruspicum［uel auctorum habet，quorum artificium］disciplina；quod illi orbem terrarum in duas partes secundum solis cursum diuiserunt，dextram appellauerunt quae septentrioni subiacebat，sinistram quae ad meridianum terrae esset，〈ab oriente ad〉 occasum，quod eo sol et luna spectaret； alteram lineam duxerunt a meridiano in septentrionem，et a media ultra antica［m］citra postica［m］nominauerunt．ex quo haec constitutio liminibus templorum adscribitur （Ill．65）．

Ab hoc exemplo antiqui mensuras agrorum normalibus longitudinibus incluserunt． primum duos limites constituerunt：unum，qui ab oriente in occidentem dirigeret．hunc appellauerunt duo［de］cimanum ideo，quod terram in duas partes diuidat et ab eo omnis ager nominetur．alterum a meridiano ad septentrionem；quem kardinem nom－ inauerunt a mundi kardine［m］（IIl．66）．

Duo［de］cimanum postea decimanum appellauerunt．quare a decem potius quam a duobus？sicut dipundium nunc dicimus duopondium，et quod dicebant antiqui duouiginti nunc dicimus uiginti，similiter duo［de］cimanus decimanus est factus．

Reliquos limites fecerunt angustiores，et qui spectabant in orientem prorsos，qui ad meridianum，transuersos appellauerunt（Ill．67）．limites autem appellati a limo，id est antiquo uerbo transuersi：nam et limum cinctum ideo quod purpuram transuersam habeat，item limina ostiorum．postea et prorsos et transuersos limites appellauerunt a liminibus，quod per eos agrorum itinera seruentur．postea apud quosdam nomina a loci natura acceperunt，et qui ad mare spectant maritimi appellantur，qui ad montem， montani（Ill．68）．omnis ergo huius［mensurae et］recturae longitudo rationaliter limes appellatur：nec interest quicquam，decimanum aut limitem dicamus．

Decimanus autem primus maximus appellatur，item kardo：nam latitudine ceteros praecedunt．alii limites sunt actuarii，atque alii linearii．actuarius limes est，qui primus actus est，et ab eo quintus quisque；quem si numeres cum primo，erit sextus，quoniam

## HYGINUS (2) ${ }^{1}$

## THE ESTABLISHMENT OF $\langle$ LIMITES $\rangle$

Among all the observances and practices of measurement the most distinguished handed down to us is the establishment of limites. For it has its origin in the heavens and its legacy is timeless; it has a system that is easy to use for those dividing land, being associated with a specified width for straight line boundaries; the appearance of the maps is beautiful and the marking out of the fields themselves is attractive. For limites are established on a principle not unassociated with cosmology, since the decumani are aligned according to the course of the sun, the kardines from the axis of the earth. So, in the first place this practice of measuring was established by the learning of Etruscan soothsayers. They divided the world into two parts according to the course of the sun, and called 'right' the area lying towards the north, and 'left' the area lying in the southern part of the earth, (moving) 〈from east to $\rangle$ west, because the sun and moon face that way. They drew another line from south to north, and called what was beyond this (taken as a middle line), antica (front part), and what was on the near side, postica (rear part). Therefore, this same arrangement (i.e. a representation of it) is ascribed to the entrances of temples. ${ }^{2}$

On this pattern the ancients enclosed measured areas of land with right-angled lengths. Firstly they laid out two limites: one was drawn from east to west and this they called the duocimanus because it divides the earth into two parts and all land is named after it; the other was drawn from south to north and this they called the kardo, after the hinge of the world.

The duocimanus they afterwards called the decimanus (decumanus). Why was it named from ten $\{$ decem $\}$ rather than two \{duo\}? Just as we now refer to dipundium as duopondium (two asses or two feet), and what the ancients called duoviginti we now call viginti, so in the same way duocimanus became decimanus. ${ }^{3}$

They made the remaining limites narrower and called those facing east prorsi (straight ahead), those facing south transversi (transverse). Indeed limites got their name from limus, that is the old expression for 'transverse'; consequently the garment limus cinctus is so named because it has a purple stripe running across it; we may also note thresholds \{limina\} of doorways. Afterwards they named straight ahead and transverse limites from limina, because through them rights of way to fields are preserved. Later, in some authors, they got names from topography, and those facing the sea are called 'maritime', those facing a mountain 'upland'. ${ }^{4}$ Every length of a straight line of this type is correctly called a limes, and it does not matter at all whether we say decumanus or limes.

The first decumanus is called the largest \{maximus\}, and similarly the first kardo. For they are wider than the others. Some limites are actuarii, and some are linearii. The limes actuarius is the one that is laid out first, and after it every fifth limes, which,
quinque centurias sex limites cludunt (Ill. 69). reliqui medii limites linearii appellantur, in Italia subrunciui. actuarii autem, extra maximos decimanum et kardinem, habent latitudinem ped. xiI. per hos iter populo sicut per uiam publicam debetur: id enim cautum est lege Sempronia et Cornelia et Iulia. quidam ex his latiores sunt quam ped. xII, ut hi qui sunt per uiam publicam militarem acti: habent enim latitudinem uiae publicae. linearii limites a quibusdam mensurae tantum disterminandae causa sunt constituti, et si finitimi interueniunt, latitudinem secundum legem Mamiliam accipiunt. in Italia etiam itineri publico seruiunt sub appellatione subrunciuorum: habent latitudinem ped. viII. hos conditores coloniarum fructus asportandi causa publicauerunt. nam et possessiones pro aestimio ubertatis angustiores sunt adsignatae: ideoque limites omnes non solum mensurae sed et publici itineris causa latitudines acceperunt (Ill. 70).

Secundum antiquam consuetudinem limites diriguntur. quare non omnis agrorum mensura in orientem potius quam in occidentem spectat. in orientem sicut aedes sacrae. nam antiqui architecti in occidentem templa recte spectare scripserunt: postea placuit omnem religionem eo conuertere, ex qua parte caeli terra inluminatur. sic et limites in orientem constituuntur (III. 71).

Multi ignorantes mundi rationem solem sunt secuti, hoc est ortum et occasum, quod is semel conprehendi ferramento non potest. quid ergo? posita auspicaliter groma, ipso forte conditore praesente, proximum uero ortum conprehenderunt, et in utramque partem limites emiserunt, quibus kardo in horam sextam non conuenerit (Ill. 72). et quidam, ne proximarum coloniarum limitibus ordinatos limites mitterent, relicta caeli ratione mensuram constituerunt, qua tantum modus centuriarum et limitum longitudo constaret (Ill. 73). quidam agri longitudinem secuti: et qua longior erat, fecerunt decimanum (IIl. 74). quidam in totum conuerterunt, et fecerunt decimanum in meridianum et kardinem in orientem, sicut in agro Campano qui est circa Capuam (IIl. 75).

Modum autem centuriis quidam secundum agri amplitudinem dederunt; in Italia triumuiri iugerum quinquagenum, aliubi ducenum; Cremonae iugerum CCX ; diuus Augustus in Veturia Emeritae iugerum CCCC, quibus diuisionibus decimani habent longitudinis actus XL, kardines actus Xx , decimanus est in orientem (Ill. 76).

Quibusdam deinde coloniis perticae fines, hoc est primae adsignationis, aliis limitibus, aliis praefecturae continentur. in Emeritensium finibus aliquae sunt praefecturae, quarum decimani aeque in orientem diriguntur, kardines in meridianum: sed in praefecturis Mullicensis et Turgaliensis regionis decimani habent actus xx, kardines actus XL (IIl. 77). nam et in alia praefectura aliter conuersi sunt limites, ut habeant in aeris inscriptionibus inter limitem nouum et ueterem iugera forte cxx: haec sunt alterius partis subsiciua (Ill. 78).

[^61]if you count inclusively, will be the sixth, since six limites mark off five centuriae. ${ }^{5}$ The remaining intermediate limites are called linearii, or subruncivi in Italy. The actuarii, apart from the decumanus maximus and kardo maximus, are twelve feet wide. Along these, just as along a public highway, a right of way is required for the people; this is provided for by the Sempronian, Cornelian, and Julian laws. Some of these are wider than twelve feet, for example, those established along the line of a public military road; they have the width of the public road. Limites linearii have been drawn by some surveyors merely for the purpose of fixing a boundary, and if there are neighbouring landholders on each side, they have a width according to the provisions of the Lex Mamilia. ${ }^{6}$ In Italy they also serve as public rights of way, under the name subruncivi, and have a width of eight feet. The founders of the colonies made these into public roads for the transport of farm produce. Moreover, some smaller landholdings were allocated on the basis of an assessment of their fertility. So, all limites were given a width not only for the purpose of conducting a survey, but also to serve as a public right of way.

Limites are aligned according to the practice of ancient times. Therefore not every land measurement system faces east rather than west. 'Facing east' means in the sense of the orientation of sacred buildings. Now, architects in ancient times wrote that templa correctly faced west. Later on it was decided to make every religious building face that part of the sky from which the earth is lit up. So, limites too are established to face east.

Many surveyors, being ignorant of the principles of the universe, have followed the sun, that is its rising and setting, although this cannot be sighted once and for all by the ferramentum. What takes place then? When the groma had been positioned after the taking of the auspices, perhaps in the presence of the very founder himself, they sighted the next sunrise, and established limites in both directions; but in this system the kardo did not tally with the sixth hour (i.e. did not face due south). And some, so as not to establish limites aligned with those of neighbouring colonies, abandoned the system based on the cardinal points of the heavens, and adopted a measurement system in which only the area of the centuriae and the length of the limites tallied (with the usual procedure). Some have been influenced by the length of the land, and in the direction where it was longer, laid out the decumanus. Some have reversed everything, and have made the decumanus face south and the kardo east, as in the Campanian land, in the vicinity of Capua. ${ }^{7}$

Some people established an area for the centuriae based on the extent of the land. In Italy the triumvirs (normally) had centuriae containing 50 iugera, elsewhere of 200 iugera; at Cremona they contained 210 iugera; the divine Augustus established centuriae of 400 iugera in Baeturia at Emerita (Mérida); in these land divisions the decumani are 40 actus in length, the kardines 20 actus; the decumanus faces east. ${ }^{8}$

Then, in some colonies, the boundary of the divided area, that is, the first allocation of land, is enclosed within one set of limites, while the praefecturae are enclosed within another set. In the territory of Emerita there are several praefecturae whose decumani likewise face east, the kardines south. But in the praefecturae of the regions of Mullica and Turgalium, ${ }^{9}$ the decumani have 20 actus, the kardines 40 . For in different praefecturae the limites have been differently oriented. Consequently, in the inscriptions on the bronze map they may have the phrase "between the new and the old limes', say, '120 iugera'; these are the subseciva of the other area.

Hae deinde agrorum diuisiones lapidum inscriptionibus tam uariis continentur quam et limitum actibus．alii uertices，alii latera，regionibus suis obsecundant〈es〉，multi tantum decimani maximi et kardinis lapides inscripserunt，reliquos sine inscriptione ad parem posuerunt；quos ideo quod nulla significatione appareat，a quoto loco numer－ entur，mutos appellant．diuus Augustus in adsignationibus suis numero limitum inscriptos lapides omnibus centuriarum angulis defigi iussit：nam locatione operis huius non solum quod ad publicos limites pertineret iniunxit，uerum etiam inter accep－ tas ne robore $i$ deessent termini cauit．inscripserunt quidam uertices lapidum et limi－ tum tantum numerum significauerunt；alii ipsarum centuriarum，sic quem ad modum qui in lateribus inscripserunt．〈a〉ut in uertice lapides sic inscripserunt，quem ad modum in decimano maximo et in kardine solet（IIl．79）：sic et ulteriores secundum numer〈or〉um suorum postulationem inscripserunt．uoluerunt autem limites inscrip－ tionibus claudi ita，ut cuius centuriae essent lapides intelligere［n］tur．sic quoque haec inscriptio obscura est．lapis autem in regione s．et $u$ ．hac ratione sic inscribitur［que－ madmodum supra］；quarta enim illi lapidi portio clusaris uacat ab inscriptione；est ergo talis inscriptio s．d．u．k（Ill．80）．in regione dextra et ultra 〈e〉idem numeri sic inscribuntur．［sic et］in regione sinistra et citra，in regione dextra et citra eidem numeri sic inscribuntur．comparemus nunc omnes quattuor lapides in unum，et intueamur eorum quartas partes uacantes，quae in suis regionibus centurias litteris intra cludunt （Ill．81）．sic et in suo interuallo distantes centurias his inscriptionibus cludunt．inspici－ amus a maximo decimano et kardine［singulorum］lapidum inscriptiones（Ill．82）．lat－ era autem lapidum recte inscribuntur，quoniam ampliores numeros capiunt；nam［in］ uerticibus inscribi non facile［omnia］possunt．inscribitur［enim］lateribus D．D． LXXXXVIII V．K．LXXV．quae inscriptio si ratione ponatur，est optima；licet et quo－ modo cumque inscripta sit，perito mensori non latebit，quoniam certus est lapis，quo centuria cluditur（Ill．83）．

Multos limitum constitutiones in errorem deducunt，dum aut inscriptionem parum intellegunt aut aliter limites numerant．uolunt esse quidam decimanum alium primum，alium maximum：et cum exierunt a decimano maximo，peractis centuriae actibus primum limitem numerant qui est secundus．deinde ad agrum de quo agitur cum perueniunt，nouam controuersiam inueniunt et de aliis quam de quibus agitur acceptis litigant，dum uolunt esse primos decimanos duos et duos kardines．hoc si esset，inter decimanum maximum et quem uolunt primum et centuria aliter appella－ retur：forte diceretur＇inter decimanum maximum et primum＇．sed quoniam is ipse

Moreover, these land divisions are covered by inscriptions on stones, which are as multifarious as the number of actus in limites. Some (surveyors) have inscribed the tops, others the sides of the stones, falling in with the practice of their own regions; many have inscribed only the stones indicating the decumanus maximus and the kardo maximus, setting up the others by analogy but without inscriptions. They call these 'mute' since there is no indication to show from which source they might be numbered. The divine Augustus in his land allocations ordered that stones inscribed with the number of the limites should be placed at all corners of centuriae. In the contracting out of this task he not only gave instructions concerning public limites, but also took care that between holdings there should be no lack of wooden boundary markers. ${ }^{10}$ Some have inscribed the tops of the stones, noting only the number of the limites. Others have inscribed the number of the actual centuriae, in the way in which those who inscribed the sides of stones (have done). Or they inscribed the tops of stones, in the same way as is usually done in the case of the decumanus maximus and the kardo maximus; similarly they have inscribed more distant stones according to the demands of their numbering system. Their intention was that the limites should be marked off with inscriptions in such a way that one could understand to which centuria the stones belonged. Yet even this kind of inscription is ambiguous. Now, a stone positioned to the left (of the decumanus) and beyond (the kardo) should be inscribed in the following way; this stone's fourth side, the closing one \{clusaris\} is left free from an inscription; so this kind of inscription reads: S. D. V. K. In the area to the right (of the decumanus) and beyond (the kardo), the same details are inscribed in the way specified. In the area to the left (of the decumanus) and on the near side (of the kardo), and in the area to the right (of the decumanus) and on the near side (of the kardo) the same details are inscribed in the way specified. Let us now compare all four stones together, and examine their fourth parts, which have been left uninscribed, and which in their own areas close centuriae internally with letters (i.e. inscriptions). It is in this way that they also close distant centuriae in their allotted space by these inscriptions. Let us look at the inscriptions on the stones, starting from the decumanus maximus and the kardo maximus. It is correct that the sides of the stones should be inscribed, since these can accommodate longer numbers, which cannot easily be written on the tops. So, we inscribe on the sides: D. D. (to the right of decumanus) LXXXXVIII V. K. (beyond kardo) LXXV. This inscription, if properly placed, is absolutely right; though in whatever way it is written it will not mislead a skilled surveyor, since the stone with which a centuria is closed, is definite. ${ }^{11}$

The establishment of limites confuses many people, either because their understanding of the inscriptions is inadequate, or because they count the limites differently. For some hold that the first decumanus is distinct from the decumanus maximus. So, when they have started from the decumanus maximus, having completed (the measurement of) the actus of the centuria, they count as the first limes the one that is in reality second. Then, when they reach the piece of land at issue, they start a fresh dispute by involving in a law-suit holdings different from those really involved, because they argue that there are two first decumani and two first kardines. However if this were true, the centuria, between the decumanus maximus and the one they call the first decumanus, would have a different name. For example it might be called 'between the decumanus maximus and the first'. But since the first decumanus is also the decumanus
primus est qui et maximus, continuo a decimano maximo et kardine centuria inscribitur D. D. I V. K. I, et S. D. I V. K. I, et D. D. I K. K. I, et S. D. I K. K. I. erit ergo nobis is primus qui et maximus (Ill. 84). sed et de limitibus quintariis quintum quemque quintarium uolunt. porro autem inter quintum et quintarium interest aliquid: quintus est qui quinto loco numeratur, quintarius qui quinque centurias cludit. hunc uolunt esse quintum, qui est sextus. nam et legum lat $\langle i\rangle$ onibus, quem admodum perlatum est, sic cauerunt, [ut] 'a decimano maximo quintus quisque spatio itineris ampliaretur' (Ill. 85). erat sane interpretatio legis huius ambigua, nisi eorum temporum formae sextum quemque limitem latiorem haberent significatione qua solent minores. tractemus nunc diligentius quid dixerint. A DECIMANO MAXIMO QVINTVM QVEMQVE LATIOREM. a decimano: quoniam decimanus erat, positi sunt deinde quinque limites, quorum nouissimus factus est latior; his quom decimanus accessit, sex fiunt (Ill. 86). eandem obseruationem et in reliqua limitum parte esse uoluerunt: quem ad modum a decimano maximo quinque limites ducebantur, quorum esset summus latior, sic et ab eo quintario, cui iam spatium definitum erat, quinque adiectis limitibus summo latitudinem suam seruari placuit (Ill. 87).

Quem ad modum ab antiquis acti sint limites, tractare coepimus: itaque persequi omnia non alienum iudico. foeda est enim culpa neglegentiae, cum de constitutione disputemus, praeterire tot operum exemplaria.

Finitis ergo ampliorum bellorum operibus, augendae rei publicae causa inlustres Romanorum uiri urbes constituerunt, quas aut uictoribus populi Romani ciuibus aut emeritis militibus adsignauerunt et $a b$ agrorum noua dedicatione culturae colonias appellauerunt. uictoribus autem adsignatae coloniae his qui temporis causa arma acceperant: non enim tantum militum incremento r(ei) p(ublicae) p(opulus) $R$ (omanus) habuit; erat tunc praemium terra et pro emerito habebatur. multis legionibus contigit bella feliciter transigere et ad laboriosam agri culturae requiem primo tirocinii gradu peruenire: nam cum signis et aquila et primis ordinibus ac tribunis deducebantur, modus agri pro portione officii dabatur. ferunt quidam postea indictum modum belli, et expleta centesima hostium congressione ad colendarum deductos terrarum agros. diuus Iulius, uir acerrimus et multarum gentium domitor, tam frequentibus bellis militem exercuit, ut dum uictorias numeraret, congressionum multitudinem obliuisceretur. nam milites ultra stipendia emerita detinuit, recusantes deinde ueteranos dimisit, mox eosdem ipsos ueniam commilitii rogantes recepit, et post aliquot bella parta iam pace deduxit. aeque diuus Augustus [in] adsignata orbi terrarum pace
maximus, immediately from the decumanus maximus and the kardo maximus a centuria is inscribed D. D. I (to the right of decumanus I) V. K. I (beyond kardo I), and S. D. I (to the left of decumanus I) V. K. I (beyond kardo I), and D. D. I (to the right of decumanus I) K. K. I (on the near side of kardo I), and S. D. I (to the left of decumanus I) K. K. I. (on the near side of kardo I). Therefore for us the first decumanus and the decumanus maximus will be identical. But in respect of limites quintarii, they also hold that every fifth limes is a quintarius. But there is a difference between the fifth and the quintarius; quintus is the limes that is counted fifth, whereas the quintarius is the limes that encloses five centuriae. So, they are claiming as the fifth limes one that is in reality sixth. Moreover in legislation, as it was passed, it was provided that 'from the decumanus maximus every fifth limes should be widened to the breadth of a path'. ${ }^{12}$ It is true that the interpretation of this law was ambiguous (or would be), if the maps of those days did not show every sixth limes as wider, on the basis of the designation (inclusive counting), which the later age now accepts. Let us now look more carefully at what they actually said: 'from the decumanus maximus every fifth one wider'. 'From the decumanus'; since it was the decumanus, five limites were then established of which the last was made wider; when the decumanus was added to these, it made a total of six. They wanted the same practice to apply to the rest of the land division; in the same way as from the decumanus maximus five limites were laid out, of which the last was wider; so, from that quintarius, which already had a defined width, they decided that a further five limites should be added, and that for the last, its own width (i.e equal to the first quintarius) should be maintained. ${ }^{13}$

We have begun to discuss how the ancients established limites, and so I consider it not out of place to examine everything. For it would be outrageously neglectful, since we are discussing the establishment of limites, to omit so many examples of work.

When the toil associated with extensive wars had finally been brought to an end, distinguished Romans founded cities to enlarge the Roman state, assigning them either to victorious citizens of the Roman people, or to discharged soldiers, and called them colonies since these lands were newly given over to cultivation \{cultura; colere\}. Colonies were allocated to the victorious people who had taken up arms in an emergency. For the Roman people did not have enough soldiers for the development of the state; at that time, land was a prize and was considered a reward for service. It happened that many legionaries successfully brought the wars to an end, and from their first rank in military service reached a hard working life of peace and quiet in cultivating the fields. When they were settled along with their standards, eagle, centurions, and tribunes, an amount of land was allocated in proportion to the rank that they had held. Some claim that later a limit was set for the fighting, and that after one hundred encounters with the enemy, the soldiers were settled on cultivable land. The divine Julius Caesar, a very energetic man and the conqueror of many peoples, kept his soldiers busy in so many wars that, although he counted up his victories, he forgot the large number of encounters. He kept his soldiers on after they had served their time, then dismissed the veterans when they balked at this; but soon, when these very soldiers asked for forgiveness in the form of being allowed to share his military service again, he took them back, and after several wars, when peace had been estab-
exercitus，qui aut sub Antonio aut Lepido militauerant，pariter et suarum legionum milites colonos fecit，alios in Italia，alios in prouinciis：quibusdam deletis hostium ciui－ tatibus nouas urbes constituit，quosdam in ueteribus oppidis deduxit et colonos nom－ inauit．illas quoque urbes，quae deductae a regibus aut dictatoribus fuerant，quas bellorum ciuilium interuentus exhauserat，dato iterum coloniae nomine numero ciuium ampliauit，quasdam et finibus．ideoque multis regionibus antiquae mensurae actus in diuersum nouis limitibus inciditur：nam tetrantum ueterum lapides adhuc parent．sicut in Campania finibus Minturnensium；quorum noua adsignatio trans fluuium Lirem limitibus continetur：citra Lirem postea adsignatum per professiones ueterum posses－ sorum，ubi iam opportunarum finium commutatione relictis primae adsignationis ter－ minis more arcifinio possidetur（IIl．88）．

Multis ergo generibus limitum constitutiones inchoatae sunt．quibusdam coloniis kardo maximus et decimanus non longe a ciuitate oriuntur．nam in proximo esse debe $\langle\mathbf{n}\rangle \mathrm{t}$ ，immo，si fieri potest，ex ipsa colonia inchoari：sed quo［nia］m uetusta municipia in ius coloniae transferuntur，stantibus iam muris et ceteris moenibus lim－ ites primos nisi a foris accipere non possunt（Ill．89）．

Multi facilitatem agri secuti：et ubi plurimum erant adsignaturi，ibi decimanum maximum et kardinem constituerunt．antiqui enim propter subita bellorum pericula non solum erant urbes contenti cingere muris，uerum etiam loca aspera et excelsa saxis eligebant，ubi illis maximum propugnaculum esset et ipsa loci natura．haec uicina urbibus rupium multitudo limites accipere propter loci difficultatem non potuit，sed relicta est，ut aut siluas rei publicae praestaret，aut，si sterilis esset，uacaret．his urbibus，ut haberent coloniarum uastitatem，uicinarum ciuitatium fines sunt adtributi， et in optimo solo decimanus maximus et kardo constituti；sicut in Vmbria finibus Spellatium（Ill．90）．

Quibusdam coloniis decumanum maximum ita constituerunt，ut uiam consularem transeuntem per coloniam contineret；sicut in Campania coloniae Axurnati．decimanus maximus per uiam Appiam obseruatur：fines qui culturam accipere potuerunt，et lim－ ites acceperunt：reliqua pars asperis rupibus continetur，terminata in extremitate more arcifinio per demonstrationes et per locorum uocabula（Ill．91）．

Quibusdam coloniis postea constitutis，sicut in Africa Admederae，decimanus maximus et kardo a ciuitate ori〈un〉tur et per quattuor portas in more $\langle\mathrm{m}\rangle$ castrorum ut uiae amplissimae limitibus diriguntur．haec est constituendorum limitum ratio pul－ cherrima．nam colonia omnes quattuor perticae regiones continet et est colentibus uic－ ina undique，incolis quoque iter ad forum ex omni parte aequale．sic et in castris groma ponitur in tetrantem，qua uelut ad forum conueniatur（Ill．92）．
been imposed throughout the world, settled as colonists the armies who had served under Antony and Lepidus, along with the men of his own legions, some in Italy, others in the provinces. For some of these he founded new cities after enemy settlements had been wiped out; in other cases he settled soldiers in previously existing towns and called them colonists. Moreover, cities that had been founded by kings or dictators, and that the occurrence of the civil wars had drained of manpower, he re-founded as colonies and increased their population, and in some cases their territory. So, in many regions the alignment of the old measurement system is cut across by the new limites on a different orientation; in fact, stones marking the old cross-roads are still visible. There is an example in Campania in the territory of Minturnae. Here the new allocation is marked out by limites on the other side of the river Liris. On the near side of the river Liris, a later allocation was made on the basis of statements made by the previous landholders. Here, after an exchange of suitable holdings opportunely available, the boundary markers of the first allocation were left in place, and the land is possessed like ager arcifinius (i.e. without a survey). ${ }^{15}$

So, the establishment of limites has been begun in many different ways. In some colonies the kardo maximus and the decumanus maximus begin not far from the town. They ought to be close; indeed, if possible, they ought to start from the colony itself. But previous municipia, when their status is changed to that of colony, if the city walls and other buildings are still intact, cannot avoid receiving their first limites from outside (the town). ${ }^{16}$

Many (surveyors) have followed the principle of ease of land management, in that they established the decumanus maximus and the kardo maximus where they were going to make most of their allocations. Men of old, because of the danger of sudden outbreaks of war, were not satisfied with building walls round their cities, but also chose sites in rough and rocky high ground, where their best defence lay in the very topography of the site. Very many of these precipitous areas adjacent to cities were not suitable for limites because of difficulties of terrain, and were left (outside the land division), either to provide woods for the community, or, if they were barren, to lie unoccupied. The territory of neighbouring communities was granted to these cities, so that they could have an extent of land appropriate for a colony, and the decumanus maximus and kardo maximus were drawn on the best land, as for example in Umbria in the territory of Hispellum. ${ }^{17}$

In some colonies they laid out the decumanus maximus so that it contained the highway \{via consularis\} running through the colony, for example, in Campania in the colony of Anxur (Tarracina). The decumanus maximus is seen along the Via Appia. Land capable of cultivation has received limites; the remainder is surrounded by rocky crags, and its outer boundary is demarcated in the fashion of ager arcifinius by landmarks and place names. ${ }^{18}$

In some colonies that were established later, for example, Ammaedara (Haïdra) in Africa, the decumanus maximus and the kardo maximus start from the town and are drawn on limites through the four gates as in the case of a military camp, like wide roads. This is the most attractive system of establishing limites. The colony embraces all four areas of the allocated land and is close to the farmers on every side, and all the inhabitants have equal access to the forum from all directions. Similarly in military

Hanc constituendorum limitum rationem seruare debebimus, si huic postulationi uel locorum natura suffragabit. saepe enim propter portum colonia ad mare ponitur. cuius fines aquam non possunt excedere, hoc est litore terminantur; et cum sit colonia ipsa in litore, fines a decimano maximo et kardine in omnes quattuor partes aequaliter accipere non potest (Ill. 93). quaedam propter aquae commodum monti applicantur; quarum aeque decimanus maximus aut kardo relictis locis interciditur ita, si trans montem coloniae fines perducuntur (Ill. 94). multas colonias et ipsi montes finiunt; propter quod quattuor regionibus aequaliter pertica non potest diuidi, sed in alteram partem tota limitum rectura seruetur (Ill. 95).

Itaque si loci natura permittit, rationem seruare debemus: sin autem, proximum rationi; non quo minus aliquid de finibus fiat aut amissionis periculum habeat: si aliter egerimus, mensura sua uni cuique constabit, decimani suo nomine appellabuntur, tantundem kardines, fines terminis obligabuntur, nihil operi deerit nisi ratio, habebit tamen inter professores existimationem. nam nec illis coloniis hoc nomine quicquam iniuriae factum est, quod kardines loco decimanorum obseruantur, decimani loco kardinum: omnis limitum $\operatorname{co}\langle\mathrm{n}\rangle$ nexio rectis angulis continetur, extremitas mensuraliter obligata est, nihil res publica, nihil possessor de finibus queritur; constat illis ratio mensurae, limitum ratio non constat, et potest dici mensura orbis alterius aut certe sinistra, hoc est inuersa. cum ipsa kardinum appellatio a kardine mundi nominetur, quare ab oriente in occidentem dirigatur, nulla est ratio. quid ergo? licet exitum decimanus maximus non habeat oppositis montibus aut mari, habeat tamen rationem, et ab eo in eam partem qua defecerit aeque suo interuallo centuriae nominentur (IIl. 96).

Quaerenda est ergo huius rationis origo. multi ita ut supra diximus solis ortum et occasum conprehenderunt, qui est omni tempore mobilis nec potest secundum cursum suum conprehendi, quoniam ortus et occasus signa a locorum natura uarie ostenduntur. sic et limitum ordinatio hac ratione conprehensa semper altera alteri disconuenit. hos qui ad limites constituendos hac ratione sunt usi, fefellit mundi magnitudo, qui [se] ortum et occasum peruidere crediderunt: aut forte scierunt errorem et neglexerunt, ei contenti tantum regioni ortum et occasum demetiri. immo contendisse feruntur ortum eum esse singulis regionibus, unde primum sol appareat, occasum, ubi nouissime desinat: hactenus dirigere mensuram laborauerunt. quid quod nec illa ipsa regione solis conspectus recte potest deprehendi, nisi aequalibus ab ortu et occasu diastematibus ferramentum ponatur; quod in qua parte sit scire difficile est, quoniam in diuersis orbis terrarum partibus mensurae aguntur. et illa ipsa regione, $\langle\mathrm{si}\rangle$ sit illi

We should keep to this system of establishing limites，if the nature of the locality is at any rate favourable to this requirement．In fact，in order to have a port，a colony is often situated on the sea shore．Its territory cannot go beyond the sea，that is，it is bounded by the shore．Now，since the colony itself is on the shore，it cannot have its land laid out equally in all four areas from the decumanus maximus and the kardo maximus．Some colonies are situated close to a mountain because of the benefit of a water supply．In this case too，either the decumanus maximus or the kardo maximus is cut short by areas left outside（the land division），if the land of the colony extends across a mountain．Many colonies are actually bounded by mountains，and because of this their land cannot be divided equally in all four directions；instead the entire layout of the limites will be confined to one direction．${ }^{20}$

So，if the nature of the locality permits，we ought to follow the system（of land division discussed above）；but if not，we ought to stick as closely as possible to our system，but not simply to prevent anything happening to the boundaries，or the dan－ ger of loss．If we act otherwise，each individual will have his own measurements，the decumani will be called by their proper name，similarly the kardines，the land will be bounded by markers，and nothing will be lacking except a system in the work，which will still have a standing among experts．For，in those colonies where the kardines are marked in place of the decumani，and the decumani in place of the kardines（i．e．the decumani run north－south，the kardines east－west），no damage has been caused on this account；the entire layout of the limites is enclosed by right angles，the outer bound－ ary has been enclosed by a measured line，and neither the community nor individual landholders make any complaint about boundaries．They agree on the system of mea－ surement，but not on the system of limites，and we can describe it as the measurement system of another world，or indeed definitely reversed，that is，the opposite way round．${ }^{21}$ Since the very name of the kardines is taken from the hinge $\{$ kardo $\}$ of the world，there is no basis for its running from east to west．Well then？Even if the decumanus maximus has no outlet because mountains or sea block its path，neverthe－ less it should have a system，and the centuriae should be named（i．e．given their num－ ber and designation in the system）starting from it in their regular sequence up to the place where it fades out．

We must therefore discover the origins of this system．Many，as I said above，have sighted the rising and setting of the sun；but the sun is continually on the move and cannot be sighted merely in terms of its own course，since the indications of its rising and setting appear in different ways according to the topography of the localities．So， an arrangement of the limites based on this system is always unsuitable elsewhere．${ }^{22}$ Those（surveyors）who have employed this system of establishing limites have been deceived by the size of the world，since they believed that they were seeing the whole pattern of the rising and setting of the sun．Or perhaps they recognized their mistake but ignored it，being satisfied to calculate the rising and setting only for that region． Indeed they are said to have argued that the sun rises in those individual regions from which it first appears，and sets in those regions where it finally disappears；so，on this basis they struggled to fix the measurement．But not even in that one region can the sighting of the sun be correctly accomplished，unless the ferramentum is set up equi－ distant from sunrise and sunset．It is difficult to discover where this place is，since sur－
forte ex altera parte campus per multa milia, mons ex altera et propior ferramento, necesse est ex illa parte apertiore sol longius conspiciatur, ex hac deinde, qua mons inminet, parere cito desinat. et si kardo a monte non longe nascatur siue decimanus, quomodo potest cursus conprehendi recte, cum ferramento sol occiderit et trans mon- tem sol adhuc luceat et eisdem ipsis adhuc campis in ulteriore parte resplendeat? (Ills 97, 98).

Quaerendum est primum quae sit mundi magnitudo, quae ratio oriundi aut occidendi, quanta sit mundo terra. aduocandum est nobis gnomonices summae ac diuinae artis elementum: explicari enim desiderium nostrum ad uerum nisi per umbrae momenta non potest. ortum enim aut occasum ne ab extrema quidem parte orbis terrarum peruidere quisquam potest, cum a sapientibus tradatur terram punctum esse caeli et infra solem amplo diastemate spiritum sumere. nam et Archimeden, uirum praeclari ingenii et magnarum rerum inuentorem, ferunt scripsisse, quantum arenarum capere posset mundus, si repleretur. credamus ergo illum diuinarum rerum magnitudinem ante oculos habuisse. qua ratione, dicamus, tot saeculis unus mortalium hoc scire potuerit? unus propter hoc laborauit et per incrementa umbrarum deprehendit.

Caeli autem punctum terram esse [certam] sic describunt, quod dicant a polo ad Saturni circulum interuallum esse quod Graeci hemitonion appellant; a Saturno deinde ad Iouem hemitonion; ab hoc deinde ad Martem tonon; a Marte deinde ad solem ter tantum esse quantum a polo ad Saturnum, hoc est trihemitonion; a sole deinde tantum esse ad Venerem, quantum a Saturno ad Iouem, hemitonion; a Venere deinde ad Mercurium hemitonion; a Mercurio deinde ad lunam tantundem, hemitonion; a luna ad terram tantum quantum a polo ad Iouem, tonon. sic terram punctum caeli esse ostendunt: nam et ars musica per haec diastemata constare fertur (Ill. 99).

Solem autem ampliorem aliquot partibus quam terram describunt, et quod palam est ab eo inluminari diem, noctem esse in dimidium ipsius terrae obumbrationem. polum ipsum quinque circulis diuidunt in sex partes. sicut ait Vergilius:
> quinque tenent caelum zonae. quarum una corusco semper sole rubens et torrida semper ab igni. quam circum extremae dextra laeuaque trahuntur caeruleae, glacie concretae atque imbribus atris. has inter mediamque duae mortalibus aegris munere concessae diuum, et uia secta per ambas, obliquus qua se signorum uerteret ordo.

Quinque ergo circulis haec nomina adsignant. summum, frigidissimae partis finem, septentrionalem appellant; secundum $a b$ eo solistitialem; $a b$ hoc deinde qui medium polum diuidit, aequinoctialem, quod in eum sol diei et noctis horas aequet. ab hoc deinde qui est aequinoctiali proximus, brumalem appellant: nam et solistitiali
in one location a plain stretching for many miles, and in another a mountain which is closer to the ferramentum, it is inevitable that from the more open location the sun is visible to him (the surveyor) for longer, while from the other, over which the mountain looms, it quickly ceases to be visible. If the kardo or decumanus originates not far from the mountain, how can the course (of the sun) be sighted properly, if the sun has set on the ferramentum, but is still shining beyond the mountain and beaming down on the very same plain in the more distant area?

We must first discover the size of the world, the explanation of sunrise and sunset, and the amount of land in the world. We must call upon an aspect of the lofty and divine science of sundials \{gnomonice $\}$. For our desire to find the truth cannot be realized except by means of the movements of a shadow. For no one, not even from the furthest part of the world, can see the whole pattern of sunrise and sunset, since scholars have reported that the earth is a point in the heavens, and exists a great distance below the sun. Moreover, men say that Archimedes, a man of outstanding intellect who made many splendid inventions, wrote down how many grains of sand the universe could hold if it were filled up. Let us accept therefore that he had before his eyes the magnitude of divine achievement. How, we may well ask, was only one man over so many centuries able to understand this? One man toiled to achieve this (understanding) and came upon the solution, in the lengthening of shadows. ${ }^{23}$

Scholars define the earth as a point in the heavens by saying that from the pole to the planet Saturn is a distance that the Greeks call a hemitonion; from Saturn to Jupiter another hemitonion; from Jupiter to Mars a tonon; from Mars to the sun is three times as far as the distance from the pole to Saturn, that is, a trihemitonion; from the sun to Venus is as far as from Saturn to Jupiter, a hemitonion; from Venus to Mercury a hemitonion; from Mercury to the moon the same, a hemitonion; from the moon to earth as far as the distance from the pole to Jupiter, a tonon. In this way they demonstrate that the earth is a point in the heavens. Moreover, music is said to be based on these intervals (i.e. between the notes in the scales). ${ }^{24}$

They describe the sun as several times bigger than the earth, and because it is obvious that daylight is produced by the sun, they argue that night is the overshadowing of half of the earth itself. They divide the heavens into six parts with five zones. As Virgil says:

> Five zones bind the heavens; one of these glows fiery red with the everlasting sun; around this zone at either end, two more extend dark-hued to the right and left, transfixed in ice and pitch-black storms; within these three the frigid zones and torrid centre, two have been conceded mortals by the gods, allowing for our frailty; a path divides them both, whereon the angled line of tandem constellations may revolve. ${ }^{25}$

They assign names to the five zones as follows: the topmost zone, the boundary of the coldest part, they call septentrionalis (northern); the second after this, they call solistitialis (of the summer solstice); then after this, the zone that divides the pole in two they call aequinoctialis (of the equinox), because in it the sun makes equal the hours of day and night; then after this, the zone that comes next to aequinoctialis they
est ordinatus．septentrionali deinde se〈s＞contrarium austrinalem appellant．circulus autem zodiacus，cuius fines sol negatur excedere，ex circulo aequinoctiali ad brumalem per diagonum extenditur ita，ut meridianum circulum ex utraque parte medium secet． per hunc sol，hoc est intra，ire fertur et orbem terrarum uiginti et quattuor horis circumire．harum ferunt xximi horarum iunctarum semper unum esse interuallum：nam increscendi aut decrescendi inter ipsas horas alternam esse mutationem．hoc ipsum per umbrarum motus ostenditur．nam cum sol orbem medium conscendit，umbras omnium rerum in hoc nostro tetartemorio meridiano axi facit ordinatas．ab hoc enim exemplo sescontrariae partis，quae uidetur eisdem horis inluminari，umbra describitur （Ill．100）．dubium fortasse esset de parallelo［n］nostri tetartemorii，si secundum zodiaci circuli cursum oceanus meridianus interueniret：nam totius terrae quattuor partes mari diuiduntur，nec ultra hominibus quartae partis ire permittitur．sed quoniam oceanus meridianus subiacet circulo meridiano，quem zodiacus medium secat，apparet，inter aequinoctialem et meridianum circulum a media terra quidquid est in oriente，ultra cursum solis esse，quam regionem quidam sescontrariae partis appellant；et quidquid a media terra in occidente inter brumalem et meridianum circulum subiaceat，nostrae esse partis，si solis cursum sequamur；quoniam omnibus terris in hac parte in occi－ dentem spectantibus umbras in dextrum emittit，exceptis illis quae sunt ab Aegypti fine usque ad oceanum，qua finit circulus aequinoctialis．has terras ferunt inhabitare Arabas Indos et alias gentes．apud hos in occidentem spectantibus umbrae in sinistrum emittuntur，ex quo apparet eos ultra solis cursum positos．sicut ait Lucanus：
inuisum uobis，Arabes，uenistis in orbem， umbras mirati nemorum non ire sinistras．
nam et Aegypto medio die umbra consumitur．ex hoc ibidem mediam terrae partem esse conprehendimus（Ill．101）．

Optimum est ergo umbram hora sexta deprehendere et ab ea limites inchoare，ut sint semper meridiano ordinati：sequitur deinde ut et orientis occidentisque linea huic normaliter conueniat．primum scribemus circulum in loco plano in terra，et in puncto eius sciotherum ponemus，cuius umbra et intra circulum aliquando intret：certius est enim quam orientis et occidentis deprehendere．adtendemus quem ad modum a primo solis ortu umbra cohibeatur．deinde cum ad circuli lineam peruenerit，notabimus eum circumferentiae locum．similiter exeuntem umbram e circulo adtendemus，et circum－ ferentiam notabimus（Ill．102）．notatis ergo duabus circuli partibus intrantis umbrae et exeuntis loco，rectam lineam a signo ad signum circumferentiae ducemus，et mediam notabimus．per quem locum recta linea exire debebit a puncto circuli．per quam lin－ eam kardinem dirigemus，et ab ea normaliter in rectum decimanos emittemus：et ex
call brumalis (of the winter solstice), and it is in alignment with the zone solistitialis; then, the zone opposite the septentrionalis they call austrinalis (southern). The circle of the zodiac, the boundaries of which the sun is said not to go outside, stretches from the aequinoctialis zone to the brumalis on the diagonal, ${ }^{26}$ in such a way that it bisects the meridian line (equator) on each side. The sun is said to go across this, that is, below it, and to orbit the earth in twenty-four hours. They say that the period of these twenty-four consecutive hours is always the same, for the increase or decrease between the hours themselves is interchangeable. This very fact is shown by the movements of shadows. For when the sun has climbed to the mid-point of the heavens, it makes the shadows of everything in our quarter of the earth's surface parallel to the meridian axis. From this example in respect of the opposite area, which seems to be in daylight during the same hours, the shadow is described. ${ }^{27}$ There might perhaps be a doubt about the zone of our quarter of the earth's surface, if the southern ocean were interposed along the route of the circle of the zodiac. For the four sections of the entire earth are divided by the sea, and men who live in the fourth section are not permitted to go beyond this. But since the southern ocean lies below the meridian zone (equator) which the zodiac cuts in the middle, it seems that whatever lies in the east, as we move from the centre of the earth, between the aequinoctialis and meridian zones, is beyond the path of the sun; some people refer to this region as belonging to the section lying opposite. Whatever lies in the west, as we move from the centre of the earth, between the brumalis and meridian (equator) zones, belongs to our section, if we are following the sun's path. In all lands in this section, when people face west, the sun casts a shadow on the right, with the exception of the lands stretching from the boundary of Egypt to the ocean, where the aequinoctialis zone forms the boundary. It is said that Arabs, Indians, and other peoples inhabit these lands. Here, when people face west, shadows are cast on the left. From this it is clear that they are situated beyond the course of the sun. As Lucan says:

You, Arabs, have come into a world unknown to you, astonished that the shadows of trees did not fall on your left. ${ }^{28}$

Moreover, in Egypt at midday there is no shadow. From this fact we deduce that the mid-section of the earth is located here.

Therefore the best practice is to mark the shadow at midday (sixth hour), and begin the limites from that point, so that they are always parallel to the meridian. It follows then that the east-west line will meet this one at right angles. First we shall draw a circle on a flat area on the ground, and at the centre of the circle set up a vertical rod $\{$ sciotherum $\}$, whose shadow should at times fall inside the circle (i.e. as well as outside); this is a more reliable procedure than an attempt to work out the east-west line. We shall observe how, from the first rising of the sun, the shadow is reduced. Then when the shadow reaches the line of the circle, we shall mark that spot on the circumference. Similarly, we shall observe the shadow leaving the circle and mark (that spot on) the circumference. When we have marked the two points on the circle where the shadow entered and left, we shall draw a straight line through these two points on the circumference and mark the middle of it. We should draw a straight line from the centre of the circle to pass through this point. Along this line we shall plot the kardo, and from it at right angles we shall establish the decumani in a straight
quacumque eius lineae parte normaliter interuerterimus, decimanum recte constituemus (Ill. 103).

Est et alia ratio, qua tribus umbris conprehensis meridianum describamus. loco plano gnomonem constituemus AB , et umbras eius qualescumque tres enotabimus CDE. has umbras normaliter conprehendemus, quanta latitudine altera ab altera distent. si ante meridiem constituemus, prima umbra erit longissima: si post meridiem, erit nouissima (Ill. 104). has deinde umbras pro portione ad multipedam in tabula describemus, et sic in terra seruabimus. sit ergo gnomon AB , planitia B . tollamus umbram maximam et in planitia notemus signo C: secundam similiter in planitia notemus signo D ; sic et tertiam signo E ; ut sint in basi pro portione longitudinis suae $B E\langle B\rangle D\langle B\rangle C$. eiciamus hypotenusas ex $C$ in $A$ et ex $D$ in $A$. nunc puncto $A$ et interuallo E circulum scribamus. ordinatas deinde lineas basi, hoc est planitiae, eiciamus in cathetum ex praecisuris hypotenusarum et circumferentiae, ex F in G et ex I in K . longissimam deinde lineam GF maximae umbrae inprimemus, et ab signo $B$ notabimus GF; secundam lineam umbrae secundae, notabimus KI. deinde ex signo F et I rectam lineam eiciemus; itemque ex CD , finibus umbrarum. hae duae lineae altera alteram conpraecident signo T . eiciemus deinde rectam lineam ex T et E ; quae erit ortus et occasus. ex hac in rectum rectam lineam eiciemus, hoc est normaliter: haec erit meridiano ordinata. eisdem signis $\langle\mathrm{t}\rangle \mathrm{et}\langle$ rantem $\rangle$ ipsum constituemus, et intuebimur quattuor caeli partes, quibus limitum ordinatio hac ratione constituta omni tempore conuenit.

Si locus, in quo colonia constituitur, cultus erit, ex ipsa ciuitate maximum decimanum et kardinem incipiemus, ita si colonia ab solo constituetur. decimanum m(aximum) autem et kardinem optimi mensores agere debebunt, idem et quintarios ad singula claudere, ne quis error operi fiat, quod post amplum actum emendare sine rubore difficile est. quod si aut ferramenti uitium aut conspiciendi fuerit, uaria contemplatio in uno quintario statim paret et tolerabilem habet emendationem. subrunciui minus erroris habent periculum. hos tamen aeque diligenter agere oportet, ne quam et hi recorrigendi moram praestent (Ill. 105). multi perpetuos limites egerunt et in illa operis perseueratione peccauerunt, sicut in ueterum coloniarum finibus inuenimus, frequentius in prouinciis, ubi ferramento nisi ad interuersuram non utuntur (Ill. 106). lineam autem per metas extendemus, et per eam ad perpendiculum cultellabimus. actuarios palos suo quemque numero inscriptos inter centenos uicenos pedes defigemus, ut ad partitionem acceptarum mensura acta appareat (Ill. 107). limitibus secundum suam legem latitudines dabimus, et aperiri in perpetuum cogemus. plurimum enim agentibus praestat acti limitis perpetua rectura: ex hoc deuerti nisi per
line. Indeed, at whatever point on this line (from the centre of the circle) we project at a right angle, we shall correctly establish a decumanus. ${ }^{29}$

There is another procedure, through which by sighting three shadows we may mark the south. We shall set up a gnomon AB on level ground and note any three shadows which it casts CDE. We shall plot these shadows with the gnomon at right angles (to the ground) to discover how the shadows differ from one another in length. If we set it up before midday, the first shadow will be longest, if after midday, the last. Next we shall draw these shadows to the appropriate scale(?) on our plan, and in this way we shall preserve their layout on the ground. So, let AB be a gnomon, B the ground. Let us take the longest shadow and mark it on the ground as C ; similarly, let us mark the second on the ground as D , and the same with the third, marked E . So, on the base (i.e. the ground) there should be $\mathrm{BE},\langle\mathrm{B}\rangle \mathrm{D}$, and $\langle\mathrm{B}\rangle \mathrm{C}$, each in proportion to its length. Next let us draw a hypotenuse from C to A , and from D to A , and then with centre A and radius E , let us describe a circle. Then let us draw lines parallel to the base, that is, the ground, onto the perpendicular ( AB ), from the points of intersection of the circumference of the circle and the hypotenuses - from F onto G and from I onto K . Then we shall apply the longest line, GF, to the largest shadow, and from point B we shall mark (the length of) GF; we shall apply the second line to the second shadow and we shall mark (the length of) KI. Then from points F and I we shall project a straight line and similarly from C and D , the ends of the shadows. These two lines will intersect each other at point T. Next we shall draw a straight line from T and E . This will mark east and west. From this line we shall draw a straight line at right angles, that is, perpendicularly, which will be parallel to the meridian (i.e. north-south). With the same points of reference we shall establish the actual point of intersection, and we shall observe the four parts of the heavens, with which the layout of limites based on this system always tallies. ${ }^{30}$

If the place where a colony is being established is under cultivation, we shall begin the decumanus maximus and the kardo maximus from the town itself, and similarly if the colony is being set up from scratch. The best surveyors ought to plot the decumanus maximus and the kardo maximus, and similarly they should complete quintarii individually, in case a mistake occurs in the work that is difficult to remedy without embarrassment after much of the task has been completed. If there has been a fault in the surveying equipment or in the sighting, then a conflicting observation is immediately appárent in one quintarius and can be tolerably easily rectified. ${ }^{31}$ The subruncivi contain less risk of error. Nevertheless we must plot these with equal care, in case the need to correct these too imposes any delay. Many (surveyors) have established continuous limites and have erred by persisting in the procedure, as I discovered in the territories of the old colonies, and more frequently in the provinces, where they do not employ the ferramentum except at turns (in the boundaries). We shall lay out a straight line using surveyor's marks, and by means of that measure horizontal distances to the perpendicular. ${ }^{32}$ We shall fix wooden stakes every 120 feet to mark off actus, each of them inscribed with its own number, so that it may be clear that a survey has been carried out for the division of the holdings. We shall establish the width of the limites according to the appropriate law, and we shall insist that they remain passable for their entire length. For when a limes has been established, its con- tinuous straight line is of very great value to those conducting a survey; it is not pos-
neglegentiam non potest. cultis locis limitem sulcis optime seruabimus. prensis tamen in conspectu longinquo signis limitem agemus (Ill. 108). si uero in propinquo sint duo signa quae ex recta linea normaliter conspici possint, ut excussis longitudinibus longiorem lineam ad breuioris longitudinem signo posito aequemus, ex quo ad inter- uersuram breuioris lineae rectam lineam iniungamus, quae sit duorum signorum conspectorum lineae ordinata, ferramento explicabimus (Ill. 109). sit ergo forma conspectus ABCD . nunc ex linea primum constituta, quae est inter B et D , conspiciamus signum quod est inter B et A . prolato exiguum per rigorem ferramento normaliter paucas dictabimus metas ex signo E . prolato iterum exiguum ferramento in signum F , signum conspiciemus ita ut rigorem ex E missum secet signum G , et quicumque numeri fuerint sic obseruabimus. quomodo fuerit FE ad EG, si et FB tractabimus, erit longitudo conspectus inter BA. eadem ratione et alteram partem conspiciemus. quanto deinde longior fuerit, signo notabimus H , et ex hoc signo in B rectam lineam iniungemus, quae erit ordinata AC (Ill. 110).

Si limites post urbem constitutam inchoabimus, ex proximo decimanum maximum et kardinem incipiemus, eisque latitudinem secundum legem suam dabimus (III. 111).

Si propter locorum difficultatem prope urbem limites inchoari non poterint, tunc in ea regione, ubi adsignaturi erimus, decimanum maximum et kardinem [sic] constituemus sic, ut decimani ordinationem ortus et occasus teneant, kardines meridiani et septentrionis (Ill. 112).

Limitibus latitudines secundum legem et constitutionem diui Augusti debemus, decimano maximo pedes xL, kardini maximo pedes xx, actuariis [autem] limitibus omnibus decimanis [et] kardinibus pedes XII, subrunciuis pedes viII. limitibus omnibus in mediis tetrantibus lapides defigemus ex saxo silice aut molari aut ne deteriore, politos, in rotundum crassos pedem, in terram ne minus habeant pedes iIs, supra terram sesquipedem (Ill. 113).

Inscribendi nobis una sit ratio. hanc itaque ex omni opere certissimam eligamus, et hac potissimum utamur. decimano maximo et kardine maximo omnes lapides in frontibus inscribamus, reliquos in lateribus clusaribus. omnes enim centuriae singulos angulos habent clusares. incipiamus ergo ponere lapides a decimano maximo et kardine, inscriptione qua debet: DECIMANVS MAXIMVS. KARDO MAXIMVS: DECIMANVS MAXIMVS. KARDO TOTVS (Ill. 114). applicemus nunc singulas centurias maximo decimano siue kardini. hae omnes quattuor ternos lapides iam positos habent: sequitur ut illis unus tantum clusaris angulus uacet, hoc est singuli; quibus debebit inscribi D. D. I V. K. I, et S. D. I V. K. I, et D. D. I K. K. I, et S. D. I K.

[^62]sible to deviate from this except through carelessness. In cultivated areas we will best demarcate a limes by furrows. We shall mark out a limes when we have our markers in long range view. But if there are two markers close by, which can be seen at right angles from the straight line, we shall arrange things with the ferramentum in order that, having examined the lengths of the two lines, we may make the longer line equal in length to the shorter by positioning a marker, from which to the junction of the shorter line we may draw a straight line; and this line should be parallel to the line of the two sighted landmarks. Therefore, let the shape of the area sighted be lettered ABCD . Now, from the line which was drawn first, that is, BD , we should sight a marker (G) which is between B and A. When we have moved the ferramentum forward a little along the straight line, we shall fix a few surveyor's marks at right angles starting from the marker E . When we have again moved the ferramentum forward a little to the marker $F$, we shall sight the marker so that a line drawn from E goes through point G, and in this way we shall note the distances. So, FE:EG will be equivalent to $\mathrm{FB}: \mathrm{BA}$, if we draw FB . Using the same procedure we shall sight the other side, and mark H at the point where that line (CD) is longer (than AB ); from this point $(\mathrm{H})$ we shall draw a straight line to B . This will then be parallel to $\mathrm{AC}{ }^{33}$

If we are to establish the limites after the city has been built, we shall establish the decumanus maximus and the kardo maximus as close as possible to it, and assign them a width in accordance with the appropriate law.

If difficulties of terrain prevent the inception of the limites close to the city, then we shall establish the decumanus maximus and the kardo maximus in that area where we are going to make the allocations, so that the decumani follow the line of the rising and setting (of the sun), and the kardines the line of south and north. ${ }^{34}$

We should assign a width to the limites in accordance with the law and ordinance of the divine Augustus, 40 feet for the decumanus maximus, 20 feet for the kardo maximus, 12 feet for all the decumani and kardines comprising actuarii limites, 8 feet for subruncivi. On all limites, ${ }^{35}$ in the middle of intersections we shall set up stones made from flint or volcanic rock, or certainly of no worse quality; they should be finished, circular-shaped, one foot thick, and be set to a depth of not less than $2 \frac{1}{2}$ feet in the ground, and $1 \frac{1}{2}$ feet above ground.

We should use only one system of inscribing the stones. ${ }^{36}$ So, let us choose the following, as being the most reliable in every kind of task, and let us use it in preference to all others. We should inscribe with decumanus maximus (DM) and kardo maximus (KM) all stones on the fronts (of the centuriae, i.e. the corners on a $D M$ or $K M$ ), and inscribe the others on the faces that close centuriae. For all centuriae have a single corner that is the closing one. Therefore we should begin to position stones, starting from the decumanus maximus and the kardo maximus, with the appropriate inscription: Decumanus Maximus. Kardo Maximus: Decumanus Maximus. Kardo number such and such. ${ }^{37}$ Next we should assign individual centuriae to the decumanus maximus or kardo maximus. All these four (central) centuriae already have three stones in position; it follows that in each case they have empty only the one corner that closes the centuria; on these stones we should inscribe: D. D. I V. K. I (to the right of decumanus I beyond kardo I), and S. D. I V. K. I (to the left of decumanus I beyond kardo I), and D. D. I K. K. I (to the right of decumanus I on this side of kardo I), and S. D. I K. K. I (to the left of decumanus I on this side of kardo I). And we ought
K. I. sic et in ceteris obseruare debebimus (Ill. 115). his angulis lapides defigamus, quibus centuriarum appellationes [in] lateribus adscribemus ad terram deorsum uersus. S. D. I V. K. I in ea parte lapidis inscribemus quae erit s. d. I, aeque ultra $\langle\mathrm{k}$. primum. quod quoniam in latitudinem exponi in hac planitia non potest, inscripturam lapidi adplicabimus, qua[m] in re ipsa lapis habere debebit. sic et D. D. I V. K. I; sic et S. D. I K. K. I. (Ill. 116). quoniam ab uno umbilico in quattuor partes omnis centuriarum ordo conponitur, ab unius primae centuriae incremento omnes inscriptiones singulis angulis cluduntur: quidquid enim ultra primum kardinem nominatur, perseuerat usque ad extremum finem ultra primum uocari. sic et k (itra); similiter d (extra) aut s (inistra). et cum d (ecumano) m (aximo) siue kardine[s] omnes lapides positi fuerint, per successionem singulis centuriis quartus lapis deerit, cui posito centuriae appellationem inscribere debemus. his deinde cum quartum lapidem posuerimus, sequenti loco centuriae quartus angulus tantum uacabit. quo numerus inscribatur ipsius. ad summam omnes clusares angulos centuriarum lineis diagonalibus conprehendemus (Ill. 117). sic et in toto opere exteriores anguli centurias cludunt ab inscriptione decimani maximi et kardinis maximi (Ill. 118).

Cum centurias omnes inscriptis lapidibus terminauerimus, illa quae rei publicae adsignabunt, quamuis limitibus haereant, priuata terminatione circumibimus, et in forma ita ut erit ostendemus, SILVAS siue PASCVA PVBLICA siue utrumque. quatenus erit, inscriptione replebimus, ut et in forma loci latitudinem rarior litterarum dispositio demonstret. harum siluarum extremitatem per omnes angulos terminabimus (IIl. 119).

Eadem ratione terminabimus fundos exceptos siue concessos, et in forma sicut loca publica inscriptionibus demonstrabimus (Ill. 120).

Concessos fundos aeque similiter ostendemus, ut FVNDVS SEIANVS CONCESSVS LVCIO MANILIO SEI FILIO. in adsignationibus enim diui Augusti diuersas habent condiciones fundi excepti et concessi. excepti sunt fundi bene meritorum, ut in totum priuati iuris essent, nec ullam coloniae munificentiam deberent, et essent in solo populi Romani. concessi sunt fundi ei quibus indultum est, cum possidere uni cuique plus quam edictum continebat non liceret. quem ad modum ergo eorum ueterum possessorum relicta portio ad ius coloniae reuocatur, sic eorum quibus plus possidere permissum est: omnium enim fundos secundum reditus coemit et militi adsignauit. inscribemus ergo concessos sic, ut in aere permaneant (Ill. 121).

Aeque territorio siquid erit adsignatum, id ad ipsam urbem pertinebit nec uenire

[^63]to mark the others in the same way. So, in these corners we should set up stones and inscribe vertically downwards on their sides the designations of centuriae. Therefore, we shall inscribe S. D. I V. K. I on that part of the stone which is to the left of the first decumanus, and equally beyond the first $\langle k\rangle(\operatorname{ardo})$. Since this cannot be written breadthwise in the space available, we shall carve the inscription on the stone where the stone should in fact accommodate it. ${ }^{38}$ Similarly, we shall inscribe D. D. I V. K. I, and also S. D. I K. K. I. Since the entire sequence of centuriae is arranged from one central point in four directions, from an extrapolation of the one first century, all the inscriptions on the individual corners are closed. Consequently, whatever is called 'beyond the first kardo' continues to be called 'beyond the first' (kardo) right to the outer boundary (of the land division). It is the same with 'on the near side' (of the kardo) and with 'right' or 'left' (of the decumanus). When all the stones have been set up with decumanus maximus or kardo maximus on them, in succession in each individual centuria, every fourth stone will be missing, and when it has been set up we should inscribe on it the designation of the centuria. Next, when we have positioned the fourth stone in these centuriae, in sequence the fourth corner of each centuria alone will have space in which may be inscribed the number of that centuria. Finally we shall join up all the closing corners of the centuriae with diagonal lines. Thus in the entire operation, the outer corners close centuriae starting from the inscription of decumanus maximus and kardo maximus.

When we have demarcated all the centuriae with inscribed stones, we shall establish an independent boundary for those areas that will be allocated to the community, ${ }^{39}$ even though they are part of the area divided by limites, and we shall indicate them appropriately on the map as 'woods' or 'public pasture land' or both. We shall fill up the entire extent with writing, so that on the map an arrangement of widely spaced letters indicates the width of the place. We shall demarcate the outer boundary of these woods at all the corners.

With the same procedure we shall mark the boundaries of farms (fundi) that have been excepted $\{$ excepti $\}$ or granted \{concessi\}, and indicate them in writing on the map, just as with public places.

We shall always designate in a similar fashion those farms that have been granted, for example, 'Farm of Seius, granted to Lucius Manilius, son of Seius'. In the allocations made by the divine Augustus, farms designated 'excepted' and 'granted', have a different status. Excepted farms were those awarded to people who performed good service, with the provision that they should be entirely subject to the law relating to private individuals, should not owe any obligation to a colony, and should remain within the land of the Roman people. Granted farms were those belonging to people to whom a special favour was shown, since individuals were not allowed to possess more land than was laid down in the edict. Therefore while that part of the land of the previous landholders left over (i.e. in excess of the amount permitted by the edict) was returned to the jurisdiction of the colony, at the same time some of them were permitted to possess more. For (he) Augustus bought up everyone's farms according to the returns and allocated them to soldiers. So, we shall write 'granted' (farms) in this way, so that they are preserved on the bronze map. ${ }^{40}$

Similarly, if something has been allocated to a territory, it will belong to the city itself, and it may not be sold or alienated from public ownership. We shall write this
aut abalienari a publico licebit. id DATVM IN TVTELAM TERRITORIO adscribemus, sicut siluas et pascua publica (III. 122).

Quod ordini coloniae datum fuerit, adscribemus in forma SILVA ET PASCVA, ut puta SEMPRONIANA, ITA VT FVERVNT ADSIGNATA IVLIENSIBVS. ex hoc apparebit haec ad ordinem pertinere (Ill. 123).

Aeque lucus aut loca sacra aut aedes quibus locis fuerint, mensura conprehendemus, et locorum uocabula inscribemus. non exiguum uetustatis solet esse instrumentum, si locorum insignium mensurae et uocabula aeris inscriptionibus constent (IIl. 124).

Siqua regio in extremitate limites non acceperit, eum locum uacantem significabimus hac inscriptione: LOCVS EXTRA CLVSVS. et extremitatem deinde terminis lapideis obligabimus, interposito ampliore spatio, et aris inscriptis conditoris nomine et coloniae finibus (Ill. 125). extra clusa regio ideo, quod ultra limites finitima linea cluditur. linea autem finitima si limitibus conprehensa non fuerit, optimum erit extremitatem ad ferramentum rectis angulis obligare et sic terminos ponere (Ill. 126). si fuerit mons asper et confragosus, per singulas petras finitimas notas inponemus et ubi potuerit inscriptiones: sic et in forma significabimus. [praeterea in Sicilia, ubi montium altitudo et asperitas est.] (Ill. 127). nam in planis quamuis omnium centuriarum subsiciua lapidibus inscriptis conprehendantur, certis tamen locis aras lapideas ponere debebimus, quarum inscriptio ex uno latere perticae applicato finem coloniae demonstret, ex altero, qua foras erit, adfines. ubi fines angulum facient, ternum angulorum aras ponemus. sic et in locis montuosis (Ill. 128). et has utraeque ciuitates constituant: adfines enim eisdem locis nomine imperatoris et finium earum inscriptione aras consecrare debebunt (Ill. 129).

Agro limitato accepturorum comparationem faciemus ad modum acceptarum, quatenus centuria capere possit aestimabimus, et in sortem mittemus. solent enim culti agri ad pretium emeritorum aestimari. si in illa pertica centurias ducenum iugerum fecerimus et accipientibus dabuntur iugera sexagena sena besses, unam centuriam tres [homines] accipere debebunt, in qua illis tres partes aequis frontibus determinabimus. omnium nomina sortibus inscripta in urnam mittemus, et prout exierint primam sortem centuriarum tollere debebunt. eodem exemplo et ceteri. quod si illis conuenerit, ut conternati sortiri debeant, qui tres primam centuriarum sortem accipere debeant, conternationum factarum singula sortibus nomina inscribemus. ut si conuenerit Lucio Titio Luci filio, Seio Titi filio, Agerio Auli filio, ueteranis legionis quintae Alaudae, ex eis unum sorti nomen inscribemus et quoto loco exierit notabimus. si conternationem urna faciet, singulis sortibus singulorum nomina inscribemus, et a primo usque ad ter-

[^64]down as follows: 'such and such granted to the territory for its support', as in the case of woods and public pasture land.

As regards something that has been granted to the government $\{o r d o\}$ of a colony, we shall enter it on the map as follows: 'the woods and pasture land', say for example, 'of Sempronius, as they have been allocated to the Julienses'. In this way it will be clear that they belong to the government of the colony. ${ }^{41}$

Similarly we shall include in our survey the position of sacred groves, or holy places, or sacred buildings, and we shall write down the names of the places. Normally, it is no small proof of antiquity if the dimensions and names of famous places tally with what is written on the bronze map. ${ }^{42}$

If some area on the outer boundaries has not received limites, we shall indicate that it is an unused area by writing as follows: 'area not enclosed' \{extraclusus\}. Then we shall mark the outer boundary with boundary stones, leaving a good space between them, and with altars inscribed with the name of the founder and the territory of the colony. It is a 'region not enclosed' because it lies beyond the limites and is cut off by the boundary line. However, if the boundary line has not been enclosed by limites, it will be best to fix the outer boundary using the ferramentum to establish right angles, and in this way set up boundary stones. ${ }^{43}$ If there is a precipitous and rough mountain, we shall place on individual rocks marks denoting a boundary, and, where possible, inscriptions; and we shall indicate this on the map. [Also in Sicily where the mountains are lofty and precipitous. ${ }^{44}$ ] On level ground, although the subseciva in all centuriae are enclosed by inscribed stones, nevertheless in certain places we ought to set up stone altars, whose inscription on that side adjacent to the measured area should indicate a colony's territory; the inscription on the other side, away from the colony, will indicate neighbouring communities. Where the boundaries produce a junction, we shall set up triangular altars. And we shall follow the same procedure in mountainous areas. ${ }^{45}$ Both communities should set up these altars, for neighbouring peoples should consecrate altars in the same places, with the name of the emperor and an inscription recording their territory.

When the land has been divided by limites, we shall compare the number of people who are to receive land with the area of the allocations, calculate how much each centuria can accommodate, and employ sortition. Cultivated lands are usually calculated in terms of the remuneration of discharged soldiers. If in a territory we have made centuriae of 200 iugera and the recipients are to be allocated $662 / 3$ iugera, then three men should receive between them one centuria, in which we shall mark out for them three portions with equal frontage. We shall write everyone's name on lots and place them in an urn, and in whatever order their names come out of the urn, so they should make the first draw of the lots containing the centuriae, and so on for the rest. But if the recipients have agreed that they should be divided into groups of three and then draw lots, as regards which three men are to receive the first of the lots containing the centuriae, we shall write on lots single names when the groups of three have been made. So, if Lucius Titius son of Lucius, Seius son of Titus, and Agerius son of Aulus, veterans of the legion $V$ Alaudae, have made such an agreement, we shall write the name of one of these on a lot and note in what order it comes out (of the urn). If the lot is used to produce a group of three, we shall write the individual names on individual lots, and the first group of three will comprise the first to the third of the
tium qui exierit erit prima conternatio．sic et ceterae．has conternationes sublata sorte quidam tabulas appellauerunt，quoniam codicibus excipiebantur，et a prima cera pri－ mam tabulam appellauerunt．peracta deinde conternationum sortitione omnes cen－ turias sortibus per singulas inscribemus et in urnam mittemus：inde quae centuria primum exierit，ad primam conternationem pertinebit．sit forte centuria D．D．XXXV V．K．XLVII：hanc ex prima tabula tres accipere debebunt．quod in aeris libris sic inscribemus：TABVLA PRIMA．D．D．XXXV V．K．XLVII L．TERENTIO L．FILIO POL（LIA）IVGERA LXVIऽ々，G．NVMISIO G．F．STE（LLATINA）IVGERA LXVIs？，P．TARQVINIO CN．F．TER（ETINA）IVGERA LXVIS？．eodem exemplo et ceteras sortes．

Adsignare agrum secundum legem diui Augusti eatenus debebimus，qua falx et arater exierit；nisi ex hoc conditor aliquid immutauerit．primum adsignare agrum circa extremitatem oportet，ut a possessoribus uelut terminis fines optineantur；ex eo inte－ riores perticae partes．siqua compascua aut siluae fundis concessae fuerint，quo iure datae sint formis inscribemus．multis coloniis inmanitas agri uicit adsignationem，et cum plus terrae quam datum erat superesset，proximis possessoribus datum est in com－ mune nomine compascuorum．haec in forma similiter conprehensa ostendemus（Ill． 130）．haec amplius quam acceptas acceperunt，sed ut in commune haberent．multis locis，quae in adsignatione sunt concessa，et ex his compascua fundi acceperunt．haec beneficio coloniae habent，in forma COMPASCVA PVBLICA IVLIENSIVM inscribi debent：nam et uectigal quamuis exiguum praestant（Ill．131）．

Subsiciuorum omnium librum facere［scire］debebimus，ut quando uoluerit imper－ ator，sciat quot in eum locum homines deduci possint：aut si coloniae concessa fuerint， CONCESSA COLONIAE in aere inscribemus．ita si rei publicae concessa fuerint，in aere SVBSECIVA CONCESSA ut IVLIENSIBVS inscribemus．

Omnes aeris significationes et formis et tabulis aeris inscribemus，data adsignata， concessa，excepta，reddita commutata pro suo，reddita ueteri possessori，et quae－ cumque 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 siqua beneficio concessa aut adsignata coloniae fuerint，siue in proximo siue inter alias ciuitates，in libro bene－ ficiorum adscribemus．et quidquid aliud ad instrumentum mensorum pertinebit，non solum colonia sed et tabularium Caesaris manu conditoris subscriptum habere debebit （Ills．132，133）．

[^65]lots that come out (of the urn), and so on for the rest. Some people gave the name 'entries' \{tabulae $\}$ to these groups of three when sortition was not used, because they were recorded in ledgers, and from the fresh wax they called it the first entry. When the drawing of lots for the groups of three has been completed, we shall write the names of all the centuriae individually on lots and place them in an urn. Then the centuria that comes out first will belong to the first group of three men; for example, centuria to the right of Decumanus XXXV beyond Kardo XLVII: the three people from the first entry should get this. We shall write this down as follows in the bronze records: First Entry: to the right of Decumanui XXXV beyond Kardo XLVII.

To Lucius Terentius son of Lucius, of the tribe Pol(lia), $66^{2} / 3$ iugera;
to Gaius Numisius son of Gaius, of the tribe Ste(llatina), $66^{2} / 3$ iugera;
to Publius Tarquinius son of Gnaeus, of the tribe Ter(etina), $662 / 3$ iugera.
We shall record the remaining lots in the same way. ${ }^{46}$
According to a law of the divine Augustus we should allocate land as far as the scythe and the plough have gone, unless the founder has made some change in this. It is correct to begin by allocating the land around the outer boundary, so that the boundaries are occupied by landholders who, as it were, serve as boundary markers. From there, the areas closer to the centre of the territory (should be allocated). If any pasture land or woods have been granted to farms, we shall write on the maps under what legal conditions they have been bestowed. In many colonies the vast quantity of land exceeded what was required for allocation, and since more land was left over than had been allocated, it was granted in common to the neighbouring landholders under the name of common pasture land. We shall indicate this land on the map similarly enclosed (i.e. with outer boundary marked). They (the landholders) received this land over and above their personal allocation, but on the condition that they should hold it in common. In many places farms also received common pasture from land that was granted in the allocation. They hold this by the favour of the colony, and on the map the words 'public common pasture land of the (colony of the) Julienses' ought to be written. These lands furnish a rent, though it is a small amount. ${ }^{47}$

We should make a ledger recording all subseciva, so that whenever the emperor wishes he can find out how many men can be settled in that area. Or if they have been granted to a colony, we shall write on the bronze map: 'granted to the colony'. So, if they have been granted to (the government of) a community, we shall write on the map: 'subseciva granted' for example, 'to the Julienses'.

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 \{tabularium Caesaris\} 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. And if any (lands) have been granted or allocated to a colony as an act of munificence \{beneficium\}, either close by or in the midst of other communities, we shall record them in the book dealing with beneficia. 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. ${ }^{48}$

Agrum rudem prouincialem sic adsignabimus, quem ad modum supra diximus. si uero municipium in coloniae ius transferetur, condicionem regionis excutiemus et secundum suam postulationem adsignabimus. multis locis conditores uniuersum locum coemerunt, multis male meritos fundorum possessione priuauerunt. ubi tamen aliquid concessum est et gratiae, in eius modi condicionibus interuenit C. V. P. ET REI PVBLICAE. hunc agrum secundum datam legem aut si placebit secundum diui Augusti adsignabimus eatenus QVA FALX ET ARATER IERIT. haec lex habet suam interpretationem. quidam putant tantum cultum nominari: ut mihi uidetur, utile $\langle\mathrm{m}\rangle$ ait agrum adsignare oportere. hoc erit ne accipienti siluae uniuersus modus adsignetur aut pascui. qui uero maiorem modum acceperit culti, optime secundum legem accipiet aliquid [et] siluae ad inplendum [acceptae] modum. ita fiet ut alii sibi iunctas siluas accipiant, alii in montibus ultra quartum forte uicinum. primum [ergo] agrum limitibus includemus, hoc est centuriabimus. deinde acceptas terminabimus: quicumque modus limitem excedit, commalliolari debet et sic in aere incidi. sortes

We shall allocate uncultivated provincial land in the way described above. But if a municipium has its status altered to that of a colony, we shall examine the conditions of the locality, and allocate land in accordance with those conditions. In many places the founders bought up an entire site, in many they confiscated the farms of people who had displeased them. Where, however, they made some concession to goodwill, in those circumstances the following phrase appears: 'granted to the prior possessor and the community'. ${ }^{49}$ We shall allocate this land according to the law issued \{lex data\}, or if we like, the law of the divine Augustus, as far as 'the scythe and the plough have gone'. This law is open to interpretation. Some think that it refers only to cultivated land. In my opinion, it says that it is correct to allocate usable land. The purpose of this is to prevent the allocation to a recipient of a plot consisting entirely of woods or pasture. But a man who receives cultivable land as the larger part of his allocation, will, according to the law, properly receive some woodland to make up the area. So, it will happen that some receive woodland adjoining their allocation, while others receive woodland situated on mountains, perhaps more than four neighbouring properties away. Firstly, we shall enclose the land with limites, that is we shall divide it into centuriae. Then we shall fix boundaries for the allocations. Whatever quantity of land exceeds what is enclosed by the limites, should be 'welded on' and in this way entered on the map. ${ }^{50}$ You will inscribe the lots as follows: if one allocation contains two, three, or more centuriae, we shall inscribe on one lot these centuriae and the proportion of the allocation they have. For example, if a man is to be granted $66 \frac{2}{3}$ iugera spread out over three centuriae: D. D. I K. K. I - $62 / 3$ iugera, D. D. I K. K. II - 15 iugera, D. D. II K. K. II - 45 iugera, then a single lot ought to contain all these. And the rest will be done in the same way. When they have drawn the lots, we shall conduct the settlers to the fields and allocate their land. When the land has been allocated, and the remaining surveyed areas apportioned, we shall lodge in the community the maps and whatever else is relevant to the survey, arranged, as I said above, 〈by〉 the founder himself. ${ }^{51}$

We ought to include within a survey ager arcifinius that yields revenue \{vectigalis\}, in such a way that it is permanently demarcated by straight lines and some kind of boundary. ${ }^{52}$ Many people have divided land of this type like that of a colony, using decumani and kardines, that is by centuriae, for example in Pannonia. In my opinion the survey of this land should be conducted by a different procedure. There ought to be a distinction between land that is exempt, and land yielding revenue. Now, just as the status of these lands is different, so the method of survey ought to be different. Our profession is not so narrowly restricted that it is not even capable of organizing the distinctive use of limites in individual provinces. Lands yielding revenue have many different forms. In some provinces, they (the landholders) pay a definite proportion of the produce, some one-fifth, others one-seventh; others pay cash, and this is based on an evaluation of the land. Definite values have been established for lands; for example, in Pannonia there are first-class lands, second-class lands, meadows, acorn-bearing woods, ordinary woods, and pasture land. ${ }^{53}$ In all these lands the rent has been established in relation to the degree of fertility in each iugerum. In the valuation of these lands, great care must be displayed in the survey to prevent any improper acquisition of land by means of false declarations. Now, disputes aris-

Pannonia．propter quod huius agri uectigalis mensuram a certis rigoribus conprehen－ dere oportet ac singula terminis fundari．quibusdam interuersuris lapides politos quadratos inscriptos lineatos defigere in eam partem qua res exiget oportebit．omnium rigorum latitudines uelut limitum obseruabimus：interstitione limitari mensuras per strigas et scamna agemus．sicut antiqui latitudines dabimus，decimano maximo et k ． pedes XX，eis limitibus transuersis，inter quos bina scamna et singulae strigae inter－ ueniunt，pedes duodenos，itemque prorsis limitibus，inter quos scamna $\dagger q u a t t u o r \dagger$ et quattuor strigae cluduntur，pedes duodenos，reliquis rigoribus lineariis ped．octonos （Ill．136）．omnem mensurae huius cultura $\langle\mathrm{m}\rangle$ dimidio longiorem siue latiorem facere debebimus：et quod in latitudinem longius fuerit，scamnum est，quod in longitudinem， striga．primum constituemus decimanum maximum et kardinem maximum，et $a b$ his strigas et scamna cludemus（Ill．137）．actuarios［autem］limites diligenter agemus，et in eis lapides inscriptos defigemus adiecto scamnorum numero．primum a．d．m．et k ． incipiemus inscriptiones uelut in quintariis ponere．primo lapidi inscribemus D．M．K． M．（Ill．138）．ab hoc deinde singulis actuariis limitibus similiter per ipsos inscribemus D．M．LIMES II，K．M．LIMES SECVNDVS．hac significatione omnium quattuor regionum limites conprehendemus（Ill．139）．his deinde quartis quadrarum angulis lapides eius generis ponemus sub hac inscriptione litteris singularibus D．D．V．〈K．〉 STRIGA PRIMA SCAMNVM I［I］et hoc in lateribus lapidum．in fronte autem regio－ nis indicium D．D．V．K．（Ill．140）．nunc quadrarum angulis lapides inscriptos inspi－ ciamus（Ill．141）．intra has strigas et scamna omnem agrum separabimus，cuius totam positionem ad uerum formatam inspiciemus，secundum quod rei praesentis formam describamus．
as in Pannonia. Therefore, it is essential to carry out the survey of this land yielding revenue, starting from clear, straight lines \{rigores\}, and for each measured area to be clearly designated with boundary markers. At some junctions it will be right to set up finished and squared stones, inscribed and marked with lines, at that place where the survey requires. We shall observe a width for all the straight lines \{rigores\} just like that of limites; and in the spaces in between the limites, we shall carry out the survey by means of strigae and scamna. We shall assign widths as the men of old did, 20 feet for the decumanus maximus and the kardo maximus, 12 feet for those limites transversi, between which two scamna and one striga are interposed, 12 feet also for the limites prorsi, within which are enclosed $\dagger$ four $\dagger$ scamna and four strigae, and 8 feet for the remaining rigores linearii. ${ }^{54}$ All the cultivated area in this survey we should make either twice as long or twice as broad; so, where the breadth exceeds the length, there is a scamnum, and where the length exceeds the breadth, a striga. First we shall establish a decumanus maximus and kardo maximus, and then from these enclose strigae and scamna. We shall carefully plot limites actuarii, and on them we shall set up inscribed stones, including the number of scamna. Starting first from the decumanus maximus and the kardo maximus, we shall place inscribed stones just as we do on quintarii. On the first stone we shall inscribe: D. M. K. M. From this we shall similarly inscribe the stones on every limes actuarius: D. M. Limes II, K. M. Second Limes. Using this notation we shall cover the limites of all four areas (i.e. the four areas made by the intersection of the DM and KM). Then, in these fourth corners of the squares, we shall set up stones of this kind, containing the following inscription in abbreviated form: D. D. V. $\langle\mathrm{K}$.$\rangle first striga scamnum \mathrm{I}[\mathrm{I}]$. This should be written on the sides of the stones. On the front we shall indicate the location: D. D V. K. ${ }^{55}$ Now we should examine the inscribed stones in the corners of the squares. Within these strigae and scamna we shall divide up all the land, and we shall inspect its entire layout when it has been accurately fashioned; in accordance with this, we should draw up a map of the existing arrangement.

# INCIPIT <br> LIBER AVGVSTI CAESARIS ET NERONIS 

## 〈LIBER COLONIARVM〉

In provincia lvcania prefecture. iter populo non debetur.

Vulcentana, Pestana, Potentina, Atenas et Consiline, Tegenensis. quadrate centuriae in iugera n . CC.

Grumentina. limitibus Graccanis quadratis in iugera n. Cc. decimanus in oriente, kardo in meridiano.

Veliensisis. actus $n . \mathrm{x}_{\mathrm{q}}$ per XXV .
Provincia brittiorvm. centuriae quadratae in iugera cc. et cetera in laciniis sunt praecisa post demortuos milites.

Ager Buxentinus $\dagger$ alirestertianis $\dagger$ est adsignatus in cancellationem limitibus maritimis.

Ager Consentinus ab imp. Augusto est adsignatus limitibus Graccanis in iugera n. CC. kardo in orientem, decimanus in meridianum.

Ager Viuonensis. actus $n$. xq per xxv . kardo in orientem, decumanus in meridianum.

Ager Clampetinus limitibus Graccanis in iugera n. cc. kardo in orientem, decimanus in meridianum.

Ager Benebentanus. actus $\mathrm{n} . \mathrm{xq}$ per xxv . kardo in orientem, decimanus in meridianum.

Provincia apvlia.
Ager Aeclanensis. iter populo non debetur. actus n. Xx per xxiII in iugera n . CCXL. decimanus in orientem, kardo in meridianum.

Ager Benusinus, Comsinus, limitibus Graccanis.
Vibinas, Aecanus, Canusinus. iter populo non debetur. in iugera n. CC.
Item et Herdonia, Ausculinus, Arpanus, Collatinus, Sipontinus, Salpinus, et quae circa montem Garganum sunt, centuriis quadratis in iugera n. CC, lege Sempronia et Iulia. kardo in meridianum, decimanus in orientem.

Item et Teanus Apulus. iter populo non debetur.

## HERE BEGINS THE BOOK OF AUGUSTUS CAESAR AND NERO ${ }^{1}$

## 〈BOOK OF COLONIES〉

In the province of lucania, praefecturae. ${ }^{2}$ A right of way is not due to the people. ${ }^{3}$
(The praefectura) of Volcei (Buccino), Paestum, Potentia (Potenza), Atina (Atena), and Consilinum (Padula), Tegianum. Square centuriae containing 200 iugera.
(The praefectura) of Grumentum (Grumento). (It is divided) by Gracchan limites in squares containing 200 iugera. The decumanus faces east, the kardo south.
(The praefectura) of Velia. 16 by 25 actus.
Province of the bruttir. (There are) square centuriae containing 200 iugera. The remaining land was divided into strips after the soldiers had died.

The land of Buxentum (Policastro di S. Marina) was allocated through a measurement grid to $\dagger \ldots \dagger$, with limites facing the sea. ${ }^{4}$

The land of Consentia was allocated by the emperor Augustus, by means of Gracchan limites (in units) containing 200 iugera; the kardo faces east, the decumanus south. ${ }^{5}$

The land of Vibo Valentia (Vibo Valentia). 16 by 25 actus; the kardo faces east, the decumanus south. ${ }^{6}$

The land of Clampetia (was divided) by Gracchan limites (into units) containing

The land of Beneventum (Benevento). 16 by 25 actus; the kardo faces east, the decumanus south. ${ }^{8}$

## Province of apulia

The land of Aeclanum (Mirabella Eclano). ${ }^{9}$ A right of way is not due to the 25 people. 20 by 24 actus containing 240 iugera; the decumanus faces east, the kardo south.

The land of Venusia (Venosa), Compsa, with Gracchan limites. ${ }^{10}$
The land of Vibinum (Bovino), ${ }^{11}$ Aecae (Troia), ${ }^{12}$ Canusium (Canosa di Puglia). ${ }^{13}$ A right of way is not due to the people; (it was divided into units) containing 200 iugera.

Similarly, Herdonia (Ordona), the land of Ausculum (Ascoli Satriano), Arpi, Collatia, Sipontum (S. Maria di Siponto), Salapia, and the area round Mount Garganus ${ }^{14}$ (were divided) into square centuriae containing 200 iugera, by a lex ${ }^{15}$ Sempronia and a lex Iulia; the kardo faces south, the decumanus east.

Similarly the land of Teanum Apulum (San Paolo di Civitate). A right of way is not due to the people. ${ }^{16}$

Ager Lucerinus kardinibus et decimanis est adsignatus: sed cursum solis sunt secuti, et constituerunt centurias contra cursum orientalem actus $n$. LXXX, et contra meridianum actus n . xq : efficiuntur iugera n . DCxL. iter populo non debetur.

## Provincia calabria.

Territoria Tarentinum Lyppiense Austranum Varinum in iugera n. cc limitibus Graccanis. et cetera loca uel territoria in saltibus sunt adsignata et pro aestimio ubertatis sunt praecisa. nam uariis locis mensurae acte sunt et iugerationis modus conlectus est. cetera autem prout quis occupauit posteriore tempore censita sunt et ei possidenti adsignata, ab imp. Vespasiano censita ex iussione. iter populo non debetur. nam eadem prouincia habet muros macerias scorofiones congerias et terminos Tiburtinos, sicut in Piceno fertur.

Provincia sicilia.
Territorium Panormitanorum imp. Vespasianus adsignauit militibus ueteranis et familiae suae. ager eius finitur terminis Tiburtinis pro parte scriptis: nam sunt et cyppi oleaginei, qui loco termini obserbantur, et distant a se in pedibus CL CC CCL CCCC DL, prout ratio postulabit: nam sunt termini proportionales, quos milites ueterani inter se emensos posuerunt et custodiunt lineas consortales.

Item Segestanorum ut supra, uel ad Leucopetram.
Provincia tvscia.
lex agrorvm ex commentario clavdi caesaris.
Lex agris limitandis metiundis partis Tusciae prius et Campaniae et Apuliae. [et uariae regiones, uel loca, territoria. uariae autem regiones non habent aequales centurias uel mensuras: in agro Florentino in centurias singulas iugera cc.] Qui conduxerit, decimanum latum ped. xL, kardinem latum p . xx facito, et a decimano et kardine $m$. quintum quemque facito ped. XII, ceteros limites subrunciuos latos p. qII facito. quos limites faciet, in his limitibus reciproce terminos lapideos ponito ex saxo silice aut molari aut ni deteriore, supra terram sesquipedem: facito crassum pedem, item politum rotundum [facito], in terram demittito ne minus ped. irs. ceteros terminos, qui in opus erunt, robustos statuito, supra terram pd. II, crassos pedem I52, in terram demittito ne minus pd. III, eosque circum calcato, scriptos ita ut iusserit. quod subsiciuum amplius iugera C erit, pro centuria procedito: quod subsiciuum non minus

The land of Luceria (Lucera) was allocated by means of kardines and decumani. But they followed the course of the sun, and established centuriae 80 actus long facing east, and 16 actus long facing south; (centuriae) containing 640 iugera are produced. ${ }^{17}$ A right of way is not due to the people.

## Province of calabria

The territories of Tarentum (Taranto), Lupiae (Lecce), Austranum (?), and Barium (Bari) (were divided) by Gracchan limites (into units) containing 200 iugera. ${ }^{18}$ Other areas or territories were allocated in saltus, and divided up according to an estimation of their fertility. Now, in several places surveys were carried out, and the area of land divided into iugera was added up. But other places were assessed afterwards, just as individuals had appropriated them, and were allocated to the person in possession of them, after they had been assessed on the orders of the emperor Vespasian. ${ }^{19}$ A right of way is not due to the people. The same province has walls, dry-stone walls, heaps and piles of stones, and boundary markers of Tiburtine stone, just as is said to be the case in Picenum.

## Province of sicily

The emperor Vespasian allocated the territory of Panormus (Palermo) to veteran soldiers and to members of his own household. Its land is demarcated by boundary markers of Tiburtine stone, which are inscribed according to the allocation; there are also markers made of olive wood, which are used in place of stones, and the intervals between them are: $150,200,250,400,550$ feet, as the layout requires. There are also boundary markers laid out proportionally, which veteran soldiers set up after measuring the distance themselves, and they preserve common boundary lines.

The same conditions as above apply to the territory of Segesta and at Leucopetra. ${ }^{20}$

## Province of tuscia

## A lex dealing with land from the commentary of claudius caesar. ${ }^{21}$

A lex formerly providing for the division and measuring of lands in the region of Tuscia, and Campania, and Apulia. ${ }^{22}$ [And (there are) different regions, or places, or territories. Different regions do not, however, have similar centuriae or measurements: in the land of Florentia there are 200 iugera in individual centuriae.] Whosoever shall have contracted (for the work to be done), shall establish a decumanus 40 feet wide, and a kardo 20 feet wide, and from the decumanus maximus and the kardo maximus, he shall make every fifth limes 12 feet wide, and he shall make the other limites subruncivi 8 feet wide. In respect of those limites he establishes, on these limites he shall place reciprocally stone markers, made from flint or volcanic stone, or something no less tough, projecting $11 / 2$ feet above the earth; he shall ensure that the stone is one foot thick, round in shape and finished, and he shall set it into the earth to a depth of not less than $2 \frac{1}{2}$ feet. He shall set up, as the other markers that are to be part of the scheme, posts made of oak, 2 feet above the ground, $12 / 3$ feet thick; and he shall set them in the earth to a depth of not less than 3 feet, tread down the earth around them, and ensure that they have been inscribed in accordance with his orders. ${ }^{23}$ In respect of subsecivum greater in extent than 100 iugera, he shall treat it as if it were a
iugera quinquaginta, id pro dimidia centuria procedito. hoc opus omne arbitratu C. Iuli Caesaris et Marci Antoni et Marci Lepidi triumuirorum r. p. c.

Colonia Florentina deducta a triumuiris, adsignata lege Iulia, centuriae Caesarianae in iugera CC, per kardines et decimanos. termini rotundi pedales, et dis- tant a se in pd. Īcccc. sunt et medii termini, qui dicuntur epipedonici, pedem longum crassum, et distant a se in pd. $\infty$ cc. ceteri proportionales sunt et intercisiuos limites seruant; quos ueterani pro obseruatione partium statutos custodiunt; qui non ad rationem uel recturas limitum pertinent, sed ad modum iugerationis custodiendum, et distant a se alius ab alio pedes sescentenos. quorum limitum cursus nulla interiecta distantia in utroque latere territorii concurrunt, ut infra monstraui.

Colonia Fida Tuder ea lege qua et ager Florentinus. in centuriis singulis iugera cc. termini lapidei alii saxei alii molares, crassum semipedem longum dodrantem: distant a se pedes sescentenos et DCCXX. quod si fuerit crassus $\varsigma\langle z\rangle$ dodran. $\left[={ }_{q}{ }^{\text {III }}\right]$ aut $\varsigma^{l z}$ deun. [=xI], est alius ab alio ped. DCccclx. si scriptus tysilogramus fuerit terminus, est alius ab alio ped. $\infty$ cc.

Colonia Volaterrana lege triumuirale, in centurias singulas iugera Cc , decimanis et kardinibus est adsignata. quam omnem ueterani in portionibus diuisam pro parte habent; in quas limites recipit interuallo ped. $\overline{\mathrm{I}} \mathrm{CCCC}$. in quibus centuriis unus quisque miles accepit iugera $X X V$ et $L$ et $X X X v$ et $L X$. termini ea lege sunt constituti qua superius diximus.

Colonia Arretium lege Augustea censita, limitibus Graccanis, qui recturas maritimas et montanas spectabant, postea per cardines et d. est adsignata, et numerus centuriarum manet. quae quadratae sunt. si in pedibus $\overline{\text { IICCCC}}$, quae pro parte terminos lapideos recipit semissales, distant a se in ped. CCC. si $\overline{\mathrm{I}}$, 22 , distant a se ped. CCXL.
 DCCCXL. si ped. $\overline{\mathrm{XI}}, 22$, in ped. $\infty$ CCCXX. haec ratio in eadem regione numeri est: pro parte enim pro modo iugerationis pedaturae numerus est designatus.

Colonia Ferentinensis lege Sempronia est adsignata. sed quod ante limitibus centuriatis fuit adsignata, postea deficientibus ueteranis iuxta fidem possessionis est recensita, sed numeris uncialibus termini sunt constituti. id est alii silicei, crassi p. I2, 22
centuria; in respect of subsecivum not less than 50 iugera, he shall treat it as if it were a half centuria. All this work was done by the decision of C. Julius Caesar and Marcus Antonius and Marcus Lepidus, triumviri for organizing the state.

The colony of Florentia (Firenze) ${ }^{24}$ was founded by triumvirs; the land was allocated under a lex Iulia, and the centuriae of Caesar contain 200 iugera, divided by kardines and decumani. The boundary stones are circular, measuring one foot, and the intervals between them are 2,400 feet. There are also mid-point boundary markers which are called 'flat' \{epipedonici\}, one foot long and one foot thick, and the intervals between them are 1,200 feet. Other boundary markers are placed proportionally, and demarcate limites intercisivi. Veteran soldiers preserve these markers, which were established to delineate individual holdings. They are not relevant to the overall plan or the straight lines of the limites, but to the safeguarding of the area of each holding, and are 600 feet apart from one another. As I have demonstrated below, the paths of these limites meet on both sides of the territory with no gap placed between them.

The colony of Loyal Tuder (Todi) (was established) under the same lex as applied to the land of Florentia. ${ }^{25}$ In individual centuriae there are 200 iugera; there are boundary stones, some of rock, others of volcanic stone, $1 / 2$ foot thick and $3 / 4$ foot long; the intervals between them are 600 and 720 feet. But if the stone is $3 / 4{ }^{36}$ foot thick or ${ }^{11 / 12}$ foot thick, each one lies 960 (up to) 1,080 feet from another. If a stone has been inscribed with a tysilogramus, it lies 1,200 feet from another.

The colony of Volaterrae (Volterra) ${ }^{27}$ was established by a triumviral lex, and its land was allocated by decumani and kardines into centuriae, each containing 200 iugera. The veterans hold all this land, divided into allocations in proportion (i.e. according to their military rank). In respect of these allocations, the colony has limites 2,400 feet apart, and in these centuriae each soldier received twenty-five or fifty or thirty-five or sixty iugera. ${ }^{28}$ The boundary stones were set up according to the lex that I mentioned above.

The colony of Arretium (Arezzo) ${ }^{29}$ was assessed under a lex Augustea by means of Gracchan limites, which produced straight lines facing the sea and the mountains. Later, it was allocated by means of kardines and decumani, and the number of centuriae remains (the same). The centuriae are square. If a centuria has one side 2,400 feet long, it has in proportion boundary stones measuring $1 / 2$ of a foot, and the intervals between them are 300 feet. If it has one side 2,000 feet long, the boundary stones measure $1 / 3$ of a foot, and the intervals between them are 240 feet; if it has one side 4,200 feet long, the boundary stones measure $3 / 4$ of a foot, (and the intervals between them are) 480 feet; if it has one side 5,250 feet long, the boundary stones measure $3 / 4$ of a foot, (and the intervals between them are) 600 feet; if it has one side 7,000 feet long, the boundary stones measure $1 / 3$ of a foot, and the intervals between them are 840 feet; if it has one side 11,000 feet long, the boundary stones measure $1 / 3$ of a foot, (and the intervals between them are) 1,320 feet. ${ }^{30}$ This calculation of number is used throughout the same region. The number (of boundary stones) was arranged in proportion, in relation to the quantity of iugera of the measured area.

The colony of Ferentis (Ferento) ${ }^{31}$ was allocated under a lex Sempronia. But whatever land had been allocated previously by means of limites and centuriae was afterwards assessed on the evidence of existing possession, as the veterans died out. Boundary stones were set up on the calculation of fractions of a foot. That is, some
longi, qui distant a se in pd. $\infty$ CCCCXL. alii albi, 22 [IIII] longi, distant a se pd. cCCCLXXX. alii longi dodran. distant a se pd. DC. ceteros prout natura locorum inuenit, positi sunt.

Colonia Capys. pro aestimio ubertatis et natura locorum sunt agri adsignati. nam termini uariis locis sunt adpositi, id est in planitia, ubi miles portionem habuit. qui termini distant a se in ped. LX LXXX C CXX CXL CL CLX CLXXX CC CCXX CCXL CCC. et si longius natura loci tendatur, sunt in pedibus DC DCCCXL DCCCCLX $\infty$ XX $\infty$ CC $\infty$ CCCCXL $\infty$ D. ceteris autem locis uias cauas itinera coronas et ante nominata. quae si ita sunt, exequi oportet. ne id sequaris quod aliqua pars posteriori tempore pacti decisionisue causa inter se sunt censiti.

Colonia Iunonia quae appellatur Faliscos a triumuiris adsignata et modus iugerationis est datus. in qua limites intercisiui sunt directi et lege agraria sunt mensurae conlecte. termini autem non sunt omnibus locis siti, sed numero pedature sunt limites constituti. in locis quibusdam riui finales et cauae quae ex pactione sunt designatae, hae tamen quae recturam limitum recipiunt. nam termini sunt silicei pro parte, et distant a se in ped. CCXL CCC CCCLX CCCCXX et CCCCLXXX et DC. ceterum normalis longitudo per riuorum cursus seruatur.

Colonia Nepis eadem lege seruatur qua et ager Faliscorum.
Colonia Sutrium ab oppidanis est deducta. ante limites contra orientalem recturam dirigebantur. postea ex omni latere sunt extenuati: et licet omnes agri ad modum iugerationis sint adsignati, tamen pro parte naturam loci secuti artifices agros censuerunt, id est fecerunt gammatos et scamnatos, riparum et coronarum natura, et iuga collium sunt emensi. terminos autem pro parte lapideos posuerunt, alios uero ligneos, qui sacrificales pali appellantur. qui distant a se ped. CCCC, p. D, ped. DC, ped. DCC, ped. DCCC, ped. DCCCC, ped. $\infty$, et pd. $\infty$ CC. ceterum pro natura loci designatum est in ripis.

Campi Tiberiani in iugeribus uicenis quinis sunt adsignati a Tiberio Caesare, et termini Tiberiani nuncupantur. qui distant a se ped. DC per $\infty$ CC, ped. DCCC, ped. CCC. alibi ped. DC per DC, alibi ped. D per DCCXx. qui termini recipiunt mensuram pedum $\dagger$ sex semis per CCGII p. = II per dua sela per $\varsigma^{2}$ qiII $\dagger$. ceterum limitibus normalibus recturae concurrunt.

Colonia Tarquinios lege Sempronia est adsignata. cuius agri mensura in tetragonon uariis locis est conlecta, et termini silicei sunt adpositi. quorum mensura est deun. ( $\varsigma \nsucceq$ ) per longum, et distant a se in pedibus DCCxx. alii per longum trien.,
were of flintstone, $11 / 6$ feet thick, $1 / 3$ of a foot long, and the intervals between them are 1,440 feet; others were white, $1 / 3$ of a foot long, and the intervals between them are 480 feet; others were $3 / 4$ of a foot long, and the intervals between them are 600 feet. ${ }^{32}$ Other boundary stones were set up according to the nature of the terrain.

The colony of Capena (Civitùcola). ${ }^{33}$ The lands were allocated according to an evaluation of their fertility and the nature of the terrain. Boundary markers were set up in different places, that is on the plain, where the soldiers had their allocations. These boundary markers have intervals between them of $60,80,100,120,140,150$, $160,180,200,220,240$, and 300 feet. If the layout of the location tends to greater length, the intervals between them are $600,840,960,1,020,1,200,1,440,1,500$ feet. In other locations (boundaries are demarcated by) roads, hollows in the ground, paths, fences, and other methods mentioned before. If these are used in this way, it is correct to observe them. But you should not be guided by what some parties have subsequently assessed on their own initiative, in order to reach an agreement or settlement.

The colony of Iunonia, which is also called Falerii (Cività Castellana), was allocated by triumvirs, and an area of iugera was granted. ${ }^{34}$ In this, limites intercisivi were laid out, and the measurements were arranged in accordance with an agrarian lex. Boundary markers were not set up in every location, but the limites were established in relation to the size of the measured area. In some locations, streams mark the boundary, and also hollows in the ground, which by agreement have been designated; however only those that allow the limites to run straight. Now, the boundary markers are in part of flint, and the intervals between them are $240,300,360,420,480$, or 600 feet. But a right-angled side is marked by the course of streams.

The colony of Nepet (Nepi) ${ }^{35}$ is maintained under the same lex as the land of Falerii.

The colony of Sutrium (Sutri) ${ }^{36}$ was founded by townspeople. Previously, the limites followed a straight line eastwards. Later, they were reduced on all sides. Although all the land was allocated in accordance with the area of iugera required, nevertheless to some extent the surveyors followed the layout of the terrain when they assessed the land, that is, they made rectangular fields bounded lengthwise \{gammati\} or fields bounded breadthwise \{scamnati\}, according to the layout of river banks and fences, and also included the ridges of hills in the survey. In part they set up boundary markers of stone, others they made of wood, which are called 'sacrificial stakes'. The intervals between them are $400,500,600,700,800,900,1,000$, or 1,200 feet. But where the terrain permitted, (the boundary) was demarcated by banks.

The Campi Tiberiani ${ }^{37}$ were allocated by Tiberius Caesar in (lots of) 25 iugera, and the boundary markers are called 'Tiberian'. The intervals between them are 600 by 1,200 feet, 800 (by) 300 feet; elsewhere 600 by 600 feet apart; elsewhere 500 by 720 feet. These boundary stones have dimensions of $1 / 2$ foot by 1 foot, $2 / 3$ foot (by) $1 / 4$ foot; $1 / 2$ foot by $1 / 2$ foot, and $5 / 12$ foot by $2 / 3$ foot. But the straight lines tally with the rightangled limites.

The colony of Tarquinii (Tarquinia) ${ }^{38}$ was allocated under a lex Sempronia. The measurement of the land was arranged in several places in the shape of a square \{tetragonon\}, and flintstone boundary markers were set up. Their dimensions are ${ }^{11 / 12}$ of a foot in length, and the intervals between them are 720 feet; others are $1 / 3$ or $1 / 4$ of

III, distant a se in ped. DCCCXXX, DCCCLX. hoc in locis montanis: in quibus alii iuxta loci naturam spissiores sunt siti, id est sine mensure suae numero podismati sunt, inter ped. CXX, inter ped. CLX, in ped. CLXXX, in ped. CC et CCXL. nam circa regionem maritimam limites rectos censuerunt et lapidibus his conpactis cursum demonstrauerunt, aliis uero locis aggeres conuallium ordinari disposuerunt.

Colonia Grauiscos ab Augusto deduci iussa est: nam ager eius in absoluto tenebatur. postea imp. Tiberius Caesar iugerationis modum seruandi causa lapidibus emensis r. p. loca adsignauit. nam inter priuatos egregios terminos posuit, qui ita a se distant ut breui interuallo facile repperiantur. nam sunt et per recturas fossae interiectae, quae communi ratione singulorum iura seruant.

Colonia Veios prius quam oppugnaretur ager eius militibus est adsignatus ex lege Iulia. postea deficientibus his ad urbanam ciuitatem associandos censuerat diuus Augustus. nam uariis temporibus et a diuis imperatoribus agri sunt adsignati. cuius ratio sic ostenditur.
circa oppidum Veios sunt naturae locorum quae uicem limitum seruant. sed non per multa milia pedum concurrunt. in quibus etiam termini siti sunt pro parte silicei et alii Tiburtini. silicei uero distant a se in ped. cccxx ccclx ccccex cccclxxx dxl dC, Tiburtini uero in ped. CCXL CCLXXX CCCXL CCCC CCCCLX DXX DLXXX DCXL DCLX. quod si spissiores non sunt, riparum cursus seruatur; harum tamen quae per multa milia pedum recturas separationesue agrorum ab initio suo usque ad occasum custodiunt. et ne eas ripas sequendas sperarent quae intra corpus agri nascuntur et in suo latere decidunt, lex limitum eas praedamnauit. ne id aliquando sequamini quod maior potestas limitum recturarumue cursus non confirmat. sed si conuentionis causa eas partes inter se custodiendas censuerunt, non recturae imputandum est, sed concurrenti definitioni fides adhibenda: erit enim uiarum riparum cauarum multorum agrorum separando rumpere meantium cursus seruandus.
pars uero camporum et silue, regionis Campaniae a Veiis tenus uel Aureliae, ante a diuo Augusto ueteranis pro parte data fuit. in qua regione limites maritimi appellantur. ubi sunt termini lapidei, sed et lignei sacrificales exordio sunt constituti. nam postea iussu imp. Adriani uice numero limitum termini positi sunt lapidei, qui ab uno incipiunt scripti numerum continuere, ut puta TERMINVS PRIMVS, TERMINVS SECVNDVS, TERMINVS TERTIVS, TERMINVS QVARTVS, TERMINVS QUINTVS, usque ad numerum suum
a foot in length, and the intervals between them are 830 and 860 feet. ${ }^{39}$ This is the practice in mountainous locations. In these, some stones have been positioned more closely together because of the nature of the terrain, that is, they were measured out without reference to their own dimensions, between 120 and between 160 feet, up to 180 , up to 200 , and up to 240 feet apart. In a region near the sea, they established straight limites, and marked their course by piling up stones; but in other locations they arranged that the upper ridges of valleys should be designated (as the boundary).

The colony of Graviscae ${ }^{40}$ was founded on the orders of Augustus. Its land was held without survey. Later, the emperor Tiberius Caesar, in order to preserve the area allocated in iugera, made measurements, set up boundary stones, and allocated some areas to the community. And between the lands of private individuals he positioned conspicuous boundary markers, which are separated from one another by such a short distance that they can easily be found. Ditches were placed along the straight lines (of the boundaries), and by common agreement these protect the rights of individual (landholders).

The colony of Veii. ${ }^{41}$ Before it was attacked, its land was allocated to soldiers in accordance with a lex Iulia. Afterwards, when these died out, the divine Augustus decided that the people should be added to the urban settlement. Lands have been allocated at different times by the divine emperors. The method by which this was done is illustrated as follows.

Around the town of Veii there are natural features of terrain that follow the pattern of the limites. But over a distance of many thousands of feet they do not harmonize (with the limites). On them boundary stones have been positioned, some made of flint, others of Tiburtine stone. Flint stones have intervals between them of 320 , $360,420,480,540$, and 600 feet; Tiburtine stones (have intervals between them) of 240 , $280,340,400,460,520,580,640,660$ feet. If the stones are not positioned relatively close together, the line of river banks is used (to mark the boundary). Some of these (river banks) mark out straight boundaries and divisions between fields over many thousands of feet, from their own source right down to their end. ${ }^{42}$ In case anyone thinks that they ought to follow (as boundaries) those river banks that begin inside an area of land and then die out on their own side (i.e. without coming in contact with a boundary between properties), the lex pertaining to limites has ruled them out in advance. This lex also forbids us to follow anything that the greater authority of the limites, and the direction of the straight line boundaries, do not confirm. However, if the parties, in order to reach an agreement, have decided to keep these banks (as boundaries) between their properties, that should not be ascribed as a fault to a straight line boundary; rather, trust must be placed in the agreed boundary definition. So, the line of roads, banks, and hollows in the ground will have to be observed since they provide the borders between many fields. ${ }^{43}$

A section of plain and woodland, in the province of Campania, from Veii to Aurelia, ${ }^{44}$ was previously distributed in proportion by the divine Augustus to veteran soldiers. In this region the limites are called maritime. The boundary markers are of stone, but wooden 'sacrificial' stakes were also set up at the start. Later, by order of the emperor Hadrian, boundary markers of stone were established in turn on all the limites; they start from one point and have a number inscribed, for example, first
[facit] uel conclusionem angulorum agri adsignati. quorum mensura licet diuersa sit, tamen distant a se in pedibus C , in CXL, in ped. CC, in ped. CCXX, in ped. CCC, in ped. cCCLX, in ped. CCCC, in ped. cccclxxx, in ped. D, in ped. dlx, in ped. DC.
nam pars agri quae circa Portum est Tiberis, in iugeribus adsignata adque oppi- danis est tradita, et pro aestimio ubertatis professionem acceperunt.
media autem pars inter Romam et Portum actis quidem mensuris est adsignata, et stipitibus oleagineis adfixis numeri ad singulos angulos sunt designati. [ad] quorum palorum loco postea lapides gregales ob numeros podismi custodiendos sunt adpositi. quibus etiam praeceptum est ut pali annui sacrificales renouarentur. postea uariis locis deficientibus ueteranis iussu imp. Caesaris Traiani agri terminis lapideis sunt adsignati. qui termini recipiunt mensuram parallelogrammam, et distant a se in ped. DC DCCCXL DCCCCLX $\infty X X \infty$ CC $\infty$ CCCCXL $\infty D C L X X X$ et $\infty D C C C$. huius enim territorii forma in tabula aeris ab imperatore Traiano iussa est describi, quod limitibus normalibus maritimisque sit adsignatus.
pars autem intra Etruriam proxime coloniam Veios omnis limitibus intercisiuis est adsignata, ut supra ostendi. in quo territorio omnis ager iugerationis modum habet collectum, sicut in aere est nominatum.

Ager Lunensis ea lege qua et ager Florentinus. limites in horam sextam conuersi sunt et ad occidentem plurimum dirigunt cursus. termini aliqui ad distinctionem numeri positi sunt, alii ad recturas linearum monstrandas.

Ager Tiferinus in centuriis fuit assignatus postea iussu imp. Tiberi Caesaris, quis prout occupauit miles, deficientibus, aliis paucioribus est adsignatus. termini pleurici positi, qui rationem obseruationis tantum ostendunt quam recturam limitum.

Ager Spellatinus lege Iulia est adsignatus in modum iugerationis. termini lapidei . . . distant a se in ped. $\infty$ CC: $5^{22}$ distant a se pd. $\infty$ DCCCCXX, IqI: p. Isz, 5 , pd. IIC: $\varsigma^{z}$, pd. II, distant a se ped. IICCCC. ea lege et mensura seruari a nostris iussum est.

Ager Amerinus lege imp. Augusti est assignatus. ueteranis est quidem adiudicatus, et pro aestimio ubertatis legem sunt secuti, ubi termini ambiguum numquam receperant, circa ipsum oppidum. sed extra tertium miliarium lex Caesariana operata est in absoluto. termini siti sunt [id est] $\varsigma \mathfrak{\xi}$, p. $\varsigma$, distant a se ped. DCCCC: alii ped., pd. $\varsigma^{22}$, ped. $\infty$ CC: alii p. Iz, ped. $5^{22}$, ped. $\infty$ CCCCXL.
fifth boundary stone, right up to the appropriate number, or the final corners of the allocated land. Even though the dimensions of the markers may vary, nevertheless the intervals between them are 100 , up to 140 , up to 200 , up to 220 , up to 300 , up to 360 , up to 400 , up to 480 , up to 500 , up to 560 , and up to 600 feet.

Part of the land around Portus ${ }^{45}$ on the river Tiber, was allocated in iugera and granted to townspeople, and they received a declaration according to an evaluation of its fertility.

The middle region between Rome and Portus was allocated after the survey had been completed; posts made from the wood of olive-trees were set up, and at every corner numbers were marked. Afterwards, in place of these posts, ordinary stones were set up to preserve the numbers (of the limites) of the measured area. In these areas, it is even laid down that the sacrificial stakes should be repaired every year. Subsequently, when in some locations the veterans died out, on the orders of the emperor Trajan, the lands were allocated with stone boundary markers. These markers have the dimensions of a parallelogram and the intervals between them are up to $600,840,960,1,020,1,200,1,440,1,680$, and 1,800 feet. The emperor Trajan ordered that a map of this territory, which was allocated by right-angled limites (including some) facing the sea, should be inscribed on a tablet of bronze. ${ }^{46}$

An area in Etruria adjacent to the colony of Veii, was allocated in its entirety by limites intercisivi, as I pointed out above. In this territory all the land has an accumulated total of iugera, as is noted on the bronze records (i.e. just the overall total, not by centuriae or smaller units).

The land of Luna (Luni) ${ }^{47}$ was allocated under the same lex as the land of Florentia. The limites face south, but stretch out further towards the west. Some boundary markers were placed to distinguish the number (of each limes), others to show the direction of the straight line boundaries.

The land of Tifernum (Città di Castello) ${ }^{48}$ was allocated in centuriae. Afterwards, by order of the emperor Tiberius Caesar, when the soldiers who had occupied this land had died out, it was allocated to others, fewer in number. Boundary markers were set up at the sides, which show only the general scheme of boundary-marking, rather than the direction of the limites.

The land of Hispellum (Spello) ${ }^{49}$ was allocated under a lex Iulia in the form of division into iugera. Stone boundary markers ... and the intervals between are up to 1,200 feet; if $5 / 6$ of a foot long, and $17 / 12$ feet thick, the intervals between them are 1,920 feet, if $13 / 4$ feet thick and $1 / 2$ foot long, 2,100 feet; if $3 / 4$ of a foot long and 2 feet thick, the intervals between them are 2,400 feet. ${ }^{50}$ In accordance with this lex, it has been laid down that the measurements should be preserved by us.

The land of Ameria (Amelia) was allocated under a lex of the emperor Augustus. It was divided among veterans, and on the basis of an evaluation of the land's fertility, they followed the lex, where the boundary markers did not allow any ambiguity, round the town itself. But beyond the third milestone, a lex Caesariana operated in land that had not been surveyed. Boundary markers were positioned, being $3 / 4$ of a foot thick and $1 / 2$ foot long, and the intervals between them are 900 feet. Others are 1 foot thick and $5 / 6$ of a foot long (and the intervals between them are) 1,200 feet; others are $11 / 4$ feet thick and $5 / 6$ of a foot long (and the intervals between them are) 1,440 feet. ${ }^{52}$

## Pars piceni.

Ager Anconitanus ea lege qua et ager Florentinus est assignatus limitibus Augusteis siue k. et d. uel maritimos aut montanos limites. ab oriente ad occidentem qui in groma sunt designati, qualis diametralis appellatur. de meridie in septentrionem qui circulum secat, uerticalis diagonalis appellatur. nam quaedam pars Tusciae his limitibus et nominibus ab Hetruscorum aruspicum doctrina uel maiorum designatione nuncupantur. ceteri limites iuxta formas et inscriptiones polygoniorum nomina acceperunt, uel ex litteris Graecis.

## Ex libro balbi provincia piceni.

Ager Spoletinus in iugeribus et limitibus intercisiuis est adsignatus ubi cultura est: ceterum in soluto est relictum in montibus uel subsiciuis, quae rei publicae alii cesserunt. nam et multa loca hereditaria accepit eius populus. ager qui a fundo suo tertio uel quarto uicino situs est, in iugeribus iure ordinario possidetur, sicut est Interamnae Flaminiae et Interamnae Paletino Piceni.

Ager Vrbis Saluiensis limitibus maritimis et montanis lege triumuirale. et loca hereditaria eius populus accepit.

Ager Tolentinus item est adsignatus.
Ager Firmo Piceno limitibus triumuiralibus in centuriis est per iugera ducena adsignatus.

Ager Senogalliensis et Potentinus, Ricinensis et Pausulensis. item sunt adsignati.
Ager Cuprensis Truentinus Castranus Aternensis lege Augustiana sunt adsignati.
Ager Anconitanus limitibus Graccanis in centuriis est adsignatus.
Ager Ausimatis item est assignatus.
Ager Asculanus locis uariis limitibus intercisiuis est adsignatus, et terminis Claudianis, qui in modum arcellae facti sunt, est demetitus, et aliis ligneis sacrificalibus. quorum limitum distantia est ped. $\infty$ CC et infra. ceterum in absoluto remansit, et riuorum tenor finitimus obseruabatur. ager eius militibus est adsignatus: sed sunt loca quae in assignationem non uenerunt.

Ager Adrianus, item et ager Nursinus et Falerionensis et Pinnensis, limitibus maritimis et Gallicis quos dicimus decimanos et kardines. nam eorum delimitatio est per rationem arcarum uel riparum. uel canabula et nouerca, quod tegulis construitur. aliis uero locis muros macerias scorofiones congerias carbunculos, et uariis locis terminos Augusteos, per quorum cursus in Piceno fines terminantur.

Provincia valeria.
Ager Amiternus. iter populo non debetur. nam ager eius in tetragonon est assignatus per nomina arcarum riparum, macerias scorofiones congerias carbunculos. nam locis montuosis loca saxuosa. termini sunt constituti Tiburtini in effigie tituli in

## Part of the province of picenum ${ }^{53}$

The land of Ancona ${ }^{54}$ was allocated under the same lex as the land of Florentia, by means of Augustan limites, both kardines and decumani; it has limites facing the sea or mountains. A limes, established by surveying, that runs from east to west, is called diametralis; one that cuts the circle going from south to north, is called verticalis diagonalis. In part of Etruria, these are names given to limites, derived from the learning of Etruscan soothsayers or the usage of our ancestors. Other limites in maps and inscriptions got the name polygonii, possibly from the Greek language.

## Extract from balbus' book on the province of picenum

The land of Spoletium (Spoleto), ${ }^{55}$ where there is cultivation, was allocated in iugera by limites intercisivi. But land on mountains or in subseciva was left unsurveyed, and others granted this to the community. Indeed its population received many places by way of inheritance. Land that is separated from (the rest of its) farm by the property of three or four neighbours is occupied in iugera according to the normal legal process, as at Interamna Nahars (Terni) and at Interamnia Praetuttiorum (Teramo). ${ }^{56}$

The land of Urbs Salvia Pollentinorum (Urbisaglia) ${ }^{57}$ was allocated by a triumviral lex, with limites facing the sea and mountains. Moreover, its people received places by inheritance.

The land of Tolentinum (Tolentino) ${ }^{58}$ was allocated in the same way.
The land of Firmum Picenum (Fermo) ${ }^{59}$ was allocated in centuriae of 200 iugera, with limites established by triumvirs.

The lands of Sena Gallica (Senigallia), ${ }^{60}$ Potentia (Santa Maria a Potenza), ${ }^{61}$ Ricina, ${ }^{62}$ and Pausulum ${ }^{63}$ were allocated in the same way (i.e. as Firmum).

The lands of Cupra (Cupra), ${ }^{64}$ Castrum Truentum, ${ }^{65}$ Castrum Novum (Giulianova), ${ }^{66}$ and Aternum ${ }^{67}$ were allocated under a lex Augustiana.

The land of Ancona was allocated in centuriae by means of Gracchan limites. ${ }^{68}$
The land of Auximum (Osimo) ${ }^{69}$ was allocated in the same way.
The land of Asculum (Ascoli Piceno) ${ }^{70}$ was allocated in some places by means of limites intercisivi, and was marked out with Claudian boundary stones, which are made in the shape of a small chest, and by other wooden 'sacrificial' stakes. The length of these limites is 1,200 feet or less. The rest of the land has remained unsurveyed, and the course of rivers is taken to mark boundaries. Its land was allocated to soldiers, but there are also areas which were not included in the allocation.

The lands of Hadria (Atri), ${ }^{71}$ Nursia (Norcia), ${ }^{72}$ Falerio (Falerone), ${ }^{73}$ and Pinna (Penne) ${ }^{74}$ were allocated by means of limites facing the sea and 'Gallic' limites, which we call decumani and kardines. The demarcation of boundaries in these areas is by chestshaped markers \{arcae\} or banks, or canals, or drainage channels. ${ }^{75}$ Elsewhere they use walls, dry-stone walls, heaps and piles of stones, rough boundary stones, and in some places Augustan boundary stones, by whose line boundaries in Picenum are marked.

Province of valeria ${ }^{76}$
The land of Amiternum (near San Vittorino). ${ }^{77}$ A right of way is not due to the people. Its land was allocated in the shape of a square, using arcae, river banks, walls, heaps and piles of stones, and stone projections. For there are rocky locations in mountainous areas. Boundary markers of Tiburtine stone were set up, some square-
tetragonon, alii trigonii, alii rotundi in effigie columnae. quorum mensura licet diuersa sit, tamen distant a se in pedibus CCXXX, in p. CCCXL, in p. CCCCXX, in p. DCLX, in p. DCLX, in p. DCCXC, in p. DCCXC, in p. DCCCCXX, in p. $\infty$ CC, in p. $\infty_{C C C X L}$, in p. $\overline{\mathrm{I}}$, in p. $\overline{\mathrm{I} C C C C L}$. interiectis locis petrae natiuae signatae inueniuntur, aut certe saxa consti- tuta sunt, quae et ipsa sine dubio finitima obseruanda sunt.

Ager Aueias ea lege est assignatus qua et ager Amiternus.
Ager Corfinius lege Sempronia est assignatus. iter populo debetur ped. LXxX. cuius agri mensura in tetragonon uariis locis est collecta, et termini silicei sunt appositi, quorum distantia est in p. DCCXX, in p. DCCCLX. hoc in locis montuosis: in quibus alii iuxta naturam loci spissiores sunt, id est sine mensura sunt appositi. et interiectis locis muros, macherias, lacos conuallium, aras, canabula, quod tegulis construitur.

Colonia Superaequana. ager eius ueteranis est assignatus: sed postea Verus et Antoninus et Commodus aliqua priuatis concesserunt.

Colonia Peltuinorum. iter populo non debetur. ager eius limitibus intercisiuis est assignatus.

Marsus municipium licet consecratione ueteri maneat, tamen ager eius intercisiuis limitibus est assignatus.

Colonia Solomontina ea lege est assignata qua et Corfinius.

EX COMMENTARIO CLAVDI CAESARIS SVBSEQVITVR, QVI SEORSVM DESCRIPTVS EST.
Civitates campaniae ex libro regionvm.
Aquinum, muro ducta colonia, a triumuiris deducta. iter populo debetur ped. xxx. ager eius perennis limitibus est adsignatus.

Abellinum, muro ducta colonia, deducta lege Sempronia. iter populo non debetur. ager eius ueteranis est adsignatus.

Antium. populus deduxit. iter populo non debetur. ager eius in lacineis est adsignatus.

Acerras, muro ducta colonia. diuus Augustus deduci iussit. iter populo debetur ped. LXxx. ager eius in iugeribus militibus est adsignatus.

Atella, muro ducta colonia, deducta ab Augusto. iter populo debetur ped. cxx. ager eius in iugeribus est adsignatus.

Atina, muro ducta colonia. deduxit Nero Claudius. iter populo non debetur. ager eius pro parte in lacineis et per strigas est adsignatus.

Alatrium, muro ducta colonia. populus deduxit. iter populo non debetur. ager eius per centurias et strigas est adsignatus.
shaped like a tablet, others triangular, others round like a column. Although they have different dimensions, nevertheless the intervals between them are up to 230 , up to 340 , up to 420 , up to 660 , up to $660(?)$, up to 790 , up to 790 (?), up to 920 , up to 1,200 , up to 1,340 , up to 2,000 , up to 2,450 feet. In some intervening places, native stones, which have been marked, are found; or at least boulders have been positioned, and these undoubtedly should be noted as boundary markers.

The land of Aveia ${ }^{78}$ was allocated under the same lex as the land of Amiternum.
The land of Corfinium (Corfinio) ${ }^{79}$ was allocated under a lex Sempronia. A right of way 80 feet wide is due to the people. The measurement of this land was arranged in several places in the shape of a square; flintstone boundary markers were set up, and the distance between them is up to 720 and up to 860 feet. This is the practice in mountainous locations, where some stones are positioned more closely together because of the nature of the terrain, that is, they are set up without measurement (of the distance between them). Moreover, in some intervening places they use walls, drystone walls, lakes in valleys, altars, and canals constructed from tiles.

The colony of Superaequum. ${ }^{80}$ Its land was allocated to veterans. Later (Lucius) Verus and Antoninus (Marcus Aurelius) and Commodus granted certain areas to private individuals.

The colony of Peltuinum. ${ }^{81}$ A right of way is not due to the people. Its land was allocated by limites intercisivi.

Marruvium (San Benedetto dei Marsi). ${ }^{82}$ Although it remains a municipium by long-standing tradition, nevertheless its land was allocated by limites intercisivi.

The colony of Sulmo (Sulmona) ${ }^{83}$ was allocated under the same lex as Corfinium.
There follows below an extract from the Commentary of Claudius Caesar, ${ }^{84}$ which has been set out separately.

## The communities of campania from the book of the regions

Aquinum (Aquino), ${ }^{85}$ a colony encircled with a wall, founded by the triumvirs. A right of way 30 feet wide is due to the people. Its land has been allocated by continuous limites.

Abellinum (Avellino), ${ }^{86}$ a colony encircled with a wall, founded under a lex soldiers.

Antium (Anzio). ${ }^{87}$ The people founded it. A right of way is not due to the people. Its land was allocated in strips \{laciniae\}.

Acerrae, ${ }^{88}$ a colony encircled with a wall. The divine Augustus ordered that it be settled. A right of way 80 feet wide is due to the people. Its land was allocated to soldiers in iugera.

Atella, ${ }^{89}$ a colony encircled with a wall, founded by Augustus. A right of way 120 feet wide is due to the people. Its land was allocated in iugera.

Atina, ${ }^{90}$ a colony encircled with a wall. Nero Claudius founded it. A right of way is not due to the people. Its land was allocated proportionately in strips and also by strigae.

Aletrium (Alatri), ${ }^{91}$ a colony encircled with a wall. The people founded it. A right of way is not due to the people. Its land was allocated by centuriae and strigae.

Aricia, oppidum. lege Sullana est munita. iter populo non debetur. ager eius in praecisuris est adsignatus.

Asetium, muro ducta lege triumuirale. iter populo non debetur. ager eius militi est adsignatus.

Anagnia, muro ducta colonia. iussu Drusi Caesaris populus deduxit. iter populo non debetur. ager eius per strigas est ueteranis adsignatus.

Abella, municipium. coloni uel familia imperatoris Vespasiani iussu eius acceperunt. postea ager eius in iugeribus militi est adsignatus.

Afile, oppidum. lege Sempronia in centuriis et in lacineis ager eius est adsignatus. iter populo non debetur.

Ardea, oppidum. imperator Adrianus censiit. iter populo non debetur. ager eius in lacineis est adsignatus.

Allifae, oppidum muro ductum. ager eius lege triumuirale est adsignatus. iter populo non debetur.

Beneuentum, muro ducta colonia Concordia. deduxit Nero Claudius Caesar. iter populo non debetur. ager eius lege triumuirale ueteranis est adsignatus.

Bouianum, oppidum. lege Iulia milites deduxerunt sine colonis. iter populo debetur ped. x . ager eius per centurias et scamna est adsignatus.

Bobillae, oppidum. lege Sullana est circum ducta. iter populo non debetur. agrum eius ex occupatione milites ueterani tenuerunt in sorte.

Casentium, muro ducta lege triumuirale. iter populo non debetur. ager eius militibus est adsignatus.

Calagna, muro ducta colonia. iussu Drusi Caesaris populus deduxit. iter populo non debetur. ager eius ueteranis est adsignatus.

Capua, muro ducta colonia Iulia Felix. iussu imperatoris Caesaris a uiginti uiris est deducta. iter populo debetur ped. c. ager eius lege Sullana fuerat adsignatus: postea Caesar in iugeribus militi pro merito diuidi iussit.

Calatia, oppidum. muro ducta. iter populo debetur ped. LX. coloniae Capuensi a Sulla Felice cum territorio suo adiudicatum olim ob hosticam pugnam.

Caudium, oppidum. muro ducta. iter populo debetur ped. L. a Caesare Augusto coloniae Beneuentanae cum territorio suo est adiudicata. ager eius ueteranis fuerat adsignatus, postea mensuratus limitibus est censitus.

Cumis, muro ducta colonia, ab Augusto deducta. iter populo debetur ped. lxxx. ager eius in iugeribus ueteranis pro merito est adsignatus iussu Claudi Caesaris.

Calis, municipium muro ductum. iter populo non debetur. ager eius limitibus

Aricia (Ariccia), ${ }^{92}$ a town; it was fortified under a lex Sullana. A right of way is not due to the people. Its land was allocated in parcels.

Asetium, ${ }^{93}$ encircled with a wall, under a triumviral lex. A right of way is not due to the people. Its land was allocated to soldiers.

Anagnia (Anagni), ${ }^{94}$ a colony encircled with a wall. The people founded it on the orders of Drusus Caesar. A right of way is not due to the people. Its land was allocated to veteran soldiers in strigae.

Abella, a municipium. ${ }^{95}$ Colonists, as well as members of the household of the emperor Vespasian, received (land) on his orders. Later, its land was allocated to soldiers in iugera.

Aefulae (Monte Sant'Angelo), a town. ${ }^{96}$ Its land was allocated under a lex Sempronia in centuriae and strips (lacineae). A right of way is not due to the people.

Ardea (Ardea), a town. ${ }^{97}$ The emperor Hadrian assessed it. A right of way is not due to the people. Its land was allocated in strips.

Allifae (Alife), ${ }^{98}$ a town encircled with a wall. Its land was allocated by a triumviral lex. A right of way is not due to the people.

Beneventum (Benevento), ${ }^{99}$ the colonia Concordia, encircled with a wall. Nero Claudius Caesar founded it. A right of way is not due to the people. Its land was allocated to veteran soldiers under a triumviral lex.

Bovianum (Boiano), a town. ${ }^{100}$ Soldiers founded it under a lex Iulia without (any other) settlers. A right of way 10 feet wide is due to the people. Its land was allocated in centuriae and scamna.

Bovillae, a town. ${ }^{101}$ It was encircled with a wall under a lex Sullana. A right of way is not due to the people. Veteran soldiers held its land in lots as a result of appropriating it.

Casentium, ${ }^{102}$ encircled with a wall under a triumviral lex. A right of way is not due to the people. Its land was allocated to soldiers.

Calagna, ${ }^{103}$ a colony encircled with a wall. The people founded it on the orders of Drusus Caesar. A right of way is not due to the people. Its land was allocated to veteran soldiers.

Capua (S. Maria Capua Vetere), ${ }^{104}$ the colonia Iulia Felix, encircled with a wall. By order of imperator Caesar, it was founded by a board of twenty men. A right of way 100 feet wide is due to the people. Its land had been allocated under a lex Sullana. Afterwards, Caesar ordered it to be allocated in iugera to each soldier according to his deserts.

Calatia, a town. ${ }^{105}$ Encircled with a wall. A right of way 60 feet wide is due to the people. The town was allocated with its territory to the colony of Capua by Sulla Felix, after a battle against (his) enemies.

Caudium, a town. ${ }^{106}$ Encircled with a wall. A right of way 50 feet wide is due to the people. The town along with its territory was allocated to the colony of Beneventum by Caesar Augustus. Its land had been allocated to veterans; later, it was measured out and assessed by means of limites.

Cumae, ${ }^{107}$ a colony encircled with a wall, founded by Augustus. A right of way 80 feet wide is due to the people. Its land was allocated in iugera to veterans, according to their deserts, by order of Claudius Caesar.
$\qquad$


Graccanis antea fuerat adsignatus, postea iussu Caesaris Augusti limitibus nominis sui est renormatus.

Casinum, oppidum. milites legionarii deduxerunt. iter populo non debetur. nam eidem militi ager eius in praecisura est adsignatus.

Capitulum, oppidum, lege Sullana est deductum. iter populo non debetur. ager eius pro merito . . . et quis prout agrum occupauit tenuit; sed postea Caesar limites formari iussit pro merito.

Castrimonium, oppidum, lege Sullana est munitum. iter populo non debetur. ager eius ex occupatione tenebatur: postea Nero Caesar tribunis et militibus eum adsignauit.

Cereatae Mariana, municipium. familia Gai Mari obsidebat: postea a Druso Caesare militibus et ipsi familiae in iugeribus est adsignatum. iter populo non debetur.

Cadatia, oppidum, lege Graccana est munitum. ager eius ueteranis est adsignatus. iter populo non debetur.

Diuinos, municipium. familia diui Augusti condidit, et ager eius isdem est adsignatus sine lege.

Esernia, colonia deducta lege Iulia. iter populo debetur ped. x , ager eius limitibus Augusteis est adsignatus.

Frusinone, oppidum. muro ducta. iter populo non debetur. ager eius ueteranis est adsignatus.

Forum Populi, oppidum muro ductum. iter populo debetur ped. xv. limitibus Augusteis ager eius in iugeribus est adsignatus. nam imperator Vespasianus postea lege sua agrum censiri iussit.

Ferentinum, oppidum muro ductum. iter populo non debetur. ager eius perennis limitibus pro parte in iugeribus et in lacineis est adsignatus.

Fabrateria, muro ducta. iter populo non debetur. ager eius iure ordinario est diuisus.

Fundis, oppidum muro ductum. iter populo non debetur. ager eius iussu Augusti ueteranis est cultura adsignatus: ceterum in eius iure et in publicum resedit.

Formias, oppidum. triumuiri sine colonis deduxerunt. iter populo non debetur. ager eius in absoluto resedit. pro parte in lacineis est adsignatus. finitur terminis siliceis et Tiburtinis.

Gauis, oppidum lege Sullana munitum. ager eius militi ex occupatione censitus est. iter populo non debetur.

Interamna, oppidum, muro ducta a triumuiris est munita. iter populo non debetur. ager eius militi metyco est adsignatus in lacineis limitibus intercisiuis.

Laurum Lauinia lege et consecratione ueteri manet. ager eius ab imppp.
people．Its land had been previously allocated by means of Gracchan limites；later，by order of Caesar Augustus，it was measured out again with limites，in his name．

Casinum（Cassino），${ }^{109}$ a town．Legionary soldiers founded it．A right of way is not due to the people．Its land was allocated to the same soldiers in parcels．

Capitulum，${ }^{110}$ a town，founded under a lex Sullana．A right of way is not due to the people．Its land according to their deserts ．．．and each man kept whatever land he had appropriated；later Caesar ordered limites to be established（for distribution to settlers）according to their deserts．

Castrimoenium，${ }^{111}$ a town fortified under a lex Sullana．A right of way is not due to the people．Its land was held as a result of appropriation．Later，Nero Caesar allo－ cated it to tribunes and soldiers．

Cereatae Marianae（Casamari），${ }^{112}$ a municipium．Members of the household of Gaius Marius appropriated it．Later，it was allocated in iugera by Drusus Caesar to soldiers and to members of his own household．A right of way is not due to the peo－ ple．

Cadatia，${ }^{113}$ a town fortified under a lex Gracchana．Its land was allocated to vet－ eran soldiers．A right of way is not due to the people．

Divinos，${ }^{114}$ a municipium．Members of the household of the divine Augustus founded it，and its land was allocated to them without any lex．

〈A〉esernia，${ }^{115}$ a colony founded under a lex Iulia．A right of way 10 feet wide is due to the people．Its land was allocated by means of Augustan limites．

Frusino（Frosinone），${ }^{116}$ a town．Encircled with a wall．A right of way is not due to the people．Its land was allocated to veteran soldiers．

Forum Populi，${ }^{117}$ a town encircled with a wall．A right of way 15 feet wide is due to the people．Its land was allocated in iugera by means of Augustan limites．Later， the emperor Vespasian ordered its land to be assigned under his own lex．

Ferentinum（Ferentino），${ }^{118}$ a town encircled with a wall．A right of way is not due to the people．Its land was allocated proportionally by continuous limites，in iugera and in strips．

Fabrateria，${ }^{119}$ encircled with a wall．A right of way is not due to the people．Its land was allocated according to the normal legal process．

Fundi（Fondi），${ }^{120}$ a town encircled with a wall．A right of way is not due to the people．By order of Augustus，the cultivated part of its land was allocated to veteran soldiers．The rest（of its land）was in his jurisdiction and reverted to public control．${ }^{121}$

Formiae（Formia），${ }^{122}$ a town．Triumvirs founded it without colonists．A right of way is not due to the people．Its land has remained unsurveyed．It has been allocated proportionately by strips．Its boundary is demarcated by flint stones and Tiburtine stones．

Gabii（Castiglione），${ }^{123}$ a town fortified under a lex Sullana．Its land was assessed for soldiers on the basis of what they had appropriated．A right of way is not due to the people．

Interamna Lirenas，${ }^{124}$ a town encircled with a wall，fortified by triumvirs．A right of way is not due to the people．Its land was allocated to non－native soldiers in strips by limites intercisivi．

Laurolavinium（Pratica di Mare）${ }^{125}$ remains according to its old lex and con－ secration．Its land was allocated in strips by the emperors Vespasian，Trajan，and

Vespasiano Traiano et Adriano in lacineis est adsignatus. iter populo non debetur.
Liternum, muro ductum, colonia ab Augusto deducta. iter populo debetur ped. cxx. ager eius in iugeribus ueteranis est adsignatus.

Lanuuium, muro ductum, colonia deducta a diuo Iulio. ager eius limitibus Augusteis pro parte est adsignatus militibus ueteranis, et pro parte uirginum Vestalium lege Augustiana fuit. sed postea imp. Hadrianus colonis suis agrum adsignari iussit.

Liguris Bebianus et Cornelianus, muro ductus triumuirale lege. iter populo non debetur. ager eius post bellum Augustianum ueteranis est adsignatus.

Minturnas, muro ducta colonia, deducta a Gaio Caesare. iter populo non debetur. ager eius pro parte in iugeribus est adsignatus: ceterum in absoluto est relictum.

Neapolim, muro ducta. iter populo debetur ped. Lxxx. sed ager eius Sirenae Parthenopae a Graecis est in iugeribus adsignatus, et limites intercisiui sunt constituti, inter quos postea et miles imp. Titi lege modum iugerationis ob meritum accepit.

Nuceria Constantia, muro ducta colonia, deducta iussu imp. Augusti. iter populo debetur ped. LX. ager eius limitibus Iulianis lege Augustiana militibus est adsignatus, et alibi in absoluto resedit.

Nola, muro ducta colonia Augusta. Vespasianus Aug. deduxit. iter populo debetur ped. cxx. ager eius limitibus Sullanis militi fuerat adsignatus, postea intercisiuis mensuris colonis et familiae est adiudicatus.

Ostensis ager ab imppp. Vespasiano Traiano et Hadriano, in precisuris, in lacineis, et per strigas, colonis eorum est adsignatus. sed postea imppp. Verus Antoninus et Commodus aliqua priuatis concesserunt.

Puteolis, colonia Augusta. Augustus deduxit. ex uno latere iter populo debetur ped. xxx. ager eius in iugeribus ueteranis et tribunis legionariis est adsignatus.

Praeneste, oppidum. ager eius a quinque uiris pro parte in iugeribus est adsignatus [ubi] cultura [est]: ceterum in absoluto est relictum circa montes. iter populo non debetur.

Priuernum, oppidum muro ductum, colonia. miles deduxit sine colonis. iter populo debetur ped. xxx. ager eius pro parte cultu in iugeribus est adsignatus: ceterum in lacineis uel in soluto remansit.

Surrentum, oppidum. ager eius ex occupatione tenebatur a Graecis ob consecrationem Mineruae. sed et mons Sirenianus limitibus pro parte Augustianis est adsignatus. ceterum in soluto remansit. iter populo debetur ubi Sirenae.

Suessula, oppidum, muro ducta. lege Syllana est deducta. ager eius ueteranis limitibus Syllanis in iugeribus est adsignatus. iter populo non debetur.

Hadrian. A right of way is not due to the people.
Liternum, ${ }^{126}$ encircled with a wall, a colony founded by Augustus. A right of way 120 feet wide is due to the people. Its land was allocated to veteran soldiers in iugera.

Lanuvium (Lanuvio), ${ }^{127}$ encircled with a wall, a colony founded by the divine Julius. Its land was allocated in part to veteran soldiers by means of Augustan limites, and in part belonged to the Vestal Virgins according to a lex Augustiana. But afterwards, the emperor Hadrian ordered the land to be allocated to his own colonists.

Ligures Baebiani and Corneliani, ${ }^{128}$ encircled with a wall under a triumviral lex. A right of way is not due to the people. Its land was allocated to veteran soldiers after the Augustan war.

Minturnae (Minturno), ${ }^{129}$ a colony encircled with a wall, founded by Gaius Caesar. A right of way is not due to the people. Its land was allocated partly in iugera. The remainder was left unsurveyed.

Neapolis (Naples), ${ }^{130}$ encircled with a wall. A right of way 80 feet wide is due to the people. But its land at Sirena Parthenopa was allocated in iugera by Greeks, and limites intercisivi were established, within which soldiers afterwards received an area of land in iugera according to their deserts, through a lex of the emperor Titus.

Nuceria Constantia (Nocera Superiore), ${ }^{131}$ a colony encircled with a wall, founded on the orders of the emperor Augustus. A right of way 60 feet wide is due to the people. Its land was allocated to soldiers under a lex, by means of Julian limites; but elsewhere it remained unsurveyed.

Nola (Nola), ${ }^{132}$ an Augustan colony encircled with a wall. Vespasianus Augustus founded it. A right of way 120 feet wide is due to the people. Its land had been allocated to soldiers by means of Sullan limites, and afterwards it was allocated to colonists and members of his household by means of internal lines \{mensurae intercisivae $\}$.

The land of Ostia (Ostia) ${ }^{133}$ was allocated to their colonists by the emperors Vespasian, Trajan, and Hadrian, in parcels, in strips, and by strigae. But later, the emperors Verus, Marcus Aurelius, and Commodus granted some land to private
individuals.

Puteoli (Pozzuoli), ${ }^{134}$ a colonia Augusta. Augustus founded it. On one side a right of way 30 feet wide is due to the people. Its land was allocated in iugera to veteran soldiers and to legionary tribunes.

Praeneste (Palestrina), ${ }^{135}$ a town. The cultivated section of its land was allocated partly in iugera by a board of five men; the remaining part, close to the mountains, was left unsurveyed. A right of way is not due to the people.

Privernum (Priverno), ${ }^{136}$ a town, encircled with a wall, a colony. Soldiers founded it without colonists. A right of way 30 feet wide is due to the people. The cultivated section of its land was allocated partly in iugera; the rest remained in strips, or unsurveyed.

Surrentum (Sorrento), ${ }^{137}$ a town. Its land was held by Greeks according to what
30 they had appropriated, because it was dedicated to Minerva. But Mount Sirenianus was allocated by means of limites, which were partly Augustan. The rest remained unsurveyed. A right of way is due to the people at the sanctuary of the Sirenae.

Suessula (Arienzo), ${ }^{138}$ a town encircled with a wall. It was founded under a lex Sullana. Its land was allocated to veteran soldiers in iugera, by means of Sullan limites. A right of way is not due to the people.

Sinuessa, oppidum, muro ducta. iter populo non debetur. ager eius in iugeribus limitibus intercisiuis militibus est adsignatus.

Suessa Aurunca, muro ducta. lege Sempronia est deducta. iter populo non debetur. ager eius pro parte limitibus intercisiuis et in lacineis est adsignatus.

Saepinum, oppidum, muro ductum. colonia ab imp. Nerone Claudio est deducta. iter populo debetur ped. L. ager eius in centuriis Augusteis est adsignatus.

Sora, muro ducta colonia, deducta iussu Caesaris Augusti. iter populo debetur ped. xv. ager eius limitibus Augusteis ueteranis est adsignatus.

Signia, muro ducta colonia, a militibus et triumuiris munita. iter populo non debetur. ager eius in praecisuris limitibus triumuiralibus est adsignatus.

Setia, muro ducta colonia. triumuiri munierunt. iter populo debetur ped. xv. ager eius in soluto ex occupatione a militibus tenetur.

Telesia, muro ducta colonia, a triumuiris deducta. iter populo debetur ped. xxx. ager eius limitibus Augusteis in nominibus est adsignatus.

Teanum Siricinum, colonia deducta a Caesare Augusto. iter populo debetur ped. lxxxv. ager eius militibus metycis nominibus IIIICl limitibus Augusteis est adsignatus.

Tusculi oppidum muro ductum. iter populo non debetur. ager eius mensura Syllana est adsignatus.

Terracina, oppidum. iter populo non debetur. ager eius in absoluto est dimissus.
Terebentum, oppidum. ager eius in praecisuras et strigas est adsignatus post tertiam obsidionem limitibus Iulianis. iter populo non debetur.

Trebula, municipium. iter populo non debetur. ager eius limitibus Augusteis in nominibus est adsignatus.

Vellitras, oppidum, lege Sempronia fuerat deductum: postea Claudius Caesar agrum eius limitibus Augusteis censitum militibus eum adsignari iussit.

Vlubra, oppidum, a triumuiris erat deducta: postea a Druso Caesare est inruptum. ager eius in nominibus est adsignatus. iter populo non debetur.

Volturnum, muro ductum. colonia iussu imp. Caesaris est deducta. iter populo debetur ped. XX. ager eius in nominibus uillarum et possessorum est adsignatus.

Venafrum, oppidum. quinque uiri deduxerunt sine colonis. iter populo debetur ped. xx. ager eius in lacineis limitibus intercisiuis est adsignatus. sed et summa montium iure templi Ideae ab Augusto sunt concessa.

Verulae, oppidum muro ductum. ager eius limitibus Graccanis in nominibus est

Sinuessa, ${ }^{139}$ a town, encircled with a wall. A right of way is not due to the people. Its land was allocated to soldiers in iugera, by means of limites intercisivi.

Suessa Aurunca, ${ }^{140}$ encircled with a wall. It was founded under a lex Sempronia. A right of way is not due to the people. Its land was allocated partly by limites intercisivi, and in strips.

Saepinum (Altilia), ${ }^{141}$ a town, encircled with a wall. A colony was founded by the emperor Nero Claudius. A right of way 50 feet wide is due to the people. Its land was allocated in Augustan centuriae.

Sora, ${ }^{142}$ a colony encircled with a wall, founded by order of Caesar Augustus. A right of way 15 feet wide is due to the people. Its land was allocated to veterans by means of Augustan limites.

Signia (Segni), ${ }^{143}$ a colony encircled with a wall. It was fortified by soldiers and the triumvirs. A right of way is not due to the people. Its land was allocated in parcels, by means of triumviral limites.

Setia (Sezze), ${ }^{144}$ a colony encircled with a wall. Triumvirs fortified it. A right of way 15 feet wide is due to the people. Its land is held unsurveyed by soldiers on the basis of what they had appropriated.

Telesia, ${ }^{145}$ a colony encircled with a wall, founded by triumvirs. A right of way 30 feet wide is due to the people. Its land was allocated by name (to individuals), by means of Augustan limites.

Teanum Siricinum (Teano), ${ }^{146}$ a colony founded by Caesar Augustus. A right of way 85 feet wide is due to the people. Its land was allocated by name to 4,150 nonnative soldiers, by means of Augustan limites.

Tusculum, ${ }^{147}$ a town encircled with a wall. A right of way is not due to the people. Its land was allocated according to a Sullan survey.

Tarracina (Terracina), ${ }^{148}$ a town. A right of way is not due to the people. Its land was left unsurveyed.

Terebentum (Trivento), ${ }^{149}$ a town. Its land was allocated, after the third appropriation, in parcels and strigae, by means of Julian limites. A right of way is not due to the people.

Trebula, a municipium. ${ }^{150}$ A right of way is not due to the people. Its land was allocated by name (to individuals), by means of Augustan limites.

Velitrae (Velletri), ${ }^{151}$ a town, which had been settled under a lex Sempronia. Later, Claudius Caesar ordered its land, which had been assessed by means of Augustan limites, to be allocated to soldiers.

Ulubrae, ${ }^{152}$ a town, which had been founded by the triumvirs; later, it was the object of an incursion by Drusus Caesar. Its land was allocated by name (to individuals). A right of way is not due to the people.

Volturnum, ${ }^{153}$ encircled with a wall. A colony was established by order of imperator Caesar. A right of way 20 feet wide is due to the people. Its land was allocated according to the names of the estates and the landholders.

Venafrum (Venafro), ${ }^{154}$ a town. A board of five men settled it without any colonists. A right of way 20 feet wide is due to the people. Its land was allocated in strips by means of limites intercisivi. But mountain ridges were also granted by Augustus, in accordance with a lex relating to the sanctuary of Ida.

Verulae (Veroli), ${ }^{155}$ a town encircled with a wall. Its land was allocated by name
adsignatus, ab imp. Nerua colonis est redditus.

HVIC ADDENDAS MENSVRAS LIMITVM ET TERMINORVM EX LIBRIS AVGVSTI ET NERONIS CAESARVM, SED ET BALBI MENSORIS, QVI TEMPORIBVS AVGVSTI OMNIVM PROVINCIARVM ET FORMAS CIVITATIVM ET MENSVRAS COMPERTAS IN COMMENTARIIS CONTVLIT ET Legem agrariam per diversitates provinciarvm distinxit ac declaravit.

Ager Carsolis. iter populo non debetur. usque ad muros priuati possident montes [possident] nomine Romanos, qui usque ad sura deficiunt. in quibus montibus positi sunt rotundi termini... iugis montium, ripis, per deuexa loca, arboribus, diuergiis aquarum, uel uniuersa positione terminorum. in campis uero terminos quadratos, cursorias spatulas, uel metas assignatur. interiectis locis arcas et monumenta, uel alia testimonia.

Camerinum, muro ducta. iter populo non debetur.
Matilica, oppidum. iter populo debetur ped. Lxxx.
Septempeda, oppidum. iter populo non debetur.
Ager Atteiatis. oppidum. populo iter non debetur. nam agri eorum intercisiuis limitibus sunt assignati et in centuriis. per quorum limitum sunt ped. $\infty$ CCCC $\infty$ DC IICC $\overline{\mathrm{II} C C C C} \overline{\mathrm{II}}$. eorum cursus est per rationem arcarum riparum canabularum uel nouercarum. et uariis locis terminos Augusteos.

## Provincia dalmatiarvm

In diuersas regiones siue uocabula, uicos uel possessiones, haec sunt testimonia agralia diuidentia. in montibus et per loca arida et confragosa petras signatas inuenimus, summa montium, terminos Augusteos, id est rotundos in effigiem columnae, aliquos littera signatos (alii uero non sunt signati), arcas finales, grumos, arbores ante missas, intactas a ferro, congerias, macherias, id est ubi saxa collecta ab utrisque partibus limites dederunt, petras, sacrificales aras. in quibus locis arbores intactae stare uidentur, in his locis ueteres sacrificium faciebant. per certa loca uiae militares finem faciunt, alibi uero deuexa montium, id est per latera montium ripae currentes, finem faciunt. aliquando monumentis sepulchris. terminos cursorios in effigiem tituli constitutos, et in trigonium. per certa loca riui et canabulae et nouercae, scorofiones. ubi duo fines cuneati se iungunt, si forte, in campestribus locis. ubi agri in planitia sunt, in iugeribus assignata sunt. praetereo uicum Saprinum et Cliniuatium, †in terra uoratos $\dagger$ et Sardiatas, testimoniis diuidi ripis, riuis, arboribus ante missis, ut supra dixi. . . . loca sacrificales, tumor terrae in effigiem limitis constitutus. aliquotiens enim
(to individuals), by means of Gracchan limites; it was granted to colonists by the emperor Nerva.

To this should be added the measurements of limites and boundary markers, from the works of the Caesars Augustus and Nero, and also of Balbus the surveyor, who, in the time of Augustus, assembled in respect of all the provinces, both maps of communities and surveys that had been discovered in the registers, and who defined and published the lex concerning land in all its variations in the provinces. ${ }^{156}$

The land of Carseoli (Carsóli). ${ }^{157}$ A right of way is not due to the people. Right up to the walls of the town, private individuals possess the mountains called 'Roman', which fade out right at the row of stakes(?). In these mountains, round boundary stones have been set up ... (boundaries are marked by?) mountain ridges, by banks through areas of sloping ground, by trees, watersheds, or by the general placing of boundary markers. In level areas, (they set up) square boundary stones, or stones shaped like a spatula $\{$ spatula cursoria $\},{ }^{158}$ or marked rocks. In the intervening areas, they use arcae, monuments, or other indicators (of a boundary).

Camerinum (Camerino), ${ }^{159}$ encircled with a wall. A right of way is not due to the people.

Matilica (Matélica), ${ }^{160}$ a town. A right of way 80 feet wide is due to the people. Septempeda, ${ }^{161}$ a town. A right of way is not due to the people.
The land of the Attidians (San Severino Marche). ${ }^{162}$ A town. A right of way is not due to the people. Its land was allocated by limites intercisivi, and in centuriae. The dimensions of these limites are $1,400,1,600,2,200,2,400,2,500$ feet. Their path is marked out by means of arcae, banks, canals, and drainage channels. In some places Augustan boundary stones are used.

## Province of dalmatia ${ }^{163}$

As regards different regions and different terminology, and villages or landholdings, the following indicate land boundaries. In mountainous areas and across dry and broken ground, we find marked stones, mountain ridges, Augustan boundary stones, that is, round stones like a column, some marked with a letter (others however are unmarked), arcae demarcating boundaries, heaps of rocks, trees previously planted and untouched by the axe, piles of stones, dry-stone walls, that is, where rocks collected by both parties have established limites, boulders, and sacrificial altars. In those places where trees are seen to stand untouched, there men of old used to make sacrifices. Through certain areas military roads fix the boundary; elsewhere mountain slopes, that is, banks running across the sides of mountains, fix a boundary. Sometimes (boundaries are marked by) tombs. Intermediate boundary markers \{cursorii\} are also set up in the shape of a tablet, or in a triangular shape. In some places, rivers, canals, drainage channels, and heaps of stones (are used). Where two boundaries meet at an angle, for example in open terrain, (boundary markers are placed). Where the fields are on level ground, they have been allocated in iugera. I pass over the village of Saprinum and Clinivatium, also $\dagger$ in land... $\dagger$ and Sardiatae, ${ }^{164}$ where boundaries are demarcated by banks, rivers, trees previously planted, as I said above ... sites where sacrifices took place, a raised mound of earth set up in the shape of a limes (i.e. a
petras quadratas inscriptas：non enim omnis titulus inscriptionibus indutus est．nam et ipsi montes sic terminantur．alia loca sunt subseciua，quae in mensuram non uenerunt． si conuenerit inter possessores，possidentur：si non conuenerit，remanent potestati．alia loca sunt praefecturae，quae ad publicum ius pertinent．

Ratio militiae adsignationis prima triumuirales lapides Graccani，rotundi colum－ niaci，in capite，diametrum pedem unum et pedem unum et semis，altus ped．III et IIIIS．

Item diui Iuli idem sunt．
Item Augustei idem sunt，hac ratione quod Augustus eorum mensuras recensiit， et ubi fuerunt lapides，alios constituit，et omnem terram suis temporibus fecit permen－ surari ac ueteranis adsignari．qui lapides，item Gai Caesaris，idem，rotundi ex saxo sil－ ice uel molari．sunt supra terram sesquipedem，in terra pedes duo semis．est altus ped． iIII．distant a se ped．$\overline{\text { IICCCC．}}$

Sunt et alii termini supra terram ped．II［duo］，grassum pedem［unum］I5 ，in terra ped．III，et altus ped．III．a se distant ped．$\infty$ Cc．

Sunt et alii Neroniani Vespasiani et Traiani，lamnici et quadrati，in diuersis numeris constituti．in quibus alii gammati uel prout natura locorum permisit positi sunt．qui distant a se alii in ped．CCXL，et alii CCXX，et alii in ped．CCC，et alii in ped． CCCLX，et alii in ped．CCCCXX，et in ped．CCCCLXXX，alii ped．DC，et alii in ped．DCCXX， interdum et in ped．DCCCXL，et in ped．DCCCCXL，et in ped．$\infty$ CC．

Nam et in saltibus sunt scorofiones et carbunculus［id est scorofion molis petrarum constructi］，et distant a se pd．$\infty$ CC，et in pd．$\infty$ DCLXXX，et in pd．$\infty$ CCCCXL， et in ped．$\overline{\mathrm{I}} \mathrm{CCCC}$ ，et in ped．$\overline{\mathrm{II}}$ ．aliis uero locis monumenta sepulcrorum，quae tamen in extremitate sunt posita．reliquum prout regio est signa sunt finalia constituta．

## 〈LIBER COLONIARVM II〉

## 〈Civitates piceni〉

Adrianus ager limitibus maritimis et Gallicis，quos nos d．et $k$ ．appellamus，finitur per rationem arcarum riparum canabularum uel nouercarum，quod tegulis construitur， aliis uero locis muris macheriis scorofionibus congeriis carbunculis，terminibus Augusteis， fluminum cursibus．

Adteiatis oppidum．ager eius aliquibus locis tribus limitibus est assignatus in cen－ turiis：quorum limitatio pedaturae haec est，a ped．$\infty$ CCCC et supra usque in ped．$\overline{I I D}$ ． nam aliorum cursus est per rationem arcarum riparum canabularum uel nouercarum，et uariis locis terminibus Augusteis；sed et aliis finitimis signis．

Asculanus ager uariis locis limitibus intercisiuis est assignatus et terminibus Claudianis in modum arcellae est demetitus，qui si tres fuerint in unum，trifinium faci－
balk）．Sometimes（we find）squared stones with an inscription on them；but not every block of stone is equipped with an inscription．The very mountains have boundaries demarcated in this way．There are other areas called subseciva，which have not been included in the land division．These are possessed if the landholders agree among
themselves．If they do not agree，the subseciva remain under the control（of the founder or the community）．There are other places called praefecturae，which come within the scope of public jurisdiction．${ }^{165}$

In the initial process of allocating land to soldiers，triumvirs have used Gracchan boundary stones，which were round and column－shaped，with a diameter at the top of 1 foot or $11 / 2$ feet，and were 4 feet or $41 / 2$ feet high．

Those of the divine Julius are the same．
Those of Augustus are the same，because Augustus revised their surveys，and where stones existed，he established others，and had the whole land measured out in his own day and allocated to veteran soldiers．These stones，like those of Gaius Caesar，are round and made from flint or volcanic stone．They extend $11 / 2$ feet above ground and $21 / 2$ feet below．So，the total height is 4 feet，and the intervals between them are 2,400 feet．

Other boundary stones are 2 feet above ground， $12 / 3$ feet thick，and 3 feet below ground；so the total height is $3(?)$ feet．${ }^{166}$ The intervals between them are 1,200 feet．

There are also other boundary markers known as Neronian，Vespasianic，and Traianic，lamnici，and squared stones，set up at different distances apart．Among them， some are marked with a（letter）gamma and have been positioned as the nature of the terrain allows．The intervals between some are up to 240 feet，between others（up to） 220 ，between others up to 300 ，between others up to 360 ，between others up to 420 ， between others up to 480 ，between others（up to） 600 ，between others up to 720 ， between others up to 840 ，between others up to 940 ，between others up to 1,200 feet．

In large areas of rough pasture and woodland \｛saltus\}, there are piles of stones and projections，and the intervals between them are（up to） 1,200 feet，and up to 1,680 ， and up to 1,440 ，and up to 2,400 ，and up to 3,000 feet．But in some places，tombs， which have been placed on the periphery，（serve as boundary markers）．For the rest， boundary markers are set up according to the practice of each region．

## $\left\langle\right.$ BOOK OF COLONIES II ${ }^{167}$

## 〈Communities of picenum〉

The land of Hadria was allocated by means of limites facing the sea and＇Gallic＇ limites，which we call decumani and kardines，and is demarcated by means of arcae，or35 banks，or canals，or drainage channels，or elsewhere by walls，dry－stone walls，heaps and piles of stones，rough boundary stones \｛carbunculi\}, Augustan boundary stones, and the courses of rivers（cf．C $177.34=\mathrm{L} 227.11$ ）．

The（land of）the Attidians，a town．Its land in several places was allocated in centuriae by means of three limites．The dimensions of its limites are from 1，400 feet right up to 2,500 feet．Their path is marked out by means of arcae，banks，canals， drainage channels，and in some places Augustan boundary stones；they also used other boundary marking symbols（cf．C $189.20=\mathrm{L} 240.10$ ）．

The land of Asculum was allocated in some places by means of limites intercisivi， and was marked out with Claudian boundary stones shaped like a small chest
unt，et palis ligneis，siliceis，sacrificalibus，per quos ratio limitum seruatur．qui distant a se in pedibus $\infty$ CC et infra．ceterum in absoluto remansit，et riuorum tenor et uiarum finitimus obseruatur．maxime in his limitibus carbunculi et scorofiones．mensura uero acta est in separationibus fundorum per Vettium Rufinum cohortis VI p p．iugera $\overline{I I I} C L$ accepit et XII agros 〈quos〉 in montibus Romani acceperunt familiariter，qui montes Romani appellantur，per Manilium Nepotem militem cohortis III pro consule et Coenio Seuero et Stola consulibus．

Ausimatis ager limitibus Graccanis per centurias est assignatus．
Anconitanus ager ea lege continetur qua et ager Ausimatis，limitibus Graccanis in iugeribus．

Albensis ager locis uariis limitibus intercisiuis est assignatus，terminis uero Tiburtinis，qui Cilicii nuncupantur et in limitibus constituti sunt．aliis uero locis sacra sepulchraue uel rigores．quorum ratio distat a se in pedes $\infty$ CCL et infra．et quam maxime limitibus est assignatus．terminatio autem eius facta est vI id．octb．per Cilicium Saturninum centurionem cohortis VII et uicies，mensoribus interuenientibus．et termini a Cilicio Cilicii nuncupantur．haec determinatio facta est Orfito seniore et Quinto Scitio et Prisco consulibus．

Aternensis ager lege Augustea est assignatus．riuorum et uiarum cursus seruatur．
Curium Sabinorum ager［eius］per quaestores est uenundatus，et quibusdam lat－ erculis quinquagena iugera inclusus est，postea uero iussu Iuli Caesaris per centurias et limites est demetitus．termini uero Tiburtini affixi sunt，sed et lapides enchorii et signati sunt．uariis autem locis muros macherias sepulchra monumenta，riuorum uel fluminum cursus，arbores ante missae uel peregrinae et putea finem faciunt；sed et alia signa quae in libris auctorum leguntur．quod si signa haec non inueniantur，arbores oliuarum si sibi in transuerso occurrerint，pro rigore seruandum est．qui rigor pinnalis dicitur．si certe ordines sibi conuenerint et hic rigor iungatur cum pinnale，hebes appel－ latur．sic enim colliges fines inter possessiones．

Campi Tiberiani，qui inter Romam et Tibur esse uidentur，a Tiberio Caesare sunt demetiti in iugeribus Xxv，et termini Tiberiani nuncupantur．qui distant a se in ped．Det supra usque in ped．$\infty$ cc．ceterum uero limitibus normalibus recturas concurrunt．

Cassiolis，ager eius．iter populo non debetur．usque ad muros priuati possident．sunt
\｛arcella\}, which, if three occur together, mark the boundary of three properties, and with wooden＇sacrificial＇stakes，and flint stones，by means of which the layout of the limites is marked．They are 1,200 feet，or fewer，distant from each other．The rest of the land has remained unsurveyed，and the course of rivers and roads is taken to mark boundaries．On these limites，rough boundary stones and piles of stones are very com－ monly used to mark the boundary．A survey was carried out，including the division of farms，by means of the work of Vettius Rufinus of the sixth praetorian cohort；the community received 4，150 iugera，and also twelve fields，〈which〉 the Romans received through goodwill，in the mountains that are commonly called＇Roman＇，by means of the work of Mamilius Nepos，a soldier of the third cohort，in the consulship of Hoenius Severus and Stloga（A．D．141）．${ }^{168}$

The land of Auximum was allocated in centuriae by means of Gracchan limites （cf．C $177.27=\mathrm{L} 227.3$ ）．

The land of Ancona is covered by the same lex as the land of Auximum，and was allocated in iugera by means of Gracchan limites（cf．C $177.26=$ L 227．1）．

The land of Alba Fucens（Albe）${ }^{169}$ was allocated in various places by means of limites intercisivi，and Tiburtine boundary stones，which are called＇Cilician＇and were set up on the limites．In other places，sacred areas，tombs，or straight lines were used （to demarcate boundaries）．The limites are laid out so that they lie 1，250 feet，or fewer， from one another．As much of the land as possible was allocated using limites．The establishment of boundaries was completed on 10 October by means of the work of Cilicius（Caecilius）Saturninus，centurion of the twenty－seventh cohort，with the assis－ tance of surveyors．And the boundary stones were called＇Cilician＇after Cilicius．This establishment of boundaries was completed in the consulship of Orfitus and Priscus （A．D 149）．${ }^{170}$

The land of Aternum was allocated under a lex Augustea．The boundary is marked by the direction of rivers and roads（cf．C $177.25=\mathrm{L} 226.13$ ）．

The land of Cures Sabini ${ }^{171}$ was put up for sale by the quaestors，and was enclosed in squares of fifty iugera．Later，on the orders of Julius Caesar，it was mea－ sured out by centuriae and limites．Boundary markers of Tiburtine stone were put in place，although local stones were also used after they had been marked．In some places，walls，dry－stone walls，memorial tombs，the course of streams or rivers，trees set in front，or trees not native to the area，and wells mark the boundary．Moreover， （there are）other boundary markers，which we read about in the works of writers（on land surveying）．But if markers of this kind are not found，lines of olive－trees can be taken to indicate a boundary，if they meet each other at an angle．${ }^{172}$ Such a boundary is called＇acute＇\｛pinnalis\}. If rows of trees tally exactly with one another, and this straight line is joined with the pinnalis，it is called＇obtuse＇\｛hebes\}. In this way you can establish the boundaries between landholdings．

The Campi Tiberiani，which apparently lie between Rome and Tibur，were allo－ cated by Tiberius Caesar in（lots of）twenty－five iugera，and the boundary markers are called＇Tiberian＇．These are up to 500 and more，right up to 1,200 feet apart from one another．But the straight lines tally with the right－angled limites（cf．C $171.37=\mathrm{L}$ 218．9）．

Carseoli，its land．A right of way is not due to the people．Right up to the walls of the town，private individuals possess（the land）．There are also mountains that are
etiam montes qui Romani appellantur, ea ratione qua in agro Asculano supra diximus. qui montes ad suram finem habent. finitur enim iugis montium, terminis Augusteis, ripis per deuexa collium, arboribus, diuergiis aquarum, sed et per alia finitima documenta. in campis uero terminos quadratos, Tiburtinos, spatulas cursorias, limitibus. interiectis uero locis per arcas instructas et monumenta finitur.

Castranus ager lege Augustea est assignatus.
Cyprensis ager ea lege est assignatus qua et ager Castranus.
Castellense municipium. ager eius limitibus d. et $k$. continetur. in centuriis est assignatus.

Cingulanus ager. iter populo non debetur. ea lege continetur qua et ager Potentinus. in iugeribus et limitibus intercisiuis est assignatus ubi cultura. ceterum uero insolutum est. reliqua in montibus idem censuerunt nam multa loca hereditaria accepit earum populus. ager qui a fundo suo tertio uel quarto uicino situs est, in iugeribus iure ordinario possidetur, sicut est Interamna Palestinae Piceni.

Corfinius ager limitibus maritimis et montanis in iugera CC sunt assignati, lege Augustea sunt censiti, et termini Augustei ibidem nuncupantur.

Casentium, muro ductum. ager eius lege triumuirale est assignatus limitibus per terminos et alia signa finalia. iter populo non debetur.

Capenus. ager eius finitur terminibus Tiburtinis, ex alia parte siliceis, qui distant a se a pedibus CC usque in ped. $\infty \mathrm{CCL}$. habet ripas uias et riuos finales.

Corfinius ager lege Sempronia est assignatus. iter populo debetur ped. LXXX. ager eius in tetragonon est assignatus, et silicei termini sunt appositi, qui distant a se in ped. a DCXX usque in ped. DCCCLX. et alia signa secundum auctorum doctrinam.

Ecicylanus ager per strigas et scamna in centuriis est assignatus, termini uero rotundi et spatulae cursoriae constituti. per montes autem congestiones petrarum et termini, sed et signa quibus ager arcifinius finitur.

Foro Nouanus per limites et centurias est assignatus. termini uero Tiburtini et Augustei, canabulae uel nouercae, muri, macheriae, putea. sed et sacrificales pali affixi sunt, qui distant a se in pedibus CCL et supra usque in pedes $\infty$ CC. uariis autem locis per instructuras, arcas, riuorum uel fluminum cursus, sed et iuga montium atque supercilia, fines seruantur.

Fidenae. ager eius ea lege seruatur qua et Campi Tiberiani.
called 'Roman', in the same way as in the land of Asculum, as I mentioned above. These mountains have their boundary at a row of stakes(?). It (this land) is demarcated by mountain ridges, Augustan boundary stones, by banks through the sloping areas of hills, trees, watersheds, and by other indicators of boundaries. In level areas (they set up) square boundary stones, Tiburtine stones, or stones shaped like a spatula $\{$ spatula cursoria\}, on the limites. In the intervening areas, the boundary is marked by the setting up of arcae and by tombs (cf. C $189.8=$ L 239.20).

The land of Castrum Novum was allocated by a lex Augustea (cf. C $177.24=\mathrm{L}$ 226.13).

The land of Cupra was allocated under the same lex as the land of Castrum Novum (cf. C $177.24=$ L 226.13).

Castellum Firmanorum, a municipium. ${ }^{173}$ Its land was enclosed by limites, both decumani and kardines. It was allocated in centuriae.

The land of Cingulum. ${ }^{174}$ A right of way is not due to the people. It is dealt with under the same lex as applied to the ager Potentinus. Its land, where cultivated, was allocated by means of limites intercisivi. But the rest was unsurveyed. They also assessed ${ }^{175}$ the remaining areas in the mountains. Indeed its population received many places through inheritance. Land that is separated from (the rest of its) farm by the property of three or four neighbours is possessed in iugera according to the normal legal process, as at Interamnia Praetuttiorum in Picenum.

The land of Corfinium was allocated in centuriae of 200 iugera by means of limites facing the sea and the mountains; it was assessed under a lex Augustea, and the boundary stones used there are called 'Augustan' (cf. C $179.8=\mathrm{L} 228.18$, Valeria; C 195.31 = L 255.12; C 201.17 = L 260.3, Samnium).

Casentium, encircled with a wall. Its land was allocated under a triumviral lex by means of limites, and (was demarcated) by boundary stones and other markers. A right of way is not due to the people (cf. C $181.26=\mathrm{L}$ 231.14).

Capena. Its land was demarcated by Tiburtine stones, and in some places by flintstones, which lie from 200 up to 1,250 feet apart from one another. It has banks, roads, and streams as boundary markers (cf. C $171.5=\mathrm{L} 216.11$ ).

The land of Corfinium was allocated under a lex Sempronia. A right of way 80 feet wide is due to the people. Its land was allocated in the shape of a square, and flint boundary stones were set up, which lie from 620 up to 860 feet apart from one another. Moreover, other boundary markers were used in accordance with the teaching of writers on surveying (cf. C 179.8; 195.21; $201.17=$ L 228.18; 255.3; 260.3).

The land of the Aequiculi ${ }^{176}$ was allocated in centuriae by means of strigae and scamna; round boundary stones were set up and also stones shaped like a spatula. In the mountains, they used piles of rocks and boundary stones, and also those markers by which ager arcifinius is demarcated.

Forum Novum ${ }^{177}$ was allocated by means of limites and centuriae. There are Tiburtine and Augustan boundary stones, canals or drainage channels, walls, drystone walls, and wells. Moreover, wooden stakes called 'sacrificial' were set up, which are up to 250 and right up to 1,200 feet apart from one another. In some places boundaries are demarcated by constructions, arcae, the courses of streams or rivers, and also the ridges of mountains and terraces.

Fidenae. ${ }^{178}$ Its land is dealt with under the same lex as the Campi Tiberiani.

Ficiliensis ager ea lege seruatur qua et ager Curium Sabinorum．
Firmo Picenus．ager eius lege triumuirale．in centuriis singulis iugera Cc．finitur sicuti ager Foro Nouanus．

Falerionensis ager limitibus maritimis et Gallicis est assignatus，quos nos d．et $k$ ． appellamus．finitur arcarum riparum canabularum siue nouercarum，muris macheriis sco－ rofionibus congeriis carbunculis，terminibus Augusteis，riuis，fluminibus，arboribus ante missis，iugis montium，superciliis，petris naturalibus signatis，sicut in Piceno fines ter－ minantur．

Fanestris Fortuna．ager eius limitibus maritimis et montanis est assignatus，et per ea signa quibus Falerionensis ager．

Kamerinus．iter populo non debetur．ager eius limitibus maritimis et Gallicis con－ tinetur：finitur enim sicut ager Fanestris Fortunae．

Luco Feronia．ager eius finitur arboribus ante missis，sed et aliis signis，quibus fines seruantur in prouincia Piceni，terminibus Tiburtinis，qui distant a se in ped．XL usque in ped．$\infty^{\text {clxx．}}$

Marsus municipium licet consecratione ueteri maneat，tamen ager eius aliquibus locis in tribus limitibus lege Augustea est assignatus．limitibus maritimis et montanis． ager eius aliquibus locis in iugeribus CC continetur．terminibus uero Tiburtinis et sili－ ceis，et aliis documentis，quibus ager Fal［l］erionensis finitur．

Matilica，oppidum，iter populo debetur ped．LxXx．ager eius ea lege continetur qua et Kamerinus．

Numentum．ager eius ea lege continetur qua et ager Foro Nouanus．
Nursia，ager eius per strigas et per scamna in centuriis est assignatus．finitur sic uti ager Asculanus．

Nomatis．ager eius ea lege continetur qua et ager Ausimatis．
Ostrensis ager ea lege continetur qua et ager Camerinus．
Pinnes．ager eius ea lege continetur qua et ager Adrianus．
Pausulensis ager per limites in centuriis singulis iugera CC est assignatus．finitur sicut ager Asculanus．

Potentinus ager ea lege finitur qua et Pausulensis．
Plentinus．colonia．iter populo 〈non〉 debetur．ager eius limitibus intercisiuis est assig－ natus．finitur sicut ager Asculanus．

Potentinus ager in iugeribus et limitibus intercisiuis est assignatus ubi cultura：

The land of Fiscellus ${ }^{179}$ is dealt with under the same lex as the land of Cures Sabini.
Firmum Picenum. Its land (was allocated) by a triumviral lex; with 200 iugera in each centuria. Its boundaries are demarcated as in the land of Forum Novum (cf. C $177.20=$ L 226.9).

The land of Falerio was allocated by means of limites facing the sea and 'Gallic' limites, which we call decumani and kardines. Its boundaries are demarcated by arcae, banks, canals or drainage channels, walls, dry-stone walls, heaps and piles of stones, ${ }^{180}$ rough boundary stones, Augustan boundary stones, streams, rivers, trees previously planted, mountain ridges, terraces, and natural stones that have been marked, just as boundaries are demarcated in the province of Picenum (cf. C $177.34=\mathrm{L} 227.11$ ).

Fanum Fortunae (Fano). ${ }^{181}$ Its land was allocated by means of limites facing the sea and the mountains, and with the same boundary markers as employed in the land of Falerio.

The land of Camerinum. A right of way is not due to the people (cf. C $189.16=$ L 240.7). Its land is enclosed by limites facing the sea and 'Gallic' limites. Its bound-

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Matilica, a town. A right of way 80 feet wide is due to the people. Its land is dealt with under the same lex as the land of Camerinum (cf. C $189.18=\mathrm{L} 240.8$ ).

Nomentum. ${ }^{183}$ Its land is dealt with under the same lex as the land of Forum Novum.

Nursia. Its land was allocated in centuriae by means of strigae and scamna. Its boundaries are demarcated in the same way as the land of Asculum (cf. C $177.34=$ L 227.11).

Numana. ${ }^{184}$ Its land is dealt with under the same lex as the land of Auximum.
Ostra. ${ }^{185}$ Its land is dealt with under the same lex as the land of Camerinum.
Pinna. Its land is dealt with under the same lex as the land of Hadria (cf. C 177.34 35 $=\mathrm{L} 227.12$ ).

The land of Pausulum was allocated by means of limites with 200 iugera in individual centuriae. Its land is demarcated just as that of Asculum (cf. C $177.23=$ L 226.11).

The ager Potentinus is demarcated by the same lex as the land of Pausulum (cf.40 C $197.45=$ L 257.19).

Peltuinum, a colony. A right of way is $\langle$ not $\rangle$ due to the people. ${ }^{186}$ Its land was allocated by limites intercisivi. Its boundaries are demarcated in the same way as the land of Asculum.

The ager Potentinus, where there was cultivation, was allocated in iugera, by means of limites intercisivi. The rest remained unsurveyed. They distributed the
ceterum in absoluto remansit. reliqua in montibus censuerunt. et multa loca hereditaria accepit eorum populus.

Pisaurensis ager finitur riuorum riparum fluminum cursu, terminorum fide, et palis sacrificalibus, sicut in prouincia Piceni.

Reate. ager eius per strigas et per scamna in centuriis est assignatus. terminos uero rotundos et spatulas cursorias posuimus, per montes autem foueas, sed et aggestum petrarum, ut est in libro regionum. finitur enim sicuti ager Foro Nouanus.

Ricinensis ager limitibus et centuriis est assignatus. finitur sicut ager Asculanus.
Sentis, oppidum. ager eius limitibus maritimis et montanis lege triumuirale est assignatus. et loca hereditaria populus eius accepit. finitur sicuti consuetudo est regioni Piceni.

Sinogalliensis ager lege triumuirale est assignatus limitibus et centuriis, terminibus atque riuis, sed et aliis signis quae in libro conditionum Italiae agrorum leguntur.

Septempeda, oppidum. iter populo non debetur. ea lege continetur qua et ager Cingulanus.

Superequum. ager eius limitibus maritimis et montanis est assignatus. in centuriis singulis iugera CC. finitur sicuti supra legitur ager Marsensis.

Tibur. ager eius a Tiberio Caesare est assignatus. ea lege continetur qua et Campi Tiberiani leguntur inter Tibur et Romam.

Tribule, municipium. iter populo non debetur. limitibus Augusteis est assignatus. finitur sicuti ager Curium Sabinorum.

Teate, qui Aternus. ager eius lege Augustea est assignatus. finitur sicuti consuetudo est in regione Piceni.

Troento. finitur sicut supra diximus de agro Teatino.
Teramne Palestina Piceni. ager eius in iugeribus et limitibus est assignatus ubi cultura est. nam ceterum in absoluto remansit. reliqua autem in montibus sub ipsius rei censuerunt. nam multa loca hereditaria accepit eius populus. tertio uel quarto uicino fundo suo situs est, iure ordinario possidetur.

Tuficum, oppidum. iter populo debetur ped. Lxxx. ager eius ea lege continetur qua et ager Adteiatis.

Tolentinus ager limitibus maritimis et montanis est assignatus lege triumuirale, et loca hereditaria accepit eius populus.
remaining areas in the mountains. Indeed its population received many places as a result of inheritance (cf. C $197.40=\mathrm{L} 257.15$ ).

The land of Pisaurum (Pesaro) ${ }^{187}$ is bounded by the course of streams, banks, and rivers, by trustworthy boundary stones, and by wooden 'sacrificial' stakes, as (is customary) in the province of Picenum.

Reate (Rieti). ${ }^{188}$ Its land was allocated in centuriae by means of strigae and scamna. We set up round boundary stones and stones shaped like a spatula. However in mountainous areas we used pits and also heaps of rocks, as is set out in the book about the provinces. For its boundaries are demarcated in the same way as the land of Forum Novum.

The land of Ricina was allocated by means of limites and centuriae. Its boundaries are demarcated in the same way as the land of Asculum. (cf. C $177.23=$ L 226.11).

Sentinum, a town. ${ }^{189}$ Its land was allocated under a triumviral lex by means of limites facing the sea and mountains. Moreover, its people received places as a result of inheritance. Its boundaries are demarcated according to the custom in the province of Picenum.

The land of Sena Gallica was allocated under a triumviral lex by means of limites and centuriae, and (it is demarcated) by stones and streams, and other markers that are discussed in the book about the categories of lands in Italy (cf. C $177.22=$ L 226.11). ${ }^{190}$

Septempeda, a town. A right of way is not due to the people. It is dealt with under the same lex as the land of Cingulum (cf. C $189.19=$ L 240.9).

Superaequum. Its land was allocated by means of limites facing the sea and the mountains. There were 200 iugera in individual centuriae. Its boundaries are demarcated as in the land of Marruvium, as is noted above (cf. C $179.16=\mathrm{L} 229.1$ ).

Tibur. ${ }^{191}$ Its land was allocated by Tiberius Caesar. It is dealt with under the same lex as the Campi Tiberiani, said to be between Tibur and Rome.

Trebula, a municipium. ${ }^{192}$ A right of way is not due to the people. It was allocated by means of Augustan limites (cf. C $187.31=\mathrm{L} 238.17$ ). Its boundaries are demarcated just as in the land of the Cures Sabini.

Teate (Chieti), ${ }^{193}$ where is also Aternum. Its land was allocated under a lex Augustea. Its boundaries are demarcated according to the custom of the province of Picenum.

Truentum. Its boundaries are demarcated as we described above in respect of the land of Teate (cf. C $177.24=\mathrm{L} 226.13$ ).

Interamnia Praetuttiorum in Picenum. Its land where there was cultivation was allocated in iugera by means of limites. The rest remained unsurveyed. They assessed the remaining areas in the mountains as part of this operation. Moreover, its people received many places as a result of inheritance. Land that is separated from (the rest of) its farm by the property of three or four neighbours is possessed according to the normal legal process (cf. C $177.15=\mathrm{L} 226.5$ ).

Tuficum, a town. ${ }^{194}$ A right of way 80 feet wide is due to the people. Its land is dealt with according to the same lex as the land of Attidium.

The land of Tolentinum was allocated under a triumviral lex by means of limites facing the sea and the mountains. Moreover, its people received places as the result of inheritance (cf. C $177.19=\mathrm{L} 226.8$ ).

Treensis ager. iter populo non debetur. ea lege continetur qua et ager Potentinus. Veragranus ager ea lege continetur qua et ager Teatinus.

## Civitates regionis samnii

Afidena, muro ducta. iter populo debetur ped. x. milites eam lege Iulia sine colo- nis deduxerunt. ager eius per centurias et scamna est assignatus. termini Tiburtini sunt appositi limitibus intercisiuis.

Antianus ager item est assignatus ut ager Alfidenatis.
Bobianus. oppidum. iter populo debetur ped. x. lege Iulia est deductum. termini rotundi sunt appositi. finitur testimonio arcarum riparum sepulturarum congeriarum carbunculorum riuorum superciliorum et limitum dd. et kk.

Clibes. ager eius lege Iulia est assignatus. finitur sicut ager Bobianus.
Corfinius ager limitibus maritimis et montanis. in centuriis singulis iugera cc. finitur terminis Tiburtinis et riuis, arboribus peregrinis uel ante missis, monumentis uiis nymphis. ager eius in precisuris est assignatus.

Esernia, oppidum muro ductum. iussu Neronis est deductum iter populo debetur ped L. in centuriis et Augusteis terminis est assignatus.

Istoniis, colonia. ager eius per centurias et scamna est assignatus. finitur sicuti ager Bobianus.

Iobanus. ager eius ea lege continetur qua et ager Eserniae.
Larinus lege Iulia est assignatus. iter populo debetur ped. x. finitur sicut ager Corfinius.

Solmona ea lege est assignata qua et ager Eserniae.

## Incipivnt nomina civitatvm apvliae

Ager Ausculinus lege Sempronia et Iulia est assignatus. ubi est d. in oriente, k. in meridianum. finitur per terminos et terrarum tumores, aliquibus locis arboribus ante missis et uiis, sed et collectione petrarum. in centuriis singulis iugera CC.

Ardona et Aspanus. agri earum ea lege et diuisione sunt assignati qua et ager Ausculinus.

Canusinus ager. iter populo non debetur. finitur uiis et signis quibus in libris descripsimus. in centuriis singulis iugera $C C$. d. in oriente.

Comsinus. ager eius limitibus Graccanis. iter populo non debetur. finitur sic uti ager Canusinus.

The land of Treia. ${ }^{195}$ A right of way is not due to the people. It is dealt with under to the same lex as the ager Potentinus.

The land of Veragranum ${ }^{196}$ is dealt with under the same lex as the land of Teate.

## The communities of the province of samnium

Afidena (= Aufidena), ${ }^{197}$ encircled with a wall. A right of way 10 feet wide is due
to the people. Soldiers founded it without colonists under a lex Iulia. Its land was allocated by means of centuriae and scamna. Tiburtine boundary stones were placed on the limites intercisivi.

The ager Antianus ${ }^{198}$ was allocated in the same way as the land of Afidena.
Bovianum. A town. A right of way 10 feet wide is due to the people. It was founded under a lex Iulia (cf. C $181.20=\mathrm{L} 231.8$; Campania). Round boundary stones were set up. Boundaries were demarcated on the basis of arcae, banks, tombs, piles of stones, rough boundary stones, rivers, terraces, and limites, both decumani and kardines.

Clibes (= Cluviae). ${ }^{199}$ Its land was allocated under a lex Iulia. Its boundaries are demarcated in the same way as the land of Bovianum.

Corfinium. ${ }^{200}$ Its land (was allocated) with limites facing the sea and the mountains. There are 200 iugera in each centuria. The boundaries are demarcated by Tiburtine stones, streams, trees not native to the region or trees previously planted, tombs, roads, or fountains. Its land was allocated in parcels.

Aesernia, a town encircled with a wall. It was founded on the orders of Nero. A right of way 50 feet wide is due to the people. It was allocated in centuriae with Augustan boundary stones (cf. C $183.20=$ L 233.14, Campania).

Histonium, a colony. ${ }^{201}$ Its land was allocated by centuriae and scamna. It is demarcated in the same way as the land of Bovianum.

Iobanus (= Iuvanum) ${ }^{202}$ Its land is dealt with under the same lex as the land of Aesernia.

The land of Larinum ${ }^{203}$ was allocated under a lex Iulia. A right of way 10 feet wide is due to the people. It is demarcated in the same way as the land of Corfinium.

Solmona (= Sulmo) was allocated under the same lex as the land of Aesernia (cf.30 C $179.23=\mathrm{L} 229.8$, Valeria) .

Here begin the names of the communities of apulia
The land of Ausculum was allocated under a lex Sempronia and a lex Iulia, with decumani facing east and kardines facing south (cf. C $165.32=\mathrm{L} 210.10$ ). It is demarcated by boundary stones, mounds of earth, in some places by trees previously planted, roads, and piles of stones. In each centuria there are 200 iugera.

Herdonia and Arpi. Their land was allocated according to the same lex and allocation as the land of Asculum (cf. C $165.32=\mathrm{L} 210.10$ ).

The land of Canusium (cf. C $165.29=\mathrm{L} 210.8$ ). A right of way is not due to the people. It is demarcated by roads and markers, which we have copied in our books. In each centuria there are 200 iugera. The decumanus faces east.

Compsa. Its land is allocated by means of Gracchan limites. A right of way is not due to the people. It is demarcated in the same way as the land of Canusium (cf. C. $165.28=$ L 210.7).

Conlatinus，qui et Carmeianus，et qui circa montem Garganum sunt，finiuntur sicut ager Ausculinus．

Eclanensis．iter populo non debetur．ager eius in centuriis singulis iugera CCXL，actus numero XX et per XXIIII，lege est assignatus qua et ager Canusinus．d．est in oriente．

Lucerinus ager kk．et dd．est assignatus：sed cursum solis sunt secuti，et con－ stituerunt centurias contra cursum orientalem．finitur sic uti ager Ausculinus．

Salpis，colonia，littore terminatur．finitur finitimis muris，uiis，aquarum ductibus， fossis．in centuriis singulis iugera $C C$ ．

Sipontum ea lege et finitione est qua et ager Salpinus．
Teate．iter populo（non〉 debetur．ager eius finitur uiis sepulturis et ceteris signis， sicut consuetudo prouinciae est．

Venusinus．

## Civitates provinciae calabriae

Quando terminauimus prouinciam Apuliam et Calabriam secundum constitu－ tionem et legem diui Vespasiani，uariis locis mensurae actae sunt et iugerationis modus collectus est．cetera autem prout quis occupauit posteriore tempore censita sunt et pos－ sidenti assignata．alia loca pro aestimio ubertatis precisa sunt．finiuntur enim ter－ minibus，riuis，fossis，arboribus ante missis，tumore terrae，collectione petrarum，sed et naturalibus signatis lapidibus，uiis，sepulchris，arboribus peregrinis；sed et aliis sig－ nis quibus superius in libris docuimus．

Ciuitates autem hae sunt．
Brondisinus ager pro aestimio ubertatis est diuisus：cetera in saltibus sunt assig－ nata．diuiduntur sicut supra legitur prouinciam esse diuisam．

Botontinus，Caelinus，Genusinus，Ignatinus，Lyppiensis，Metapontinus，Orianus， Rubustinus，Rodinus，Tarentinus，Varinus，Veretinus，Vritanus，Ydrontinus，ea lege et finitione finiuntur qua supra diximus．

The Conlatinus land, which is the same as the Carmeianus land, and those (communities) that are situated around Mount Garganus, are demarcated like the land of Ausculum. ${ }^{204}$

Aeclanum. A right of way is not due to the people. Its land was allocated in centuriae, each containing 240 iugera, with 20 by 24 actus, under the same lex as the land of Canusium. The decumanus faces east (cf. C $165.25=\mathrm{L}$ 210.4).

The land of Luceria was allocated by means of kardines and decumani. But they followed the course of the sun and established centuriae facing east. So, its boundaries are demarcated in the same way as the land of Asculum (cf. C $167.1=\mathrm{L} 210.15$ ).

Salapia, a colony, is bounded by the shore. The land is demarcated by boundary walls, roads, water channels, and ditches. There are 200 iugera in each centuria (cf. C $165.33=\mathrm{L} 210.11$ ).

Sipontum is dealt with under the same lex and method of boundary demarcation as the land of Salapia (cf. C $165.33=\mathrm{L} 210.11$ ).

Teanum (i.e. Apulum). A right of way is $\langle$ not $\rangle$ due to the people (cf. C $165.36=$ L 210.14). Its land is demarcated by roads, tombs, and other markers, according to the custom of the province.

The land of Venusia (cf. C $165.28=\mathrm{L} 210.7$ ).

## Communities of the province of calabria

When we established boundaries for the provinces of Apulia and Calabria, according to the pronouncement and lex of the divine Vespasian, in several places surveys were carried out and the area of land divided into iugera was added up. But other places were assessed afterwards, just as individuals had appropriated them, and were allocated to the person in possession of them (cf. C $167.10=\mathrm{L} 211.7$ ). Other places were divided according to an estimation of their fertility. Boundaries were demarcated by stones, streams, ditches, trees previously planted, mounds of earth, piles of rocks, natural rocks which have been marked, roads, tombs, trees not native to the area, and other markers, which I explained earlier in my work.

These are the communities.
The land of Brundisium (Brindisi) ${ }^{205}$ was divided according to an estimation of 30 its fertility; the remaining areas were allocated in saltus. They were allocated in the same way as the rest of the province was allocated, as is pointed out above.

The land of Butuntum, the land of Caelia (Ceglie di Bari), the land of Genusia, the land of Egnatia, the land of Lupiae, the land of Metapontum, the land of Uria(?) (Oria), the land of Rubi (Ruvo di Puglia), the land of Rudiae, the land of Tarentum, the land of Barium, the land of Veretum (Vereto), the land of Urium(?), the land of (H)ydruntum (Otranto); their boundaries were demarcated according to the lex and boundary-marking practice that I discussed above. ${ }^{206}$

## BALBI AD CELSVM

## EXPOSITIO ET RATIO OMNIVM FORMARVM

Notum est omnibus, Celse, penes te studiorum nostrorum manere summam, ideoque primum sedulitatis meae inpendium iudiciis tuis offerre proposui. nam cum sibi inter aequales quendam locum deposcat aemulatio, neminem magis conatibus nostris profuturum credidi quam qui inter eos in hac parte plurimum possit. itaque quo cultior in quorundam notitiam ueniat, omnia tibi nota perlaturus ad te primum liber iste festinet, apud te tirocinii rudimenta deponat, tecum conferat quidquid a me inter ipsas armorum exercitationes accipere potuit. et si meretur publica conuersatione sufferre uniuersorum oculos, a te potissimum incipiat: quod si illi parum diligentem adhibitam curam esse credideris et in aliqua cessasse uidebimur parte, non exiguum laboris mei consequar fructum, quod te monente malignorum lucri fecerim existimationem. quaeso itaque, si non est inprobum, habeat apud te quandam excusationem, quod non potuerit eo tempore consummari, quo genus hoc instrumenti feruentibus studiis nostris disputatum est. omnium enim, ut puto, liberalium studiorum ars ampla materia est; cui in hac modica re nequid deesset, ingenti animo admoueram uires. interuenit clara sacratissimi imperatoris nostri expeditio, quae me ab ipsa scribendi festinatione seduceret. nam dum armorum magis exerceor cura, totum hoc negotium uelut oblitus intermiseram, nec quicquam aliud quam belli gloriam cogitabam. at postquam primum hosticam terram intrauimus, statim, Celse, Caesaris nostri opera mensurarum rationem exigere coeperunt. erant dandi interueniente certo itineris spatio duo rigores ordinati, quibus in tutelam commeandi ingens uallorum adsurgeret molis: hos inuento tuo operis decisa ad aciem parte ferramenti usus explicuit. nam quod ad synopsim pontium pertinet, fluminum latitudines dicere, etiam si hostis infestare uoluisset, ex proxima ripa poteramus. expugnandorum deinde montium altitudines ut sciremus, uenerabilis diis ratio monstrabat. quam ego quasi in omnibus templis adoratam post magnarum rerum experimenta, quibus interueni, religiosius colere coepi, et ad consummandum hunc librum uelut ad uota reddenda properaui. postquam ergo maximus imperator uictoria Daciam proxime reserauit, statim ut e septentrionali plaga annua uice transire permisit, ego ad studium meum tamquam ad otium sum reuersus, et multa uelut scripta foliis et sparsa artis ordini inlaturus recollegi. foedum enim mihi uidebatur, si genera angulorum quot sint interrogatus responderem 'multa': ideoque rerum ad professionem nostram pertinentium, in quantum

## THE DESCRIPTION AND ANALYSIS OF ALL FIGURES WRITTEN BY BALBUS AND ADDRESSED TO CELSUS ${ }^{1}$

It is known to everyone, Celsus, that you represent the high point of our science, and consequently I decided to offer to your judgement the first product of my industry. For, although rivalry demands some place for itself among people of the same age, I thought that no one would promote my efforts more effectively than the one who, among his coevals, has the greatest capacity in this activity. So, this book should hurry to you first, bringing material all of which is already known to you, in order that it should come to the attention of certain people in a more polished condition; it should deposit with you the rudiments of my apprenticeship, and discuss with you whatever it was able to receive from me in the midst of my military service. And if it deserves to go before everyone's eyes in public intercourse, it can most appropriately start from you. But if you think that too little care and attention have been applied to the book, and if I seem to have failed in some respect, I shall obtain no insignificant reward for my labour, if through your advice I get the better of the attitude of unfriendly critics. If it is not improper, I beg that you should excuse the book, in that it could not be completed at the time when this type of work was under discussion, when our studies were thriving. ${ }^{2}$ For, in my opinion, technical skill provides ample material for all liberal studies. And I made great mental efforts to make sure that it (technical skill) lacked nothing in this small venture. But the famous expedition of our most revered emperor intervened, ${ }^{3}$ which lured me from speedy writing. While I was more occupied by military service, I laid aside this entire business, virtually forgetting it, and I thought about nothing but military glory. But after we entered enemy territory for the first time, Celsus, the operations of our emperor immediately began to require surveying skill. Two aligned straight lines \{rigores\} had to be established, with a defined width for the roadway between them, and by means of these a huge earthwork was constructed to protect communications. Through your invention the use of the ferramentum revealed these (lines), when part of the work had been brought into the line of sight. ${ }^{4}$ In respect of the survey of bridges, we were able to work out from the adjacent bank the width of rivers, even if the enemy wished to launch repeated attacks. Furthermore, that skill venerated by the gods showed us how to work out the height of mountains that had to be stormed. After it had been tested in the great events in which I had participated, I began to cultivate this skill more devoutly, as if it were worshipped in all the temples, and hastened to complete this book as if I were fulfilling a vow. Therefore, after our mighty emperor had victoriously occupied Dacia, he immediately permitted me to leave the northern region for a year, and I returned to my studies as if to a period of leisure, and collected again many scattered ideas jotted on pages, with the intention of adding them to the practices associated with our skill. It seemed disgraceful to me that if asked how many kinds of angle there were, I should reply 'many'. Therefore in respect of those points relevant to our profession,
potui occupatus, species qualitates condiciones modos et numeros excussi. per quae satis ampla mediocritatis meae opinio seruabitur, si illa uir tantae auctoritatis studentibus profutura iudicaueris.

Ergo nequid nos praeterisse uideamur, omnium mensurarum appellationes con- feramus. nam mensura non tantum ista de qua loquimur appellatur, sed et quidquid pondere aut capacitate aut animo finitur mensuram aeque quam longitudinem appellant. quid ergo mensura sit de qua quaeritur, tractemus.

Mensura est conplurium et inter se sequalium interuallorum longitudo finita, ut pes per unciam, per pedem decempeda, per decempedam actus, per passum stadium, per stadium miliarium, et his similia.

Mensurarum appellationes quibus utimur sunt duodecim, digitus uncia palmus sextans pes cubitus gradus passus decempeda actus stadium miliarium. minima pars harum mensurarum est digitus: siquid enim infra digitum metiamur, partibus respondemus, ut dimidiam aut tertiam. uncia habet digitum unum et tertiam partem digiti. palmus habet digitos iIII, uncias iII. sextans, quae eadem dodrans appellatur, habet palmos iII, uncias viifi, digitos XII. pes habet palmos iIII, uncias XII, digitos XVI. in pede porrecto semipedes duo. in pede constrato semipedes IIII. in pede quadrato semipedes viII. cubitus habet sesquipedem, sextantes duas, palmos vi, uncias XVIII. gradus habet pedes duo semis. passus habet pedes quinque. decempeda, quae eadem pertica appellatur, habet pedes X . actus habet longitudinis ped. CXX, latitudinis ped. CXX. stadium habet pedes DCXXv, passus CXXv. miliarium habet passus mille, milia pedum v , stadios VIII.

Pes prostratus sic obseruabitur. ducis longitudinem per latitudinem: facit embadon.

Pes quadratus sic obseruabitur. longitudinem per latitudinem metiemur, deinde per crassitudinem: et sic efficit pedes solidos.

Pes quadratus concauus capit amforam trimodiam.
In centuria agri iugera CC, modii DC. in circuitu ped. VIIIDC habet. in ea pedum $\overline{\text { IICCCC }}$ per ĪCCCC, passus CCCCLXXX per CCCCLXXX, actus XX per XX, cubita $\infty$ DC per $\infty$ DC.

Pedes ut in cubitos redigamus, semper duco octies, et sumo partem xiI: erunt cubita. cubita uero ut in pedes redigamus, semper duco duodecies, et sumo partem octauam: erunt pedes.

Mensurae aguntur generibus tribus, per longitudinem et latitudinem et altitudinem. hoc est rectum planum solidum (Ill. 142). rectum est cuius longitudinem sine latitudine metimur, ut lineas, porticus, stadia, miliaria, fluminum longitudines, et his similia (Ill. 143). planum est quod Graeci epipedon appellant, nos constratos pedes; in quo longitudinem et latitudinem habemus; per quae metimur agros, aedificiorum sola, ex quibus altitudo aut crassitudo non proponitur, ut opera tectoria, inauraturas, tabulas, et his similia. solidum est quod Graeci stereon appellant, nos quadratos pedes appellamus; cuius longitudinem et latitudinem et crassitudinem metimur, ut parietum structuras, pilarum pyramidum aut lapidum materias, et his similia (Ill. 144).
as far as I could in my work, I have set out the types, characteristics, conditions, measurements, and numbers. If you, a man of considerable influence, think that this work will benefit those learning (the profession), that will be sufficient recognition of my modest talent.

Therefore in case I seem to have omitted anything, let me set out the names of all the measurements. 'Measurement' is applied not only to the matter that we are discussing, but anything that is defined by weight, capacity, or by judgement they also describe by 'measurement' or 'size'. Let us consider what measurement is, which is the object of our enquiry.

A measurement is a defined length consisting of several equal intervals, e.g., a foot in fractions of a foot, 10 feet in feet, 120 feet in lengths of 10 feet, a stade ( 625 Roman feet; 600 Greek feet) in passus ( 5 feet), a mile in stades, and other similar examples.

There are twelve names for measurements that we use: digitus, uncia, palmus, sextans, pes, cubitus, gradus, passus, decempeda, actus, stadium, miliarium. ${ }^{5}$ The smallest of these measurements is the digitus. If we measure anything smaller than a digitus, we use fractions like a half or a third. An uncia consists of one digitus and one third of a digitus. A palmus has four digiti, three unciae. A sextans, which is also called dodrans, has three palmi, nine unciae, twelve digiti. A pes has four palmi, twelve unciae, sixteen digiti. In a pes porrectus there are two half-feet. In a pes constratus four halffeet, in a square foot, eight half-feet. A cubitus has one and a half feet, two sextantes, six palmi and eighteen unciae. A gradus has two and a half feet. A passus has five feet. A decempeda, which is also called pertica, has ten feet. An actus has 120 feet in length and 120 feet in breadth. A stadium has 625 feet or 125 passus. A mile has 1,000 passus, or 5,000 feet, or eight stadia. ${ }^{6}$

A pes prostratus is defined as follows: you take the length by the breadth; this makes an embadon (the area of a plane figure).

A pes quadratus is defined as follows: we measure the length by the breadth, and then by the depth; this makes pedes solidi.

A pes quadratus concavus has the capacity of an amphora of three modii.
In a centuria there are 200 iugera of land, 600 modii. The circumference has 9,600 feet. In it there are 2,400 by 2,400 feet, 480 passus by 480 passus, 20 actus by 20 actus, 1,600 by 1,600 cubita.

To convert feet to cubita I always multiply by eight and divide by twelve; this produces cubita. To convert cubita to feet, I always multiply by twelve and divide by eight; this produces feet.

Measurements are taken in three ways, by length, by breadth, and by height. That is, a straight line, a plane figure, and a solid figure. A straight (line) is where we measure the length without the breadth, for example, lines, porticos, ${ }^{7}$ running-tracks, length in miles, the length of rivers, and similar things. A planum (plane) is what the Greeks call epipedon; we refer to pedes constrati. In this we have the length and breadth, and in this way measure fields, the area of buildings in cases where the height or depth is not at issue, for example in respect of plaster work, gilding, tables, and similar things. A solid figure is what the Greeks call stereon; we refer to pedes quadrati. In this we measure the length, breadth, and depth, for example, the structure of walls, the substance of pillars, pyramids or stones, and similar things.

Omnis autem mensurarum obseruatio et oritur et desinit signo. signum est cuius pars nulla est. haec est omnium extremitatium finitima contemplatio. signum autem sine parte est initium, a quo omnia incipiunt.

Extremitas est quo usque uni cuique possidendi ius concessum est, aut quo usque quisque suum seruat (Ill. 145). extremitatium genera sunt duo, unum quod per rigorem obseruatur, alterum quod per flexus (Ill. 146). rigor est quidquid inter duo signa ueluti in modum lineae rectum perspicitur; per flexus, quidquid secundum locorum naturam curuatur, ut in agris arc[h]ifiniis solet. decumanus est longitudo rationalis, itemque cardo, constitutis in unum binis rigoribus, singulis spatio itineris interueniente. nam quidquid in agro mensorii operis causa ad finem rectum fuerit, rigor appellatur: quidquid ad horum imitationem in forma scribitur, linea appellatur (III. 147).

Linea est longitudo sine latitudine, lineae autem fines signa. ordinatae rectae lineae sunt quae in eadem planitia positae et eiectae in utramque partem in infinitum non concurrunt (Ill. 148).

Linearum genera sunt tria, rectum, circumferens, flexuosum (Ill. 149). recta linea est quae aequaliter suis signis rectis posita est; circumferens, cuius incessus a conspectu signorum suorum distabit. flexuosa linea est multiformis, uelut aruorum aut iugorum aut fluminum; in quorum similitudinem et arcifiniorum agrorum extremitas finitur, et multarum rerum similiter, quae natura inaequali linea formata sunt (Ill. 150).

Summitas est secundum geometricam appellationem quae longitudinem et latitudinem tantum modo habet, summitatis fines lineae. plana summitas est quae aequaliter rectis lineis est posita (Ill. 151). omnium autem summitatium metiundi obseruationes sunt duae, enormis et liquis; enormis, quae in omnem actum rectis angulis continetur (Ill. 152); liquis, quae minuendi laboris causa et salua rectorum angulorum ratione secundum ipsam extremitatem subtenditur (Ill. 153).

Genera angulorum rationalium sunt tria, rectum ebes acutum. haec habent species viII; rectarum linearum tres, rectarum et circumferentium tres, circumferentium tres.

Rectarum ergo linearum species angulorum generis sui tres, recta ebes acuta (Ill. 154). rectus angulus est euthygrammos, id est ex rectis lineis conprehensus, qui Latine normalis appellatur (Ill. 155). quotiens autem recta super recta linea stans ex ordine angulos pares fecerit, et singuli anguli recti sunt, et stans perpendicularis eius lineae super quam insistit est. cuius sede si subtendens linea perpendiculari fuerit iniuncta, efficit triangulum recto angulo (Ill. 156). ebes angulus est plus normalis, hoc est excedens recti anguli positionem, et qui, si triangulus secundum hanc positionem constitutus fuerit, perpendicularem extra finitimas lineas habeat (Ill. 157). acutus angulus est conpressior recto; qui si a recta linea, quae sedis loco fuerit, rectam lineam secundum suam inclinationem emiserit, similique cohibitione rectam lineam in occursum exceperit, efficiet triangulum qui perpendicularem intra tres lineas habebit (Ill. 158). rectus ergo angulus est normalis, ebes plus normalis, acutus minus normalis (Ill. 159).

Every noting of measurements begins and ends with a point. A point is something that has no substance. The analysis of all boundaries is related (to this). A point without substance is the start from which everything begins. ${ }^{8}$

A boundary is the place up to which rights of possession are granted to everyone, or the point up to which everyone maintains his own property. 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. A decumanus is a calculated length, and similarly a kardo, when two rigores have been established to make one boundary, with the space of a roadway between the individual rigores. ${ }^{9}$ Whatever occurs on land as part of the work of measuring to establish a straight boundary, is called a rigor. Whatever is drawn on a map to represent this, is called a line $\{$ linea $\}$.

A line is a length without breadth, and the ends of a line are points. Parallel straight lines are those that are placed on the same level, and if extended in both directions do not meet in infinity.

There are three kinds of line: straight, circular, ${ }^{10}$ curving. A straight line is one that is positioned in relation to its straight points (i.e. it runs between two points set in a straight line). A circular line is one whose course will remove it from direct sighting of its points. A curving line is one of many shapes, as in the case of fields or mountain ridges or rivers. The boundary of ager arcifinius is demarcated in ways similar to these, and similarly in the case of many other things that are made with a line that is by nature not uniform.

A surface $\{$ summitas $\}$, according to the terminology of geometry, has only length and breadth, and lines mark the boundary of the surface. A level surface is one that is laid out with uniform straight lines. There are two ways of noting the measurement of all surfaces: enormis and liquis. Enormis is when the surface is contained within right angles over all its extent; liquis is when, in order to reduce work while maintaining the principle of right angles, the surface is stretched out according to the (shape of) the boundary itself. ${ }^{11}$

There are three kinds of measured angles: right-angled, obtuse, acute. These have nine types, three involving straight lines, three involving straight lines and circular lines, and three involving circular lines. ${ }^{12}$

There are three types of angle specific to straight lines: right-angled, obtuse, acute. A right angle is euthygrammos, that is, enclosed by straight lines, and is called normalis in Latin. Whenever a straight line positioned above another straight line makes equal angles in order, and the individual angles are right angles, it stands as a perpendicular to that line over which it is positioned. If another line is joined to the perpendicular from the base line it makes a right-angled triangle. An obtuse angle is greater than a right angle, that is, it goes beyond the position of a right angle, and if a triangle is established
according to this position, it has a perpendicular outside the enclosing lines. ${ }^{13}$ An acute angle is more compressed than a right angle. If a straight line is projected from the straight line that serves as the base line, at a similar angle, and meets a straight line at a similar angle, it will make a triangle which has a perpendicular within its three sides. ${ }^{14}$ A right angle is therefore the intersection of two straight lines at 90 degrees, an obtuse angle is more than a right angle, and an acute angle is less than a right angle.

Rectarum linearum et circumferentium species angulorum generis sui tres, recta ebes acuta (Ill. 160). quaecumque autem linea in dimensione medium secans circulum per punctum transiens ad circumferentem lineam pares alternos secundum suam speciem rectos angulos faciet (Ill. 161). ebetes angulos faciet generis sui quaecumque ordinata dimensioni linea intra semicirculum, in eo tamen spatio quod inter se et lineam quae per punctum semicirculi transiet interiacebit (Ill. 162). quotiens intra semicirculum linea fuerit ordinata dimensionis lineae, acutos angulos faciet generis sui, quos in circumferentia cludet (Ill. 163). rectarum ergo et circumferentium linearum anguli rectus ebes acutus; rectus, quoniam recta linea quae per punctum ad circumferentiam peruenit, medium secat circulum et utraque parte pares angulos diuidit; ebes et acutus ideo quod ordinata dimensioni linea intra semicirculum inferiores facit angulos maiores: nam quos intra circumferentiam cludet, minores (Ill. 164).

Circumferentium linearum species angulorum generis sui tres, recta ebes acuta (IIl. 165). quotiens ex uno duorum punctorum diastemate duo circuli pares exeunt, ad conexionem circumferentiarum interiores rectos angulos facient (Ill. 166); ebetes exteriores, qui sunt sescontrarii rectis: acuti anguli sunt lunati, qui inter rectos et ebetes includuntur (Ill. 167). circumferentium linearum rectos angulos ideo quod si tres circuli pares inter se fuerint aequali diastemate conexi, intra scriptos angulos pares alternos habebunt, per quorum signa si rectae lineae intra scribantur, in partes quas circulorum conexio consu $\langle\mathrm{m}\rangle$ met medias diuident. ebetes angulos exteriores, quod sunt omnibus intra scriptis maiores. lunati autem acuti, quod exilissima tenuitate finiuntur (III. 168).

Rationalium linearum genera angulorum haec sunt. quibus si flexuosa linea iniungatur, faciet species angulorum secundum suam inaequalitatem complures (Ill. 169): omnes tamen illae inaequalitates rationalibus lineis conprehendi et diuidi possunt. [flexuosa autem linea sicut elicis aut cornualis.] (Ill. 170). nam flexuosa linea ad mensuram redigitur, quem admodum ipsius loci natura permittit, qua proxima est rectae lineae adque circumferenti circulari, si terminibus arboribus notatis aut fossis aut uiis aut iugis montium et diuergiis aquarum fines obseruabuntur.

Angulus autem omnis species capit duas, planam et solidam (Ill. 171). planus angulus est in planitia duarum linearum adtingentium, sed et non in rectum positarum, alterius ad alteram inclinatio (Ill. 172). solidus angulus est cuius planitiae altitudo adiungitur aut aequatur (Ill. 173).

Forma est quae sub aliquo aut aliquibus finibus continetur.
Formarum genera sunt quinque. unum quod ex flexuosa linea continetur. alterum quod ex flexuosa et rationalibus. tertium quod ex circumferentibus. quartum quod ex circumferentibus et rectis. quintum quod ex rectis. horum generum sunt species multitudinis infinitae (IIl. 174).

Flexuosarum linearum formae species habent multas in infinitum.
Aeque multas ac uarias figuras habent formae, quotiens flexuosae lineae rationalis siue recta siue circularis linea interuenit (Ill. 175).

Circumferentium linearum formae aliquae sunt sine angulo, aliquae uno, aliquae duorum, aliquae trium, aliquae quattuor, et aliquae super hunc numerum singulis

There are three types of angle specific to straight lines and circumferences: rightangled, obtuse, and acute. Any line (drawn) on the diameter, cutting the middle of the circle, going through the (mid-)point to the circumference, will produce equal, right angles (with the tangent) on both sides, according to its type. Any line parallel to the diameter within the semicircle will produce obtuse angles (with the tangent) in respect of its type, in that space which lies between it and the line that passes through the (mid-)point of the semicircle. Whenever a line inside the semicircle is parallel to the line of the diameter, it produces acute angles in respect of its type, where it encloses them on the side of the circumference. Therefore, the angles associated with straight lines and circumferences are right-angled, obtuse, and acute; a right angle, when a straight line which passes through the (mid-)point and goes on to the circumference, cuts the circle in the middle, and on each side makes equal angles; obtuse and acute, when a line inside the semicircle parallel to the diameter makes angles that are obtuse below it, while those it encloses on the side of the circumference it makes acute. ${ }^{15}$

There are three types of angle specific to circumferences: right-angled, obtuse, acute. Whenever two equal circles are drawn from the same radius (intersecting each other), they make the interior angles at the junction of the circumferences right angles. ${ }^{16}$ The outside angles are obtuse, opposite the right angles. The acute angles are lunati, ${ }^{17}$ which are enclosed between the right angles and the obtuse angles. (We also have) right angles associated with circular lines for the reason that, if three equal circles with the same radius are joined, they will have inside (the circles) as drawn equal (right) angles in succession. If straight lines are drawn through the centre of these (circles), they divide into equal parts those areas that the junction of the circles makes. The outside angles are obtuse since they are greater than all those drawn inside. The angles known as lunati are acute since they they are bounded at a very sharp angle. ${ }^{18}$

These are the kinds of angle associated with measured lines. If a curving line is added to them, it will make several types of angle according to its unequal shape. All these inequalities can be enclosed and divided by measured lines. ${ }^{19}$ A curving line is brought under measurement in the way that the nature of the terrain permits, by which it is closest to a straight line or the circumference of a circle, if the boundary is recognized by means of stones, marked trees, ditches, roads, mountain ridges, and watersheds.

Every angle has two types, plane and solid. A plane angle is formed on the flat surface of two lines that touch, but not at right angles; one slopes into the other. A solid angle is one whose height is added to the level surface or made equal to it.

A figure is an area contained within one or several boundaries.
There are five kinds of figure. One is contained within a curving line; another within curving and measurable lines; another within circular lines; a fourth within circular and straight lines; a fifth within straight lines. There is an infinite multitude of40 varieties of these kinds.

Figures made from curving lines have an infinitely large number of varieties.
Similarly, figures have many varied shapes whenever there is a combination of a curving line and a measured or straight or circular line.

There are several figures made from circular lines, which have no angle; some have one angle, some two, some three, some four, and some have more than this, with
angulis accedentibus ut plurimum in infinitum. forma est sine angulo circuli unius pluriumue. circulus autem est plana forma ab una linea conprehensa, ad quam ab uno signo intra formam posito omnes accedentes rectae lineae sunt inter se pares (Ill. 176). ex pluribus circulis forma sine angulo, ut harenae ex quattuor circulis (III. 177); ex pluribus quam quinque, ut in opere picturarum aut architectura. forma anguli unius ex tribus circinis, ut in opere marmoreo. duorum angulorum forma e duobus circinis (Ill. 178), trium angulorum ex tribus circinis (Ill. 179), quattuor angulorum ex quattuor circinis (Ill. 180), reliquae accedentibus singulis plurilaterae in infinitum (Ill. 181).

Rectarum linearum et circumferentium [forma sine angulo] duorum laterum totidemque angulorum forma est ex recta linea et circumferenti semicirculo (Ill. 182). [rectarum linearum et circumferentium formae sine angulo lateris unius, duorum angulorum ex duobus lateribus, trium angulorum ex tribus lateribus, quattuor ex quattuor, reliquae singulis accedentibus plurilaterae.] (Ill. 183). trilatera forma est trium laterum totidemque angulorum ex duabus rectis lineis et una circumferenti (Ill. 184), uel ex duabus circumferentibus et una recta. ex duabus ergo rectis et una circumferenti. ex duabus circumferentibus et recta. quadrilatera forma est quattuor laterum totidemque angulorum ex quattuor lineis comprehensa, ut duabus rectis et duabus circumferentibus (Ill. 185). plurilatera forma est quae plus quam quattuor lineis comprehensa est, ut quinque laterum totidemque angulorum ex duabus rectis et tribus circumferentibus (Ill. 186), ex tribus rectis et duabus circumferentibus. et quaecumque huic formae accedentibus singulis angulis et lateribus similis fuerit, plurilatera appellatur (Ill. 187).

Planarum autem et rectis lineis comprehensarum aliae sunt trilaterae, aliae quadrilaterae, aliae singulis adiectis super hunc numerum plurilaterae in infinitum. trilatera forma est quae tribus rectis lineis continetur. trilaterarum formarum et ex rectis lineis comprehensarum species sunt quattuor. una qua rectus angulus continetur, et efficit triangulum recto angulo, quod Graeci orthogonion appellant (Ill. 188).
plurilatera forma est quae plus quam quattuor rectis lineis sub qualicumque specie continetur
quinque, quam formam Graeci pentagonon appellant (Ill. 189). amplioribus quoque formis apud Graecos nomina $\langle\mathrm{ab}\rangle$ angulis dantur, ut hexagono heptagono et super hunc numerum compluribus. has nos plurilateras appellamus adiecto angulorum numero, ut sex angulorum et septem. et quantumcumque super hunc numerum auxeris, eadem appellatione utamur (Ill. 190).

Alia species est formae per quam frequenter arc[h]ifiniorum agrorum quadratura concluditur ex rectis angulis [ex] pluribus quam quinque, accedentibus super hunc numerum in quantacumque multitudine cogitaueris.
... qualemcumque rectorum angulorum formam rectis lineis comprehendere.
Ex data recta linea ducere posito signo
. relato in utramque partem circino, aequali punctorum diastemate (Ill. 191) circulos scribere oportet, per quorum conexionem recta linea transeat factura normales
individual angles accruing for the most part in endless numbers. A figure without an angle consists of one or more circles. A circle is a plane figure embraced by one line, and all straight lines that come to this (line) from one point placed inside the figure, are equal to one another. ${ }^{20}$ A figure can be constructed from several circles without any angle, like sand (spread) in four circles. ${ }^{21}$ (A figure can be made) from more than five circles, as in painting or architecture. A figure containing one angle can be produced from three arcs, as in marble work. A figure containing two angles can be produced from two arcs, containing three angles from three arcs, and containing four angles from four arcs. The remaining figures have many sides, made up from the addition of individual arcs, in endless numbers.

A figure including straight and circular lines, containing two sides and as many angles, consists of a semicircle made from a straight and curving line. [Figures consisting of straight and circular lines without any angle consist of one side; if they have two angles they consist of two sides, if three angles, of three sides, and if four angles, of four sides. The remaining figures consisting of many sides are constructed from the addition of individual angles. ${ }^{22}$ A three-sided figure consists of three sides and as many angles, made from two straight lines and one circular, or from two circular and one straight, that is, from two straight and one circular, or from two circular and one straight. A four-sided figure consists of four sides and an equal number of angles enclosed by four sides, e.g., two straight lines and two circular. A many-sided figure is one that is enclosed by more than four lines, e.g., five lines and an equal number of angles, made from two straight and three circular lines. And whatever kind of figure is similar to this, with the addition of individual angles and sides, is called manysided.

Of plane figures enclosed by straight lines, some are three-sided, some four-sided, others many-sided, with the addition of individual sides beyond this number to infinity. A three-sided figure is one enclosed by three straight lines. There are four types of three-sided figures enclosed by straight lines: one where a right angle is included and makes a right-angled triangle, which the Greeks call orthogonion. ${ }^{23}$

A many-sided figure is one that is enclosed by more than four straight lines, with whatever kind of variation.
five, and the Greeks call this figure a pentagonon. The Greeks name the larger figures on the basis of the angles, e.g., hexagonon, septagonon, and many with higher numbers than this. We call these many-sided, adding the number of angles, e.g., with six or seven angles. And no matter how many you add on top of this number, we use the same terminology.

There is another type of figure, by which an area of ager arcifinius is frequently enclosed, with more than five right angles; to this number you can add as many angles as you think fit.
... to enclose any figure containing right angles with straight lines. ${ }^{24}$
To draw from a given straight line when a marker has been positioned $\qquad$ when the compass has been moved to both sides, it is appropriate to draw circles with a radius equal to the distance between their two centres, and where they intersect, a straight line should pass through, and will make
in data linea angulos (Ill. 192). sed quo in rectarum linearum forma circularis linea non interueniat rectis, a circumferentiarum parte chiasmi cuiusdam ratione utamur (Ill. 193).

Quod si ab eadem recta linea ducenda fuerit quae rectum angulum faciat, ex quolibet puncto qui per caput recta linea transeat rectam lineam eicere, per cuius signum quod est in circumferentem lineam a capite rectae lineae recta linea transeat factura in data linea rectum angulum (Ill. 194). in hanc autem rationem sublata circumferentia chiasmis utendum est. nam quod ad extremam lineae normationem pertinet, uulgaris consuetudinis est sex octo et decem: haec de qua supra disputauimus (Ill. 195) circuli ratio magis artificialis est, quae numeros non praefinit: habemus enim apud Eucliden, quocumque loco ad circumferentem lineam ex signis dimensionis duae lineae concurrerint, normam facturas.
right angles at a given line. But in a figure consisting of straight lines, where a circular line does not intersect the straight lines, starting from part of the circumference we must use the method involving chiasmus. ${ }^{25}$

But if a line has to be extended from the same straight line $(\mathrm{AB})$ to make a right angle, from the central point (C) (of the circle) extend a straight line which passes through the extremity of the circle (D) in a straight line. Through the point on this line, which is at the circumference (E), a straight line (BE) should pass from the extremity of the (first) straight line, which will make a right angle on the given line (AB). If there is no circumference, we must use chiasmi in this manner. In respect of the establishment of a perpendicular at the end of a line, it is the usual custom to have the numbers six, eight, and ten. I discussed this above. The method using a circle is based more on art and does not define numbers in advance. ${ }^{26}$ Indeed we have it in (the works of) Euclid that at whatever place on the circumference two lines intersect, starting from the ends of the diameter, they make a right angle. ${ }^{27}$

## LEX MAMILIA ROSCIA PEDVCAEA ALLIENA FABIA

K．L．III

Quae colonia hac lege deducta quodue municipium praefectura forum concilia－ bulum constitutum erit，qui ager intra fines eorum erit，qui termini in eo agro statuti erunt，quo in loco terminus non stabit，in eo loco is，cuius is ager erit，terminum
 colonia municipio praefectura foro conciliabulo iure dicundo praeerit，facito uti fiat．

## K．L．IIII

Qui limites decumanique hac lege deducti erunt，quaecumque fossae limitales in eo agro erunt，qui ager hac lege datus adsignatus erit，ne quis eos limites decumanosue obsaepito，neue quid immolitum neue quid ibi obsaeptum habeto，neue eos arato，neue eas fossas opturato neue obsaepito，quo minus suo itinere aqua ire fluere possit．si quis aduersus ea quid fecerit，〈is〉 in res singulas，quotienscumque fecerit，HS $\overline{\text { IIII }}$〈n（ummum） colonis municipibusue eis，in quorum agro id factum erit，dare damnas esto，〈eiusque〉 pecuniaeque qui uolet petitio hac lege esto．

## K．L．V

Qui hac lege coloniam deduxerit，municipium praefecturam forum conciliabulum constituerit，in eo agro，qui ager intra fines eius coloniae municipii fori conciliabuli praefecturae erit，limites decumanique ut fiant terminique statuantur curato．quosque fines ita statuerit，ii fines eorum sunto，dum ne extra agrum colonicum territorium fines ducat．quique termini hac lege statuti erunt，ne quis eorum quem eicito neue loco moueto sciens dolo malo．si quis aduersus ea fecerit，is in terminos singulos，quos eiecerit locoue mouerit sciens dolo malo，HS V m（ilia）n（ummum）in publicum eorum，

## LEX MAMILIA ROSCIA PEDUCAEA ALLIENA FABIA ${ }^{1}$

## CHAPTER III OF THE STATUTE

Whatever colony shall have been founded in accordance with this statute, and whatever municipium, praefectura, forum, or conciliabulum shall have been established,
and whatever land shall lie within their boundaries, and whatever boundary markers shall have been set up on that land, at whatever location a boundary marker shall not be standing, the person who owns the land shall see to it that the boundary marker is replaced at that location, as he shall consider it proper. The magistrate who shall be in charge of jurisdiction in that colony, municipium, praefectura, forum, or conciliabulum, is to ensure that this be done.

## CHAPTER IIII OF THE STATUTE

Whatever boundaries \{limites\} and decumani shall have been laid out in accordance with this statute, and whatever boundary ditches shall be on that land, which land shall have been granted and allocated in accordance with this statute, no one is to have those limites or decumani blocked, nor anything built in them, nor anything placed as an obstruction there, nor is he to plough them up, nor is he to block or obstruct those ditches, so as to prevent water from being able to move and flow in its natural course. If anyone shall have acted against these injunctions, in each individual case, every time he shall have done it, he is to be condemned to pay 4,000 sesterces to the inhabitants of the colony or municipium, in whose land this shall have occurred, and in accordance with this statute there is to be a suit for that amount for any person who shall wish. ${ }^{2}$

## CHAPTER V OF THE STATUTE

Whoever shall have founded a colony or established a municipium, praefectura, forum, or conciliabulum in accordance with this statute, is to ensure that boundaries \{limites\} and decumani be laid out and boundary markers set up on that land, which land shall be within the boundaries of that colony, municipium, forum, conciliabulum, or praefectura. And whatever boundaries he shall have established in this way, they are to be their boundaries provided that he does not establish boundaries outside the land of the colony or the territory. And whatever boundary markers shall have been set up in accordance with this statute, no one is to displace any of them or move it from its location knowingly with wicked deceit. If anyone shall have acted against these injunctions, he is to be condemned 〈to pay〉 for every individual boundary marker which he shall have knowingly with wicked deceit displaced or moved from its location, 5,000 sesterces to the public control of those people inside whose boundaries
quorum intra fines is ager erit，$\langle\mathrm{d}($ are $)\rangle \mathrm{d}$（amnas）esto．deque ea re curatoris，qui hac lege erit，iuris dictio reciperatorumque datio addictio esto．cum curator hac lege non erit，tum quicumque magistratus in ea colonia municipio praefectura foro conciliabulo iure dicundo praeerit，eius magistratus de ea re iuris dictio iudicisque datio addictio esto．inque eam rem is，qui hac lege iudicium dederit，testibus publice dumtaxat in res singulas $h$（ominibus）$x$ denuntiandi potestatem facito，ita uti 〈ei〉e re publica fideque sua uidebitur．et si is，unde ea pecunia petita erit，condemnatus erit，eam pecuniam ab eo deue bonis eius primo quoque die exigito；eiusque pecuniae quod receptum erit， partem dimidiam ei cuius unius opera maxime is condemnatus erit 〈dato〉，partem dimidiam in publicum redigito．quo ex loco terminus aberit，si quis in eum locum ter－ minum restituere uolet，sine fraude sua liceto facere，neue quid cui is ob eam rem hac lege 〈dare〉 damnas esto．
that land shall be．With regard to that matter，jurisdiction and the appointment and confirming of assessors \｛recuperatores\} is to be the responsibility of whoever shall be curator in accordance with this statute．${ }^{3}$ When there shall not be a curator in accor－ dance with this statute，then whatever magistrate shall have responsibility for juris－ diction in that colony，municipium，praefectura，forum，or conciliabulum，to that magistrate is to belong jurisdiction and the appointing and confirming of a judge in that matter．In respect of that matter，whoever in accordance with this statute shall have granted a trial，is to grant the right of publicly serving notice on witnesses，up to ten $\langle\mathrm{men}\rangle$ for each individual instance，in so far as it shall seem $\langle$ to him〉 to be in accordance with the public interest and his own integrity．And if the person，against whom there shall have been a suit for that money，shall have been condemned，he is to exact that money from him or from his property on the very first（available）day， and in respect of that money which shall have been recovered，〈he is to give〉 half of it to that person by whose efforts he shall have been principally condemned，and he is to place the other half in public control．From whatever location a boundary marker shall be missing，whoever shall wish to replace a boundary stone in that location，it shall be permissible to do so without any personal liability，and he is not to be con－ demned 〈to pay〉 anything to anyone on that account in accordance with this statute．

## DE SEPVLCHRIS

[IMP. TIBERIVS CAESAR TRIVMVIRIS IVLIO M. ANTONIO ET LEPIDO. De ea lege agrorum custodienda et limitum fide constare oportet, quem admodum decumanis antehac adsignatum est, cum ager diuisus militi traderetur, ut extremis ac conpaginantibus agros limitibus uel uiis monumenta sepulchraue sacrarentur. nam] quidam rationem agrorum per eas recturas putant obseruari, quo uergant itinera ante colonias munita: in quibus si monumenta constituta inueniuntur [uel constituuntur], putant esse finalia.

Nam monumentum plurimis est constitutum rationibus. est unum quod ad itinera publica propter testimonium perennitatis est constitutum [uel quod constituitur]: quod rationem finium non recipit, nisi forte inter conuenientes ager diuisus pactione fuerit. est et aliud quod proximis aedibus suis unus quis miles uel consors condidit in portionibus suis, ut ad progeniem futuram testis loco heredibusue suis uice instrumentorum tabellarumue possessionis causam monstrauerit: quod aeque nullam limitum recipit rationem. est et aliud quod longe $a b$ aedibus [uel itinera publica] constitutum [id] est iuxta legem Semproniam et Iuliam, quod kardinibus et decumanis esse constitutum monstratur: quod rationem finium recipere uidetur, id est concurrentium linearum adque secantium se inuicem, et ordinem in utrosque custodit, limitum rationem discernens. nam et alia intra agros sunt sita, quae partes limitum seruant et iuxta perennem rationem unam lineam mittunt: haec iugerationis modum seruandi causa sunt sita; quibus etiam termini lapidei adpositi certam distinctionem dant: quos apparet non ad fidem nec rationem eorum limitum qui maiorem modum agri respiciunt pertinere.

Eorum igitur sepulchrorum sequenda est constitutio, quae extremis finibus concurrentibus plures decursus agrorum spectant adque multo longiores discretiones linearum perennes admittunt.

Sunt etiam monumenta in itineribus constituta quae fidem publicam tenent: si tamen idem uiae publice cursus finitimus repperitur, finalia esse arbitramur. omne enim monumentum dominorum nomina testatur, quaad iura possessionum pertinere noscuntur.
[Et ideo hanc legem dedimus rationemue declarauimus, ut aere contineatur. Data Rom. kal. april. Tiberio Caesare consule in aede Veneris genetricis.] (Ill. 196).

## TOMBS'

[Emperor Tiberius Caesar to the triumvirs, Julius (Octavian?), Marcus Antonius, and Lepidus. ${ }^{2}$ With regard to that lex concerning the safeguarding of the integrity of fields and limites, it is necessary to agree how land was previously allocated by means of decumani, when it had been divided and was being given to soldiers, in such a way that monuments and tombs were invested with sacred authority (i.e. as boundary markers) on outer limites and those enclosing fields, and also on roads.] Some people think that the layout of fields is marked by those straight lines, where the roads run that were constructed before the establishment of the colonies. So, if tombs are found built on these, they consider them to be demarcating a boundary. ${ }^{3}$

Now, tombs were set up for many reasons. There is one that was set up to serve as a proof of perpetuity in respect of public rights of way. This does not have any relation to the layout of the boundaries, unless the land happened to be divided by arrangement through the agreement of the parties. There is another (tomb), which a soldier, and perhaps his wife, built on his allocation adjacent to the house, so that it should act as a witness and take the place of written documentation and records, in proving the fact of possession for the benefit of his future children and for his heirs. Similarly, this has no relation to the layout of limites. There is another (tomb), which was built a long way from buildings in accordance with the Sempronian or Julian lex, and is shown to have been positioned in relation to the kardines and decumani. This does seem to relate to the layout of boundaries, that is, lines running together and intersecting one another in turn, and preserves the system for both (kardo and decumanus), by demarcating the layout of the limites. Other tombs are situated inside fields, and mark some of the limites by establishing one (boundary) line in perpetuity. These tombs have been positioned to preserve the correct quantity of iugera; boundary stones placed around clearly distinguish them. ${ }^{4}$ It is clear that these are not relevant to the integrity and layout of those limites that apply to a larger area of land.

Therefore we must examine the position of those tombs situated where outer boundaries meet, which overlook several expanses of land and permit a much more extensive differentiation of boundary lines in perpetuity.

There are also tombs set up on roads, and they preserve public rights of way. If, however, the route of a public highway is also found to be situated on a boundary, we hold that these tombs demarcate the boundary. Every tomb testifies to the names of its owners, so far as rights of ownership are reckoned to be relevant.
[Therefore we granted this lex and published the system, so that it could be entered on bronze. Given at Rome on 1 April in the consulship of Tiberius Caesar in the temple of Venus Genetrix.]

## EX LIBRIS DOLABELLAE

Omnis terminus ab oriente lympidum latus habet, ab occidente roscidum latus habet (Ill. 197).

Vertices agrorum qui sunt? si sunt in montibus lapides tantum modo, et non potest in eis fodiri et terminus figi: inductis quadratariis ut firmius esset quod naturaliter dolantes in montibus ex monte terminum eminentem monti constituerent, quam si cauarent et sic infigerent lapides finales. ideoque uertices agrorum, quod sicut uerticem in capite humano natura prestitit, sic et in montibus mensores docti instituerunt ut essent uertices agrorum qui in montibus lapides naturales sunt (Ill. 198).

Omnis possessio quare Siluanum colit? quia primus in terram lapidem finalem posuit. nam omnis possessio tres Siluanos habet. unus dicitur domesticus, possessioni consecratus. alter dicitur agrestis, pastoribus consecratus. tertius dicitur orientalis, cui est in confinio lucus positus, a quo inter duo pluresue fines oriuntur. ideoque inter duo pluresue est et lucus finis (Ill. 199).

Fines templares sic quaeri debent; ut si in quadrifinio est positus et quattuor possessionibus finem faciet. quattuor aras quaeris, et aedes quattuor ingressus habet ideo ut ad sacrificium quisquis per agrum suum intraret. quod si desertum fuerit templum, aras sic quaeris. longe a templo quaeris pedibus xv , et inuenis uelut fundamenta aliqua. quod si inter tres, tria ingressa habet: inter duos dua ingressa habet templum (III. 200).

In agro oliuario sic quaeris quo dirigant fines. si ordines oliuarum sibi in transuerso occurrerint, sic est rigor finalis. si certi ordines sibi conuenerint, non est rigor finalis: nam hi duo rigores ebetes sunt appellati, quia sine lapidibus sunt. ideoque non potest ager oliuarius demetiri, nisi sic ut ad ordinem disconuenientem adtendas: et sic recolligis quo finis inter possessiones demetiatur aut qua exitum habeat (Ill. 201).

Fines sepulturarios siue cineratios sic intellegis, quo uadunt rigores inter possessiones, iuxta sepulturam siue buxus siue etiam cineates aut cacabos inuenis aut orcas fractas aut certe integras. ut inuenias si finalis est sepultura, quaeris longe ab ea pedes quinque aut aratro terram agis: et si inueneris ea signa, finalis est sepultura. si enim non inueneris, transi in alio latere: et sic per rigorem uicinarum possessionum in rigorem uenies de quibus possessionibus intentio uertitur: et sic ueritas agnoscitur (III. 202).

## FROM THE WORKS OF DOLABELLA ${ }^{\prime}$

Every boundary stone has from the east a 'clear' \{limpidus\} side, and from the west a 'dewy' \{roscidus\} side.

What are the 'high points' of lands? ${ }^{2}$ If on mountains there is only a rocky surface, and it is impossible to dig down and set up a boundary stone, then stone masons are brought in to hew into shape natural stones on the mountains, and establish more securely boundary markers (that are) conspicuous from mountain to mountain; (this is more effective) than excavation and the setting up of boundary stones. So, with regard to the 'high points' of lands, which nature provided just as she provided the crown of the human head, skilled surveyors have established that on mountains the 'high points' of lands should be boulders that occur naturally on mountains. ${ }^{3}$

Why does every landholding worship Silvanus? Because he was the first to establish a boundary stone in the ground. Every holding has three Silvani. One is called domesticus, sacred to the holding; the second is called agrestis, sacred to shepherds; the third is called orientalis, in whose honour a grove was established on the common boundary, from which boundaries between two or more properties originated. So, the grove itself constitutes a boundary between two or more properties. ${ }^{4}$

Boundaries relating to shrines ought to be examined in the following way. If the shrine is positioned where four boundaries meet and establishes the boundary for four properties, look for four altars; moreover the shrine has four entrances so that anyone can enter through his own land to conduct a sacrifice. But if the shrine has been abandoned, look for the altars in the following way; look about fifteen feet from the temple and find anything that resembles foundations. Now, if the shrine is between three properties, it has three entrances, if between two, then it has two entrances.

In an olive grove you should find out the direction of the boundaries in the following way. If the rows of olive-trees meet one another at an angle, this is a boundary line. If they meet in straight lines, this does not constitute a boundary. These two lines are called hebetes because they lack boundary stones. So, an olive grove cannot be measured unless you examine as indicated each row that does not tally (with other rows). In this fashion you can determine the demarcation of a boundary line between holdings, and where it ends. ${ }^{5}$

You can recognize in the following way boundaries associated with tombs or receptacles for ashes, where straight lines run between holdings, since you should find near the tomb either box-trees, or also ashes, or cooking-pots, or broken earthenware vessels, or indeed intact ones. In order to discover if a tomb marks a boundary, look five feet away from it or turn the earth over with a plough. If you find the signs mentioned, then the tomb marks a boundary. If you do not, go round to the other side. So, by means of the straight line boundary of the neighbouring holdings you will come to the boundary relating to the holdings with which the enquiry is concerned. In this way you can ascertain the truth. ${ }^{6}$

Quare per aedes publicas in ingressus antiqui fecerunt crucem, ANTICA, et posTICA? quia aruspices secundum aruspicium in duabus partibus orbem terrarum diuiserunt; una parte $a b$ oriente in occidentem, alia a meridiano in septentrionem. ideoque si qui imperatorum aut consulum pugnantes terras adquisierunt nomini
5 Romano et partiti sunt ueteranis aut militibus Romanis, et pro uoto suo dis templum aedificauerunt, ut sciretur a posteris quia adquisierant terras nomini Romano, secundum aruspicium signum fecerunt in aedes deorum suorum, ut scriberent ANTICA et postica (Ill. 203).

Why did men of old make a cross at the entrance of public temples, with antica and postica on it? Because soothsayers, according to the art of soothsaying, divided the world into two parts. One part faces from east to west, the other from south to north. So, if any generals or consuls acquired land in the name of Rome by fighting, and divided it among Roman veterans or soldiers, they built a temple to the gods in discharge of their vow, so that posterity should know that they had acquired the land for the Roman name. They made a symbol on the temples of their gods, in accordance with the practice of soothsaying, and inscribed it with antica and postica. ${ }^{7}$

## EX LIBRIS LATINI DE TERMINIBVS

Terminus si caput de aquila factum habuerit (Ill. 204), montem transcisum transit, et usque in oliuastellum mittit. si tres oleastri fuerint, trifinium faciunt.

Terminus si transpertusus fuerit (Ill. 205), cisternam significat, alueum transit, et usque in aqua uiua mittit. et ipsa aqua uiua in arca trifinii est.

Terminus si subcumbus positus fuerit (Ill. 206), limitem ostendit. quidam maxime per conuallia pergunt. si autem in plano subcumbus positus fuerit, ubi uallis non sit, in proximo ante se claudet finem.

Terminus si in quadrum dolatus fuerit (Ill. 207) et in latere punctum habuerit, fontem significat. si uero super se cauum habuerit, puteum finalem significat.

Terminus si a sursum usque deorsum scissuram habuerit (Ill. 208), fluuium aut certe riuum significat.

Terminus si super se plumbum habuerit (Ill. 209), stagnum significat aut cisternam.

Terminus si subcauus fuerit (Ill. 210), lauacrum significat.
Terminus si bifurcus fuerit (Ill. 211), samardacus dicitur, trifinium facit.
Terminus si rotundus fuerit et breuis, et de una parte in latus punctum habuerit (Ill. 212), in fontem quattuorangulatilem descendet.

Terminus si ecce talem (Ill. 213) lignum habuerit subtus uel supra, arborem peregrinam significat, qui in eo loco ex studio in fine posita est.

Arbor si plumbum habuerit (Ill. 214) idem sicut terminus, aut stagnum aut fluuium maiorem aut fontem significat.

Termini autem omnes nec uno modo nec uno tenore sunt constituti, in trifinium aut quadrifinium, et sagrabam quam appellant adluuionem. etiam monticelli sunt in finibus constituti (Ill. 215). alioquin qui nesciunt quid est in lectionibus, negant esse in finibus constitutos autem in tempore quando milites occidebantur in bello publico: alibi quam maxime non ponebantur, nisi circa fines et in centuriis: et quantos milites ponebant, tantos lapides defigebant. ideoque $\dagger$ scringis et allabinibus $\dagger$ et centuriis signa proponebantur. quoniam terminus si in tres acies constitutus fuerit, tres lineas auctoris ostendit; si in quattuor acies, quadrifinium facit (Ill. 216).

[^66]
## FROM THE WORKS OF LATINUS ABOUT BOUNDARY STONES ${ }^{\wedge}$

If a boundary stone has its top carved in the form of an eagle, it indicates a boundary that has been cut across a mountain, and demarcates it right up to a small wild olive. If there are three wild olive trees, they mark a boundary of three holdings.

If a boundary stone is pierced through, it indicates a cistern, and the boundary crosses its channel and goes right on to a spring; the spring itself is at an arca, on the point of the meeting of three boundaries.

If a boundary stone has been set in position lying on its side, it marks a limes. Some particularly mark a boundary through valleys. If, however, a boundary stone has been placed on its side on level ground where there is no valley, it marks the end of the boundary, nearby, in front of it.

If a boundary stone has been carved in the shape of a square and has a hole in its side, it designates a spring. If it has a hollow on top, it designates a well that marks a boundary.

If a boundary stone has a cleft running from top to bottom it indicates a stream, or at least a brook.

If a boundary stone has lead on top, it indicates a pool or a cistern.
If a boundary stone is hollow underneath, it indicates a washing place.
If a boundary stone is two-pronged, it is called samardacus ${ }^{2}$ and demarcates three
ndaries.
If a boundary stone is round and small and has a hole in the side at one place, it demarcates a boundary with four angles descending to a spring.

If a boundary stone has a piece of wood above or below it as illustrated, it indicates a non-native tree, which has been deliberately positioned in that place on the boundary.

If a tree has lead on it, just like a boundary stone, it indicates a pool, or a bigger stream, or a spring.

Boundary stones were not all established in the same way or with uniform appearance, at a triple or a quadruple boundary, or sagraba, which they call alluvial land. ${ }^{3}$ Even small hillocks have been used to mark a boundary. Besides, those who are ignorant of what is in books deny that they (stones) were set up on boundaries at the time when soldiers were being killed in the civil wars; ${ }^{4}$ elsewhere, they certainly were not set up, except around the periphery and in centuriae. All the stones that the soldiers set out, they (the surveyors) fixed in the ground. So, markers were placed on $\dagger$ $\ldots$ and $\ldots \dagger^{5}$ and in centuriae. Whenever a boundary stone was set up on three boundaries, it showed three lines inscribed by the person responsible; if it was set up on four boundaries, it made a quadrifinium.

## GENERA LAPIDVM FINALIVM

Lapis fluuialis cromatica uocatur. lapis Tiburtinus caesalis dicitur. terminus coctus testatius ullageris dicitur. lapis alua silicinea, si peralua fuerit, Galliensis nuncupatur: si mixta uena habuerit, ignifera nomen habet. nam in aliquibus locis terminos non dolitos posuimus, et nihil illis subter addidimus. terminus si uenas mixtas habuerit, $\dagger$ ficto aciem $\dagger$ dicitur, aspratilis autem qui uelut signinum coagulatus lapis naturalis fuerit. terminus si superius politus fuerit et inferius subulis inpolitus, monumentalis est, non habet fidem finitionis.

## GAIVS AVCTOR V. P.

Nam et naturales lapides cecidimus et in finem constituimus. in orientales partes autem omnes palos de ilice picitos posuimus: in terminatione uerum quam maxime sub terra ipsos palos percooperuimus, et signatim, ut inueniantur pali ipsi, stellam consecrauimus (Ill. 217). et ipsa stella iunior nomine uocatur. terminus autem si una acie reproba habuerit, hoc est non aequalem aciem, ipsum quoque reprobum reputamus (Ill. 218). id autem ponitur aliquando in trifinium. in quadrifinium autem reprobus non ponitur, nisi solidus lapis. et quattuor lapides in quadrifinium constituimus (Ill. 219). si extra quattuor lapides fuerit, epetecticales obseruentur.

## AVCTOR VITALIS

Terminus si fuerit quinque pedes intra limitem, aliis quinque pedibus in caput limitis terminum inuenies.

Terminus si in medium limitem constitutus fuerit et unam partem subcauam habuerit, tres monticellos transit, et in tertium monticellum arcam circa lauacrum significat, et ipsa arca in quadrifinium constituta est.

## FAVSTVS ET VALERIVS VV. PP. AVCTORES

Dum per Africam assignaremus, circa Chartaginem in aliquibus locis terminos rariores constituimus, ut inter se habeant pedes $\overline{\text { IICCCC. }}$ in limitibus uero, ubi rariores terminos constituimus, monticellos plantauimus de terra, quos botontinos appellauimus. et intra ipsis carbones et cinus et testa tusa cooperuimus. trifinium quam maxime quando constituimus cum signis, id est cinus aut carbones et calce ibidem construximus, et super duximus, et super toxam monticellum constituimus. in Chartagine

## TYPES OF BOUNDARY STONES

A boundary stone associated with a river is called cromatica. A Tiburtine stone is called caesalis (i.e. suitable for cutting). A boundary stone of baked pottery is called ullageris. A white flinty stone, if it is pure white, is called Galliensis. If there is a mixed vein through it, it is called fire-bearing \{ignifer\}. Now, in some places we set up stones which had not been smoothed and we added nothing underneath them. If a boundary stone has veins of mixed colour in it, it is said $\dagger$ line $\ldots \dagger .{ }^{6}$ A natural stone, which looks as if it has solidified like opus signinum, is called aspratilis. ${ }^{7}$ If a stone has been finished on top but left unfinished underneath, it is a stone belonging to a tomb and has no credibility as a boundary marker.

## THE WRITER GAIUS V. P. ${ }^{8}$

We have cut up natural stones and placed them on a boundary. In the eastern part we set up wooden stakes all made from holm-oak and covered with pitch. In establishing the boundary, as far as possible we buried these stakes in the earth, and dedicated a star by way of a marker so that the stakes themselves could be found. This star is referred to as iunior. ${ }^{9}$ If a boundary marker has a line out of place \{reproba\}, that is, a line which is not consistent, we consider the boundary marker itself as reprobus. ${ }^{10}$ Such a marker is sometimes placed at a trifinium. However a reprobus marker is not placed at a quadrifinium unless it is of solid stone. Indeed we set up four stones at a quadrifinium. If the four stones are outside (i.e. on the outer corners of a unit of land division?), they should be regarded as corner stones \{epetecticales $\}$. ${ }^{11}$

## THE WRITER VITALIS

If a boundary stone is five feet within a limes, in another five feet you will find a boundary stone at the head of the limes.

If a boundary stone has been set up in the middle of a limes and has one part hollowed out underneath, (it indicates that) the boundary crosses three hillocks, and that in the third hillock there is an arca near a washing area, and that the arca itself has been set up at a quadrifinium.

THE WRITERS FAUSTUS AND VALERIUS VV. PP.
Through the Gallic provinces and through Africa
While we were allocating land in Africa, in some areas around Carthage we set up boundary stones at rather widely spaced intervals, so that they were 2,400 feet apart from one another. But on the limites where we set up these rather widely spaced stones, we heaped up hillocks of earth which we called botontini. And in these we
et in prouincia ss. quam maxime oliuastellum et cotoneum (Ill. 220) et sabucum in finem constituimus, et circa sabucum monticellos constituimus, sicut superius scripsimus, cum signis et sigillis quam maxime. fines ut sint breues in prouinciis et per montibus saxuosis limites de lapides constituimus. et in aliquibus locis murum de lapides fecimus constringere, ex calce et harena fundamenta quam maxime. in alios fines nihil posuimus, sed ex opere fossas fecimus mitti in alto. alios fines, quos sursum monte direximus, in XII pedes latitiam constituimus propter ripae ruinam. circa urbem Babylonis Romae maritimum fiet et Gallicum. iubeo te ius iurandum prestare, si cotoneum malum inueneris, quia trifinium erit. si oliuastellum fuerit in medium, unum terminum demonstrat. laguinas tres quadrifinium faciunt. in conuallia loca aqua demonstrat (Ill. 221). terminus si tres petras circa se habuerit fixas, trifinium facit.

Terminus in modum arcellae cauatus Claudianus dicitur. breuis est. et si tres fuerint, trifinium faciunt (Ill. 222).

## LATINVS V. P. TOGATVS

Terminus siue petra naturalis si branca lupi habuerit facta (Ill. 223), arborem peregrinam significat.

Terminus siue petra naturalis si branca ursi habuerit (Ill. 224), lucum significat.
Terminus siue petra naturalis si ungulam pecoris bifurcam habuerit (Ill. 225), de sub saxo egredientem aquam significat.

Terminus siue petra naturalis si caput uituli sculptum habuerit (Ill. 226), de duobus montibus aquas egredientes significat, per quas lineae confinales descendunt: super se autem sacra paganorum ostendit in trifinio.

Terminus si aspratilis fuerit et mixta piperacia loca habuerit (Ill. 227), sine dubio in trifinio constat: paralleloneum uocamus. constat eum habere legum initia consulta: pedatura eius fit pedes cCcclx.

| CCL | CCCL | CCCCL | DL | DC | DCC | DCCC | DCCCC |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{A}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{D}$ | $\mathbf{E}$ | $\mathbf{F}$ | $\mathbf{G}$ | $\mathbf{H}$ |
| $\infty$ | $\infty \mathrm{L}$ | $\overline{\mathrm{I} D}$ | $\overline{\mathrm{IIID}}$ | $\infty$ | $\infty \mathrm{D}$ | $\infty \mathrm{CC}$ | $\infty \mathrm{CCC}$ |
| $\mathbf{I}$ | $\mathbf{K}$ | $\mathbf{L}$ | $\mathbf{M}$ | $\mathbf{N}$ | $\mathbf{O}$ | $\mathbf{P}$ | $\mathbf{Q}$ |
| $\infty \mathrm{CCCC}$ | $\infty \mathrm{D}$ |  | $\infty \mathrm{D}$ |  | $\infty \mathrm{DC}$ | $\infty \mathrm{DCC}$ | $\infty \mathrm{DCCC}$ |
| $\mathbf{R}$ | $\mathbf{S}$ | $\mathbf{T}$ |  | $\mathbf{V}$ | $\mathbf{X}$ | $\mathbf{Y}$ | $\mathbf{Z}$ |

Has litteras si inueneris in terminibus scriptas, singillatim, uel binas, quantum compotum habuerit, tantum quaeris ab eo in aliud signum.

Terminus si ungulam equi sculptam habuerit, terminum cursorium significat, et usque in fontem mittit, et ipse fons trifinium facit.
above, as far as possible we established little wild olive trees, and quince-trees, and elder-trees on the boundaries, and round the elder-trees we heaped up hillocks, just as we described above, as far as possible with markers and symbols. We arranged that boundaries in the provinces should be short, and in rocky and mountainous areas we set up stones along the limites. Moreover, in some places we arranged the erection of a stone wall, making the foundations as far as possible from lime and sand. On some boundaries we placed nothing, but arranged for the construction of a deep ditch. To some boundaries, which we directed up the side of a mountain, we gave a width of twelve feet, because of the ruins of a bank (i.e. this formed the basis of the boundary). Around the city of Babylon Rome there will be limites facing the sea and 'Gallic' limites. ${ }^{13}$ I instruct you to make an oath if you find a quince-tree, because that will mark a trifinium. If a little wild olive tree is in the middle, it signifies one boundary. But three flagons ${ }^{14}$ indicate a quadrifinium. In valleys, water marks the boundary. If a boundary has three boulders positioned round it, it constitutes a trifinium.

A boundary stone hollowed out like a little box $\{$ arcella $\}$ is called 'Claudian'. It is small. If there are three, they constitute a trifinium.

## LATINUS V. P. TOGATUS

A boundary stone, or natural stone, if it has the paw of a wolf carved on it, indicates a non-native tree.

A boundary stone, or natural stone, if it has the paw of a bear carved on it, indicates a grove.

A boundary stone, or natural stone, if it has the cloven hoof of a cow, indicates water emerging from underneath a rock.

A boundary stone, or natural stone, if it has the head of a calf carved on it, indicates rivers flowing down from two mountains, along which boundary lines run downwards. Above it, it shows a shrine of country folk at a trifinium.

If a boundary stone is described as aspratilis, and has spotted areas running through it, without doubt it stands at a trifinium. We call it a paralleloneum. It is agreed that it has the opening words of leges (carved on it). Its distance (from another) is 460 feet.

A 250 B 350 C 450 D 550 E 600 F 700 G 800 H 900 I 1000 K 1050 L 2500
M 3500 N 1000 O 1500 P 1200 Q 1300 R 1400 S 1500 T 1500 V 1600
X 1700 Y 1800 Z 1900.
If you find these letters written on boundary stones, individually or in pairs, whatever the sum-total in feet is, you should take this to be the distance from this marker to the next. ${ }^{15}$

A boundary stone if it has the hoof of a horse carved on it, indicates an internal boundary marker, and demarcates the boundary right up to a spring; the spring itself constitutes a trifinium.

## CASAE LITTERARVM

## CASAE A

A. Casa quae per A nomen habet, finis non grandis habentis, super se montem habentes. in sinistra parte aquam uiuam significat. ad orientales partes ribum signifi- cat.
B. Casa 〈quae〉 per B nomen habet, finis grandis habentes. ante se finis subiacet. contra sextaneum riuum significat. finis circa se.
C. Casa quae per C nomen habet, finis super se non habentes. post orientalem proximum uenit. in alias finis aquam mittet. fontem habentes. subtus fluminiam indicat casa. aqua uiua in sinistris fluminis indicat terminum. trans[it] fluuium transit. uias multas transit. limitem eius pedes MCC transit. labacrum significat. collis riguram sequeris.
D. Casa quae per D nomen habet, finis post se habentes. de super se mittit usque in balle. montem de latus habentem. †uersus finibus casa hoc finis habentem. $\dagger$
E. Casa quae per E nomen habet, fluuium sub se significat. de latus riuum transit. limitem sextaneum ante se.
F. Casa quae per F nomen habet, finis ante se habentis. casa in monte posita. fluuium transit. limitem sextaneum proximum habientem.
G. Casa quae per G nomen habet, tortas fines habentis. in monte posita. tria riuora significat. in trifinio uineam positam.
H. Casa quae per H nomen habet, multas fines habet. in monte posita. super albarum et fontem. super se montem significat a sextaneo.
I. Casa quae per I nomen habet, finis habientem et hoc in longum significat. si in sextaneo, pedes Xxx , quod cumputum colligo. si in orientale, MCC.
K. Casa quae per K nomen habet, finis ante se subiacet. super se montem habentem. de latus uallem habentem. et in uallem duas aquas uiuas habentis. casa in latere montis posita. super se fines proximas habentem. super se riuum et cabam. terminum iuxta. sub ipso fluuium curret. proximum se pentagonus habientem. uineam in sinistris, pratum sub se habentem. [et haec casa, quae per K numen habuerit, talis finis habentes.]
L. Casa quae per L nomen habuerit, fines sub se proximum habientem. proximum se aquam significat. limitem sextaneo pedes $\langle M\rangle C C L$. de latus orientalis significat riuum, qui est albiarum. [hoc legitur. casa per L quam plurimum terminum significat.]

# CASAE LITTERARUM 

## CASAE A ${ }^{1}$

A. The farmstead ${ }^{2}$ that is named A does not have extensive land. Above it, it has a mountain. In the left-hand part it exhibits a spring, on the eastern side a brook. ${ }^{3}$

5
B. The farmstead that is named B has extensive land. Its land lies close by, in front of it. Towards the south side it exhibits a brook. Its land surrounds it.
C. The farmstead that is named C has no land above it. Behind (the farmstead) the east boundary line comes close. Water extends into another property. It (the farmstead) has a spring. Below, it exhibits a river. A spring on the left side of the river marks a boundary. A stream flows across (the land); it crosses several roads. The limes of the farmstead extends for 1,200 feet. It (the farmstead) exhibits a washing area. You should follow the range of hills.
D. The farmstead that is named D has its land behind it. Above it, it stretches out into a valley. On one side it has a mountain. $\dagger$ The estate has the boundary $\ldots \dagger^{4}{ }^{4}$
E. The farmstead that is named E exhibits a stream below it. On one side a brook flows across. It has the southern limes in front of it.
F. The farmstead that is named F has its land in front of it. The farmstead is situated on a mountain. A stream flows across. It (the farmstead) has the southern limes close by.
G. The farmstead that is named $G$ has curving land. It is situated on a mountain. It exhibits three brooks. It has a vineyard situated at a trifinium.
$\mathbf{H}$. The farmstead that is named H has extensive land. It is situated on a mountain. Above it, it has a river-bed and a spring. Above it on the southern side it exhibits a mountain.
I. The farmstead that is named I has land, and indeed it exhibits this stretched out over a long distance. On the south side this is 30 feet long, which I reckon by measurement. On the east side, it is 1,200 feet long.
$\mathbf{K}$. The farmstead that is named K has its land close by in front of it. Above it, it has a mountain. On one side it has a valley. And in the valley it has two springs. The farmstead is situated on the side of the mountain. Above it (the farmstead), it has its land close by. Above it (the farmstead), there is a brook and a hollow in the ground. ${ }^{5}$ The boundary is nearby. Below this runs a stream. Nearby, it has a five-sided stone (as a boundary marker). It (the farmstead) has a vineyard on the left-hand side and a meadow below it. [And this farmstead which is known as K , has land like this.] ${ }^{6}$
L. The farmstead that is named L has its land below it close by. Close to it, it exhibits water. The limes in the south is 1,250 feet long. On the eastern side it exhibits a brook that forms a river-bed. [This is what is read. The farmstead L generally exhibits a boundary. $]^{7}$
M. Casa quae per M nomen habet, dextra leuaque aquam uibam significat. finis egregios habentes. casa in medium finem posita. finis quadratos habentes. limites maritimenses Gallicum intercidunt. haec casa aquam in curtem habentem.
N. Casa quae per N nomen acciperit, sinistra parte finis nihil habet. et haec casa in campo posita. super se limitem proximum habentem. ante se fluuium, qui 〈in〉 albeum currit. limitem eius pedes in longum Īccc. et haec in alio casalem inpinget. partet miliarium. in sinistro quid demitto casalibus.
O. Casa quae per O nomen acciperit, in monte posita; quae per campos finis rotundas habentem et culta. per mediam finem aquam bibam significat, sub se iuncina et fora‘s aquiuergia. arcam in monticulum constitutam, ubi casa per O mittet casalis, quos demisimus. ideo haec arca trifinium facit.
P. Casa quae per $\mathbf{P}$ nomen habet, finis ante se habentem. de latus limitem orientalem proximum casa uenit. multos casales fundum contenit. limitem eius orientalem post casam uenit. proximum aquam habet, super aquam arcam, super arcam memoriam. de latus sextanea parte aliam fontanam sub se habentem. super se montem. de latus monte in triuio tri botontinos. in sinistra parte arca constituta in trifinio posita. [inter O et P multa casalia.]
Q. Casa quae per Q nomen habet, post si finem habet. multas aquas uiuas. transit riuum de sinistram partem in alias fines. montem super se habentes. subtus fluminia transet, subtus fluminia uinea posita, et circa uineam riuum currit. et intra uinea memoriae sunt. super se loca macra habentem. subtus se campum extensum habentem. limitem eius pedes mCCL.
R. Casa quae per R nomen habet, finis super se habentem diffusas. campus sub se habentem. et per medium campum flumina current. et subtus flumina albarum transit pratum. super fluminiam habentem. de lato fluminiam indicat. super se montem habentem. de montem exurget riuum, qui descendit proximum casa. et de riuum petent aquam. et de [sub riuum] latus riuum limitem transet, qui uenet e sextaneo.
S. Casa quae per $S$ nomen habet, finis egregios habentes. super se aquam uibam significat. de orientalibus partibus riuum significat. super riuum currentem transet. super se montem habentem. casa in umoroso loco finis habentem. de septentrionem proximum finem, et super se fines grandis habentes, et subtus se alius casalis intra limitem habentes. et super se montem et subtus se montem. inter montem et montem albarium habentem. †eerero $\dagger$ [haec nomina et signa in casa. finies limitibus.]
T. Casa quae per $T$ nomen habet, super se finem nihil habentem. sub se mittet riuum, qui curret subtus. transet limitem eius. et trans flumen aquam uibam. usque in aliam aquam uibam mittet limitem eius. et ipsa aqua uiua trifinium facit. super se limitem orientalem proximum casa uenit. [hoc legitur.]
M. The farmstead that is named $M$ exhibits a spring on the right and left. It has splendid land. The farmstead itself is situated in the middle of the land. It has squareshaped land. Limites that go towards the sea intersect with 'Gallic' limites. ${ }^{8}$ This farmstead has a water supply in the farmyard.
$\mathbf{N}$. The farmstead that has received the name $\mathbf{N}$ has limited land ${ }^{9}$ on the left-hand side. And this farmstead is situated on a plain. Above it, it has a limes close by. In front, it has a stream, which flows into a river-bed. Its limes is 2,300 feet long. And this adjoins the land of another farmstead. A milestone marks the boundary. On the left, (the farmstead has land) that I detach for the neighbouring farmstead.
$\mathbf{O}$. The farmstead that has received the name O is situated on a mountain. On the plain it has circular-shaped land and cultivation. In the middle of the land it exhibits a spring, and, below it, rushes and water outlets. ${ }^{10}$ It has an arca ${ }^{11}$ set up on a small mountain, from where the farmstead $O$ passes into the neighbouring farmstead, which we have detached (i.e. for another holding). Therefore the arca marks a trifinium.
$\mathbf{P}$. The farmstead that is named P has its land in front of it. On the side, the eastern limes comes close to the farmstead. The property contains several neighbouring farmsteads. Its eastern limes comes behind the farmstead. Close by, it has water, and above the water an arca, and above the arca, a tomb. On the side of the southern area it has another spring below it. Above it, it has a mountain. On the side of the mountain, at a meeting place of three roads, it has three piles of earth. On the left side an arca has been set up, situated at a trifinium. [Between O and P there are many farmsteads. ${ }^{12}$
Q. The farmstead that is named Q has its land behind it. It has many springs. A brook flows across from the left side to other land. It has a mountain above it. Below, a river flows across, and below the river a vineyard is situated, and a brook flows round the vineyard. And inside the vineyard there are tombs. Above it, it has infertile areas. Below it, it has a substantial plain. Its limes is 1,250 feet long.
$\mathbf{R}$. The farmstead that is named R has widely spread out lands above it. It has a plain below it. And rivers flow across the middle of the plain. And below the rivers a river-bed cuts across a meadow. Above, it (the farmstead) has a river. On the side, it exhibits a river. Above it, it has a mountain. A brook rises on the mountain and flows down close to the farmstead. And people take water from the brook. On one side, the brook flows across the limes, which comes from the south.
S. The farmstead that is named $S$ has splendid land. Above it, it exhibits a spring. From the eastern side, it exhibits a brook. Above, a brook flows across. Above it, it (the farmstead) has a mountain. The farmstead has its land in a well-watered spot. In the north the land lies close by, and above it, it has extensive land, and below it, it has a neighbouring farmstead within the limes. Moreover, it has a mountain above it and a mountain below it. Between both mountains it has a river-bed. $\dagger \ldots \dagger$ [These names and indications (appear) on this farmstead. The boundaries (are established by) limites.] ${ }^{13}$
T. The farmstead that is named T has limited land above it. Below it, there extends a river, which flows downwards. Its limes runs across (the land). And on the other side of the river, it (the farmstead) has a spring. Its limes is extended right up to another spring. And this spring marks a trifinium. Above it (the farmstead), the eastern limes comes close by the farmstead. [This is what is read.]
V. Casa quae per V nomen habet, fines egregios habentes. super se montem. et casa in plano loco posita. sub se riuum discindit. et de leua parte riuus alter. tria riuora discindent. a sinistra parte lapis grandis, qui in albarum est. duas serras $\langle h\rangle a b e n t e s ~ c a b a s ~ d e ~ a b ~ u n a ~ p a r t e . ~ e t ~ s a c r a ~ p a g a n o r u m ~ a p p e l l a t u r . ~$
X. Casa quae per $X$ nomen habet, finis in longo habentem. et casa ipsa in campo posita. non per omnes fines seminatur sed per campum. super se montem significat. de latus se albarum curret, de sub se alium albarum. [pintagonem] proximum se riuum, de latus alium ribum. quattuor riuora habentem in finibus suis. et in hoc fine[m] albarum inpinget. super albarum alium ribum curret, quod in albarum coniunget. arca super $\langle\mathrm{r}\rangle \mathrm{ip}[\mathrm{s}]$ a de albarum constituta. ideo super se montem habentem. et trans montem alius casalis constat. a duodecimani partes limitem proximum constat. a sinistris partibus ribum significat. [hoc legitur.]
Y. Casa quae per Y nomen habet, finis grandis habentis. montem sub se habentem. super se planum habentem. de latus in sinistris fontem. de ap partem sinistram $\dagger$ mutabilis locus. casa in suis subiacet ceteris. e proximo uenit casa. $\dagger$ super casa dua riuora current. [hoc legitur.]
Z. Casa quae per Z nomen habet, fines nihil habentes. proximum se orientalis concidet. de sinistris partibus proximum fontanam habentem. proximum se limitem casalis inpinget.
$\dagger$ Orocite. diuidi. $\infty$ uenit computationis limites, qusq finibus a littera prima $A$ usq in $Z$ fines partire cuitu litteris, quia de litteris computare casa $q$ nomen habuerit, de iugum putare fines computum, hoc est nominis designata conputum p CCC CCCL, hoc est in litteris quo modo in litteris conputum coligo ab omnis conpagina litterarum ab A usq in Z fines qua legis hoc habebis. $\dagger$

## CASAE III

A. monticellum habet. post montem non transet. ad collem stricta est. habet ad pedem aquas uiuas duas, et sub se flumen (IIl. 228).
B. super se montem habet. ad pectus stricta est. alia casa eam ibidem mordet. post se riuum habet, et transet contra. non longe fines a riuo ei iacent (Ill. 229).
$\Gamma$. ad collem exit. non grandes fines habet. in gamma iacet. post se ad pedem aquam uiuam habet, et flumen inferius (Ill. 230).
$\Delta$. ad montem se colliget. inferius maiores fines habet. ad pedem aquam uiuam habet, et flumen inferius (Ill. 231).
E. super se montem. sicca casa est, aquam non habet. per collem iacet. longe a se fluuium habet (Ill. 232).
I. in scamnum iacet per iugum in lanceolam. habet ad pedem aquam uiuam, et flumen inferius (Ill. 233).
K. super se nihil habet, quia usque ad collem exit. ad pectus sterelis terras habet et confragosas, et sub se meliores et latiores. a sinistra parte aquam uiuam habet, et flumen inferius (Ill. 234).
$\boldsymbol{\Lambda}$. in trigono iacet. inferius latior est. et ad pedem habet aquam uiuam, et flumen inferius (Ill. 235).
M. quadra possessio est. super se colliget aquam. et habet uelut herbam germanam. ad dextra et sinistra parte aquas uiuas habet, et flumen inferius (Ill. 236).
V. The farmstead that is named V has excellent land. Above it, there is a mountain. And the farmstead is situated on a plain. Below it a brook flows downwards. On the left side there is another brook. Three brooks flow downwards. On the left side there is a large stone, which is in a river-bed. On one side it has two serrated hollows. ${ }^{14}$ It is called the shrine of the country people. ${ }^{15}$
$\mathbf{X}$. The farmstead that is named X has land that stretches out over a long distance. The farmstead itself is situated in a plain. Not all the land is planted, but only throughout the plain. Above it, it exhibits a mountain. From its side there runs a river-bed, and below it there is another river-bed. Close by (it has) a brook, and on the side, another brook. ${ }^{16}$ It has four brooks on its land. And a river-bed encroaches on this land. Above the river-bed flows another brook, and this merges with the river-bed. An arca has been set up above the bank of the river-bed. Moreover, it has a mountain above it. And on the other side of the mountain, there is another farmstead. On the western side, the limes is close by. On the left side it exhibits a brook. [This is what is read.]
Y. The farmstead that is named Y has extensive land. It has a mountain below it. Above it, it has a plain. On the left side it has a spring. $\dagger \ldots \dagger .{ }^{17}$ Above the farmstead flow two brooks. [This is what is read.]
Z. The farmstead that is named Z has limited land. The east (limes) comes together with it close by. On the left side it has a spring close by. Close to it, its limes encroaches on a neighbouring farmstead. ${ }^{18}$

## CASAE III

A. It has a small mountain. It does not extend behind the mountain. It is confined near a hill. It has at its foot two springs, and below it a river.
B. It has a mountain above it. It is confined at the front. At this point another farmstead bites into its land. Behind it, it has a brook and this goes across to the other side. Its land does not lie far from the brook.
$\Gamma$. It extends up to a hill. It does not have extensive land. It is in the shape of the (letter) gamma. Behind it, at the foot it has a spring, and below, a river.
$\Delta$. It extends itself up to a mountain. Below, it has extensive land. At the foot it has a spring, and below, a river.
E. It has a mountain above it. The farmstead is dry and has no water. It spreads over a hill. It has a stream far away from it.
I. It lies in the form of a strip \{scamnum $\}$, across a ridge like a lance. At the foot it has a spring, and below, a river.
K. It has nothing above it since it extends right up to a hill. Across its front, it
N. ad collem exit. usque ad flumen aqua a colle redit. a sinistra parte ad pedem aquam uiuam habet, et flumen inferius (Ill. 237).
II. per colles in quadrum iacet. per colliculos descendentes dextra leuaque aquam habet, et flumen inferius (Ill. 238).
P. circat montem et sub se redet. habens aquam uiuam, et sub se fluuium (IIl. 239).
$\boldsymbol{\Sigma}$. uallem tenet. ab aqua exit et per colles in aquam reuertitur. [finis eius interdum flumen habet.] (Ill. 240).
T. per longum currit ei limes. ante se habet casalem. post se ad pedem habet aquam uiuam, et flumen inferius (Ill. 241).
$\boldsymbol{\Phi}$. in montem se colliget. in octogonum iacet. per medium flumen habet, et ad pedem aquam uiuam, et flumen inferius (Ill. 242).
$\Omega$. a plano contra pectus iacet. sub se mordet eam alia casa. dextra leuaque aquas habet, et flumen inferius (Ill. 243).
N. It extends to a hill. Water from a hill goes right to a river. On the left side at the foot, it has a spring, and below, a river.
$\Pi$. It extends over hills in the shape of a quadrangle. On little hills that slope downwards, it has water on the right and left, and below, a river.
P. It extends round a mountain and then turns back underneath it. It has a spring, and below it, a stream.
$\boldsymbol{\Sigma}$. It occupies a valley. From a water (supply), it extends over hills and returns to the water. [Its boundary occasionally has a river.] ${ }^{19}$
T. Its limes stretches out for a long distance. It has in front of it a neighbouring farmstead. Behind it at the foot, it has a spring, and below, a river.
$\boldsymbol{\Phi}$. It extends itself onto a mountain. It lies in the shape of an octagon. It has a river through the middle (of the land), and at the foot a spring, and below, a river.
$\boldsymbol{\Omega}$. It lies in a plain opposite the front. Underneath it, another farmstead bites into its land. On the right and left it has water, and below, a river.

## NOMINA AGRI MENSORVM, QVI IN QVO OFFICIO LIMITABANT

Primo inuenitur in scarifo ciuitatis Capuensium, in forma Sorana, Satrium Verum militem datum a Metello Nepote . . . IIII k. Aug. M. Annio Vero iII Eggio Ambibulo consulibus.

Item in scarifo regionis Asculanorum Piceni. mensura acta separationibus fundorum Vettii Rufini tribuni cohortis vi pretoriae, iugera IIICLV regionis Asculane, familiario XII agri Romani, per Mamilium Nepotem militem cohortis iII pretoriae, conss. T. Hoenio Seuero et Stloga.

Item in mappa Albensium inuenitur: haec depalatio et determinatio facta ante d. vi id. oct. per Cecilium Saturninum centurionem cohortis viI et XX mensoribus interuenientibus, Scipione Orfito et Quinto Nonio Prisco consulibus.

## CENTVRIARVM QVADRATARVM DEFORMATIO, SIVE MENSVRARVM DIVERSARVM RITVS

Centuria habet ped. ĪCCCC per IICCCC, passus CCCCLXXX per CCCCLXXX, actus XX per Xx , cubita $\infty$ DC per $\infty \mathrm{DC}$, perticas CCXL per CCXL, agnas DC per DC, decempedas $\overline{\text { LVIIDC. fiunt in centuria acti constrati CCCC, ped. } \overline{\text { LDCCLX }} \text { milia. efficit iugera CC. }}$

Pes habet palmos IIII. cubitus habet pedem unum $\varsigma$. gradus habet ped. IIs. passus habet ped. $v$, ulna ped. IIII. decempeda habet ped. $x$ digitorum xvi. pertica habet ped. XII digitorum XVIII. actus habet ped. CXX, perticas XII. stadius habet ped. DCXXV.
 iugerus habet ped. XXVIIDCCC.

Mensurarum genera sunt tria, rectum, planum, solidum. rectum est cuius longitudinem tantum modo metitur. planum est cuius longitudinem et latitudinem et crassitudinem metetur.

Angulorum genera sunt tria, rectus, acutus, hebes. rectus est qui normaliter constitus est; acutus, qui minor est recto. ebes est qui maior est recto.

## THE NAMES OF LAND SURVEYORS AND THEIR OFFICIAL POSITION WHEN THEY ESTABLISHED LIMITES

First we find in the plan relating to the community of Capua, in the map of Sora, that Satrius Verus, a soldier, was sent by Metellus Nepos ..., 29 July in the consulship of M. Annius Verus, III, and Eggius Ambibulus. ${ }^{1}$

Similarly, in the plan of the area of Asculum Picenum, a survey was carried out, including the division of farms, by Vettius Rufinus, soldier of the sixth praetorian cohort, and the region of Asculum received(?) 3,155 iugera, and also twelve fields known as 'Roman' through friendship(?), by means of the work of Mamilius Nepos, tribune of the third praetorian cohort, in the consulship of T. Hoenius Severus and Stloga. ${ }^{2}$

Similarly in the map of Alba Fucens, we find that this demarcation and establishment of boundaries was completed on 10 October by Cecilius Saturninus, centurion of the twenty-seventh cohort, with the assistance of surveyors, in the consulship of Scipio Orfitus and Quintus (Nonius?) Priscus. ${ }^{3}$

## THE LAYOUT OF SQUARE CENTURIAE, AND THE USAGE OF DIFFERENT MEASUREMENTS ${ }^{4}$

A centuria has 2,400 by 2,400 feet, or 480 passus ( $=5$ feet) by 480 passus, or 20 actus by 20 actus, or 1,600 cubits ( 1 cubit $=11 / 2$ feet) by 1,600 cubits, or 240 perticae (= 10 feet) by 240 perticae, or 600 agnae (apparently $=4$ feet; cf. ulnae) by 600 agnae, or 576,000 decempedae ( $=5,760,000$ feet). There are 400 actus constrati $^{5}$ in a centuria, $5,760,000$ feet; this produces 200 iugera.

A foot has the width of four palms. A cubit has $11 / 2$ feet; a gradus $21 / 2$ feet, a passus 5 feet, an ulna 4 feet, a decempeda 10 feet and 16 digiti; a pertica has 12 feet and 18 digiti. An actus contains 120 feet, or 12 perticae. A stadius contains 625 feet, a mile 1,000 steps (passus), 5,000 feet. A porca contains 7,200 feet, an acnua 14,400 feet, a iugerum 28,800 feet. ${ }^{6}$

There are three types of measuring: one-dimensional \{rectum $\}$, two-dimensional \{planum \}, and three-dimensional \{solidum $\}$. One-dimensional is where the length only 30 is measured, two-dimensional is where the length, width, and depth are measured. ${ }^{7}$

There are three types of angles: right $\{$ rectus $\}$, acute $\{$ acutus $\}$, and obtuse $\{$ hebes $\}$. A right angle is one made by the right-angled intersection of two lines; an acute angle is one smaller than a right angle; an obtuse angle is one bigger than a right angle.
iugera xL possidet, possessio neminem excidat.
I. Antonio p. constituende cons. ss. II designatus et tertio dicit: redditum suum quibus est, uti finibus antiquis sic teneant, neue si qui minus multa iugera professus est capiatur, neue siquis multa iugera professus est teneat.

Ex commentario Vrbici edictorum vi Caesaris Quinto $\dagger$ Pedio Camidiano quae oppresit illa agrorum $\dagger$.

Item ex commentario Caesaris. quae centuriae in territoria incurrunt. ubi miles falx et aratrum ierit et acceptum quod itinere patet sumpserit, reliquum eius centuriae territorium sit. qui agri diuisi fuerunt et restituti sunt et mercis mediam diem qualis ager restitutus est militem.

## INCIP. NOMINA AGRORVM

Ager adsignatus ager centuriatus<br>ager subsiciuus<br>ager dextratus<br>ager sinistratus<br>ager citratus<br>ager ultratus<br>ager tetragonus<br>ager tessellatus<br>ager cultellatus<br>ager normalis<br>ager epipedonicus<br>ager triumuiralis<br>ager solitarius Syllanus<br>ager Neronianus podismatus<br>ager Caesarianus adsignatus<br>ager iugarius in quinquagenis iugeribus<br>ager meridianus in Xxv iugeribus<br>ager commutatus ex beneficio Augusti<br>EXPLIC[I]VNT NOMINA AGRORVM FELICITER.

INCIPIVNT NOMINA LIMITVM
Limites orientales
limites septentrionales
limites maximi
limites actuarii
limites intercisiui
it occupies 40 iugera; the occupation should not prejudice anyone's interests(?).
(?)Antonius (triumvir?) for putting the state in order, consul for the second time, designated for a third, declares: those to whom land has been returned may hold it with its original boundaries, on the condition that no one who has under-declared may be defrauded(?), or who has over-declared may hold it. ${ }^{8}$

Extract from the commentary of Urbicus on six edicts of Caesar, $\dagger \ldots$ which disturbed those (areas) of land $\dagger$. ${ }^{9}$

Similarly, an extract from the commentary of Caesar, referring to those centuriae that intrude in territories. When the soldier has taken possession of his plot of land, as far as the scythe and plough shall have gone, which is accessible by right of way, the remainder of that centuria should be a territory (i.e. belonging to the community). In respect of those lands that have been allocated, and those that have been returned, and $\ldots$ the quality of the land that has been returned, the soldiers should ...(?). ${ }^{10}$

## HERE BEGIN DEFINITIONS OF LAND

Allocated land
Land divided into centuriae
Land consisting of subseciva
Land to the right (of the decumanus)
Land to the left (of the decumanus)
Land on the the near side (of the kardo)
Land on the far side (of the kardo)
Land in the shape of a square
Land in the shape of a small square
Land measured to the horizontal
Land laid out with right angles
Land on a level surface
Land distributed by the triumvirs
Land standing on its own distributed by Sulla
Land distributed by Nero (or possibly Tiberius), with its area calculated
Land allocated by Caesar
Land allocated in iugera, in lots of fifty iugera
Land facing south, allocated in lots of twenty-five iugera
Land exchanged through the munificence of Augustus
Here properly end definitions of land.

## HERE BEGIN DEFINITIONS OF LIMITES

## Limites running east

Limites running north
Limites that were largest (i.e. DM, KM)
Limites that were of major significance
Limites inside a centuria (marking individual allocations)
limites quintarii
limites cultellati
limites nonani
limites maritimi
limites Gallici
limites temporales
limites regales
limites subrunciui
limites lineares
limites sextanei
limites tessellati
limites diagonales
limites montani
limites austrinales
limites praefecturales
limites undecumani
limites colonici
limites passiui
limites ypotenusales
limites duodecimani
limites egregii
limites solitarii
limites perpetui
limites qui per antica et postica diuiduntur Sunt limites n. xxviII, agrorum n. xviII.

EXP. NOMINA LIMITVM

## EX LIBRO BALBI NOMINA LAPIDVM FINALIVM

Ortogoneus rectum angulum mittit.
Isoplerus rectus subter constitutus.
Isosceli.
Exculinus siue exagineus.
Excutellatus lateribus.
Sumbus siue trapizeus.
Isoscaeli.
Solus trigonus ilia iactat.
Pararerogamus pentagonus.
Exagonus.
Septagenus.
Sinagonus.
Terminus Graeca littera scriptus.
Terminus in summo acutus.
Limites marking off five centuriae
Limites measured to the horizontal (in sloping ground)
Limites that tallied with the ninth hour
Limites facing seawards
Limites associated with Gaul ${ }^{11} 5$
Limites of a temporary nature
Limites in royal lands
Limites intervening between the main limites
Limites lineares $=$ subruncivi
Limites that tallied with the sixth hour ${ }^{12} \quad 10$
Limites marking off small squares
Limites drawn at an angle
Limites facing mountains
Limites facing south
Limites relating to a praefectura
Limites that tallied with the eleventh hour
Limites relating to a colonial settlement
Limites established without a proper plan(?)
Limites relating to the hypotenuse
Limites that tallied with the twelfth hour
Limites that were of major significance (cf. actuarii)
Limites standing on their own (i.e. not part of a system)
Limites that were continuous
Limites that are divided by means of antica and postica (i.e. using old terminology).

There are twenty-nine definitions of limites and nineteen definitions of land.
Here end the definitions of limites.

## FROM THE BOOK OF BALBUS: DEFINITIONS OF <br> BOUNDARY STONES

(Latin is given where the meaning is unclear) 30
Ortogoneus (right-angled stone) indicates a right-angled boundary
Equilateral stone set upright
Two-sided stone
Exculinus or exagineus
Stone with slanting sides
Lozenge-shaped stone
Two-sided stone
A single three-cornered stone extends the lines of its sides(?)
Five-cornered stone
Six-cornered stone
Seven-cornered stone
Sinagonus
Stone marked with a Greek letter
Stone pointed at the top

Circulatus per ramos mitae acutae similis.
Conplactus rumbus ampligoneus.
Amicirculus quadratus.
Terminus angustus.
Terminus in summo acutus.
Terminus cursorius.
Terminus trifinius.
Sepulturam finalem.
Terminus in laterculum constitutus.
Terminus lineatus.
Terminus rotundus.
Terminus qui angulum subiacet.
Terminus quadrifinius.
Item terminus lineatus.
Spatula cursoria.
Terminus in inuersum positus.
Spatula cursoria.
Arcifinium.
Quadrifinium.
Qui sunt lapides finales in diuersas regiones secundum positionem locorum.
Terminus g[r]ammatus.
Terminus lineatus.
Quadrifinius.
Nouerca.
Simmatus.
Centustatus.
Tiuortinus.
Amicirculus.
Varouerrimus.
Triideus.
Augusteus.

Fiunt n. XxxiI.
Circular stone like the branches of a sharp mita (= meta?)
Stone shaped as a solid rhombus with large sides
Circular stone with a square
Narrow stone
Stone pointed at the top ..... 5
Stone marking an internal boundary
Stone marking a triple boundary
Stone marking the boundary of a tomb
Stone set up in a square of land
Stone marked with a line ..... 10
Round stone
Stone marking a corner
Stone marking a quadruple boundary
Another stone marked with a line
Stone shaped like a spatula indicating an internal boundary ..... 15
Stone placed upside down
Stone shaped like a spatula indicating an internal boundary
Stone defining ager arcifinius
Stone marking a quadruple boundary
These are the boundary stones in various regions according to the layout of the sites. ..... 20
Stone marked with a (letter) gamma ${ }^{13}$
Stone marked with a line
Stone marking a quadruple boundary
Stone marking a canal(? $)^{14}$
Stone marked with the Greek letter sigma ..... 25
Centustatus
Tiburtine stone
Semi-circular stone
Varoverrimus
Triideus ${ }^{15}$ ..... 30
Augustan stoneOn the authority of the emperor T. Aelius Hadrianus Antoninus Augustus Pius,Father of the Fatherland, a decision was delivered by Tuscenius Felix, leading centu-rion for the second time, after Blesius Taurinus, soldier of the sixth praetorian cohort,land surveyor, had established the boundaries of the territory of the people of Ardea. ${ }^{16}$35
There are thirty-two definitions. ${ }^{17}$
Here properly end the definitions of boundary stones.

## ORDINES FINITIONVM

## EX DIVERSIS AVCTORIBVS

Termini si duo in unum fuerint, embadiam formam ostendunt. si autem ambo quadri fuerint, naturalem lapidem in XV ped. ostendunt, et in xxiI alium oportet in- ueniri (Ill. 244).

Terminus si in modum colobri lineam super se flexuosam habuerit, alluuionem per flexum finalem significat. si ante ipsam lineam fossulam habuerit, lacum finalem significat, in quo usque linea ipsa decurrit (Ill. 245).

Petrae si duae aut tres uel quattuor, taxatae non perdolatae a ferro, in quadrifinio inuentae fuerint (Ill. 246), ab oriente per conuallia limitem ostendunt. a sextanea parte termini inueniuntur, et ad occidentem per ped. CCCCL excurrunt. a septentrione per conuallia limitem ostendunt.

Si testacios terminos aut tegulas aut imbrices inueneris, ossis incensis probantur, si in terminatione sunt constituta. quod si ita inueneris, ab oriente eius linea pertransit, et ab alia linea ped. cccclxxxir, si quidem talis centuria fuerit. nam unum quodque signum secundum statum possessionis suae, quam claudit, ita extenditur (Ill. 247).

Termini sunt maiores qui iuxta flumina positi sunt (Ill. 248). mensales uocantur: alii autem bases eos dicunt, alii autem intraametra. in quibus constat mensura aquae, trapeadi uocantur. et in modum platumae eos posuimus, ut qui nesciunt, miliarios eos putent (Ill. 249). et si in quindecim pedes inuentus fuerit, in arcam mittit, quae est super flaminiam. quae habent inter se ped. cccclimi, et $a b$ arca pedes XliII inueniri potest quod plantauimus. et riuus per eorum limites currit, iuxta quem terminos posuimus (Ill. 250).

Oliuam fructiferam in lineam limitis posuimus (IIl. 251), quae puteum ostendit, aut certe alueum fluminis.

Termini si tres fuerint in unum, pentagoni uocantur: sed in quadrifinio constant, in fronte conlimitare debent.

## VITALIS ET ARCADIVS AVCTORES

Lauacrum pro terminos occurrit. nam et aliquotiens in ipso lauacro terminum posuimus (Ill. 252).

Terminus si singularis in trifinium fuerit, ab eo usque ad alium ped. CCCL et interdum DXII. si autem in quadrifinio fuerit, usque ad alium quadrifinium addendum ped.

## ARRANGEMENTS FOR MARKING BOUNDARIES

## EXTRACTS FROM VARIOUS AUTHORS

If two boundary stones are combined together, they produce the shape of an embadon. ${ }^{1}$ If both are square-shaped, they indicate a natural stone at a distance of 15
feet, and another should be found at a distance of 22 feet.

If the boundary stone has a wavy line on top like a snake, it signifies alluvial land along a curving boundary. If it has a small ditch (depicted) in front of this line, it signifies a lake marking a boundary, on which the (boundary) line itself runs.

If two or three or four stones, shaped, but not smoothed with iron, ${ }^{2}$ are discovered at a quadrifinium, they indicate a boundary running from the east through a valley. The boundary stones are found in the southern part and run towards the west for 450 feet. They also indicate a boundary running from the north through a valley.

If you find markers made of pottery, or roof- or gutter-tiles, the evidence of bones burnt there can prove if they were established to demarcate a boundary. If you find this to be the case, the boundary line extends from the east, and is 482 feet from the other line, if the centuria was of this type. Each marker, according to the position of the holding that it encloses, is laid out in this way.

Boundary stones placed near rivers are bigger. They are called mensales. Others call them bases, others intraametra. Those that record the width of the river are called trapeadi (= trapezii). We set them up in the form of a marble slab, with the result that some people in their ignorance mistake them for mile posts. If it is found up to 15 feet (from the river), it leads to an arca, which is above the river. They have 454 feet between them, and 44 feet away from the arca can be found the one that we established. ${ }^{3}$ And a brook runs along their limites, close to which we set up the boundary stones.

We set up a fruit-bearing olive-tree on the line of the limes, and this indicates a well, or certainly a river-bed.

If three boundary stones are combined together, they are called pentagoni (fivecornered). But if they stand together at a quadrifinium, they ought to mark the same (common) boundary in front (of them).

## THE AUTHORS VITALIS AND ARCADIUS ${ }^{4}$

A washing area can stand as a boundary marker. Sometimes we have set up a boundary marker in the washing area itself.

If an individual boundary stone appears at a trifinium, there will be 350 feet, and sometimes 512 feet, between it and the next one. But if it appears at a quadrifinium, there must be 225 feet to the next quadrifinium. From an intermediate marker
CCXXV. a termino cursorio, qui de quadrifinio egreditur, usque in trifinium ped. CCLXX. si tamen cursorius non eo lapide aut colore fuerit quo et trifinius aut quadrifinius, duos lapides inuenies finales, qui terminus dici non potest, eo quod plus a tres pedes habeat, ideoque termetis dici debet (Ill. 253). nam terminus pro hoc dic- itur quod tres pedes non integros habeat. huius pedatura extenditur a ped. C et CCL usque in $\overline{\mathrm{IC} C C C C}$, in Africa maxime et in aliquibus locis usque in $\overline{\mathrm{IIII}}$.

Terminus epetecticalis siue in finitione agri siue praefecturae extenditur in ped. $\operatorname{CCCC}$ et ped. DCCCC. in quadrifinio uero si plus a quattuor lapides fuerint inuenti, epetecticales uocantur. nam terminus iste maximus appellatur.

Terminus si libidum colorem habuerit, limitem ostendit.
Terminus reprobus in fine ponitur: in trifinio autem reprobum non posuimus. nam obtunso angulo posuimus in trifinio, non reproba acie.

Terminos emicicliores uocauimus hos quos in capitibus centuriarum sub terra posuimus. quam maxime distant a se ab alio termino ped. cL, et ab eo iterum ped. $\overline{\text { IICCL. }}$ qui si in cursoriis inuenti fuerint, distant a se in ped. CCL et CCCXCV.

Terminus qui sub forma agri fuerit aut super formam, distant a se in ped. cCCCIIII et in ped. DCCC et in pedes $\infty$ DCCLXXX; et si longius, in ped. $\overline{\text { IICCCCXX}}$. nam isti singulares litteras habere solent.

Terminus laguenaris uel orcularis, id est laguna uel orcula (Ill. 254), distant a se in ped. LiII; si amplius, in ped. CL; et si plus, in ped. CCCLV; et si hoc non, uelut regioni consuetudo est. haec tamen distantia non semper $a b$ hoc quod incipies hoc inuenies, sed et alia signa finalia occurrunt.

Terminus quadratus similia angula habens (Ill. 255), si nullum signum habuerit, per aequalia latera limitem demonstrat. ipse acies extenduntur. nam sine dubio finem faciunt et habet initium pedaturae, ped. CCCL et CCCCL et DCL et DCCL et DCCC, et si multum, in p. $\infty$ L.

Termini quos in planis locis posuimus, distant a se in p. CCCLX.
Termini quos in uallibus posuimus, distant a se in p. cCClXXV. si imbricem ante arcam inueneris constitutam (Ill. 256) uel tubulum in modum cursorii, riuum significat. si uero tegulae, si tres inuentae fuerint, trifinium faciunt.

Terminus a ferro taxatus si fuerit, et subditum nihil habuerit, epilogonius nuncupatur.

Terminus in medio limite si fuerit constitutus et unam partem subcauam habuerit, tres monticellos transit, et in tertium monticellum arca circa lauacrum significat, et ipsa arca in quadrifinio est constituta. a sextaneo uero si uis sequi limitem, rectam serram sequeris ped. CL. a septentrione in sinistra limitis denormata linea a duodecima parte per subrectioribus locis usque in aquam uiuam, ubi est terminus epetecticalis subseciuorum.
\{cursorius\}, which comes from a quadrifinium, it is 270 feet to a trifinium. If however the marker is not the same type or colour of stone as that at the trifinium or quadrifinium, you will find two boundary-marking stones, neither of which can be described as a terminus, because each one is more than 3 feet (in length), and so ought to be called termetis. ${ }^{5}$ A boundary stone $\{$ terminus $\}$ has this name because it does not have three whole feet. The measured distance extends from 100 and 250 feet, right up to 2,400 , and up to 4,000 feet, especially in Africa and in other places.

A boundary stone called epetecticalis, on the boundary of either a field or a praefectura, extends up to 400 and 900 feet (i.e. the distance from one to another). If more than four stones are found at a quadrifinium, they are called epetecticales. For that boundary stone is described as the most important.

If a boundary stone has a reddish colour it signifies a limes.
A boundary stone called reprobus is placed on a boundary. But we do not place a reprobus at a trifinium. We place a stone with an obtuse angle at a trifinium, not one with the line that is 'out of place'. ${ }^{6}$

We call emicicliores ${ }^{7}$ those stones that we place underground at the heads of centuriae. These are generally set 150 feet apart from another boundary stone, and then from it (there is) a gap of 2,250 feet. If they are found among cursorii, they are set 250 and 395 feet apart from one another.

Boundary stones that are above or below the surface of the land, are set up to 404 feet apart, or up to 800 , or up to 1,780 ; and if further apart, up to 2,420 feet; and they normally have individual letters written on them.

A boundary stone called laguenaris or orcularis, that is, shaped like a flask or cask, is up to 53 feet apart from another one; if more, up to 150 , and if more, up to 355 feet. And if this is not the case, then there is a particular practice for (that) region. You will not always find these distances between stones from the one where you begin. Indeed other boundary markers also appear.

A four-sided boundary stone with equal angles, if it has no mark, signifies a limes (running) along its equal sides. The boundary line itself is extended (through here). Undoubtedly, they define a boundary and mark the start of the measured area, (with a distance between them) of 350 , and 450 , and 650 , and 750 , and 800 , and if more, up to 1,050 feet.

Boundary stones that we placed in level areas are 360 feet apart from one another.

Boundary stones that we placed in valleys are 375 feet apart from one another. If you find a gutter-tile placed in front of an arca, or a water-pipe in the form of a marker, it signifies a brook. But if three roof-tiles are found, they signify a trifinium.

If a boundary stone has been shaped by metal and has nothing buried underneath, it is called epilogonius.

If a boundary stone has been set up in the middle of a limes and has one part hollowed out, the boundary crosses three small mountains and on the third mountain an arca at a washing place signifies (the boundary), and the arca itself is established at a quadrifinium. If you want to follow the limes from the south; follow the straight chain of mountains for 150 feet; from the northern boundary on the left-hand side, the line of the limes has been drawn from the west through rising ground straight to a spring, where there is a boundary stone $\{$ epetecticalis\} marking subseciva.

## GAIVS ET THEODOSIVS AVCTORES

Terminos singulares in trifiniis si constituimus, adire a singulo usque ad alium pedes CCCL et DXII; si in quadrifinio usque ad alium quadrifinium per cursorios, pedes CCXXV, et cClXXv. et si termini uno colore in quadrifinio et in cursorio positi sunt, reuerti ad auctorum sublimitatem iubemus, et quod iusserint obseruetur. nec enim uerecundum sit frequenter ad auctorum doctrinam reuerti. quotiens enim legeris singularum litterarum interpretationem, sine dubio artificiosius terminabis. nam termini ad modum agri sine rigore sunt ordinati, nec praeposuit alium alio. nam et lapides naturales cecidimus et in finem constituimus.

Stellam iuniorem super picitos palos consecrauimus: et ut inuenias rationem, inter se habent pedes CCCCXI.

Terminus quam maxime ideo $\mathrm{I}_{\zeta}$ ped. habet, quod tali nomine utatur.
Terminus testacius in p. CCCCL. per Tusciam urbicariam et annonariam ueteranorum agri secundum modum iugerationes acceperunt: qui termini distant a se in ped. CC , in p. CCCC, in p. D. per terminos cursorios de trifiniis in quadrifiniis haec mensura constat.

Termini epetecticales in centuriis et in cardinibus habent inter se ped. DCcc. laguenas et orculas in finibus posuimus, et sepulchra in trifinio quam maxime.

Terminos in multis locis a ferro non taxatos in finibus constituimus. nam alios tegularum fragminibus circum calcauimus, alios autem sua caesura suffulsimus: aliquibus nihil est subditum.

Terminos quadratos sub terra conlocauimus, qui a mensoribus Italiae pro ipotenusa obseruantur. cathetum uero in terminum praesidentem in formam trifinii conlocauimus. nam et alios terminos quadros cursorios posuimus: qui nesciunt eorum mensuram, non eos intellegunt, an in trifinio an in cursorio sint. et multos limites in errorem deducunt: nam distant a se in p. CCCLXXIIII et in ped. D.

## LATINVS ET MYSRONTIVS TOGATI AVGVSTORVM AVCTORES

## DE LOCIS SVBVRBANIS VEL DIVERSIS ITINERIBVS PERGENTIVM IN SVAS REGIONES

Aliquibus locis pro terminibus monumenta sepulchraue ueteranorum constituimus, in sequentibus lineis fossatos quos Augusteos appellamus. deficientibus autem

## THE AUTHORS GAIUS AND THEODOSIUS ${ }^{8}$

When we set up individual boundary stones at a trifinium, to go from one to another is a distance of 350 and 512 feet. If we set them up at a quadrifinium, the distance to another quadrifinium by means of the internal boundary markers $\{$ cursorii $\}$ is 225 and 275 feet. If boundary stones of the same colour have been placed at a quadrifinium and along an internal boundary, I order that we should refer to the authority of the writers and follow their instructions. For there should be no disgrace in referring frequently to the teaching of authorities. For whenever you read an interpretation of individual letters (i.e. inscriptions on stones), without doubt you will establish boundaries in a more accomplished fashion. Boundary stones are positioned according to the area of land, without a straight line, and none of them has precedence over another. Indeed I have quarried natural stones and established them on a boundary.

I dedicated a small star above stakes daubed with pitch. And so that you can discover the system followed, they are 411 feet apart from one another.

A boundary stone is customarily $21 / 2$ feet high because it has this name $\{$ terminus $\}$. ${ }^{9}$

A boundary marker made from pottery lies up to 450 feet apart (from another). Throughout Tuscia urbicaria, and the annonaria diocese, ${ }^{10}$ the lands of veterans received a certain number of iugera in accordance with the area (allocated). These boundary stones are up to 200 , up to 400 , and up to 500 feet distant from one another. These measurements are maintained by means of internal boundary markers \{cursorii\}, from trifinia to quadrifinia.

Boundary stones called epetecticales in centuriae and on the kardines are 800 feet apart. I established markers shaped like flasks and casks on boundaries, and, in particular, tombs at a trifinium.

In many places, I established on boundaries stones that had not been shaped with iron. In some cases I tramped down broken pieces of tile (round the stone); in others I propped up the stone with stone chippings(?). Under some stones nothing has been buried.

I buried squared boundary stones in the earth; they are used by surveyors in Italy to mark the hypotenuse (a slanting boundary line). I put a vertical line on the leading boundary stone at a trifinium. I also established other four-sided stones as cursorii. Those who do not know their dimensions, do not understand whether they are placed at a trifinium or on the line of an internal boundary; and they make mistakes over many limites. The (stones) lie apart from one another up to 374 and up to 500 feet.

## LATINUS AND MYSRONTIUS ROMAN WRITERS OF THE EMPERORS

## SUBURBAN PLACES AND THE DIFFERENT ROUTES FOLLOWED BY THOSE GOING TO THEIR OWN AREAS

In some places, instead of boundary stones, I established the monuments and tombs of veteran soldiers, and boundary ditches in continuous lines, which we call
illis terminos posuimus, aut certe instructuram fecimus, deinde limitem manu operis factum constituimus.

Item palos sacrificales defiximus, in quibus locis constricti mensuris frequenter sibi duas fines cuneatas occurrunt, propter rigorum aut linearum cursus. ergo in locis supra scriptis talia signa inueniuntur, termini Tiburtini, șilicei, tufinei, igniferi, spatulae cursoriae, structurae parietum in modum lineae.

Monumenta finalia militari uiae non coniunguntur. monumenta uero non omnia sunt finalia, nisi ea quae in extremis finibus occurrunt.

Nam aliquibus locis alluuiones et diuergia aquarum et itinera finem faciunt, quae tamen uicem limitum expectant a regammantibus lineis uel percurrente rigore. in his locis nulla conportionalium signa inueniri possunt. ea ratione sicut scripsimus hortua nuncupantur.

Nam in multis agris diuersorum signorum fides querenda est, termini, congerias, macerias, uel foueae, arbores ante miss $\langle\mathfrak{a}\rangle e$, sabuci, aqua uiua, uepres, et mala cotonea, uel diuersa genera arborum, quae in ea regione qua metiuimus inueniuntur peregrina.

In modum currentis lineae parietem struximus.
Nam in locis montanis terminos posuimus rotundos, quos Augusteos uocamus, pro hac ratione quod Augustus eos recensiuit, et ubi fuerunt lapides, alios constituit, et omnem terram suis temporibus fecit remensurari ac ueteranis assignari. qui lapides Gai Caesaris lapides rotundi ex saxo silice aut molari sesquipede in terra, super pedes duo semis, et ped. IIII, et distant a se in ped. IICCCC.

Sunt et alii termini supra terram p. II, grassum p. Is, alti p. IIII. distant a se in p. $\infty$ CC.

Sunt et alii Neroniani, Vespasiani et Traiani imperatorum, lamminae et quadrati, in diuersis numeris constituti. in quibus alii gammati, alii uelut locorum natura permisit, ita positi sunt, in $p$. $\overline{\mathrm{I}} C C C C$ et in p . $\overline{\mathrm{II}}$ in aliis uero locis monumenta sepulchraue ueteranorum constituimus.

## EX LIBRIS MAGONIS ET VEGOIAE AVCTORVM

Nam sunt monumenta quae propter perennitatem itinerum constituta sunt, quae nullam limitum recipiunt rationem. nam monumenta finalia non coniunguntur itineri publico, ei maxime qui auctoris nomen optinet per redemptores et magistros pagorum munitur: sed ab itinere publico separata sunt, et saepe pumicas habent, per quas ex industria finales lineae diriguntur (Ill. 257).

Pontes quoque interdum trifini, interdum quadrifinii, aliquando pentagonii recipiunt rationem. et hoc si exegerit loci commoditas. hi uero pontes hac ratione deseruiunt, quorum aluea proximae eos fines ultro citroque non transmittunt, per quos
'Augustan'. When they faded out I set up boundary stones, or certainly a construction of some kind; then I established a limes built by hand. ${ }^{11}$

I also set up 'sacrificial' stakes in those places where, confined by their dimensions, two wedge-shaped pieces of land frequently meet together, because of the direction of their straight-line boundaries. Therefore, in the places described above, the following markers are found: Tiburtine stones, stones of flint, stones of tufa, firebearing rocks, spatula-shaped markers, and walls built in a straight line.

Tombs demarcating a boundary are not set beside military roads. Indeed not all tombs serve as boundary markers, only those that appear on the periphery.

In some places, alluvial land, watersheds, and roads demarcate a boundary. But these require in place of limites (direction) from rectangular lines or a continuous straight line. In these places no markers can be found on the boundaries between allocations. By the method described above allotments are designated.

In many lands trust is required in different markers: boundary stones, piles of stones, dry-stone walls, pits, trees previously planted, elder-trees, springs, brambles, quince-trees, other types of tree that are found to be non-native to the area under survey.

I erected a wall in the form of a running straight line.
In mountainous places, I set up round boundary stones, which we call 'Augustan', because Augustus re-assessed this land, and where there were stones in existence, set up new ones, and had all the land surveyed again in his day and allocated to veterans. These stones of Gaius Caesar (i.e. Augustus) are round stones made from flint or volcanic rock, $11 / 2$ feet underground and $21 / 2$ feet above ground, or sometimes 4 feet; they are 2,400 feet apart from one another.

There are other boundary stones 2 feet above ground, $12 / 3$ feet thick, and 4 feet high (in total); they are 1,200 feet apart from one another.

There are others called after emperors: Neronian, Vespasianic, and Traianic, flat slabs (lamnici) and squared stones, and have been set up at different distances apart. Among them, some were marked with a (letter) gamma, others were set up as the nature of the terrain permitted, up to 2,400 and up to 3,000 feet apart. But in other places I established the monuments and tombs of veterans (as boundary markers). ${ }^{12}$

## EXTRACTS FROM THE WORKS OF THE AUTHORS MAGO AND VEGOIA ${ }^{13}$

There are tombs that were erected because of the long-standing character of the roads (beside which they stood), and that do not fit into any system of limites. Tombs demarcating a boundary are not linked to a public highway, especially if it has the name of the original founder, and is maintained by contractors and the officials of the pagi. ${ }^{14}$ Indeed they were separated from public highways and often have pumice-stone markers, by which the boundary lines are deliberately aligned.

Moreover, bridges sometimes fit into the scheme of a trifinium, or sometimes a quadrifinium, and occasionally a five-cornered marker \{pentagonus\}. This occurs if the suitability of the location calls for it. These bridges serve the purpose (of boundary markers) in this way, when rivers closest to those boundaries on either side do not cross over them, and across them (the bridges) run public highways, for which the
et itinera publica currunt, quibus limis lege colonica seruit. nam sunt et alii pontes in uicinalibus et priuatis uiis, quorum aluea uariantur. quae tamen in trifinii rationem ex conuenientia limitum atque signorum cursus frequenter accipi possunt (Ill. 258).

Aquarum ductus per medias possessiones diriguntur, quae a possessoribus ipsis uice temporum repurgantur: propter quod et leuia tributa persoluunt. quarum putea aliquotiens in cursorio a terminibus demonstrantur. quae si in extremis finibus occurrerint, ex conuenientia centuriarum in trifinio uel quadrifinio obseruari debebunt. idem uariatio fluminum, riuorum cursus, canabulae uel nouercae, quod tegulis construitur. saepe imbrices in finem posuimus, saepe instructuras fecimus. idem partes Tusciae Florentiae quam maxime palos iliceos picatos pro terminibus sub terra defiximus. ergo, ut superius legitur, una quaeque regio suam habet condicionem. nam Sabinensis ager, qui dicitur quaestorius, quem actis limitibus quibusdam laterculis quinquagena iugera incluserunt. postea uero aliquibus locis terminos posuerunt, et signa aliqua pro terminibus defoderunt. hi uero agri multas habent condiciones. nam in supra dictis locis suburbanis, ubi limitem opere manuum hominum ordinauimus, terminos non necesse habuimus ponere, nisi in certa ratione, in trifinio aut in quadrifinio. in praedictis locis in modum lineae parietem construximus. et iuxta ipsam lineam multorum militum ueteranorum sepulturae inueniuntur, sicut est in territorio Gauinati, id est pergentes, itinera, quae et ipsa saepe finem faciunt. nam in locis suburbanis circa ipsa itinera ea signa requirenda sunt, sicut et de agro Gauinatium diximus.

Ager uero qui Tibur appellatur, idem est assignatus, et aliquibus locis propter sterilitatem aut indigentiam, eo quod non inuenimus lapides peregrinos quos ponere, ex ipso metallo saxum a ferro signauimus, aut certe congerias petrarum, quae scorofiones uocamus. nam in aliis limitibus qui aliena nomen accipiunt, in ipsis quoque ita posuimus terminos; sicut et in locis saxuosis similis est condicio. nam in locis campestribus rariores terminos construximus, et maxime arborem peregrinam plantauimus. idem et in conuallibus constituimus, ut ubi limitem fecimus, aut certe fossas siue montes decisi siue ea per quae arcifinalis ager finitur constituimus, terminos difficile posuimus. nam et in ss. locis campestribus uel conuallibus limes sextaneus transit per limitem possessionis. nam limes orientalis usque in occidentem rumpi non potest, quia maximus appellatur maxime quia centurias claudit.

## IDEM VEGOIAE ARRVNTI VELTYMNO

Scias mare e[x] [ae]t[h]er(r>a remotum. cum autem Iuppiter terram Aetruriae sibi uindicauit, constituit iussitque metiri campos signarique agros. sciens hominum auaritiam uel terrenum cupidinem, terminis omnia scita esse uoluit. quos quandoque quis
limes serves, according to the lex of the colony. ${ }^{15}$ There are other bridges on local and private roads, crossing over different types of river. These can frequently be included in the scheme of a trifinium, as long as there is agreement with the limites and the direction of the boundary markers.

Aqueducts follow a course through the middle of properties, and after a period of time they are cleaned by the landholders themselves; for this purpose they pay a small levy. Cisterns associated with aqueducts are sometimes designated by boundary stones along the course (of the aqueducts) within the land. If they are situated on the outer boundary of the land, they ought to be recognized (as marking a boundary) at a trifinium or quadrifinium, in agreement with (the marking of) the centuriae. Similarly bends in the direction of rivers, the course of brooks, canals, and ditches contructed with tiles (should be recognized as boundary markers). I have often placed gutter-tiles on a boundary, and I have often erected some construction. Similarly in parts of Tuscany round Florentia, I usually fixed in the earth holm oak stakes daubed in pitch, in place of boundary stones. Therefore, as was said above, each region has its own practice. In the Sabine land, which is called 'quaestorian', when the limites were drawn they enclosed squares of 50 iugera. ${ }^{16}$ Later, in some places they set up boundary stones, and buried various markers instead of stones. These lands have many different practices. In the suburban places mentioned above, when I constructed a manmade limes, I did not think it necessary to set up boundary stones, except by a definite plan, at a trifinium or quadrifinium. In the places mentioned before, I built a wall in a straight line. Next to that line are found the tombs of many veteran soldiers, just as in the territory of Gabii, that is, they line the roads, which themselves often mark a boundary. In suburban areas, these markers should be searched for near the roads, just as I have pointed out in respect of the territory of Gabii.

The land called Tibur was also allocated, and in some places, because of its barren and empty nature, and because I could not find any non-native stones that I could set up, I used iron to cut a mark on quarried stones, or indeed erected piles of stones, which we call scorofiones. And on other limites, which have a different name (i.e. other than the main limites), on these too I placed boundary stones. The same practice was followed as in rocky terrain. Now, in level areas I rarely set up stones, but generally planted non-native trees. And I did the same in valleys, to the extent that when I made a limes, I clearly established (as boundary markers) ditches, or mountains that had been defined, or those things by which ager arcifinalis is bounded; we set up boundary stones only with difficulty. In the level areas or valleys mentioned above, the southern limes passes along the boundary of holdings. The eastern limes cannot be interrupted, right up to the west (i.e. the end of the territory), because it is called 'greatest' \{maximus\}, because above all it closes off centuriae.

## THE WORK OF VEGOIA ADDRESSED TO ARRUNS VELTUMNUS ${ }^{17}$

You should know that the sea is separated from the earth. ${ }^{18}$ When Juppiter claimed the land of Etruria for himself, he decided and ordered that the plains should be surveyed and the land marked out. Knowing the avarice of man and his worldly greed, he wished everything to be recognized by boundary stones. ${ }^{19}$ Those which at any time any-

〈posuerit〉，ob auaritiam prope nouissimi octaui saeculi，data sibi 〈licentia〉 homines malo dolo uiolabunt contingentque atque mouebunt．sed qui contigerit moueritque， possessionem promouendo suam，alterius minuendo，ob hoc scelus damnabitur a diis．si serui faciant，dominio mutabuntur in deterius．sed si conscientia dominica fiet，caelerius domus extirpabitur，gensque eius omnis interiet．motores autem pessimis morbis et uulneribus efficientur membrisque suis debilitabuntur．tum etiam terra a tempestatibus uel turbinibus plerumque labe mouebitur．fructus saepe laedentur decut－ ienturque imbribus atque grandine，caniculis interient，robigine occidentur．multae dissensiones in populo．fieri haec scitote，cum talia scelera committuntur．propterea neque fallax neque bilinguis sis．disciplinam pone in corde tuo．

## ARCADIVS AVGVSTVS AVCTOR

## DE TERMINIBVS ET DE LINEIS PARTIVM ORIENTALIVM

Constantinopolim maxime cum signis et sigillis constituimus terminos，et in fossa ex calce et harena construximus，et carbones subiecimus．nam in isdem prouinciis transmarinis et siliceos terminos posuimus，et in ipsis terminibus nomina fundorum scripsimus，ut sic quaeratur eorum pedatura sicut in libro xir auctores constituerunt， his generibus litterarum sicut in omnem mundum．nam et colores terminorum orien－ talium et lignorum finitimorum genera agri mensori notum faciam．sunt enim termini marmorei in limite，alii marmorei uirides，alii palumbacii，alii prasini，et ipsi termini $v$ pedes in terram conlocati sunt：et alios marmoreos albos sicut subter in forma descrip－ simus（Ill．259）．

Nam et in limitibus pro terminibus plantauimus dactulum，amygdalas，et mala cotonea，et maxime oliuastellum，et ficum caprium in fine constituimus（Ill．260）．qui beneficium nostrum legerit，hoc obseruet，ut haec signa uel termini cCL inter se pedes habeant．ita de trifiniis：in quadrifiniis sicut superius exposuimus obseruetur．

## ITEM VITALIS AVCTOR

Terminus si in medio limite constitutus fuerit et unam partem subcauam habuerit， in tertio monticello arcam circa lauacrum significat，et ipsa arca in quadrifinio est con－ stituta．a sextaneo uero si uis sequi limitem，rectam serram sequeris ped．CL．a septen－ trione in sinistram limitem determinatam lineam，pedes XII．inuenies arcellam in trifinio positam，et ipsud trifinium duabus lineis descendit per planuria，et alia a duodecima parte in suberectioribus locis usque in aquam uiuam，ubi est terminus epi－ tecticalis，id est subseciuorum．planis dorsis quam maxime terminos posuimus，et mul－ tas centurias assignauimus，et terminos posuimus Tiburtinos，et alium posuimus

[^67]one 〈has placed〉，because of the greed of this eighth－almost the latest－saeculum， arrogating to themselves 〈licence〉，men with wrongful deceit will violate，touch，and move．${ }^{20}$ But whosoever shall have touched and moved（a boundary stone），in the act of extending his own holding and diminishing that of another，will be condemned by the gods for this crime．If men of inferior standing do it，they will be reduced to a lower status by their master．${ }^{21}$ But if it is done with their master＇s connivance，then his house will be speedily extirpated，and his entire family will perish．The instigators will be affected by awful diseases and sores，and their limbs will be debilitated．Then the very earth will be assaulted by storms and whirlwinds，and on many occasions by plague． Crops will often be damaged and cut down by heavy rain and hail；they will be destroyed by drought，and will perish from blight．There will be much civil strife among the people．Know that this will come about，when crimes of this nature are committed． Therefore do not be deceitful or false．Establish restraint in your heart．

## THE AUTHOR ARCADIUS AUGUSTUS²2

## BOUNDARY STONES AND BOUNDARY LINES IN EASTERN REGIONS

I have established boundary markers at Constantinople，mainly using signs and symbols；in the ditch I have constructed markers from limestone and sand and have placed carbon underneath．In the same overseas provinces，I have established bound－ ary stones of flint and I have written the names of the farms on these stones，so that their dimensions can be discovered，just as the authors laid down in Book XII．These types of letters apply to the whole world．I shall inform the land surveyor of the colours of boundary stones used in the East，and the types of wood used to designate boundaries．For there are marble stones on boundaries，some in green marble，others dove－coloured，others light green；the stones are set 5 feet into the ground；other stones are of white marble，just as I have set out below on the map．

On limites，instead of boundary stones，I have sometimes planted date－trees， almond－trees，quince－trees，and especially olive－trees，and also wild fig－trees on a boundary．Anyone who reads my useful work will note that these markers or stones should have 250 feet between them．This is also the case with trifinia；at quadrifinia， the practice set out above will be followed．

## THE AUTHOR VITALIS

If a boundary stone has been set up midway along a limes and has one section hollowed out underneath，it signifies an arca near to a washing area on the third hillock，and the arca itself is set up at a quadrifinium．If you wish to follow the limes from the south，you should follow a straight range of hills for 150 feet；（if you wish to follow the boundary）from the north，（you should follow）the left limes along the designated line，for a distance of 12 feet．${ }^{23}$ You will find a small arca set up at a trifinium，and from the trifinium two lines descend，one across level ground，and the other from the west goes through higher ground right up to a spring，where there is a boundary stone \｛epetecticalis\}, that is, marking subseciva. I set up boundary stones
tufineum. hi non sunt semper a ferro taxati, et circa botontinos obseruantur. constituimus in bilamnis et oliuastellum, in ipsis bilamnis fossatum fecimus: in aliis locis congerias lapidum fecimus, in aliis memoriam in finem constituimus. nam et monticellos de terminibus circum dedimus.

## ITEM FAVSTVS ET VALERIVS

In Africa et in Galliis et Sirmium, ubi pertica nostra definiuit, talia signa constituimus. itaque alios quadros terminos constituimus, alios rotundos, alios tres in unum secundum formam.

Si fuerit arca longa ped. xxx , lata ped. xv , alta ped. viI, duco longitudinem per altitudinem: fiunt ped. CCX. hoc duco per latitudinem: fiunt ped. $\overline{\mathrm{II} C L}$. sic quaero pedaturam.

## INCIPIT EXPOSITIO LIMITVM VEL TERMINORVM

Omnes limites maritimi aut Gallici una factura current.
Quoniam sanctior est, id est iustior uidetur, maritimus limes frequentius solet recte studiri, quod interpretatur non extorcet, qui est constitutus ita.

Est Gallicus in sua consuetudine, secundum quem ordinauimus, quem exposuimus frequentius corrumpet; extorcet, et saltum dat, qui est constitutus ita.

Contra urbis Babylonis Roma maritimi limites fient, et Gallicus inpinget.
Quia de limitibus curauimus exponere, sub terminis qualia signa inueniuntur? aut calcem, aut gypsum, aut carbones, aut uitria fracta, aut cineres, aut testam tusam, aut decanummos uel pentanummos. haec signa si inueniuntur, una certatio est ad iustitiam antiquitus quando terminos constituimus, quoniam res uoluntaria est. siquis nouit geometricae artis philosophiam, nouit haec signa terminorum diligenter exponere.

Terminus si decem $[\mathrm{x}]$ habuerit, quatrifinium exponet: si succumbum fuerit, limitem ostendit aut uallem desiderat.

Terminus si incisuram habuerit, riuum aut fossatum significat aut fluuium ostendit.

Terminus si fossulam habuerit, lauacrum aut piscinam significat aut terminum rotundum ostendit. si aliquid fictum habuerit super se, acrum aut plumbum aut stagnum epicteticum, hoc est massatium fabritum, quod est inter censam centuriae.

Terminus si transpertusus fuerit, flumen transit aut in aqua uiua mittit.
Terminus si punctum habuerit, puteum aut fontem ostendit.
stones, and sometimes set up boundary markers of tufa. These are not always shaped by metal, and can be observed close to piles of earth. I planted olive-trees on bilamnae, ${ }^{24}$ and made a ditch on the bilamnae themselves. In other places I made piles of stones, in others I established that a tomb should mark the boundary. Moreover, I surrounded hillocks with boundary stones.

## FAUSTUS AND VALERIUS

We have established the following markers in Africa, in Gaul, and at Sirmium, where our territory has marked out its limits. We set up some four-sided stones, some round stones, and sometimes three combined in one, in accordance with the map.

If an arca is 30 feet long, 15 feet wide, and 7 feet high, I multiply the length by the height, which makes 210 feet; I then multiply this by the breadth, which makes 3,150 feet; in this way I calculate the area of the land. ${ }^{25}$

## HERE BEGINS A DISCUSSION OF LIMITES AND BOUNDARY STONES ${ }^{26}$

## All limites called 'maritime' or 'Gallic' run as part of one system.

Normally the 'maritime' limes is rightly studied more often, because it is more revered, that is, it is deemed to be more sound; (a limes) that has been laid out in this way does not disturb the layout. ${ }^{27}$

The 'Gallic' follows its own practice, according to which I have laid it out. As I have explained, (a limes) that has been laid out in this way can rather frequently mislead, disturb and distort(?) the layout (i.e. if not properly surveyed).

On the other hand, in the city of Babylon-Rome, 'maritime' limites are used, and the 'Gallic' intersects these. ${ }^{28}$

Because I have undertaken to talk about limites, what kind of symbols are found underneath boundary stones? We find limestone, or gypsum, or carbon, or broken glass, or ashes, or crushed pottery, or ten-nummus and five-nummus pieces. ${ }^{29}$ If these symbols are found, one point of contention concerns the validity (of the action) in the past when we set up the stones, since the practice (of leaving symbols) is voluntary. If anyone understands the reasoning of the skill of geometry, he understands how to expound carefully these symbols associated with boundary stones. ${ }^{30}$

If a boundary stone is marked with an X-shape, it signifies a quadrifinium; if it is placed on its side it signifies a limes, or points to a valley.

If a boundary stone has a line carved on it, it signifies a stream or ditch, or points to a stream.

If a boundary stone has a small opening on it, it signifies a washing area or a pond, or sometimes points to a circular boundary stone. If it has something fashioned on top of it, either a lead tip or a silver-lead-alloy block, that is, a solid construction, then it is within the censa(?) of a centuria.

If a boundary stone is perforated, it signifies that the boundary crosses a river, or passes by a spring.

If a boundary stone has a dot on it, it signifies a well or spring.

Terminus si aliquam cissuram, hoc est taliaturam, habuerit, montem cissum, id est taliatum, ostendit. limes illa finem transit.

Terminus si tres petras circa sese habuerit, trifinium demonstrat. talem terminum nomine bifurtium samartia uocatur, et habet arcam in trifinio. si botontini terrae, ex superis prohibeo te sacramentum dare. si cihiamellus, hoc est siliqua siluatica, fuerint tres, trifinium demonstrat. si oliuastellum inueneris unum, terminum demonstrat, aquam uiuam et conuallia loca significat. si tres murtae fuerint, trifinium demonstrat. si tres cotonei fuerint, trifinium demonstrant.

Terminus si scriptus fuerit et punctos habuerit litteris Graecis, sequeris cursum eius asion, hoc est ab oriente per litteras Graecas de mappa, hoc est pentagonum, quod interpretatur cubitos quinque.

## INCIPIT EXPOSITIO TERMINORVM PER DIVERSAS PROVINCIAS POSITORVM

Terminum singulum in quatrifinio inuenies. quattuor lapides in quadrifinio positae sunt, et termini factura tornatilis, hoc est rotundi, subtilissimi: in quatrifinio inuenies.

Puteum si in fine inuenis, pro termino habebis.
Cisternam factam in fine positam, et circa hanc memoratum terminum inuenies, et pro termino habebis.

Terminum de lapide decisa uiua inuenies, et pro termino habebis.
Macherias lapidum in finem pro termino inuenies.
Sepulchra finalia aut monumenta sine dubio inuenies.
Melum cotonium in fine pro termino inuenies.
Cypressum in fine pro termino inuenies.
Oliuastellum in fine pro termino inuenies.
Fossatum decisum paruum in fine pro termino posuimus. fossato alio finales maiores sine dubitatione inuenies.

Limitem torrem, hoc est torum, sine dubio inuenies.
Parietes de calce fabricatas finales direximus.
Ripas decisas finales direximus.
Botontones finales inuenies.
Arbores ante missas finales inuenies, peregrinas, exteras.
Pontem marmoreum in fine inuenies.
Pontem de lapide uiuo in fine inuenies.
Pontem ex calce factum in fine inuenies.
Orcas in fine inuenies.
Sarcofaga in fine inuenies.
Imbrices in fine inuenies.
Collectaculum de carbonibus in calce miscitatos et glerias fluminales ne dispicias: signales constituimus.

Palos picitos pro terminis inuenies.
Laterculos quadrangulos pro terminis inuenies.

If a boundary stone has a fissure, that is, a cleft in it, it signifies a mountain with a fissure, that is, a cleft. A limes crosses the boundary there.

If a boundary stone has three rocks around it, it indicates a trifinium. This kind of stone is called 'two-pronged' samartia, ${ }^{31}$ and has an arca at the trifinium. If there
are heaps of earth, I forbid you to administer an oath from the gods. ${ }^{32}$ If there is a cihiamellus in groups of three, that is, a siliqua silvatica, ${ }^{33}$ it indicates a trifinium. If you find a single olive-tree, it marks a boundary and indicates a spring and valleys. If there are three myrtle-trees, that indicates a trifinium. If there are three quince-trees, that indicates a trifinium.

If a boundary stone has Greek letters and spots, you should follow the line it marks from Sion(?), ${ }^{34}$ that is, from the east, according to the Greek letters on the map, that is, a pentagon, which should be interpreted as meaning 5 cubits (to the next marker?).

## HERE BEGINS A DISCUSSION OF BOUNDARY MARKERS SET UP IN VARIOUS PROVINCES

You will find a single boundary stone at a quadrifinium. Four (other) stones are placed at a quadrifinium. The boundary stones are very carefully fashioned and are round; you will find them at a quadrifinium.

If you find a well on a boundary, consider it as a boundary marker.
If you find a cistern constructed and positioned on a boundary, and near this a boundary stone as I have mentioned, consider it as a boundary marker.

If you find a stone made from living rock, consider it as a boundary marker.
You will find dry-stone walls on a boundary serving as a marker.
You will certainly find tombs and monuments marking boundaries.
You will find the quince-tree on boundaries serving as a marker.
You will find the cypress-tree on boundaries serving as a marker.
You will find the olive-tree on boundaries serving as a marker.
I have established a small ditch, which was dug out, on a boundary as a marker. Bigger ditches you will also certainly find as boundary markers.

You will undoubtedly discover a raised limes, that is, a balk.
I have built walls from limestone to mark boundaries.
I have established banks that have been dug out to mark boundaries.
You will find piles of earth marking boundaries.
You will find trees previously planted, non-native, from another area, marking boundaries.

You will find a marble bridge on a boundary.
You will find a bridge made from living rock on a boundary.
You will find a limestone bridge on a boundary.
You will find pottery vases on a boundary.
You will find tombs on a boundary.
You will find gutter-tiles on a boundary.
Do not overlook a reservoir containing carbon mixed with limestone and river gravel; I established them as boundary markers.

You will find wooden stakes daubed in pitch serving as boundary markers.
You will find four-sided structures serving as boundary markers.

Lapides natiuas cum aliquo signo finem pro termino constituimus, et multa consecratione signauimus.

Flumen aliquotiens in fine inuenies.
Riuum finalem inuenies.

Haec signa per diuersas prouincias obseruentur.
Vnde et territoria diuiduntur, ut requiras casales secundum litteras istas, quomodo sunt positae in monte et in planis locis.

## ITEM EXPOSITIO TERMINORVM

Quales terminos constituimus? alii quidem politos, et ubi dispectas lapides posuimus, subtus terram decisimus, ut firmarentur lapides: quae dispectas in rigora et in latere limitis constituimus lapides, quae positae sunt in terminis. amplius mensura eius non potest inueniri, quam tertio pede de manu, et de his pedibus semisse minus unum. scutanei sunt, hoc est dolatiles. alii qui sunt lapilli facti tornatiles, siue alia factura breuiores, hoc est minores, et in fine positi: si haec non admittuntur, subter terram decisas inuenies, quas decisas in omnibus finales sunt. aut quidem in altum per iugum de monte. haec signa constituimus dirigi lineam, quod est ualle incisam. quia sub axae caeli determinata est terra. euangelium [a]ad Matheum, sanctus Petrus, sanctus Paulus, sanctus Laurentius, sanctus Iohannes euangelista, Christus filius dei, per quem et pax terminationis in terra processit, et praecepit limitibus continere, et stanti, et fontibus egredi, et egresse sunt per singula loca.

Quas litteras singulas in terminis inuenies, quae capitaneas non sunt fundorum, sed rationis terminum ostendit.

A si in termino inueneris, finem in proximum significat, aut aquam uiuam designat.

B si in termino inueneris, bifurtium ostendit, aut riuum significat.
C si in termino inueneris, a centuria numquam recedas.
D si in termino inueneris, deciman[n]o ostendit.
E si in termino inueneris, uallem ante se significat, aut riuum, aut fluuium, et super se subrectiores loca per planitia limes excurrit.

F si in termino inueneris, finalis causa exponit, et in longinquo terminum ostendit.

G si in termino inueneris, sui nominis auctorem limitem tortuosum ostendit.
H si in termino inueneris, grandes longitias limitum ostendit, et rariora signa in fine inuenies.

I si in termino inueneris, uiam significat, aut collis riguram ostendit, hoc est iugum.

K si in termino inueneris, kardinem ostendit, quod terminum subtilissimum et speciosum inuenies, hoc est formonsum.

L si in termino inueneris, suae normae facturam designat, limitem gammatum

I have set up native stones bearing a symbol on a boundary as a marker, and have marked them with much devotion.

You will sometimes find a river on a boundary.
You will find a brook acting as a boundary.
These symbols (indicating boundaries) can be noted in various provinces.
Territories are divided in the same way, and you should enquire about estates according to those letters, as to how they are situated on mountains and in flat areas. ${ }^{35}$

## FURTHER DISCUSSION OF BOUNDARY STONES

What kind of stones did I establish? I set up some finished stones where they can be seen, and I dug into the earth so that the stones could be firmly set up. I set up stones that can be seen on straight lines and on the side of a limes; all these stones were set up on boundaries. The largest of these stones set up by hand is 3 feet (high), the smallest $11 / 2$ feet. The stones are shield-shaped, that is, they are carved. Others are little stones, finished on the lathe, or made shorter by some workmanship, that is, smaller stones, placed on the boundary. If these are not present, you will find marked stones in the earth, and these marked stones act as boundary markers everywhere. Some are placed on high ground along the ridge of a mountain. I established these markers to delineate the boundary, which cuts along the valley. For the earth is positioned underneath the axis of the heavens. The Gospel according to Matthew, St Peter, St Paul, St Lawrence, and St John the Evangelist, and Christ the son of God, through whom the peace of demarcated boundaries has flowed through the land, ordered that the land was to be contained within limites, and that it was to be fixed, and that (water) was to come forth from springs, and (waters) did come forth (as boundaries) for the individual areas. ${ }^{36}$

If you find individual letters on boundary stones, which are not the capital letters of the estates, they signify the purpose of the boundary stone. ${ }^{37}$

If you find $A$ on a stone, it signifies a boundary close by, or denotes a spring.
If you find B on a stone, it denotes two branches (of the boundary), or signifies a brook.

If you find C on a stone, you are confined within a centuria.
If you find $D$ on a stone, it denotes the decumanus.
If you find E on a stone, it signifies a valley in front of itself, or a brook, or a stream, and above it the limes extends across higher ground through a plain.

If you find F on a stone, it indicates a boundary, and denotes (another) boundary stone in the distance.

If you find G on a stone, it denotes a curving limes like its own letter.
If you find H on a stone, it denotes very long limites, and you will find markers sparsely placed on the boundary.

If you find I on a stone, it signifies a road, or denotes the line of a hill, that is a ridge.

If you find K on a stone, it denotes the kardo; you will find that this boundary stone is very carefully made and elegant, indeed beautiful.

If you find L on a stone, it indicates a right angle, like its own shape, and a limes which is like a (letter) gamma (i.e. right-angled), and denotes in the distance an arca
et in longinquo arcam finalem ostendit, et conuallia eius fundum finem uindicat.
m si in termino inueneris, fines quadras designat, et in proximo signa finalia inuenies.

N si in termino inueneris, proximam aquam significat, et quadras fines habentes aquae. a septemtrione arcam marmoream inuenies.
o si in termino inueneris, a septemtrionali parte siluam demonstrat, et per ipsam siluam riuus currit, et trans riuum signa demonstrat.

P si in termino inueneris, pedaturam significat, extra aliis signis finalibus, uel quod litteras finales continet. has per singulos titulos inuenies, aliosque finales titulos sine nostris signis in agris posuimus, qui rationem ostendunt limitum et causam dirigunt finalem.

Q si in termino inueneris, a limite riuum.
R si in termino inueneris, per collicellum terminos inuenies.
S si in termino inuenies, supra possessionem multas aquas uiuas indicat, quae alueum transeunt.

T si in termino inueneris, trifinium ostendit.
v si in termino inueneris, terminum in collem meridianum ostendit per limitem orientalem.
x si in termino inueneris, quatrifinium exponit, et pro decumano finem habebis.

Y si in termino inueneris, sub se fontanam proximam habet.
Z si in termino inueneris, a sinistra parte fontem significat.
Haec omnia supra scripta expositione terminorum constant, ut intellegas quae signa aut quales causae finem faciunt.

## INCIPIT EXPOSITIO DE MARGINIBVS TERRAE ET OPERIBVS CAESIS

Quamquam igitur de terminis expositione aliquotiens extra limites termini positi inueniuntur, antiquae tamen mensurae conuenit ut terminos foris limites ponerentur. sine dubio constat finis, et quia arcas aliquotiens circa sepulchrum sine dubio ponuntur, et super ipsam arcam memoriae constitutae, et quod sanctius uidentur. antiquitus nobis sic conuenit mensura, ut in ipsa memoria consecraretur arca finalis. et ita ad mensuras nostras perscribamus, ut sine dubio, ubi haec signa inueniuntur, finales adnectimus in legibus exponantur, sicut superius lectio continet.

## INCIPIT EXPOSITIO DE VALLIBVS

Valles autem si fluuiis permittunt, et constitutum sit fluuium, qui foris agrum non uagatur et alueum alterum per agrum non mutet, et flumen fuerit saxuosum, qui aluea
marking the boundary; and confirms that a valley marks the boundary of its estate.
If you find $m$ on a stone, it indicates square-shaped land and you will find boundary markers close by.

If you find N on a stone, it signifies water close by, and the water embraces
square-shaped land. In the north you will find a marble arca.

If you find o on a stone, it indicates a wood in the north, and a brook runs through the wood, and on the other side of the brook markers indicate (the boundary).

If you find $P$ on a stone, it signifies a measured area, apart from other boundary markers, and this contains letters denoting boundaries. You will find these letters in individual inscriptions. And I set up other boundary inscriptions in the fields without any of my markers, which show the layout of the limites, and establish the position of the boundary.

If you find Q on a stone, (it signifies) a brook near the limes.
If you find R on a stone, you will find boundary stones across a little hill.
If you find $s$ on a stone, it indicates many springs above the holding, which cross a river-bed.

If you find T on a stone, it denotes a trifinium.
If you find $v$ on a stone, it denotes a boundary stone on a south-facing hill along the eastern limes.

If you find x on a stone, it indicates a quadrifinium, and you will find the boundary on the edge of the decumanus.

If you find $Y$ on a stone, it has a spring below it close by.
If you find z on a stone, it signifies a spring on the left-hand side.
All the information supplied above tallies with the discussion of boundary stones, so that you can grasp what distinguishing signs and what factors make a boundary.

## HERE BEGINS A DISCUSSION OF LAND BORDERS AND CONSTRUCTIONS

Although in the discussion about boundary stones, stones are sometimes found to have been positioned outside limites, it fits with the surveying practice of antiquity that the limites should be placed outside the boundary markers. A boundary is agreed without any doubts, both because arcae are undoubtedly occasionally placed round a tomb, and because monuments are set up above an arca itself, and because they seem more sacrosanct. The surveying practice of antiquity conforms to our own view, in so far as an arca marking a boundary is sanctified by its position on a monument. Therefore, we should add this to our own practice of surveying, so that without question when these markers are found we should regard them as relating to boundaries, and they should be included in the relevant leges, as my earlier writings describe.

## HERE BEGINS A DISCUSSION ABOUT VALLEYS

If the valleys include rivers, and a river is located there, which does not flow outside the land and does not change its course as it flows through the land, and if it is a river with rocky banks and which flows along a steep bed with virtually straight
alta quasi rectos alueos excurrit, finalis causa per ipsum direximus. haec quia singuli semper agri non finiti nisi per terminos, nisi per diuersas macherias, signa finita sunt, per terminorum rationem, per aquas uiuas ubi terminus non possit, fossas finales et aquae ductos in fine direximus, quoniam agri qui rectas lineas, hoc est ualles finales habet, per riuum, quod frequentiore solet in questionem deduci. sed qui riuum collectaculum uallium subter eum limitem suscepit, sine dubio finalis ipse riuus obseruetur. et aliquotiens super labium de ipso riuo terminum finalem constituimus, qui mittit rectum rigorem limitem: sine dubio per legem obseruetur.

## INCIPIT DE PALVDIBVS

Non perdescribantur signa finalia.
Stagnum uero finalem aliquotiens direximus, et lacunar, quae interpretatur aqua uiua, unde ipse stagnus exiet. ex tertia hora ipsum stagnum finalem constituimus, et quam plurime contra tertiam horam. superius alueum signa quae inueniuntur, per sepulchra finali causa diriguntur. plurisque super ripam paludis sacra paganorum inueniuntur. qui finales sint requirantur, quia, ut supra dixi, requirendum oportet qualia signa finalia admittantur. et terminos altiores posuimus: sine dubio obseruentur.

Haec ratio notis iuris est exponenda ex lege secundum grammaticae et philosophiae geometricae artis. singulos fundos ex notis iuris obligauimus: sed ita exponantur leges secundum artis geometricae, ad pertinentes lectiones secundum locis rumorem, quod interpretatur, secundum loci obseruationem, seu fossis subseciuis seu rigores seu centuriis seu terminis. ita exponantur, quia, sicut in preteritis diximus, duae fossae finem non faciunt. preterea si circa publica diriguntur.

Casale eius si in monte posita finis, quam maxime in oriente: a sole occumbente uia, et in uia terminum scriptum habet.

## ITEM INTERPRETATIO VBI SVPRA. DE FINIBVS AGRORVM

Fines dictae eo quod agri funiculis sunt diuisi. mensurarum lineae in terrarum partitione tenduntur, demensionibus aequitas teneatur. limites appellati antiquo uerbo transuersi. nam transuersa omnia antiqui lima dicebant: a quo et limina hostiorum, per quas foris et intus itur; et limites, quod per eos in agro foris et intus eatur.
sides, we can establish the boundary along it. Because individual fields are always marked out only with boundary stones or various dry-stone walls, the following markers have been defined (as boundary markers) according to the system of boundary markers, and, when stones could not be used, I have employed springs, ditches, and aqueducts on the line of a boundary to demarcate it, in the case of land that had straight lines, that is, valleys on its boundaries (i.e. its overall layout was based on straight lines). I also used a brook, which tends to come into dispute more often. But undoubtedly the brook is taken to designate a boundary, if it acts as a receptacle for the brooks in the valley below the limes. ${ }^{38}$ Sometimes I set up a boundary marker above the curved edge of the stream; this produces a limes along a straight line; undoubtedly it will be recognized by the lex.

## HERE BEGINS A DISCUSSION ABOUT MARSHES

Boundary markers have not been exactly described.
Sometimes I have used a pool of water as a boundary marker, and a pond, which is described as a spring, from which the pool itself comes. I established a pool as a boundary marker on the eastern side, and to a large extent on the opposite side. As regards the markers that are found above a river-bed, the boundary is often demarcated by tombs. Above the bank of a marsh the shrines of countryfolk are often found. We need to discover which are boundary markers, because, as I said above, it is right to discover what kind of markers are accepted as designating a boundary. I also set up rather higher boundary stones; they will certainly be recognized (as boundary markers).

This system should be expounded with legal abbreviations in accordance with the lex, and in line with the art of grammar, philosophy, and geometry. I have designated individual estates in accordance with legal abbreviations. But leges should be expounded according to the art of geometry, with reference to relevant written material in accordance with the report on the place, which is to be analysed, and also in accordance with observation of the place, whether it has ditches, subseciva, straight lines, centuriae, or boundary stones. It should be set out in this way because, as I said above, two ditches do not necessarily make a boundary, especially if they run near public land.

If the boundary of an estate is positioned on a mountain, it lies particularly in the east; the road stretches from the west and on the road there is an inscribed boundary stone.

## THE SAME HEADING AS ABOVE LAND BOUNDARIES ${ }^{39}$

Boundaries are so described because lands are divided up by the surveyor's rope. In land division, the measuring lines are stretched out, and equality is maintained by the measuring process. Transverse limites got their name from a very old word; for the ancients called all transverse lines lima, and from this we get doorstep \{limen\}, across which we go in and out; and also limites, because across these we go into and out of
hinc et limus uocabulum accepit, cingulum quo serui publice cingebantur obliqua purpura. termini dicti quod terrae mensuras distinguunt atque declarant. his enim testimonia finium intelleguntur et agrorum contentio et certamen aufertur. limites in agris maxime if sunt, cardo et decumanus. cardo, qui a septentrione directus a cardine caeli est: nam sine dubio caelum uertitur in septentrionali orbe. decumanus est qui ab oriente in occidentem per transuersum dirigitur: qui pro eo quod formas $x$ faciat, decumanus est appellatus. ager enim bis diuisus figuram denarii numeri efficiet. arcam ab arcendo uocatam: fines enim agri custodit eosque adire prohibet. trifinium dictum eo quod trium possessionum fines attingit. hinc et quadrifinium, quod quattuor.

## DE MENSVRIS AGRORVM

Mensura est quidquid pondere capacitate longitudine altitudine latitudine animoque finitur. maiores itaque orbem in partibus, partes in prouinciis, prouincias in regionibus, regiones in locis, loca in territoriis, territoria in agris, agros in centuriis, centurias in iugeribus, iugera in clymmatibus, deinde clymmata in actos perticas passus gradus cubitos pedes palmos uncias et digitos diuiserunt: tanta enim fuit eorum sollertia. digitus est minima pars agrestium mensurarum. inde uncia habet digitos tres. palmus autem quattuor digitos habet, pes xvi, passus pedes v, pertica passus duos, id est pedes decim. pertica autem a portando dicta, quasi portica. omnes autem praecedentes mensurae in corpore sunt, ut palmus pes passus et reliqua: sola pertica portatur. est enim x pedum, ad instar calami in Ezechihele templum mensurantis. actus minimus est latitudine pedum quattuor, longitudine CXL. clymmata quoque undique uersus pedes habent $\mathrm{LX}, \mathrm{LX} \underset{\mathrm{LX}}{\stackrel{\mathrm{LX}}{\square}} \mathrm{LX}$. actus quadratus undique finitur pedibus CXX, ita: CXX $\stackrel{\text { CXX }}{\stackrel{\text { CXX }}{C X X}} \mathrm{CX}$. hunc Betici arapennem dicunt, ab arando scilicet. actus duplicatus iugerum facit. ab eo quod est iunctum, iugerum nomen accepit. iugerum autem constat longitudine pedum duocentorum xL, latitudine CXX; ita. CXX $\frac{\text { CCXL }}{\frac{\text { ingerum }}{C C X I}}$ CXX. actum prouinciae Beticae rustici agnam uocant. porcam idem Betici xxx pedum latitudine et LXXX longitudine definiunt, ita. XV $\stackrel{\text { LXXX }}{\stackrel{\text { LXXX }}{\text { LXI }}} x v$. sed porca est quod in arando Lxxx extat; quod defossum est, lyra. Galli candetum appellant in areis urbanis spatium centum pedum, quasi centetum; in agrestibus autem pedum CL quadratorum iustum candetum uocant. porro stadialis ager habet passus cxxv, id est pedes DCXXV. cuius mensura octies computata miliarium facit, qui constat quinque milium pedibus. centuria autem ager est ducentorum iugerum, qui apud antiquos a centum iugeribus uocabatur, sed postea duplicata nomen pristinum retinuit. in numero enim centuriae multiplicatae sunt, sed nomen mutare non potuerunt.

## DE AGRIS

Ager Latine appellari dicitur eo quod in eo agatur aliquid. alii agrum ex Graeco nominare manifestius credunt, unde et uilla Graece choragros dicitur. uilla a uallo, id
fields. From the same derivation there is also the word limus, referring to the slanting purple band with which slaves were publicly invested. Boundary stones are so called because they mark out and reveal the boundary lines on the land. They are regarded as proof of boundaries, and therefore disputes and arguments over land are removed. ${ }^{40}$ There are two principal limites on the land, the kardo and decumanus. The kardo, which stretches from the north, is called after the axis of the heavens; without doubt the heavens turn on a northern axis. The decumanus is the limes that stretches transversely from east to west. Because it makes the shape of an X, it is called decumanus. ${ }^{41}$ For the land divided twice in this way makes the shape of number ten. An arca is so called because it wards off \{arcere\}; for it guards land boundaries and prevents anyone from approaching them. A trifinium is so called because it touches on the boundaries of three holdings; similarly a quadrifinium because it touches on four holdings.

## LAND MEASUREMENTS ${ }^{42}$

Measurement refers to the definition of anything by weight, capacity, length, height, breadth, and spirit. Our ancestors divided the world into parts, parts into provinces, provinces into regions, regions into areas, areas into territories, territories into lands, lands into centuriae, centuriae into iugera, iugera into clymmata (see below); then they divided clymmata into actus, perticae, paces, steps, cubits, feet, palms, unciae, and finger-breadths. Such was their wisdom. The finger-breadth is the smallest dimension of land measurement. Then the uncia has three finger-breadths, a palm four, a foot sixteen; a pace $\{$ passus $\}$ has five feet, a pertica two paces, that is, ten feet. Pertica receives its name from 'carrying' \{portando\}, like portica. ${ }^{43}$ All the preceding measurements come from the body, for example, palm, foot, pace, and the rest. Only pertica is imported. It consists of ten feet, like the reed used to measure the temple in Ezekiel. ${ }^{44}$ The smallest actus is 4 feet wide and 140 feet long. Clymmata have 60 feet on all sides (diagram). A square actus has 120 feet on each side, as follows (diagram). The Baetici call this arapennis, naturally from ploughing \{arando\}. A double actus makes a iugerum. Iugerum receives its name from something that is joined. It is agreed that a iugerum is 240 feet in length and 120 in width, as follows (diagram). In the province of Baetica, the farmers give the name agna to an actus. Similarly, the Baetici define as a porca land 30 feet broad and 80 feet long, as follows (diagram). ${ }^{45}$ Indeed porca is land that extends for 80 feet in ploughing. Land that is dug up is called a lyra. The Gauls call candetum an area of 100 feet in urban areas, like centetum; in rural areas they give the name iustum candetum to 150 square feet. Now, land called stadialis has 125 passus, that is, 625 feet. This figure multiplied eight times produces a mile, which is 5,000 feet. A centuria is land consisting of 200 iugera, which the ancients called after 100 iugera, but later when the amount was doubled the earlier name was retained. The centuriae were increased in size but could not change their name. ${ }^{46}$

## LANDS ${ }^{47}$

Ager is said to get its name in Latin because something is done \{agere $\}$ in it. 40 Others believe that ager clearly comes from the Greek, in that in Greek a villa is called
est aggere terrae, nuncupata, quod pro limite constitui solet. possessiones sunt agri late patentes publici priuatique, quos initio non mancipatione sed quisque ut potuit occupauit atque possedit; unde et nuncupati. fundus dictus quod in eo fundatur uel stabiliatur patrimonium. fundus autem et urbanum aedificium et rusticum intellegendum est. praedium, quod ex omnibus patris familias maxime prouidetur, id est apparet, quasi praeuidium; uel quod antiqui agros quos bello caeperant ut praedae nomine habebant. rura ueteres incultos agros dicebant, id est siluas et pascua. ager dictus qui a diuisoribus agrorum relictus est ad pascendum communiter uicinis. alluuius ager est quem paulatim fluuius in agrum reddit. arcifinius ager dictus est quia certis linearum mensuris non continetur, sed arcentur fines eius obiectu fluminum montium arborum. unde in his agris nihil subseciuorum interuenit. noualis ager est primum proscisus, siue qui alternis annis uacat nouandarum sibi uirium causa. noualia enim semel cum fructu erunt, et semel uacua. squalidus ager quasi excolidus, quod iam a cultura exierit; sicut exconsul quod a consulatu discesserit. uliginosus ager est semper umidus. nam umidus dicitur qui aliquando siccatur. uligo enim umor terrae est naturalis ab ea numquam recedens. subseciua sunt propriae quae sunt ut sutor de materia praecidens quasi superuacua abicit. inde et subseciui agri quos in pertica diuisos recusant quasi steriles aut palustres. item subseciua quae in diuisura agri non efficiunt centuria, id est iugera ducenta. area dicitur tabularum aequalitas. dicta autem area a planitie et aequalitate, unde et ara. alii aream uocatam dicunt quod pro triturantibus frugibus eradatur uel quod non triturentur in ea nisi arida.

Mensuras uiarum nos miliaria dicimus, Greci stadia, Galli lewas, Egyptii signes, Persae parasangas. miliarium mille passibus terminatur. et dictum miliarium quasi mille aditum, habens ped. v milia. lewa finitur passibus mille D. stadium octaua pars miliarii est, constans passibus cxxv. uia est qua potest ire uehiculum, et uia dicta est a uehiculorum incursu: nam duos actus capit propter euntium et uenientium uehiculorum incursum. strata quasi uulgi pedibus trita. ipsa est et dilapidata, id est lapidibus strata. ager est media stratae eminentia coaggeratis lapidibus, quod historici uiam militarem uocant. ut qualis saepe uiae deprehensus in aggere serpens. iter uel itiner est uia qua iri ab homine quaqua uersum potest. iter uel itiner diuersam significationem habet. iter enim est locus transitu facilis, unde et appellamus et itum. itiner enim est iter longae uiae, et ipse labor ambulandi, ut quo uelis peruenias. tramites sunt transuersa in agris itinera, siue recta uia, dicta quod transmittat. diuortia sunt flexus uiarum, hoc est uia in diuersa tendens. item diuerticula sunt, hoc est diuersae ac diuisae uiae, siue semitae transuersae, quae sunt alterae uiae. orbita uestigium carri,
a choragros. Villa comes from vallum, that is, a heap of earth, which is normally established in front of a limes. ${ }^{48}$ Holdings are lands stretching far and wide, both publicly and privately owned, which at the start individuals occupied and possessed as they could, not by mancipatio. From this they got their name. An estate $\{$ fundus $\}$ is so called because one's wealth is founded $\{$ fundare $\}$ and secured on it. An estate must be understood as meaning both property in town and in the country. A praedium is so called because it is especially provided for by all heads of families, that is, it appears as a kind of foresight $\{$ praevidium $\}$. Or perhaps because the ancients who captured land in war held it under the name of booty $\left\{\right.$ praeda\}. ${ }^{49}$ The ancients used to give the name rura to uncultivated areas, that is, woods and pasture land. This is described as land left over by the men who allocated the land, as common pasture for those nearby. Alluvial land is that which a stream has gradually deposited on the land. The term arcifinius is given to land that is not contained within definite measured lines; its boundaries are protected by the appearance of rivers, mountains, and trees. Therefore there are no subseciva in these lands. ${ }^{50}$ Novalis is land that has been ploughed for the first time, or that lies fallow in alternate years so that it may regain its fertility. These lands will at one time bear crops and at another lie fallow. Squalidus is land that is virtually unused, because it has now gone out of cultivation, just like an ex-consul who has vacated the consulship. Uliginosus (bogland) is land that is always damp. 'Damp' is the name given to land that sometimes dries out. Bog is a natural dampness in the earth that never departs. Subseciva are areas that can be likened to those pieces that a shoemaker cuts off from his raw material and throws away as surplus. So, subseciva are areas excluded from divided and allocated land, because they were infertile or marshy. Subseciva are also areas that, in the allocation of land, did not suffice to make a centuria, that is, 200 iugera. ${ }^{51}$ An area $\{$ area $\}$ consists of even stretches of land. Area gets its name from levelness and evenness, from which altar \{ara\} also gets its name. Others think that area is so called because it is scraped clear \{eradere\} for threshing crops, or because they are not threshed in it unless it is dry \{arida\}. ${ }^{52}$

Distances along roads we call miles, the Greeks stadion, the Gauls lewa (or leuga), the Egyptians signis(?), the Persians parasanga. A mile contains 1,000 paces. ${ }^{53}$ It is called miliarium, as if it had a thousand approaches, and contains 5,000 feet. A lewa has 1,500 paces. A stadium is $1 / 8$ of a mile, containing 125 paces. A road is a place suitable for vehicular traffic, and gets its name from the movement of vehicles. It has two tracks for the movement of vehicles going and coming. The word strata (applied to a road) suggests a roadway well worn by people's feet. It is also called dilapidata, that is, laid out with stones. A highway is a road raised on an eminence by piled up stones, which historians call a military road, as in 'Just like a snake, caught as often occurs on a causeway,. ${ }^{54}$ Think of how often we see a snake caught on a highway. Iter or itiner is a road along which a man can go in every direction. Iter and itiner have different meanings. Iter is a road with easy passage, which is why we give it the name from 'having gone' $\{$ itum $\}$. Itiner is a journey along a long road and takes a lot of walking to get to where you want. Tramites are paths that run transversly across the fields, or a straight thoroughfare, so called because it takes people to their destination \{transmittere\}. Junctions are turning points in the road, that is, where the road forks in different directions. Similarly, there are turnings, that is, roads that go in different
ab orbe rotae dicta. porro actus, quo pecus agi solet. cliuosum iter, flexuosum. ambitus inter uicinorum aedificiorum locus duorum pedum et semipedis, ad circum eundi facultatem rectus et $a b$ obambulando dictus.
orbita is the rut left by the wheel of a cart, and it is called after the circle \{orbis\} of a wheel. Furthermore, actus is so called because livestock are normally driven \{agere\} along it. A road described as clivosus has curves. ${ }^{55}$ Ambitus is the name given to the space of $21 / 2$ feet left between neighbouring buildings to facilitate travelling round them, and is so called from walking past \{obambulare $\}$. ${ }^{56}$

## ILLUSTRATIONS

The illustrations in this volume are reproductions of the original line drawings of the manuscript illustrations in F. Blume, K. Lachmann and A. Rudorff, Die Schriften der römischen Feldmesser (Berlin, 1848-52)

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## PART III. COMMENTARY

# COMMENTARY - JULIUS FRONTINUS 

(TRANSLATION p. 3)


#### Abstract

SUMMARY C 3.3-5.3 - types of land C 5.4-9.26 - land disputes C 9.27-11.43 - limites, their names, orientation C 11.44-13.2-definition of pertica, praefectura C 13.3-15.33 - methods of measuring land with irregular boundaries


1. The text printed (up to p. 162) is that of the Teubner edition of C. Thulin (see p. xx, n. 4) with some variations, as explained in the notes; cf. also Resina Sola, Frontino. De Agri Mensura (1983). The illustrations are taken from MS A.
2. This title was probably supplied by an editor and excerptor of Frontinus' text. MS F (ninth century A.D.), which begins at C $3.23=\mathrm{T} 2.8$, has the title: 'Here begins the survey of measurable lands'.
3. Suessa Aurunca (Sessa) was the ancient capital of the Aurunci who inhabited the central coastal district of western Italy. In 313 b.c. a Latin colony was founded at Suessa to protect one of the roads to Capua in Rome's struggle with the Samnites for dominance in this area. The town was colonized again some time after 43 b.c. with the new title colonia Iulia Felix Classica Suessa. 'Classica' may suggest settlement by veterans who had served in a sea campaign (Salmon, RCR, 58-9; Keppie, CVSI, 143). According to Urbicus' De controversiis agrorum, which is probably in large part derived from Frontinus, since there was no woodland close to the allocated land at Suessa Aurunca, boundary markers were established on nearby Mount Massicus (which produced a famous wine) and areas of it were assigned to the colonists, as old maps demonstrated (C 37.8-13 = T $39.8-13=\mathrm{L} 48.16-20)$. The illustration of MS A (Ill. $34=\mathrm{L}$ fig. $36=\mathrm{T}$ fig. 35 ; cf. Chouquer, $L A R, 53$ ) shows the walled colony of Suessa and an adjacent mountain (inaccurately labelled Aricus), trees, and boundary markers; land division is indicated entirely in centuriae. The Liber Coloniarum refers to a Gracchan settlement at Suessa, with land allocated in strips (C $187.3=\mathrm{L}$ 237.11-13), and Chouquer wished to associate this with a field-system he identified between Mount Massicus and Suessa, consisting of units of 13 by 13 actus. He also identified a grid of centuriae of 20 by 20 actus between Suessa, Sinuessa, and Minturnae, which may relate to the later colony (Structures agraires, 172-80); cf. Arthur, Northern Campania (1991), 41-4. For the methods and problems of identifying Roman field-systems, see Introduction pp. lvii-lxi.
4. This was a method of dividing land. A scamnum had greater breadth than length as viewed from the original orientation of the survey, a striga greater length than breadth. Scamna and strigae could be grouped with their like or with one another. The use of these terms in land division may be associated with their meaning in farming, scamnum being a balk or ridge left in ploughing, striga a swath or windrow. Ill. 3 suggests that its author understood scamna and strigae as adjuncts of centuriated land, attached to the sides of a centuria. But the illustration is unlikely to belong to the original composition, and presumably represents the interpretation of an unknown later writer. See further, p. 399, n. 54.

At C 2 , line $9=$ T $1.12=\mathrm{L} 3.4-5$, I have accepted Goesius' correction (edition of 1674) of latitudinem for the meaningless alltitudinem of MS A.
5. At C 3 , lines 11 and $13=$ T 1.13 and $15-16=\mathrm{L} 3.5$ and 4.1 , I have translated hac similitudine and in hanc similitudinem as a reference to illustrations, which may have accompanied Frontinus' original text. However, the phrase may have a more general meaning, such as 'in this fashion'. For the problems of the illustrations, see pp. xxiii- xxvi.
6. Tributum soli was a tax on land outside Italy, which was reckoned either as a quota of produce, or on the assessed value of the land, including perhaps goods and materials needed to work the estate; it may have included other related items, like estate buildings. The assessment was conducted by means of provincial censuses organized by the Roman government.

Although liability for tributum soli was ultimately on the individual (see e.g. Digest 7.1.7.2; 1.52; 33.2.32.9; CJ 8.14(15).1), there is evidence that the tax was assessed on a communal basis in local communities (see e.g. Strabo 10.485 - a fisherman appealing to Augustus on behalf of his community on the island of Gyaros for a reduction in tribute; 14.657 - a reduction in the tribute of Astypalaea in lieu of a statue of Venus taken by Augustus; Dio 49.34 .2 - four communities that had reneged on their tribute). Apparently each community was held to owe a certain sum to Rome on the basis of all the land within its jurisdiction (Frontinus, C 3.18-19 = T 2. 2-3 = L 4.5-5.2; Digest 50.15.4.2). This is one explanation of the importance attached in the Agrimensores to the clear demarcation of territorial boundaries, and the occurrence of disputes between communities about possession of land in respect of the 'requirement of exacting tribute' (Hyginus 1, C 79.27-39 = T 74.3-19 = L 114.12-24; cf. Siculus Flaccus, C 133.9-21 = T 129.11-24 = L 164.25-165.9, describing other obligations on a community, based on its territory). It was important for a community to have as many landholders and payers of tribute as possible under its jurisdiction, since it was responsible for the collection of the assessed amount of tributum soli within its territory, using local magistrates or sometimes special officials who were performing a compulsory public service.

It is possible that in some cases the lump sum owed by a community to the Roman government was less than the total liability of individual landholders within its jurisdiction, although there is no clear evidence that a community could appropriate any surplus to its own use. On the other hand, if there were a shortfall in the amount collected, the tax collectors, and, if they defaulted, the entire community, would be responsible for making up the difference. See Neesen, Untersuchungen zu den direkten Staatsabgaben der römischen Kaiserzeit (1980), 19-98, and the review by Brunt, JRS (1981), especially 166-70.
7. This means that trees had been planted earlier or subsequently left untouched deliberately in order to mark a boundary. They were usually positioned in front of other trees or objects, so that they could be recognized immediately; cf. Urbicus C $29.25-6=$ T 31.24-5 = L 41.12-13, 'trees which farmers leave and call "previously planted", for the purpose of marking a boundary'; Hyginus $1-$ C $95.1=$ T $91.2=\mathrm{L}$ 128.2. Siculus Flaccus (C $115.22=$ T $112.18-19=$ L 148.16-17) mentions trees previously planted and positioned in front of a ditch to mark the boundary; cf. C 115.2-3 $=\mathrm{T} 111.17-18=\mathrm{L}$ 147.17-18 (arbores ante missae surrounded by thorn bushes).

It is less likely that arbores ante missae should be translated as 'trees set in front', which would refer to their conspicuous position on the boundary.
8. I interpret $\mathrm{C} 3.34-5=\mathrm{T} 2.21-2=\mathrm{L} 7.3-4$ to mean that land which could not be allocated for whatever reason, even though it was within the four limites of a centuria, was still called subsecivum because it was marked off by a line (cf. Frontinus - C 7.27-30 = T 8.7-11 = L 20.3-6; Urbicus - C $39.6-8=$ T 41.4-7 $=\mathrm{L} 81.10-13$ ('in allocated lands, not all the area inside four limites could be allocated to veterans'); Commentum - C $57.6-12=$ T $57.8-14=$ L 7.11-18; Siculus Flaccus - C 123.17-21 $=$ T $120.5-9=$ L 155.28-156.3). Mommsen ('Bodenrecht', 115) preferred to delete 'quam intra clusum est', holding that 'minus' was the equivalent of 'non': 'Whatever is not allocated within four limites ... is called subsecivum'. This however seems unnecessarily severe, and 'quidquid ... minus quam ... est' is picked up by the subsequent 'is modus qui adsignationi superest'.

The texts in the Corpus (principally C $3.31-9=\mathrm{T} 2.16-3.5=\mathrm{L} 6.5-7.8$; C $39.4-26=$ T $41.1-26=$ L 81.7-82.4; C $85.26=$ T $80.20=\mathrm{L} 117.18$; C $85.31-5=$ T $81.2-6=\mathrm{L} 117.24-118.4 ; \mathrm{C} 87.11-12=\mathrm{T} 82.6-7=\mathrm{L} 119.3-4 ; \mathrm{C} 89.25-6=\mathrm{T} 84.22-4$ $=\mathrm{L} 121.20-4 ; \mathrm{C} 99.18-32=\mathrm{T} 96.11-97.8=\mathrm{L} 132.24-133.16 ; \mathrm{C} 123.14-21=\mathrm{T} 120.1-9$ $=\mathrm{L} 155.25-156.3 ; \mathrm{C} 125.5-6=\mathrm{T} 121.16-17=\mathrm{L} 157.9-10 ; \mathrm{C} 125.15=\mathrm{T} 122.1=$ L 157.19; C $131.1-7=\mathrm{T} 127.6-13=\mathrm{L} 162.20-7$; C 131.14-21 $=\mathrm{T} 127.21-128.2=$ L 163.5-14) suggest that essentially there were only two types of subsecivum (see especially C 3.31-9; 39.4-9; 123.14-21): (i) land between the centuriae and the outer boundary line of divided and allocated lands; or between the outer boundary and the right-angled lines of other layouts; (ii) land within centuriae that was unsuitable for distribution. Some have argued (see Hinrichs, Institutionen, 131-4; Keppie, CVSI, 183) that subsecivum could also be applied to land confiscated from a neighbouring community for the benefit of a colony and then not allocated. At C 87.11-12 = T 82.6-7 $=$ L 119.3-4, Hyginus 1 notes with reference to confiscated and unallocated land: 'So, excluded from this is any land which is unallocated and it is called subsecivum'.

However, Siculus Flaccus (C 131.14-21), referring to land confiscated from neighbouring communities but not allocated, says that subseciva and unused centuriae (lines $14-15$ ) were returned to the people from whose territory they had been confiscated. He seems to mean that of the land confiscated for the colony, some had been divided into centuriae for distribution, while the rest had been left for whatever reason as subseciva. Then some of the unallocated centuriae and subseciva were returned together to the original community.

The answer to the difficulty may be in the wide meaning of subsecivum ('anything cut off by a line'). Surveyors perhaps employed subsecivum occasionally in a non-technical sense, either as a temporary definition, or as a general description of areas which strictly had their own definitions and map notations. So, at C 131.17-20 $=\mathrm{T} 127.26-128.1=\mathrm{L} 163.10-13$, Siculus Flaccus describes divided but unallocated land as having a status 'like that of subseciva', i.e., the founder had to decide what to do with it. Therefore it is possible that various areas of land not included in the original distribution could be loosely assimilated to the definition of subsecivum (cf. C 125.3-6, referring to excepta and compascua, 'quod est genus quasi subsecivorum'; C 125.15, referring to land surrounding a river excluded from the assignation as 'tamquam subsecivus'). When such land was granted or sold it then acquired what-
ever status and definition were appropriate (cf. C 99.22-3 $=$ T 96.18 $=$ L 133.5-6; C $131.1-7=$ T $127.6-13=$ L $162 \cdot 20-7$ ).

It is also worth considering the designations ager relictus and ager extraclusus. These occurred only in allocated lands and referred to areas not included in the land divided by limites. Ager relictus because of rough terrain or through the wishes of the founder did not receive limites, while ager exclusus lay outside the limites but within the outer boundary of the settlement's territory. Both had a status similar to that of subsecivum and they were subject to the same ius (see C 3.40-5.3 = T 3.6-15 = L 8.1-9; C 7.40-5 = T 9.3-8 = L 21.7-22.4; C 45.7-20 = T 47.9-22 = L 86.26-87.8; C 157.11-18 $=\mathrm{T} 161.13-21=\mathrm{L} 198.12-20 ; \mathrm{L} 341.31$ ). The difference in definition seems to be more apparent than real, though subsecivum could include land inside a centuria, while extraclusus embraced only land outside it. The important point was presumably that all such land was at the disposal of the founder of the colony.

For discussion of the Flavians and subseciva, see p. 344 n. 47.
9. At C $3.41-3=\mathrm{T} 3.9-10=\mathrm{L} 8.3-5$, the text printed is based on that of MS P (cf. Commentum - C $57.23-7=\mathrm{T} 57.26-31=\mathrm{L} 8.10-15$ ). Thulin, following Lachmann, prefers 'sive peregrinae urbis aut locis sacris aut religiosis aut quae ad populum Romanum pertinent ...'. This would mean: 'or to the sacred and religious places of a native city, or (to those) that belong to the Roman people'.
10. This title appears in MS A; P has 'Item Controversiae' - 'Similarly, Land Disputes'.
11. In the Corpus Agrimensorum are included three chapters from a law - Lex Mamilia Roscia Peducaea Alliena Fabia (C 216-19 = L 263-6), which originally may have been included in the text of Hyginus 1, but is difficult to identify and define (see especially Taylor in Studies in Honour of A. C. Johnson (1951), 68-78; Hinrichs, Hist. (1969); Institutionen, 186-8). In the following I am dependent on the arguments of M. Crawford, Athenaeum (1989). Now, the Agrimensores refer several times to a Lex Mamilia: Frontinus (C 5.22 = T $5.1=\mathrm{L} 11.5$ ); Urbicus (C $23.46=$ T $27.5=\mathrm{L} 66.15$; C $31.17=\mathrm{T} 33.14=\mathrm{L} 74.17$ ); Commentum (C $61.20=\mathrm{T} 61.3=\mathrm{L} 12.12$ ); Siculus Flaccus $($ C $111.30=$ T $108.19=$ L 144.19); Hyginus $2(\mathrm{C} 137.9=$ T $134.8=$ L 169.7 $)$. This law specified a right of way of a minimum width of five feet along both straight line and curving boundaries, which had to be maintained in perpetuity and could not be appropriated by usucapio (a process by which ownership of an object could be acquired by possession or occupation of it for a period fixed by law). $\mathrm{C} 61.20=\mathrm{T} 61.3$ $=\mathrm{L} 12.12$ (cf. C $93.12-13=\mathrm{T} 89.2=\mathrm{L} 126.4$ ), mentioning a width of five or six feet, may refer to an untypical region or possibly suggest that five feet had come to be regarded as a recommended minimum width. A Lex Mamilia is also mentioned by Cicero (Leg. 1.55-7).

This Lex Mamilia cannot be the same law as the Lex Mamilia Roscia Peducaea Alliena Fabia (C $216-19=$ L 263-6), which is not a statute about boundaries, but rather deals with the foundation of colonies, municipia, and other communities, and the distribution of land. It is also necessary to take into account Digest 47.21 .3 pr. where Callistratus refers to a lex agraria of Gaius Caesar (almost certainly Julius Caesar), quoting a clause which is very similar in content and intention to chapter 5 of the law quoted in the Corpus Agrimensorum. Mommsen (Lachmann, Feldmesser II, 223-6) argued that the Lex Mamilia Roscia Peducaea Alliena Fabia was associated
with Julius Caesar's agrarian legislation of 59 b.c., and was a decision of a five-man commission (the five men mentioned in the title) set up as a subdivision of the original twenty-man commission established by Caesar in 59 to oversee the distribution of common land in Italy. But this seems implausible because the text carries the distinctive features of a law passed by the assembly of the people. Moreover, the twenty members of the commission, as far as they can be identified, come from distinguished families, whereas four of the five names associated with the Lex Mamilia Roscia Peducaea Alliena Fabia seem to be of obscure origin.

Perhaps the three chapters preserved in the Corpus Agrimensorum are derived from a Lex Mamilia Roscia Peducaea Alliena Fabia Agraria, which was however quite distinct from the Lex Mamilia often referred to by the Agrimensores. Clauses from the former were then borrowed for a Lex Iulia Agraria and also for the Lex Coloniae Genetivae, chapter 104, which reproduces chapter 4, but in a form specifically relevant to its immediate requirements.

On the other hand, it is possible that the excerpted title Lex Mamilia Roscia Peducaea Alliena Fabia became mistakenly attached to part of the text of a Lex Iulia Agraria. If this is right, the three chapters might come from a Lex Iulia Agraria of Caesar, which is most likely to be dated to 59 b.C., and which is quite distinct from the Lex Mamilia Roscia Peducaea Alliena Fabia, of uncertain date and unknown content.

As for the Lex Mamilia so often mentioned by the Agrimensores, it may date from the end of the second century B.C., and is perhaps to be associated with C. Mamilius Limetanus, tribune of the plebs in 109 b.C. (Broughton, The Magistrates of the Roman Republic I (1951), 546).
12. At text, lines 19-20, 'nec dubium ... dixerim' is probably an interpolation by a commentator. At line 25 Lachmann corrected the ad patentem of MSS AP.
13. Supercilium (see also, principally, C $29.40-6=\mathrm{T} 32.11-18=\mathrm{L} 73.21-8$; C $95.19-23=$ T $91.19-92.2=$ L $128.15-20$; C $109.37-46=$ T $107.3-13=\mathrm{L} 143.3-13$ ) is usually translated as 'brow of a hill', 'small hillock' (OLD s.v. supercilium 3b). However, Siculus Flaccus (C $107.2-3=$ T $103.4-5=$ L 139.4-5) mentions how supercilia naturalia can make a boundary, and it may be that in the surveying texts supercilia normally referred to a partly man-made 'terrace', a feature common in Mediterranean agriculture.
14. Ulpian provides a useful definition of site (locus): 'A site is not a tract of land but some part of one ... it is only our opinion and decision that distinguish a site from a tract of land, so that even a small site can be called a tract if we have the intention to call it this ... A tract of land, however, has its own boundaries but a site extends as far as it may be determined and defined' (Digest 50.16.60).

A dispute over site concerned not simply the direction of a boundary line or the land within five feet of it, but a quantity of land, though that would normally touch on a boundary. It would be a surveyor's job to establish the location and dimensions of the site; the justification for the claim, however, would be dealt with in the legal process. In the dispute described by Frontinus, the plaintiff is unable to give precise dimensions that might help to identify the site. For surveyors and the law, see Appendix 6.
15. Frontinus means presumably that since the property extends into different
centuriae, the limes does not necessarily form a boundary for its entire area, and it might be difficult to prove the accuracy of old titles. It would be a surveyor's task to measure and check the area (modus) under dispute. The interpretation of this information in respect of old property titles would be the responsibility of a judge. If a settler was found to have less land that he was entitled to, that may have been because of appropriation by a third party, or a mistake in the original allocation not spotted at the time.

At text, line 33, MS A has repromissioni, P promissionis. Lachmann, following Goesius in his edition of 1674, read promissioni. Rigaltius, in his edition of 1614, retained repromissioni, which he took as equivalent to cautioni (cf. Hyginus 1 C $99.11=\mathrm{T} 96.3=\mathrm{L} 132.17$ ).
16. Cf. Urbicus (C $37.8-13=\mathrm{T} 39.8-13=\mathrm{L} 79.13-18$ ). See above, n. 3 .
17. For the phrase pro indiviso, see Cato, Agr. 137; Plin., NH 18.53; Seneca, Dialog. 12.19.1.
18. At text, lines 7-9, Thulin regarded this as an interpolation referring to disputes about public areas, and line 11 as a further interpolation disrupting the coherence of the passage. He therefore rejected Lachmann's suggested emendation - 'alteram agrestis; 〈agrestis〉, quod ...', arguing that 'huius soli' in lines 11-12 refers to '(soli) agrestis' in line 10.

However, I think that it is possible to retain most of the MSS text, and have translated accordingly. Frontinus is trying to explain that in territorial disputes the jurisdiction of communities is at issue, and expounds this by citing examples of public areas for which an urban community had direct responsibility and which would normally be inalienable, i.e., those inside the formal town boundary, and those in the countryside under the jurisdiction of the community. Augustus' speech presumably tried to emphasize the rights of existing communities in respect of these areas, despite which, in some cases, the allocation of land to a colony went right up to the walls of some municipia and even included part of the urban area. At lines 11-12 huius soli cannot refer only to solum agreste, as the example of Interamnia Praetuttiorum makes clear, and must also include solum urbanum.

Florus (2.9.27) includes 'Interamnium' among four splendidissima municipia whose land Sulla auctioned off, and this community is usually identified with Interamnia Praetuttiorum (see Brunt, IM, 308; Keppie, CSVI, 103, n. 13). The confiscation recorded by Frontinus seems to have been extensive, since Asculum received a part of Interamnia's urban area, and this may suggest a date after Philippi (see Keppie, CVSI, 180-1). For jurisdiction, see below, p. 362, n. 23; also Campbell, JRS (1996), 97-8.

Editors have wished to delete the bracketed material at C 6.16-17 and 18-20 on the grounds that they do not fit in with the line of thought and may be later glosses on the text. But exposition in the surveying texts is sometimes haphazard and we should not judge them by the standards of modern textbooks; if the comment on conciliabulum refers to Interamnia Praetuttiorum, it must be taken as a general reference to the community's early development.
19. This is one of several references in the Corpus Agrimensorum to public properties of the Roman people; see also Urbicus (C 39.43-41.8 = T 42.20-43.8 = L $82.24-83.5$ - river beds; C $45.30-4=$ T $48.8-12=\mathrm{L} 87.19-23-$ sacred groves);

Hyginus 1 and Siculus Flaccus (C 83.38-85.3 = T 79.5-16 = L 116.5-15; C 105.5-7 = T 100.15-19 = L 137.1-4 - captured lands); moreover, the land of the Vestal Virgins and priestly colleges was perhaps administered as public property (C $83.6-8=$ T 77.15-17 = L 283.18-20; C $85.16-20=$ T $80.7-13=$ L 117.5-11; C 131.8-13 = T $127.14-20=$ L 162.28-163.4).

It is possible that the term solum populi Romani (C 45.31-2) is a mere survival and that the effective management of this land had passed to the emperor, who in time came to treat it as imperial property. The agrimensores provide most of the evidence for land owned by the Roman people, and to them at.least it seemed an important definition although they were aware that the emperor himself owned landed property (e.g. C 43.28-9). Indeed surveying writers describe a society where land was in demand and individual property rights were jealously guarded by landholders; disputes were common, involving all kinds of land owners - communities, the Roman people, the emperor, and above all, private individuals (see in general, Campbell, JRS (1996), $90-4$ ). The limited amount of evidence for the survival of the public property of the Roman people in the imperial period is reviewed by Millar, $E R W, 621-3$.

The figure accompanying the text (Ill. $20=\mathrm{L}$ fig. $20=\mathrm{T}$ fig. 20) attempts to depict a river bed and woods belonging to the Roman people, combining them in one example, although the text treats them as separate cases. The farm is owned by one Septicius (fundus Septicianus), which is a common name in the Sabine country (see Dilke, Geog. Journal (1961), 424), although the exact location of Mount Mutela cannot be identified. The map shows the encroachment of Septicius' farm on the mountain and its woods which were the property of the 'res publica populi Romani'. A river flows down one side of the farm before making a sweeping right-hand turn; here is depicted the 'island of the farm of Septicius' (insula fundi Septiciani), cut off from the main area by another channel of the river (AB added to Ill. 20). Presumably this channel had dried up (though the map does not clearly distinguish between the river and the dry river bed), extending Septicius' land as the island was united with the main body of the farm. It is possible, however, that the author of the map was in fact thinking about a different problem, when a river left its course and flowed through someone's property, making an island between the new and the old course (see C 39.43-41.3). In any event, the legal questions were much the same; could Septicius appropriate the dried-up river bed, and did the island, if laid down by the river, belong to him?

At text, line 27, exclusae is Thulin's suggestion for the meaningless et divisi of the MSS. Lachmann suggested elisa ('the force of the current, compressed by the island in the way ...').
20. See pp. 345-6; and Campbell, JRS (1996), 82-3; 91-2.
21. Owners of tombs were principally concerned to protect their property from interference (FIRA ${ }^{2}$ III, 262-70), and ensure a right of way to the tomb and sufficient area for the performance of funerary offerings; a tomb might have an attached garden or enclosure sometimes protected by a wall (ibid., 271-3), although this area could not be used for any other purpose (Digest 11.7.12.pr.-1). See in general, Crook, Law and Life of Rome (1967), 133-8. The area of a tomb's enclosure was marked off by special stones (cippi) which surveyors had to distinguish from boundary markers (C $81.12-15=\mathrm{T} 75.17-20=\mathrm{L} 281.18-21$ ). On the other hand, a tomb itself could be
used to mark boundaries and might serve as a useful demonstration of a family's ownership of the land around it (C 221-3; 253.41).
22. For the legal process see Digest 39.3: '(This action) is applicable whenever water will probably cause damage to land through human agency, that is, when someone does something to make the water flow in a different course from that in which it is accustomed to flow naturally, if by directing its flow he increases its volume or rapidity or force, or if by containing it he makes it overflow' (3.1 - Ulpian). In Africa, however, problems arose when the water flow into someone's land was impeded (Urbicus - C $47.8-10=$ T $49.6-8=\mathrm{L} 88.26-8$ ). For the surveyor and the law, see Appendix 6.
23. For limites and the provision of access, see Campbell, JRS (1996), 84-5; note also Hyginus 1 (C 99.44-101.3 = T 97.23-98.5 = L 134.7-13); Siculus Flaccus (C 125.29-127.8 = T 122.18-123.18 = L 158.8-159.8).

C 9.17 secundum legem colonicam. In the early period, strictly speaking only the Roman people could decide on the foundation of a colony, its location, and the number of settlers. Therefore, normally a foundation would be preceded by an enabling measure, sometimes a law passed by the assembly. This process was often heavily influenced by the advice of others, especially the senate, tribunes of the plebs, and military commanders; for example, Livy (8.16.13-14) describes how Cales was founded after a proposal put by the consuls, followed by a senatorial decree; five maritime colonies were founded at the instigation of a tribune of the plebs (32.29.3-4). In the imperial period emperors will have decided as suited them.

By the term lex colonica Frontinus seems to have in mind a law containing some tralatician material, possibly based on previous experience of colonial ventures. Now, the agrimensores also refer to leges datae. A lex rogata was a law passed through the assembly, whereas a lex data was a law issued by a magistrate by virtue of his authority (cf. Crawford, Statutes, 5-7; Gargola, Lands, 80-2). In practice many of the detailed regulations affecting colonies and other communities will have been issued by founders or magistrates through leges datae. The full phrase may have been lex coloniae data, with one or other part left out; therefore there is probably no need to posit a general lex coloniae which was passed first, and to which material relevant to a particular settlement was added later. The leges datae will have taken account of general requirements, tralatician material, and local conditions, and could be emended subsequently by further provisions, or, in the imperial period, by letter or edict (Hyginus $1-\mathrm{C} 85.21-5=\mathrm{T} 80.14-19=\mathrm{L} 117.12-17$; C $85.36-9=\mathrm{T} 81.7-10=$ L 118.5-8; cf. C $85.40-87.25=$ T $81.11-82.23=$ L 118.9-119.19; Siculus Flaccus C $125.7-13=$ T $121.18-25=\mathrm{L} 157.11-17$; C $131.30-2=\mathrm{T} 128.14-15=\mathrm{L} 163.26-7$; C 131.45-133.8 = T 128.30-129.10 = L 164.14-24). It may be relevant to compare the formulation of the law of the municipium Flavium Irnitanum in Spain. Galsterer argues that this law was data in Rome by the emperor, and that it consisted of general clauses based on previous experience, to which was added detailed material relating to the specific community ( $J R S$ (1988), especially 89-90).
24. The title was added by Thulin. At this point in the MSS there occur two short passages which Thulin relocated ( T 14.22-15.4; 18.12-19.8); see further at C 11.44-13.2, and 15.22-33.

For C $9.28-38=\mathrm{T} 10.20-11.13=\mathrm{L} 27.13-28.9$, a page of MS A is missing and
the text depends largely on MS F. Lachmann used the edition of Scriver (1607), who had employed E , which is damaged, and a copy of F .
25. Cf. Varro, Ling. Lat. 7.7; Hyginus 2 (C 135.8-17); see also Diagram 9. Etruscan influence on Roman surveying is obscure, but the ritual definition of space was central to Roman life, in the practice of the haruspices and augurs, and should not be separated from the techniques of surveyors, who also sought to define space by lines. Although the activities may have developed separately, the Romans surely recognized the analogy, especially if land distribution began with the ceremony of taking the auspices (C 137.23-4); see Dilke, Atti del Congresso internazionale di studi varroniani (1976); Behrends, Feldmesskunst, 213-39; also Hübner, ibid., 140-71; and especially, Gargola, Lands, 42-50. For Etruscan boundary stones, see Clavel-Lévêque, Hygin, 3-5, n. 2.

At C $8.25\langle a b$ oriente $a d\rangle$ was a necessary addition by Lachmann to establish the orientation; at line 26, MS F has the meaningless quidam carpiunt architectum. Hyginus 2, in a passage of similar theme and wording has nam antiqui architecti ... (C 137.18-19 = T 134.18-19 = L 169.17-18).
26. Decumanus or decimanus (a later form) are adjectives derived from decimus (tenth). As part of surveying terminology decumanus (with limes understood) indicates one of the limites dividing individual centuriae. Siculus Flaccus explained the association with 'tenth' on the hypothesis that limites marked off a length of ten actus, which he apparently associated with the distribution of agri quaestorii, blocks of fifty iugera measuring ten actus square (C 103.39-105.3 = T 100.10-13 = L 136.17-19; C 119.44-5 $=\mathrm{T} 117.9-10=\mathrm{L} 153.11-12$ ). This explanation is unconvincing, mainly because it is unlikely that land division in squares of fifty iugera was common enough to have influenced the terminology in this way. Dilke ( $R L S, 231-3$ ) plausibly suggests that decumanus retained the meaning 'huge' common in early Latin (see Paul. Fest. p. 62L), in the sense that the decumanus, as the wider of the two limites designating a centuria, was a 'wide road'.

At C 9.41 and 42 I have accepted Thulin's deletion of et duoviginti and et viginti on the grounds that they were glosses designed to explain duo[de]cimanus and decimanus. C 9.45 is also probably a gloss.
27. Archaeological investigation in the ager Campanus has confirmed that around Capua the decumanus runs from north to south. It has been suggested that, since the decumanus was the wider of the two limites and since the orientation was based on Capua itself, the surveyors aimed to exploit the wide main road running south from the city; see Castagnoli, Le ricerche, 26-7; BCAR (1946-48); Dilke, RLS, 207 (= Plate VI below); Johannowsky in Zanker (ed.), Hellenismus in Mittelitalien (1976); Bencivenga, RAAN (1976); Vallat, MEFRA (1979); MEFRA (1980); Misurare, 222-6; Arthur, Northern Campania (1991); the most wide-ranging study of the texts in conjunction with the archaeological evidence for the ager Campanus is found in Chouquer, Structures agraires, especially 199-231; 298-314; Chouquer, LAR, 116-17; for social and economic conditions in Campania, see Frederiksen, Campania (1984), chs 12-13. See further below, pp. 413-27.
28. The location of the ager Uritanus in Gaul is obscure.
29. Fanum Fortunae lies on the coastline of Umbria south of Ariminum and close to the mouth of the river Metaurus as it flows down from the foothills of the

Apennines. It exactly fits the terms 'sea' and 'mountain' ascribed to its limites. The Via Flaminia passes through the town before turning north-west on its way to Ariminum. Fanum was given the title Iulia and raised to the status of a colony by Augustus with the settlement of veterans; in A.D. 9-10 a monumental arch was dedicated on which is recorded the emperor's gift of a circuit of walls (ILS 104); he may also have contributed to the construction of a basilica, which was planned and supervised by his protégé Vitruvius, and laid out in such a way as not to obstruct the view of the temple of Augustus (De Architectura 5.1.6). See further Alfieri, RSA (1976-7), who suggests that the colony's land embraced about 48 centuriae of 200 iugera. There are traces of subdivisions within centuriae, producing squares of 50 iugera. It is not safe to assume, however, that this was the allocation for each settler (i.e. only 192 veterans). It is possible that the squares were further subdivided to provide smaller allocations, so allowing for the settlement of more veterans; on the other hand, land may have been set aside for public areas and common pasture. See p. 349, n. 55.
30. At text, line 16, MSS AE have figuram similem, which appears to stand in place of a figure. This may have been an interpolation of a later editor and does not prove that Frontinus' original text was illustrated.

For the size of centuriae and allocations, see below, p. 339, n. 30. See Diagram 2 for the measurements cited.
31. In MSS AGF this paragraph appears at the end of the section De Controversiis (C $9.26=\mathrm{T} 10.18$ ). Thulin believed that it had been erroneously placed there because some of the words in the first sentence were similar to the phraseology of the last part of De Controversiis (C 9.23 = T 10.14-15 - 'quod ad solum non pertinet'). However, the passage hardly suits its present location, since, although it starts by referring to the characteristics of limites, it goes on to describe territorial definitions, whereas the preceding section deals with the origins of limites and methods for establishing them and making measurements. The paragraph more properly belongs with the material treated in De Controversiis. Frontinus perhaps meant it to be an endnote, indicating that limites mark boundaries and designate areas of land, the true status of which is sometimes a matter for the law, not surveyors, to determine. On the other hand, if it is right that the fragment has been misplaced (its opening sentence may have been wrongly attached), it could be relocated at $\mathrm{C} 7.26=\mathrm{T} 8.6$, in the section dealing with ius territorii, where it would pick up the solum discussed at $\mathrm{C} 7.11=\mathrm{T} 7.6$. This is entirely speculative.

At C $13.1-2=\mathrm{T}$ 15.3-4, Thulin wished to delete this phrase on the grounds that it had been added spuriously to link this fragment with $\mathrm{C} 15.22=\mathrm{T} 18.12 \mathrm{ff}$., which in his view had also been misplaced in the MSS; see n. 40.
32. This title was added by Thulin, noting references to treatises on land measurement in Urbicus' De Controversiis Agrorum (C $21.43,45=$ T $25.6,9=$ L 64.13-14, 17), which is heavily dependent on Frontinus' work. However, this passage almost certainly concerns material written or collated by Urbicus himself, and does not necessarily refer to Frontinus. Furthermore, Frontinus' short account (C 13-15 = T $15-19=$ L 31-4) seems to be narrowly directed at land measurement in certain areas with uneven boundaries, and the measurement of horizontal distances in sloping terrain.
33. For help with this section (C $13-15=\mathrm{T} 15-19=\mathrm{L} 31-4$ ) I am very grateful to

Dr F. T. Hinrichs who sent me an early version of his paper delivered to the Agrimensores-Colloquium in Wolfenbüttel (now published in Behrends, Feldmesskunst, 348-74) and offered subsequent advice; cf. also Institutionen, 99-105 (though with several misprints). His analysis has been very helpful, although I have been unable to accept all his suggestions. For further discussion and criticism I am greatly indebted to Professor Michael Crawford and members of the London University Ancient History Seminar.

Frontinus is here describing the measurement of an area with a curving uneven boundary. The argument runs as follows: the purpose is to measure straight lines as close as possible to the uneven perimeter, and from these right-angled triangles can be constructed to measure irregular areas ( $\mathrm{C} 13.4-19=\mathrm{T} 15.6-16.4=\mathrm{L} 31.12-32.6$ ). But this is only one theoretical approach and it cannot always work, because obstacles such as mountains and valleys prevent the measurement of straight lines. The ferramentum should be used to deal with all problems (of uneven boundaries and obstacles) and produce accurate measurements in all circumstances (C 13.20-8 = T 16.5-14 = L 32.7-15). The surveyor, using the ferramentum, goes round the entire site and places markers, which help to establish a measured area with straight lines (C 13.28-45 = T $16.14-17.9=\mathrm{L} 32.16-33.13$ ). But how in practice does the surveyor deal with physical obstacles blocking the measurement of straight lines? (C 15.1-4 $=$ T 17.10-15 = L 33.14-18). He must employ the process of measuring horizontal distances (cultellare) (C. $15.22-33=\mathrm{T} 18.12-19.8=\mathrm{L} 26.11-27.12$; for the position of this paragraph, see n .40 ), and for the sake of an example this can then be applied to the case of a wide valley ( $\mathrm{C} 15.5-15=\mathrm{T} 17.16-18.5=\mathrm{L} 33.19-34.7$ ) or a narrow valley ( $\mathrm{C} 15.16-21$ $=\mathrm{T} 18.6-11=\mathrm{L} 34.8-13$ ).

At C $13.13-17=$ T 15.15-19 = L 31.20-32. 1, Frontinus refers to the measuring of straight lines as close as possible inside the irregular perimeter (lines 8-9 'agrum quo usque loci positio permittet'), in order to produce a regular shape, the area of which can be measured (see Diagram 3, ABCD). The next steps involve the dropping of perpendiculars from the straight lines that make up the central area to the curving perimeter lines; then straight lines are measured round the curving perimeter to create an angular outline, and in this way the surveyor can produce a series of right-angled triangles. Through these he can approximately calculate the area of land between the uneven perimeter and the figure ABCD and by adding the area of $A B C D$ can calculate the area of the entire piece of land.

There are many textual problems. At text, line 7, A has sol, corrected to soli immobile by $\mathrm{A}^{2}$, E soli. With hesitation I have accepted soli ('of land'). Scriver (in his edition of 1607) suggested sola, which would presumably refer to locorum in line 2, taken as neuter plural ('by themselves, they (the sites) have ...').

At text, line 11, MS A has procentemato and MS E proextimato, which seem meaningless. Scriver suggested aestimato, but it is very hard then to explain how MS A became corrupted to the more difficult reading procentemato. I have therefore accepted the emendation of Lachmann (followed by Thulin): praecenturiato, which presumably would refer to measurement akin to the measurement of centuriae, i.e., with a regular outline. At text, line 11 I read similem (agreeing with obliquitatem, understood) for simile of MS AE. At text line 10 I retain coherentem of MSS AE with the minor correction to cohaerentem; there is no need for Lachmann's supplement
lineis, since mensuralibus statutis can be taken as neuter plural -- 'fixed elements of measurement'.

Hinrichs, however, argues that Frontinus' words were seriously distorted by the later compilers of the Corpus, who did not understand some of the procedures involved, since they had fallen out of use. He suggests the following text:

> ex quibus proximam quamque extremitatium obliquitatem per omnes angulos facta normatione complectimur et cohaerentem mensuralibus statutis certo procentesimato spatio similem futurae tradimus formae. modum autem intra lineas clusum rectorum angulorum ratione subducimus. subiectas deinde extremitatium partes ad rectum centesimum nostrarum postulationum podismis suis adaeramus et adscriptis spatio suo finibus ipsam loci reddimus ueritatem.

He explains this on the hypothesis that at lines 12ff. Frontinus is referring to a system for drawing the land to a prearranged scale so that it can be entered on the map with the appropriate dimensions. He therefore would translate: 'We transcribe it on the intended map as a coherent area in an accurate representation corresponding to our measuring instructions to an established scale of 1 to $100 \ldots$ We then record the adjacent parts of the perimeter in the correct scale of 1 to 100 according to our requirements ...'

These suggestions, however ingenious, remain unconvincing, partly because the proposed emendation to procentesimato produces a word which is not attested, though 'milites ... centesimavit' appears in the Historia Augusta, Opil. Macr. 12.2, 'he executed every hundredth soldier'. Moreover, in a passage devoted to the measurement of land of uneven boundary, it seems odd that Frontinus should introduce the question of scale in this way, a concept not otherwise mentioned except through another emendation at C 35.33 (see ad loc.).
34. At text, lines 13-14, MS A has adrectamgentium, with a suprascript correction of $n$ above the $m$ of rectam; E has are tangentibus. There have been many suggested emendations: Hinrichs (see note 33); Lachmann, followed by Thulin, accepted Scriver's areas tangentium, which I interpret to mean: 'areas which our requirements touch', though this seems obscure. The general sense of the passage is that once proper surveying principles had been applied to the irregular areas of the perimeter, the dimensions should be recorded. My printed text makes a small and readily explicable change to the reading of MS A (ad rec $\langle$ ta $\rangle$ tangentium ...), and I construe as follows: tangentium agrees with extremitatium and governs ad recta nostrarum postulationum, which refers to the rectangular figure constructed at the start of the measuring process. 35. At text, line 22, MS A has 'quae potius actus incessae imilitationis ( F incensiti imitationis) effectum laterum longitudines aequeet ferramento ...'. Lachmann emended to 'qua potius actus incessus limitationis effectum laterum longitudine aequet; ferramento ...'. I have accepted this, understanding limitatio to mean the plotting of regulated straight lines; incessus (genitive singular) will refer to the course of the measuring process. The general sense seems to be that the surveyor had to measure round an obstacle by establishing accurately measured straight lines and creating a kind of figure, possibly involving right-angled triangles. It is difficult, however, to extract this range of meaning from the text, even with the emendations suggested by Hinrichs (op. cit. (n. 33), 353-4): 'quae potius atque in assimilationis effectum laterum longitudines aequet, et ferramento ...' (see also Diagram 4).

The ferramentum or groma was the most common surveying instrument, used for plotting straight lines and right angles. Parts of one were discovered in what seems to be a surveyor's workshop at Pompeii; it consisted of a metal base and a wooden pole, to which was attached, possibly by a curved angle-bracket, a cross set horizontally; from each arm of the cross was suspended a plumb line; for the groma, and other surveying instruments in less common use, see Dilke, RLS, 66-81; ANRW (1974), 569-73; Adam, MEFRA (1982); Bouma, Marcus Iunius Nypsus (1993), 92-3; also Diagram 18. Recent analysis of the archaeological remains of the groma at Pompeii has suggested that there may not have been a curved angle-bracket, and that the cross was attached directly to the top of the pole, permitting easier sighting; see Schiöler, Analecta Romana (1994).
36. At text, lines 23-4, MSS AF read 'et omnia indomita perpenso dirigere, cuius ex omnibus corniculis expensa ...'. For the meaningless indomita and expensa Lachmann suggested momenta and extensa. For cuius he suggested oculo, which must be taken with perspicere ('to sight'). I have followed this version in my translation.

At text, lines $25-6$, MS A has: 'donec proxima consumpto alterius visu. sola si mentiatur'. I have accepted Lachmann's corrections (printed in the text), though it is also worth mentioning Hinrichs' suggestion: 'proxima ... visu sola sentiatur'.

Frontinus seems to be emphasizing that a surveyor should obtain the correct direction of a measured straight line by using the ferramentum at all bends or obstacles and establishing a right angle at the point of intersection, so providing for the continuation of the line (see Diagram 4).
37. Frontinus here returns to the measurement of perimeter areas of uneven boundary; he assumes that the measurement of a central area has already been accomplished; this is the primus rigor of his description. The markers at the corners of the perimeters were to be joined by a straight line, which involved the dropping of perpendiculars and the creation of right-angled triangles (see Diagram 5). This would be the final part of the process, for their measurement had to be brought into correlation with the central measured area (C 13.40-1). At text, line 32, I accept Lachmann's correction proximo ('the next side' - i.e. to the first rigor) for the reading of MSS AF: maximo lateri. Frontinus seems to mean that a second rigor was plotted at right angles from the central measured area, first to the closest marker on the perimeter. Then a further line was measured at right angles to a mark, so as to be parallel to the original rigor. This process could then be continued round the perimeter. See also Hinrichs, op. cit. (n. 33), 355-6, who accepts, however, the MSS reading maximo lateri (presumably 'the longest side', i.e. the most distant marker, indicating the furthest extent that had to be measured).
38. At text, lines 6-9, MS A has: 'cuius rigoris incensum ut sis in contrario (se in contrario F) aeque adflectante linea (adflicta ante F) ad capitulum perticae aequaliter ad perpendiculum cultellare debemus nam et perpensum rigorem extendere linea in quam (lineam in qua F ) cultum locum perpendiculis adsignant (adsignatus F )'. I have accepted some of Lachmann's corrections, but he suggested (followed by Thulin): 'tum ad permensum rigorem extendere lineam quam in cultrum locatam perpendiculus adsignat'; Rudorff (in Lachmann, Feldmesser II, 340) interpreted in cultrum locatam to mean a shape like a half-opened penknife, i.e., right-angled ('... then extend to the measured rigor the cord which a plumb line ensures is at right-angles').

This interpretation of in cultrum locatam seems obscure, and it is curious that at OLD (p. 466, s.v. culter, 3) 'in cultrum (col)locare' is cited as if it were part of the original Latin text. The other examples cited of this usage (Vitruvius, De Arch. 10.5.2; 9.2) are not clear-cut, and the first seems to mean 'set on its edge'.

A further difficulty is the meaning of the word linea at line 7. I interpret my printed text and translation as follows: if we take linea to be a cord attached to the top of the pertica serving as a temporary perpendicular, we can explain Frontinus' system as follows. At each marker on the intended course of the rigor on the sloping side of a valley (sighted from the ferramentum), a surveyor's measuring pole (pertica) was set up horizontally with a cord (linea) attached to its end and kept at right-angles by a plumb-bob; this acted as a perpendicular, and where it touched the valley-side another pole was set up and the process repeated, so enabling the rigor to be plotted accurately segment by segment (Diagram 6a; see also Dilke, GRM 99, fig. 16(a); Misurare, 134-5, where, however, linea is wrongly represented as a pole). In this I translate aequaliter as 'consistently' or 'uniformly', and take it with ad perpendiculum cultellare debemus.

It is possible, however, to translate aequaliter as 'horizontally', and take it closely with linea. This would suggest that when the pertica was set up horizontally, the linea was attached to it by a surveyor's helper, who stretched it out horizontally; from the tip of the linea a plumb-line was then dropped to the valley-side, and so on (Diagram 6b). This procedure seems cumbersome, and difficult to carry out in very rough or steep terrain.

Hinrichs (op. cit. (n. 33), 357-8) argues that linea refers to a cord stretched out along the ground to preserve the rigor, which is measured by the horizontally held pertica. Otherwise, it would be difficult to keep in sight the surveying marks, spread out through a large valley (Diagram 6c). However, I find it difficult to extract this range of meaning from Frontinus' words, and in any case there would be no need for the surveyor to keep all the markers in sight if each step were carefully plotted.

Moscatelli (RSA (1979)), expressing doubts about Hinrich's interpretation (as expressed in Institutionen, 105-6), also noted that the pertica, used in the ways described above, would not make a very effective implement for its intended purpose. He thinks that when the terrain prevented the surveyor from seeing the marks normally employed, because they were below the sight line of the ferramentum, the pertica was set up vertically as a ten-foot high pole and the linea was attached to the top of it. The surveyor could sight along the linea (the other end of which was attached to a mark near the ferramentum) and bring it into alignment with the rigor already established. A plumb-line attached to the top of the pertica would allow a mark to be set up beside it, and so enable the continuation of the rigor to be marked on the ground (Diagram 6d). Moscatelli's hypothesis has some merit, though it is difficult to see why in this system the surveyor could not simply have used tall poles without the linea.

At text, line 11, MS A has: 'non minus fit distendi quam si iacentia quam compressiorem autem vallem ...'. Lachmann suggested: 'non minus fit dispendi quam si iacentia sequamur. Compressiorem autem vallem ...' However the meaning of this remains obscure. I have printed Hinrich's emendation, and interpret this to mean that when a rigor was measured and plotted on sloping and uneven ground without the use of a plumb-line, over a long distance the positioning of the markers could only be
approximate and so the rigor would go out of alignment, just as if the measuring rods had been laid flat on the ground; on uneven terrain this would not allow accurate measuring.
39. At text, line 14, MS A has: 'et pensis caelium (perpenso celi F) rigorem (rigore F) ...' I have followed Lachmann's emendation: 'et perpenso coeptum rigorem', and take perpenso to agree with ferramentum understood from line 9 ('the ferramentum having been carefully balanced'). See Diagram 7. Hinrichs, op. cit. (n. 33), 359, suggests that the original text was: 'et perpensum caeli rigorem', meaning the imaginary extension of the rigor or 'bee-line' across the narrow valley (see also Diagram $6 \mathrm{c})$. But he cites no parallel for this usage.
40. This fragment ( $\mathrm{C} 15.22-33=\mathrm{T} 18.12-19.8=\mathrm{L} 26.11-27.12$ ) originally appeared in the MSS with C $11.44-13.2=\mathrm{T} 14.22-15.4=\mathrm{L} 26.5-10$ (see ad loc.) at the end of De Controversiis ( $\mathrm{C} 9.26=\mathrm{T}$ 10.18). Thulin believed that it did not fit there and inserted it where it now stands. But this general reflection on cultellatio is inappropriate at this point, since the whole process has already been discussed. Perhaps it should be transferred to C 15.4 . Then the run of thought would be: the measurement of straight lines is essential for the calculation of the area of any site; the surveyor must deal with all obstacles; the general principle of measuring horizontally is applicable in dealing with certain types of obstacle; specific examples of valleys. On the other hand, the fragment has an illustration (Ill. $33=\mathrm{T}$ fig. 33) and may originally have been part of a separate illustrated treatise on measuring horizontally to establish area in sloping or uneven ground; the surviving part of De Arte Mensoria is unillustrated.

At text, line 19, MS A has: 'omnis enim illa soli inaequalitas re colligi poterit ...'; F: 'omnis enim illa soli inaequalitas colligi non poterit'. Lachmann suggested quare for $r e$, and printed a question mark after nascatur. Thulin preferred: 'non enim illa inaequalitas recte colligi poterit ...'. I prefer to retain re and accept F's colligi non poterit. The point is that plants helped establish the principle of measuring uneven areas. Frontinus seems to mean that the nature of growing plants demonstrates the principles of using the plumb-line, since plants grow up straight into the air even from sloping ground, just as a plumb-line is dropped straight to it. If trees or other plants on mountains (presumably an example of an obstacle to measuring straight lines) grew in orderly rows, it would be possible to calculate approximately the area they occupied.

# COMMENTARY - AGENNIUS URBICUS 

(TRANSLATION pp. 17-19)


#### Abstract

SUMMARY C 17.1-21.38 - analysis of dialectical methods, theoretical definitions, broad definition of land disputes and duties of the surveyor C $21.39-23.20$ - previous works on the subject, importance of geometry C 23.21-25.19 - categories of dispute and importance of boundary and site C 25.20-27.39 - more theoretical definitions and distinctions in disputes C 27.40-33.38 - disputes relating to boundaries, site, area C 33.39-35.46 - checking evidence provided by maps, the example of Lucus Feroniae C 37.1-45.46 - disputes relating to ownership, possession, subseciva, rivers, territorial rights, public places, places left out and not enclosed, sacred and religious places C 47.1-47.27 - drainage, rights of way C 47.28-49.4 - surveyor's role as expert, either in adjudicating or in presenting evidence in court.


1. For Urbicus, see pp. xxi-xxiii. Lachmann attempted to distinguish precisely Urbicus' words and those taken from other sources, in his view mainly Frontinus. Thulin was more cautious but nevertheless put what he thought were Urbicus' words in small print. I have adopted this method in the Latin, though the text in normal print should be taken, not as the exact words of Frontinus, but as something derived from Frontinus, perhaps overlaid with other material. Particular points of difficulty are noted in the commentary. The illustrations are taken from MS A.
2. For the fragmentary beginning of the text, and the rearrangement by Lachmann and Thulin, see p. xxxi and n. 77; p. 359, n. 8. At text, line 7 I print ornatum instead of MS B's ornatam.
3. At C $17.9-29=\mathrm{T} 20.9-21.9=\mathrm{L} 59.8-60.4$, I have accepted the minor corrections adopted by Lachmann, though at text, line 14, I suggest set for et of MS B. The mention of Reason and Providence may suggest Stoic, or possibly Neoplatonic, influences in this passage, though it is difficult to detect the intellectual origins of Urbicus' truncated commentary. He seems to mean that the process of reasoning, with its clear objectives, definitions, and parameters, is essential for surveying. It is Reason that teaches us how to analyse sounds and relate them to the meaning of words, and how to define consistent letter forms, so that we can understand the written word. Similarly, Reason teaches us to understand the relationship between numbers. Man is connected with Reason, but it is not inherent within him. Its development is assisted by external factors governed by Providence, and sustained by careful training and nurturing in childhood, through which Reason can be fully liberated to work within us for our greater understanding, ensuring that we realize the mind's potential but also distinguish wrong opinions. At text, line 19, for semotior of MS B I accept semotiore suggested by Lachmann.
4. In the nominative plural: $\alpha \boldsymbol{\alpha} \tau \iota \chi \theta$ óves (the southern hemisphere); $\alpha$ 人vtıлódes (the Antipodes).
5. For the measurement of shadows, see Hyginus 2 (C 147.18-19 = T 148.10-11 $=$ L 184.13; C 149.8-151.26 = T 150.12-154.11 = L 187.1-191.11).
6. At this point in the original order of the manuscript (B 91) occurs the subscript: EXP LIB.
7. At text, line 1, MS B has aiugerum, which Lachmann corrected to ager est.
8. At text, lines 4-5, MS B reads: 'At si ad provincias respiciamus, habent agros colonicos quidem iuris, habent et colonicos stipendiarii qui sunt in communem, habentem et colonis stipendiarios'. Immunes is generally accepted in place of in communem. In my translation I have followed the suggestions of Thulin, who argued that 'habent et colonicos stipendiarii' (line 4) was a gloss originally intended to explain the corrupt text in line 5 . On this interpretation, Urbicus makes no explicit reference to the ius Italicum, though he may be held to imply it through immunes (see below).

However, Rudorff and Lachmann suggested: 'At si ad provincias respiciamus, habent agros colonicos eiusdem iuris, habent et colonicos qui sunt immunes, habent et colonicos stipendiarios'. On this version Urbicus appears to make a distinction between colonial land enjoying rights like those in Italy, i.e., the ius Italicum, colonial land that was exempt from tax, and colonial land that paid tax.

Note that at text, line 6, Thulin (T 23.13) prints with a full stop: peregrinarum. Et stipendiarios ... . This is unnecessary and disrupts the run of the sentence.

For discussion of ius Italicum, see RE X cols 1238-53 (A. von Premerstein 1917); Sherwin-White, Roman Citizenship ${ }^{2}$ (1973), 275-7; 316-22; Hinrichs, Institutionen, 147-57; Watkins, CJ (1983); M. Malavolta s.v. ius Italicum, in Diz. Epig. IV fasc. 73-4 (1985), 2333-9. Since 167 b.c. Italian land had not been subject to tax, while provincial land, whatever its status - colony, municipium, or non-Roman community - was subject to tributum soli; in certain provinces there was also a poll tax, tributum capitis. However, members of communities granted the ius Italicum had a privileged status, identified with that of citizens in Italy in respect of civil law and personal rights. A list of communities with ius Italicum is given by Ulpian and Paul (Digest 50.15.1; 8). Paul makes a contrast between Tyre, which had the ius Italicum, and Antioch, which was granted colonial status without compromising its payment of tribute, salvis tributis; this suggests that a grant of ius Italicum brought with it exemption, immunitas, from the land tax, and also the poll tax (cf. 15.8.7). At 8.1 Paul indeed seems to use immunes as an alternative to 'those with the ius Italicum', and it may be that the ius could not be granted without tax exemption (it was, however, possible for communities to have certain exemptions without having the ius Italicum). This would suggest that it was a comparatively rare honour, and that the financial benefits were of great importance. However, communities will also have valued the added status and the clear expression of imperial goodwill. Watkins (op. cit.) argues that between A.D. 14 and 117 there were more colonies with the ius Italicum than we hear about, and that indeed all duly founded colonies of Roman citizens had the ius. But there is no evidence for such a specific connection, and the arguments for identifying individual colonies with ius Italicum seem entirely conjectural.

The ius Italicum may have originated in the early imperial period. For example, communities of dispossessed veterans of Antony settled by Augustus at Dyrrhachium and Philippi held it (Dio 51.4.6; Digest 50.15.8.8). But it is possible that the grant of
ius Italicum was made much later to these communities, or that the meaning of the term had changed by the time Ulpian wrote. Sherwin-White (op. cit., 317-18) suggested that these displaced settlers simply received all their former rights as Roman citizens of Italy. The Elder Pliny refers to ius Italiae in respect of veteran colonies in Spain (NH 3.25), and the ius Italicum as a privilege held by certain Liburnian communities in Dalmatia (ibid., 139), but without defining the expressions. Sherwin-White (op. cit., 318) conjectures that the Liburnian communities had received citizenship along with the adjacent region of Transpadane Gaul in 49 b.c., and were allowed to retain this status (described as ius Italicum) when Augustus' organization of the Italian regions placed them outside the formal boundaries of Italy.

Indeed the ius Italicum seems to have developed gradually during the early Principate and was not a single creation of Augustus or any other emperor. Originally occurring in varying circumstances, it perhaps did not receive a precise definition, at least until the second century. It was a privilege conferred on colonies, though perhaps not exclusively, as suggested by Urbicus (see Sherwin-White, op. cit., 318, n. 2, for the uncertain cases of Stobi, and also Selinus Trajanopolis, which apparently received the ius Italicum to commemorate Trajan's death in the city). At all times the grant of ius Italicum was on the initiative of the emperor, and, being associated with the status of colonia civium Romanorum, was the most important mark of privilege awarded to a community. So, it is not surprising that it could be closely linked with politics. For example, Septimius Severus gratefully extended the ius Italicum to a number of communities that had supported him in the civil wars in 193-7.
9. In private law, certain legal actions were effective only in respect of Italian, not provincial land. The most notable of these were mancipatio - the formal conveyance of ownership by a legal formula in front of witnesses, the property transferred being res mancipi; in iure cessio - a legal fiction of a trial before a magistrate for formal transfer of ownership ex iure Quiritium; usucapio - a process by which ownership of an object, moveable or immoveable, could be attained by possession of it for an amount of time fixed by law (Gaius, Inst. (De Zulueta (1953)) 2.14a-15; 22; 24; 27; 31; 46; 63 (on the alienation of land acquired through a dowry); Tit. Ulp. 19.1; 3-4). Dominium ex iure Quiritium was ownership acquired by a Roman citizen, according to the ius civile, of things that could be in private ownership (Gaius, Inst. 2.40-4; 4.36).

Urbicus at C 21.7-12 = T 23.13-18 = L 63.1-6, perhaps uses nexum loosely to refer to mancipatio (cf. Gaius, Inst. 2.27 - nexum was an old term for mancipatio), and is presumably referring to the inapplicability of some types of legal action in respect of land in the provinces. Lands could of course be acquired by the informal process of traditio (see Digest 41.1 .31 pr.), although that did not transfer ownership, dominium. See also below, n. 27.

Gaius (Inst. 2.7) held that provincial land was under the ownership, dominium, of either the Roman people or the emperor; in the case of the former the land tax was called stipendium, in the case of the latter, tributum (ibid. 2.21). However, Jones (JRS (1941)) argued that the doctrine that the ownership of provincial land was vested in the Roman people or the emperor, though legally valid, was relatively unimportant in terms of government policy, and had been adduced by lawyers to explain the absence of dominium in private law in provincial land. In his view, provincial land that was not actually ager publicus was subject to local law, where formal Roman legal pro-
cedures were unsuitable, but where traditio would be suitable since it was part of the ius gentium (the law common to all peoples); see also Grelle, Index (1990).

At C $21.12-13=\mathrm{T} 23.18-20=\mathrm{L} 63.6-7$, Urbicus is referring to the fixing of boundaries by those in possession of the land, as is confirmed by debere eos discretum finem habere, not the legal process of vindicatio (an action for the recovery of property), as Buckland (TRL, 190) mistakenly supposed.
10. Cf. Digest 39.3.
11. Lachmann attributed to Frontinus all the text at C $21.29-38=\mathrm{T} 24.17-29=$ L 36.24-37.8, except C, lines 34-7. Thulin thought that lines $17-22=\mathrm{C} 29-33$ could be ascribed to Frontinus. But if Frontinus is to be identified with the distinguished consular (see above, pp. xxxvii-viii), it is very unlikely that he can be the author of any of this. As a Roman senator he surely could hardly speak of surveying as a profession in which he himself could participate, or even appear in court to present evidence. Surveying, despite its increasing importance, continued to be practised by men outside the senatorial and equestrian classes (see pp. xlix-li).

Urbicus is here explaining that the role of a surveyor is necessarily limited to the exposition of certain technical aspects of a legal case, and that he must not become involved in matters that are properly the concern of a judge.
12. In the obscure passage at $\mathrm{C} 23.14-16=\mathrm{T} 25.23-6=\mathrm{L} 65.5-7$, Urbicus seems to be referring to the ability of geometry to assist in the resolution of problems beyond its immediate intellectual origins, e.g. through measurement and survey, by means of regular geometrical figures.

At C $23.21=\mathrm{T} 26.3=\mathrm{L} 65.12$, Thulin believed, on the basis of $\mathrm{C} 21.27=$ T $24.13=\mathrm{L} 63.23$, that a list of the types of dispute had been lost, and that C $47.28-49.4=\mathrm{T} 49.26-51.3=\mathrm{L} 89.25-90.21$, wrongly placed by MSS AB as an epilogue, should be included here; see further pp. xxxi-xxxii.
13. Urbicus employs a number of technical terms some of which do not appear elsewhere in the surveying texts. It is difficult, therefore, to evaluate their exact significance, and some of the definitions seem artificial. I have attempted to preserve consistency in translation:
condicio - category
effectus - procedure (of a dispute; i.e. the circumstances or methods involved in resolution of a dispute)
genus - kind
qualitas - type
status - condition(s) (of a dispute; i.e. a way of defining a dispute according to its essential characteristics)
transcendentia - the progression or movement (of a dispute; i.e. a change in the type of argument relating to the dispute, perhaps involving a new status).
14. That is, they embrace the basic subject matter or causation from which land disputes arise.
15. For the Lex Mamilia, see pp. 321, n. 11.
16. At $\mathrm{C} 25.7-10=\mathrm{T} 27.12-15=\mathrm{L} 66.22-5$, Urbicus may be contrasting the limes, which, marked between two straight lines (rigores), has width or substance (up to 40 feet), and a single rigor, which has no width. The argument is that even a single line with no thickness, which divides a single entity into two and therefore performs
a function, has an existence. So, we need to think about three things: the dividing line, and the two parts into which the single entity has now been divided.

At lines 13-14, Urbicus seems to be arguing that anything on earth must be solid to be capable of division. In Siculus Flaccus (C $107.14=$ T $103.18=$ L 139.18), versura means a turn, or an angle, and it can mean the turn at the end of a furrow (Columella 2.2.28). I have followed this in my translation on the hypothesis that 'angles' are key points in a boundary, but versura might possibly be taken as an 'open field', a meaning cited by Niermeyer (1976), quoting a Lombard charter of 729 from Novara (Codice diplomatico longobardo, ed. L. Schiaparelli (2 vols, Rome, 1929, 1933), (Fonti per la storia d'Italia, 62, 63), I, no. 44, p. 148). Urbicus apparently envisages a boundary made by a very narrow furrow, which is at a lower level than the land on either side, perhaps because it has been set up in a ditch or depression; therefore the line of the furrow is presumed to be extended upwards to the level of the land, providing a clear edge for the fields.
17. At C 25.19, I have accepted Lachmann's suggestion of a lacuna, in which Urbicus presumably treated locus, the second of the two basic causes of disputes.

C $25.20-27.38=$ T $27.28-30.10=\mathrm{L} 67.16-70.9$ contain a long theoretical analysis that seems to be largely the work of Urbicus. Disputes were grouped according to their condition (status), that is, the factors, circumstances, or parameters, both legal and technical, that defined the nature of a dispute. The effectus was the procedure used to analyse a dispute and effect its resolution. So, in defining a dispute, a true statement of the appropriate status allows a progression (transcendentia) from incorrectness and obscurity to correctness and clarity, by means of the right procedure. But if a dispute is incorrectly defined with an inappropriate status, the progression will produce the opposite effect.

The effectus are: coniunctiuus, disiunctiuus, spectiuus, subiectiuus, expositiuus, reciperatiuus (for Urbicus' explanation of these, see C 27 ).

The status are: assumptiuus generalis (condition of extraneous arguments boundary stones), initialis (condition of beginning - rigor), materialis (condition of material - boundary; site), effectiuus (condition of implementation - area; ownership; possession; subseciua; alluvial activity), iniectiuus (condition of placing a claim on - territorial rights; public places; places left out and not enclosed; sacred and religious places; rain water; rights of way).

Urbicus follows Frontinus in taking boundary and site as the basis of all land disputes. In Frontinus, however, the position of boundary markers is listed as one of the fifteen types of dispute, not connected specifically with either boundary or site, whereas Urbicus treats it closely with these disputes, in which it seems to be subsumed as a kind of essential preamble. Urbicus' theoretical approach in this section, which seems over-schematic and artificial, is divorced from the reality of land survey as it appears in Frontinus and other writers. Moreover, he is inconsistent, and at one point he virtually equates the effectus subiectiuus (C $27.13-15=\mathrm{T} 29.12-14=\mathrm{L} 69.8-10$ ). with a transcendentia ex uero in falsum (C $25.22-6=$ T $28.3-5=\mathrm{L} 67.21-3$ ), even using similar language. Either this is a careless oversight, or Urbicus has failed to master conflicting theories which he may have found in his sources.
18. Omitted in error by Thulin (cf. L 68.18).
19. In this obscure section Urbicus is arguing that it is not always possible, or easy,
to apply and maintain transcendentiae, which are closely associated with the procedures (effectus) for resolving disputes. The crucial point is that, if the condition of a dispute is changed without adequate justification, it can be very difficult to achieve a resolution since the procedure will be flawed and unsustainable.
20. The title was added by Lachmann; at this point he also added a passage from the Commentum (C 59.15-31; 34-9 = T 58.31-59.18; 21-6 = L 70.18-71.9; 71.11-16); this derives from his argument that it is possible precisely to identify Frontinus' words, and that a second book of his treatise can be constructed; the grounds for this are insubstantial (see pp. xxviii-xxix).
21. At C 26.35 , for possessionum of MS B I have accepted positionem, suggested by Goesius (edition of 1674), and at C 28.1, sit, taken from Arcerius' copy, for B's sed.
22. At text, lines $3-4$, MS B reads 'inperitia artificis alia uerentur non putant rationi inesse ordinem', which is difficult to construe; the printed text incorporates emendations suggested by Lachmann and Thulin.
23. The lacuna was suggested by Lachmann; the title has been taken from Frontinus ( $\mathrm{C} 5.23=\mathrm{T} 5.3=\mathrm{L} 12.1$ ). Again Lachmann sought to insert material from the Commentum (C 55.44-57.7; 73.18-23 = T 56.22-57.8; 69.16-20 = L 6.24-7.11; 24.25-9); see n. 20.
24. See p. 322, n. 13; since agricultural terraces rose in a series of steps, if the farmer on the lower ground owned the sloping ground supporting the step above, by digging or working it he could undermine the land of the man above. At C 30.2, MSS BP have augentur ipsa subiacet. Thulin printed angerentur ipso subiacente, but it may be possible to retain augentur, or more likely augeretur, and I have translated accordingly. The passage seems to refer to a landholder on the topmost terrace who concedes to the landholder below that part of this land supported by the lower terrace, presumably because it was not worth the trouble of cultivating.
25. The lacuna was suggested by Lachmann, who also added the title. The exact context of line 17 cannot be recovered though the general sense seems clear; the praecipuae magis archifiniis of MS B has been emended to praecipue in agris. Lachmann also printed in adsignatis for B's id adsignatis.
26. At text, lines $18-19$, for MS B's 'si fit ut possentiam inritum sit', I have printed Thulin's suggested emendations. In my view Urbicus is here speaking in general terms and means that, if incorrect parameters were provided for the officials empowered to investigate the case, any subsequent decision would be invalid. Hinrichs (Institutionen, 189) thought that the specific problem was that the parties believed that the case concerned area (modus), when it fact it concerned site (locus). For the surveyor and the law, see Appendix 6.
27. In Roman law there was a distinction between possession of something, and ownership of it - see Digest 41.2.12.1 - 'Ownership (proprietas) has no common feature with possession (possessio)'. So, there was nothing to stop a man establishing rights of ownership over property that was in the possession of someone else. Proprietas was apparently synonymous with dominium and may have been a later formulation. If two people were in dispute over a site, the one who had secure possession of it could appeal for the issue of an interdict uti possidetis, which had the effect of confirming him in his possession of the disputed property and preserving the existing situation, so that if a legal action developed he would be the defendant and
the burden of proving the case would lie with the plaintiff (see 43.17). But if his possession of the site was less secure (if, for example, it had been acquired by force or deception), then he must sue in accordance with the ius civile to establish ownership of it (see in general Buckland, TRL, 186-9; 196-204; 734; Crook, Law and Life of Rome (1967), 139-46).
28. At text, line 29, I retain the reading of MS B: decernatur ideo. Urbicus presumably means that a decision is made on the basis that the case is held to be less certain and therefore the use of an interdictum is inadvisable, as described in lines 27f. Thulin (at T 34.11) preferred to accept Huschke's emendation: ne certetur interdicto ('that we should not employ an interdictum'). In this section the author is perhaps explaining the general legal background for the benefit of prospective surveyors, who might have to offer advice and guidance to a client on these matters.

At text, line $30=$ T $34.12=\mathrm{L} 44.16$, the phrase silua caedua is technical, meaning timber suitable for firewood and general domestic and agricultural purposes rather than building work (see Cato, Agr. 1.7; Pliny, NH 17.151; cf. Pliny, Ep. 5.6.8). Urbicus presumably refers to the claiming back of the fruits of the land, if the wood had been chopped down by the possessor.
29. At text, lines 2-5, I accept the corrections printed by Thulin, except that at line 6 I retain the MS B's illa, which refers to haec (i.e. 'sites' or 'features') at line 4; at line 4 culturae should be taken as dative singular and propriae as nominative plural. At line 6, MS B has: 'fundum finem et ita obligare', which Lachmann (L 45.5), followed by Thulin (T 35.1), probably rightly emended to 'fundum et ita fidem obligare'.
30. Not much is known about the size of land allocations in Roman foundations; in many early settlements colonists probably received the traditional two iugera; later, there was much variation:

## Latin colonies

193 b.C. at Thurii infantrymen got 20 iugera, cavalrymen 40;
192 b.c. at Vibo infantrymen got 15 iugera, cavalrymen 30;
189 в.с. at Bononia 70 iugera for cavalrymen, 50 for others;
181 b.C. at Aquileia foot-soldiers got 50 iugera, centurions 100 , and cavalrymen 140.

## Citizen colonies

184 b.c. at Potentia and Pisaurum 6 iugera;
183 b.c. at Saturnia 10 iugera, at Parma 8, at Mutina 5;
181 b.c. at Graviscae 5 iugera;
177 b.c. at Luna $61 / 2$ iugera (Tibiletti (Athenaeum (1950), 226, n. 1) emended Livy 41.13.14 from LIS ( $511 / 2$ ), which seems much too large as an allocation, to VIS ( $61 / 2$ ); see also Castagnoli, $B C A R(1946-8), 55$ );
173 b.c. on land taken from Gauls and Ligurians, viritane allotments of 10 iugera for Roman citizens and 3 for Latins (evidence for all the above in Tibiletti, Athenaeum (1950); Salmon, RCR, 95-111; Brunt, IM 53; 191-4; Dilke, RLS, 180-1; Briscoe, A Commentary on Livy Books XXXIV-XXXVII (1981), 157-8; 204; see also López Paz, La Ciudad Romana (1994), 174-7);

122 b.C. at Iunonia (Carthage) up to 200 iugera at least for cavalrymen (Lex Agraria Crawford, Statutes, p. 147, lines 58-61). A land-division grid covering much of northeast Tunisia has been identified. It has a different orientation from Caesar's colony at Carthage, though two limites intersect at the centre of the urban area. It is impossible to say if the grid dates to the Gracchan period; it may be entirely the work of Caesar, or perhaps he adopted the remains of a Gracchan system (see p. lix, n. 195). 59 b.c. in Campania, probably 10 iugera, and 12 in the Ager Stellas (Brunt, IM, 314-15).

## Triumviral period onwards

The only explicit evidence is the Liber Coloniarum, whose authority is not secure in points of detail. In addition, we need to consider archaeological evidence and the comments of the Agrimensores. Investigation of Roman field-systems can often establish the size of each centuria, but this does not necessarily show if, or how, they were subdivided. At a number of sites, subdivision of centuriae, each containing 200 iugera, into smaller units of 50 iugera has been detected - Florentia (Castagnoli, L'Universo (1948)), Concordia (Bosio, AIV (1965-66)), Fanum (Alfieri, RSA (1976-77)), Iader, Parentium, Pola, Salona (Suič, Zbornik Instituta (1955), 32-6). It is, however, possible that centuriae were further subdivided for distribution. On the other hand, where the boundaries of these smaller units of 50 iugera have persisted into modern times, there may be reason to suppose that they represent the boundaries of individual allotments. For other suggested schemes of subdivision in Italy, see Misurare, 88-93. At La Marsa near Carthage there are signs of an internal division of centuriae into three strips in the proportions 2:1:2; this seems to be part of the Roman system, but it is not clear if these strips had further subdivisions, all traces of which have disappeared (Bradford, Ancient Landscapes, 198-205; see below, Plate V). At Damascus in Syria, to the west of the city, a Roman field-system has been identified containing centuriae of 200 iugera; in one case there is an internal division into four equal squares, which themselves have been subdivided into another four equal squares (Dodinet et al., Syria (1990), 343-4).

In a few other cases scholars have tentatively identified the size of allocations: Cremona - 35 iugera (Tozzi, Storia padana antica (1972), 20-3), though at Cremona centuriae were of the rather unusual size of 210 iugera; see Frontinus (C 11.31), Siculus Flaccus (C 127.9), Hyginus 2 (C 137.36); Aquinum - it has been suggested that part of the layout at Aquinum had units of 36 by 36 actus, which were suitable for subdivision into units of about 40 iugera (Castagnoli, RAL (1956); Coarelli, Quad. Ist. Top. Ant. (1964)); but see now Chouquer, Structures agraires, 127-9, who argues for a centuriation grid of 20 by 20 actus; Arausio - 331/3 iugera (Piganiol, Documents, 56; Salviat, $\operatorname{RAN}$ (1977), 117).

Literary evidence offers some general guidance. Centuriae of 50 iugera were apparently associated with the triumvirs (C $137.35=\mathrm{T} 135.17=\mathrm{L} 170.19$; cf. C 11.32 $=\mathrm{T} 14.7-8=\mathrm{L} 30.20$ ). In a passage attributed to Hyginus 1 by Lachmann, it is implied that 50 iugera was a minimum allocation, at least in the imperial period (L 110.8-11), and in a list of names of areas of land included in the Liber Coloniarum, we find the phrase 'ager iugarius in quinquagenis iugeribus', although there is also: 'ager meridianus in XXV iugeribus' (C $243.32=\mathrm{L} 247.17-18$ ). Now, Domitius Ahenobarbus urged
his troops to fight against Caesar in 49 b.c. by promising them 40 iugera each from his own lands; presumably this was intended to be a reasonable offer in the context of the soldiers' expectations (Caes., BC 1.17; cf. Brunt, Latomus (1975)). Furthermore, Hyginus 2, while describing the use of the lot, cites an example of allocations granted to veterans of the legion $V$ Alaudae, which he claims were divided on the basis of three men for each centuria containing 200 iugera, i.e., $66^{2} / 3$ iugera for each soldier (C $157.30-159.13=$ T $162.12-164.5=\mathrm{L} 199.11-201.6$; for the process involved, see Campbell, $C Q$ (1995)). The names of the first group of soldiers are those normally given for the sake of example in legal texts, and it may be that the names and figures are theoretical, designed to illustrate the general principles of land allocation. But the names of the second group seem to be genuine, and, more importantly, have their tribal affiliation; it has been conjectured that these details were taken from official records relating to the settlement of members of the legion $V$ Alaudae at Augusta Emerita in Spain in 25 в.c. (Keppie, CVSI, 94). Of course allocations of this size may not be typical (we hear that in some cases a man might have land assigned to him in two or three or more centuriae (C 5.32-7; 161.19-23 = T 5.16-22; 167.5-11 = L 13.7-14.6; 204.7-13)), and it is likely that there was much variation. It is important that despite the wealth of detail in the works of the Agrimensores, no mention is made of an ideal allocation size. Much depended on the quality of the land, the amount of land available, the requirement for communal areas in the new community, and political sensitivities, that is, if there was a need to avoid confiscations. In the case of veteran soldiers, men of higher rank sometimes received greater allocations (C 123.25-8; $141.36-7=$ T $120.15-20 ; 141.6-8=$ L 156.9-13; 176.11-13). For example, in the settlement at Volaterrae, which was probably Caesarian, 'through a triumviral law' each soldier received allocations of $25,50,35$, and 60 iugera, presumably depending on his rank, though this may have had something to do with variations in the fertility of the land (Liber Coloniarum - C 169.21-7 = L 214.10-215.2). In fact it is impossible to calculate the size of land allocations to veterans under Augustus and his successors, since we do not know precisely the number of recipients, or the cash-value of the land, or variations in the size of the allocations.
31. At text, line 17 MS B has: 'loci natura inretetur et cultura nihil impediet secundum formas nec est initum deterre'; the last part is emended in $\mathrm{B}^{2}$ : 'nec est inritum decernere'. Lachmann (L 45.18-19) followed by Thulin (T 35.18-19) suggested at line 18 'secundum formas aestimatum petere', but this introduces an idea of valuation which does not appear to be justified. I have accepted $\mathrm{B}^{2 \text { 's }}$ decernere, excising nec est inritum, which was possibly a gloss intended to emphasize nihil impediet ... decernere.
32. At text, line 18 MS B has 'lex enim modo petitis definita praescribit'; I have printed Lachmann's emendation (L 45.19; T 35.19-20). Hinrichs (Institutionen, 87-9), who thought that a suit for the regulation of boundaries underlay the dispute described here, suggested: 'lex enim modo petere de fine ita praescribit'. But this produces a difficult expression, which presumably should mean: 'In respect of the area the law lays down as follows that the claim should come under the category "concerning the boundary"'.

The situation described at C $33.18-31$ is that the surveyor has to check the area of the original allocation and the area now existing (cf. Digest 10.1.8.1). Lines 22-5
seem to mean that, if the details of the amount and layout of the original allocation tally with the description provided on the map, the surveyor may make an immediate recommendation based on the map. I interpret the rest of the passage as follows: the law laid down that a claim involving an area of land had to be backed up with data, so that the area stated in documents should agree in respect of the site under dispute before any detailed ground survey was undertaken to detect changes. At line 22 he introduces a new situation; in a case where there is no record of the area, it is legitimate for a surveyor to attempt to work it out on the ground, even if a judge defines the site while the surveyor is still working (i.e. the judge, in establishing the parameters of the case, identifies the site, e.g. through a combination of boundary markers, but not the area).
33. Urbicus means that matters of ownership and jurisdiction are not the concern of the surveyor, who deals only with technical questions; see Appendix 6.
34. At text, line 33, I retain MS B's reading and also in se at line 34. In my view this means that from the evidence of the boundary lines a surveyor can reproduce a map for the place under dispute, and compare it with the current situation and the original map (cf. C 35.41). However, Lachmann proposed: 'et habet aes, cuius formam respicit ...', and also aes in line 34 (L 46.10-12; T 36.14-16). This will mean: 'He has the bronze record, the map of which he examines when the area is under dispute ... the map ought to have first ...'.
35. At C $35.2-14=\mathrm{T} 36.19-37.10=\mathrm{L} 77.6-18$, Urbicus is developing the point that truth should be consistent in all its details, with none of the inconsistencies that reveal untruth. But the difficulty is that sometimes untruth through clever misrepresentation can deceive, and appear as a copy of the truth, just like a statue, which is a copy of a man. He seems to argue that to demonstrate falsehood in place of truth is a tough battle, whereas to demonstrate truth in place of falsehood is more straightforward. So, in the case of a man and a statue, we can easily recognize the real truth here by observing the three pieces of evidence (drinking, walking, talking) which demonstrate that a man has life and is not a statue (i.e. by seeking a consistent pattern of evidence as outlined at $\mathrm{C} 33.44-6=\mathrm{T} 36.14-17=\mathrm{L} 46.10-13$ ); but to convince anyone that a statue had life would be a real battle. Unfortunately Urbicus expresses this obscurely, and at line 4 an adversative particle before falsis latentius would help to give a clearer direction. At text, line 6 and 7 MS B has uiuere and uiuat; B often confuses $b$ and $u$, and despite the well-known quotation - 'lives, moves, and has its being' - I have accepted the reading bibere and bibat; otherwise it would be odd to have at lines 5-6 'since everyone would agree that a man lives and walks, if someone wants to discover if he has life ...'.
36. At text, line 12, MSS AB have cum per omnium, which Lachmann emended, as in the printed text ( L 46.17 ; T 37.13 ). It is possible, however, that cum per omnium is correct, representing a comment by Urbicus in which he moved from a particular example to a general attribution to Augustan colonies. The sentence at C 35.20-2, which Thulin (T 37.16-18) thought went back to Urbicus, does not suit the context. It may have originated as a general comment by Urbicus on types of land distribution in Augustan colonies, and have been misplaced here.

From the third century b.c. onwards the grove of the goddess Feronia had flourished in the territory of Capena, to the north-east of Rome. In 46 b.c. this area
was surveyed on behalf of Caesar in preparation for a settlement of veterans (Cicero, Fam. 9.17.2; Liber Coloniarum -- C 171.5-7). Probably on the basis of this settlement a colony was established, either in the triumviral period or, as is more likely, after Actium. Now, the settlers are referred to as 'Augustini' (C 35.17). This may be explained on the hypothesis that they were established by Augustus, although he did not give the name Augusta to the colony, which in fact was called Iulia Felix. One thousand iugera would allow only five centuriae of the usual dimensions, but this may not have comprised the entire settlement; see in general, Jones, PBSR (1962), arguing for a Caesarian date; Keppie, CVSI, 168-9. Crawford (Athenaeum 68 (1980), 497-8, review of Potter 1979), argues that the archaeological evidence suggests a large-scale abandonment of farms and the settlement of new sites in the vicinity of Lucus Feroniae and Sutrium in the triumviral or Augustan age. This is surely to be connected with land settlement on the ground and colonial foundations in these localities.

Lucus Feroniae is cited here as an example of how surveyors must ensure that site, area, and shape tally with the map and records of the piece of land in question (it is unclear if there had been a genuine dispute here, or if it is a hypothetical case using a well-known place). At C 35.22-8 Urbicus is discussing site (area and shape are discussed at 35.29-36), and imagines that the surveyor has a map, which will be of the immediate locality of the settlement, not of the whole of Italy. It identifies the area, the shape, and the location at Lucus Feroniae. As the surveyor checks this out on the ground, how does he know that he is looking at Lucus Feroniae, even if the area and shape tally superficially with the map? What landmarks help identify it? This was, of course, easy to answer in the case of Lucus Feroniae, which had a famous temple, but with a poor map and a little-known location, the task might be much more difficult. The author then develops the idea of how maps might be misleading because of wide, featureless countryside or the effects of flooding, which could change the appearance of the land ( $\mathrm{C} 35.26-7=\mathrm{T} 38.1-3=\mathrm{L} 47.6-8$, where 'si ut aquae diffusae $\ldots$ '. is a description taken from a map, not a simile). Shaw suggested that this water had been spread deliberately by the farmers, and was a feature of flood-zone agriculture (AntAfr. (1984), 142-7). However, Peyras (Actes du IIIe Colloque (1986), 259) argued that the flooding was a natural process in a low-lying area. At C $35.29=$ T $38.5=$ L 47.10, the 'same' thousand iugera means that they are apparently those represented on the map as being at this location.
37. At text, line 22, from the words 'nihil deest' which appear in the manuscripts, Lachmann argued that there had been a diagram here, and used this conclusion to resolve the difficulty at line 24 , where MSS AB read ad pro centa adscripta; he suggested velut $A D$ pro $C A$ scripta (L 47.11-17; T 38.6-10), relating this to the diagram:


Although brilliant, this conjecture seems excessively bold, and I have preferred to obelize the text, since the overall meaning is clear, and the corrupt sentence simply
explained how the shape did not tally.
Hinrichs (Institutionen, 102, n. 33) wished to retain ad procenta scripta ('in as much as it was drawn to scale'), on the hypothesis that the phrase refers to a reduction in scale for entry on the map. But this produces a word of uncertain pedigree (procenta), and in any case seems unlikely, because a reduction in scale would not alter the shape, and as long as a record was kept of the scale, a surveyor could reconstruct the layout accurately.

At text, line 25 MS A has $u t$, B aut. Lachmann (L 47.17; T 38.11) printed at, but Urbicus is continuing his exposition, and after dealing with site and area, now concentrates on the shape. Consequently aut seems most appropriate in sense, though its position at the beginning of the sentence is odd.
38. See above, n. 35.
39. For the technical terminology, see above, n. 17.
40. The illustration (Ill. $34=\mathrm{L}$ fig. $36=\mathrm{T}$ fig. 35) at the end of the section on proprietas $(\mathrm{C} 37.40=\mathrm{T} 40.16=\mathrm{L} 80.19)$ refers to this passage and depicts on the left a triangular-shaped mountain with trees and boundary stones; it is designated Mons Aricus, a mistake for MSS AB's Maricus, which is itself a mistake for Mount Massicus. To the right is a representation of the walled colony of Suessa, which stands in the middle of a land division grid; for land division at Suessa, see p. 318, n. 3. Although this diagram may have been copied from a now lost illustration in MS A of Frontinus' treatise, it is likely that the cityscape is a later addition (Dilke, Geog. Journ. (1961), 424; Carder, Art Hist., 136-8).
41. For the concept of 'legal persons' and the position of communities, see Buckland, TRL, 173-6; Crook, Law and Life of Rome (1967), 241-2; Johnston, JRS (1985).
42. For the lack of suitable adjacent woodland in Campania, see Frontinus (C $5.40-5=$ T $6.3-8=$ L 15.1-6), and above, n. 40.
43. For surveyors and the law, see Appendix 6.
44. The accompanying illustration (Ill. $35=\mathrm{L}$ fig. $37=\mathrm{T}$ fig. 36) depicts the demarcation of boundaries and has little to do with the text; it shows boundary stones, date palms, two other types of tree, a well, and a river, all serving to bound a rectangular plot of land containing a farm estate (Carder, Art. Hist., 138-40).
45. At text, line 3, to supplement the lacunose text of MSS AB, I have adopted Goesius' suggestion: his habere (edition of 1674; T 40.27).
46. At text, line 11, for the meaningless inritante of MSS AB, I read incitante (a suggestion of Professor Dilke); Lachmann and Thulin read inuitante (L 53.23; T 41.12); cf. C 45.18, where I read incitati.

For subseciva, see p. 320, n. 8.
47. This refers to Vespasian's attempt to raise money by selling off subseciva; cf. Frontinus (C 41.35-42 = T 44.15-23 = L 52.4-13); Hyginus 1 (C 89.46-91.1; 99.26-32 = T 85.21-86.1; 96.21-97.8 = L 122.20-123.1; 133.9-16); Siculus Flaccus (C 131.20-1 $=\mathrm{T} 128.1-2=\mathrm{L}$ 163.13-14); Suetonius, Vesp. 16 (his love of money); letter of Vespasian to the Vanacini ( $F_{I R} A^{2} \mathrm{I}, 72=M W 460$ ); letter of Domitian to the Falerienses $\left(F I R A^{2} \mathrm{I}, 75=M W 462\right)$; inscriptions relating to Vespasian's restoration of public land - AE 1945.85; 1951.200; ILS $5942=M W 339$; cf. $I L S 251=M W 444$; SEG IX. $166=M W 435$ (Cyrene); for the inscription of Arausio (Orange), see Piganiol,

Documents; Hinrichs, Institutionen, 137-9; Salviat, RAN (1977), questioning the established view of the orientation of cadastral plan A, and emphasizing the work of Vespasian at Arausio; cf. also Chouquer in Clavel-Lévêque, Cadastres, 275-95.

Vespasian exploited the legal status of subseciva, which, unless they had been specifically granted to individuals or communities when the land was divided, remained under the legal control of the person who had the right to allocate the land; in the imperial period this would be the emperor, and if he had paid for land for the original settlements from his own funds, any unallocated land would belong to him and his successors personally. In older foundations unallocated land presumably remained the property of the Roman state, as whose representative the emperor could act. By reclaiming subseciva, Vespasian forced those who had occupied them either to surrender or to buy them. So, in many cases the emperor himself could hope to profit from the subseciva. Suetonius alleges that he was greedy and neglected few opportunities to increase imperial revenues, and there may therefore be some significance in Hyginus 1's comment (C 99.26-7) that Vespasian claimed the subseciva 'for himself'. It is worth noting that Urbicus (C 39.20-1) refers to a substantial benefit to the fiscus (the emperor's treasury) from the sale of subseciva. On the other hand, this may merely indicate the usual difficulty in distinguishing between state revenues and the emperor's personal fortune.

But Vespasian's original ruling must have been that all subseciva should be checked to establish the rightful owner. He presumably intended to ensure that colonies and municipia faced up to their responsibilities, and made the most out of their available revenues and assets by controlling and exploiting land legally belonging to them. Additional revenue for the state was an undoubtedly welcome consequence of this. Moreover, we know that Vespasian was eager that all kinds of public land appropriated by private individuals in Italy and in the provinces should be restored to their rightful owner. At Orange in A.D. 77 he intervened directly: 'Imperator Vespasian ... in order to restore the public lands which the Divine Augustus had given to soldiers of the legion II Gallica, and which over a number of years had been appropriated by private individuals, ordered that a map be set up with a note on each centuria of the annual rent .... For public lands in Cyrene, see C 89.42 ff . This evidence seems to indicate a much wider interest in the proper allocation and maintenance of land and the legal rights associated with it than a mere desire to raise money.

The appropriation of subseciva had been extensive and there was widespread disruption after the emperor's ruling. Numerous deputations approached Vespasian himself, and the weight of their complaints eventually forced him to discontinue his policy, illustrating how emperors were still subject to public opinion and protest. He did not, however, change the legal position, and Titus continued the scrutiny of subseciva and renewed imperial claims on some of them. Domitian's common-sense decision to issue an edict granting effective legal ownership of subseciva to those in possession of them shows how emperors could very directly influence patterns of landholding.

The consequences of Vespasian's measure on subseciva are strikingly illustrated by events at Augusta Emerita (Mérida), where those who had appropriated subseciva were forced to buy them (C 41.25-42); they therefore gained a ruling from the
governor that a certain width should be assigned to the river Ana (Guadiana) which flowed through their land, so that they should not have to pay for this, or for any action that damaged the land (for harmful river action see below, n. 50; cf. C $39.39=$ T $42.15=\mathrm{L} 50.5$ ). Two other cases may also be relevant. Vespasian's letter to the Vanacini in Corsica about a boundary dispute with the neighbouring community of the Mariani mentions that the land in question had been bought by the Vanacini from the emperor's procurator. It is possible that this land was subseciva confiscated and sold off by the procurator on Vespasian's instructions, and that the dispute concerned the location of the boundary (a surveyor was despatched to Corsica by the emperor). If it were cultivated imperial land of long standing, it is odd that it had not been demarcated before this.

The dispute between Firmum and Falerio certainly concerned subseciva. A colony at Firmum was founded by Octavian perhaps after Philippi with veterans from Legion IV Macedonica. It is not clear when Falerio became a colony, though it had this status by the start of the second century A.D. (Keppie, CVSI, 181-2). After the passage of many years Firmum laid claim to subseciva currently in the possession of Falerio, perhaps exploiting the confusion and uncertainty caused by the pronouncements on subseciva by Vespasian and Titus. Domitian rejected the claim and upheld the rights of the landholders of the Falerienses on two grounds: firstly their length of occupation, which exceeded that required for ownership by usucapio; secondly a letter of Augustus to the veterans settled at Firmum had urged them to sell off subseciva, presumably to the Falerienses. The implication of this was firstly that Augustus had granted the subseciva to individuals at Firmum (as the author of the land division he could do this) and that therefore any subsequent sale was legal and the buyers had a proper legal title that could not be upset; and secondly that the emperor's advice to the veterans to sell off the subseciva had, in Domitian's view, certainly been followed.

The situation at Firmum was probably that Augustus granted subseciva (either those on the periphery of Firmum's territory adjoining that of Falerio, or unused tracts in the middle of the divided and allocated land) to the veteran settlers (that is why his generosity is mentioned, because he could have kept them in his ownership or returned them to the original owners if the land had been confiscated); these subseciva will have remained entirely at the disposal of the settlers. But he also urged them to sell off any subseciva they did not require for pasture and so on, and it was presumably the Falerienses who had bought these (see also p. 320, n. 8).

A diagram attached to the text of Hyginus 2 (III. $128=$ L fig. $192=\mathrm{T}$ fig. 131), illustrating the use of a three-sided ara to mark the junction of the territory of three towns, names the Iulienses, Falerenses, and Vettonenses. The second group can be identified as the people of Falerio, and the first may be Firmum, although there is no evidence that the colony had the title Iulia; but Vettona (modern Bettona) in the Pianura Umbra does not share a boundary with these communities. Dilke argued, probably rightly, that this is a teaching map and the names are used merely as an example with no intention of geographic or historical precision (Riv. dell'Ist. (1975)). 48. The illustrations accompanying the text of Urbicus, which have been preserved in the Arcerianus manuscript, normally come at the end of an entire section and seem to offer a general summary of the matters discussed. It is appropriate, therefore, that the original illustration attached to C 39.27 clearly depicts a large marshy area labelled
as subseciva in a land division grid (Ill. $36=\mathrm{L}$ fig. $39=\mathrm{T}$ fig. 38). But Lachmann, followed by Thulin, wrongly used this diagram to illustrate alluvial action (C 41.42), where the illustration is missing in MS A. They also transposed the illustration L fig. 38 (= T fig. $37=$ Ill. 37) from C 43.31 to the end of the section on subseciva (C 39.27). But this is inappropriate since this illustration (which has possibly been misplaced) depicts a city in a land division grid and has no indication of subseciva (see below, n. 60).

Ill. $36=$ L fig. $39=\mathrm{T}$ fig. 38 resembles an illustration attached to Frontinus' text concerning a dispute about subseciva (Ill. $19=\mathrm{T}$ fig. 19); this depicts subseciva and an area of water in a land division grid, but has no mountain. A copyist or editor of Urbicus may have been influenced by this illustration, or by the fifth century there may have been a group of stock diagrams to illustrate certain topics; see also Carder, Art Hist., 140-1.
49. Gaius makes a clear distinction between gradual alluvial action and more dramatic movement of land by a river (Digest 41.1.7.1-6; cf. Gaius, Inst. 2.66-72). In the former, land added to a man's property becomes his under the ius gentium: 'that is held to have been added by alluvial action which is added so gradually that we cannot discern how much is added at each moment of time'. But if the force of a river dislodged a substantial portion of land and transferred it to another's property, it should continue to belong to the original owner if he could identify it, unless it had remained in its new location so long that trees carried with it had taken root; in this case it became part of the land where it had been washed up. This rule may have been largely theoretical since it would be difficult to pursue such a case, but must indicate a concern, perhaps going back to the early Republic, to protect landed property, especially of small farmers. For legal obligations in respect of buttressing the bank without infringing river traffic or the rights of landholders along the river, see 43.15 (Ulpian). Maddalena, Gli incrementi fluviali (1970), has an excellent collection of evidence on all legal aspects of alluvial activity; see especially 5-70.
50. For ager publicus see p. 323, n. 19. Frontinus is talking about a dramatic change in a river's course or pattern of behaviour, involving substantial flooding, distinct from gradual alluvial action; for harmful river action, see also Hyginus 1 (C 91.21-93.9 = T 87.4-88.18 = L 124.3-125.18); Siculus Flaccus (C 117.31-8 = T $114.25-115.5=\mathrm{L} 150.24-151.5$ ). The examples refer to the valley of the river Po, Cisalpine Gaul, the river Ana (Guadiana) at Augusta Emerita (Mérida) in Lusitania, and the river Pisaurus, which flows into the Adriatic on the Umbrian coast at the town of Pisaurum (Pesaro).

Apart from gradual alluvial action, there were three main legal problems associated with rivers: (i) the appearance of an island in mid-stream; it was held to belong to those who owned land on both sides on the banks opposite, in proportion to the frontage of their property on the river, if it was closer to one bank, it belonged to the landholders whose property adjoined that bank, in due proportion - Digest 41.1.7.3; $1.29 ; 1.30 .1-3 ; 1.56 .1 ; 43.12 .1 .6-7$ (for the ius alluvionis, see below). (ii) If a river in flood left its normal course and made an island in someone's land before rejoining its usual bed, Gaius argued that this land, which had been made into an island between the two channels of the river, naturally continued to belong to the original owner (see Ill. $20=$ L fig. $20=$ T fig. 20 for a possible illustration of this; cf. p. 323, n. 19).

However, if the river became set in its new course, the old bed ceased to be public property and belonged to the landholders adjoining it, presumably in proportion. Only the new course of the river was public property (41.1.7.5; cf. Ulpian, 43.12.1.7-10). On the other hand there was perhaps a legal debate on these matters, since Frontinus cites the rather strict view of some legal experts that soil deposited around the old course of the river remained public property and could not therefore be appropriated by any landholder (C $39.45-41.4=\mathrm{T} 42.23-43.2=\mathrm{L} 50.12-18$ ); discussion in Sargenti, BIDR (1965). (iii) Land temporarily flooded by a river overflowing its banks did not become public property, but continued to belong to the original owner when the water receded. The damage caused by flooding could be restricted if a width had been assigned to the river including its likely flood limit; all such land would then be outside the area divided and allocated (C 41.12-42; 87.38-42; 125.14-28 = T 43.12-44.23; $83.7-12 ; 121.26-122.17=$ L $51.3-52.13 ; 120.7-12 ; 157.18-158.7$ ); see also Sargenti, op. cit., 204-15.

At Digest 41.1.16 (Florentinus) it is claimed that 'in land with limites (in agris limitatis), it is agreed that the right associated with alluvial action (ius alluvionis) has no place; this was also decided by the Divine Pius ...'; cf. 43.12.1.6-7 (Ulpian); 41.1.56 pr. (Proc. 8 Epist.). Maddalena (op. cit. (n. 44), 46-63) argued that the ius alluvionis referred only to the movement of large pieces of land as a result of storms, or to the creation of an island in a river, and came about because in divided and allocated lands an area was set aside on either side of the river which was owned by the community (for this point, see above and Campbell, JRS (1996), 91-2). Since private landowners would own no land on the riverfront, the ius alluvionis would therefore only be applicable in land with no formal boundaries. This view, however, is not supported by the surveying writers, who seem unaware of such a distinction (Hyginus 1 at C 91.21-7 = T $87.4-11=\mathrm{L} 124.3-10$, is not referring to the ius alluvionis; see p. 365, n. 34), and takes no account of the fact that a designated area round a river was by no means consistently provided in communities. Moreover, at Pisaurum the local community sold off this area, while at Augusta Emerita settlers appropriated, and were later required to buy, the land round the river Ana. In many communities there will have been settlers owning land around a river, not to mention those who had minor streams marking their boundaries (cf. Maddalena, op. cit., 63-70 on lands only partly bounded by limites). The limited excerpts in the Digest probably conceal the full story, and it is likely that the law was extended or interpreted so as to allow claims in certain cases in divided and allocated lands.
51. An action for damnum infectum ('damage not yet inflicted') was available to anyone who believed that his interests were liable to be damaged by another person's actions in respect of his own property; cf. Digest 39.2.
52. In this passage, Urbicus, who is here using Frontinus or another earlier source, speculates on the role of a surveyor at the foundation of a colony. But he also has in mind a later situation, when a surveyor might be required to deal with a dispute involving land on the bank of a river, and would need to know about earlier principles of land distribution and the records of a particular settlement. At text, line 17, I have translated Lachmann's correction aeris for the eius of MS B (L 51.15; T 44.1), which would presumably refer to the possessor (C $41.20=\mathrm{T} 43.22=\mathrm{L} 51.13$ ), who would then be rather awkwardly coupled with the postulatio formarum.
53. At text, line 19, MS B has the meaningless cursum an praetium etiam. Lachmann and Rudorff printed cursum an perticam sequamur (L 51.19). Thulin suggested cursu an pertica metiam $\langle u r\rangle$ (T 44.4), but I prefer cursum an perticam metiam $\langle u r\rangle$. Urbicus is describing a measuring procedure, and pertica, because of what follows, refers to the measured area, not the surveyor's measuring rod. The debate concerns the extent of the allocated area in relation to the river.
54. For Roman field-systems in the territory of Augusta Emerita (Mérida), see Wiegels, Madrid. Mitteil. (1976); Gorges in Février and Leveau, Villes et campagnes dans l'empire romain (1982), 101-10; in Clavel-Lévêque, Cadastres, 199-206; MCV (1993); Canto, Gerión (1989); Sáez Fernández, Habis (1990), and with Pérez Paz (1993); two grids have been identified, one to the north of Mérida, the other to the south on a different orientation, covering in total about 90,000 ha. For the rivers Ana and Pisaurus, see above, n. 50, and Campbell, JRS (1996), 91-2.

At text, line 31, MS B has reigerendum, changed in the same manuscript ( $B^{1}$ ) to referendum. The $O L D$, s.v. regero 4 c cites regerendum in this passage in the sense 'to make a collection of', without noting the manuscript difficulty.
55. The 'Tudertini' are the inhabitants of Tuder (Todi) in Umbria. It was known as colonia Iulia Fida Tuder and was possibly founded after 36 B.C., or after Actium (C 169.15-20; Keppie, CVSI, 176-7). The 'Fanestres' are the inhabitants of Fanum Fortunae (see p. 326, n. 29). This passage shows that Tuder had a special privilege from its foundation, presumably through the goodwill of Octavian, and that Fanum subsequently gained a similar privilege; this may have occurred under the emperor Augustus, by whom Fanum was advanced to the status of a colony and given the title Iulia. Normally if a community had a piece of land, e.g., in the territory of a neighbouring colony, that land remained under the jurisdiction of the first community and its inhabitants owed taxes and services to that community, not to the colony. There were a number of circumstances in which such enclaves could appear; for example, in the case of land taken from a community for a colony, only that which was allocated to the settlers belonged to the jurisdiction of the colony; anything else remained under its original legal status; secondly landholders whose land was not confiscated for the colony remained under the jurisdiction of their original community even though they were now physically cut off from their fellow-citizens (Hyginus 1 - C 85.30-87.37 = T $80.25-83.6=$ L 117.23-120.6). The privilege discussed by Frontinus allowed, for example, Tuder to compel the inhabitants of such an area within its territory, even if they belonged to the jurisdiction of another community, to perform all the duties required in Tuder. This is another good illustration of the range of benefits which communities could receive by direct approach to the emperor.
56. Saltus often means an area of upland woods and pasture, but here is used in the technical sense of a continuous tract of land, amounting to 5 by 5 centuriae (5,000 iugera) according to Siculus Flaccus (C $125.40-1=\mathrm{T} 123.3-4=\mathrm{L} 158.20-1$ ), though Varro ( $R R$. 1.10) suggested 2 by 2 centuriae ( 800 iugera); see Dilke, JRA 2 (1989), 187.

Frontinus presumably did not mean to imply that there were no large estates in Italy. Doubtless large landholders in Africa had several contiguous saltus, whereas in Italy rich men perhaps had smaller individual estates scattered in different regions (see Brunt, IM, 283-4; 303-4; 330-1; 352; Duncan-Jones, The Economy of the Roman

Empire (1982), appendix 1; Structure and Scale in the Roman Economy (1990), 121-42; Garnsey and Saller, The Roman Empire (1987), 66-71).

The especially large estates in Africa perhaps had their origin in the attempt by Gaius Gracchus to found a colony at Carthage. The lex Agraria (Crawford, Statutes no. 2, with bibliography there cited) of 111 B.C., which deals with the treatment of public land in Italy, and also in Africa and Greece, suggests that land allocations of up to 200 iugera had been proposed in African colonial foundations (lines 58-61). According to this law, ager publicus in Africa was available for purchase by citizens or lease by non-citizens, and much of this probably went to the wealthy since the use of agents to manage the land is provided for (lines $55-6 ; 68-9 ; 83$ ). In these circumstances there was great opportunity for land speculation and the acquisition of huge estates. We hear how Atticus saved the eques Julius Calidus, who had been added to the list of the proscribed by Antony's praefectus fabrum because of his extensive possessions in Africa (Nepos, Atticus 12.4). Cicero mentions that Caelius' father had business and lands in Africa (Pro Caelio 73), and another friend, L. Aelius Lamia, seems to have had large landed interests there (Fam. 12.29); the saltus Lamianus referred to in inscriptions (CIL VIII. 25943 (Aïn-el-Djemala); 26416 (Aïn Wassel)) probably belonged to L. Aelius Lamia ( $P I R^{2}$ A 200), consul of A.D. 3 and grandson of Cicero's friend. Indeed, according to Pliny ( NH 18.35 ), in the time of Nero six men owned half of Africa, and were murdered by the emperor for their wealth.
57. In technical language, legere generally referred to conscription. See Brunt, $S C I$ (1974), who argued that conscription was more common than supposed in the provinces in the first two centuries A.D., until the improvement in service conditions in the Severan period brought more volunteers. The obligation was on the city to find the required number of recruits from the villages and land in its territory; this was probably an irregular requirement as there were always volunteers, but in Diocletian's reorganization of the army the burden on the cities was formalized (see Jones, LRE, 615; Brunt, op. cit., 114-15).
58. This refers to the transport of personnel and goods for the Roman imperial government, often in respect of the imperial post (vehiculatio). Local communities in the provinces (Italy had been exempted from the vehiculatio by Nerva) had to bear the cost of this, through requisitions of animals and the requirement to provide hospitality; see Mitchell, JRS (1976). The burden on communities, especially those near roads, could be considerable, even without the abuse and corruption which the government never succeeded in removing from the system (for abuses, especially by soldiers, see also Campbell, The Emperor and the Roman Army (1984), 246-54). This passage shows how local communities would have to use all the resources of their territory, and also how they organized their contribution, by attributing certain quotas to individual districts in their jurisdiction.
59. It is difficult to discover precisely the extent of imperial landed property in Italy and the provinces, since the evidence is widely scattered, in terms both of chronology and location. But it is likely to have been substantial, acquired by legitimate inheritance, by lapse in ownership, or by confiscation (for Nero's murder of the six leading landholders in Africa, see n . 56 above). In this way emperors would assume the role of private landholders, and it is important that Frontinus (if he is the source for this passage) regarded their status in disputes to be equivalent to ownership by private
individuals, and capable of challenge in the normal legal process; indeed he assumes that in this matter communities frequently challenged the emperor at law ( C 43.27-9 $=\mathrm{T} 46.4-7=\mathrm{L} 53.13-15$ ). This is striking in an autocracy where the autocrat was also a great landowner.

In Africa there were substantial imperial estates, administered by procurators, and under the control of a central office in Carthage (see Haywood in Frank (ed.), Economic Survey of Ancient Rome IV, 83-102; Kolendo, REA (1963); Kehoe (1988)). Frontinus here illustrates an important issue. Local communities, which themselves faced heavy demands from the imperial government, wished to protect their rights in exacting services and obligations from those dwelling within large estates owned by either private individuals or the emperor. There is some evidence that emperors recognized the problem. Marcus Aurelius and Lucius Verus ruled in a rescript that their tenants were liable to obligations (i.e. imposed by neighbouring communities) though without detriment to the imperial treasury (Digest 50.1.38.1). Severus Alexander also ruled that tenants of imperial estates were not for that reason excused from civil obligations, and so must perform tutela (guardianship). But there were differences of opinion among jurists. Callistratus, writing in the early third century, held that the tenants of imperial estates were free from obligations so that they could be kept more at the disposal of land belonging to the treasury (Digest 50.6.6.11). And Herennius Modestinus (early third century) notes that men must complete their duties as guardians or curatores before becoming imperial tenants; indeed Septimius Severus had ruled that failure to reveal such obligations was tantamount to forgery (19.2.49). For imperial landowning in general, see Millar, $E R W, 175-89$.
60. In MS A, $\mathrm{III} .37=\mathrm{L}$ fig. $38=\mathrm{T}$ fig. 37 originally appeared here (see above, n . 48). The illustration has no obvious connection with the theme of territorial rights, but may have been intended as a general depiction of a community with its territory.
61. The reference may be to the colony of Concordia in Venetia at the junction of the Via Annia and the Via Postumia. Its foundation date is disputed, with suggestions ranging from the second century b.c. to the period after Philippi (Keppie, CVSI, 201). In the early imperial period it was known as colonia Iulia Concordia, although there is no attestation in inscriptions of the name Augusta.
62. These areas might have been intended for the incarceration of criminals, but it seems much more likely that they were for the performance of executions, probably of slaves or bandits, conducted by Roman communities, either municipia or colonies, in Italy and the provinces.

At C 45.6 and $20=$ T 47.8 and $22=\mathrm{L} 55.15$ and 56.11 , two illustrations have been cut from MS A and are not preserved elsewhere.
63. For the instructions (mandata) given to provincial governors by emperors, see Burton, $Z P E$ (1976), who demonstrated that from the start of the imperial period mandata were issued to proconsuls as well as to imperial legates. It is interesting that the protection of sacred places featured so prominently in the imperial mandata; cf. Ulpian (Digest 1.16.7.1 - from the second book on the duties of a proconsul): 'He (the proconsul) should visit sacred buildings and public monuments in order to inspect them and establish if they are in good order and properly maintained, or if they need any repair; and he should ensure that those that have been begun are completed, as far as the resources of that community permit ...'.
64. For public property of the Roman people, see p. 323 , n. 19.
65. This must refer to a tax raised by a local community in the form of rents or charges for people attending festivals, shows, or markets in its territory, and tells us a little about the obscure subject of local finance; cf. Gabba, SCO (1975); Frayn, Markets and Fairs in Roman Italy (1993), 133-44.
66. The two towns involved are Hadrumetum (Sousse), a coastal city, which had been raised to colonial status by Trajan, and Thysdrus (El Djem) about 50 km to the south. Thysdrus had become a municipium towards the end of the second century A.D. and was a rival of Hadrumetum for the position of second city in the province of Africa after Utica. Nothing is known about a temple of Minerva. The illustration accompanying the text (Ill. $38=\mathrm{L}$ fig. $40=\mathrm{T}$ fig. 39) contains three elements: a plan of the land-division grid of a community including a three-dimensional portrayal of the city walls; a three-dimensional representation of two buildings surrounded by a wall; this obtrudes onto a part of the land division and may be intended to show a sacred enclosure partly within the community's territory; a very detailed representation, which presumably depicts a statue of the goddess Minerva standing on a plinth in a circular temple. The last element is difficult to date, but was perhaps a later addition to the illustrations in the corpus (see further, Carder, Art Hist., 144-7).
67. At text, line 29, MSS AB have finibus pr. coli. I have printed Lachmann's correction (L 57.5-6; T 48.20-1).
68. For rights of way, see p. 364, n. 27.
69. It is difficult to see how these references to 'our profession' can have been written by Frontinus, if he is the distinguished senator of the late first century (see pp. xxvii-xxviii; also Campbell, $J R S$ (1996), 76-7). It is possible that Urbicus here is using material collated from a number of unidentified sources.

For Thulin's convincing arguments on the relocation of this passage, see p. xxxii, n. 81. I have, however, followed him in printing the passage in its traditional place.

# COMMENTARY - COMMENTUM 

(TRANSLATION pp. 51-5)
SUMMARY

C 51.1-9 - introduction on the value of learning, in which land surveying has a part
C 51.10-57.42 - categories of land, based on Frontinus
C 59.1-63.43 - land disputes, boundary markers, site, area
C 63.44-65.38 - disputes over ownership, occupancy
C 65.39-73.23 - disputes over rivers, territorial rights, subseciva, public ownership, places left out and not enclosed, sacred places, passage of rain water, rights of way
C 73.24-75.21 - theoretical distinctions between disputes, based on Agennius Urbicus, role of surveyor

1. The title is taken from the subscript at C $57.42=\mathrm{T} 58.14-15=\mathrm{L} 9.12-13$. The commentaries are a pastiche of the works of the Gromatici, particularly Frontinus, Agennius Urbicus, Hyginus 1, and Siculus Flaccus (see pp. xxxiv-v). In printing the Latin text I have preserved most of the conventions used by Thulin in his edition: small print - words of anonymous commentator; italics with quotation marks Frontinus; italics - taken largely verbatim from another known source; larger print - taken from an unknown source; v - words omitted by commentator.

I have not followed these printing conventions in my translation. However I distinguish those passages taken verbatim from Frontinus by single quotation marks and a citation by page and line number in brackets; passages quoted verbatim or largely verbatim from other known sources have the citation of page and line number in brackets.
2. Thulin attributed C $51.19-23=\mathrm{T} 52.13-17=\mathrm{L} 1.27-2.6$ to the commentator; the word intercisiones does not appear elsewhere in the corpus. For the idea of the division of a centuria between one hundred settlers, see Siculus Flaccus (C 121.11-13 = T 118.1-3 = L 153.28-30); also p. 376, n. 39; Gabba, RIL (1978).
3. This passage seems to be based on Siculus Flaccus (C 105.27-9; 105.18-20 = T 102.1-3; 101.11-13 = L 138.3-5; 137.19-20).
4. This is derived from Frontinus ( $\mathrm{C} 5.24-7=\mathrm{T} 5.6-10=\mathrm{L} 12.4-7$ ) and Hyginus 1 (C $93.16-21=\mathrm{T} 89.6-13=\mathrm{L} 126.9-15)$.
5. This is taken from Frontinus ( $\mathrm{C} 3.9-11=\mathrm{T} 1.10-12=\mathrm{L} 3.2-5$ ), but the commentator has retained the mistaken MSS reading of altitudinem (instead of latitudinem; see p. 318. n. 4), for which he provides a fatuous explanation (C 53.12-14 = T $53.21-54.2$ = L 3.12-16).
6. This passage seems to be derived from Hyginus 2 (C 135.19-20; 137.21-3; 31-3 $=\mathrm{T} 132.7-9 ; 135.1-2 ; 12-14=\mathrm{L} 167.4-6 ; 170.3-4 ; 14-15)$.
7. Thulin thought that this fragment was from an unknown source, perhaps connected with the material on a similar theme, the demarcation of territorial boundaries, at C 69.4ff. = T 65.25ff. = L 19.15ff., which comes from Hyginus 1.
8. This is from the Expositio et ratio omnium formarum of Balbus (C 211.38-41 =

L 104．3－7）．However，I suspect that at C $55.11-14=\mathrm{T} 55.20-4=\mathrm{L} 5.12-17$ ，the com－ mentator has confused forma（＝＇shape＇）with forma（＝＇map＇）．
9．For the definition of quintus and quintarii，see Hyginus 2 （C 141．6－10 $=$ T $139.9-14=\mathrm{L} 174.13-17$ ．At text，line $11=\mathrm{T} 55.26=\mathrm{L} 5.18$ ，I retain the MSS in omnibus，taking demonstrare as dependent on ammonemur（line 10）．Lachmann sug－ gested noverimus．
10．Lachmann believed that $\mathrm{C} 55.36-42=\mathrm{T} 56.13-20=\mathrm{L} 6.15-22$ could be attrib－ uted to Hyginus 1，and corrected lines 41－2 on the basis of the triumviral law quoted in the Liber Coloniarum（C 169．1－3＝L 213．1－5）：＇subsecivum maius centum iugera ＜pro centuria〉［dictum］est，subsecivum $\langle n o n\rangle$ minus $L$ iugeribus 〈pro dimidia centuria〉 ［nuncupatum］＇．Thulin，however，argued that the passage reflected a more complex range of influences：the triumviral law at lines 36－8；Hyginus 1 （C 99．21－30＝ T 96．15－97．5＝L 133．2－13，on the allocation of subseciva）at lines 38－9；then at lines $40-2$ ，he was perhaps trying to explain Frontinus＇definition（C $3.33-4=$ T $2.18-19=$ L 6．7－7．1）of an incomplete centuria，and therefore means that in a large allocation （perhaps over 200 iugera in each centuria；cf．C $11.30-1=\mathrm{T} 14.5-6=\mathrm{L} 30.18-19$ ），if a centuria could not be completed，the unused land was still called subsecivum，whether it consisted of more than 100 or fewer than 50 iugera．
11．This is taken from Frontinus（ $\mathrm{C} 9.16-17=\mathrm{T} 10.7-8=\mathrm{L} 24.6-7$ ）．
12．At text，lines $9-10$ ，there is a grammatical anacoluthon，making poterit agnosci difficult to construe；Lachmann suggested that designavimus be emended to designa－ tum（L 7．20－1）．It is preferable to read $\langle e t\rangle$ poterit．
13．Probably taken from Hyginus 1 （C $99.26-30=$ T 96．21－97．5 $=\mathrm{L} 133.9-16$ ；cf． also Urbicus－C $39.16-26=$ T $41.16-26=\mathrm{L} 54.2-13$ ）．
14．C $59.3-5$ are a slightly modified version of $\mathrm{C} 5.4-9=\mathrm{T} 4.2-7=\mathrm{L} 9.2-7$ ．
15．C 59．15－30．This passage is of uncertain origin although 24－5 are taken out of context from Agennius Urbicus（C 25．32－3＝T $28.13=\mathrm{L} 68.6-7$ ）．Lachmann ascribed this passage to Urbicus and ultimately to Frontinus．The point is presumably that internal boundary markers added by veterans for their own purposes might be con－ fused with markers on the external boundary of the property．
16．This is closely based on Frontinus（C $5.16-19=\mathrm{T} 4.15-19=\mathrm{L} 10.4-11.2$ ）， which refers to markers on the external boundaries of properties．
17．Lines $34-9$ are most likely the commentator＇s attempt to expound the difficul－ ties of conportionales at 22－5．
18．At C 59．40－61．5，the commentator is using material from Hyginus 1 （C 95．19－23；28－9＝T 91．19－92．2；7－8＝L 128．15－20；129．2－3）and Siculus Flaccus （C 109．11－17；40－2＝T 106．5－11；107．8－10＝L 142．5－11；143．8－10）．But he has been misled by the mistaken reading of MS B at C 58.32 （T $91.20=\mathrm{L} 128.17$ ）（latitudinis for altitudinis）and has compounded the confusion by adding patuerit（ C 60.1 ）．
19．C 61．6－19 is based on the Liber Coloniarum（C 173．22－36＝L 220．15－221．11）．
20．In Hyginus $1(\mathrm{C} 95.6=\mathrm{T} 91.7=\mathrm{L} 128.7)$ this phrase refers to a right of way．
21．Cf．Hyginus $1(\mathrm{C} 95.2=\mathrm{T} 91.3=\mathrm{L} 128.2-3)$ ，Siculus Flaccus（C 105．46－107．1 $=\mathrm{T} 103.2-4=\mathrm{L} 139.2-4$ ）．
22．This passage is seemingly based on $\mathrm{C} 97.37-8=\mathrm{T} 94.21-95.1=\mathrm{L}$ 131．15－16． G＇s text is difficult to construe，and the reading of MS B is to be preferred：＇qui aere et in scriptura formae continetur，licet dominus ．．．＇．
23. At text, line 21, MS B's reading quomodo perueniri potest should be accepted in preference to G's meaningless commode (or commodi) reuocari. At C $63.33=\mathrm{T} 62.3$ $=\mathrm{L} 13.23$, the vital words ad possessiones have been omitted by the commentator.
24. This is derived fron Urbicus ( $\mathrm{C} 37 \cdot 16-21=\mathrm{T} 39.17-22=\mathrm{L} 48.24-49.3$ ).
25. Probably taken from Urbicus (C $37.32-3=\mathrm{T} 40.8-10=\mathrm{L} 80.10-12$ ).
26. Cf. Urbicus (C $37.37=\mathrm{T} 40.15=\mathrm{L} 80.17-18$, referring to cases involving ownership); for 'agitur apud praesidem', see CTh 2.26 .2 (330); note also 26.1 for the idea that the surveyor has second place in this kind of dispute.
27. At text, line 8, MS G has 'per regionem excedens alveum ...'; in my translation at C $91.44=\mathrm{T} 88.7=\mathrm{L} 125.8-9$, I have followed Thulin, who emended MS B's 'excedens alpes albei per regione', to 'excedens alveum per regionem ...'.
28. This is taken from Urbicus (C 41.5-8; 36-7; 41-2= T 43.4-8; 44.16-17, 22-3 = L 50.20-3; 52.5-7, 11-13).
29. This is collated from Frontinus ( $\mathrm{C} 7.7-8=\mathrm{T} 7.1-2=\mathrm{L} 17.1-2$ ) and Urbicus (C $45.1-2=\mathrm{T} 47.4-5=\mathrm{L} 55.11-12$ ).
30. This is a muddled version of Frontinus (C $7.10-12=$ T $7.5-8=\mathrm{L} 18.2-5$ ), for which see p. 323, n. 18. C 67.37-42 is collated from Frontinus (C 7.16-17 = T 7.11-12 $=$ L 18.8-9), Hyginus $1($ C $95.11=$ T $91.12=$ L 128.11), Siculus Flaccus $($ C $103.22=$ T $99.9=$ L 135.20), Hyginus 2 (C $143.5-7=$ T $142.8-12=$ L 177.13-178.3). At text, line 24 , tutelatum (perhaps taken from tutela, line 22) is the work of the commentator, but may be a mistake for cultellatum, i.e. sloping land brought within a survey.
31. $\mathrm{C} 67.42-5$ is based on Frontinus ( $\mathrm{C} 7.19-23=\mathrm{T} 7.13-8.2=\mathrm{L} 18.10-19.4$ ), and C $67.46-69.4$ on Urbicus ( $\mathrm{C} 43.7-11=\mathrm{T} 45.11-14=\mathrm{L} 52.22-53.1$ ), but confusedly. So, at C 66.30 the commentator omits non (cf. C $7.22=\mathrm{T} 8.1=\mathrm{L} 19.3$, where MS P is certainly correct; see too Hyginus 1 (C 87.36-7 = T 83.5-6 = L 120.5-6): 'there are some municipia that have no jurisdiction outside their walls'). Again, the point of lines 67.46-69.4 should be that the people under another jursidiction should nevertheless perform their obligations in the colony (see p. 362, n. 23).
32. The section at C 69.4-16 was attributed to Hyginus 1 ( $\mathrm{C} 79.27-39=\mathrm{T} 74.4-19$ $=\mathrm{L} 114.11-115.3$ ) by Lachmann, on the grounds that at $\mathrm{C} 99.33-4=\mathrm{T} 97.9=$ L 133.17-18, Hyginus claims that he has already discussed territorial rights, and that Siculus Flaccus, who makes use of Hyginus 1, has a similar phrase relating to the demarcation of territorial boundaries ( $\mathrm{C} 131.32-3=\mathrm{C} 69.8-9$; $\mathrm{T} 128.16-17=\mathrm{T} 66.3-4$; L 163.27-164.1 = L 114.15-16). Thulin accepted Lachmann's hypothesis (though he thought that $\mathrm{C} 69.16-18=\mathrm{T} 66.13-16$ were the explanatory observations by the commentator) and printed this section as part of Hyginus 1's treatise (T 74.4-19), and this has been followed in the arrangement of this volume ( $\mathrm{C} 79.27-39$ ).
33. Cf. C $99.18-25=\mathrm{T} 96.11-20=$ L 133.1-8.
34. Lachmann attributed this passage to Hyginus 1, but it seems to be based on Siculus Flaccus (C 105.4-7= T 100.15-19 = L 137.1-4).
35. The commentator seems to be developing the text of Urbicus (C 43.42-4 = T $46.24-5=\mathrm{L} 55.1-3$ ), while omitting the reference to temples. Thulin ( T 67.7) thought that peregrinis, which is an addition of the commentator, might refer to travelling pilgrims.
36. This passage has been taken from Frontinus ( $\mathrm{C} 7.21 ; 33-4=\mathrm{T} 7.16 ; 8.15-17=$ L 19.2; 20.10-21.1) and Urbicus (C $37.26-7=\mathrm{T} 40.3=\mathrm{L} 49.9$ ), with several observa-
tions by the commentator; at text, line 6, I retain quae casalia non utuntur of MS P. Lachmann proposed: quae communalia nominantur.
37. This is based on Frontinus ( $\mathrm{C} 7.42-3=\mathrm{T} 9.5-6=\mathrm{L} 22.1-2$ ), but the commentator has added an explanatory comment on the founder of a settlement - hoc est mensoris - virtually equating his role with that of the surveyor; see further, p. xlix.
38. C 71.28-38 are the commentator's observations, though at lines $35-6$ he has adapted a comment found in Urbicus ( $\mathrm{C} 45.29-31=\mathrm{T} 48.8-9=\mathrm{L} 56.19-20$ ), attributing the illicit appropriation of sacred groves by landholders to the influence of the developing Christian religion, rather than to the high density of population in Italy. Lines $38-40$ are based on Frontinus (C $9.5-6=\mathrm{T} 9.17-18=\mathrm{L} 23.3-4$ ). At text, line 29 religiosum ... relinquendo breaks up the comparison of sacrum and profanum and may be a gloss. At text, line 31, the context requires a reference to tombs. Lachmann proposed moesilea.
39. At C 73.5-11, the commentator is trying to develop ideas in Frontinus (C 9.10-14 = T 9.21-10.4 = L 23.7-24.3).
40. The source of C 73.18-23 is uncertain.
41. At $C$ 73.27-75.5, the commentator is using material from Urbicus (C $25.41-27.38=$ T $28.22-30.10=\mathrm{L} 68.16-70.9$ ); lines $30-2$ are taken from C $41.43-6$ $=\mathrm{T} 44.24-45.1=\mathrm{L} 84.11-15$. However, the commentator has misunderstood Urbicus' argument, and his list of eight status is a conflation of status and effectus, which Urbicus attempts to distinguish. Furthermore, at C 73.32-41, the commentator has changed the word effectus to status in every case (see pp. 336-7, nn. 13 and 17).
42. This passage is based on Urbicus ( $\mathrm{C} 27.9-13=\mathrm{T} 29.8-12=\mathrm{L} 69.3-8$ ), but at C 73.36, the important words quo rigore termini desint and quomodo sint reponendi, present in Urbicus (MS B), have been omitted from MS P of the Commentum.
43. At text, line 26, MS P adds non, which is not present in MS B's text of Urbicus (C $27.15-17=$ T $29.15-16=\mathrm{L} 69.12-13$ ).
44. Urbicus' description of the progression ( $\mathrm{T} 29.24-30.2=\mathrm{L} 69.21-70.1$ ) is omitted by the commentator.
45. This is taken from Agennius Urbicus (C $27.31-4=$ T 30.3-6 $=$ L 70.2-4), but omits the point that the dispute does change its appearance (speciem), though not its character.
46. At C 75.1-5, the commentator is apparently trying to explain the defective text at C 27.36-8 $=$ T $30.7-10=\mathrm{L} 70.5-9$. In Thulin's view, this indicated that in the commentator's copy the text had been disturbed in the same way as in MS B.
47. At C 75.16, the words omitted seriously distort the sense; they refer to the integrity required by a surveyor in presenting evidence in a court case, and this is picked up by hoc autem.

# COMMENTARY - HYGINUS 1 

(TRANSLATION pp. 77-9)

SUMMARY



1. At C 77.15-28, Hyginus 1 is apparently referring to a system orientated so that the decumanus maximus ran north-south, and the kardo maximus east-west (see Barthel, $B J$ (1911), 43, n. 1). The surveyor sights from north to south so that east is on his left (see Diagram 8). At lines 15-17, I have accepted Lachmann's supplement of the text (L 111.16-21), on the analogy of 77.18-21; it is not necessary to add 'K. K. I' at text, line 12 (as suggested by Thulin, T 71.15). At 77.26, in place of B's occidentem I have accepted Barthel's proposed reading of orientem, which is required by the sense.

Stones marking centuriae were usually cylindrical. By the phrase 'quae pars ad cardinem spectat' (which I interpret as 'that part of the stone that faces the kardo'), Hyginus 1 seems to be suggesting that K. K. I or V. K. I were to be carved on that part of the stone facing the kardo. For the more detailed description of the numbering of centuriae given by Hyginus 2 (C 139.1-35; 153.32-155.20), see below, p. 385, n. 11 .
2. See also Hyginus 2 (C 141.6-22 $=\mathrm{T} 139.9-140.11=\mathrm{L}$ 174.13-175.14). Legislation provided that every fifth limes from the decumanus maximus or kardo maximus should be wider. There was a possible ambiguity here, in that this might refer either to the limes counted fifth, or to the limes which marked off five centuriae but was in fact sixth because the decumanus maximus was counted as the first. Old maps demonstrated that the quintarius was indeed the limes which closed the fifth centuria after the decumanus maximus or kardo maximus (see below, p. 384, n. 5 and Diagram 10).
3. Hyginus 1 seems to be referring to the fact that, for example, in the case of the first limes beyond the kardo maximus, the inscription on the stone in the closing corner of each centuria would retain this designation right to the edge of the land division system (cf. C 155.9-11; and see p. 384, n. 5).
4. Lex may refer to a colonial charter. Augustus' provision for the measurement of land 'as far as the scythe and plough shall have gone', is also discussed by Hyginus

2 (C 159.14-15; 161.7-13 = T 164.6-8; 166.10-19 = L 201.7-9; 203.14-204.2), who notes differing interpretations. Some held that the phrase referred only to cultivated land, but Hyginus 2 thought that it meant productive land, i.e., any land that could be cultivated. This idea had apparently been made explicit in the wording of Rullus' land law, quoted by Cicero (Leg. Agr. 2.67) - 'which can be ploughed or cultivated'. Hyginus 2 reckoned that Augustus' intention had been to prevent the distribution to settlers of an allocation consisting entirely of wood or pasture land; such areas would normally be assigned to the community as a whole or the owners of adjacent farms (C 157.3-6; 159.18-29 = T 161.4-7; 164.11-165.3 = L 198.3-6; 201.12-202.4). Nevertheless, within the terms of the law, if an individual had a sufficient share of cultivated land, it was possible to make up his allocation with some wood or pasture. Hyginus l's reference to Augustus' law is linked with a map definition including cultivated areas, uncultivated land, and woods. Despite Augustus' efforts to protect the interests of his veterans, this interpretation of his law may have led to the distribution to some veterans of wholly unsuitable land, either through the carelessness or unscrupulousness of officials, or the difficulty in finding enough cultivable land. Certainly in A.D. 14 some veterans complained about their land allocations - 'under the name of fields they received waterlogged swamps or uncultivated mountainsides' (Tac., Ann. 1.17). Of course, if veterans were to receive only cultivated land, it would have to be taken from someone, and since Augustus declined to confiscate land after 31 b.C., that would have greatly increased the cost. He boasted (Res Gestae 16) that he had expended 860 million sesterces in purchasing land for his veterans in 30 and 14 в.c.
5. For the allocation of land by sortition, see Campbell, $C Q$ (1995), where I argue that the sentence here printed at lines $9-10$ was misplaced in the original text at line 14. See also Moatti, APT, 27-30 and Gargola, Lands, 95-8. In my view, the numbers of settlers mentioned (tens in Hyginus 1, threes in Hyginus 2) are exempli gratia, and there is no definite indication in Hyginus 2 that the amount of land should be fixed first and the number of settlers adjusted accordingly (as argued by Gargola, Lands, 96); indeed Hyginus 2 notes that land could be distributed by lot to individual settlers.

For the formal, public nature of sortition and its possible religious overtones, see Gargola, Lands, 97-8; 108-9. Rosenstein, AJPh (1995) emphasizes the political importance of sortition, but doubts its religious significance.
6. This title was added by Thulin on the basis of C 91.16 and 99.34 (T 86.17; 97.10 $=\mathrm{L} 123.16-17$; 133.18), where Hyginus 1 mentions his researches into categories of land.
7. I have accepted Lachmann's view that this passage, found in the Commentum (C $69.4-16=$ T $65.25-66.13=\mathrm{L} 19.15-29$ ), should be attributed to Hyginus 1, on the grounds that at C 99.33 Hyginus 1 says that he has already discussed ius territorium in his writings on categories of land; furthermore, Siculus Flaccus (C 131.32-4 = T $128.16-18=\mathrm{L} 163.27-164.1$ ), who discusses the demarcation of territorial boundaries in a way similar to Hyginus 1 , specifically mentions the distinctive description of territories - 'for the records begin to go round the territories (in their description) and include the names of several locations'. For the use of such descriptions in boundary disputes, see Appendix 4.
8. At L 281-4 there appears a short, independent treatise with the title 'Agrorum quae sit inspectio'. It is found in MS B alone, among the fragments of Agennius Urbicus. As printed, it begins with quotiens quid inter uicinos extiterit ... and ends with securae perpetuitatem possessionis efficerent. However, Thulin (Eranos (1910)) ascribed the passage to Hyginus 1 on grounds of content and style, and printed it accordingly (T 74.24-78.17). This view has been disputed by Toneatto in Sodalitas. Scritti in onore di A. Guarino IV (1984), 1611-12, and presents some difficulties. In particular, in MS B the original order ran as follows: 'ordinem naturalium rerum substituunt ...' (T $77.18=\mathrm{C} 83.9$ ), and this ends with 'occupatorii vero ideo hoc vocabulo utuntur ... possessionis efficerent' ( $\mathrm{T} 78.9-17=$ C $83.21-8$ ). This was then followed by the title 'Agrorum quae sit inspectio' and the section beginning 'quotiens quid inter vicinos extiterit ...' (T $74.24=\mathrm{C} 79.40$ ) and ending 'quin etiam usui, hoc est incepto et incrementis artis' (T 77.17-18 = C 83.8). So, Lachmann and Thulin in their printed texts have reversed the order of two sections of the passage. The result of this is that at $T$ $77.15-21=\mathrm{C} 83.6-11$ (where the end of the passage extracted from Urbicus is joined to its beginning), the combination of ideas is largely meaningless.

If Thulin's hypothesis, that Hyginus 1 is the author of the passage, is correct, we have to assume that loose pages of a manuscript were misplaced and put in reverse order, and that the whole was then added to the text of Urbicus. On the other hand, it is possible that this passage, by some anonymous author, represents material collated by Urbicus. Indeed, if we retain the original order of MS B, it makes good sense. We have a statement in praise of geometry ( $\mathrm{T} 25.27-26.2=\mathrm{C} 23.18-20$ ), and then an expression of disapproval that some surveyors neglect this ( $\mathrm{T} 77.18-21=\mathrm{C} 83.9-10$ ). In addition, the section 'ex antiquitate recipiunt hoc ... quin etiam usui hoc est incepto et incrementis', when placed in its original order, leads naturally into 'adversantur, ne quid in rerum natura finitum esse videatur' (taken by Lachmann and Thulin (T 20.5 $=\mathrm{C} 17.4$ ) as the fragmentary beginning of Urbicus' text) - 'Indeed to the use of skill, that is, its beginning and development, they are opposed, in order that nothing in the natural world may appear capable of being brought under control'. However, the question must remain unresolved and I have decided to print the fragment with the text of Hyginus 1, as suggested by Thulin. For discussion of this passage, I should particularly like to thank Professor Michael Crawford.
9. At C 81.6, the supplement was suggested by Lachmann on the basis of line 3. At text, line 11, MS B has subulis, and I have accepted Lachmann's emendation: subtus (L 281.20). However, Thulin (T 75.19) argued that this was awkward with inferior, and that subulis might be retained on the hypothesis that it stood for scalpris (scalprum - a cutting tool); cf. C 229.8-9 = L 306.28 - inferius subulis inpolitus. Also, at text, line 11, I have retained nominandus of MS B, which makes better sense that Lachmann's ominandus; Thulin suggested opinandus.
10. At text, line 18, MS B has the unattested inflexuosam; Lachmann (L 282.9) suggested inflexura, which is obscure in meaning, and Goesius (1674) aut flexuosam. However the general import about the marking of trees seems clear enough.
11. At C 81.31, I follow Thulin (T 76.13) in adding non, required by the sense of the argument.
12. At text, line 27, MS B has discripserit. I have accepted Thulin's simple emendation to discripserint ( T 76.16 ), and translated accordingly. Lachmann suggested dis-
crepant ( L 282.21 ), but this needlessly repeats the point about different types of cultivation made by discrimina culturae.
13. At text, line 33, MS B has the meaningless illi qui indigere; Lachmann (L 283.6) suggested illi qui id ageret ('the man who was conducting this', i.e. the survey), but Thulin (Eranos (1910), 199) argued convincingly that this was out of place, since at line 32 this man had already been clearly defined by inspector; he therefore suggested illi quae indagaret, which has been translated here.
14. For the difficulties of this passage, see above, n. 8.

For maps associated with the land of the Vestals and priestly colleges, see also Hyginus 1 (C $85.16-20=\mathrm{T} 80.7-13=\mathrm{L} 117.5-11$ ); Siculus Flaccus ( C 131.8-13 = T 127.14-20 = L 162.28-163.4); Hyginus 2 (C 157.7-10 = 161.8-12 = L 198.7-11). Many sacred areas had originally only the outer boundaries and a total area recorded, with no detailed survey or precise land measurement (see particularly C 131.11-13 = T 127.19-20 = L 163.3-4). Of course, if the names and dimensions of temples, tombs, and sacred groves did tally with those on the map, that would be good proof of their genuine antiquity and accuracy.
15. At text, line 14 MS B has ut ex line ariafinalem; Thulin accepted Schulten's proposal ut laciniis arcifinalem ( T 78.5 ). But laciniis appears elsewhere in the Corpus Agrimensorum Romanorum only in the Liber Coloniarum, where, in the context of allocations, it means 'strips of land'; I have accepted Lachmann's suggestion: eis lineis arcifinalem (L 284.6-7), where lineis will refer to the boundary lines demarcating the subseciva.
16. This analysis of occupatorii, in which neither the verb occupare nor any derivative appears, fails to explain the origin of the name, and it is possible that a sentence has been lost from the text (cf. Commentum - C $51.34-5=\mathrm{T} 53.4=\mathrm{L} 2.20$; Siculus Flaccus - C $105.18-21 ; 27-33=$ T 101.12-14; 102.1-8 = L 137.19-21; 138.3-10). According to Siculus Flaccus, occupatorius was 'land to which a victorious people has given a name by occupying it', after the defeat and ejection of the previous inhabitants. Men took as much land as they hoped to be able to cultivate in the future, and tried to establish boundaries as things settled down in the period after conquest. Occupatorius was closely associated and sometimes identified with arcifinius. At C 83.21-8 = T 78.9-17 = L 284.9-17, the early process of conquest and occupation is being described. For types of land, see Appendix 5; also Botteri, Cahiers du Centre G. Glotz (1992).
17. Although ager quaestorius was measured, normally divided up by limites into units of fifty iugera, and recorded on maps, it was distinct from ager centuriatus, which was allocated to Roman settlers by decision of the state. Rudorff in Lachmann, Feldmesser II, 285-8, held that the state conferred only the right of possession of quaestorian land, while the land itself remained public property; discussion in Appendix 5, p. 472-4; see also below, n. 20
18. At text, line 27, I have accepted Thulin's supplement praestituit, which is based on praestitutum (line 27).
19. At text, line 29, MS BP read non tamen universos ...; I have accepted Thulin's suggestion notum est non (he also suggested constat enim non - T 79.3); Lachmann proposed nocet enim non (L 116.2).
20. Vectigales agri were leased to individuals by the Roman state or by local com-
munities for a specific period or in perpetuity. Provided that the lessee paid the rent and the lease had not elapsed, he had undisturbed title which he could pass on to an heir by will, although the land was not inalienable (cf. Gaius, Inst. 3.145, with De Zulueta (1953), 173-4; Digest 6.3 (Paul)); moreover, in the case of leased land, an actio publiciana in rem was available to the lessee for reclaiming property of which he was the owner only in bonis, i.e., without full ownership rights (cf. 6.2.12.2). The vectigal could be calculated either as a proportion of produce, or on the basis of the potential fertility of the soil for each iugerum, established by survey and a statement made by the lessee (C 161.37-45 = T 168.9-169.2 = L 205.9-206.1). The relevant information was often entered on the map, e.g., 'such and such a farm, so many iugera, so much for individual iugera' (C 99.3-9).

Many Italian communities owned land that was leased out, e.g., Cicero's home town, Arpinum, had agri vectigales in Cisalpine Gaul, the rent from which apparently made up all the community's income, out of which it had to pay for religious observances and the upkeep of temples and public buildings; three equites had been sent to administer the property and collect rents from the tenants (Fam. 13.11; cf. the agri vectigales in Cisalpine Gaul belonging to Atella in Campania, ibid., 7). From the imperial period, we find that at Veleia many landholders made declarations of their estates 'subject to deduction of the vectigal' (de Pachtère, La table hypothécaire (1920), 93-5). At Arausio (Orange) part of the land was subject to a municipal vectigal (see Piganiol, Documents, 57-60). For the nature and significance of agri vectigales, see Bove, Ricerche (1960); also Lintott, Imperium Romanum (1993), 80-1.
21. See also C $83.6-11 ; 131.8-13=\mathrm{T} 77.15-21 ; 127.14-20=\mathrm{L}$ 283.18-23; 162.28-163.4. Much of the Vestal Virgins' land was doubtless of ancient origin, confirmed by old titles as Hyginus 1 points out (C 83.6-8); at C $85.17-18=$ T 80.9-11 $=$ L 117.7-9, he means that sometimes the maps of this land recorded only the outer boundary and the total area, with no other detailed measurements or notations.

Augustus seems to have been generous to the Vestals. As chief priest, he was responsible for their discipline and conferred benefits on them including special seats. at the games opposite the praetor's tribunal (Suet., Aug. 31.3; 44.3), the use of the house of the Rex Sacrificulus (Dio 54.27.3), and the privileges of women who had borne children (56.10.2). He may also have bestowed more land on the cult; according to the Liber Coloniarum (C $185.6=$ L $235.6-7$ ), when the emperor allocated part of the land of Lanuvium to veteran soldiers he also granted some to the Vestals. Lanuvium has here perhaps been confused with Lavinium, traditional seat of the cult of the Penates and Vesta (Pais, Colonizzazione, 235).

The Vestals seem to have been legally under the control of the Roman people, though this would be exercised through the Pontifices (cf. Aulus Gellius, Noctes Atticae 1.12.9; 18; Mommsen, Röm. Staatsr. II.1, 54-7). Lands granted to the Vestals presumably had the status of public property; cf. Digest 1.8.9 (Ulpian): 'Sacred places are those dedicated in the name of the state, whether they are in the city or in the country'. Urbicus notes how the guardianship of sacred places was preserved 'according to a law of the Roman people', and how landholders appropriated 'sacred groves whose land undoubtedly belongs to the Roman people ...' (C $45.26-34=\mathrm{T} 48.4-12=\mathrm{L} 56.15-23$ ). We may surmise that rents from the lands of the Vestals were used to pay for the upkeep of the holy rites and the priestesses, with any surplus accruing to the public
treasury. See in general, Guizzi (1968).
22. Cf. Frontinus ( $\mathrm{C} 3.6-14=\mathrm{T} 1.6-16=\mathrm{L} 2.1-4.2$ ); Siculus Flaccus (C 121.20-133.34 = T 118-130 = L 154-165). Crawford (Statutes, 153-4) argues that vetus possessor was a legal category meaning a 'prior (to the relevant moment) (legally recognized) possessor'. He was referring specifically to the context of the occupation of ager publicus, but the definition can be applied more widely. The writers in the Corpus normally use the word redditi in the context of the return of land to veteres possessores, sometimes coupled with commutati, and are probably not referring to ager publicus (C 85.33-4; 87.17; 123.4-11; 125.17-18; 129.24; 143.11-13; 155.39-41; 159.35-7 = Т 81.4-5; 82.13-14; 119.19-27; 122.4-5; 126.8-10; 142.16-19; 160.16-18; 165.10-14 = L 118.2-3; 119.9-10; 155.14-22; 157.22; 161.19-21; 178.6-9; 197.15-17; 202.11-15).

At C $85.21=\mathrm{T} 80.16=\mathrm{L} 117.14$, reddere is unusually associated with the granting of land to veteran soldiers and other people. Yet it can hardly be translated in the neutral sense of 'to hand over' or 'to make over to' (cf. C $85.16=\mathrm{T} 80.8=\mathrm{L} 117.6$ ), since reddere occurs again in the same line with its usual connotation (redditi commutatique); see Crawford, Statutes, 155.

For the lex data see p. 325, n. 23.
23. For jurisdiction, see also Frontinus (C 7.7-26 $=\mathrm{T} 7.1-8.2=\mathrm{L} 17.1-19.4$ ); Urbicus (C $37.25-33 ; 43.4-13=$ T $40.1-10 ; 45.6-15=$ L 80.1-12; 84.19-28); Siculus Flaccus (C 127.23-129.6; 131.14-133.8 $=\mathrm{T}$ 124.9-125.17; 127.21-129.10 $=$ L 159.26-161.2; 163.5-165.24); the views of these writers may be summarized as follows:
(i) In Italy a colony was usually founded on the site of an existing municipium; its lands were appropriated and existing inhabitants would be included in the colony, which had jurisdiction over the lands and urban area of the new community.
(ii) In certain circumstances not all the land of the existing municipium was required for new settlers; surplus lands were restored (redditi) to the original owners, or in some cases exchanged (commutati) for different land elsewhere in the colony, so that the new colonists could have contiguous holdings. Jurisdiction over these lands also belonged to the colony and the original landholders were included in the colony (Hyginus 1 C $85.21-5=$ T 80.14-19 = L 117.12-17).
(iii) If the lands available in the existing municipium were insufficient for the colonists, more were confiscated from the territory of neighbouring communities (ex alieno territorio). Those confiscated lands that were divided and allocated to the colony's settlers belonged to the jurisdiction of the colony and were often called praefecturae (C 11.46-13.2; 127.29-35 = T 15.1-4; 124.17-24 = L 26.6-10; 160.4-11).

But everything else, e.g., unusable land (subseciva) and towns in the territory, remained under the jurisdiction of the community from which the lands had been taken (C 85.40-87.37; 131.35-45 = T 81.11-83.6; 128.19-30 = L 118.9-120.6; 164.3-14). This view was not universally accepted, and in its support Hyginus 1 produces a lengthy analysis of the wording of the laws of the founders of colonies; within the designated boundary of the confiscated and allocated land, the founder granted jurisdiction to the colony only in respect of specified areas - 'lands, places, and buildings I have granted and allocated'; this form of wording was irrelevant, argues Hyginus, if they meant that the colony should have jurisdiction over everything (see also Gargola, Lands, 80-2). And he points to a series of edicts issued by Augustus affirming that only land allo-
cated to the veterans came under the jurisdiction of the colony (C 87.30-4 $=$ T $82.28-83.3=$ L 119.24-120.3).

Moreover, if lands confiscated ex alieno territorio were not in the end required, they could be returned either to the community from which they had been confiscated, or to their original owners; in either case they remained in the jurisdiction of the community from which they had originally been taken (C 85.30-5 $=$ T 80.25-81.6 $=$ L 117.23-118.4). Of course there were some communities that lost all their land to a colony and were left simply as an urban area (Siculus Flaccus - C 131.44-5 = T $128.30=\mathrm{L} 164.13-14$ ). The urban area of a community normally remained under its existing jurisdiction when its land was confiscated, and did not come under the jurisdiction of the neighbouring colony ( $\mathrm{C} 87.3-12=\mathrm{T} 81.23-82.7=\mathrm{L} 118.20-119.4$ ). However, it seems that if a large quantity of land had been confiscated, it might indeed include some of the public urban areas of a community, which therefore passed under the jurisdiction of the colony (Frontinus - C 7.13-20 (with p. 323, n. 18) $=$ T 7.8-15 $=$ L 18.5-19.1).

It was possible that a municipium could have an enclave within the territory of a colony, if, for example, land originally confiscated for the colony was later returned. In these circumstances, emperors occasionally permitted a colony to claim that the inhabitants of such an enclave, although in another jurisdiction, should perform local duties and obligations in the colony (C 43.4-13 (with p. 349, n. 55) $=$ T $45.6-15=$ L 84.19-28). Veyne (Latomus (1959)) has suggested that Caudium and Ligures Baebiani were enclaves in the territory of Beneventum.
(iv) Siculus Flaccus (C $133.1-8=\mathrm{T} 129.3-10=\mathrm{L} 164.17-24$ ) is problematical. While apparently discussing the return of land confiscated ex alieno territorio to the community from which it had been taken, he states that jurisdiction was not granted. This is inconsistent with his own comments at C 131.14-17; 44; 133.29-34 = T 127.21-5; $128.29 ; 130.5-11=\mathrm{L} 163.5-9 ; 164.13 ; 165.18-24$, and the view of Hyginus 1 (C $85.40-87.37=\mathrm{T} 81-83=\mathrm{L} 118-120$ ). It is possible that Flaccus, if not simply in error, means that if lands were given back to a community from which they had been confiscated, after its new boundaries had been officially designated (C 133.1; cf. 3-4 $=\mathrm{T} 129.1-2$; cf. $5=$ L 164.15-17; cf. 19-20), jurisdiction over such land did not fall to that community. Instead it may have belonged to the colony; or perhaps the person conducting the allocation had the right to decide.
(v) If the land taken ex alieno territorio did not suffice for distribution, the colonial founder could on his own initiative take some extra land and grant it to colonists; this was land allocation without division, and probably consisted of small quantities of land granted to individuals (Siculus Flaccus - C 127.38-129.1 = T 125.1-11 = L 160.13-22).
24. For the harmful action of rivers see p. 347, n. 50.
25. At text, line 35, MS B has aquitenales, P aquintinales; I have accepted the emendation ac vicinales proposed by Thulin (T 83.15). Lachmann (L 120.15) suggested atque venales on the basis of Frontinus (De Aquis 94-5), concerning the sale of water.
26. At text, line 3, MS B's minime patentes is not strictly correct since the quintarii were normally supposed to be wider than the other intermediate limites (C 135.37-137.11; 141.5-22 = T 133.10-134.10; 139.8-140.11 = L 168.8-169.9; 174.12-175.14). MS P's minus patentes ('less wide') may be preferable. A law of

Augustus had recommended a width of 40 feet for the DM and 20 for the KM (C $153.25-8=\mathrm{T} 157.9-13=\mathrm{L} 194.9-13$ ), though in practice there were many variations according to the decision of each founder (C 77.3-9; 125.29-127.8; $135.27=$ T 71.3-9; 122.18-123.18; $132.18=$ L 111.9-15; 158.8-159.8; 167.15).
27. Limites were intended to facilitate routine surveying work and to provide a perpetual right of way, either for main thoroughfares, or for those requiring access to their land; being wide enough for a vehicle to pass they also served as a means of transporting farm produce (C 93.38-9; 119.43-4 = T 90.16-18; 117.5-9 = L 127.15-17; 153.7-11). If limites passed through land unsuitable for a roadway, then the road could be moved to better ground and the adjacent landholder could make use of a limes for a wood if he wished ( $\mathrm{C} 47.17-23=\mathrm{T} 49.15-21=\mathrm{L} 89.14-20$ ). The importance of the right of way can be seen from the requirement on landholders to provide access through their own farm buildings if necessary, with doors and even slaves to open them for travellers. A landholder was not permitted to offer a detour to avoid a building on a limes if the new route was less convenient for the people than the former one (C 89.7-12; 125.41-127.8 = T 84.1-7; 123.4-18 = L 120.24-121.6; 158.22-159.8). Since the internal roads in a settlement were based on the layout of the limites in the original survey, the limites not only divided the land into parcels for the settlers, but also provided a framework for equal and convenient access for all.

The principle of public rights of way is also laid down in a clause of the Lex Coloniae Genetivae Iuliae of 44 B.c. (FIRA I. 21. 78; Crawford, Statutes, no. 25) 'whatever public roads and public pathways exist or have existed within those lands which have been granted to the colony, and whatever limites and whatever roads and whatever pathways exist, have existed, or will exist through those fields, let those roads, those limites, and those pathways be public property'. Note also the Lex Agraria (Crawford, Statutes, 151, lines 89-90), 'Whatever [land is in Africa, whatever roads and public ways] there were [in that] land, before Carthage was captured, all those are to be public and the boundary-roads between the centuries [...]'. For limites as rights of way in the surveying texts, see Palma, $A N R W$ II. 14 (1982), 866-77, who emphasizes that the gromatici are more interested in the practical realities arising from the use of limites, than in the strictly legalistic view of the jurists concerning the definition of public and private roads (cf. Digest 43.8.2.21-3).

In the Liber Coloniarum the phrase 'iter populo debetur' or 'non debetur' occurs frequently in descriptions of the foundation of settlements and the distribution of land. Saumagne argued that the right of way was intended to define a real connection of servitus, the effect of which was to place on private property an easement to provide permanent passage for the profit of the public domain (Revue de Philologie (1928)); for servitus in rural areas, see p. 375, n. 26; for the definitions of various rights of way, see below n. 49. Saumagne's view does not explain why in many cases the width defined for the right of way is so extensive (they range from 10 to 120 feet). This variation may reflect the fact that the rights of way applied both to minor roads passing through private property, and to main roads that happened to run through a settlement's territory. Since public roads did not always run on public land, but sometimes, especially in the territory of a colony, used the route taken by local roads, they required a servitude for transit. The original founders presumably established extremes for each community, depending on local conditions and the width of existing roads,
and it is possible that they were principally concerned to ensure the rapid deployment of the veteran soldiers, who often made up the settlers. However, on some occasions the public road ran entirely on land belonging to the state, in which case there was no need for a servitude; discussion in Palma, op. cit., 871-3.
28. Hyginus 1 is probably referring to the foundation of Poetovio (Ptuj) by Trajan (cf. ILS 2462; 9085) soon after the Dacian Wars, or possibly before the end of A.D. 102, since in the passage Hyginus does not ascribe the title Dacicus to the emperor, which was granted at the end of 102 . The term evocatus denotes a soldier retained beyond the normal service span, often to perform specialist tasks.

Hyginus begins by describing how the surveyor recorded precise dimensions for each settler's allocation. He then compliments in more general terms earlier surveyors for their diligence in noting the area of incomplete centuriae. When he returns to Trajan's surveyor at C $89.22-7=\mathrm{T} 84.20-6=\mathrm{L} 121.18-24$, he may have in mind allocations at the edge of the settlement; if the surveyor recorded the area of an incomplete centuria and the area and exact dimensions of individual allotments, it would be possible to identify and work out precisely the area of the subseciva in that centuria. This was the personal initiative of one man, and it is difficult to see how in large settlements this amount of detail could be included on the map; however, surveyors could have used the records and registers that accompanied the map.
29. For public property in the provinces, see p. 323, n. 19.
30. The ratio of a Roman foot to a Ptolemaic was $1: 1+1 / 24$. Therefore, the total of 1,250 iugera measured in Ptolemaic feet must be multiplied twice by a factor of $1+1 / 24$ to acquire the Roman equivalent for the square measure: $1250 \times(1+1 / 24) \times(1+1 / 24)=$ 1,356.3367, or $1,3561 / 3$ Roman iugera in round figures (see Lachmann, Feldmesser II, 421, though with a misprint of $1,302 \frac{1}{3}$ instead of $1,3561 / 3$ ); see also Favory in ClavelLévêque, Cadastres, 88, n. 95.

In order to express in square Roman feet the area of a Ptolemaic iugerum (240 $\times 120=28,800$ square Ptolemaic feet $): 240 \times(1+1 / 24)=250 \times(120 \times 1+1 / 24=125)=$ 31,250 square feet.
31. At C 91.8, I accept Lachmann's explanation (L 123.8 ad loc.; cf. Feldmesser II, $282 \mathrm{n} .143)$ : unиm $(1=28,800)+$ uncia $(1 / 12=2,400)+$ dimidium scripulum $(1 / 576=50)$ $=31,250$ square feet.
32. The Tungri were a tribe located in north-east Gaul with their tribal capital at the town of Atuatuca Tungrorum (modern Tongeren or Tongres). The pes Drusianus presumably got its name from Nero Claudius Drusus Germanicus, who was son of Ti. Claudius Nero and Livia, and younger brother of the future emperor Tiberius. In 13 в.c. Drusus organized the census in the three Gauls, and from 12-9 was involved in campaigns in Germany aimed at subduing the area between the Rhine and the Elbe, for which he was awarded an ovatio in 10 b.c. In 9 b.C. Drusus was consul, but, having resumed campaigning in Germany, he died after a fall from his horse. That a unit of measurement was named after him may indicate his ambitions for land division and settlement in the area.
33. This title was added by Thulin. The text of Hyginus 1 ends at this point in MS P, but MS G, which contains the Commentum, is usually cited to supplement B.
34. The community involved here was Pisaurum at the mouth of the river Pisaurus (modern Foglia); cf. Siculus Flaccus (C 125.15-28 = T 122.1-17 = L 157.18-158.7). At

C $91.22-7=\mathrm{T} 87.4-11=\mathrm{L}$ 124.3-10, Hyginus is not in my view referring to ius alluvionis (see p. 347, n. 50). He simply means that landholders living in ager occupatorius or arcifinalis cannot reclaim lost land because there are no maps, whereas in allocated lands there are maps, and the possessor loses nothing because his area of land and its exact shape are known and can be restored. Similarly, if an island appeared a surveyor could work out how much of its area adjacent landholders were entitled to claim.
35. See Appendix 5, p. 474.
36. For the Lex Mamilia, see p. 321, n. 11. At text, line 13, finis enim multis documentis seruabitur occurs in MS G but is omitted in B; in quo intuendum, omitted in both MSS, should be transferred from line 19, as Blume suggested (T 89.6); id ... fuit is a gloss. There is no need to delete lines 18-19, as suggested by Lachmann.
37. For boundary-marking techniques, see Appendix 4; for trees, see p. 372, n. 24.
38. At C 95.5, I translate utrius partis of MS B; Lachmann (L 128.6; T 91.6) preferred MS G's utriusque sit partis, but this seems unnecessary.
39. Cf. Urbicus ( $\mathrm{C} 29.40-6=\mathrm{T} 32.11-18=\mathrm{L} 73.21-8$ ); Siculus Flaccus (C $109.37-46=$ T $107.3-13=$ L 143.3-13). Terraces were often used in agri arcifinii to demarcate boundaries (see also p. 338, n. 24). Some people held that it was every man for himself in deciding where the boundary lay. But the established principle among surveyors was that the interests of the landholder on the higher ground prevailed, and he could claim land right down to level ground below, if there were no boundary stones. The landholder on the level ground must not take any action, such as ploughing or digging, that might be detrimental to the interests of the man above.
40. Since the limes has width, when it formed a communal boundary, the actual boundary line was considered to be in the middle of the limes; when it formed a private boundary, the boundary line was held to run along the outside edge of the limes.
41. Hyginus 1 means that if trees growing on a disputed site are identical in type and age with those growing on the land of a neighbouring landholder, they would offer a good indication that the disputed area belonged to this man; the surveyor would have to make a careful inspection of the characteristics of the trees, and identify any that had been deliberately planted to mark the boundary; vines could provide similar confirmation. See also p. 372, n. 24.
42. At text, line 24, Thulin, probably rightly, accepted Lachmann's suggestion of a lacuna ( $94.15=\mathrm{L} 131.9$ ). He suggested a supplement taken from Siculus Flaccus (C $109.29=$ T $106.24=$ L 142.23-4), who notes that trust could be established in deliberately constructed markers: si intelligitur ea industria conuenientiaque possessorum fieri - 'if it is understood that this was done deliberately and with the agreement of the landholders'.
43. See Appendix 5, p. 474.
44. There is a survey of the evidence for Vespasian's veteran settlements in Italy in Keppie, PBSR (1984), 91-104.
45. At text, line 4, there is a lacuna, for which Lachmann suggested the supplement: nascuntur nisi agrum ex cautione - 'great disputes arise unless they can demonstrate ... through an agreement of purchase or renting' (L 132.9; T 95.16).
46. The phrase in singulis iugeris tantum means that a record was kept of the rent per iugerum; cf. Piganiol, Documents, 338-41.
47. For subseciva, see p. 320 , n. 8 . At C $99.30-2=$ T $97.6-8=$ L 133.14-16, Hyginus

1 means that his book contained a collection of imperial decisions on a range of matters relating to the land. There is therefore no need to suppose that the reference to Nerva implies that he found it necessary to complete or extend Domitian's measures on subseciva.
48. At text, line 33, MS B has limitibus praedictis. This might perhaps be interpreted as 'prescribed' or 'established' (by surveyors). Lachmann, however, on the basis of Siculus Flaccus ( $\mathrm{C} 131.30=\mathrm{T} 128.13=\mathrm{L} 163.25$ ), suggested perpetuis - 'permanent limites' (L 134.1-2). I have preferred Thulin's emendation limitibus perductis - 'extension of limites' (T 97.17).
49. Cf. Urbicus ( $\mathrm{C} 47.24-7=\mathrm{T} 49.22-5=\mathrm{L}$ 89.21-4); Isidore, De Agris (C $273.32-275.5=\mathrm{L} 370.10-30$ ). In the question of rights of way, there was a fine linguistic distinction between via, iter, actus, and ambitus. We may note Ulpian's basic definition relating to servitudes (Digest 8.3.1; cf. 3.7 (Paul); 3.12 (Modestinus)): iter referred to a pathway or passage for a man with no draught-animal; actus referred to the right of bringing a beast or a vehicle; so a man who had the right to a pathway had not the right to bring a draught-animal or a vehicle; a man who had the right to an actus naturally also had the right of walking without a draught-animal; via subsumed walking, driving an animal, or bringing a vehicle. Gaius argued, on the basis of a law of the Twelve Tablets, that a via subject to right of way should be at least 8 feet wide if straight, 16 at bends (8.3.8), but Paul (3.23) held that a via subject to right of way could be less than 8 feet wide, provided that it was passable for a vehicle; otherwise it was classed as an iter. According to Isidore (C 275.3), an ambitus was a $21 / 2$ feet passageway to provide a way through between neighbouring buildings.

# COMMENTARY — SICULUS FLACCUS 

(TRANSLATION pp. 103-5)

SUMMARY

C 103.1-105.26 - categories of land and their origins
C 105.27-119.28 - agri occupatorii; boundary marking methods therein including stones (and the importance of ceremonies associated with Terminus), terraces, trees, roads, thorn bushes, ditches, walls, rivers, regional differences
C 119.29-121.19 - agri quaestorii; origins, division and distribution by limites; origin of term centuria
C 121.20-127.8 - allocated land; terminology, history, layout, map notations of different types of allocation, inclusion of width of rivers and limites in the allocation, rights of way
C 127.9-22 - size of centuriae
C 127.23-129.6 - definition of praefecturae; grant of extra land to individuals; return of land
C 129.7-131.25 - settlement patterns and their effect on the appearance of the land; subseciva; land held by priestly colleges
C 131.26-133.21 - territorial boundaries; jurisdiction; boundaries of pagi
C 133.22-28 - survival of boundary stones of the Gracchi and Sulla
C 133.29-34 - jurisdiction in allocated lands

1. For Siculus Flaccus, see pp. xxxvii-ix. Note the translation (into French) and commentary by Clavel-Lévêque and others ( $S F$ (1993)).
2. At text, line 16, it is curious that there is no reference in the MSS to municipia, since Flaccus does make a clear distinction between coloniae and municipia (С 103.19-23; 131.26-7; 35-9 = T 99.7-12; 128.8-9; 19-26 = L 135.18-23; 163.20-1; 164.3-10). In my translation I have accepted Thulin's suggestion that aut municipia was lost from the text after coloniae (taking coloniae and praefecturae as nominative case). Clavel-Lévêque ( $S F 5$, n. 4) argued strangely that Siculus Flaccus' use of coloniae subsumed municipia and was a form of abbreviation.
3. The etymology of municipium in the context of early communities in Italy, is best explained by Brunt, IM, 525-7. A municipium was a community of municipes, that is, people who accepted munia. Since the root mei-, on which munia and munera are based, means 'exchange', munia may be interpreted as 'obligations' originally undertaken by the municipes in a city that was not their own. Such obligations, might be owed by municipia in the first instance to Rome, but perhaps in some cases to a colony (cf. C $43.4-13=\mathrm{T} 45.6-15=\mathrm{L} 84.19-28$ ). At text, line 18 , I take munificentia to refer to the duties and obligations owed by a municipium (for this use cf. also C $155.36=$ T 160.13 = L 197.12 'nec ullam coloniae munificentiam deberent ...').
4. At least down to the end of the Second Punic War, all citizen-colonies were founded on the coast, with the object of protecting the sea approaches to Roman territory. According to Siculus Flaccus they were called coloniae maritimae (cf. Livy 27.38.3; 36.3.4, who refers to the settlers as coloni maritimi). The settlers were not
expected to fight at sea, but to resist invaders by preventing their landing, or by fighting them on the shore or in the hinterland. Consequently special rules applied to the coloni: they were in some circumstances exempt from service in the legions; they were not to be away from their colony for more than thirty days; they were not to be absent at night in time of war. However, many of these colonies were also intended to protect vital land communications (Salmon, RCR, 70-81; Briscoe, A Commentary on Livy Books XXXIV-XXXVII (1981), 222).
5. The lacuna at C 102.29 may have contained a summary of other reasons for colonization. Lachmann suggested the supplement ut cum vellet. He presumably intended to construe: 'Then other reasons multiplied, as when Gracchus wished to assign ...'.
6. Siculus Flaccus seems to say that one of the Gracchi introduced a law forbidding anyone in Italy from owning more than 200 iugera. Stockton (The Gracchi (1979), 131, n. 40) assumes that this refers to Gaius Gracchus and discounts it. Tiberius Gracchus, one of whose motives was certainly to increase the citizen population, introduced a lex agraria, but the weight of other evidence indicates that he intended to redistribute to landless citizens holdings of ager publicus reclaimed from people who had occupied more than the 500 iugera permitted by law (see Astin, Scipio Aemilianus (1967), 191-201; Stockton, op. cit., 40-60; Brunt, Social Conflicts in the Roman Republic (1971), 76-92). And a speech delivered by Cato in 167 B.C. confirms that the accepted limit for occupation of ager publicus was 500 iugera (Malcovati, Oratorum Romanorum Fragmenta Liberae Rei Publicae, p. 65, 167; Astin, Cato the Censor (1978), 242). Stockton may be right to suggest that Siculus Flaccus referred to the maximum size of allocations in some colonies set up by Gaius Gracchus. The agrarian law of 111 b.C. seemingly refers to a maximum allocation of 200 iugera under the Lex Rubria in the Gracchan colony of Junonia at Carthage (Crawford, Statutes, 119.60).

On the other hand, Mommsen, Gesammelte Schriften I (1905), 96, wished to emend the text of Siculus Flaccus to $M(1,000)$, which would refer to the provisions of Gracchan legislation that each man could hold 500 iugera, with an additional 250 iugera for each child, up to a total of two (see Crawford, Statutes, 155).
7. For land owned by the Roman people, see p. 323, n. 19; for agri quaestorii and other categories of land, see Appendix 5. Reate was a Sabine city in Regio IV.
8. At text, lines 8-20, there are several textual problems:
line 9 - Goesius, in his edition of 1674 , took insessarum to mean 'quae certam sedem non habent', i.e., peoples who did not have a settled abode. But this does not fit the meanings of insideo or insido. It seems better to take insessarum as perfect participle passive of insido, and translate 'peoples who had been settled', i.e. established peoples. Thulin's suggestion of diversarum is unnecessary.
line 10 - I have accepted Thulin's emendation of mutarent sedem for MS P's meaningless mutantes id.
line 11 - I have followed Clavel-Lévêque, $S F, 11, \mathrm{n} .11$ in punctuating with a full stop after Libie $[m]$. However, in line 12 I retain the supplement in (suggested by Turnebus in his edition of 1554), understanding finibus from later in the sentence. lines 12-13 - I have followed Thulin in his rejection of the untranslatable quas Frigiis Diomedis fines. quae etiam socii, as a confused gloss.

Fryges $=$ Phrygians; used by poets to refer to the Trojans, who in legend migrated to Italy under the leadership of Aeneas, after the sack of Troy by the Greeks.

Diomedes (leader of the men of Argos and Tiryns in the Trojan War); one legend claimed that Diomedes after the sack of Troy, finding that his wife Aegialeia had been unfaithful, left Greece and settled in Italy in the region of Apulia. There was an area known as the 'plain of Diomedes' in the vicinity of Cannae in Apulia (Livy 25.12.5; Silius Italicus 8.241; Paul, Fest. 66L). It was also alleged that Diomedes under the protection of the local king Daunus (Daunia was another name for Apulia Paul, Fest. 60L) had founded a settlement in Apulia (Virgil, Aen. 8.9; Ovid, Metam. 14.475 ff .). This was usually identified by the ancients, largely on the basis of the name (Strabo 5.215; 6.284; Pliny, NH 3.104), with Argos Hippion or Argyrippa (Arpi), a town located in the centre of the Tavoliere. There was also an insula Diomedis, an island off the coast of Apulia where Diomedes was allegedly buried.

Macedonians in Libya; Libya was the Greek name for North Africa. The known Greek colonies in this area were not settled from Macedonia; so Siculus Flaccus may be referring to the activities of the Macedonian Ptolemaic dynasty of Egypt. Ptolemy III (246-221 B.C.) refounded two existing communities: Euhesperides, perhaps founded by the Greek colony of Cyrene in the sixth century b.c. and then moved to a new site and rebuilt c. 246; it was named Berenice (Benghazi) after Ptolemy's wife; the port of Barke, colony of Cyrene, built on the site of an earlier Greek settlement of the seventh century B.C., and refounded by Ptolemy with the name Ptolemais (Tolmeita).

The Tyrreni in Gaul; Tyrr(h)enus represents the Greek name corresponding to Tuscus, and was used especially by poets to refer to the Etruscans. The Etruscans established cities in the valley of the river Po perhaps $c .525$ b.C., and their influence extended as far as the southern Alps near Comum, and in the North-East as far as Venetia (see Ogilvie, Early Rome and the Etruscans (1976), 159-61; CAH VII.2, 302-6; Cornell, The Beginnings of Rome (1995), 313-18).

The Gauls and their allies in Asia; in 278 b.c. after a series of raids by Celtic peoples, one group crossed the Hellespont and eventually settled in districts of Phrygia and Cappadocia, subsequently called Galatia. The state was organized on a tribal basis, and three tribes dwelt around three tribal capitals - Ancyra, Pessinus, and Tavium. A Celtic dialect was still spoken in Galatia in the fifth century A.D. The districts occupied by the Celts formed part of the Roman province of Galatia, created in 25 b.c.

None of these cases precisely illustrates the point that Flaccus is trying to make about the development of municipia and the acquisition of more land, and it seems that he has assembled a list of famous examples to emphasize the general observation that migration and territorial disruption are common features of early history.
9. I have followed Thulin in excluding text, line 14 as a confused gloss referring to civibus in line 15 . In my view, $h i$ in line 14 will refer to the settlers from Rome involved in the foundation of early communities. At text, line 15, Lachmann (followed in Clavel-Lévêque, $S F, 13, \mathrm{n} .14$ ) replaced civibus of MS P with hostibus. But this is unnecessary. Siculus Flaccus means that the citizens of the communities under attack were driven away.

At text, lines $18-19$, Thulin argued, probably rightly, that these lines are a gloss constructed from 24 and 28 . Line 20 also seems out of place, perhaps being repeated from $24-5$. On the other hand, I have retained the sentence bracketed as
a gloss by Thulin at line 16, since it is possible that Flaccus was referring to his intention to treat the definition of territory elsewhere. The subject is not raised again in his extant work, but that means little since we do not know how much of his work has been lost.
10. For the etymology, see Frontinus (C 3.27-8); categories of land are examined in Appendix 5; for the distribution and management of public land, see Gargola, Lands, 129-46.
11. At C 104.38, I retain appellant of MS P, omitted by Thulin. At 106.4-5, we should understand ex conuenienti (termino) ad conuenientem (terminum), i.e. boundary markers agreed by the landholders; uiderit similiter should be omitted as a gloss.
12. Coxa means 'hip' or 'haunch'; OLD s.v. coxa 2 cites the meaning 're-entrant angle', based on this passage in Siculus Flaccus and also C 117.46-119.1. Yet this does not seem appropriate. Coxa also appears in the treatise De Munitionibus Castrorum 54; 58; here it apparently means a projection or a jutting-out angle of a fort; this was something to be avoided because it might expose the defenders to attack (cf. Vitruvius, De Arch. 1.5.2 - 'when angles project, defence is difficult'). I suggest that in the gromatici coxa means 'projecting' or 'convex'; contrast Guillaumin, REA (1988).
13. For boundary marking practices, see Appendix 4; Toneatto (1984) analyses the types of boundary marking discussed by Siculus Flaccus, with a comparison of his treatment of the topic and that of Hyginus 1. The decus or decussis (from decem = ten) carved on top of a boundary stone was literally an X-shaped mark, and normally indicated the intersection of two boundary lines; see Bosio, Mem. stor. forogiuliesi (1965). Some surviving Gracchan boundary stones are marked with a simple cross: Warmington, p. 168, no. $24=\operatorname{ILLRP} 470$; Pani, RIL (1977), 393; Grelle, Ostraka (1994), 252; scholars assume that this can be identified with the decussis, but surveyors perhaps originally intended to keep the decussis to mark intersections that were not right-angled.
14. For the religious observances associated with Terminus, the spirit of boundary markers, see also Ovid, Fasti 2.639-84. Each year on 23 February at the Terminalia, neighbouring landholders met together to renew the power of Terminus by sacrifice, and to hold a feast. All this is a good indication of the importance of established land boundaries for the early Romans - 'Every field will be a subject of litigation without you' (Fasti 2.660). Terminus also represented the inviolability of Rome's boundaries, and was worshipped on the Capitol, where traditionally he had been present before the temple of Jupiter Optimus Maximus was built, and refused to move. So, he shared the temple with Jupiter and there was an opening in the temple roof above Terminus, because out of respect for his origins he had to be below an open sky (cf. Dumézil, La religion romaine archaïque (1966), 203-6). The religious aspects of Roman boundary marking practices, and the role of Terminus, are discussed in detail by Piccaluga, Terminus (1974), especially 98-122.
15. At C 109.4-7, Siculus Flaccus uses possessores (landholders) and domini (landowners) indiscriminately (see also p. 338, n. 27).
16. Siculus Flaccus means that in some properties boundary stones were placed only at the beginning and end of the boundary, designating where the land of neighbours began, whereas in others they were positioned at intervals all along the boundary line. See Compatangelo, Le Salento romain (1989), 95-108 for a good account of
the difficulties of identifying boundary-marking stones in Apulia.
17. At text, line 22, I have retained MS P's quoniam; Thulin suggested quom.
18. Supercilia or terraces are frequently cited by the Agrimensores as boundary markers. They therefore discussed them carefully in terms of structure, since if the incline was more than 30 feet it was to be defined as a hill (collis). But the writers are principally concerned to teach surveyors where to look for the boundary on supercilia (cf. C 5.27; 29.40-31.4; 93.19; 95.19-23; 97.29; $105.41 ; 119.9$ = T 5.9; 32.11-24; 89.10; 91.19-92.2; 94.13; 102.17; 115.23 = L 12.7; 73.21-8; 126.12; 128.15-20; 131.7; 138.19; 151.23; also p. 322. n. 13; p. 338, n. 24).

At text, line 34, I have accepted Thulin's suggestion of cedantur for MS P's cedant ius.
19. At C 111.11, I have translated Thulin's suggestion of culta in for MS P's cultis.
20. This probably means that these trees were allowed to grow unhindered.
21. For the Lex Mamilia, see p. 321, n. 11.
22. The point is that larger trees indicating a boundary are marked out, not just by their size, but also because the neighbouring trees are of a different type. In line 28 his refers to the boundary-marking trees, and eas to the other trees that are different.
23. At text, lines 29-31, following Lachmann's punctuation (L 144.28-145.3), I read: ' ... utrum hae quae finales videbuntur arbores habeant in alterutra parte similes. quae utrimque tales habeant, una re videbuntur (i.e. finales esse), si notatae sint'. Siculus Flaccus means that trees did not have to be marked to indicate a boundary; the size and type of tree might suffice (cf. C 111.34-8; 43-6; and see below, n. 24). But if there was any kind of uncertainty then marks cut on the tree were the only definite test.

Thulin (T $108.28-109.2$, reading $a n$ for quae) preferred to punctuate: '.. utrum hae quae finales videbuntur arbores habeant in alterutra parte similes, an utrimque tales habeant. una re videbuntur, si notatae sint'. But in this case, the general statement 'una re ... sint' seems inappropriate, since it is true only in so far as it refers to circumstances where trees on both sides were similar to the supposed boundary-marking trees; it is incorrect to say that the marking of trees was the only criterion for boundary demarcation (cf. the translation in Clavel-Lévêque, $S F, 33$, which seems, however, to be contradicted by Toneatto's comments, ibid., n. 41).
24. Trees were an important aspect of boundary marking and the severe penalties laid down for those who overturned boundary stones also applied to those who removed trees. Siculus Flaccus aims to provide a clear and coherent guide for the recognition of trees as boundary markers (there is a useful discussion in Toneatto (1984), 1623-31):
(1) Unmarked Trees
(i) Trees could be left growing naturally on a boundary (Flaccus may have in mind arbores ante missae (see p. 319, n. 7)).
(ii) One type of tree was left on a boundary by cutting down all other types.
(iii) A type of tree different from others in the vicinity could be deliberately planted.
(iv) Trees that were larger than neighbouring trees could serve as boundary markers though it might be necessary to provide further proof.
(2) Marked Trees (cf. also C $31.40-4=\mathrm{T} 34.13-17=\mathrm{L} 75.10-13$ )
(i) Trees owned in common by two landholders were marked on both sides.
(ii) Trees relating to one property were marked with a broad gash on one side, and they belonged to the property facing the side of the tree where there was no mark.
(iii) Trees marking a curve in a boundary had special marks.

Surveyors had to decide which trees marked a boundary, and also who owned the trees, since trees were sometimes planted by agreement and shared, while some landholders planted trees on their own land. If trees were left to grow naturally on properties, the surveyor was to compare neighbouring types and recognize a boundary by the differences between them; so, if the supposed boundary trees ( 1 x and 1 y below) had trees of a similar type on only one side of them, then they could be accepted as demarcating a boundary:
$2 \mathrm{xxxxxxxxxxxx}^{x}$
$1 \mathrm{xxxxxxxxxxx}_{x}$
(boundary)
1 y y у у у у у у у y
2 y y y y y y y y y
However, if the trees on both sides were of a similar type, then further proof (i.e. marks) would be needed:

X X X X X X X X X X X X
X X X X X X X X X X X X
xxxxxxxxxxxx (boundary, with marked trees)
X X X X X X X X X X X X
X X X X X X X X X X X X
If a unique type of tree had been planted, that was normally a good guide to a boundary:

## xxyxxxxxxx


zzzzzzzzzzz (boundary)
y y y y y y y y y y
ууууууууууу
At C $113.1-5=\mathrm{T} 109.6-12=\mathrm{L} 145.7-13$, Siculus Flaccus is simply making a cautionary comment on this situation; the surveyor should not assume that the line of trees marked z was owned in common, since it might have been deliberately planted by one owner.
25. This passage provides valuable information on maintenance of roads in Italy. In the Republic the responsibility for organizing the construction of roads lay primarily with the censors or other senior magistrates; for example, the Via Appia was begun by the censor Appius Claudius Caecus in 312 b.C., who built the section 132 miles long between Rome and Capua (Livy 9.29.6-7); the road was eventually extended as far as Brundisium. There was, therefore, little coherent policy, and Augustus found the roads of Italy in a poor state. He took the matter in hand in 27 B.C. by repairing the Via Flaminia at his own expense and ordering other senators to see to the repairs of individual roads from their own purses. However the senators were reluctant and the repair operation was tardy, requiring a substantial cash subvention from Augustus himself (Dio 53.22.1-3; ILS $84=$ EJ 286). The various responsibilities are nicely stated by a denarius of 16 b.C., which depicts a boundary stone with the inscription: 'The Senate and People of Rome in honour of Imperator Caesar
because the roads were repaired out of the money which he lodged in the treasury' (EJ 287). In 20 b.C. Augustus was appointed curator of all the roads in the vicinity of Rome; in this capacity he erected the golden milestone, which marked the point where the main roads met in the Forum; but he also established a board of senatorial curatores of praetorian rank for the construction and maintenance of roads (Dio 54.8.4). It seems that they took responsibility for individual roads, although the emperor continued to intervene personally (cf. $I L S 9371=E J 288$ - a milestone of $2 / 1$ B.c. found near Bononia, recording the repair of the Via Aemilia by Augustus from Ariminum to the river Trebia). This practice was continued by his successors; the Via Appia needed the attention of Caracalla in A.D. 216 - 'Caracalla ... onwards from this white stone over a distance of 21 miles at his own expense, with new paving stones repaired the road, which had been incompetently laid and which had decayed, so that it should provide a firmer surface for travellers' (ILS 5822).

As Siculus Flaccus explains, public highways were repaired by contractors, to pay for which a set sum was collected from adjacent landholders on a regular basis; the justification will have been that they gained most benefit from a public amenity. Doubtless the state covered additional expenses and any shortfall in funds. Furthermore, emperors could intervene, and the combination of responsibilities may be seen in an inscription of A.D. 123, which records how Hadrian repaired the Via Appia, which had fallen out of use through long neglect, by adding a sum of money to that contributed by the landholders (ILS 5875). According to Hyginus 2, some public highways were called 'military roads' (C 137.6-7 = T $134.4=\mathrm{L} 169.3$; C $189.34=$ L 241.7); this may have been a temporary designation for certain roads considered to have strategic importance.

Local roads were the responsibility of the communities through which they ran, and again those owning land adjacent to a road were responsible for its upkeep either through their own labour or by payments.

Outside Italy, provincial governors assumed responsibility for the construction and repair of roads, and could often call upon the assistance of the army since many roads were constructed primarily for military purposes; nevertheless, in inhabited areas the expense fell on the local communities through which roads passed: 'By the authority of the emperor Caesar Trajan Hadrian Augustus a new road from Cirta to Rusicade was laid by means of the landholders of the territory of the people of Cirta' (ILS 5873), though sometimes there was imperial assistance; so Hadrian himself paid for the bridges on this road (ILS 5872; cf. 5874).

Siculus Flaccus' classification of roads is perfectly explicable in terms of the concerns of land surveyors, who were principally interested in the land, access to it, and the relationship of the land division framework to the network of paths that emerged from it. So, Flaccus divides roads firstly into public highways and local roads. In the absence of adequate local roads, rights of way were provided through private property, and sometimes small roads were formally agreed, maintained, and shared by two landholders (viae communales); such roads could be defined in general terms as privatae. There is an excellent analysis of the legal definitions of Roman roads by Palma ( $A N R W$ (1982), especially 866-77), who correctly emphasizes the distinction between the surveying writers, who are principally interested in the practicalities of the use of roads and their organization for the benefit of those whom they served, and the
lawyers (represented by Ulpian), who took a strictly legalistic view in respect of the definitions of public and private roads. To Palma's bibliography, add Cursi, BIDR (1989-90), who unfortunately contributes little new; note also Paz López Paz, La Ciudad romana (1994), 289-300; for a general survey of Roman road building, see Chevallier, Roman Roads (1989); a list of curatores viarum is compiled by Coarelli in Scritti di archeologia e storia dell'arte in onore di Carlo Pietrangeli (1996), 57-60.
26. Servitus refers to an easement permitting an individual to make use of property not belonging to him, normally in respect of right of way (Digest 8.3; 43.19). The phrase ita ut maximus optimusque est $(\mathrm{C} 113.29=\mathrm{T} 110.19-20=\mathrm{L} 146.19)$ is explained by Paul (Digest 50.16.169) - 'The phrase "In the best possible condition" is added not only in contracts but also in purchases stipulations and wills, and means that the land is guaranteed to be free from obligations but not that servitudes are due to it' (cf. 50.16.90; 18.1.59; C. G. Bruns, Fontes Iuris Romani Antiqui (1919), no. $135=$ $F I R A^{2}$ 3, no. 92; Buckland, TRL, 261-8; 488-9).

So, the phrase ita ut optimus maximusque est, as normally employed at transfers of property, does not fit the context of Siculus Flaccus' account. He may have used the phrase carelessly as something which he knew was associated with the legal process of servitudines.
27. At text, line 8, I read ipsarum (referring to the ditches), instead of ipsorum of the MSS.
28. At text, line 19, Lachmann suggested the addition of est enim iustum in place of MS P's etenim, because the text has no verb governing the infinitive oportere (L 148.20-2). Thulin prosposed 〈eluc〉et enim (T 112.23-5). But this seems unnecessary, and from the context of the whole section we should perhaps understand respiciendum est.
29. At text, line 25 , I retain enim of MS P and punctuate with a semi-colon after intelligitur, since this is required by the sense of the passage.

Compatangelo, Le Salento romain (1989), 108-16 discusses archaeological evidence for the use of walls as boundary markers in Apulia.
30. At text, line 2, MS P has non interuenientibus quae erunt uiis, quibus ambigatur

This is accepted by Clavel-Lévêque, $S F, 45$, n. 47, but the translation is obscure, and, as Toneatto points out (ibid.), it is difficult to understand why roads should be mentioned in this context. Of the suggested emendations, Lachmann's qualitatibus (L 149.23) seems an improbable corruption of the original text. I have translated Schulten's querellis, understanding Siculus Flaccus to be referring to some of the doubts that he discussed above ( $\mathrm{C} 115.31-46=\mathrm{T} 113.4-22=\mathrm{L} 149.3-20$ ), about the definition of boundary markers in various areas.

At text, line 4, Thulin may be right in thinking that eae should be preferred to the $e a$ of MS P (T 113.28-9), since the word must refer to the ditches.
31. At text, line 18, finem of MS P may be retained, if it is taken in apposition to tractum riui - 'stretch of a stream (serving as) a boundary'.
32. In the phrase riuo recto, the adjective rectus probably refers to the use of the river as a 'proper' or 'accepted' boundary, not its direction. At text, line 23, curvoque should be deleted as a later gloss.
33. For rivers and the problems of erosion, see p. 347, nn. 49-50. At text, line 25, MS P has repetitio finium addatur; the context requires the idea that land cannot be
claimed back in these circumstances (cf. Hyginus $1-$ C $91.22-4=\mathrm{T} 87.4-7=\mathrm{L}$ 124.3-6). Lachmann proposed non datur, but the suggestion haud datur relayed by Thulin seems preferable, since it is easier to explain the corruption.
34. The MSS have mutando, but it is difficult to see a real distinction between cambiare and mutare, which refer to the circumstances where a previous landholder was offered land in exchange for his original holding. Thulin's mut $(u\rangle$ ando (from mutuari), which normally means 'to borrow', may suggest the commutation of land as some kind of surety. It is possible, however, that mutando is a gloss.
35. At text, line 15 , propter quaestorios agros, which is perhaps a muddled reference to lines $30-2$, should be deleted.
36. For the etymology of decumanus, see p. 326, n. 26.
37. This sentence seems to mean that in quaestorian lands where the original divisions had disappeared, boundary markers similar to those in agri occupatorii might be used.
38. For the derivation of limes, see C 10.8-12.
39. Cf. Commentum ( $\mathrm{C} 51.29-31=\mathrm{T} 52.25-53.1=\mathrm{L} 2.14-17$ ). Both authors refer to the traditional view that Romulus established the heredium (a plot of inalienable land reserved for the heir) of a Roman citizen as two iugera (Varro, $R R$ 1.10.2). If it is true that in early Rome the family or clan formally owned most property, the two iugera may have been construed as an individual's personal allowance in the form of garden land; but cf. Gabba, RIL (1978).
40. At text, line 26 , quorum is awkward, and as it stands we must accept the antecedent as quidam, referring to surveyors mentioned in general terms by Siculus Flaccus at lines 22 ff . It may be preferable to assume that quorum was a mistake for quarum, in which case the antecedent will be formas.
41. At text, line 28, Thulin proposed the supplement aut ( T 118.26); this would mean 'moves a boundary forward of his own accord, or in case the only evidence should seemingly be ... . Therefore Siculus Flaccus would be referring to the possibility of disputes among individual settlers about the area of their allocations; in this case it was not enough to consult the map; other records would have to be examined. However, I have followed Lachmann, who inserted a full stop after proferat (L 154.22). This version affirms the overwhelming importance of the maps as evidence. For the archives, see Moatti, APT, 79-104.
42. At text, line 37, Lachmann, following Rigaltius in his edition of 1614, suggested exigerentur for eximerentur of MS P (L 155.9). But Thulin (T 119.13) correctly retained the manuscript reading with the explanation that it referred to the use of lot in allocating centuriae (see p. 358, n. 5).
43. At text, line 14, I accept Thulin's supplement mensura $\langle e\rangle$ (T 120.4). For subseciva, see p. 320, n. 8 .
44. For the size of allocations, see p. 339, n. 30.
45. At text, line 29, I have accepted Lachmann (followed by Thulin) in his emendation of quaedam of MS P to quae an, which makes better sense (L 156.22; T 120.28). But Lachmann's suggested change of aliter into inaequaliter is unnecessary, since aliter satisfactorily conveys the sense of 'different'.
46. At text, line 6, there is a lacuna, though Thulin (T 121.18), following Goesius in his edition of 1674 , suggested a solution to part of the problem by reading pascunt
(= 'they have the right of pasturing', cf. C $119.27=\mathrm{T} 116.16=\mathrm{L} 152.15$ ) for pascua. 47. At text, line 7, I accept Thulin's suggestion of itinera for itineris (T 121.21), and take itinera, uiae, actus, ambitus, ductusque aquarum as nominatives and antecedents of quae. If itineris of MSS Gp is retained, then uiae, actus, ambitus, ductusque also must be taken as genitives dependent on seruierint - 'under the requirement of a right of way ...'.

For rights of way see p. 364, n. 27.
48. For rivers in land allocation, see p. 347 , n. 50 .
49. At C $125.29-30=\mathrm{T} 122.18-19=\mathrm{L} 158.8-9$, the phrase per amplum spatium probably refers to the width of the limites, rather than to the extent over a wide region of the practice described.
50. At text, line 25, I accept Thulin's change of limitibus to limitationibus ( T 122.21); and understand this to refer to cases where the limites bounding centuriae were excluded from the measurement of the centuriae for the purposes of distribution. At line 25, Thulin's supplement enim seems necessary.
51. At text, line 26 , the phrase ad praescripta lege latitudinis has been mistakenly repeated from line 25 .
52. At text, line 29, I have accepted the reading of MS G: sors; MS p has sors solum. For quintarii, see p. 384, n. 5.
53. At C 124.35, MSS Gp have ut similes occupent; Lachmann suggested ut limites occurrent ( L 158.26; T 123.9), but there is no good reason to reject occupent. For servitus, see further p. 375, n. 26.
54. At text, line 11, MSS Gp have: 'tot enim actus, quorum numerus ... datis inter se multiplicatos ...'. In my printed text I accept some of Lachmann's suggestions, expressed in his apparatus criticus (L 159.16-18; T 123.27-9), and read: 'tot enim actus, quorum numeri ... dati inter se multiplicati ...'.
55. In 41 b.c. after the Battle of Philippi veteran soldiers were settled at Beneventum by L. Munatius Plancus. According to the Liber Coloniarum (C 181.17-18 = L 231.5-6), there was a further settlement by 'Nero Claudius', probably to be identified with Tiberius, operating in the reign of Augustus (Keppie, CVSI, 155-61). Chouquer's investigation of the terrain suggested that there were at least two land division grids at Beneventum, on different orientations (Structures agraires, 159-64). He argued that one layout containing 20 by 20 actus was the work of Munatius Plancus and that the other, containing 16 by 25 actus was of later date, but there is insufficient evidence to confirm this; see also p. 404, n. 8.

In respect of variation in the size of centuriae, the agrimensores, writing in the late first century A.D. and after, seem to think that centuriae of 20 by 20 actus ( 200 iugera) are standard practice. But Frontinus and Siculus Flaccus express this only in general terms (C 11.23-32; 127.9-16 = T 13.16-14.8; 123.19-29 = L 30.9-20; 159.9-18; cf. Balbus - C $207.31=\mathrm{L} 96.14$ ), while Hyginus 2 makes no statement of the predominance of this layout (C 137.34-43 = T 135.15-136.7 = L 170.17-171.10). All three writers note a wide variety of possible dimensions of centuriae. It may be that, although a layout of 20 by 20 actus was considered an ideal in theoretical and didactic terms, there was rather more variation than is allowed by modern scholars (see further, Castagnoli, Le ricerche, 23-4; Misurare, 87-8; Favory in Clavel-Lévêque, Cadastres, 108-12).

The variations on the 20 by 20 actus layout noted in the surveying texts are as follows:
Cremona (210 iugera, 21 by 20 actus) - Frontinus (C $11.31=$ T 14.5-6 = L 30.18-19; cf. Hyginus $2-\mathrm{C} 137.36=\mathrm{T} 135.16-17=\mathrm{L} 170.19$ ).
Triumvirs ( 50 iugera) - Hyginus 2 (C $137.35=\mathrm{T} 135.16=\mathrm{L}$ 170.18-19).
In Baeturia (Veturia) (see p. 385, n. 8), at Augusta Emerita (Mérida) (400 iugera, 40 by 20 actus); praefecturae in territory of Emerita ( 400 iugera, 20 by 40 actus) Hyginus $2(\mathrm{C} 137.37-46=\mathrm{T} 135.18-136.10=\mathrm{L} 171.1-13)$; for archaeological investigations, see below, n. 56 .

Furthermore, the Liber Coloniarum suggests a wide variety in the dimensions of centuriae during the period from the Gracchi to Augustus; as well as 20 by 20 actus, we find 10 by 10 ( $=50$ iugera); 14 by 14 ( $=98$ iugera); 14 by 16 ( $=112$ iugera); 13 by 13 (= $=84.5$ iugera $) ; 15$ by $15(=112.5$ iugera $) ; 16$ by $16(=128$ iugera $) ; 16$ by $25(=200$ iugera); 20 by 24 ( $=240$ iugera); 80 by 16 ( $=640$ iugera). For the reliability of individual entries in the Liber Coloniarum, see below pp. 402-32.

Archaeological investigations of Roman field-systems in Italy have suggested a considerable diversity in layouts, of which the more clearly identified are (further discussion at pp. liv-xi):
Acelum - 21 by 21 actus $=2201 / 2$ iugera - Fraccaro, Studi Ciaceri (1940).
Aesernia -16 by 16 actus $=128$ iugera - Chouquer, Structures agraires, 142-4.
Aletrium/Frusino/Verulae - 13 by 13 actus $=84 \frac{1}{2}$ iugera - Chouquer, Structures agraires, 119-23.
Altinum - 30 by 40 ? actus $=600$ iugera (see Bradford, Ancient Landscapes, 167-8).
Aquinum - possibly a multiple of 36 actus, though Chouquer has argued that the main grid identified at Aquinum contained 20 by 20 actus (Structures agraires, 125-9; Chouquer, LAR 120-1).
Atina - 14 by 14 actus $=98$ iugera - Chouquer, Structures agraires, 137-9.
Bellunum - 20 by 18 actus $=180$ iugera - Alpago-Novello, RAL (1957), 261-9; however his conclusions have been seriously undermined by Liverani (MEFRA (1987)) who shows that many stones previously identified as boundary markers belonged to wine- or olive-presses.
Bovianum - 16 by 16 actus $=128$ ingera - Chouquer, Structures agraires, 144-7.
Bovillae-Tusculum - 14 by 14 actus $=98$ iugera - Chouquer, Structures agraires, 87-94.
Cales -15 by 15 actus $=112 \frac{1}{2}$ iugera - Chouquer, Structures agraires, 194-5.
Caudium - 13 by 13 actus $=841 / 2$ iugera; also 15 by 15 actus $=112 \frac{1}{2}$ iugera Chouquer, Structures agraires, 164-7.
Corfinium and Sulmo - 15 by 15 actus $=112 \frac{1}{2}$ iugera - Chouquer, Structures agraires, 133-6.
Cosa - 16 by 32 actus $=256$ iugera - Castagnoli, MAAR (1956).
Cremona - 21 by 20 actus $=210$ iugera - Pontiroli, CSDIR (1967-8); Tozzi, Storia padana antica (1972).
Ergitium -20 by 16 actus $=160$ iugera - Dilke, RLS, 146.
Fabrateria - 15 by 15 actus = 112 iugera - Chouquer, Structures agraires, 126-30.
Forum Iuli (Udine Cividale) - 12 by 12 actus $=72$ iugera (or possibly 23 by $12=138$ iugera) - Degrassi, Il confine (1954), 18-20.

Forum Popilii - 15 by 15 actus $=112 \frac{1}{2}$ iugera - Chouquer, Structures agraires, 191.
Gabii - 15 by 15 actus $=112 \frac{1}{2}$ iugera - Chouquer, Structures agraires, 94-5.
Iulia Concordia - 20 by 18? actus = 180 iugera - Bosio, AIV (1965-6), 249-60.
Neapolis -16 by 16 actus $=128$ iugera - Chouquer, Structures agraires, 207-8.
Pompeii - 18 by 23 actus $=207$ iugera - Castagnoli, RAL (1956), 373-4.
Saepinum -15 by 15 actus $=112 \frac{1}{2}$ iugera - Chouquer, Structures agraires, 147-9.
Setia - 10 by 10 actus $=50$ iugera - Chouquer, Structures agraires, 100-2.
Suessa - 13 by 13 actus $=84 \frac{1}{2}$ iugera - Chouquer, Structures agraires, 172-3.
Tarvisium - 21 by 21 actus $=2201 / 2$ iugera - Pilla, AIV (1965-66).
Teanum - 14 by 14 actus $=98$ iugera - Chouquer, Structures agraires, 195-9.
Trebula -15 by 15 actus $=112^{1 ⁄ 2}$ iugera - Chouquer, Structures agraires, 149-2.
ad Tricesimum - 12 by 12 actus $=72$ iugera - Degrassi, Il confine (1954), 44-5; Bradford, Ancient Landscapes, 170-4.
Velitrae -15 by 15 actus $=112 \frac{1}{2}$ ingera - Chouquer, Structures agraires, 98.
Venafrum - 16 by 16 actus $=128$ iugera - Chouquer, Structures agraires, 141. Note also:
The Corinthia - possibly centuriae of 16 by 16 actus dating from 111 b.C.; 16 by 12 actus in the land settlement of 44 в.C.; Romano in Gregory (ed.), The Corinthia in the Roman Period (1993).
Arausio (Gallia Narbonensis) - probably 20 by 40 actus $=400$ iugera - Piganiol, Documents, 93-4; Dilke, RLS, 159-77.
Pharia (Stari Grad, island of Hvar, Croatia) - 25 by 20 actus $=250$ iugera -Duboković-Nadalini, Vjesnik za arheologiju i historiju dalmatinsku (1961-2); cf. Bradford, Ancient Landscapes, 191-3, who identified a grid with 5 by 5 actus. The uncertainty in identifying land division grids is demonstrated by the fact that recent research suggests that this may be part of an earlier Greek system (Chouquer, LAR, 124).

Between Ucubi and Lacimurga in Spain (275 iugera, 25 by 22 actus) - based on a reevaluation of the fragment of a bronze surveying map (Gorges, MCV (1993), especially 11-14). For a general survey of the rapidly developing investigations into Roman field-systems in Spain, see p. lviii and n. 192.

There is a useful list of possible sites of Roman field-systems in Paz López Paz, La Ciudad romana (1994), 337-7, though without discussion of the difficulties of the evidence.

The accuracy of measurement in identified centuriae tends to be variable. With a normal Roman foot of $29.57 \mathrm{~cm}, 20$ actus should measure 709.68 m . The shorter foot in use in the third century A.D. would give about 706 m for 20 actus. However, the average length in Italy seems to be about 707 m , which is best explained as local practice or simple error in measuring (Dilke, RLS, 85; Favory in Clavel-Lévêque, Cadastres, 112). 56. Cf. Hyginus 2 (C $137.39-46=\mathrm{T} 136.1-10=\mathrm{L} 171.4-13$, with Ill. $78=\mathrm{L}$ fig. $140=\mathrm{T}$ fig. 79), who points out that in some settlements the orientation of the original land division was different from that of land taken from another community and added to the first settlement. He cites as an example Augusta Emerita (Mérida) in whose territory there were several praefecturae; for praefecturae at Mérida, see Grelle (1964); Gorges in Février and Leveau, Villes et campagnes (1982); in Clavel-Lévêque, Cadastres, 203-6; MCA (1993); Rosselló Verger in Estudios sobre centuriaciones
romanas en España (1974), 19-20; Canto, Gerión (1989); Paz López Paz, La Ciudad romana (1994), 253-61; Étienne in Cité et territoire (1995); also p. 349, n. 54.

At C $129.32-3=$ T $126.19-21=$ L 162.3-5, Siculus Flaccus may have in mind praefecturae, when he cites Nola as an example of a community where land division did not begin from a single point; it is interesting that recent research suggests that at least three systems of the same type ( 20 by 20 actus), but with different orientations, were superimposed in the vicinity of Nola (Castagnoli, $R A L$ (1956), 374-6; Chouquer, Structures agraires, 209-12).
57. Siculus Flaccus is here referring to the administration, by the magistrates of a colony, of a praefectura that is geographically separate from the territory of the colony. It is possible that he may also have had in mind the praefecti iure dicundo; in newly settled areas the Roman government could delegate representatives of the praetor in Rome in order to administer justice in communities of Roman citizens scattered in rural areas; in the absence of other magistrates they could assume wider administrative responsibilities (see Brunt, $I M, 524 ; 528-535$ ).
58. At text, line 30, MS P has inlimitatus ager (G inlimitatibus). Inlimitatus is very rare, appearing in the form illimitatus in Itinerarium Alexandri 21 and Servius, Georg. 3.354, with the meaning 'unbounded'. However, since it is comprehensible in the sense 'with no limites established', it is reasonable to follow Thulin's conjecture and read: $\langle s i\rangle$ inlimitatus ager (T 125.2), which has been translated here. What follows at lines 32-4, confirms that Flaccus is referring to land that had no formal divisions. Lachmann (L 160.14) suggested in limitationibus $\langle s i\rangle$ ager ...; the translation of this would be: 'But sometimes when limites were being established, if land taken from neighbouring communities ...'.
59. At text, line 4, I accept the suggestion of Lachmann and Thulin of pecunia for the meaningless quoniam of MSS PG.
60. At text, line 7, I retain the text of MSS PG: similes conuenientesque, which must be taken as nominative plural agreeing with culturae. Lachmann followed by Thulin (L 161.4-5; T 125.19-20) emended to similis conuenientisque, which must then be taken as genitive singular agreeing with culturae, which would depend on facies.

At text, line 8, in place of the meaningless potestatique of the MSS, I have translated Lachmann's suggestion partitique 〈qui〉 (L 161.6); Thulin (T 125.21) proposed potitique $\langle q u i\rangle$. At line 9, MS P has 'in cuius agro fuissent plures personae hic divisus et assignatus est'. In my translation I have followed Thulin's suggestion, which makes explicit that the property of one person could be divided among several even though it retained its original appearance: 'qui unius ager fuisset, pluribus personis hic divisus et assignatus est'.
61. This difficult passage concerns a dispute over area (modus). At text, line 19, MSS PG have eiusdem hominis. I accept the correction to eiusdemque nominis, and take this to refer to the plot of land; nomen then will be an entry in the register of the settlement. If the rest of the text is sound, Siculus Flaccus may have in mind a case where, through an error by the founder and his surveyors, the number of plots of land allocated did not coincide with the area of the centuriae, and two men had allocations with identical designations. Therefore at lines 25-7, Flaccus means that, for example, in a centuria where X has a large holding and Y owns a small quantity of land (having the rest of his holding in another centuria; cf. Frontinus - $\mathrm{C} 5.32-7=\mathrm{T} 5.16-22$
$=\mathrm{L} 13.7-14.6$ ), Y gives up his land to X , and is presumably compensated with land from elsewhere. This would cause less disruption to established arrangements.

It is possible, however, that eiusdemque nominis refers to the owners. In this case Siculus Flaccus presumably means that homonymous owners might cause confusion in the public records of landholding. However, it is then difficult to see how this would relate to what follows.

Clavel-Lévêque (SF, 85, n. 88) cites in comparison Digest 10.1.7 (Modestinus) under the heading 'The establishment of boundaries':

> De modo arbitri dantur et is, qui maiorem locum in territorio habere dicitur, ceteris, qui minorem locum possident, integrum locum adsignare compellitur; idque ita rescriptum est.
> Arbitrators are appointed to establish the area (of the land), and the man who is declared to have more land (than he ought to in the territory, is compelled to hand over the complete share to those who possess less land (than they ought to); this was laid down in a rescript.

But this seems to refer to a different situation, where settlers had received either more or less than the quantity of iugera to which they were entitled in their allocations, and arbitrators solved the problem by taking land from those who had too much. Moreover, to extract this kind of meaning from the passage of Siculus Flaccus, we must interpret sequitur as 'pursues at law' and translate: 'The man who possesses a smaller area of land (than he ought) pursues (at law) the man who possesses a larger area (than he ought)'. In other words, the man who was found in possession of more land than should have been allocated to him in the original settlement would be the defendant; the man who thought that he had less than his proper allocation would be the plaintiff. Yet the concise expression at lines $26-7$ can hardly bear the weight of this reconstruction.

At lines 27-30, Siculus Flaccus goes on to emphasize that the records must be examined in detail, and, even when they seem to tally with the original map, the surveyor must ask if an apparent anomaly in ownership was the result of buying and selling after the initial allocation (C $129.27-30=\mathrm{T} 126.14-18=\mathrm{L} 161.25-162.2$ ). Hyginus 2 (C $157.7-10=\mathrm{T} 161.8-12=\mathrm{L} 198.7-11)$ emphasizes that the best proof of genuine antiquity is if the old records of famous places tally with the surveyor's measurement of the site. On the use of records in land disputes, see also Papinian (Digest 10.1.11):

> In disputes involving boundaries, ancient records and the authority of the census conducted before the legal case was begun must be followed, provided that it is proved that tracts of land have not been added or removed and the boundaries subsequently changed, through a number of successions or by the decision of those in possession.
62. See above, n. 56.
63. It is curious that none of these soldiers had any heirs, or none able to claim. This may be connected with the ban on marriage which Augustus probably imposed on the troops. Any child born of an illicit liaison would be illegitimate and usually a non-citizen, and so could not be instituted as heres; furthermore such a child would have no claim in intestate succession.
64. For the lands of the Vestal Virgins, see p. 361, n. 21.
65. For subseciva and Domitian's decision, see, p. 344, n. 47.
66. Hyginus 1 quotes an example of such a description, which is not specific and was presumably intended for teaching purposes (C 79.31-8 = T 74.10-19 = L 114.16-24); see also Appendix 4, p. 470.
67. Siculus Flaccus is referring to a case where a community had all its land confiscated for settlement but retained control of its urban area.
68. For jurisdiction and the problem of this passage, see p. 362, n. 23.
69. Siculus Flaccus means that surveyors would usually face questions about the extent of a territory brought by the community, not about the status of a pagus initiated by its inhabitants. The extent of a community's territory could be deduced from the area of land covered by the lustratio of the pagi within it. He rightly supposes that a pagus was a subdivision of the territory of a community. For the historical development and structure of pagi, see Martini (1973); Frederiksen in Hellenismus in Mittelitalien (1976).
70. Mitchell, $J R S$ (1976) discusses the demands made by the government on local communities for transport and supplies for officials and soldiers.
71. At text, line 15, I retain the reading pagis of MS P.
72. For the find-spots of Gracchan boundary stones, see Appendix 2. They were usually inscribed with the title of the land commission, usually tresviri agris iudicandis adsignandis ('three men for adjudicating and allocating land'), and the names of the commissioners.

However, these stones provide rather disappointing evidence for the identification of land division by Tiberius and Gaius Gracchus. They may have been moved or replaced in the wrong location, and not enough have been found to give a coherent picture. For example, it is curious that two stones were found in Campania. This on its own can hardly be taken as evidence for a settlement in the ager Campanus, against the specific statement by Cicero that the Gracchi left this land untouched (Leg. Agr. 2.81). It may be that the commissioners merely conducted a survey in this area.

Tiberius Gracchus in his land bill addressed the problem that land belonging to the state had been occupied by people who had no legal title (it was an offence to occupy more than 500 iugera of such land; see above n. 6). The land commission established by Tiberius was to investigate and compel landholders to surrender land held in excess of the 500 iugera (with an additional allowance of 250 iugera, probably for each of two children), and the reclaimed land was to be distributed for settlement by small farmers. Gaius Gracchus continued his brother's plans, but also planned the foundation of a colony at Junonia on the site of Carthage, and possibly other colonies in Italy (see in general, Salmon, $R C R, 118-21$, Brunt, $I M, 278-84$; Hinrichs, Institutionen, 58-61; Stockton, The Gracchi (1979), 40-60; 131-6; Paz López Paz, La Ciudad romana (1994), 78-81; Gargola, Lands, ch. 8; the Liber Coloniarum mentions Gracchan colonies at Ferentium and Tarquinii in Tuscany, and at Abellinum, Aefulae, Cales, Corfinium, Suessa Aurunca, Sulmo, Velitrae, and Verulae in Latium and Campania (C 169.43; 171.43; 179.30; 181.11; 46; 179.8; 187.3, 179.23; 187.33; $46=$ L 216.3; 219.1; 229.16; 230.21; 232.13; 228.18; 237.11; 229.8; 238.19; 239.11; see below, pp. 407-27; Appendix 2A nos 7-8).

Sulla wished to settle his veterans as colonists in towns to provide security for his rule throughout Italy. It is likely that he established about 80,000 soldiers in 20 to

23 colonies with about 4,000 men in each, although not many can be securely identified. It is by no means certain that Sulla's colonists produced a corresponding increase in the number of small farmers in Italy, since in many cases the new settlers will have displaced existing farmers, who lost their land; moreover, not all the colonists made good and many drifted into destitution. Catiline, who appealed to the downtrodden for support, was to find much support in Etruria where many veterans of Sulla had been settled (see in general, Brunt, IM, 300-12; Hinrichs, Institutionen, 68-75; Chouquer, Structures agraires, 248-9; Paz López Paz, La Ciudad romana (1994), 83-5). 73. At text, line 23, I have followed Thulin (T 130.5-8), who interpreted quos as aliquos, and et as etiam. Lachmann, however, wished to delete cum and et (L 165.18-20). In that case we would translate: 'Moreover, the authors ... undoubtedly allocated those (lands) which they had taken from neighbouring territories ...'.

Other evidence on jurisdiction indicates that such land allocated to individuals was under the jurisdiction of their colony (see p. 362, n. 23). Siculus Flaccus presumably refers here to land confiscated but not used, which was returned to its original jurisdiction.

# COMMENTARY - HYGINUS 2 

(TRANSLATION pp. 135-7)

SUMMARY

C 135.1-17 — importance of land survey and its origins
C 135.18-137.33 - limites; terminology; orientation; width
C 137.34-139.35 - size of centuriae; praefecturae; designation of centuriae
C 139.36-141.22 - numbering of limites
C 141.23-143.15 - historical background of Roman land settlements
C 143.16-145.31 - preferred methods of land division
C 145.32-151.26 - using the sun's course to plot orientation; relationship of surveying to astrology; the significance of the heavenly zones; methods for establishing orientation by measuring shadows
C 151.27-153.24 - land division in cultivated areas; measurement techniques and the problems of different types of site
C 153.25-31 - width of limites; stone markers
C 153.32-155.20 - designation of centuriae
C 155.21-157.29 - mapping definitions and boundary marking
C 157.30-161.28 - use of lot; the keeping of records
C 161.29-163.28 - measurement and division of ager vectigalis.

1. For Hyginus 2, see pp. xxxvi-vii. For commentary on the illustrations (taken from MSS AGP), see Carder, Art Hist., 76-125.
2. See p. 326, n. 25. For the orientation of temples, see $\mathrm{C} 137.16-20=\mathrm{T}$ 134.15-21 = L 169.14-170.2, and Frontinus (C 9.31-2 = T 11.4-5 = L 28.1-2), both of which may be based on Vitruvius, De Arch. 4.5.1, who explains the idea that temples should face west, on the hypothesis that this would permit those who came to sacrifice to look towards the east and the image in the temple. At C 135.13-14 = T $132.1-2$ = L 166.14-16, Hyginus 2 means that, as the haruspex looks from east to west, he establishes the 'right' in the northern area, and 'left' in the southern. See Diagram 9.

The sentence vel ... artificium at text, lines 8-9 should be deleted as a gloss.
3. For the derivation of decumanus and kardo, see p. 326, n. 26. At text, lines 20 and 23, I have, with Thulin (T 132.13; 16), accepted the reading duocimanus (MS P), rather than duodecimanus (MSS AB).
4. See p. 326, n. 29.
5. See Diagram 10. There is confusion in the MSS illustrations; Ill. $69=\mathrm{L}$ fig. 131 $=\mathrm{T}$ fig. 70 incorrectly depicts the decumanus quintarius as marking off six centuriae. Ill. $70=\mathrm{L}$ fig. $132=\mathrm{T}$ fig. 71 is correct; cf. also Ills $85-7=\mathrm{L}$ figs $147-9=\mathrm{T}$ figs $86-8$.
6. Hyginus 2 cites a number of laws dealing with demarcation of land:

Lex Sempronia - agrarian law either of Tiberius Gracchus in 133 b.c., or of Gaius Gracchus in 123/122 в.C., concerned with the distribution of public land to new settlers.
Lex Cornelia - probably a law of Cornelius Sulla during his dictatorship (82-79 в.с.)
concerning the establishment of colonies for his veteran soldiers.
Lex Iulia - probably the Lex Iulia Agraria, a law passed during Caesar's consulship (59 B.c.) concerning the distribution of public land, mainly to veteran soldiers.
Lex Mamilia - see p. 321, n. 11.
7. Cf. Frontinus (C $11.4-5=\mathrm{T} 12.9-10=\mathrm{L} 29.5-6$ ); p. 326. n. 27. Ill. $72=$ L fig. $134=\mathrm{T}$ fig. 73 seemingly demonstrates a number of different alignments of the decumanus maximus and the kardo maximus.
8. For the size of centuriae, see p. 339, n. 30 . Veturia corresponds to Beturia or Baeturia, an area south of Mérida; cf. Pliny, NH 3.13; García Iglesias, AEA (1971).

Ills 76; $77=$ L figs $138 ; 139=$ T figs 77; 78 illustrate respectively decumani 40 actus long with kardines of 20 actus, and kardines 40 actus long with decumani of 20 actus. In Ill. $77=\mathrm{T}$ fig. 78, $K$ at the mid-point is the copyist's mistake for $D$.
9. Turgalium (Trujillo) lies about 80 km north-east of Augusta Emerita (Mérida). The praefectura Mullicensis may be identified with Montemolin (= Mons Mulli = Mullicensis); cf. Clavel-Lévêque, Hygin, 27, n. 25. For the extent of land division at the colony of Augusta Emerita, see Wiegels, Madrider Mitteilungen (1976); Gorges in Février and Leveau, Villes et campagnes (1982); idem in Clavel-Lévêque, Cadastres, 203-6; MCV (1993); Canto, Gerión (1989); Étienne, Cité et territoire (1995).
10. For Augustus' role in land distribution, see Campbell, JRS (1996), 94-9.
11. See also C $153.32-155.20=$ T $157.17-159.17=\mathrm{L} 194.17-196.14$ and Hyginus 1 (C 77.10-26 = T 71.10-72.13 = L 111.16-112.8). These passages deal with methods for designating the position of centuriae within a land division system. In respect of the text, at line 4 MSS AB have a toto loco, E toto loco, and P quoto loco. Thulin read a quoto loco, which has been translated here; Lachmann preferred quoto loco.

At text, line 9, we must understand numerum from the previous line (cf. Barthel, $B J$ (1911), 43, n. 2), which in any case should be interpreted to mean the full designation of the centuria, since Hyginus 2 talks of writing the number on the sides of the stone, which was necessary to accommodate the full co-ordinates (see below). Lachmann argued that a word had fallen out of the text, perhaps litteras, which would make explicit the reference to the full designation of the centuria. Mommsen ('Bodenrecht', 95-6) suggested appellatione.

At text, line 10, MSS ABE have $u t$, which is omitted by P and is difficult to translate. I have printed Lachmann's emendation: aut; Thulin suggested vel.

At text, line 15, MSS AB have quartam, P quadrata; MSS ABE have lapides, which is omitted by P; I have accepted Thulin's emendations: quarta and lapidi.

Hyginus 2's line of thought seems to be as follows: there was much variation in surveying practice; some inscribed only the tops, others the sides of stones (C 139.3); some inscribed only the stones marking the decumanus maximus and kardo maximus, leaving the others uninscribed (C 139.4-5). Augustus required that in his settlements, stones should be placed in all corners of every centuria, inscribed with the number of the limites, that is, for example, D II or K II; these acted as street numbers, and the same method of numbering served in each direction, on either side of the DM and the KM (see Diagram 11). At C 139.11-18, Hyginus 2 seems to pick up the brief introductory comments at C 139.3-5; some surveyors inscribed the tops of stones with only the numbers of the limites, while others inscribed the full designation of the centuriae on the sides (C 139.11-12). In respect of those simply inscribing the
numbers of limites (lines $15-16$ show that Hyginus 2 is thinking of inscribing the number of each limes in sequence), this method was ambiguous, since it would not be clear whether the limites in question were in a centuria to the right or left of the DM, or near side or far side of the KM (C 139.13-18). So, to ensure clarity it was necessary to number the centuriae by their location in the land division scheme (C 139.18ff.).

This was done as follows: standing at the centre of the survey at the intersection of the DM and KM and looking along the original orientation, the surveyor decided which of the four central centuriae was to the right or left of the DM, and beyond or on the nearside of the KM. The corner of any of the four centuriae closest to the centre point of the survey had a stone marked DM KM; the two adjacent corners of such a centuria had similar stones, that on the kardo maximus was marked KM D. II, and that on the decumanus maximus DM K. II as appropriate. The remaining corner (angulus clusaris) contained the stone that closed the centuria, and on it was inscribed the number of the centuria, according to its position in relation to the centre of the survey. This was inscribed down the fourth portion of the stone, facing the centuria (C 139.20-7). Hyginus 2 may have had in mind the cross on the top of some boundary stones, designating the DM and KM, which divided it into four segments (see Ill. $79=\mathrm{T}$ fig. 80 ). Later he modified his views (see below, p. 387). The example cited of a centuria - 98 to the right of the DM and 75 beyond the KM - was presumably chosen to show a particularly long numeral, as the system of designation was extended beyond the four central centuriae to the entire area. At C 139.21-7, Hyginus 2 is referring to the four central centuriae (he does not mention their number since they were all naturally numbered 'one'), which had a total of twelve corners on the DM and/or KM, and four anguli clusares. In the system described by Hyginus 2, it seems that beyond the four central centuriae, the stone marking the angulus clusaris was established first; after that, other stones may have been added according to the decision of individual surveyors, and perhaps normally only where they abutted on the decumanus maximus or kardo maximus (see Diagram 12).

Ills $80-2=\mathrm{L}$ figs $142-4=\mathrm{T}$ figs $81-3$ are confused, since the illustrator did not understand anguli clusares. Ill. $83=\mathrm{L}$ fig. $145=\mathrm{T}$ fig. 84 (cf. 84a) shows a circular stone, which has inscribed on its side numbers different from those used in the text. The stone also has the numbers of the decumani and kardines carved on the top, which are not mentioned by Hyginus 2 and would be superfluous if the designation of the centuria were inscribed. Since the decumanus maximus and kardo maximus also served as the first decumanus and kardo (C 77.32-9), the number of each decumanus and kardo should be one more than the number of the corresponding centuria. So, in Ill. 83 the number of the centuria D. D. LXXXVI correctly differs by one from that of the decumanus (LXXXVII), but the number of the centuria V. K. LXIV, and that of the kardo, are wrongly identical.

At C 153.32-155.20, Hyginus 2 again discusses the method of designating centuriae on stones, largely in similar terms: those stones marking the DM and KM , i.e., in the corner closest to the centre of the survey, and the adjacent corners, should be marked on the front, i.e., facing the decumanus maximus and kardo maximus, with the appropriate letters - DM/KM, DM/K. II and so on (at C 139.3; 11-12 he talks about inscribing the tops of these stones; but there he was discussing various methods used by surveyors; at C 153.5-6 he is recounting the recommended method); the stone in
the fourth corner, closing each centuria, should have inscribed on it the designation (both co-ordinates) of the centuria, and nothing else. At C 155.13-17, Hyginus 2 is referring to the placing of stones in the angulus clusaris throughout the whole survey, after the completion of the four central centuriae.

In my view, at C 155.3-4, Hyginus 2 means that the designation should be carved so that S. D. I should be visible on the appropriate decumanus, and V. K. I on the appropriate kardo, and so on; this could be done by inscribing the co-ordinates side by side on the circular stones normally used to mark boundaries, or on adjacent faces of a quadrilateral stone. Ill. $116=\mathrm{T}$ fig. 118 fails to represent this scheme accurately; the top centre stone should have DM K. II, the centre DM KM, the middle left KM D. II, the middle right KM D. II, the bottom left S. D. I K. K. I, the bottom centre DM K. II, the bottom right D. D. I K. K. I. Ills 117-18 = L figs $181-2=$ T figs 120-21 are vague and confused.

Hyginus 1 (C 77.12-79.4 and see p. 357, n. 1) also deals with the placing of marker stones in centuriae. He emphasizes two points: firstly, the point closest to the centre of the survey has a stone marked KM and DM, and, by implication, the two adjacent corners have similar stones with the appropriate designation; secondly, the stone in the fourth corner can then be inscribed with the number and location of the centuria; Hyginus also envisages that the designation will be inscribed to face the appropriate part of the survey. He further recommends that a stone should be placed to mark quintarii (C 77.30-1).

For the inscriptions on surviving cadastral stones, see Appendix 2.
12. At text, line 6, in the translation I follow Thulin's emendation lationibus for latoribus of MSS BEP.
13. For quintarii see above, n. 5 .
14. At C $141.31-3=\mathrm{T} 141.1-3=\mathrm{L} 176.5-8$, Hyginus 2 seems to be referring to the valuable contribution of soldiers as settler-farmers. Clavel-Lévêque (Hygin, 47) interprets this sentence to mean that Rome did not have enough land to distribute to the increasing number of soldiers.

At C 141.39-46 = T 141.11-142.1 = L 177.1-7, Hyginus 2 may have in mind a specific example of Caesar's toughness with his troops. According to Suetonius, Caesar threatened to disband the mutinous Ninth Legion at Placentia and the Tenth in Rome (Div. Iul. 69-70).
15. A Roman colony was established at Minturnae (Minturno) in 295 b.c. to guard the point where the Via Appia crossed the river Liris (Garigliano). This settlement was on a small scale, and probably lay on the northern side of the river. Hyginus 2 cites Minturnae as an example of different sets of limites in the same location, which arose from the establishment of fresh settlements. He seems to have in mind a settlement at Minturnae by Augustus, whose activities he has just been describing with regard to the addition of colonists to existing communities. The Liber Coloniarum (C 185.11-13 $=$ L 235.12-14), speaks of a colony founded at Minturnae by Gaius Caesar. This can hardly mean Caligula, and probably refers to Julius Caesar, or possibly Augustus. Keppie (CVSI, 141-3) has suggested that there may have been a settlement under Caesar, c. 47-44 B.C., and subsequent activity after Actium. Or, if the first movement took place in 31 b.C., there may have been a fresh settlement in 14 b.C.

Chouquer (Structures agraires, 169) has attempted to identify traces of Roman
land division along the Via Appia west of the old town of Minturnae, which is of consistent orientation and is laid out in rectangular units of 4 by 8 actus, of which the long side is parallel or at right angles to the road, suggesting to him an arrangement of strigae and scamna. Furthermore, land division grids have been identified both to the north of Minturnae, and also south-east of the river, between Minturnae and Mount Massicus; there are two contiguous sections with the same layout (centuriae of 20 by 20 actus) and orientation ( $\mathrm{N}-40^{\circ} \mathrm{E}$ ), but they are not a single network (Chouquer, ibid., 172-80). It is tempting to identify this field-system with the settlement trans fluvium Lirem (C 143.10-11 = T 142.15-16 = L 178.5-6); if a settlement of Caesar or Augustus was subsequently extended to accommodate more settlers, that could explain the two grids of centuriation; but this must remain speculative. Hyginus 2 describes an allocation of land that took place after the initial land division, by means of statements made by the previous landholders (C 143.12-13 = T 142.16-19 = L 178.6-9); new settlers swapped their allotments as suited them, and in the end occupied the land without any formal survey; this presumably took place on the land along the Via Appia and may have involved settlers who could not be accommodated on the main site.

A boundary stone has recently been discovered near the modern locality of Sessa Aurunca, with the inscription Pub(licum) col(oniae) Camp(anorum). It is dated to the late first century b.c. and seems to mark the boundary of public land belonging to the colony of Capua (Pagano in Pagano and Villucci, AAP (1985), 49-53). Pagano believes that the boundary stone may be associated with a substantial settlement at Minturnae, probably by Augustus, and that it attests public land of Capua, on the margins of the new allocations. This suggestion has interesting possibilities, though it is rather speculative; see also Pagano, RAAN (1981).

An illustration in MS P (Ill. $88=\mathrm{L}$ fig. $150=\mathrm{T}$ fig. 89) depicts the walls of 'Mynturnae' straddling the river Liris, which flows into the sea, represented by a large pool of water. Three town buildings are shown: a bronze statue on a plinth; a sixsided building, presumably an amphitheatre; a rectangular building surmounted by a vault, perhaps a tomb; all these buildings are probably symbolic of a typical town. The diagram has north at the top, and on the west side of the Liris (citra Lirem) and to the north-west of Minturnae itself lies a range of hills designated as Mons Vescini (the town of Vescia is mentioned by Livy 9.25 .4 as one of the three urban centres, along with Minturnae and Ausona, of the Aurunci; the saltus Vescinus was said to be adjacent - Livy 10.21 .8 ). West of the town and below the hills, allocations are marked by the phrase agri adsignati per professiones; to the east of the town, a broad land division grid designated nova adsignatio shows the allocations stretching to the north and south-east of Minturnae. The diagram therefore shows a knowledge of local terrain and the lay-out of the allocations, but also combines symbolic elements which may have been intended to make it more entertaining as a teaching map; it should not be seen as deriving directly from original surveying maps (see Castagnoli, MAL (1943), no. 3; Dilke, Geog. Journal (1961), 418; idem in Behrends, Feldmesskunst, 344).
16. For the translation of moenia as 'buildings' or 'public buildings' instead of 'city walls', see Clavel-Lévêque, Hygin, 53, n. 45.
17. Hispellum (Spello) was a hill town on the Via Flaminia, built at the end of a mountain spur overlooking the plain of the Pianura Umbra. It is cited by Hyginus 2
primarily as an example of a city to which land was granted from adjacent communities to sustain its new colonial status; but he also had in mind the precipitous site of Hispellum, which precluded the establishment of limites starting from the centre of the town. The grant of additional land to Hispellum probably occurred in the triumviral period or under Augustus, since it is referred to in inscriptions as colonia Iulia Hispellum and Pliny mentions it as a colony of the inland area of Umbria (NH 3.113). Some of the extra land may have been taken from Asisium (Assisi). Propertius, a native of Asisium, refers to the confiscation of land in his youth: 'All too young you gathered up the bones of your/father and were forced to take a more humble home;/ for although many bullocks used to till your fields,/ the cruel measuring rod robbed you of your rich plough land' (4.1.127-30). Propertius' youth ought to fit the period of confiscations after Philippi. Moreover, Propertius refers to the death of a relative ( $1.21 ; 22$ ) in the war of Perusia between L. Antonius (brother of the triumvir) and Octavian. Propertius' family, if threatened with confiscation on the authority of Octavian, may have chosen to support Antonius. Some traces of land division have been discovered south-west of Hispellum and the Via Flaminia between Foligno and Bevagna, though there is no clear indication of the extent of the ager Spellas (see Castagnoli, RAL (1956), 377; Dilke, Geog. Journ. (1961), 418-19; Keppie, CVSI, 177-9).

An illustration in MS P (Ill. $90=\mathrm{L}$ fig. $152=\mathrm{T}$ fig. 91 ), shows a colonia Iulia, walled, surrounded by mountains on three sides, and with centuriae marked beyond the walls to the right of the city. On the left of the city is a river designated flumen finitimum - 'neighbouring' or 'boundary' river, which Schulten identified with the river Ose, separating Spello from Assisi (Hermes (1898)). However the diagram was probably not intended to achieve complete factual accuracy, and it does not include two lakes, present in the ancient world, which were subsequently drained.
18. Tarracina-Anxur (Terracina) was founded in 329 b.c. on the coast of Latium as a citizen colony by 300 settlers who received two iugera each (Livy 8.21.11). In 312 the Via Appia was constructed, passing through Tarracina on its way from Rome to Campania.

Chouquer (Structures agraires, 105-9; LAR, 55-6) has argued that the first settlement took place on the north side of the subsequent route of the Via Appia, where he has identified a system of parallel lines running at right angles to the road and producing square-shaped holdings of 2 by 2 actus. It may be that the road took its route from the well-established decumanus maximus.

There was then a second settlement, consisting of centuriae of 20 by 20 actus, also on the north side of the Via Appia, though perhaps extending beyond the road to the south. The centuriae may have been subdivided into four areas of fifty iugera. Chouquer cites several tiles found in the territory of Tarracina, with stamps mentioning colonists, and in the name of Cn. Domitius Calvinus, a partisan of Antony and consul for the second time in 40 b.C., and argues that Calvinus was responsible for organizing the colonization at Tarracina, perhaps after the Battle of Philippi. Some support for this may be taken from the fact that the general context in Hyginus 2 for the land division at Minturnae, Hispellum, and Tarracina appears to include the Civil Wars (C 141.39-143.7 = T 141.11-142.12 = L 177.1-178.2). The statement in the Liber Coloniarum (C 187.26-7 = L 238.12-13) that at Tarracina the land had been left with-
out formal allocation remains inexplicable. If not a simple error, the text may refer to changes that had come about in the period after the triumviral allocation.

The illustration in MS P (Ill. $91=\mathrm{L}$ fig. $153=\mathrm{T}$ fig. 92) has north at the top and shows: (i) a walled town with eight towers, named colonia $A\langle n\rangle x u r n a s$; (ii) a river flowing through the town into an expanse of water that probably represents the sea; (iii) the Via Appia entering the town from the north-west; (iv) land division to the north-west of the town, between the Via Appia and the sea; the framework of this depends on the Via Appia which supplies the decumanus maximus; (v) on the other side of the Via Appia are hills and paludes (the Pomptine marshes). See Dilke, Geog. Journ. (1961), 420; idem in Behrends, Feldmesskunst, 342-4.

Although the Pomptine marshes properly lie between the road and the sea, the diagram is in the main geographically accurate, and may be based on a cartographical source. However it can hardly derive from a genuine surveyor's map, since it inaccurately places all the land division system on the seaward side of the Via Appia.
19. A better spelling of Admedera is Ammaedara (Haïdra, in Tunisia). This town occupied an important strategical site on the route from Carthage to Theveste in the interior. The III Augusta legion made its first camp at Ammaedara, before moving under the Flavians to Theveste, and subsequently to Lambaesis; at the time of the first move, Ammaedara became a colony largely composed of veterans, as the name suggests: colonia Flavia Augusta Emerita Ammaedara.

The illustration in MS P (Ill. $92=\mathrm{L}$ fig. $154=\mathrm{T}$ fig. 93) shows a hexagonally walled city with four gates through which pass the DM and KM, to intersect in the middle of the city. Hyginus 2 compares this arrangement to that of a military camp, and at lines 45-6 refers to a central point where the surveyor set up his groma to sight the four gates of the camp and establish the via praetoria and the via principalis (cf. Pseudo-Hyginus, De Munitionibus Castrorum, 12). An inscription of A.D. 267/268 from the gate of the headquarters of the camp at Lambaesis, which refers to its reconstruction by Gallienus, uses the term groma, rather than the usual principia, to describe the building ( $A E$ 1974.723). It is difficult, however, to judge the significance of this isolated reference.

There is certainly a similarity between military camps and the layout of some communities, which had been influenced by the accompanying land division. A military camp had a regular, right-angled layout, with straight roads leading to four gates, one in each of its four sides. But this should not be pressed too far, since the four roads did not intersect in the middle of the camp, which was usually occupied by the headquarters of the commanding-officer, and in some cases the gates were not placed at the mid-point of the camp walls. It is likely that land division and the design of military camps evolved in a parallel fashion, with a degree of mutual influence.

Although the archaeological remains at Ammaedara show that two roads intersected at right angles in the centre of the settlement, it is difficult to relate the town to the surrounding field-system. The orientation of its territory is different from that further south, and, most notably, the orientation of the town's main street differs from that of the adjacent land. For the extensive land division schemes identified in Tunisia, see p. lix and n. 195.

Some cases have been identified where a land division grid seems to originate in the settlement itself: Thubunae (Tobna in Algeria), see Baradez, Fossatum Africae
(1949), 293. For evidence in Italy, see Misurare, 102-5; note also Chouquer, Structures agraires, 156-8 (Allifae); G. Samonati, Diz. Epig. IV (1972), s.v. Luca, 1876 (Luca).
20. At text, line 2, I follow Thulin in retaining vel of MSS BE; Lachmann preferred MS P's et.

MS P contains three illustrations for this paragraph: Ill. $93=\mathrm{L}$ fig. $155=\mathrm{T}$ fig. 94 depicts an unnamed town elaborately walled including nine towers and four gates; the sea (incorrectly labelled lacus) sweeps round the front of the town and above and on the right there are hills and trees leaving only a limited amount of space. Allocated land would presumably be situated mainly to the left of the city. This diagram seems to have been artificially constructed for teaching purposes.

IIl. $94=\mathrm{L}$ fig. $156=\mathrm{T}$ fig. 95 depicts a square-shaped town with towers at the corners and four gates; the decumanus maximus and kardo maximus are marked and intersect in the middle of the town. To the right of the town, ranges of hills and two rivers prevent land division along the KM in this direction. The town is described as colonia Claudia, with mons Larus, flu〈men> Adum, neighbouring land - fines Tegurinoru $\langle m\rangle$, and a grid of land division units. Neither the river nor the mountain can be identified, but the Tigorini or Tigurini were a Helvetian tribe who lived near Aventicum (Avenches in Switzerland), and the settlement depicted here has been identified with the colony founded at Aventicum by Vespasian - colonia Pia Flavia Constans Emerita; in that case colonia Claudia on the map must be a corruption of colonia Flavia. Some traces of land division have been found near Aventicum (see Grosjean, Le Globe (1956)). But there are many discrepancies between the diagram and the geography of Avenches, and it may be best to reject this identification (see Dilke, RLS, 123; Geog. Journ. (1961), 420-1). Moreover, the comparable diagram in MS E has colonia Claudia Tiburtino $\langle r u m\rangle$, which would refer to Tibur (Tivoli) near Rome.

Ill. $95=\mathrm{L}$ fig. $157=\mathrm{T}$ fig. 96 depicts a settlement with hexagonal walls surrounded at the top and right by mountains; the DM and KM meet in the middle. Mons Mica cannot be identified; the fines Viruxentinorum may refer to the Brixentes, an Alpine tribe of uncertain location mentioned by the elder Pliny. The town is named colonia Augusta and is usually identified with Augusta Praetoria Salassorum (Aosta). The colony occupied a strategic position at the convergence of the Great and Little St Bernard passes, and was probably founded in 25 b.c. on the site of the military camp of M. Terentius Varro Murena, who had been conducting campaigns in the area. The 3,000 settlers were soldiers from the praetorian cohorts. According to Dio (53.25.5), the praetorians were given the best land, although some of the Salassi were incorporated into the settlement; in $23 / 22$ b.C. a statue was erected in honour of Augustus by 'inhabitants of the Salassi who at the start brought themselves into the colony' (ILS $6753=E J 338$ ). Perhaps unused land was returned to the original owners in the way so often described by the Agrimensores. However, no signs of land division have yet been discovered in the Aosta valley, and the mountains at Aosta itself do not encircle the town in the way depicted in the illustration. Another possible identification is Augusta Bagiennorum (Bene-Vagienna) in Liguria, created as a municipium after 27 B.c. (see, Dilke, Geog. Journ. (1961), 421; Keppie, CVSI, 205-7).
21. At text, line 18, the MSS have urbis. But in the context 'city' does not seem to make sense, and Thulin's suggested emendation orbis has been followed here. Cf.

C 145.46 and $149.25-9$, where Hyginus 2 considers the difficulties of surveys conducted in different parts of the world.
22. At this point in all MSS there follows C 153.3-20 (si uero ... ordinata $A C$ ), since one page of the archetype was incorrectly inserted here.

In the following section, Ill. $97=\mathrm{L}$ fig. $159=\mathrm{T}$ fig. 98 is intended to show incorrect orientation because bearings were taken at sunrise or sunset; the first reading was taken at sunrise (ortus), the second later in the day (solis cursus). However, the diagram is inaccurate, in that there is enough space to plot the sun's course before its disappearance behind the mountain. Ill. $98=$ T fig. 98 a (MS P) illustrates the problem more effectively by placing the second reading on the mountain as the sun disappears from view.
23. For methods of orientation using sundials, see Dilke, $R L S, 56-8 ; 70-3$; below n. 29.
24. Intervallum is equivalent to the Greek $\delta$ ı $\alpha \sigma \tau \eta \mu \alpha$, which means the distance between two points, or an interval of time, and also refers to music. The view that the earth was at the centre of the universe was commonly held in antiquity. Hyginus 2 is using a Pythagorean version, in which the sun is a satellite of the earth, which occupies a central position.
25. Georgics 1.233-9 (translation by Smith Palmer Bovie, Virgil's Georgics (Chicago, 1956)). Virgil took this description from a poem called Hermes by Eratosthenes of Cyrene (275-194 в.с.). On this view, the earth was stationary at the centre of the sphere of the heavens, which revolved round it on an axis inclined to the level of the horizon. Consequently the north pole remained constantly visible, while the south pole, being underneath, was invisible. Corresponding to the five zones of the sphere of the heavens, were five parallel zones on earth. Only the second and fourth zones were considered suitable for habitation. See Dilke, Imago Mundi (1967), 25-6.
26. At text, line 2, it is not necessary to follow Clavel-Lévêque (Hygin, 79, n. 67), in replacing aequinoctiali with solistitiali. Hyginus 2 means that the circle of the zodiac runs from brumalis right to the edge of the aequinoctialis zone, where it adjoins the solistitialis zone. See Ill. $100=\mathrm{L}$ fig. $161=$ T fig. 100.
27. Hyginus 2 seems to mean that all twenty-four hours should be regarded as changing according to season, but with a correlation between hours of daylight (normally divided into twelve equal segments) and hours of night. Therefore, if there were thirteen hours (periods of 60 minutes) of daylight, each daylight segment would last for one hour five minutes $(12 \times 65)$, and each night segment for 55 minutes $(12 \times 55)$, thus making a total of twenty-four hours.
28. Lucan, Pharsalia 3.247-8; Dilke, RLS, 61-3.
29. Cf. Ill. $102=\mathrm{T}$ fig. 102a (MS P), which is not included in Lachmann, and Ill. $103=$ L fig. $164=$ T fig. 103 (MS A), which shows a gnomon (incorrectly designated con mons) and east and west shadows; the phrase meridiano ordinatorum ('of lines parallel to the meridian') refers to south shadows. The line drawn towards the south is the kardo maximus, and the line drawn at right angles to it the decumanus maximus. The diagram is inaccurate in that the shadow on the right is called 'west shadow' (umbra occidens) when it should be 'east shadow' (umbra oriens); furthermore, the shadows plotted to the east and west of the gnomon should be joined by a line drawn from the points where they intersected the circumference of the circle; that line was
then bisected at right angles to establish the kardo maximus. See Diagram 13. For this method, cf. Vitruvius, De Arch. 1.6.6-7; it did not require the use of a dioptra, a sophisticated instrument for surveying and astronomical observation (Dilke, RLS, 75-9).
30. This complex method depends on solid geometry; for an explanation of the mathematics, see Dilke, Imago Mundi (1967), 17-18, based on the calculations of the map projectionist, C. B. Mollweide (see Diagram 14); note also Clavel-Lévêque, Hygin, 89, n. 77. Thulin (at T 154.1-2) is wrong to suggest the emendation of GF to BF and KI to BI ; Dilke argues that the intention was to mark off a point L on BC , so that $\mathrm{BL}=\mathrm{GF}$, and a point M on BD , so that $\mathrm{BM}=\mathrm{KI}$; the manuscript illustrations are confused and inadequate: L fig. $166=\mathrm{T}$ fig. 105 ; L fig. $167=\mathrm{T}$ fig. 106 a .

The word multipeda occurs only at C 151.8 in a measurement context (elsewhere it means a small, many-legged creature). Dilke, op. cit., 17, translated the word as 'footrule', presumably a way of measuring large distances to scale. The sense required by the context is the creation of a drawing to scale, perhaps in cases where the gnomon was large.
31. At text, line 26, I retain uaria of MS A, in the sense of 'conflicting' or 'variable in result'. Thulin accepts the emendation uana (T 154.20).

Ill. $105=\mathrm{L}$ fig. $168=\mathrm{T}$ fig. 107 (cf. 107a) illustrates the (exaggerated) consequences of not plotting the limites at right angles; the $D M$ has been incorrectly designated $K M$ at one end.
32. The procedure for measuring horizontal distances in uneven terrain is discussed by Frontinus (C $13.3-15.33=$ T $15.6-19.8=$ L 31.12-34.13; 26.11-27.12); see p. 327, n. 33. Ill. $108=\mathrm{L}$ fig. $171=\mathrm{T}$ fig. 110 (cf. 110a) is supposed to illustrate land division in a cultivated area; the purpose of the mountains is unclear.
33. In Ill. $110=\mathrm{L}$ fig. $173=\mathrm{T}$ fig. 112 , the scribe has written D instead of B at the left-hand corner of the figure, and K instead of H . The drawing of the diagram itself is inaccurate since H is misplaced to such an extent that the figure does not support the argument in the text, which concerns the identification of parallel lines by theoretical methods, using similar right-angled triangles. The surveyor, who is presumably unable to get to AC and to measure AB and CD on the ground, has to work out if BD is parallel to AC , and, if not, to plot a line through B parallel to AC. See Diagram 15.
34. Ill. $112=$ L fig. $175=$ T fig. 114 shows a colonia Iulia hemmed in by mountains (montibus conclusa) so that the land division has to begin some distance away from the town. There are a number of other illustrations referring to a colonia Iulia, but in terms so vague as to make identification difficult (Ill. $90=\mathrm{L}$ fig. $152=\mathrm{T}$ fig. $91-$ the text makes clear that this is Spello (see above); Ill. $96=\mathrm{L}$ fig. $158=\mathrm{T}$ fig. 97 (cf. 97 a ); Ill. $132 \mathrm{~b}=$ L fig. 196 and $196 \mathrm{a}=\mathrm{T}$ fig. 135). Colonia Iulia should refer to a foundation by Julius Caesar or Augustus (see in general Salmon, $R C R$, 132-44).
35. At text, line 24, I follow Lachmann in retaining limitibus omnibus; Thulin proposed to delete the words, presumably thinking that they were a reduplication of lines 23-4.
36. See above, n. 11.
37. Hyginus 2 means that the stone at the junction of the decumanus and kardo maximus is marked DM KM; the adjacent stone along the DM is marked DM K. II
and so on; totus means 'such in order of number' (OLD, 1954, s.v. totus ${ }^{2}$ ).
38. At text, line $3, k$ was correctly added by Goesius. Thulin argued that the text at lines 4-5 was an interpolation attempting to explain deorsum versus at line 2 (T 158.15-17). But elsewhere Hyginus 2 seemingly repeats himself or expands previous explanations, and I have preferred to accept the MSS text.
39. At text, line 18, adsignabunt has an impersonal plural subject; or perhaps we should understand the founders of colonies as subject.
40. Fundus as used in this passage may retain part of its technical meaning of land (originally belonging to an allied community) included in a measurement and registration process conducted by Rome (see Gabba, Athenaeum (1985), 280-3).

According to Hyginus 2, land designated as exceptus was held not to be part of the surveyed and allocated area, and to be beyond the jurisdiction of the colony. Therefore those who held such land had no obligation to the colony, e.g., for local tax, or any requirement to provide services for the benefit of the colony. Apparently, a fundus exceptus was a kind of enclave remaining within the domain of the Roman people. Perhaps Augustus as representative of the res publica, when founding colonies and allocating land, maintained that land acquired for distribution belonged to the Roman people. So, if he chose to revoke any special grants, such land would revert to the Roman people in the same way as bona vacantia (see Tit. Ulp. 28.7; Gaius, Inst. 2.150). Siculus Flaccus (C $129.37-46=$ T $126.26-127.5=$ L 162.9-19) notes that after the death in battle of some of Caesar's veterans, who had taken up military service again under Augustus, their lands (apparently having reverted to the state) were distributed to other veterans. In reality, the emperor will always have had complete control over the allocation of land. Siculus Flaccus (C 125.3-4 = T 121.14-15 = L 157.7-8) emphasizes that the distribution of fundi excepti was an act of personal patronage by the founder of a colony, who indeed could reserve them for himself. We may conjecture that the 'bene meriti' mentioned by Hyginus 2 (C 155.34-5 = T $160.12=\mathrm{L}$ 197.10-11) were friends and partisans of Augustus, or wealthy local people who were influential and powerful enough to safeguard their interests. The privileges attached to ager exceptus can hardly have been extended to many people.

The edict or law establishing a settlement will usually have laid down a certain allocation of land for each settler. But in cases where land was returned to the previous possessor, those holding fundi concessi were permitted to retain more than the specified amount of land. It is difficult to see why this concession cannot also have been extended by the founder to certain prominent or favoured settlers.

The restoration to previous possessors of land surplus to the requirements of a colony was a common practice, since there are many references to it in the surveying texts (C 55.38-9; 85.23; 121.39-123.11; 123.33-125.2; 129.2; 159.35-7; 161.6-7 = T 56.16-17; 80.16-17; 119.7-27; 120.24-121.13; 125.13; 165.10-12; $166.10=$ L 6.18-19; $117.14-15 ; 155.3-22 ; 156.18-157.6 ; 160.24 ; 202.11-13 ; 203.14)$, and there was a special map notation - redditum suum, or redditum illi tantum, or redditum veteri possessori. The most detailed discussion is in Siculus Flaccus, who initially had in mind colonies founded in lands overseas conquered from 'enemies'. But the same practice will have occurred in Italy. A fragment of an edict of the Triumviral period preserved in the Liber Coloniarum (C 243.3-6 = L 246.11-15) records the return to certain people of lands with their ancient boundaries intact. We may also note the case of Virgil who
may have received back his confiscated ancestral lands as a benefaction from Octavian (see below, n. 43); according to Probus (p. 5 K ) these would have accommodated sixty veterans.

Augustus presumably intended to ensure that if a special concession of extra land was permitted, either to certain settlers or to previous possessors whose lands were being returned, this should be made clear in the map notation by adding fundi concessi. But in time the distinction between fundi redditi and fundi concessi probably faded out, partly because concedere was used without technical precision to mean 'grant' (e.g. C $121.43=$ T $119.12=\mathrm{L} 155.8$ ). Indeed the return of lands to the previous owners is closely associated with the idea of a concession inherent in concedere. So, it is understandable that concedere is closely linked in the terminology of the surveying writers with the return of lands, and is used almost interchangeably with reddere, e.g., in the abbreviation for an obviously well-known phrase $C$ (oncessum) $V$ (eteri) $P$ (ossessori) - C 161.6-7 $=\mathrm{T} 166.10=\mathrm{L} 203.14$. This suggests that agri concessi were most often returned to the previous owners, and that consequently the distinction between concessi and redditi became less significant. Siculus Flaccus (C 125.1 $=\mathrm{T} 121.12=\mathrm{L} 157.5-6$ ) quotes the phrase redditum suum, lati fundi in the context of the return of two or more entire centuriae (i.e. more than 400 iugera) to an individual. Lands on this scale should presumably have been defined as concessi, yet here they are simply classed as 'returned'. In returned lands, then, it perhaps came to be assumed that a concession to hold more than the amount originally assigned to settlers was inherent. If it is right that the distinction between agri redditi and concessi ceased to be sustained, then the appearance of both words in lists of map designations for surveyors ( C 55.39 ; 159.35-7 = T 56.15-17; 165.10-12 = L 6.18-19; 202.11-13) simply indicates a need for surveyors to be aware of all possible definitions and eventualities. Moreover, there would remain a valid distinction between concessi and redditi, in that concessi could be bestowed on those who had not been previous landholders in the area, if an emperor wished to confer a special favour.

When the original possessors had their land returned, they did not necessarily receive all of it, or in exactly the same location. They might be compelled to exchange part of it for an area of equal value elsewhere. This was covered in the map notation: redditum commutatum pro suo and similar phrases (C 97.9-11; 123.5-11; 129.2-6; $143.10-15 ; 161.44-5=$ T $93.12-13 ; 119.20-7 ; 125.13-17 ; 142.16-19 ; 169.1-2=$ L 130.8; 155.15-22; 160.25-161.2; 178.6-9; 205.16-206.1; also 222.12-13). Doubtless this could benefit an original landholder if he succeeded in consolidating in one farm previously scattered holdings. But the intention of the founder will have been to satisfy the needs of the settlers, ensure that they had contiguous and convenient holdings, and were in a position to deploy rapidly to defend themselves. Any grant to a previous landholder was a concession, as we see from one of the land designations recorded in the Liber Coloniarum - 'land exchanged through the benefaction of Augustus' (ager commutatus ex beneficio Augusti - C $245.34=$ L 247.19).

The process of return and exchange of land required an accurate record of holdings. To assist in this, previous landholders were required to make a declaration (professio) detailing the extent and quality of their holdings. Hyginus 2 warned surveyors (C $161.44-5=\mathrm{T} 169.1-2=\mathrm{L} 205.15-206.1$ ) to be on their guard against false and misleading declarations. This problem was presumably common; the edict of the
triumviral period quoted above (C $243.3-4=$ L $246.11-15$ ) stated that land should be returned to the previous owners on the basis of the old boundaries (i.e. on the basis of records and measurement), so that incorrect statements should neither injure nor benefit the claimant. After an existing landholder had made a declaration, he might be expelled from his land with monetary compensation according to its declared value, with no further rights ( $\mathrm{C} 129.2-6=\mathrm{T} 125.13-17=\mathrm{L} 160.25-161.2$ ).

At text, line 32, if in place of reditos we read reditus, this must be taken as equivalent to professio, in the sense that landholders make returns not of money but of their accounts.
41. Ills $119-23=\mathrm{L}$ figs $183-7=\mathrm{T}$ figs $122-6$ are intended to teach surveyors how to insert on maps various map notations, in order to fill the available space, and to mark individual boundaries ( $\mathrm{C} 155.21-7$ ). Therefore, they do not necessarily represent real situations, e.g., in Ill. $120=\mathrm{T}$ fig. 123, the name 'Seius', used to denote the farm owner, is employed by legal writers as a typical name; in Ill. $121=\mathrm{T}$ fig. 124, lands are concessi by Publius Scipio, who presumably appears as a well-known example of a Roman politician and military commander; the designation in the illustration is entirely different from that in the text. In Ills $122-3=\mathrm{T}$ figs 125 and 126, the colonia Iulia Constantia mentioned in the designation cannot be definitely identified.
42. Ill. $124=$ L fig. $188=\mathrm{T}$ fig. 127 shows a lucus Dianae Iuliensium on a treecovered area, which is designated mons. This is not precise enough to represent a real location, and must be a general example for teaching purposes. According to the earlier advice ( C 155.25 ), the designation should be written inside the area it identified.
43. Ill. $126=$ L fig. $190=$ T fig. 129 (cf. Ill. $125=\mathrm{L}$ fig. $189=\mathrm{T}$ fig. 128) depicts land division, and, between this and the irregular boundary of the territory, an area marked regio extraclusa et non assignata; the excluded area has been prepared for survey by the creation of right angles. The outer boundaries are marked Fines Iuliensium (the territory of colonia Iulia), and Fines Mantuanorum (the territory of Mantua), and the latter may be a reference to Virgil, who was born at Andes near Mantua; after the Battle of Philippi, the lands of Virgil's father were expropriated for distribution to veterans, probably at Cremona. Virgil may have been granted recompense on appeal to Octavian (see Keppie, CQ (1981); CVSI, 190-2). colonia Iulia appears presumably as an example of a typical colony.
44. At text, lines 17-18, this sentence, omitted by MS P, is probably a gloss.
45. Ill. $127=$ L fig. $191=\mathrm{T}$ fig. 130 (cf. 130a) curiously combines a pictorial depiction of a mountain and boundary stones (designated: 'natural stones carved with boundary marks'), with a diagrammatic representation of centuriation. An original teaching diagram may have been altered subsequently. For Ill. $128=$ L fig. $191=\mathrm{T}$ fig. 131, see p. 346 , n. 47 . III. $129=$ L fig. $193=$ T fig. 132 apparently depicts altars designating an outer boundary on the edge of allocated land, with a pictorial representation of a seascape.
46. For allocation of land by lot, see p. 358, n. 5. At text, line 8, I have corrected the misprint in Thulin's text (T 164.3) of XLVI for LXVI.
47. At C $159.26-7=\mathrm{T} 164.18-19=\mathrm{L} 202.2-3$, Hyginus 2 means that some pasture land was granted individually to certain farms. At C $159.29=$ T $165.2=\mathrm{L} 202.4$, the vectigal was surely payable to the local community, not Rome, as suggested by ClavelLévêque, Hygin, 145, n. 113. It is clear from the context (cf. haec beneficio coloniae
habent) and the map designation that the land had been granted to, and was owned by, the colony, and did not remain the property of the Roman people.

Ill. $130=$ L fig. $194=$ T fig. 133 (MS A), which is intended to teach the correct use of map notations, has pasture land pictorially represented by various fauna, in the middle of land allocations, with the designation: 'public pasture land of the farms of the colony' (pascua fundorum col. publica). Ill. $131=$ L fig. $195=$ T fig. 134 (accompanying MS P) has a simple diagrammatic representation of the pasture land with the designation: compascua Iuliensium. For the nature of the illustrations, see further pp. xxiii-vi.
48. The terminology used by surveyors for the records associated with land survey was in my view not always consistent. However there are some commonly used terms: Forma usually refers to the map of the survey; maps had been used by surveyors from early times ( $\mathrm{C} 65.9 ; 141.13=\mathrm{T} 63.8 ; 139.18=\mathrm{L} 15.19 ; 175.3$ ) and were of great importance for their work. They were expected to contain certain specific information, including some details of the land division and natural features of the location, which would involve writing and diagrammatic representation. These maps were usually carved in bronze (aes), although other materials like wood and parchment were sometimes used (C $121.25-7=$ T 118.16-19 = L 154.13-16), and would eventually be displayed in the settlement (cf. L 295.11, where Nipsus discusses changes 'after the map had been put up' - post aes fixum). Because maps were so commonly carved in bronze, the word aes came to be used to express 'map' (C 89.16; 93.8; 99.1; 129.22; $155.44 ; 161.19=\mathrm{T} 84.12 ; 88.17 ; 95.11 ; 126.8 ; 160.20-1 ; 167.5=\mathrm{L} 121.11 ; 125.18$; 132.4; 161.19; 197.19; 204.6-7), though since other records were also carved in bronze (see below) there was some ambiguity ( $\mathrm{C} 105.34=\mathrm{T} 102.9=\mathrm{L} 138.11$, where aes is distinguished from forma; cf. also possibly C $41.22-3=\mathrm{T} 44.1=\mathrm{L} 83.22$ ); see Moatti, APT, 31-48.
Typon (Greek túлos) was used as a synonym for forma (C 121.29; 159.39-40; see Goetz and Gundermann (eds), Corpus Glossariorum Latinorum, vol. II (1888; rept. 1965), 461.

Inscriptio aeris (e.g. C $137.45=\mathrm{T} \cdot 136.8-9=\mathrm{L} 171.11$ ) normally refers to notations made on the map; cf. also scriptura formae (C $97.38=\mathrm{T} 94.21-95.1=\mathrm{L}$ 131.15-16). Libri aeris ('books of the bronze (map)') are often to be understood as mapping registers, containing extra details of the settlement, for which there was no room on the map (see Moatti, APT, 50-9; cf. commentarii below). Liber suggests a record kept on parchment or papyrus, which could perhaps be easily transferred to the imperial record office (cf. tabulae below). We also hear of a liber subsecivorum (C 159.30-4 = T $165.4-9=\mathrm{L} 202.5-10$ ), a special record of the fate of unused land, and a liber beneficiorum (C $159.43=$ T 165.18-19 = L 203.1-2), listing special grants to the colony, copies of which were also kept in the emperor's record office, where, as Hyginus 2 imagines, the emperor himself might wish to consult them.
Tabula usually refers to an object made from a hard substance, such as stone, wood, or bronze. Tabulae aeris, according to Hyginus 2 (C 159.35-41 = T 165.10-16 = L 202.11-17), were records on bronze of the mapping notations and other material on the registers described above. If we can take his language precisely, he seems to suggest that while the bronze map and tabulae remained in the colony, the libri aeris (i.e. parchment or papyrus copy of the registers) and a copy of the map (presumably also
in parchment form) were transported to the record office in Rome. In the copy of the law found at Heraclea, which seems to be a collection of material taken from different sources relating to the conduct of municipal government, there is a regulation by which the chief magistrates in the municipium were obliged to record census details in the public records (tabulae publicae) of their community and send registers (libri) containing this information to Rome (Crawford, Statutes, no. 24, 148).

At C $159.1-11=\mathrm{T} 163.12-164.1=\mathrm{L} 200.12-201.3$, tabula seems to be used in a special context of the recording of the drawing of lots for individual allocations. This process began with a temporary record, apparently made on codices, which could be equated with wax-covered wooden tablets (tabulae; cf. Seneca, Dial. 10.13.4). This 'entry' was presumably then transferred to the mapping registers, to be retained in the colony.
Commentarii. At C $127.41=$ T $125.5-6=$ L $160.17-18$, this word refers to a record of decisions made by the founder of a colony, but since this would normally have been incorporated with the mapping registers, commentarii served as a simple alternative for libri aeris (C 121.35-6 = T 119.2-4 = L 154.24-155.1; see Moatti, APT, 50-2).

For the record office in Rome and its development in the imperial period, see Moatti, $A P T, 63-78$; the importance of documentation in surveying: Campbell, JRS (1996), 88-90.

Ill. $133=$ L fig. $196 \mathrm{~b}=\mathrm{T}$ fig. 135 a , and Ill. $135=$ L fig. 197a $=$ T fig. 136a (MS P) cover double pages and correspond to the much simpler diagrams (Ill. $132=\mathrm{L}$ fig. 196 and $196 \mathrm{a}=\mathrm{T}$ fig. 135 , and Ill. $134=$ L fig. $197=\mathrm{T}$ fig. 136) in MS A, which contain a conventional depiction of a town and land division, with the marking DM and KM. The colony in IIl. 133 can be identified with Augusta Taurinorum (Turin), with, on the right, the town of Hasta (Asti), which lies about 50 kilometres east-south-east of Turin; to the left on the map is another small town, Opulentia, which is approached by two roads. This cannot be identified; the map maker may have intended oppidum Pollentia or Polentia (Pollenzo), but that is situated about 50 kilometres south-southeast of Turin. However, the Peutinger Table places Polentia south-west of Turin. So, there was some confusion in antiquity. The map's notation fines secustetronensium seems to be a reference, corrupted in transmission, to the territory of the people of Segustero'; this might refer to Segusio (Susa) in the Cottian Alps about 50 kilometres north-west of Turin, or possibly to Segustero (Sisteron) in the Alpes de Haute Provence. It is unlikely that the map should be taken as a genuine geographical record; it seems to be a teaching sketch loosely based on a recognizable area but arranged to demonstrate all the features that might appear on a map studied by a surveyor: several urban centres with their centuriated territory; the boundary lines of adjoining communities; common woods and pasture owned by communities; land that had been exceptus or concessus; main roads; landmarks and natural features. The use of ut ('for example') to introduce several features also suggests that the map was hypothetical.

Ill. 135 mentions a colonia Augusta (unidentified), Atella in Campania, Vercellae (Vercelli) situated between Milan and Turin, both municipia, and Antemnae near Rome, apparently designated as a praefectura. Clearly this map cannot represent one area of Italy. Since three different sets of decumani and kardines maximi appear, the author presumably happened to have several maps showing the details of various territories, and combined them to produce a diagram for demonstration and teaching.

This is loosely relevant to the preceding discussion in Hyginus 2 (C 161.24-8 = T $167.12-16=$ L 204.12-15), who speaks of putting in the record office a complete map of what was done, though there is no illustration of the specific point about allocations in three different centuriae. It is possible that Ills 133 and 135 were later artistic elaborations of existing illustrations, though Carder, Art. Hist., 111-20, argued that the illustrations in MS A were simplified copies of a more complicated original, which was more completely preserved in MS P; note also Dilke, Geog. Journ. (1961), 421-3).

At the top of III. $133=\mathrm{L}$ fig. $195 \mathrm{~b}=\mathrm{T}$ fig. 135a, are the words: 'We ought to arrange in this way the map of the entire allocated area, so that we show all the limites of the survey, and the lines of (i.e. marking) the subseciva'. These comments seem to have been written by the author of the illustration, and were erroneously included in the main text by Lachmann (L 203.4-6).
49. At text, line 5, MS P has C. V. PE. TRP. SVP. agrum. Clavel-Lévêque, Hygin, 147, n. 115, wishes to adopt this reading, interpreting as follows: C. V. P. et $R(e i)$ $P(u b l i c a e)$ Sub(seciva) - 'granted to the prior possessor, and the subseciva to the community'. This seems unlikely and does not account for agrum in P's text.
50. The sense of the verbs commalliolare and commalleare (C 39.14), as used in the surveying texts, is 'to add on'. However, the words are derived from malleolus or malleus (a 'small hammer' or 'hammer'), and, in the context of adding material to a bronze map, may suggest the hammering and welding of a new piece of bronze.
51. At $\mathrm{C} 161.19-25=\mathrm{T} 167.5-12=\mathrm{L} 204.7-14$, Hyginus 2 means that, in the preparation for the drawing of lots, if one allocation was situated in several centuriae, it should nevertheless be recorded on one lot, and, when it had been paired with an individual settler, it would be recorded like this in the registers.
52. Hyginus 2 here refers to ager arcifinius that belonged either to the Roman state or a local community (colony or municipium), and was leased out; see p. 360, n. 20, and Bove, Ricerche sugli "Agri Vectigales" (1960), especially chs 1 and 2.
53. For the classification of land in Pannonia, see Neesen, Untersuchungen zu den direkten Staatsabgaben (1980), 44-8.
54. Hyginus 2 recommends a system of division into scamna and strigae that was to conform in principle to the right-angled layout of the limites in land division by centuriae. The two main limites were to be designated decumanus maximus and kardo maximus (both 20 feet wide), though quintarii could not be used since they were appropriate only to division by centuriae. The next limes actuarius after the decumanus maximus was designated limes secundus prorsus (cf. Frontinus - C 11.7-9 $=$ T 12.13-14 $=$ L 29.9), and the next after the kardo maximus was called limes secundus transversus, and so on (both 12 feet wide). The lines dividing individual rectangles were limites linearii ( 8 feet wide).

Hyginus 2's description is difficult to interpret because he does not make clear what unit of measurement he proposes for the division into scamna and strigae. Mommsen ('Bodenrecht', 99-101) argued that Hyginus intended the measurement to be as close as possible to a normal centuria of 20 by 20 actus $=400$ square actus ( 200 iugera). Therefore he suggested a scamnum 24 actus broad and 16 actus long, and a striga 16 actus broad and 24 actus long, producing an area of 384 square actus (192 iugera). In this explanation, the unit of measurement is half the shorter side ( $=8 \mathrm{actus}$ ); each scamnum and striga has two sides of different lengths, of which one is two units
long (16 actus), the other three units long. So, longer or broader by half (if we translate dimidio as 'half' and interpret this to be half of the two units on the shorter side), is $16+8=24$ actus. This partly depends on Mommsen's emendation of the text at line 9 , where MS B has omnium mensure huius cultura demedio; P has omne (omnes G ) mensurae cuius quadratura dimitio; the text is missing from A except for the ending io. Mommsen (op. cit., 99, n. 1) dismissed PG's quadratura as an interpolation, and read omnem mensurae huius culturam dimidio, where cultura must be interpreted as the the cultivated area involved in this survey. If we accept quadratura $\langle m\rangle$, it should presumably refer to the division of the land into squares by the combination of scamna and strigae (see below).

Mommsen's scheme requires two scamna and one striga between the kardo maximus and the second limes (C 163.10), and six strigae and four scamna between the decumanus maximus and the second limes (see Diagram 16). At line 7, where Thulin obelised the text, MS A has inter quo scamna quattuor strigae cluduntur, and B in quos scamna quattuor et quattuor strigae includuntur. Mommsen contended that the phrase quattuor et quattuor strigae was corrupt, possibly a later addition, and that quattuor did not fit in with the preceding distributive numerals (line 6); he believed that it was also incorrect as a cardinal number, since, on his view, there ought to be six strigae. Consequently he suggested a radical emendation: inter quos scamna quaterna strigaeve senae cluduntur.

However, there is no reason to accept Mommsen's assumption that, because the system was marked out by limites, the dimensions should be as close as possible to those of a 'normal' centuria. Nipsus indeed refers to dimensions of 20 by 24 actus $=240$ iugera ( L 293.13-17), though it is not clear precisely what type of land involving scamna he had in mind. Weber, whose views were firmly rejected by Mommsen (op. cit., 101, n. 1), had argued for 30 by 20 actus $=300$ iugera (Römische Agrargeschichte (1891), 22-5, Tafel II).

It may be, however, that Hyginus 2 intended his scamna and strigae to be combined in squares; apart from the disputed reading at text, line 9 (see above), he uses quadra (square) at C 163.21 and 25 . It is indeed possible to construct a square of scamna and strigae, if we interpret dimidio longiorem sive latiorem (text, line 9) to mean that one side is to be twice (see $O L D$, s.v. dimidium) the length or breadth of the other - 'All the cultivated area (or division of land into squares) in this survey, we make either twice as long or twice as broad'; see Diagram 17; cf. T fig. 137a (MS P), which is more comprehensible than the confused drawing in MS A (Ill. $136=\mathrm{T}$ fig. 137). This arrangement requires less drastic emendation at line 7 (inter quos scamna duo et quattuor strigae) than suggested by Mommsen. For another version of this layout, with further bibliography, see Favory in ClavelLévêque, Cadastres, 126-9; he curiously represents a quadratura as a rectangle in the diagram on p. 129.
55. Hyginus 2 describes a system for setting up inscribed stones at the corners of each block of strigae and scamna produced by the limites. This is clear enough for points ABD on Diagram 17:

A - DM KM
B - DM limes II
D - KM limes II

The fourth corner (C) is obviously supposed to be the equivalent of the angulus clusaris in land divided by centuriae (see above, n. 11), which registered the full coordinates of the centuria. This was based on the original orientation, to the right or left of the decumanus, and on the far side or near side of the kardo, to which Hyginus refers at C 163.19. But as the text stands, this would be impossible to execute since no method is given for the order in which the strigae and scamna are to be numbered. I interpret Hyginus 2 as follows: at line 18, I read, following Barthel, BJ (1911): D. D. V. $\langle K$.$\rangle . The location was established, in this case to the right of the decumanus$ and beyond the kardo, and this was inscribed on the front of the stone (line 19); the full designation was inscribed on the side, including a reference to strigae and scamna. But here the MSS are very confused; A has: STRIGA PRIMA SCAMNO II, P: STRIGAM PRIMAM SCAMNO II, B: STRIGA PRIMA SCAMNA II; Thulin (T 170.15) suggested $S C A M N V M$. With these textual difficulties, it is difficult to understand what Hyginus 2 meant, and in any case each block or unit of measurement ought to have the same number of strigae and scamna, from whatever direction it is viewed. I suggest D. D. V. K. STRIGA PRIMA SCAMNVM I (II may have been mistakenly written on the basis of line 16) on the hypothesis that this designated the 'closing corner' of the first group of strigae and scamna to the right of the decumanus and beyond the kardo. From this the surveyor could work out (if he did not already know) the dimensions of the unit of measurement, locate the next 'closing corner', which would mark the second group of strigae and scamna, and note the number of strigae and scamna contained within each unit. The purpose of this scheme was presumably to enable a surveyor to find his bearings, and work out the kind of system with which he was dealing. With additional information, he could calculate the location of individual holdings.

Mommsen made an ingenious attempt to expound a numbering system, though with significant modifications to the text. He argued that from point C (Diagram 16), looking towards B , there were (on his scheme) four scamna, and towards D , two scamna and one striga, and that this information was inscribed on the appropriate side of the stone. He therefore held that at text, line 18 , litteris singularibus D. D. $V$ was a confused marginal comment that eventually dislodged the genuine text - scamna quattuor, and that STRIGA PRIMA SCAMNO II was a corruption of striga una scamna duo (op. cit., 102); he also wished to read clusaris generis for the eius generis of the MSS at line 18. He argued that these errors arose from the incomprehension of later writers, who tried to explain Hyginus' comments in the light of the designation on marker stones in a centuria.

# COMMENTARY - 〈LIBER COLONIARUM〉 

(TRANSLATION p. 165)

1. It is likely that 'Nero' referred to in the title should be identified with the future emperor Tiberius, who was Tiberius Claudius Nero before his adoption by Augustus in A.D. 4 (cf. Thomsen, Italic Regions, 271-4; Keppie, CVSI, 9-10, arguing against Pais, Colonizzazione, 145-6, who wished to identify 'Nero' with the emperor Nero). Five other entries in the Liber may also describe the work of Tiberius - C $201.21=$ L 260.7 (Nero); C $179.40=$ L 230.4 (Nero Claudius); C $181.17-18=$ L 231.6 (Nero Claudius Caesar); C $183.10=$ L 233.5 (Nero Caesar); C $187.7=$ L 237.15 (Imperator Nero Claudius). Several references to 'Claudius Caesar' (C 167.27; 179.24; $181.45=$ L 211.23; 229.10; 232.12) may in fact refer to the young Tiberius (see below, n. 21). Thomsen probably correctly identified the 'Drusus Caesar' who participated in several foundations (C 181.6; 183.13; $187.37=\mathrm{L} 230.15 ; 233.8 ; 239.2$ ) as Tiberius' brother, even though Drusus had not been adopted into the Julian house and did not receive the name 'Caesar'.

For the nature and layout of the Liber Coloniarum, see pp. xl-xliv. The identification of individual colonies is often difficult. Generally the government of a colony consisted of a board of two (duoviri), while a municipium was governed by a board of four (quattuorviri), but this was not consistent, and the reverse was sometimes the case (see Salmon, $R C R, 155$ and n. 316). Furthermore, the term municipes could be used to refer to the inhabitants of a colony. Therefore to test the claims in the Liber, we need specific literary references, confirmed by inscriptions or other similar evidence. The remains of field-systems, if they can be securely identified, can also help. In this respect much useful information concerning central and southern Italy has been published by Chouquer, especially in Structures agraires, which is extensively cited in the following pages. It should be noted, however, that despite the great value of this work, many of its conclusions remain hypothetical; see the cautious comments by Gabba, Athenaeum (1989).

For an excellent account of the government procedures involved in the foundation of colonies, see Gargola, Lands, chs 3-5. There is a summary and analysis of some land division features described in the Liber, with suggestions for the interpretation and reconstruction of rural layouts, by Clavel-Lévêque and Favory in Behrends, Feldmesskunst, 108-31.

Appendix 7 contains a list of the communities mentioned in the Liber; see also Maps 1 and 2.
2. Provincia - this term as used in the Liber Coloniarum refers to the fact that by the time of Constantine Italy had been divided into provinces for administrative purposes.

Praefectura - Brunt, IM, 280-1, argued that the Liber refers to the type of praefectura known in the early Republic (juridical centres for Roman citizens), and that many citizens were scattered throughout the countryside of Lucania as a result of the Gracchan settlements. If this is correct, it suggests that the Lucanians had lost much of their land to Rome after the Hannibalic War.

On the other hand, surveying writers often use praefectura to denote land taken from the territory of a neighbouring community and allocated to the settlers of a
colony; the colony then had jurisdiction over this land. Although most of the examples cited in Lucania do not seem to fit this category, it is possible that in some cases the Liber is referring to communities that had a praefectura in their territory.

However, it should be noted that the compiler of the Liber did not necessarily understand the full range of meaning of the word praefectura, which he may have used carelessly without any attempt to distinguish its precise significance in each case.

In what follows, the expression 'Gracchan limites' need not imply a Gracchan settlement, but may mean 'limites (laid out) in the Gracchan style'.
Volcei - a municipium in the first century A.D. (CIL X.416); see Bracco, Forma Italiae (1978); a Gracchan boundary stone was found nearby (Appendix 2, no. 10).

Paestum - the Latin colony of Paestum was established in 273 b.c., and Vespasian set up a colony of veteran soldiers here in A.D. 71 ( $A E$ 1975.251); Keppie, PBSR (1984), 98-104; Gasparri, AION (1989); (1990).

Potentia - a municipium in the imperial period (CIL X.135).
Atina - listed among the inland oppida of Lucania by Pliny (NH 3.98); a Gracchan boundary stone was found nearby (Appendix 2, no. 12).
Consilinum - noted as Consilinum castrum by Pliny (NH 3.95); a Gracchan boundary stone was found nearby (Appendix 2, no. 13).
Tegianum - a Gracchan boundary stone was found in the vicinity (Appendix 2, no. 14).

Grumentum - may have been a colony of the Gracchan period, though its grid plan probably dates from the early third century b.C.; its chief magistrates were called praetores duoviri, and this nomenclature is associated with Narbo Martius, founded in 118 B.C. (Pais, Colonizzazione, 150-1; Brunt, IM, 358-9).

Velia (previously Elea) - a municipium after 88 b.c.
Pais argued that the phrase 'with Gracchan limites' may also have stood in lines $5-6$, since Gracchan cippi had been found at Volcei and Atina (to which add Consilinum).
3. For rights of way, see p. 364 , n. 27 ; p. 367 , n. 49 . The phrases iter populo debetur or iter populo non debetur occur frequently in the Liber; see p. 364, n. 27.
4. Buxentum was founded as a citizen colony in 194 b.c. with 300 settlers, and was reinforced in 186. At text, line 12, for the meaningless alirestertianis of MS A, Lachmann (L 209.14) suggested a triumviris veteranis, and Pais limitibus Gracchanis. There is no evidence for a settlement in the Gracchan or triumviral periods.
5. Little is known about Consentia and there is no evidence for Gracchan or Augustan settlements. At text, line 14, MS A has ager Constantinus, which Pais (Colonizzazione, 153) conjectured might be accepted as an epithet of Consentia in the imperial period.
6. A Latin colony was established at Vibo Valentia in 192 b.c. (wrongly dated by Velleius to 239 B.C. - 1.14 .8 ) with 3,700 infantry and 300 cavalry; cavalrymen received 30 iugera, infantrymen 15 (Livy 35.40.5). Before Philippi, Octavian exempted Vibo from confiscation of its land (Appian, BC 4.86); it seems to have remained a municipium in the imperial period.
7. Clampetia was captured by Rome in 204 B.C., or possibly went over of its own accord in 203 (Livy 29.38.1; cf. 30.19.10). It was described simply as a locus by Pliny ( NH 3.72 ), and there is no evidence for a Gracchan settlement.
8. Cf. Siculus Flaccus (C $127.20-2=\mathrm{T} 124.5-8=\mathrm{L} 159.22-5$ ). Beneventum is listed under Bruttium either through simple error (cf. C $181.17=\mathrm{L} 231.5$, where it is placed in Campania), or possibly because it controlled a praefectura there (see Pais, Colonizzazione, 155). Beneventum was a Latin colony of 268 b.C., and received a settlement of veteran soldiers in 41 B.C. after the Battle of Philippi, when it perhaps acquired its titles Iulia Concordia Felix; later it is designated colonia Augusta and may have received a further settlement under Augustus. At C 181.17-18, the Liber records a settlement by Nero Claudius Caesar, who is probably to be identified with Tiberius (see n. 1). The territory of Beneventum was extended by the addition of land taken from Caudium and Ligures Baebiani (cf. C 185.8; Keppie, CVSI, 155-61). Chouquer, Structures agraires, 159-64, claims to identify two superimposed land division grids of 16 by 25 and 20 by 20 actus, the former dating to the Augustan period, the latter to the triumviral. This means, however, that major redistributions of land will have occurred at Beneventum twice in some forty years. That seems unlikely, not least because Augustus promised to bring peace and order. It is possible that the layout of 16 by 25 actus belongs to the earliest foundation of the colony (see Patterson, JRS (1991), 215). 9. Cf. C $203.4=\mathrm{L} 261.5$ (Apulia). Aeclanum was a municipium (Pais, Colonizzazione, 156). Gracchan boundary stones have been found at Rocca San Felice, near Aeclanum (see Appendix 2, nos 4, 5, 6).
10. Venusia was a Latin colony founded in 291 b.c. It was one of the eighteen cities designated before Philippi for veteran settlement (Keppie, CVSI, 163-4). Compsa was a municipium. The Gracchan boundary stones found at Aeclanum may relate to the land between that community and Compsa.
11. Mentioned by Pliny (NH 3.105); see RE 8A. 2 (1958), 1947.
12. A city of the Daunii, recaptured from Hannibal by Fabius Maximus in 214 b.c. (Livy 24.20.5). In the imperial period it was known as colonia Augusta Apula (CIL 9.950). Pliny refers to the Aeclani (NH 3.105). Some traces of a field-system have been identified from aerial photography (Bradford, Antiquity (1949), 67).
13. Cf. C $201.39=$ L 260.25 (Apulia). A municipium (CIL IX.342); a colony was established in the reign of Antoninus Pius - colonia Aurelia Augusta Pia Canusium (CIL IX.344). Importance of Canusium - Brunt, $I M$, 366-8; field-system Bradford, op. cit. (n. 12), 67.
14. Cf. C 201.33; 37; 203.1; $10=\mathrm{L} 260.18 ; 23 ; 261.3 ; 12$ (Apulia).

Herdonia - known only as a municipium (CIL IX.690); for traces of a field-system, see Bradford, op cit. (n. 12), 67.
Ausculum - apparently a municipium; the Ausculani are listed by Pliny among the inland peoples of Apulia (NH 3.105); there may have been a settlement here by Sulla or Caesar, and some traces of a land division grid have been discovered (see Keppie, CVSI, 165-7, citing information from G. D. B. Jones).
Arpi - in the Second Punic War the town surrendered to Hannibal, but was brought back to the Roman side in 213 b.c. In 194 b.C. the colony of Sipontum was founded on some of its confiscated land (Livy 34.45.3); apparently a municipium (CIL IX.697). Collatia - the town in Apulia is known only by name (Pliny, NH 3.105).
Salapia - Hannibal wintered here in 214 b.c. (Livy 24.20.15); later, it was transferred to a new site by M. Hostilius, possibly in the first century b.c. (Vitruvius 1.4.12); known only as a municipium.

Of these communities, only Sipontum seems to have been a colony, and, although there are some signs of centuriation, Gracchan or triumviral distributions in Apulia were probably made to individual settlers, and did not involve the formal establishment of colonies.
15. The word lex appears frequently in the Liber, but at the time of composition the legal rules that had once accompanied the establishment of communities were no longer relevant, and it is unlikely that the compiler understood the exact status of each enactment that could be described as a lex. For example, he may have thought that a lex Augustea or Augustiana was a 'law' of Augustus, but did he have evidence for the precise details of the enactment? In some cases lex seems to indicate a 'regulation' or 'rule', that is, something less than a formal law. Therefore, in recognition of this uncertainty, I have retained lex in the translation.
16. Cf. C $203.15=\mathrm{L} 261.16$ (Apulia). Teanum Apulum was conquered by the Romans in 318 B.C. and was subsequently a municipium (see CIL IX.705; Russi, Teanum Apulum: Le iscrizioni e la storia del municipio (1976)).
17. Luceria was originally founded as a Latin colony in 314 b.c., with 2,500 settlers. Two inscriptions ( $A E 1937.64 ; 1938.110$ ) demonstrate that the town, which is noted as a colony by Pliny ( $N H 3.104$ ), acquired this status before the end of the reign of Augustus. Land division systems have been identified in the vicinity, one of which may go back to the earliest settlement; another perhaps relates to a Gracchan settlement (see Bradford, op. cit. (n. 12), 66-7; Keppie, CVSI, 164-5).
18. For Calabria cf. C. 203.19-38 = L 261.20-262.12.

Tarentum - a colony was founded by C. Gracchus in 122 B.C., though it failed to sustain itself; attempts to reinvigorate the settlement by sending army veterans in Nero's reign also failed (Velleius 1.15.4; Plutarch, C. Gracchus 8.3; Tac., Ann. 14.27). Lupiae - was probably founded by the Romans after 267 B.C on the site of an ancient Messapian town. It was raised to the status of a municipium at an uncertain date and was described as a colony in Antonine times (CIL X.1795). There are some traces of a land division grid at Lupiae (preserved in the dry-stone field walls), consisting of units of 20 by 20 actus covering a vast area of 300,000 iugera; see Compatangelo, Un cadastre de pierre (1989), 55-60; 105-6, who thinks that it might be of Gracchan date; however, in the absence of inscribed stone or other evidence, the chronological context must remain uncertain (cf. Patterson, $J R S$ (1993), 191); see also Clavel-Lévêque and Vignot, Atlas historique (1998).
Austranum - site unknown. Pais (Colonizzazione, 163) argued that Austranum was not an unknown town, but a reference to the south-facing layout of the site of Lupiae. But this phraseology is unparalleled in the Liber, and seems an unlikely intrusion into a simple list of communities. When Lupiae is mentioned later (L 262.9), Austranum does not appear.
Barium - a municipium (Tac., Ann. 16.9). There is no confirmation for Gracchan settlement at Barium.
19. For saltus (text, line 6), see p. 349 , n. 56 . The meaning of the verb censere (text, line 8) as used in the Liber is rather vague. I have normally translated it as 'assess', that is, 'measure for a census' or 'measure as if for a census'.
20. There is no independent confirmation for the assertions in the Liber about these three communities.
21. Following Mommsen, Pais (Colonizzazione, 165) emended Claudius Caesar to C. Iulius Caesar (and also at C 179.24; 181.45; $187.34=$ L 229.10; 232.12; 238.20), arguing that the triumvirs acted as testamentary executors of the policy of Caesar (cf. C $169.2-3=$ L $213.3-5$ ). But these are insufficient grounds on which to change the original text. Claudius founded a number of colonies in the provinces, although there is no certain evidence for his activity in Italy. It is possible however that Claudius Caesar may be a reference to the future emperor Tiberius (see n. 1).
22. At text, line 21, prius of the MSS is difficult, and Lachmann suggested provinciae for prius et. This would mean 'part of the district of Tuscia, Campania and Apulia', but it is not easy to see how such a change occurred in the manuscript. Lines $21-3$ seem to be a later gloss commenting on variations in the size of centuriae, and misplaced in the text here.

All the towns in the district of Tuscia are described as coloniae, and each one must be considered on its merits.
23. Cf. Hyginus 2 (C 139.7-11 = T 136.17-137.3 = L 172.2-7).
24. Castagnoli, L'Universo (1948), identified some centuriae to the west and northwest of the town divided into blocks of 50 iugera, as suggested by the Liber. For the possible extent of the grid west of Florentia in the direction of Empoli, see Ristori, L'Universo (1980). However, the date for the establishment of the town of Florentia and its status as a colony are much disputed. While some have ascribed both to the activities of Sulla, others think that the town may have been founded by Caesar in 47-44 в.c., and that colonial status was conferred later, perhaps by Octavian. It is possible, however, that the colony was established under Caesar's land legislation during his consulship in 59 b.c. There is no confirmation for the idea that further colonists were sent by the triumvirs (see Hardie, JRS (1965); Ciampoltrini, SCO (1981), 46-8; Keppie, CVSI, 175-6; Chouquer, LAR, 118). Gabba, Athenaeum (1989), 570, suggested that the word deducere as used in the Liber meant 'to establish' in an administrative sense, and did not necessarily imply the settlement of soldiers.

The Liber has an unusually detailed account of the subdivision of land that had been laid out with limites. Castagnoli (op. cit.) correctly interpreted this to mean that each centuria was subdivided into square units of 50 iugera, which could then be further divided into squares of land for the veterans.
25. Its full title was colonia Iulia Fida Tuder, and the settlement was probably after the Battle of Philippi (Keppie, CVSI, 176-7). Cf. Agennius Urbicus (C 43.7-11 = T $45.9-14=\mathrm{L} 84.19-27$ ). At text, line 12, I have corrected the punctuation of Lachmann (L 214.5), who placed a comma after longum. For dimensions of boundary stones, see below, n. 30. The precise significance of tysilogramus (text, line 14) is unknown.
26. The symbol in MS A (omitted by EP) inaccurately represented two-thirds instead of three-quarters (dodrans); see Lachmann at L 214.7. Cf. also n. 30.
27. The land of Volaterrae had been confiscated by Sulla, though apparently not distributed (Cic., Att. 1.19.4). Caesar had exempted its land from his agrarian bill of 59 b.C., but it was to be included in the distributions to veterans in 47-44 (Cic., Fam. 13.4.2; 13.5). Since Volaterrae is not attested as a colony, it is possible that Caesar settled a small number of veterans individually on its land (see Ciampoltrini, SCO (1981), 48-9; Keppie, CVSI, 54-5; 57).
28. For the size of allocations, see p. 339, n. 30. For allocations in proportion to military rank, see Siculus Flaccus (C $123.22-32=$ T $120.10-23=$ L 156.4-17); variations in the size of allocations could also be the result of differences in the fertility of the land.
29. Arretium had supported Marius, and was punished by Sulla by the installation of veteran colonists, who were described as the 'more loyal Arretini' (Arretini Fidentiores), in contrast to the native inhabitants, the 'old Arretini' (Pliny, NH 3.52; ILS 6608). Pliny also mentions other inhabitants known as Iulienses. Keppie (CVSI, 54 ; 57) suggests that this indicates a further viritane settlement by Julius Caesar in 47-44 B.C., rather than a settlement after Philippi, or later in Augustus' reign (as argued by Brunt, $I M, 306 ; 337$, n. 1). A settlement at Arretium seems to be confirmed by the discovery of a lead pipe stamped col(onia) Iul(ia) Arr(etina), and by traces of land division to the west of the town (Ciampoltrini, SCO (1981), 50-2, who places it after Philippi or Actium).
30. Lachmann (L 215) argued that the size of the marker stones was intended as a guide to the distances between them, and the overall dimensions of the lines they demarcated. So, the basic layout here is that for the side of a square centuria 2,400 feet long there are eight markers measuring half a foot, at 300 feet intervals ( $=2 \frac{1}{2}$ actus). In a side 2,000 feet long, eight markers at 240 feet intervals will cover 1,920 feet, to which must be added 80 feet, which is one third of 240 ; this is expressed by making the marker $1 / 3$ of a foot long. This also applies to sides $7,000(840 \times 8=6,720$; $7,000-6,720=280=1 / 3$ of 840$)$, or $11,000(1320 \times 8=10,560 ; 11,000-10,560=440$ $=1 / 3$ of 1,320 ) feet long. However, in a side 4,200 feet long eight markers at 480 feet intervals will cover 3,840 feet, to which must be added 360 feet, which is three-quarters of 480 ; this is expressed by making the marker $3 / 4$ of a foot long; a similar calculation applies to a side 5,250 feet long with intervals of 600 feet ( $600 \times 8=4,800$, to which must be added 450 , which is three-quarters of 600 ). In this system, the use of eight markers must be taken as a stock number in a normal scheme. But we cannot be sure if the Liber had in mind a precise system of enumeration. For example, the boundary stones cited may be the minimum number for the marking scheme, and not necessarily related to the length of the sides. It is therefore unwise to rely on precise calculations based on these principles; see also below, nn. 32, 37, 39, 50, 52.
31. Ferentis was a municipium in the imperial period (Vitruvius, De Arch. 2.7.4); there is no evidence for Gracchan allocations.
32. By applying the principles of measurement discussed above (n. 30) Lachmann calculated the length of the sides of the three centuriae, assuming that eight is the number of markers $(1,440 \times 8=11,520$ to which is added $1 / 3$ of $1,440(=480)=12,000 ; 480$ $\times 8=3,840$ to which is added $1 / 3$ of $480(=160)=4,000 ; 600 \times 8=4,800$ to which is added $3 / 4$ of $600(=450)=5,250)$.
33. Cf. C. $195.28=\mathrm{L} 255.9$, where Capena is included in Picenum. It seems to have remained a municipium. Julius Caesar settled some veterans on the land of Capena in 46 B.C. (cf. Cicero, Fam. 9.17.2); archaeological evidence of a hiatus in the occupation of many farm buildings in the late Republic, and of rebuilding on new sites, should probably be associated with the settlement of veteran soldiers by Caesar and others (see Potter, The Changing Landscape of South Etruria (1979), 132, and the review by Crawford, Athenaeum (1980), 497-8). Later, Caesar's settlement provided the basis for
the veteran colony at Lucus Feroniae (Iulia Felix Lucus Feroniae), which had originally been in the territory of Capena, perhaps after Philippi or Actium (Keppie, CVSI, 168-9; see also Jones PBSR (1962)).

At line 9 , pactum and decisio are technical terms, meaning respectively the agreement of two or more parties concerning the same subject (Digest 2.14.1.2), and the settlement of a dispute by a deal or by an oath from the contending parties.
34. Falerii was the chief city of the Faliscans and was finally subdued by Rome in 241 в.C., after which the town was moved from its ancient site to a new location which was then called Falerii Novi (S. Maria di Falleri). The title Iunonia mentioned by the Liber must derive from a local cult of Juno Curitis and adds some weight to its ascription of colonial status to Falerii. Moreover, Pliny (NH 3.51) lists Falerii (in the form Falisca) as one of the inland colonies of the seventh Augustan region. Yet the available evidence suggests that in the late republic and early imperial period it remained a municipium - Augustus is described as pater patriae et municipi (ILS 5373) - and that colonial status was granted later, perhaps as late as the reign of Gallienus (cf. CIL XI.3112, though here Gallienus is described as 'Restorer' of the colony). It is possible that the supposed colony, if founded at Falerii Novi, was of little significance alongside the municipium of Falerii, which was much better known. Keppie suggests that a colony was established at Falerii Novi by the triumvirs or by Augustus, but was short-lived, reverting to the status of a municipium, only to be restored to colonial rank later, perhaps by Gallienus (CVSI, 170-2).
35. Nepet, founded as a Latin colony c. 382 b.C., later became a municipium. Pais (Colonizzazione, 174) suggested that the Liber had confused viritane land allocations in the territory of a municipium with a genuine colonial settlement.
36. A Latin colony dating from 383 b.C., Sutrium is attested as a colony in the later period, though the precise date when it achieved this status is unknown; an inscription dating from Augustus' reign, or soon after, gives its title as colonia Coniuncta Iulia Sutrina, though the unusual element coniuncta may have been subsequently replaced by Augusta (Pais, Colonizzazione, 174; Keppie, CVSI, 169-70; Morselli, Forma Italiae vol. 7 (1980), 14-17).
37. According to the Liber, an area between Tibur and Rome (see also C 193.40; 195.46; $199.28=\mathrm{L} 254.5 ; 255.28 ; 258.19$ ). There may be confusion between the river Tiberis and Tibur, and between Tiberis and Tiberius. However Chouquer (Structures agraires, 95-8), claims to identify a land division grid between Rome and Tibur, in which a long section of the Via Collatina formed one limes. This is based on the identification of ancient roads and pathways and seems rather hypothetical.

At C $171.37-9=\mathrm{L} 218.9-10$, the Liber refers to various subdivisions of centuriae on the basis of individual lots of 25 iugera or parts thereof; 600 by 1,200 feet $=$ 25 iugera; 800 by $300=8.3$ iugera, or one third of a lot; 600 by 600 and 500 by 720 $=12.5$ iugera, or half of one lot; see Favory in Clavel-Lévêque, Cadastres, 123, where fig. 25 , however, provides an inaccurate picture of the layout, in that the rectangles marked 25 iug. do not represent the correct extent of the allocations (followed by Chouquer, Structures agraires, 97).

At L 218.13-14, on the basis of his analysis of the size of boundary stones (see above, n .30 ), Lachmann interpreted the corrupt text as follows: ped(is) semis per $p(e d e m), \varsigma \imath, \neq p \varsigma \operatorname{per} \varsigma$, iz per $\varsigma$ ?, that is, pedis semis per pedem, bessis, quadran-
tis, pedis semis per semissem, quincuncis per bessem. This has been followed in the translation.
38. Tarquinii was an Etruscan city, which later became a Roman municipium. No colony was established here, but Pais speculated on some Gracchan allocations to individuals (Colonizzazione, 175). At C $179.8=\mathrm{L} 228.18$, Corfinium is described in terms very similar to Tarquinii, and there may have been confusion caused by the palaeographic similarity between Tarquinios and Corfinius (Thomsen, Italic Regions, 279-81). 39. See n. 30. With markers 720 feet apart, Lachmann calculates the length of the side as follows: $720 \times 8=5,760+11 / 12$ of $720(=660)=6,420$ feet. At text, line 1 a similar calculation produces odd lengths for the sides, i.e. $6,919.6$ and 7,095 feet respectively. Lachmann wished to emend to make the markers 840 and 870 feet apart. With markers 840 feet apart, we find $840 \times 8=6,720+1 / 3$ of $840(=280)=7,000$. In the case of markers 870 feet apart, Lachmann argues that this is seven actus plus a quarter actus $(=840+30)$, making a side 6,960 feet long $(870 \times 8)$. But this is a deviation from his own system, which indeed expected too much exactitude from the Liber. If the figures in the MSS are correct, they presumably indicate variations in the boundary marking system.
40. Gravisca or Graviscae was the port of Tarquinii. Although described as an oppidum by Pliny ( NH 3.51 ), a colony of Roman citizens had been founded here in 181 b.c. There is no confirmation of a further settlement in the Augustan era. The site had the reputation of an unhealthy climate (see Brunt, $I M, 618$ ).
41. See also C $173.40 ; 175.4 ; 7 ; 19=\mathrm{L} 221.14 ; 222.11 ; 14 ; 223.10$. Veii was an Etruscan city captured by the Romans in 396 b.c. Its land was distributed to Roman citizens individually, and although at some time the site was reoccupied Veii never regained its political importance. Cicero mentions (Fam. 9.17.2) that Caesar's surveyors were active in the territory of Veii in 46 b.C., and there may have been a small settlement of veterans. By a.d. 1 Veii appears with the title municipium Augustum Veiens (ILS 6579; 6582a), indicating that a further settlement had taken place here after 27 B.C. This may also be reflected in the wording municipes intramurani and municipes extramurani on separate dedications of Augustan date (CIL XI. $3797=I L S$ 922; CIL XI.3798-3799), suggesting differences between existing and new settlers. But note the suggestion of Bitto (RSA (1971)) that intramurani might refer to citizens of Veii who lived in Rome. For a historical account of Veii, see Liverani, Municipium Augustum Veiens (1987).

Jones (Latomus (1963), 773-6) argued that at text, line 10, the phrase prius quam oppugnaretur referred to an attack on Veii by Agrippa in 41 в.C., as he captured Sutrium and moved against Perusia, and that a settlement of veterans followed. Pais, however, thought that oppugnaretur should be amended to obsideretur, which has the sense of 'appropriated' as at C 182.11 (Colonizzazione, 176).
42. At C 173.23-6 = L 220.15-221.2, the flint and Tiburtine boundary stones, set at different intervals, should be seen as two independent systems of boundary marking (see Favory in Clavel-Lévêque, Cadastres, 125, n. 257 and fig. 26).

At text, line 19, MS A has occansum, G occasum. I have accepted occasum. Lachmann (L 221.4) suggested occursum ('junction').
43. At text, line 24, MS A's text (as printed) is garbled; MS E has: multorum locorum uel agrorum superandorum ue primiantium. My translation is based on one of

Lachmann's suggested emendations: erit enim uiarum riparum cauarum multorum agrorum separationes promittentium cursus seruandus (L 221.11-13).
44. This presumably refers to land between Veii and the Via Aurelia.
45. This seems to refer to the harbour built by Claudius just over three kilometres north of the mouth of the Tiber, and subsequently extended by Trajan.
46. For bronze records, see p. 397, n. 48.
47. Luna was a Roman coastal colony founded in 177 b.c. with 2,000 settlers (Livy 41.13). Some traces of land distribution have been identified (see Ciampoltrini, $S C O$ (1981), 41-3), but cannot be dated. Therefore a triumviral settlement cannot be demonstrated, though Octavian appears as patron in an inscription no later than 28 B.C. $(C I L ~ X I . ~ 1330=I L S ~ 78) . ~ S e e ~ i n ~ g e n e r a l ~ D e l a n o ~ S m i t h ~ e t ~ a l ., ~ P B S R ~(1986) . ~$
48. Probably Tifernum Tiberinum (not Tifernum Metaurense) in Umbria, which was a municipium, known principally from the Younger Pliny, who had estates near there (cf. Ep. 4.1; also CIL XI, p. 871). It is possible that the compiler of the Liber was misled by a false etymology of Tiberinum into his belief that Tiberius made allocations here; cf. C 171.36; $199.27=\mathrm{L} 218.9 ; 258.18$.
49. At text, line 24, Pais (Colonizzazione, 184), following Mommsen, read Iulia for Aelia. Hispellum was a hill town on the Via Flaminia, which became a colony under the triumvirs or Augustus, with the title: colonia Iulia Hispellum (CIL XI.5278; cf. Pliny, $N H$ 3.113; Hyginus 2 (C 143.24-33 = T 143.8-18 = L 178.19-179.10), and note ad loc.; Keppie, CVSI, 177-9; Chouquer, $L A R, 54-5$ ). Augustus granted as a gift to Hispellum the Fontes Clitumni (Pliny, Ep. 8.8.6). For discussion of land division in the plain of Hispellum, see Castagnoli, RAL (1956); also Clavel-Lévêque and Vignot, Atlas historique (1998).
50. See above, nn. 30; 39. On Lachmann's interpretation of the figures in the text, with boundary markers $5 / 6$ of a foot long and 1,920 feet apart, the length of a side will be: $1,920 \times 8=15,360+5 / 6$ of $1,920(=1,600)=16,960$. With boundary markers $1 / 2$ of a foot long and 2,100 feet apart: $2,100 \times 8=16,800+1 / 2$ of $2,100(=1,050)=17,850$; Lachmann argued that here, since 2,100 was $17 \frac{1}{2}$ actus (symbolized by the half-foot long stone), the length of the side was $2,100 \times 8=16,800$. With boundary markers $3 / 4$ of a foot long and 2,400 feet apart: $2,400 \times 8=19,200+3 / 4$ of $2,400(=1,800)=21,000$.
51. Known only as a municipium; Pais (Colonizzazione, 185) conjectures distributions of land to individuals.
52. On Lachmann's view (see nn. $30,32,37,39,50$ ), the length of the sides should be $7,650,10,600$, and 12,720 feet respectively.
53. Pais (Colonizzazione, 185) brings together the headings at text, line 1 (Pars Piceni) and line 9 (Ex Libro Balbi Provincia Piceni). The two headings may suggest two extracts or redactions that had originally been separate and were then combined in the Arcerianus manuscript. For the identity of Balbus, see below, n. 156.
54. Cf. C 177.2 = L 227.1. The Liber claims that land was allocated on the basis of the same lex as at Florentia, that is, a lex Iulia. It seems that a colony of veteran soldiers from two legions associated with Antony was settled at Ancona in 41 b.c. after Philippi (Appian, BC 5.23). The colonial status is confirmed by Pliny and by inscriptions (NH 3.111; CIL XI.5898; 5841; Keppie, CVSI, 63; 66-7; 184).
55. Spoletium was founded as a Latin colony in 241 b.C. and later had the rank of municipium (Florus 2.9.27 mentions it as a splendidissimum municipium that was sold
up by Sulla). The Liber may refer to land granted to individuals.
56. Interamna Nahars was a municipium. At text, line 14 (cf. C 177.15; 195.20), MS A has: Interamnae Paletino Piceni, P Palestino, E Palastino. For the difficult Paletino or Palestino, Mommsen (in Lachmann, Feldmesser II, 169) suggested Interamnae alterius Piceni - 'Interamnia in the other part of Picenum'. I have accepted Pais' proposal that the corrupt text had originally included a reference to Praetuttii, the people to which Interamnia belonged (Colonizzazione, 188-90; cf. Frontinus (C 7.19-22 = T 7.13-8.1 = L 18.10-19.3), and p. 323, n. 18.
57. This important road junction site in inland Picenum became a colony probably in Flavian times (CIL XI.5533); there is no evidence of settlement by the triumvirs.
58. Cf. C $199.44=\mathrm{L} 259.9$ (Picenum). Tolentinum was a municipium; there is no evidence for a triumviral settlement.
59. Cf. C $197.2=$ L 256.3 (Picenum). Firmum Picenum was founded as a Latin colony in 264 B.C. A colony was established here with veterans of Legion IV Macedonica, probably after Philippi (Keppie, CVSI, 181-2; see also p. 346, n. 47). For a general account note Polverini, Firmum Picenum (1987).
60. Founded as a citizen colony between 289 and 283 b.C. There is no independent confirmation of triumviral activity.
61. A citizen colony founded on the coast astride the Via Flaminia in 184 b.c. (Salmon, $R C R, 104-5$ ), which flourished into the imperial period (Strabo 5.241; Pliny, NH 3.111). There is evidence of land division in strips, which investigators have associated with the foundation of the colony. There is also a centuriation grid, which they wish to associate with triumviral activity (Alfieri et al., Studia Picena (1965-66), 19-33).
62. Ricina was a municipium and did not become a colony until the end of the second century A.D., under the name colonia Helvia Ricina Pertinax (CIL IX.5547; 5755). There is no independent confirmation of triumviral activity.
63. There is no independent confirmation of triumviral activity.
64. Cf. C 195.10-11 = L 254.21-2 (Picenum). Cupra Montana was a municipium (CIL IX, p. 543). Cupra Marittima was also a municipium; there is no evidence for allocations by Augustus (see now Paci (ed.), Cupra Marittima (1993)).
65. Cf. perhaps C $199.34=\mathrm{L} 258.27$ (Picenum). Nothing is known about the status of Castrum Truentum.
66. Castrum Novum in Picenum was perhaps not a colony, at least in the Republic (Salmon, $R C R, 180, \mathrm{n} .119$ ). There is no clear confirmation of activity by Augustus, but see Gianfrotta, Forma Italiae vol. 3 (1972), 12-21.
67. Aternum seems to have been merely a vicus in later times (cf. CIL IX, p. 315). There is no confirmation of activity by Augustus.
68. See above, n. 54 .
69. Cf. C $193.12=\mathrm{L} 253.1$ (Picenum). According to Velleius (1.15.3) Auximum was founded as a citizen colony in 157 B.c. (accepted by Brunt, IM, 281). Some have thought this too early; and Salmon placed its foundation in 128 b.C., arguing that it was an attempt by Tiberius Gracchus' opponents to outstrip the popularity that his agrarian reforms had brought to his political supporters ( $R C R, 112-14$, and n . 194). But there is no clear evidence for this idea.
70. Asculum Picenum was a colony (Pliny, NH 3.111, described it as the most dis-
tinguished in Picenum). Cf. Frontinus (C 7.19-20 = T 7.13-15 = L 18.10-19.1) and p. 323, n. 18. At text, line 25, Pais (Colonizzazione, 194) preferred to read Iulianis for Claudianis, arguing that at C 181.45 and 187.34, Claudius was a corruption of C. Iulius. But this should be rejected (above, n. 21). See in general, Conta Haller (ed.), Asculum II. 1 (1982), ch. 3.
71. Cf. C $191.34=$ L 252.2 (Picenum). Hadria was established as a Latin colony c. 289-283 b.C. (Salmon, $R C R, 62-4$, and n. 81), and is listed as a colony in Pliny, $N H$ 3.110; it was founded before 11 B.C. since an inscription (ILS 919) in honour of Paullus Fabius Maximus describes him as consul (11 b.c.) and patron of the colony (Keppie, CVSI, 179-80, suggesting a possible settlement after Philippi).
72. MSS AP omit Nursia and Pinna from the list; cf. C 197.30; $35=\mathrm{L} 257.5 ; 11$ (Picenum). Nursia was certainly a likely target for triumviral allocations; it resisted Octavian in 41 b.c. in the campaign of Perusia, and then inscribed on the tombs of those who had been killed in battle: 'they died fighting for freedom'. Consequently Nursia was heavily fined and the inhabitants were eventually forced to abandon their town and its territory (Dio 48.13.6; Suet., Aug. 12).
73. Cf. C 197.5; $13=\mathrm{L} 256.6 ; 14$ (Picenum). Falerio was a colony at least by the start of the second century A.D., but there is no clear indication of its origin (Keppie, CVSI, 182-3; above, p. 346, n. 47). For limited traces of a field-system near Falerio in the valley of the river Tenna, see Bonvicini, Studia Picena (1958).
74. See above, n. 72. Pinna apparently was a municipium.
75. At text, line 31, noverca means 'stepmother'. Rudorff (in Lachmann, Feldmesser II, 269-70) explained this on the hypothesis that it was a kind of drainage channel made of wood and filled with pieces of broken tile, which let the water through grudgingly, like a stepmother; see also C $189.23=$ L 240.14 ; C $189.38=\mathrm{L} 241.11$; C 247.24 $=\mathrm{L} 250.4 ; \mathrm{C} 191.36 ; 42=\mathrm{L} 252.4 ; 12 ; \mathrm{C} 195.41=\mathrm{L} 255.23 ;$ C $197.7=\mathrm{L} 256.8$.
76. The section from C 177.40-179.23 = L 228.3-229.9 appears in MS P, but not in MS A (see Mommsen in Lachmann, Feldmesser II, 166-7, who doubted its reliability). When Italy was divided into provinces, Flaminia and Picenum constituted the area of eastern Italy north of Samnium, bordering on the Adriatic. Valeria was the name of a province established soon after A.D. 423, comprising the southern part of Flaminia and Picenum (see Thomsen, Italic Regions, 221-6).
77. Although by the end of the Republic most Italian communities had been assimilated to the status of a colony or municipium, Amiternum unusually was still a praefectura (see Glossary) with VIII viri in the time of Augustus (ILS 3701). As in the case of Aveia (below, n. 78), there is no evidence for land distributions. See in general, Segenni, Amiternum e il suo territorio in età romana (1985).
78. Originally a city of the Vestini in the Abruzzi, which is reflected in the community's official name - Aveiates Vestini. It was a praefectura, which later acquired municipal status, and appears in an inscription of the mid-third century A.D. as municipium Habae(a) (ILS 9087); see La Regina, Ricerche (1986).
79. Cf. C $195.21=\mathrm{L} 255.3$, which refers to allocations by Augustus; C $195.31=$ L 255.12 (Picenum); C 201.17 = L 260.3 (Samnium). Corfinium was a municipium in the imperial period (CIL IX, p. 297). Chouquer, Structures agraires, 133-6 identified two land division grids between Corfinium and Sulmo, one with squares of 15 by 15 actus, which he assigned to a Gracchan distribution, the other with squares of 20 by

20 actus, which he attributed to Augustus. He believed that this brought confirmation to the Liber Coloniarum, but his argument remains somewhat circular, in that the only evidence for the date of the grids is provided by the Liber.
80. Cf. C 199.24 = L 258.15 (Picenum). At C 179.16 (cf. 185.29 ), MS P has Severus Antoninus Commodus. Mommsen (in Lachmann, Feldmesser II, 167) thought that because of the impossible combination of emperors, the whole entry was the result of late falsification. Lachmann (L 229.2), however, plausibly suggested Verus or L. Verus for Severus. Mommsen, op. cit., 178, n. 44 (see also below, n. 133) objected on the grounds that these three emperors did not rule simultaneously. But the entry may mean that the emperors made the grants at different times. Superaequum had duoviri (CIL IX.3313), which is consistent with, but does not necessarily prove, colonial status; see Wonterghem (ed.), Forma Italiae. Regio IV (1984).
81. Cf. C $197.42=\mathrm{L} 257.16$ (Picenum). Peltuinum was formerly a praefectura (CIL IX.3429); later in the first century A.D. it appears not as a colony, but as a municipium (CIL IX.2384). Other inscriptions refer to the community as civitas Peltuinatium Vestin. (ILS 5056, A.D. 271), or Pars Peltuinatium (ILS 5668/9), and Pliny classes the Peltuinates as a people in the Vestinian region (NH 3.107). The ascription in the Liber of colonial status may have been a misunderstanding of grants to individual settlers in the territory of the municipium, although there is no evidence for this.
82. Cf. C $197.20=\mathrm{L} 256.23$ (Picenum). Marruvium was the chief city of the Marsi in the Abruzzi; it was a municipium (CIL IX, p. 349). Inscriptions from Marruvium honouring members of Augustus' family cannot be taken as evidence for any Augustan allocations (cf. Pais, Colonizzazione, 280).
83. Cf. C $201.30=\mathrm{L} 260.16$ (Samnium), where it is associated with allocations at Aesernia (C 201.21 = L 260.7 (Samnium); C 201.21 = L 233.14 (Campania)). Sulmo had been destroyed on the orders of Sulla (Florus 2.9.28). In the imperial period it was a municipium (CIL IX, p. 290). For field-systems between Sulmo and Corfinium, see above, n. 79.
84. See above, n. 21.
85. Aquinum is listed among the inland colonies of Latium and Campania by Pliny ( NH 3.63 ); its foundation perhaps belongs after Philippi; a land division grid in its territory had been established by 39 b.c. (so Coarelli, Quad. Ist. Top. Ant. (1964), though the evidence for the dating seems uncertain); cf. Chouquer, Structures agraires, 125-30; 273-80, who also identified an earlier system consisting of a series of parallel limites 10 actus apart. See also Keppie, CVSI, 137-8; Chouquer, LAR, 120-1.

At line 23, for the translation of perennis, see below, n. 118.
86. An inscription of A.D. 240 gives its full name as colonia Ven(eria) Livia Aug(usta) Alexandriana Abellinatium (CIL X.1117), but it remains unclear when this status was conferred; the title Livia may suggest a reference to Augustus' wife Livia, but she is not known to have had any connection with Abellinum, and there is no other example of a colony named after her; Keppie (CVSI, 19, n. 54) noted the possibility that Livia was associated with the Elder, or Younger, Livius Drusus, although there is no support for this. The title Alexandriana remains unexplained, but might be connected with Octavian's victory over Antony and Cleopatra, his occupation of Egypt and Alexandria, and the discharge of veterans after Actium. It might on the other hand refer to a refoundation by the emperor Severus Alexander. Mommsen
argued for a Sullan foundation (see CIL X, p. 89; the name Veneria is elsewhere occasionally associated with Sullan foundations); Pais, Colonizzazione, 203-4; 252-5, thought that the colonial foundation was early (on the basis that the chief magistrates at Abellinum were called praetores duoviri, which is usually regarded as an early formulation), and accepted a Gracchan date; he was influenced by the epithets derived from deities (comparable to Veneria) used in some Gracchan colonies, e.g. Iunonia (Carthage); Neptunia (Tarentum); Minervia (Squillace); Martius (Narbo); and possibly Herculanea (Telesia). Chouquer, Structures agraires, 168-9 has identified a small land division grid around Abellinum based on squares of 14 actus, although its dating remains uncertain.
87. A city of the Volscians in Latium where Rome established a colony in 338 b.c. Nero tried to cure its under-population by refounding it with veterans from several legions and the praetorian cohorts (Tac., Ann. 14.27; Suet., Ner. 9).
88. Acerrae is described as an oppidum by Pliny ( $N H 3.63$ ), and apparently remained a municipium (Festus 117L). There is no confirmation for an Augustan settlement. For traces of a field-system extending between Acerrae and Atella, see Chouquer, Structures agraires, 207; 226-7; but there is no evidence outside the Liber for its date.
89. Atella was punished by Rome in 211 b.c. by the confiscation of part of its territory, after it had joined Capua in defecting to Hannibal. In the late Republic it was a municipium (Cicero, Fam. 13.7). Atella remained closely associated with Capua and other neighbouring towns in the Ager Campanus (see Bencivenga, RAAN (1976); Vallat, MEFRA (1979); also MEFRA (1980)). Chouquer, Structures agraires, 208-9 argues for a small grid in centuriae of 20 actus, which cannot however be securely dated; see also n. 88 above; for a summary of land division in Campania, see Chouquer, $L A R$, 116-17. For Augustus' general interest in Campania, see Frederiksen, Campania (1984), 331.
90. For the identification of Nero Claudius see above, n. 1. Atina was a municipium (CIL X.5064). However, an inscription records parallel dedications to a senator probably of Augustan date, P. Tettius Rufus Tontianus, by a Twentieth Legion and by the Atinates urbani (ILS 930-930a; Wiseman, New Men in the Roman Senate (1971), no. 426). Tontianus may have been responsible for organizing land allocations for veterans of the Twentieth legion, but his activity cannot be dated. Chouquer, Structures agraires, 137-9, has identified a grid with squares of 14 actus. This does not fit the description in the Liber, and there is no independent evidence of its date.
91. Aletrium, an old town of the Hernici, received Roman citizenship in 90 b.C. and in the time of Cicero was a municipium; it still had this status in the early Empire (CIL X.5808). Chouquer, Structures agraires, 119-23, has attempted to identify two superimposed land division grids in the vicinity of Aletrium, Frusino, and Verulae; but the evidence seems very uncertain and they cannot be dated.
92. An old Latin town on the Via Appia. It was stormed by Marius in 87 b.c. (Perioch. Liv. 80; Appian, BC 1.69; Orosius 5.19.9), which led Pais to conjecture (though without evidence) that a Sullan settlement here was plausible (Colonizzazione, 209).

The use of the verb munire (see also C 181.1; 183.9; 16; 183.39; 42; 187.12; 15 $=\mathrm{L} 230.10 ; 233.3,10 ; 234.15,18 ; 237.20,23$ ) must in the context indicate fortification, but presumably also implies the idea of foundation or settlement often expressed by deducere.
93. Asetium is unknown and may be a corruption of another name. Casentium (C $181.26=\mathrm{L} 231.14$ ), which is also unknown, seems to be a muddled repetition of Asetium, in which the abbreviation C (for civitas or colonia) was added to Asetium and then entered as a separate community (Mommsen in Lachmann, Feldmesser II, 186). Cf. C $181.28=\mathrm{L}$ 231.16, where Calagna is a similar corruption and repetition of Anagnia (C181.5 = L 230.15).
94. Anagnia was capital of the Hernici and later became a municipium (Cicero, de Dom. 81; CIL X.5919). Chouquer (Structures agraires, 114-17) sought to identify a system of dividing land in strigae, which he wished to associate with the Roman conquest of Anagnia in 306 b.c. But the remains are so slight and the layout so irregular that it is difficult to place any weight on this hypothesis. He has also noted, rather more persuasively, a division into centuriae of 20 by 20 actus, between Anagnia and Signia, which he wished to date to the triumviral period; it is possible that this grid was utilized for subsequent distributions. See also Mazzolani, Forma Italiae (1969). For the identification of Drusus Caesar, see above, n. 1; cf. C 183.13; $187.37=$ L 233.8; 239.2 .
95. This is an error since Abella was a colony in the Republic, perhaps from the time of Sulla (Salmon, RCR, 131). Chouquer (Structures agraires, 209-10) identified a land division grid between Nola and Abella in squares of 20 actus. It is not clear, however, if this can be related to the information in the Liber concerning Vespasian. For Nola, see below, n. 132.
96. There is no other evidence for Gracchan settlement at Aefulae.
97. A town of the Rutuli in Latium where a Latin colony was established in 442 B.c. (Salmon, $R C R, 42$ ). Cf. C $247.32-6=\mathrm{L} 251.1-17$, an inscription of the reign of Antoninus Pius, recording land measurement at Ardea; Mommsen (CIL X.676) accepted this as a genuine record, but regarded it as the source of the notice in the Liber. For the history of Ardea, see Morselli and Tortorici, Forma Italiae. Regio I, vol. 16 (1982), 34-45.
98. Allifae, originally part of Samnium, was included in Campania after Augustus' reorganization of Italy. Although Pliny ( $N H 3.63$ ) registers it as an oppidum, it appears as a colony in the late first and second centuries A.D. (CIL IX.2354; X.4590). Chouquer (Structures agraires, 155-6), developing and modifying the work of Castagnoli ( $R A L$ (1956), 376), has identified a land division grid located in the middle Volturno valley, involving the towns of Allifae, Teanum, Telesia, and Saticula, and containing centuriae of 20 by 20 actus. It seems to have originated at Allifae, since there is a close correspondence between the orientation of the limites and the layout of the town. Chouquer suggested a triumviral, rather than a Sullan date. See also, Pagano, RAAN (1984), although his identification of boundary stones has been seriously undermined by Liverani (MEFRA (1987)).
99. Cf. C $165.22=\mathrm{L}$ 210.1. For discussion of land division at Beneventum, see above, n. 8. For the identification of Nero Claudius Caesar, see above, n. 1 .
100. Cf. C $201.10=\mathrm{L} 259.23$ (Samnium). Bovianum was still a municipium in 48-46 B.C. (ILS 70). In the first century A.D. it was a colony with the title colonia Bovianum Undecumanorum (CIL IX.2564), which implies settlement by veterans from a legio XI. On the basis of Pliny, NH 3.107 (colonia Bovianum Vetus et alterum cognomine Undecumanorum), some (notably Mommsen, CIL IX, pp. 257; 239) have argued that
there were two separate towns - one, Bovianum vetus, a colony of the late first century b.c. situated at Pietrabbondante, the other Bovianum Undecumanorum, a foundation of Vespasian with veterans of XI Claudia, situated about 40 kilometres to the south at Boiano. However, archaeological investigation has indicated that occupation of the site at Pietrabbondante had virtually ceased by the end of the first century в.с. It is likely that there was one town, with a distinction betwen the original inhabitants (veteres), and the men of the eleventh legion (undecumani) (La Regina, Rh. Mus. (1966)). Keppie believes that the veteran settlement took place under Caesar, or after Philippi; a Caesarean settlement could perhaps have been reinforced and given colonial status after Actium (CVSI, 161-3). There is no evidence to suggest that Vespasian was responsible for the colony at Bovianum, though Hyginus 1 notes that he did establish a settlement in Samnium (C 97.39-99.2 = T 95.1-13 = L 131.16-132.6). Chouquer, Structures agraires, 144-7, claims to identify two grids at Bovianum, one in squares of 16 actus, the other in a series of unequal rectangles. He ascribes the grid of 16 by 16 actus to Augustus, mainly on the hypothesis that these dimensions are typical of Augustan land division; but this is unconvincing, because there is often a lack of independent evidence for dating land division grids. Moreover, Chouquer's own analysis of alleged Augustan settlements shows significant variation in dimensions (ibid., 253).
101. Bovillae was a municipium. Pais (Colonizzazione, 217) conjectured grants to individual veterans by Sulla, without the establishment of a colony. For traces of land division between Bovillae and Tusculum, see Chouquer (Structures agraires, 87; 92-3), who assumes a distribution by Sulla (but see below, n. 110). For a general account of Bovillae, see de Rossi, Forma Italiae (1979).
102. See above, n. 93.
103. See above, n. 93.
104. Capua was one of the most important settlements in the ager Campanus. A short-lived colony was set up in 83 b.c. by the Marians, but it was not until 59 b.c. that a colony was securely established by Julius Caesar. The neighbouring communities of Calatia and Casilinum subsequently had veterans from Caesar's Gallic campaigns settled on them and also became colonies. Later, both were assimilated into the territory of Capua, perhaps before the death of Augustus. There were further allocations after Philippi (Appian, BC 4.3), and in 36 b.c. (Velleius 2.81; Dio 49.14.5; ILS 6308), and Nero added more veterans in A.D. 57 (Tac., Ann. 13.31). The full title of Capua emerged as colonia Iulia Felix Augusta (ILS 6309). Augusta may suggest additional allocations or fresh benefactions after 27 B.C. In an inscription dated by Mommsen to the late third century A.D., Capua appears with the title Concordia, although it is unclear when this was adopted (ILS 6310). See Pais, Colonizzazione, 218-21; Keppie, CVSI, 143-7.

The remains of land division in the ager Campanus are well documented although their precise dating remains difficult (see p. 326, n 27, and above, n. 89; also Pl. VI). Chouquer's detailed study (Structures agraires, 199-231; 294-314; cf. Chouquer, $L A R, 116-17$ ) supported the assertion in the Liber that Sulla distributed land at Capua (Sulla is known to have extended the temple land of Diana Tifatina: Vell. 2.25.4; ILS 251; 3240). He argued that the grid in the ager Campanus between Nola and Capua, consisting of units of 20 by 20 actus, was the work of Sulla. But
there seems to be insufficient independent evidence to support this contention.
For boundary stones discovered in the ager Campanus, see Appendix 2.
105. For the fate of Calatia, see above, n. 104. The Liber seems to be referring to the eventual decline of Calatia, after the settlements of Caesar, but the circumstances and date have been muddled. Mommsen (in Lachmann, Feldmesser II, 186-7; CIL X, p. 444) argued that the reference was to Caiatia.
106. See above, n. 8 . During the settlement of 41 в.C., Beneventum's territory was extended, at least at the expense of Caudium. An inscription of Severan date (ILS 6488) was set up by colonia Iulia Concordia Aug(usta) Felix Beneventum on the western edge of the ager Caudinus, 'in its own territory, which also surrounds the community of Caudium right up to town wall'. So the territory of Caudium, but not the town itself, was in the jurisdiction of Beneventum. Cf. Frontinus (C 7.7-26 = T 7.1-8.6 $=\mathrm{L} 17.1-20.2$ ), and p. 323, n. 18. Chouquer claims to identify traces of two field-systems at Caudium, one in units of 13 by 13 actus (ascribed to the second or third century b.c.), the other in units of 15 by 15 actus, which he ascribes to an Augustan settlement after the Battle of Actium (Structures agraires, 164-7).
107. The earliest clear attestation for the colonial status of Cumae is at the end of the third century A.D. (ILS 4175). However, it has been argued that Cumae had become a colony before the death of Augustus. This view depends on the interpretation of several inscriptions (including $I L S 6388$; 5054) that use the abbreviation $C I$ (this can reasonably be expanded to colonia Iulia), and are ascribed to Cumae. But Keppie has shown that this ascription is unsafe (CVSI, 148-50). Moreover, Pliny ( NH 3.61) does not list Cumae as a colony, and in CIL X. 3697 (probably from A.D. 7) the inhabitants are described as municipes, although this is not decisive. On balance, the assertion in the Liber Coloniarum of an Augustan foundation should probably be rejected, but the reference to Claudius Caesar might indicate some viritane allocations by Tiberius in Augustus' reign, or indeed by the emperor Claudius (see above, nn. 1; 21).
108. A Latin colony was established at Cales in 334 b.c. and this subsequently became a municipium (Cicero, Fam. 9.13.3; CIL X.4641; 3643). Gracchan settlement is attested in areas in the general vicinity, where Gracchan boundary stones have been discovered (see Appendix 2). Chouquer (Structures agraires, 191-5) identified some land division by strigae, which he associated with the first foundation; a grid in units of 14 by 16 actus, which he associated with Gracchus; and a third, in units of 15 by 15 actus, which he associated with Augustus (possibly in the form of grants to individual veterans). However, settlement patterns may not have been as clearly defined as suggested, and it is worth noting that there may also have been a small settlement of Caesar's veterans at Cales in 47-44 в.c. (Keppie, CVSI, 53; 57-8).
109. There were Sullan allocations at Casinum (Cicero, Leg. Agr. 3.14). It was a colony in the imperial period (cf. CIL X.4860; 5198; 5200; 5796, although it is cited as an oppidum by Pliny, NH 3.63). Pais (Colonizzazione, 223-4) argued that it acquired this status under the triumvirs. He noted an image of the goddess Concordia in Cales (CIL X.5159), celebrating the pact of Brundisium between Octavian and Antony in 40 b.c. Concordia also appears in the name of other triumviral colonies in the region, Capua (CIL X.3877) and Beneventum (CIL IX.2165). For some traces of land division in the territory of Casinum, which however do not help the problem of the date
or origin of the colony, see Chouquer, Structures agraires, 127-30.
110. Capitulum Hernicorum was a municipium and there is no independent confirmation of allocations by Sulla or Caesar, though Chouquer (Structures agraires, 116-17) suggests that a land division grid between Anagnia and Signa, which extends towards Capitulum, may indicate a triumviral extension of work by Caesar. But there is no proof of date. Brunt (IM, 311, n. 4) conjectures that this reference in the Liber (cf. also Bovillae (C $181.23=\mathrm{L} 231.11$ ), Castrimoenium (C183.9 $=\mathrm{L} 233.3$ ), and Gabii (C $183.39=\mathrm{L} 234.15$ )) may indicate that in these areas land occupied by Sullan landholders was allocated to veterans in later settlements.
111. A municipium (CIL XIV, p. 239). Some traces of a field-system containing units of 14 by 14 actus have been found in the area extending from Bovillae to Tusculum and including Castrimoenium (Chouquer, Structures agraires, 87; 93-4). But this cannot be dated except through the evidence of the Liber. For the identity of Nero Caesar, see above, n. 1 .
112. C. Marius was born in the vicinity, near Arpinum. The meaning of familia is vague and unexplained in the Liber. Although at line 12 'family' might stand as a translation because of Marius' connection with the area, elsewhere it would be inappropriate, and I have preferred to use the expression 'members of the household', taking this as a general reference to the entourage of important men.

Pliny calls Cereatae Marianae an oppidum (NH 3.63; cf. Strabo 5.238). For the identification of Nero Caesar as the elder Drusus, brother of Tiberius, see above, n. 1; in settling veterans he may have established a municipium.

Obsidere should be interpreted as 'to appropriate' (cf. Pais, Colonizzazione, 225-6); above, n. 41; note also obsidionem - 'appropriation' (C 187.28 = L 238.14; below, n. 149).
113. For the corrupt Cadatia, a reference to Caiatia or Calatia has been suggested (Pais, Colonizzazione, 226-7). But Calatia is treated at C $181.36=\mathrm{L} 232.3$, and Chouquer (Structures agraires, 149-51) argued for Caiatia. Caiatia (Caiazzo) was a municipium (CIL X, p. 444). A land division grid has been identified to the east of the town, comprising units of 13 by 13 actus. Chouquer is disposed to accept the Gracchan allocations suggested by the Liber, since the 13 by 13 actus layout corresponds with that in other areas where there was a Gracchan settlement. The argument seems circular, and in fact there is substantial variation (ibid., 247). Although Gracchan boundary stones have been found in some areas of Campania (see Appendix 2), this does not in itself make a Gracchan settlement at Caiatia seem any more likely.
114. For the corrupt Divinos, Lachmann, followed by Pais (Colonizzazione, 227), suggested the town of the Dirinii mentioned by Pliny (NH 3.105). However this was situated in Apulia. There is no confirmation for the claim of an Augustan settlement. 115. Cf. C $201.21=\mathrm{L} 260.7$ (Samnium). Aesernia was founded as a Latin colony in 263 b.c. Despite the claims in the Liber, in Augustus' time Aesernia is still attested as a municipium (CIL IX, p. 245). Chouquer (Structures agraires, 142-4) claimed to identify a grid north of Aesernia, which he dated to the third century b.c. But the remains are surely too slight for any weight to be placed on this. He also identified a grid at Aesernia itself, with units of 16 by 16 actus. This cannot be independently dated, but if we take Nero at line 21 to be the future emperor Tiberius (see $n .1$ ), we may con-
jecture that land was allocated to individual veterans by Caesar, and that this settlement was later reinforced in the time of Augustus.
116. Frusino was a colony in the imperial period (CIL X.5662). Traces of two superimposed land division grids, extending to the territory of the neighbouring towns of Aletrium (C 179.43) and Verulae (C 187.46), have been identified. One grid may have had units of 13 by 13 actus, and Chouquer has suggested a Gracchan date, endorsing the statement in the Liber about Verulae (Structures agraires, 119-23). But the identification and dating must remain speculative (see above, n. 113).
117. This is Forum Popilii on the ager Falernus. Archaeological investigation and aerial photography have identified land division near Forum Popilii by a series of parallel limites; there is apparently a subsequent grid containing units of 14 by 14 actus, which may be conjectured as Sullan or Gracchan. Around Forum Popilii itself, a grid with a different orientation, containing units of 15 by 15 actus, has been identified. Chouquer saw this layout as typical of Augustan settlements and accepted the statement in the Liber (Structures agraires, 181-91). But it is possible that this grid represents settlement after Augustus, possibly by Vespasian, if the information in the Liber is correct.
118. Ferentinum was a municipium in the late Republic and early imperial periods (CIL X.5829; 5852). Some uncertain traces of an early grid system have been identified, marked out by limites, largely parallel but not equidistant, and with no clearly consistent orientation. By this system land would have been allocated in strips. Chouquer wished to date this to $c .338$ в.C., associating it with the development of the Via Latina and Roman settlement after the Latin War (Structures agraires, 117-19). But it is not demonstrable that land division by strips is necessarily of early date, and this conclusion must remain speculative. Two dedications made at Ferentinum in the imperial period (CIL X.5825; 5828) refer to Ferentinates Novani, and may suggest the arrival at some time of new settlers, possibly veterans.

At text, line 25, MSS EP have perennis militibus, MS A perennis limitibus (cf. also C 179.28-9 = L 229.14-15; above, n. 85). Grammatically, perennis should be nominative singular, agreeing with ager. But this does not give a comprehensible meaning. If we take perennis as an intended ablative plural agreeing with its noun, the term 'continuous' limites (adopted here) does not fit well the idea of land distribution in strips. However, although distribution to soldiers is appropriate, the adjective perennis would then be meaningless. Goesius, in his edition of 1674 , suggested peregrinis for perennis; this would presumably be interpreted as non-citizen auxiliary soldiers. But this distinction involving auxiliary soldiers is unparalleled in the texts, though at C 183.43 and $187.22-3=$ L 234.19 and $238.7-8$, the phrase metycus miles appears, which might be interpreted as 'foreign soldier' or possibly 'soldier from outside Italy'. See also below, n. 124.
119. It is not clear if the Liber refers to Fabrateria Vetus (Ceccano) or Fabrateria Nova (Isoletta). Both were municipia (CIL X.5653; 5584). Fabrateria Nova is more likely; it was founded in 124 в.c. to replace Fregellae, which had been destroyed by the Romans (see de Lucia Brolli, Arch. Laz. (1983)). Chouquer identified in its territory a land division grid containing units of 15 by 15 actus, which he wished to date to 124 B.C., because the close relationship between the orientation of the town and that of the surrounding land suggests that both were established together, at the
moment of foundation; he also pointed out that the 15 by 15 actus layout occurs in several foundations of the Gracchan era (but see above, n. 113, and on his own argument this layout is common in the Augustan era). Later, possibly in the triumviral period, a land division grid mainly of centuriae of 20 by 20 actus was established for the whole area of the valley of the river Liris, and this was superimposed on part of the earlier layout (Structures agraires, 126-30; 272-3).
120. Fundi, a town of the Aurunci on the Via Appia, was a municipium in the imperial period (CIL X.6245). East of Fundi thirteen lines parallel to each other, eight actus apart, have been identified; they are perpendicular to the Via Appia, dividing the land into strips. The historical context of this is unclear, and it need not indicate Roman confiscation and settlement. West of Fundi there are very faint traces of what may be Roman land division, and to the south-west limites demarcate units of 15 by 15 actus, on the same orientation as the layout of the town itself; this may be the work of Augustus, as the Liber claims (cf. CIL X.6229; Chouquer, Structures agraires, 109-12).
121. At text, line 30, I have printed the reading of MSS AE, and interpret this to mean that the founder of a settlement retained control of unallocated land, but that at Fundi Augustus had granted this to the jurisdiction of the community. MS P has in cetera eius ius publicum resedit. This is obscure, but we might translate: 'in respect of the rest (of its land), public jurisdiction remained (over it)', taking it as a reference to the practice by which, in cases where land was confiscated from a neighbouring community for a new settlement, the original community retained jurisdiction over all areas not specifically allocated to veterans. This went back to a decison of Augustus (C $87.26-37=\mathrm{T} 82.24-83.6=\mathrm{L} 119.20-120.6$ ).
122. Formiae, a town on the Via Appia, remained a municipium until elevated to colonial status, probably by Hadrian - col. Aelia Hadriana Augusta Formiae (CIL X.6079). Modern development has made this area difficult for archaeological investigation. But Chouquer, working from a map, claims to have found east of the town traces of a land division grid, though it is doubtful if the slight remains can with certainty be identified as a system of units of 16 by 16 actus. The Liber refers to a triumviral settlement, but a 16 by 16 actus layout has not been identified at any other site where the triumvirs are thought to have made a settlement, and, in Chouquer's opinion, is characteristic of Augustan settlements. The history of settlement at Formiae remains obscure (Structures agraires, 112-13).
123. Gabii, on the Via Praenestina, was still a municipium in Augustus' time (CIL XIV, p. 270). Its territory formed part of a possible land division grid east of Rome, including the territory of Collatia, in units of 15 by 15 actus (Chouquer, Structures agraires, 94-5; 286-8). There is no evidence that the settlement was Sullan (see above, n. 110). Slight confirmation for a military settlement at Gabii appears in another extract in the Corpus Agrimensorum Romanorum - Ex Libris Magonis et Vegoiae Auctorum (C 257.22-5 - 'next to the very (boundary) line the tombs of many veteran soldiers are found, for example in the territory of Gabii ...').
124. Interamna Lirenas was founded as a Latin colony in 312 b.c. with 4,000 colonists. After the Social War it was a municipium (see CIL X, p. 525; 5338-9). North-east of the town there is some evidence of a small grid of parallel lines 13 actus apart, dividing the land into strips; but the date of this is completely uncertain. Later, a large area of land division was established at Aquinum, Fabrateria, Interamna, and

Casinum consisting of centuriae of 20 by 20 actus; at its eastern extremity this involved some of the territory of Interamna. If it is right to ascribe this work to the triumvirs, it is possible that when building fortifications at Interamna they also undertook some (limited) settlement of the community's land (Chouquer, Structures agraires, 124-5; 127-30; 263-8). For the phrase militi metyco, see n. 118.
125. More commonly known as Lavinium, this city in Latium was traditionally founded by Aeneas and named after his wife, Lavinia. It was the centre of the Laurens ager and the people were sometimes called Laurentes, which explains the city's other name. There is no independent confirmation of the statements in the Liber. The phrase lege et consecratione veteri presumably refers to Lavinium's long-standing treaty with Rome, and status as the original seat of the worship of the Penates and Vesta.
126. Liternum was founded in 194 b.c. as a citizen colony with 300 settlers. There is no evidence for a fresh Augustan settlement, but Pais (Colonizzazione, 235) conjectures that c. 36 B.C. settlers were sent to Liternum and Volturnum by Octavian as a defence against the attacks of Sextus Pompey.
127. A municipium in Latium. There is no archaeological confirmation of the Liber, though a dedication to Antony by '[Sena]tus populusque [Lani]vinus Veteres', may suggest that new settlers had been installed at some time (CIL X.2100).

Pais (Colonizzazione, 235), suspected that the reference to the land of the Vestal Virgins indicated confusion between Lanuvium, which was the centre of the cult of Juno Sospita, and Lavinium, the original seat of the cult of Vesta.
128. Part of the land of Ligures Baebiani had been incorporated in the territory of Beneventum in the settlement of veterans in 41 b.c.; see above, nn. 8, 99, 106; Veyne, MEFR (1957); (1958); Keppie, CVSI, 155-60. The alimentary table erected at Ligures Baebiani in the reign of Trajan gives details of the location of farms in a pagus, and sometimes specifies either pertica Beneventana, or finibus Beneventanorum, or in Beneventano, which may be interpreted as 'in the allocated land of Beneventum' (i.e. land taken from Ligures Baebiani), 'in the territory of Beneventum' (i.e. an area owned by the people of Beneventum ), 'in the land of Beneventum' (i.e. the original land of Beneventum). It is possible that finibus Beneventanorum means 'on the borders of the people of Beneventum', and refers to land between Beneventum and Ligures Baebiani. Since the phrase pertica Beneventana appears only once in the table, the confiscation of land from Ligures Baebiani may have been relatively limited. However, the phrase in Beneventano may refer to citizens of Ligures Baebiani living within the territory newly annexed by Beneventum, but to whom their own land had been returned for some reason. In that case they would remain under the jurisdiction of Ligures Baebiani though occupying an enclave in Beneventum's territory (see p. 362, n. 23). It is not clear how much of the land of Ligures Corneliani was confiscated at this time.

The location of one farm of Ligures Baebiani is described as pertica Nolana, which perhaps suggests that part of the community's land was transferred to Nola, since Nola did not have a common border with Ligures Baebiani (see n. 132).
129. For the history and archaeology of Minturnae, see p. 387. n. 15.
130. At text, line 11, MS A has syriae pulestinae a, E seriae palestinae a, P syria et palestinae. Mommsen (CIL X, p. 171) argued that the text referred to Neapolis in Syria Palaestina. But this would be inexplicable in a list of Campanian towns, and

C 185.40-3, with its reference to the sanctuary of the Sirenae near Surrentum, supports Lachmann's emendation Sirenae Parthenopae (L 235.16; 236.22-237.4). The text then should refer to Neapolis in Campania, where the cult of the Sirenae would be characteristic of the area's Greekness.

Naples was founded c. 650 b.c. from Cumae, and in tradition was originally called after the Siren Parthenope, who was washed up on the shore nearby. It had municipal status and apparently did not become a colony until the reign of Commodus - colonia Aurelia Antoniniana Felix (Pais, Colonizzazione, 237-9; for the early history of Naples, see Frederiksen, Campania (1984), 85-95; 105-7). A land division grid has been identified in the area between Naples, Mount Vesuvius, and Taverna Nova, comprising units of 16 by 16 actus, although extensive development in the harbour area of the modern city makes investigation impossible in that direction. Chouquer conjectured that this grid was the work of Augustus. Now, although Augustus showed favour to Naples, allowing sacred games to be established in his honour, which he indeed celebrated in person shortly before his death (Dio 55.10.9; 56.29.2), there is no explicit evidence for land distribution, and Chouquer depends heavily on his view that 16 by 16 actus was a typical size for Augustan settlements (Structures agraires, 207-8; 226-7). But this is not entirely convincing; see above, n. 100.

Pais suggested without evidence that the reference in the Liber to a settlement by Titus could be explained on the hypothesis that reconstruction and resettlement would be needed after the eruption of Vesuvius.
131. Nuceria occupied a strategically important position near the headwaters of the river Sarno, on the Via Annia, controlling access to Salernum. From at least the third century b.c., Nuceria was designated Alfaterna to distinguish it from Nuceria Camellaria in Umbria. Yet in the imperial period it was known as Nuceria Constantia, and Constantia probably derives from the name of the colony established after Philippi, since Nuceria was among the eighteen cities marked down for settlement then (Appian, BC 4.3); the full title was perhaps colonia Iulia Constantia Nuceria (Keppie, CVSI, 150-2). Land division has been discovered at Nuceria, one large grid with centuriae of 20 by 20 actus, the other between Nuceria and S. Marzano with dimensions either 20 by 20 or possibly 20 by 15 actus (see Castagnoli, RAL (1956); Chouquer, Structures agraires, 212-14; 253). Chouquer cautiously interprets this as a triumviral settlement of 20 by 20 actus, with later additions by Augustus. Indeed some of the work may be dated to the time of Nero, who in A.D. 57 established more veteran colonists at Nuceria (Tac., Ann. 13.31).

On the basis of a passage in Hyginus 2 describing the granting of woods and pasture called Semproniana to a colony, which in the accompanying diagram is designated colonia Iulia Constantia, Pais conjectured that there was a Gracchan allocation at Nuceria (C 157.3-6, with Ill. 123 = T fig. 126; Colonizzazione, 239-40). This is unsafe since these diagrams were often constructed for teaching purposes, with a combination of real and imaginary detail, and cannot normally be taken as depicting real localities and historical situations.
132. Nola was an ancient city with an important position on the Via Annia. There is reasonable evidence that a colony was established by Sulla (see Gabba, Republican Rome: the Army and the Allies (1976), 44-7; 68), and it certainly had colonial status
by the late first century b.C. (Pliny, NH 3.63; CIL X.1233). An inscription from the time of Diocletian refers to col(onia) Fel(ix) Aug(usta) Nola, though it is not clear when the titles Felix and Augusta were adopted. Castagnoli identified two land division systems at Nola, which, though differently orientated, both contained centuriae of 20 by 20 actus (Castagnoli, RAL (1956), 374-6). Chouquer (Structures agraires, 209-12; 225-30) has identified a third grid also with centuriae of 20 by 20 actus. The archaeological evidence therefore confirms Siculus Flaccus (C 129.31-6 = T 126.19-25 $=\mathrm{L}$ 162.3-8), who cites the territory of Nola as an example of several differently orientated centuriation systems, which existed side by side (see p. 380, n. 56). There is also a small grid between Nola and Sarnum comprising about 60 units of 16 by 16 actus. It is plausible enough (although there is no conclusive evidence for dating outside the Liber) that three of the grids identified at Nola relate to settlements by Sulla, Augustus, and Vespasian. Indeed Augustus died at Nola while staying in a house owned by his father (Tac., Ann. 1.9). However, it is worth noting that there was later activity: CIL X. 1263 records a settlement of veterans at Nola a Divo N(erva). See also Pais, Colonizzazione, 240-2; Keppie, CVSI, 152; above, n. 128.
133. Ostia was founded $c .350$ B.C. as a Roman colony with 300 settlers at the mouth of the river Tiber, to guard the river and coastline. There is no archaeological evidence to test the statements of the Liber. At text, line 21, MS A has: inppp Severus Antoninus et Commodus. Mommsen declined to accept the emendation of Verus for Severus on the grounds that Verus, Antoninus, and Commodus were not emperors together. He therefore suggested inpp. Marcus Antoninus et Commodus (in Lachmann, Feldmesser II, 178 n. 44; see also above, n. 80).
134. A citizen maritime colony was established in 194 b.c. with 300 settlers. It became an important port, and may have received fresh settlers in the triumviral period, possibly after 36 b.C. A wax-tablet from Pompeii, dated to A.D. 39, gives the name of the town as colonia Iulia Augusta Puteoli (cf. Keppie, CVSI, 147-8). Nero made a new settlement at Puteoli (CIL X.5369: colonia Neronensis Claudia Augusta Puteoli; cf. Tac., Ann. 14.27). On Puteoli in general, see D'Arms, JRS (1974); Frederiksen, Campania (1984), 319-58.
135. An ancient Latin town. Sulla established a colony at Praeneste (Florus 2.9.27; Cic., Leg. Ag. 2.78), but by request to Tiberius it reverted to the status of a municipium (Aulus Gellius, Noctes Atticae 16.13.5); by the third century it had become a colony once again (CIL XIV, p. 290). Some traces of land division have been identified; see Muzzioli, Arch Laz. (1993), and note also Quilici, Röm. Mitt. (1980).
136. A town of the Volsci. In 329 b.c. a citizen colony was founded at Tarracina on land taken from Privernum. At some stage, possibly in the second century b.c., or after the Social War, Privernum itself received colonial status, though it is listed among the oppida by Pliny, NH 3.64 (see Chouquer, Structures agraires, 104). Traces of two land grids have been identified at Privernum: parallel lines 13 actus apart east of the old site of the town, dividing the land into strips, which Chouquer dated to the second part of the fourth century b.C., and associated with land confiscations by Rome in 341 . On a different orientation there are parallel lines 10 actus apart, partly superimposed on the first grid. Chouquer suggested a triumviral date on the grounds of the unusual allotment size ( 50 iugera), and the reference in the Liber to an allocation in iugera, which he believed to indicate a later settlement (op. cit., 102-5). But as he
admits himself, all this remains hypothetical.
137. Originally a Greek colony; a municipium in the imperial period, notable for the cult of Minerva and also of the Sirenae. Pais explains the reference to Augustus in the Liber on the hypothesis that there were no military settlements, but that part of the territory was given over to members of his family (Colonizzazione, 244). Discussion of religious cults may be found in Mingazzini and Pfister, Forma Italiae (1946), 14-15.
138. The territory of Suessula was associated with the land division system on the ager Campanus and made up part of one of the grids at Nola, comprising centuriae of 20 by 20 actus; this may reflect a Gracchan settlement at Suessula (for a Gracchan boundary stone, see Appendix 2, no. 8), which is ignored by the Liber, and perhaps a further settlement by Sulla (Chouquer, Structures agraires, especially 210, 242, 249).
139. A Roman colony was established at Sinuessa in 296 B.c. Land distribution systems have been identified on the coastal plain of the river Liris, between Mount Massicus and the Auruncan mountains, affecting the territory of Minturnae, Suessa Aurunca, and Sinuessa. Between Suessa Aurunca and Sinuessa, and at Sinuessa itself, land division was apparently not based on typical Roman measurements, but on a multiple of a vorsus (i.e. a length of 100 feet), and may be of pre-Roman origin. In the plain between Sinuessa, Suessa, and Minturnae there is a large grid of centuriae of 20 by 20 actus. Chouquer has suggested a triumviral date (Structures agraires, 169-81), but there is no confirmation for this; see also Arthur, Northern Campania (1991), 41-4. Under the Flavians the colony was apparently reinforced by another settlement and acquired the name colonia Flavia (CIL X.4735).
140. An old Latin colony founded in 313 b.C., subsequently a municipium (Cic., Phil. 13.18, April 43 в.c.), which later acquired colonial status, presumably in the triumviral period; the colony's title was: colonia Iulia Felix Classica Suessa (CIL X.4832; Pliny, NH 3.63; Frontinus (C $3.9=\mathrm{T} 1.9-10=\mathrm{L} 3.2$ ), Urbicus (C $37.8-13=\mathrm{T} 39.8-13$ = L 79.13-18); Pais, Colonizzazione, 245-6; Keppie, CVSI, 143). Chouquer (above, n. 138, especially $172-3$ ) wishes to ascribe a grid of 13 by 13 actus identified at Suessa to the Gracchan settlement mentioned by the Liber. But this dating must remain hypothetical.
141. This Samnite town was a municipium (CIL IX, p. 227). The Nero Claudius mentioned by the Liber is probably Tiberius Claudius Nero, the future emperor Tiberius (above, n. 1), who, with his brother Drusus, is celebrated in an inscription from Saepinum, which records that they undertook the construction of the wall, gates, and towers, a task completed in A.D. 4 (ILS 147). Since Drusus died in 9 b.c., Tiberius must have overseen the rest of the work himself. It seems that the town site was redesigned in the time of Augustus (Sepino: archeologia e continuità (1979)), and it is plausible to suppose that all this activity was accompanied by a land settlement. In view of this evidence, Chouquer is probably right to associate with Augustan activity a land division grid at Saepinum containing units of 15 by 15 actus (Structures agraires, 147-9).
142. A town on the river Liris where a Latin colony was established in 303 b.C., Sora was a colony in the early imperial period (Pliny, NH 3.63; CIL X. $5713=I L S 2226$ ). The inscription refers to L. Firmius, who had served as a chief centurion and military tribune, and was the first priest in the new colony; it was set up by the members of Legion IV Sorana, which had probably been recruited in Sora in 43 b.c. Keppie has
argued for an Augustan settlement at Sora after Actium (CVSI, 136-7). In the plain south of Sora, between the town and Isola del Liri, there are traces of land division units of 15 by 15 actus, which may indeed be ascribed to Augustus' work (Chouquer, Structures agraires, 136-7).
143. Signia, traditionally founded by Tarquinius Superbus, was one of the oldest of the Latin colonies (495 b.C.). It remained a municipium, and it is possible that the Liber confused allocations to individual settlers with a full colonial foundation. Between Signia and Anagnia a land division grid has been identified with centuriae of 20 by 20 actus, which Chouquer believed should be assigned to the triumviral era (Structures agraires, 115-17), but there is no evidence for this and the remains are very slight.
144. Traditionally founded by Heracles; a Latin colony was established c. 383 b.c. After the Social War, Setia was a municipium (cf. Pliny, NH 3.64) and only a late inscription shows it as a colony (CIL X.6465). A small land division grid has been identified of fewer than 100 units of 10 by 10 actus, i.e. 50 iugera in each centuria. This may give some support to the view that the settlement was triumviral, since centuriae of 50 iugera are noted by the Agrimensores as typical of that period (C 11.32; $137.35=\mathrm{T} 14.7-8 ; 135.16-17=\mathrm{L} 30.20 ; 170.18-19$ ). On the other hand some lands captured from the enemy were sold off in lots of 50 iugera by the quaestors (ager quaestorius - C 119.29-121.19 = T $116.19-118.10=\mathrm{L} 152.23-154.7$ ). In the case of Setia, this might reflect the occasion in the second half of the fourth century b.c. when Rome defeated the Latin league, of which Setia was a member (discussion in Chouquer, Structures agraires, 100-2).
145. A Samnite town, which, although described as an oppidum by Pliny (NH 3.64), had colonial status from the first century b.c. (CIL IX.2266). It appears from one inscription (CIL IX.2219) that it had the title col(onia) Herc(ulanea) Tel(esina). There are signs of a system of land division between Telesia and the rivers Titerno, Volturno, and Calore, with centuriae of 20 by 20 actus, and provision for the subdivision of these into units of 50 iugera (Chouquer, Structures agraires, 152-5). Since it is difficult to date this system, it cannot help to settle the debate over the context of the grant of colonial status to Telesia. Mommsen argued for a Sullan foundation, while Pais suggested a Gracchan date, noting other colonies established by Gaius Gracchus which had a religious cognomen like Herculanea (see above, n. 86). He also believed that there was a viritane triumviral allocation (Colonizzazione, 249-63). It is possible that at the time of the triumviral settlement at Beneventum, with men from Legions VI and XXX, Telesia lost some land, which then became a praefectura of Beneventum; an inscription from Telesia shows a veteran of Legion XXX, and another from neighbouring Solopaca mentions a veteran of Legion VI (Keppie, CVSI, 159, and sylloge, nos 53-4). Chouquer has also identified a larger system consisting of centuriae of 20 by 20 actus on the middle Volturno (ibid., 156-9), but there is no clear indication of an Augustan settlement.
146. This is Teanum Sidicinum, an ancient city in northern Campania. It was described as a colony by Pliny ( $N H 3.63$ ), and Mommsen ascribed the colonial foundation to Claudius on the basis of two inscriptions, referring to col. Cl. Firma Teanum; he expanded Cl. to Claudia (CIL X, p. 471). But Pais (Colonizzazione, 263-9) suggested Classica, arguing that the settlement contained non-Roman or newly enfranchised sailors from Octavian's fleet (i.e. militibus metycis; see above, n. 118). However,

Keppie has pointed out that settlement of non-Romans at Teanum would be surprising, and that the epithet classica may refer to settlement by a legion, some of whose members had served with a naval squadron; he places the context of the original settlement after Philippi (CVSI, 139-41). An inscription (CIL X.4781) seems to show that Teanum was a colony in Augustus' time. However, the inscription, first seen in 1753, was subsequently lost, and much of it was rejected by Mommsen, although it was copied by a man elsewhere recognized by him as reliable (probus vir). The recorded text mentions col. Cl. Firma Teanum, when Augustus was holding tribunician power for the twentieth time (July 4 в.C.-June 3 b.C.), was consul designate XIII (in 3 b.c.), and was Father of the Fatherland (formally assumed in February 2 b.c.); see Pais, Colonizzazione, 263-5; Keppie, op. cit., 140-1.

Archaeological investigation north and east of the old town of Teanum has revealed some traces of a possible land division grid consisting of units of 14 by 14 actus, which Chouquer confidently associates with a Gracchan or Sullan settlement. Superimposed on part of this is a layout of units of 16 by 16 actus between Cales and Teanum. Chouquer wished to ascribe this to Augustus, and thought that it added support to the Liber (Structures agraires, 195-9; 280-3). But it is doubtful if the archaeological evidence available can allow such precision in dating.
147. A city in Latium, which gained municipal status in 381 b.C. A land division grid has been identified between Bovillae and Tusculum, comprising units of 14 by 14 actus. This has been used to confirm a Sullan settlement, which may be plausible since Tusculum had supported the Marians (Chouquer, Structures agraires, 87; 92-4). This hypothesis suggests that land was distributed to some veterans, and not just to friends or partisans of Sulla, as suggested by Pais (Colonizzazione, 269).
148. Tarracina was founded as a citizen colony in 329 b.c. and retained this status in the imperial period (see Hyginus $2-$ C. $143.34-9=$ T 144.1-8 = L 179.11-18), and p. 389, n. 18 for possible land division grids at Tarracina).
149. This is Terventum, a town in the territory of the Samnites. It was a municipium (CIL IX, p. 241), and there is no archaeological evidence to support the Liber. For obsidionem, see n. 112.
150. Trebula should probably be identified with the Samnite settlement of Trebula Bulliensis or Balliniensis; the later reference in the Liber (C $199.29=\mathrm{L} 258.21$ ) to Tribule (a corrupt form of Trebula), may refer to Trebula Suffenas or Trebula Mutuesca in the land of the Sabines. The reference at C 199.31 to Cures Sabini as a community bounded in the same way as Trebula surely suggests this.

Just south of the Samnite Trebula a grid of units of 15 by 15 actus has been identified, which Chouquer assigned to Augustus, using this to support the identification of the Samnite Trebula at C 187.31 (Structures agraires, 149-52). But, beyond the Liber, there is no evidence for an Augustan date except that, in Chouquer's view, the 15 by 15 actus layout is typical of Augustan settlements; but this is only partly true, and has the danger of circularity (see above, n . 113). Trebula remained a municipium. 151. A colony established by Rome and the Latin League in 494 B.C. on the southern edge of the Alban hills; it was a colony in imperial times (CIL X.6555). Slight traces of a land division grid have been identified, consisting of units of 15 by 15 actus, traversed in the south-west by the Via Appia (Chouquer, Structures agraires, 98). There is no independent evidence for dating this to the Augustan period or for any

Gracchan distributions. For Claudius Caesar, see above, n. 21.
152. A municipium situated in the Pomptine marshes (CIL X.6490). Some traces have been discovered of lines 8 actus apart whose date and purpose are unclear. There is no sign of the supposed allocations of the triumvirs, or of activity by Drusus, mentioned by the Liber (see Chouquer, Structures agraires, 99-100). For Drusus Caesar, see above, n. 1 .
153. A maritime colony of 300 settlers established in 194 b.c. on territory taken from Capua because of its support for Hannibal. It remained a colony in the Republic and early Empire (Pliny, NH 3.61 describes it as an oppidum, but cf. CIL X.3722-4), and was one of the communities damaged by the activities of Sextus Pompey in 38 b.c. (Dio 48.46). It would not be surprising if Augustus had reinforced this area with fresh settlers, but no plan of land division can be specifically assigned to Volturnum.
154. A town in the valley of the river Volturno; a colony had been established by the end of the first century b.c. Boundary stones refer to Venafrum as colonia Iulia Venafrana, and an inscription of uncertain date describes the community as colonia Augusta Iulia (CIL X.4875; 4894). It seems likely that a colony was established by Augustus, perhaps after Actium (Keppie, CVSI, 138-9). With the help of aerial photography, east of the old town a series of parallel but not equidistant limites dividing the land into strips or strigae has been identified. Chouquer ascribes this to the early third century b.c. and Roman occupation after the Samnite wars (Structures agraires, 139-41). It must, however, be noted that land division by strigae or scamna was not necessarily an early method (see pp. lx-lxi). In the northern part of Venafrum's territory there is a grid of about 35 to 40 units of 16 by 16 actus. A little further south on a different orientation 40 to 50 units of 16 by 16 actus have been identified. Chouquer, noting the amount of evidence for Augustan involvement in the area, plausibly associates these with an Augustan settlement (op. cit., 141-2). The quinqueviri mentioned in the Liber may have constituted a group despatched to make a preliminary land assessment.
155. A city in Latium south of the Hernici mountains, with municipal status (CIL X. $5796=I L S 6268$, A.D. 197). On the plain between Aletrium, Frusino, and Verulae traces of several land division systems have been identified, with different orientations, and which cannot with certainty be assigned to individual communities. Parallel limites stretch over a large area and seem to be part of land allocation by strips, which Chouquer wishes to date to Roman intervention towards the end of the fourth century b.c., after the surrender of the Hernici and the conclusion of the Latin war (Structures agraires, 119-22). However Hinrichs (Institutionen, 38-40) may be right in arguing that the traces suggest a pre-Roman system which simply followed the terrain. Further land division has been identified in the same area with units of 13 by 13 actus, and Chouquer (ibid., 123) suggested that this was the Gracchan settlement mentioned by the Liber. But these dimensions can hardly be described as typical of Gracchan settlements, given the wide variations which Chouquer himself documents (ibid., 247). Moreover, land division grids that extended to the territory of more than one community were certainly not confined to the Gracchan era.
156. For the identity of Nero, see above, n. 1; and for Balbus, Campbell, JRS (1996), 95.
157. Cf. C $193.45=$ L 254.10 (Picenum). A town on the Via Valeria. A Latin colony
of 4,000 settlers was authorized in $303 / 2$ b.c., but was not finally established until 298 because of fierce resistance from the local tribes (Salmon, $R C R$, 59-60). It was a municipium after the Social War. There is no evidence to support an Augustan settlement. Pais (Colonizzazione, 197-8) thought that the Liber was perhaps referring to the municipium of Carsulae in Umbria. The other communities treated at C 189.16-24 = L 240.7-15 (MS E), are in Umbria and Picenum, and Pais wished to relocate this section at $\mathrm{C} 177.39=\mathrm{L} 228.2$, in the district of Picenum.
158. At text, line 10 , cursorius seems to signify a smaller boundary marker placed between more important markers, i.e. an intermediate marker (see Josephson, Casae Litterarum, 292-3).
159. Cf. C $197.14=$ L 256.16 (Picenum). Camerinum had municipal status in the imperial period (CIL X.5632; 5635). A dedication to Octavian as patron of the community after 33 b.c. (CIL X.5642) encouraged Pais to think that some land allocations were made to individuals (Colonizzazione, 199).
160. Cf. C $197.26=\mathrm{L} 257.1$ (Picenum). A town in Umbria, a municipium in the time of Hadrian. There is no evidence for Augustan allocations.
161. Cf. C $199.22=258.13$ (Picenum). A municipium in Picenum. There is no evidence for any land settlement.
162. Cf. C $191.39=\mathrm{L} 252.8$ (Picenum). Attidium is mentioned by Pliny (NH 3.113) as one of the oppida in Umbria. It was a municipium (CIL XI.5178; 5676). There is no confirmation for any Augustan settlement.
163. It is unclear how Dalmatia came to be included in the Liber, which is otherwise confined to Italy suburbicaria. Mommsen (in Lachmann, Feldmesser II, 166) explained this on the hypothesis that the author came from Dalmatia. But the section on Dalmatia shows little sign of any local knowledge, and seems rather to contain themes and detail typical of a surveyor's guide or textbook. Moreover, as Pais points out, it probably contains extracts from different authors (Colonizzazione, 298-300). The inclusion of Dalmatia may have something to do with political conditions in the fourth or fifth century A.D., when the Liber was compiled. Then, Dalmatia was of pivotal importance for maintaining or establishing control of Italy. On the other hand, it is possible to believe that in its original form the Liber included information, subsequently lost or discarded, about other provinces. The work of Balbus (C 188.4), which may have been one of the sources for the Liber, contained material taken from all the provinces.
164. At text, line 32 the text is corrupt. For in terra uoratos of MS P, Lachmann suggested Tariotas or Autariatas (L 241.14-15). The region of the Tariotares in Dalmatia is mentioned by Pliny, as are the Sardeates (NH 3.141-2).
165. For praefecturae, see above, n. 2, and glossary.
166. At text, line 15, MSS AP have: altus ped. III; G has: alti p. IIII. The sense of the passage requires: ped. $V$.
167. For the second part of the Liber, see pp. xl-xli; for L $244-251$, see p. 443. n. 1. In the Latin text, the use of italics indicates material already covered in the Liber, and its source is given in brackets in the translation.
168. For line 5, cf. C 241.9-10 (L 244.11). I read 'accepit et XII agros 〈quos $\rangle$ in montibus Romani acceperunt familiariter'. Mommsen (Lachmann, Feldmesser II, 169) suggested miliario for familiariter, but without explaining its precise meaning. I interpret
familiariter in the sense of 'favour' or 'goodwill' or 'friendship' displayed to the Romans at the time when they acquired the land.

For montes and agri Romani, see also C 189.8; $193.45=$ L 239.20; 254.10. According to Siculus Flaccus, this phrase meant that the land in question belonged to the Roman people ( $\mathrm{C} 105.5-7=\mathrm{T} 100.15-19=\mathrm{L} 136.21-137.4$ ). If the facts and dates are accurate, which cannot be proved, it seems that there was a further settlement at Asculum by Antoninus Pius. This is interesting, since there is little evidence for land settlement in Italy after the Flavians.
169. Cf. C $241.13=$ L 244.13. A Latin colony founded by Rome in 303 в.C. with 6,000 settlers (Salmon, $R C R, 59-61$ ). After the Social War it was a municipium (Cic., Phil. 3.39; CIL IX, p. 370). A series of limites 12 actus apart on an identical orientation has been identified, suggesting land allocation by strips, possibly in strigae and scamna. Although this brings some confirmation to the description in the Liber, there are no clear reasons for dating this system to the foundation of Alba, as argued by Chouquer (Structures agraires, 130-3).

The Liber derives the name of the boundary stones at Alba (cilicii) from the name of the centurion Cilicius Saturninus (Cecilius at C $241.14=\mathrm{L} 244.14$ ). However Mommsen rejected this (in Lachmann, Feldmesser II, 171, n. 28), arguing that this name was a corruption of L. Marculeius Saturninus, a veteran of the VII praetorian cohort in Augustus' time, who was curator operum publicorum at Alba, in which position he may have conducted the survey mentioned at C $241.13=\mathrm{L} 244.13$ (CIL IX.3923). Pais (Colonizzazione, 281-2) rejected Mommsen's view, arguing that the centurion mentioned at C $241.14=\mathrm{L} 244.14$ was indeed Caecilius Saturninus, and that the land settlement and boundary marking at Alba, for which he was responsible, was for the benefit of praetorian veterans in the reign of Antoninus Pius. It is possible however that there was a two-fold corruption: of the centurion's name from Caecilius to Cilicius because of the stones (cilicii), and earlier from silicei (flint boundary stones), which are frequently mentioned in the Liber, to cilicii; see Castagnoli, BCAR (1946-8), 57.

At line 15 , I accept the MSS reading 'VII et uicies, mensoribus interuenientibus'; if we read 'VII, et uiginti mensoribus interuenientibus', the number of surveyors seems impossibly high; cf. C $241.15=$ L 244.15 .
170. The names of the consuls have been muddled. Ser. Cornelius Scipio L.? Salvidienus Orfitus and Q. (Pompeius) Sosius Priscus were consuls in A.D. 149 :
171. Centuriae of 50 iugera have been uncovered near Cures Sabini (Muzzioli, RAL (1975); Forma Italiae (1980), 38-46), confirming the Liber in this respect. Pais (Colonizzazione, 283) conjectured viritane allocations by Octavian.

At line 19 , venundatus might refer to the 'renting' of the land.
172. For trees as boundary markers, see p. 372, n. 24. Presumably the point is that, if the rows of olive-trees lay straight, they had been planted at the same time and belonged to the same property.
173. Pliny ( NH 3.111 ) refers to Castellum Firmanorum as an oppidum; cf. Strabo 5.241. Castellum was the port of Firmum, and Pais (Colonizzazione, 283) conjectures that it eventually came to have an independent status. There is no evidence for land distributions.
174. A municipium. The comparison with the ager Potentinus (for which see

C 177.22; 197.40 and $45=\mathrm{L} 226.11 ; 257.15$ and 19) suggests triumviral allocations; there is no evidence for land distributions, but Pais (Colonizzazione, 283-5) conjectures viritane grants. Those who suffered may have been the partisans of Labienus, who had been a benefactor of Cingulum (Caesar, BC 1.15.2).
175. At text, line 12, for the meaningless consuerunt of the MSS, I read censuerunt; cf. C $197.46=$ L 257.21.
176. A district with municipal magistrates (CIL IX, p. 388), where viritane settlement may have taken place; there are possible examples of veterans settled here in the early Empire (CIL IX.4121-3). See also Morandi, ArchClass (1983).
177. A municipium (CIL IX.4786). Cf. also C 197.3; 28; $199.10=\mathrm{L} 256.4 ; 257.4$; 258.3. There is no evidence of land distributions.
178. An early Latin colony traditionally ascribed to the time of Romulus, placed at the last point for crossing the Tiber north of Rome (Salmon, $R C R, 42-3$ ). For the Campi Tiberiani, see C $171.37=$ L 218.9 (above, n. 37); C $193.40=$ L 254.5.
179. The ager Ficiliensis is usually identified with the area in the vicinity of Mount Fiscellus (Gran Sasso) mentioned by the elder Cato (apud Varro, $R R$ 2.3.3), Pliny ( NH 3.109), and Silius Italicus (8.517), on the boundary between Praetuttian, Vestine, and Sabine land. However, Lachmann (L 256.1) probably rightly equated ager Ficiliensis with Ficolea, mentioned by Pliny but perhaps misplaced among the Samnite peoples (NH 3.107).
180. For the MSS macheriis, I read congeriis; cf. C $177.38=\mathrm{L}$ 227.16.
181. Fanum Fortunae, a town on the Via Flaminia near the mouth of the river Metaurus on the Adriatic coast. It had become a colony before the death of Augustus, with the title Iulia. Vitruvius, the architect and friend of Augustus, had worked on the buildings of Fanum, which he describes as a colonia in his De Architectura, published after the Battle of Actium (5.1.6). The walls of Fanum were also built in the Augustan period (ILS 104; Keppie, CVSI, 184-5). For a Gracchan boundary stone at Fanum, see Appendix 2, n. 1. There is a useful discussion of the topography in Alfieri, $R S A$ (1976-77).
182. In the imperial period Lucus Feroniae was a colony with the titles Iulia Felix. This should probably be dated to 41 B.C., or possibly after Actium. Urbicus, perhaps using Frontinus (C 35.17), describes the inhabitants as Augustini, which may suggest that at some time the colony had Augusta in its titles (Keppie, CVSI, 168-9; Jones in Foot (ed.), War and Society (1973); and above, n. 33).
183. A municipium in the imperial period (CIL XIV.3955); there is no archaeological evidence.
184. A municipium (CIL IX.572). According to the Liber Coloniarum (C 177.27; 193.12 = L 227.3; 253.1), Auximum was allocated by Gracchan limites, but there is no archaeological confirmation for Numana.
185. A municipium (CIL XI.918). There is no confirmation for triumviral allocations at Ostra.
186. Cf. C $179.19=$ L 229.4 (and above, n. 81 ), where non is included in the phrase iter populo debetur.
187. Pisaurum was originally founded as a citizen colony on the Adriatic in the Ager Gallicus in 184 b.c. It was then reinforced by Antony probably in 41 в.c., and in the Empire flourished as the colonia Iulia Felix Pisaurum (Keppie, CVSI, 185-6).
188. A Sabine town that was still a praefectura in the time of Augustus (ILS 6543 - Agrippa was patron in 27 в.c.). Although Reate did not become a colony, allocations to individual veterans were made, possibly by Augustus, and certainly by Vespasian, who was born there (CIL IX.4682-5; 4687; 4689; 4754). For the traces of strigae and scamna identified at Reate, see Hinrichs, Institutionen, 41-3; this system may have been connected with the problem of drainage and flood prevention on the upland plain near Reate, which was sometimes in dispute with Interamna Nahars (see Cicero, Att. 4.15.5; Tac., Ann. 1.79). There is a useful discussion of the topography in di Flavio, Lunario romano (1982).

The 'book about the provinces' is presumably a reference to the work of Balbus (C $189.3=$ L 239.14).
189. Sentinum was besieged by Octavian in 41 b.c. (App., BC 5.30; Dio 48.13.2-5), and may have been punished with a stiff fine, like Nursia which also came under attack (above, n. 72). It is plausible that some triumviral settlement took place at Sentinum, although there is no archaeological confirmation.
190. This probably refers to the writings of Siculus Flaccus.
191. Cf. Campi Tiberiani (C $171.37=\mathrm{L} 218.9$; above, n. 37).
192. See above, n. 150.
193. The Liber refers to Teate Marrucinorum near Aternum in the Abruzzi, distinct from Teanum Sidicinum in Campania (C $187.21=\mathrm{L} 238.6$ ), and Teanum Apulum in Apulia (C 165.36; $203.15=\mathrm{L} 210.14 ; 261.16$ ). Teate was a municipium and there is no evidence to confirm any Augustan settlement (see Cianfarani, Atti del settimo Congresso internazionale di archeologia classica (1961)).
194. A municipium in the imperial period (CIL XI, p. 829). The Liber Coloniarum (C $189.24=\mathrm{L} 240.15$ ) speaks of Augustan boundary stones at Attidium, but there is no confirmation of activity by Augustus at Tuficum.
195. A municipium in the imperial period (CIL IX, p. 538). The ager Potentinus (C $177.22=\mathrm{L} 226.11$ ) was allocated under a triumviral lex. Slight traces of a possible land division system at Treia have been identified by Moscatelli (Forma Italiae (1988), especially 27-8).
196. Beregrani appears among the towns of Picenum in Pliny (NH 3.111); B $\varepsilon \rho \varepsilon \rho \gamma \alpha$ is mentioned in Ptolemy 3.58, and the fragmentary inscription CIL IX.5822, with the word VEREG, probably refers to this town. But its location is uncertain.
197. A municipium by the imperial period (CIL IX.2805); there is no confirmation of allocations to soldiers.
198. This could refer to Antinum of the Marsi, a municipium in the imperial period (CIL IX, p. 362) or Anxanum of the Frentani, also a municipium (CIL IX, p. 278). There is no supporting archaeological evidence.
199. Almost certainly Cluviae, a municipium in Samnium (Tac., Hist. 4.5). There is no confirmation of land allocations by Caesar or Augustus. For the topography of the site of Cluviae, see La Regina, RAL (1967).
200. Cf. C 179.8; 23; 195.21; 31; $201.29=$ L 228.18; 229.9; 255.3; 12; 260.15; above, n. 79.
201. Histonium was a municipium, not a colony, in the first century A.D. (CIL IX, p. 265). Discussion in de Felice, Forma Italiae (1994), 22-33.
202. A municipium (CIL IX.2959). There is no supporting archaeological evidence.
203. A municipium (CIL IX, p. 69). There is no supporting archaeological evidence. For its territory and remains see de Felice, Forma Italicae (1994).
204. The ager Conlatinus is unknown (but cf. C $165.33=\mathrm{L} 210.10$; above, n. 14). Carmeianus - the Notitia Dignitatum Occ. VII. 18 mentions a procurator rei privatae per Apuliam et Calabriam sive saltus Carminianensis.
205. A Latin colony of 244 b.c. The Via Appia ended at Brundisium, which was important for travel to Greece and was besieged by Antony in 40 B.c. The triumvirs renewed their agreement by the pact of Brundisium. For traces of land division at Brundisium into units of 20 by 20 actus, see Compatangelo, Un cadastre de pierre (1989), 237-9.
206. For Barium, Lupiae, and Tarentum, see above, n. 18. For the practice and methods of land division in the Sallentine peninsula of Apulia, see Compatangelo, Un cadastre de pierre (1985).
The Butuntinenses were an inland people of Calabria (Pliny, NH 3.105).
Caelia: placed by Strabo (6.282) between Egnatia and Canusium.
Egnatia: listed as an oppidum by Pliny (NH 3.102); Agrippa was a patron - CIL IX. 262 .

Genusia: the Genusini were an inland people of Calabria (Pliny, NH 3.105).
Hydruntum: listed as an oppidum by Pliny ( NH 3.100 ).
Metapontum: listed as an oppidum by Pliny, but see Brunt (IM, 362), who thinks that in the early Principate the inhabitants migrated to Genusia.
Orianus: it is possible to take the (ager) Orianus (rather than Uritanus) as referring to
Uria or Hyria on the Via Appia between Tarentum and Brundisium; listed as an oppidum by Pliny ( $N H 3.100$ ); scene of an engagement in the civil war between Octavian and Antony (Appian, BC 5.58).
Rubi: the Rubustini were an inland people of Calabria (Pliny, NH 3.105); a municipium (CIL IX.312).
Rudiae: listed as an oppidum by Pliny (NH 3.102); a municipium (CIL IX.23); it apparently had only 500 adult males in Hadrian's reign (see Brunt, $I M, 127$ ).
Veretini: mentioned by Pliny ( $N H 3.105$ ) among the inland Sallentini in Calabria.
Uritanus: the (ager) Uritanus may refer to Urium on the Gargano promontory (Pliny, NH 3.103), included in Calabria by error.

Pais (Colonizzazione, 162-4; 324), comparing the treatment of Calabria in the Liber Coloniarum at C $167.5-15=\mathrm{L} 211.1-11$ with the list at C $203.30=\mathrm{L} 262.6$, concluded that since eleven communities are mentioned in the latter which are not in the former, the second list could not be a mere reworking of the first section of the Liber, as argued by Mommsen (see pp. xl-xli).

## COMMENTARY - BALBUS

(TRANSLATION pp. 205-9)

1. For the identity of Balbus and Celsus, see pp. xxxix-xl. The illustrations reproduced here and in the remaining texts are taken from MS G. For a translation and commentary, see Guillaumin, Balbus, who discusses how some of Balbus' work may have been influenced by Euclid's Elements, a textbook on mathematics and geometry.
2. At text, line 15, I have translated the reading of MSS GM: disputatum est. MS V has deseperatus sum; J: deesse paratus sum, which might be interpreted: 'when I was ready to retire from our studies, which were thriving ...'.
3. See above, p. xxxix.
4. Balbus is apparently referring to the process of measuring horizontal distances in rough terrain (see Frontinus - C 13-15).
5. See also Appendix 8.
6. The text at L 95.11-96.7 has been omitted as a reworking of the preceding section.
7. Porticus seems out of place here unless Balbus meant it to be an example of a long, straight building. Perhaps we should read perticae (a length of 10 feet). For Balbus' terminology of measurement see Guillaumin, Balbus, 33, n. 22.
8. I am not persuaded by the arguments of Guillaumin in Mathématiques dans l'antiquité (1992), 205-14, that observatio and contemplatio here have a unique meaning, namely, a 'type' or 'subdivision' relating to measurements.
9. At text, line 9, I follow MS V and translate singulis as referring to the rigores. MS J has singuli, which would have to refer to the roadway.
10. Elsewhere circumferens linea can refer specifically to the circumference of a circle; see below n. 15.
11. Enormis as used here seems to be derived from norma (square), in the sense 'made from squares' (see Thesaurus Linguae Latinae V.2, col. 606; cf. OLD s.v. enormis). The author is contrasting land laid out in centuriae with ager arcifinius, which had uneven boundaries; liquis appears only here.
12. It seems to me unlikely that Balbus intended by his use of genus and species to introduce a precise and consistent categorization of angles and their subdivisions, as argued by Guillaumin (Balbus, 27, n. 12; 45, n. 41), who admits, however, to some inconsistency in their use (C 205.40-207.2 = L 93.12-14; C $209.17=\mathrm{L} 99.3$ ). Generally, I translate genus as 'kind', and species as 'type', which should be taken as a non-technical distinction.
13. Balbus means that the perpendicular dropped to the base line from the apex of the triangle is outside the triangle itself.
14. 


15. In this section circumferens (linea) is the circumference of a circle, while recta linea in my view refers to a tangent. Dimensio is the diameter of the circle. The diagrams accompanying the manuscript are inaccurate and incomplete; the following sketch illustrates what Balbus is trying to explain:


For a different interpretation see Guillaumin, Balbus, 61.
16. Balbus means that each of the circles passes through the centre of the other.
17. Lunatus - literally 'crescent-shaped', but in geometrical terminology refers to an angle whose sides were made up by the arcs of circles.
18. Through these rather obscure definitions involving angles and circles, Balbus may be attempting to provide a theoretical basis for the measurement of areas with uneven boundaries (represented by the intersecting circles), through the creation of a series of triangles; at $\mathrm{C} 210.20=\mathrm{L} 103.2$, we should read consummet, from consummare, with the meaning 'to produce'. For Frontinus' account of measurement in uneven terrain, see above, C 13-15. The figures accompanying the manuscript are once again inaccurate; the draughtsman has not understood the implications of the text. We require the following:


A = APPARENT RIGHT ANGLE
B = OBTUSE ANGLE
C = ACUTE ANGLE

$$
\mathrm{WX}=\mathrm{XY}=\mathrm{YZ}
$$

Note that the intersection of the circumferences of the circles produces only the illusion of a right angle.

At lines 19-26 we may explain Balbus' ideas as follows:

19. The excluded text is a gloss explaining flexuosa.
20. This statement is untrue unless the point is the centre of the figure.
21. At text, line 4, MS P has sine angulo ut arthenae ex quattuor circulis. Lachmann (105.2) printed ut harenae ex ..., which would presumably refer to sand spread or scattered on the ground in a series of circular shapes. MS E has sine angulo ut in hac re ex ..., which might be taken to refer to an illustration: 'shaped from four circles, as in this (illustration)'. The MS drawing (Ill. $177=\mathrm{L}$ fig. 107) is inaccurate. It should be as follows:

22. The text at lines 11-13 was omitted by MSS EGR. It may be a marginal gloss. 23. The lacuna after this line presumably contained material on other types of three-sided figures and discussion of four-sided figures. The lacuna at C $213.33=$ L 106.23 will have dealt with a five-sided figure.
24. The text at C $213.42-215.14$ was omitted by MSS EGR, and Lachmann seemingly regarded it as an interpolation. But it is appropriate in its context because it was part of the surveyor's job to plot and draw angles in the measurement process.
25. In this passage Balbus apparently refers to the difficulty of establishing measurable right-angled lines in rough terrain with uneven boundaries. The MS diagrams (Ills 191-5 = L figs 122-6) do not properly explain the text. For lines 45ff., see Bouma, Marcus Iunius Nypsus (1993), 109-10, with figs v-vi. By connecting both points of intersection of two circles, a perpendicular line is produced. Using B as a starting point a third circle is drawn, which intersects the extended line $A B$ at $C$. With $C$ as a starting point, a fourth circle is drawn with the same diameter as the third. Between the
two points of intersection of the third and fourth circles a straight line DE is drawn. This line intersects BC at right angles:


B


Apart from the texts of the gromatici, chiasmus appears only in medical writers in Latin literature; cf. Cael. Aur., Chron. 1.4.127 (see Thesaurus Linguae Latinae III, col. 1007). Balbus seemingly employs it as a technical term, referring to the intersection of two lines (Liddell and Scott, s.v. $\chi$ tuouós, cite in comparison the Latin decussis), as part of an alternative way of plotting angles.
26. Balbus refers to a previous discussion, but there is nothing of this in the existing text. The numbers mentioned seem to refer to figures associated with the plotting of right angles. The correct diagram to demonstrate the establishment of a right angle is as follows:

27. Elements 3.31, where Euclid explains the construction of a right angle within a semi-circle.

## COMMENTARY - LEX MAMILIA

(TRANSLATION pp. 217-19)

1. Text and translation in Crawford, Statutes no. 54, pp. 763-7. For the background and context of the law, see Crawford, Athenaeum (1989); also p. 321, n. 11.
2. A virtually similar clause appears in the Lex Coloniae Genetivae, chapter 104; see Crawford, Statutes, no. 25, pp. 409; 445; FIRA I, p. 191. 104. Moreover, Callistratus (Digest 47.21.3) summarizes part of a Lex Iulia Agraria, which is very similar to chapter V of the statute. If Crawford (art. cit. (n. 1)) is correct that the three chapters preserved in the Corpus Agrimensorum belonged to an agrarian law of Caesar, perhaps from 59 b.c., we may surmise that chapter IIII, as a fundamental definition of landholding in Italy, was transferred with appropriate specific changes to the Lex Coloniae Genetivae, and similarly that chapter V was cited by Callistratus as an exemplar of normal practice.
3. For recuperatores see Frier, The Rise of the Roman Jurists: Studies in Cicero's pro Caecina (1985), 197-204; Johnston, JRS (1987), 67-70. The recuperatores (who perhaps originated as a means of resolving disputes between communities) comprised a court of several members, often three or five, with legal responsibility for certain civil and criminal matters. The procedure involving recuperatores may have been speedier than that before a iudex. The curator was a temporary official with responsibility for a particular function, here the organization of a colony.

## COMMENTARY - TOMBS <br> (TRANSLATION p. 221)

1. These extracts on burial places are of uncertain date, and may have been part of a specialist guide for land surveyors on the recognition of boundary marking techniques. For the use of tombs as boundary markers, see also C 223.32-40 = L 303.12-21.
2. This is apparently a confused reference to the triumvirs Octavian, Antony, and Lepidus. The mention here of the emperor Tiberius, and at $\mathrm{C} 221.35-7=\mathrm{L} 272.21-3$, seems to be part of a muddled interpolation.
3. At text, line 7, uel constituuntur is probably the addition of a later commentator; cf. lines 9 and $14=\mathrm{L} 271.13$ and 21.

The author means that an old road network could sometimes have been used as the basis for the limites. Tombs placed along a road would tend to confirm that it was of ancient origin and did indeed mark a boundary.
4. These tombs demarcate boundary lines between individual holdings, i.e., not on main limites and kardines, but on internal limites (intercisivi). In a list of boundary markers, there occurs 'tomb of a soldier on a boundary' (L 341.3; cf. C 223.32-40; $253.41-2=\mathrm{L} 303.12-21 ; 347.5$ ). The use of vetera monumenta as evidence in boundary disputes is mentioned by Papinian (Digest 10.1.11), and a monumentum appears in Hyginus 1's description of a typical definition of a territory (C $79.37=\mathrm{T} 74.18=$ L 114.23). For monumenta as boundary markers in the Liber Coloniarum, see C 189.15; 195.7; $201.20=$ L 240.6; 254.18; 260.5.

## COMMENTARY - DOLABELLA

(TRANSLATION pp. 223-5)

1. The author cannot be identified. The Latin of the treatise suggests, however, that it belongs to the Later Empire.
2. The author seems to be referring to the most conspicuous boundary in an area of land or territory.
3. For boundary marking techniques using stones, see Appendix 4.
4. Silvanus was the god of forests and uncultivated land beyond the confines of a farm, as well as of agriculture. His cult, which was particularly important among ordinary people, was prevalent in the Western Empire in the imperial period (see Dorcey, The Cult of Silvanus (1992)). In this passage he seems to be partly identified with Terminus (see p. 371, n. 14). Orientalis, from the verb oriri ('to appear' or 'come into being'), refers to the emergence of common boundaries.
5. For the use of trees as boundary markers, see p. 372, n. 24.
6. The author here advises surveyors on the importance of distinguishing between the boundaries of land attached to a tomb, and tombs that themselves constituted a boundary between properties.
7. See p. 326, n. 25.

## COMMENTARY - LATINUS <br> (TRANSLATION pp. 227-31)

1. The authors in this miscellaneous collection about boundary stones and methods of boundary marking (Latinus, Gaius, Vitalis, Faustus, Valerius) cannot be identified, though the style of writing indicates that all should be placed in the Late Empire.
2. Samardacus was a colloquial word meaning 'trickster' or 'conjurer'. In surveying parlance it meant a 'misleading' boundary stone (see Souter, Later Latin, s.v. samardacus). This may refer to the fact that although it had two prongs, it designated the boundary of three properties; see p. 447, n. 31.
3. The derivation of sagraba is unclear. It may possibly be connected with the river Sagrus in Samnium.
4. At text, line 26, Lachmann suggested constitutos for MS G's constituebantur, which is difficult to construe.
5. At text, line 28, scringis and allabinibus, which seem to be ablative forms, are certainly corrupt and their meaning is entirely unclear. I wonder if the text originally had strigis et scamnis, which, taken with centuriis, would mean that boundary markers were placed in all kinds of land. But this is an unlikely corruption.
6. At text, line 6, the manuscript reading ficto aciem dicitur is meaningless, and there is no obvious emendation.
7. Opus signinum was a kind of masonry constructed from lime, sand, and fragments of stone or pottery (Vitruvius, De Arch. 5.11.4; 8.6.14).
8. Vir Perfectissimus. Perfectissimus appeared from at least the second century A.D. as a title for equestrian office holders of the rank of tricenarii (earning 300,000 sesterces a year). By the time of Diocletian, perfectissimus was held by all equestrian office holders except the praetorian prefects, who alone were honoured with the title of viri eminentissimi.
9. Cf. C. 253.14.
10. Reprobus literally means 'unsound' or 'counterfeit'.
11. The epetecticalis or epitectalis marker was the corner stone of a survey, marking the beginning or end of a boundary. It can be contrasted with the cursorius stone, which marked the internal direction of the boundary.
12. The meaning of toxa (text, line 31) is unclear.
13. The author's reference to Babylon Rome is obscure. It may contain a reminiscence of the Revelation of St John (18.1-24), where Babylon is equated with Rome. It is not clear why the epithet 'Gallic' is applied to limites; here the author may have in mind limites running north of Rome, i.e. towards Cisalpine Gaul, which intersected the limites running east-west, towards the sea. Cf. especially C $261.15,19,23=$ L $359.15,19,23$; and also C $177.35=$ L 227.12; C $245.5=\mathrm{L} 248.10 ; \mathrm{C} 191.34=$ L 252.2; C $197.5,15=$ L 256.6, 17; C $235.3=$ L 328.21; L 334.12.
14. At text, line 10, laguinas stands for lagona (also laguna or lagynos), a flask or flagon.
15. The same number is set against several letters - either a mistake by the copyist or a variation permitted by surveyors.

## COMMENTARY - CASAE LITTERARUM

(TRANSLATION p. 233)

1. I am persuaded by Josephson's analysis of the texts that make up the Casae Litterarum in the Corpus Agrimensorum Romanorum (Casae Litterarum 130-50). He distinguished five lists of estates, which he designated according to the order in which they appear in MS P: CASAE I (L 310.1-318.19); CASAE II (L 318.20-325.10); CASAE III (L 325.11-327.3; MS $\mathrm{P}^{\mathrm{b}}$ has the title 'Discussion of Boundary Letters'); CASAE IV (L 331.8-338.7). The fifth list he called CASAE A (L 327.4-331.7) after the Arcerianus manuscript where it appears. Josephson went on to argue that CASAE I, II, and IV were substantially a revision of CASAE A, which had often been badly distorted in the process, and that they had been subject to serious interpolations. All this renders them of limited value as independent texts. Accordingly, I have in the main followed Josephson's text, and have translated here only CASAE A and CASAE III, as the best sample of what these texts have to offer.

For discussion of the nature of the texts, see p. xliv; below n. 3.
2. For the interpretation and translation of casa and casalis see Josephson, Casae Litterarum, 30-43. In the late Latin of the Casae Litterarum, casa in the opening sentence of each notice generally refers to the whole of a landed property including the buildings; but elsewhere it can often mean specifically the house attached to a landed property. Josephson deals with this ambiguity by translating casa into German as Hof (op. cit., especially 37-8). I have tried to express the same idea in English by consistently using 'farmstead' - 'a farm with the buildings upon it'. In the translation it should normally be clear from the context when casa refers to the house itself.

There is a full discussion by Josephson, op. cit., 151-296, of the many linguistic and grammatical pecularities in the Casae Litterarum. I refer to these only when they are directly relevant to the understanding of particular phrases or sentences.
3. The account of each estate seems to be based on a map description, i.e., features of the estate appear either at the top or bottom or on the left or right, to someone looking at a map. For example, in Estate A it is assumed that the top of the map is also the north. Significare refers to the 'denoting' or 'exhibiting' of features on a map. Phrases like super se or ante se etc. ('above it'; 'before it') usually denote the entire farmstead as depicted on a map, where a letter of the alphabet symbolizes the layout of the land and some of the natural features; see Ills 228-43 = L figs 254-69 (accompanying CASAE III). For example, at Estate E (see below, C 237.31-2), the map shows a mountain above the estate and a complete absence of water. At Estate K , the map shows nothing above the estate, then a spring to the left and a river below it, as the text says (C 237.35-7).
4. No convincing emendation has been suggested for this corrupt text.
5. Caua (caba) appears as a noun in Hyginus 1 (C 81.3, $6=\mathrm{T} 75.6,10=\mathrm{L} 281.8$, 12), meaning a hollow or depression in the ground used to mark a boundary. Josephson translates as 'Schlucht' (ravine). Elsewhere, caua also appears as an attribute of the word serras in the phrase duas serras habens cauas, which apparently refers to a boundary stone with a serrated, hollowed out part (e.g. C 237.4; cf. Josephson, Casae Litterarum, 247-9; 289-91).
6. As suggested by Josephson, the last sentence is probably a later addition.
7. The last two sentences may have originated as a marginal note, later incorporated into the text (see Josephson, Casae Litterarum, 221). For hoc legitur, note also C 235.46 and 237.14.
8. For a possible meaning of the adjective 'Gallic' applied to limites, see p. 440, n. 13.
9. For the interpretation of nihil finis, which probably corresponds to parvos or curtiores fines, see Josephson, Casae Litterarum, 230-2.
10. See Josephson, Casae Litterarum, 273-4, who argues that aquivergia refers to a method for directing the flow of water.
11. For arca as a boundary marker, see p. 446, n. 25.
12. This is probably a later interpolation (Josephson, Casae Litterarum, 39, n. 2).
13. After the corrupt word eerero, the last two sentences were dismissed as a later interpolation by Josephson; cf. also 234.37; 236.12; 16 (Casae Litterarum, 91, n. 3; 221).
14. See above, n. 5.
15. Tria riuora ... appellatur in MS A was transposed from its proper context in Letter V to Letter O (as printed by Lachmann, 328.32-329.2); see Josephson, Casae Litterarum, 78-9.
16. At text, line 7, pintagonem is excluded as a gloss; at C 233.33 , pentagonus denoted a five-sided boundary stone.
17. This corrupt text has defied convincing emendation.
18. At text, line 20, the text is too corrupt to permit emendation and translation, but apparently refers in general terms to the methods used by surveyors to identify and demarcate land, based on a code of letters of the alphabet.
19. This sentence is perhaps a later addition; see Josephson, Casae Litterarum, 117.

## COMMENTARY - NAMES OF SURVEYORS ETC.

(TRANSLATION pp. 241-5)

1. C 241-249 were printed by Lachmann at L 244-251, between the two parts of the Liber Coloniarum, because there is a certain similarity of theme in the history of communities in Italy and in the definitions of land and limites. In MS A the short account of measurements and other miscellaneous material (C 241-3) appears before the text of Frontinus (see Toneatto, Codices artis mensoriae (1994-5), 153-4). The definitions of land, limites, boundary stones, and the survey of Ardea appear after the Casae Litterarum (Toneatto, op. cit., 158-9).

At line 4, for the corrupt text in MS J: Marco Antonio triumuiros et Ambibalo, I have printed the emendation of Mommsen (Lachmann, Feldmesser II, 178, n. 45). Verus and Ambibulus were consuls in A.D. 126. Lachmann (L 244.6-7) suggested: Marco Antonio triumuiro II et Aemilio consulibus ( 34 B.c.), but that date is considerably out of line with the rest of the material in this section.
2. T. Hoenius Severus and M. Peducaeus Stloga Priscinus were consuls in A.D. 141. For the confused text at lines 7-8, cf. the entry for Asculum in the Liber Coloniarum (C 191.44-193.11 = L 252.14-27); for the difficult familiario, we might perhaps read familiariter - 'through friendship'.
3. For Alba, and the difficulties of this passage, see above, p. 429, n. 169.
4. For the different possible meanings of lex in these late texts, see p. $405, \mathrm{n} .15$.
5. Constratus refers to measurement on a flat surface.
6. At C 241.21-2, the figures for decempeda and pertica are inconsistent with what follows and with line 26 . The correct figure is 10 feet.
7. This definition suits solidum, not planum; some words may have been mistakenly omitted from the manuscript.
8. Rudorff (Lachmann, Feldmesser II, 389) believed that this was a triumviral edict of Octavian, presumably in 32 B.C., when he will have been consul-designate III for 31 . The text seems to be referring to the practice by which landholders were required to make a declaration of the extent and value of their land; presumably some had wilfully misrepresented their holdings through fear of confiscation; the entire process would have to be checked by a surveyor (see C 129.2-6; 143.10-15; 161.44-5 $=$ T 125.13-16; 142.16-19; 169.1-2 = L 160.25-161.1; 178.7-9; 205.16-206.1; p. 394, n. 40).
9. The reference is to the work of Agennius Urbicus (see pp. xxxi-iii). The text at line 6 is corrupt.
10. This paragraph seems to be referring to the confiscation for a veteran colony of land from a neighbouring community; in that case only land actually allocated to soldiers (allowing for proper access) belonged to the colony's jurisdiction; the rest was returned to the original community. In this case, Caesar may refer to Augustus, who established or reinforced this principle (see p. 362, n. 23). Rudorff (Lachmann, Feldmesser II, 390) conjectured that the problematical last lines refer to financial compensation for soldiers who may have been deprived of the best land by the return of some of it to the original owners.
11. See p. 440, n. 13.
12. Limes sextaneus - that is, drawn on the midday shadow at the sixth hour of
the day, running due south, (often the kardo; cf. C 137.21-6 $=$ T 135.1-6 $=\mathrm{L} 170.3-8$ ). The decumanus (often running east-west) could then be described as a duodecima parte - 'from the twelfth part' (L 318.2-3; cf. C $245.20=$ L 249.25). Limites nonani (line 3) and undecumani (line 16) may also refer to their orientation (see Josephson, Casae Litterarum, 55-7; 62-4). Mommsen, noting the un-Latin termination eus in sextaneus, speculated that a late writer was perhaps thinking of the limes quintarius, which, despite its name, was sixth (including the main limes) and closed off five centuriae ( $B J$ (1895), $285=G S$ VII, 476). But this seems unlikely, since the term quintarius was well established in the technical writing on surveying.
13. I read gammatus (marked with a shape like the Greek letter gamma, i.e., a rightangle, or possibly a stone shaped in this fashion), rather than the MSS grammatus, which would presumably mean 'marked with a letter'.
14. For noverca, see p. 412, n. 75.
15. For the unexplained triideus, Rudorff suggested triodeius, which he identified with a stone set up at a crossroads - in triuio constitutus (Feldmesser II, 519).
16. See p. 415, n. 97.
17. There are thirty-three definitions of boundary stones, but Isosc(a)eli is mentioned twice.

## COMMENTARY - VARIOUS AUTHORS: BOUNDARIES AND LANDS (TRANSLATION pp. 249-55)

1. An embadon or embadum was the area of a plane figure; cf. C 207.27; Nipsus (L 298.13).
2. The distinction here seems to be between stones that had been lightly marked and those that had been carefully finished with metal tools (perdolatae a ferro).
3. The author is apparently referring to his own experiences as a practising surveyor.
4. Arcadius appears again at C $259.14=\mathrm{L} 351.12$ as Arcadius Augustus Auctor, and this may be a reference to the emperor Arcadius (A.D. 383-408), or possibly his chief surveyor. Vitalis in unknown; cf. C $259.31=$ L 352.7.
5. At text, lines 3-4, in the phrase plus a tres pedes, $a$ stands in place of an ablative of comparison, as often in late Latin (see Josephson, Casae Litterarum, 183). The author seems to associate terminus with the meaning 'three' (ter, the root of tres) and 'less' (minus). The expression termetis is not found elsewhere in the Corpus.
6. Cf. C $229.16-19=\mathrm{L} 307.7-10$.
7. Perhaps based on the Greek $\mathfrak{\eta} \mu \kappa$ ки́к $\lambda 七 亍$ - 'semicircular'.
8. Gaius and Theodosius may have been used here to exemplify a legal writer and and emperor respectively.
9. See above, n. 5.
10. Diocletian organized Italy like a province, and divided it into two dioceses: the northern area, known as regio annonaria, and the area round the city of Rome and the south, known as regio urbicaria.
11. This refers to the construction of a raised balk to demarcate the limes.
12. Lines $25-30$ of this passage in MS G appear similar in form in MSS AP (printed by Lachmann at L 242.19-243.6 = C 191.18-23); see Toneatto, Codices Artis Mensoriae (1994), 158; 226; 258. In MS A, they originally appeared after a fragment on tombs as boundary markers ( $\mathrm{L} 271.12-272=\mathrm{C} 221.11-37$ ), and in MS P, in the Liber Coloniarum (L $228.2=\mathrm{C} 177.39$ ).
13. Mago was a Carthaginian who wrote a work on agriculture in twenty-eight books. It was translated from Punic into Greek, and then, by order of the Senate, into Latin, probably in the mid-second century b.c. (Varro, $R R$ 1.1.10; Columella 1.1.13). However, the subject matter of our extract is hardly consistent with a Carthaginian work on agriculture, and the use of language suggests a date in the Later Empire. It is likely that this section became attached to Mago's name because he had an established reputation among authors who wrote about the land.

Vegoia (= Begoe) was an Etruscan nymph who had passed on the secrets of Etruscan lore to Arruns Veltumnus, who was perhaps an Etruscan soothsayer. The prophecy illustrates the sacred significance attached to boundaries and also some of the background of Etruscan society, and is normally accepted as a genuine Etruscan piece, though other elements may have been added at various times; for example, at C $259.13=$ L 351.11 ('disciplinam pone in corde tuo'), there is a possible echo of Christian ideology (cf. Proverbs 24.32). The reference at C $259.1-3=\mathrm{L} 350.22-3$, should place this text in the early first century b.C., since in Etruscan tradition, the nation lived for ten saecula and the eighth had ended in 88 b.c. Heurgon (JRS (1959))
argued strongly that the extract belonged to the struggle to defend landed property in Etruria against Roman land division after the tribunate of M. Livius Drusus ( 91 b.C.), whose land bill threatened Italian landowners. He was strongly opposed by Umbrians and Etruscans who flocked to Rome.
14. There is a suggestion here of a passage of Siculus Flaccus on the upkeep of roads (C 113.16-17 = T 110.3-4 = L 146.3-4). But the reference is so brief and vague that we need not assume that our author had read the earlier work. But see below, n. 16.
15. The meaning seems to be that as long as a river spanned by a bridge carrying a main road did not cross a boundary, then the bridge's location could act as a boundary marker; in this case, the river would run parallel to the boundary. For the forms alvea (C 254.37 ) and limis (256.1), see Josephson, Casae Litterarum, 153; 105).

For the different possible meanings of lex in these late texts, see p. 405 , n. 15. 16. This passage closely follows the wording of Siculus Flaccus (C 103.39-105.3 = T $100.9-12=$ L 136.16-18), and may suggest that our author had read that section, or that a long-standing definition of quaestorian lands, based on Flaccus' work, had been transmitted.
17. See above, n. 13.
18. At text, line 34, I prefer to read mare e terra remotum for MS G's difficult mare ex aethera remotum. Lachmann conjectured ex aere et terra natum (L 350.18).
19. At text, line 36, Lachmann suggested saepta ('enclosed') or sancita ('sanctified') for scita, which however can surely stand with the meaning 'known' or 'recognized'.
20. At text, line 1 , the text as printed is corrupt. Turnebus deleted quis, though this makes it difficult to construe the passage with quandoque ('whenever'), while Lachmann proposed lascivi for data sibi, which seems an unlikely corruption (L 350.22-3). Heurgon reckoned that words had fallen out between sibi and homines, and conjectured that quis referred to Livius Drusus himself (above, n. 13). This is entirely hypothetical and his suggested restoration of the missing words seems ambitious: ... data sibi 〈bona pro nihilo ducens aliena appetiuerit〉 ('whenever someone ... considers his own property of no account and desires that of others'). But it is possible to translate on the hypothesis that just two words have fallen out of the text, perhaps posuerit and licentia. So we might read: 'quos quandoque quis posuerit, ob avaritiam prope novissimi octavi saeculi, data sibi licentia homines ... movebunt'.

It is unclear if the prophecy preserves some genuine legal prohibitions on tampering with boundary stones; cf. also Pfiffig, Gymnasium (1961).
21. This is a reference to the Etruscan social custom by which people were divided into two groups, the leaders (domini), and those of lesser status (servi), who nevertheless had certain property rights.
22. See above, n. 4.
23. This is a reworking of a passage in Vitalis and Arcadius (C 251.40-3 = L 345.15-18). For serra (C $259.35=\mathrm{L} 352.12$ ), in the sense of 'range of hills', see Josephson, Casae Litterarum, 289-90.
24. This word appears only here. Lamina (or lamna) normally means a thin sheet of metal or other substance; perhaps a kind of boundary stone or marker (cf. lamnici at C 191.21).
25. The arca (chest-shaped boundary marker) symbolizes, according to some pre-
arranged scale, the area of the land on which it is found, in conjunction with other boundary markers.
26. This section is included under a general heading - 'Method for arranging Limites', which begins with a list of the length of limites, based on letters of the alphabet (L 358-359, omitted from this work).
27. At text, line 15, I read qui est constitutus (cf. line 17), rather than MS G's sed est constitutus.

For the problem of 'Gallic' limites, see p. 440, n. 13.
28. The author seems to have a confused notion of the equation of Babylon and Rome in the Revelation of St John (cf. p. 440, n. 13).
29. Nummus could stand for a sesterce (one quarter of a denarius), but here probably means simply a small denomination coin.
30. For symbols under boundary stones, see also Siculus Flaccus (C 107.28-109.9 $=\mathrm{T}$ 104.14-106.2 = L 140.11-142.2).
31. See C $227.20-1=\mathrm{L} 305.22-3$, and n. 2. Souter, Later Latin s.v. samartia, defined samartia as 'mistake', in particular a wrong turning that was caused because the boundary stone touched the boundaries of three properties. But the context suggests that, in respect of land survey, the jargon referred to the curious two-pronged nature of the stone, which could be misleading; it was presumably placed on one boundary in such a way that the prongs indicated the other two intersecting boundaries.
32. The author may mean that there was not sufficient evidence of the boundary for the surveyor to swear an oath to its validity.
33. The meaning of cihiamellus and siliqua siluatica are unclear. Siliqua appears elsewhere in the Corpus as a small unit of weight (L 373.22; 26), but in earlier Latin can mean 'pod' or 'carobtree'. Siluaticus should mean 'associated with woodland'.
34. At text, lines 7-8, MS G has cursum eius asion. I have followed Rigaltius, who, in his edition of 1614, suggested a Sion, presumably as a traditional example of a famous eastern city.
35. That is, letters were used to designate estates with a particular layout, as in the Casae Litterarum.
36. The translation of this obscure passage is problematic. At text, line 16 , I suggest that for aad we read apud, since the Gospel was supposed to be 'according to', not 'to'. It is difficult to find in the New Testament any justification for the author's view about Christ's teaching on boundaries. However, he may have in mind Acts XVII.26, where Paul is addressing the Athenians: 'He (God) fixed the epochs of their (the races of men) history and the limits of their territory' (in the Vulgate - definiens ... terminos habitationis eorum).

In the Old Testament there are indeed several references to the importance of termini (Proverbs XXII.8: 'Do not transgress the ancient boundary stones that your fathers set up'), and the need to respect them (Deut. XXVII.17: 'Accursed be he who moves the boundary stones of his neighbour'). Boundary stones were seen as protected by God (Deut. XIX.14: 'You will not take and move the boundary stones of your neighbour, which men of old have established on your holding, which your Lord God will give to you to be held on the land that you have received'). In a wider sphere, God was reckoned to have established the boundaries of the world (Isai. XXXX.28).

Interestingly, Psalm 104.2-10 mentions how 'you established boundary stones that are not crossed ... you sent forth springs in the valleys ...'.

However the author of the passage in the Corpus may have had a more general purpose, in that he was trying to associate the doctrine and practice of Christianity with the traditional Roman respect for boundaries and the demarcation of boundary lines, originally associated with the god Terminus (see p. 371, n. 14). In this case, he will have added the names of certain revered persons in the Church for emphasis, without any strict scriptural authority. The collocation of Peter, Paul, and Lawrence certainly suggests a Roman source for this passage. The extramural shrines of these three only were linked to the walls of Rome by porticoes from about the fifth century A.D.

I am much indebted to my colleague Dr Raymond Davis for advice on this passage.
37. See above, n. 35.
38. This seems to mean that because one brook received water from several sources, it was wider than the others and therefore made a clearer boundary.
39. Under the general heading 'The same Discussion as above' are included several passages from the Origines or Etymologiae of Isidorus Hispalensis (Isidore, Bishop of Seville c. A.D. 600-636) starting with 15.14 . The Origines is an encyclopaedic compendium containing material from many sources.
40. At text, line 3, the MSS have agrorum intentio. But the Leiden manuscript (ninth to tenth century A.D.) of Isidore has contentio, which is certainly correct. For the origins of the word limen, see C 11.11-16.
41. For the derivation of decumanus, see p. 326, n. 26.
42. Isidore, Origines 15.15.
43. Pertica seems to be akin to the Oscan perekais; see OLD s.v. pertica.
44. Ezekiel XL.3; 5. The measuring reed is six cubits and one hand's breadth.
45. The diagram has some incorrect numbers.
46. For the derivation of centuria, see p. 376, n. 39 .
47. Isidore Origines 15.13.
48. These etymologies are false; see $O L D$ s.v. ager (akin to Sanskrit ajati; Greek ${ }^{\alpha} \gamma \rho \rho_{\text {s }}$ ); villa (probably from the root vic-sla; see also vicus).
49. Fundus, on which fundare depends, is akin to Greek $\pi \dot{v} v \delta \alpha \xi$ and Sanskrit budhnáh meaning 'bottom' (OLD s.v. fundus). Praedium is connected with praes, meaning a guarantor and his property, or a guarantee ( $O L D$ s.v. praes).
50. For ager arcifinius, see Appendix 4.
51. For subseciva, see p. 320, n. 8 .
52. According to $O L D$ s.v. area, this word may derive from arere - 'to be dry'.
53. This section is taken from Isidore, Origines 15.16.
54. Virgil, Aen. 5.273. Agger here probably refers to a road raised above the level of the surrounding countryside.
55. Clivosus normally means 'hilly'; the point may be that in hilly country a road would often be unable to follow a straight course.
56. OLD s.v. ambitus points out that this word is derived from ambire ('to go round'), which is a combination of ire and the prefix $a m b i(=G r e e k ~ \alpha \mu \phi i)$. For rights of way, see p. 364, n. 47; p. 367, n. 49.

## APPENDICES

## APPENDIX 1. THE CONTENTS OF THE CORPVS AGRIMENSORVM ROMANORVM

The authors and treatises in the Corpus are listed here in the order in which they appear in this edition. A list of works not here included is appended; see also Dilke, $R L S, 227-9$.
(i) Sextus Julius Frontinus, De agrorum qualitate, De controversiis, De limitibus, De arte mensoria (C 3-15 = T 1-19 = L 1-58).
(ii) Agennius Urbicus, De controversiis agrorum (C 17-49 = T $20-51=\mathrm{L} 59-90$ ).
(iii) Commentum de agrorum qualitate, de controversiis (C51-75 = T 51-70 = L 1-26; Lachmann includes the Commentum with his text of Frontinus).
(iv) Hyginus (designated 1 in this work), De limitibus, De condicionibus agrorum, De generibus controversiarum (C 77-101 = T 71-98 = L 108-134). The fragment Agrorum quae sit inspectio (L 281-284) is included by Thulin in Hyginus 1 - T $74-78$ (= C 79-83); see p. 359, n. 8.
(v) Siculus Flaccus, De condicionibus agrorum (C 103-133 = T 98-130 = L 134-165).
(vi) Hyginus (designated 2 in this work), Constitutio limitum (C 135-163 = T 131-171 = L 166-208).
(vii) Liber Coloniarum (C 165-203 = L 209-243; 252-262).
(viii) Balbus, Expositio et ratio omnium formarum (C 205-215 = L 91-108).
(ix) Extracts from the Lex Mamilia (C 217-219 = L 263-266).
(x) De sepulchris (C $221=\mathrm{L} 271-272$ ).
(xi) Extracts from the works of Dolabella (C $223-225=$ L 302-304).
(xii) Extracts from Latinus, Gaius, Vitalis, Faustus and Valerius on boundary stones (C 227-231 = L 305-309).
(xiii) Extracts from the Casae Litterarum (C $233-239=$ L $327-331 ; 325-327$ ); cf. (xxviii).
(xiv) Miscellaneous material - names of surveyors, measurements, definitions of land, definitions of limites, boundary stones, boundary settlement at Ardea (C 241-247 = L 244-251).
(xv) Miscellaneous brief notes on boundary demarcation (C $249=\mathrm{L} 342-343$ ).
(xvi) Vitalis and Arcadius on boundary stones (C 249-251 = L 343-345).
(xvii) Gaius and Theodosius on boundary stones (C $253=$ L $345-346$ ).
(xviii) Latinus and Mysrontius on boundary stones and various monuments (C 253-255 = L 347-348).
(xix) Extracts from Mago and Vegoia on boundaries and aqueducts and on the consequences of the violation of boundaries ( $\mathrm{C} 255-259=\mathrm{L} \cdot 348-351$ ).
(xx) Arcadius Augustus on boundaries at Constantinople (C $259=$ L 351-352).
(xxi) Vitalis, Faustus and Valerius on boundary stones (C 259-261 = L 352-353).
(xxii) Expositio limitum vel terminorum. Anonymous descriptions of limites, boundary stones, valleys, and marshes (C 261-269 = L 359-366).
(xxiii) Isidore, Origines $14-15 ; 13 ; 16$, on the terminology of boundaries and measurement; types of land ( C 269-275 $=\mathrm{L}$ 366-370).

Works not included in this edition:
(xxiv) Extracts from the Codex Theodosianus (2.26) and Pauli Sententiae (L 267-270).
(xxv) Extracts from Novellae Constitutiones (24.1; 4.1; 20.1) of Theodosius (L 273-275).
(xxvi) Extracts from the Digest (10) relating to Finium regundorum (L 276-280).
(xxvii) Marcus Junius Nipsus, Fluminis varatio, Limitis repositio, Podismus; an account of the geometrical aspects of surveying, the calculation of the width of a river, measurement of centuriae, the use of stones to designate centuriae (L 285-301).
(xxviii) Parts of the Casae Litterarum (L 310-325; 331-338).
(xxix) List of measurements (L 339-340).
(xxx) Litterae singulares. List of letters on Italian boundary stones, with no explanation (L 340).
(xxxi) List of boundary stones with diagrams (L 340-342).
(xxxii) Litterae singulares. List of letters on boundary stones (L 353); cf. (xxx).
(xxxiii) De iugeribus metiundis, on measuring the quantity of iugera in land of differing shapes (L 354-356).
(xxxiv) Litterae singulares. Single-letter abbreviations with brief explanations (L 357-358).
(xxxv) Ratio limitum regundorum. Limites designated by letters according to length (L 358-359).
(xxxvi) Expanded version of (xxiii) including material on weights and measures from Isidore, Origines 16.25 (L 371-376).
(xxxvii) Extracts from a Latin translation of Euclid's geometry, Books 1-4 (L 377-92).
(xxxviii) Extracts from a geometrical work of Cassiodorus (L 393-412).
(xxxix) Extracts from Boethius, Geometriae (L 413-416).

For material not included in Lachmann, Feldmesser, see p. xx.

## APPENDIX 2. LIST OF INSCRIBED CADASTRAL STONES

This list contains stones that have an inscription relating to the layout of limites or centuriae, and therefore to the division and allocation of land. Simple boundary stones, marking either private property or the property of communities, are not included. See, in general, Misurare, 135-9. Hyginus 2 (C 139-41; 153-5) describes the various ways in which cadastral stones were inscribed; he believed that the co-ordinates of the centuria should be carved from top to bottom on the side of the stone; cf. Nos A 9, 12, 13.

## A. GRACCHAN STONES (ALL CYLINDRICAL IN SHAPE)

1. $\quad$ CIL I $\mathrm{I}^{2} .719=$ XI. $6331=\operatorname{ILS} 26=$ Warmington $29=\operatorname{ILLRP} 474$ (Fanum Fortunae) records the re-establishment in the first century в.C. of boundary stones originally set up in 132 B.C., 'where Publius Licinius, Appius Claudius, and Gaius Gracchus, Board of Three for granting allocating and adjudicating lands, established them'. See now Paci in Milesi (ed.), Fano romana (1992), 59-62, who argues that the original settlement should be dated to 133-130, and the re-establishment probably to $82-81$ or $75-74$ в.c.
2. Russi and Valvo (1977); Pani (1977) (Celenza Valfortore) - on the side of the stone are the names [M.] Folvi(us) M. f. [C.] Semproni(us) Ti . f. IIIvir(ei) a(gris) i(udicandis) a(dsignandis). The stone has a cross carved on top, representing the limites, with D(ecumanus) incised on one of the lines; it may also have had $k$ (ardo) inscribed on the side. It is worth pointing out that in a late, anonymous text $D$ appears as a symbol for 550 , in respect of the length of a limes (L 358.18); see Bracco (1974), 161. But it would be unwise to attribute this symbol to Gracchan stones, since earlier surveying writers so commonly use $D$ to represent decumanus.
3. Grelle (1994) (Celenza Valfortore) - another stone discovered not far away from the find-spot of No. 2, with the names of the same land commissioners carved on the side. On the top is carved a cross signifying the intersecting limites, one marked $K$ and with $\lambda$ at the other end, the other $D$ and with $\square$ at the other end.
4. $\quad C I L \mathrm{I}^{2} .643=$ IX. $1024=$ ILS $25=$ Warmington $26=I L L R P 473$ (Rocca S. Felice).
5. $\quad$ CIL $\mathrm{I}^{2} .644=$ IX. $1025=$ Warmington $27=$ ILLRP 473 (Rocca S. Felice).
6. $\quad C I L \mathrm{I}^{2} .645=$ IX. $1026=$ Warmington 28 (cf. Degrassi on $I L L R P$ 473) (Rocca S. Felice) - Nos 4, 5, 6 were found in the same location, the first two having carved on the side the names of M. Fulvius Flaccus, C. Sempronius Gracchus, and C. Papirius Carbo, Board of Three for adjudicating and allocating lands. The tops of the stones are incised with lines denoting limites, in the case of Nos 4 and 5, with abbreviations of uncertain reading and interpretation but probably defining the boundary of existing landholders, and in the case of No. 6 a representation of the boundary of $F P$ Vet, which may indicate the estate of an established landholder (fundus possessoris veteris).
7. CIL I. $640=$ X. $3861=I L S 24=$ Warmington $25=I L L R P 467$ (S. Angelo in Formis) records on the side C. Sempronius Gracchus, Appius Claudius Pulcher, P. Licinius Crassus, Board of Three for adjudicating and allocating lands. On the top is carved the designation of the centuria - on the left of Decumanus I, on the near side of Kardo XI.
8. $\quad$ CIL $\mathrm{I}^{2} .641=\mathrm{X} .3760=$ ILLRP 468 (Arienzo) - records on the side C. Sempronius Gracchus, Appius Claudius Pulcher, P. Licinius Crassus, Board of Three for adjudicating and allocating lands. There are no other symbols.
9. Bracco (1979) (Auletta) - records on the side C. Sempronius Gracchus, Appius Claudius, P. Licinius; from top to bottom is carved $K(a r d o) X I I[T ?]$, and on the top of the stone $D$, with faint traces of two lines intersecting at right angles.
10. $A E 1945.25=I L L R P 469=$ Bracco (1974), 275 (Sicignano degli Alburni) - records on the side C. Sempronius, Appius Claudius, P. Licinius, Board of Three for adjudicating and allocating lands; on the top is carved d(ecumanus) XIII, K(ardo) I.
11. $A E 1955.190=$ Bracco (1974), 276 (Forum Popillii) - records on the side C. Sempronius, Appius Claudius, P. Licinius, Board of Three for adjudicating and allocating lands. On the top of the stone two lines intersecting at right angles can be dimly discerned.
12. CIL $\mathrm{I}^{2} .639=$ Warmington $24=\operatorname{ILLRP} 470=$ Bracco (1974), 277 (Atena Lucana) - records on the side C. Sempronius, Appius Claudius, Publius Licinius, Board of Three for adjudicating and allocating lands. Elsewhere on the side, $K(a r d o) V I I$ is carved from top to bottom. On the top is carved a cross signifying the intersecting limites, to which the letter $D$ has been added.
13. ILLRP $471=$ Bracco (1974), 278 (Sala Consilina) - records on the side C. Sempronius, Appius Claudius, P. Licinius, Board of Three for adjudicating and allocating lands. Elsewhere on the side, $K(a r d o) V$ is carved from top to bottom. On the top is carved a cross signifying the intersecting limites, to which the letter $D$ has been added.
14. CIL- T. $642=\mathrm{X} .289=\operatorname{ILLRP} 472=$ Bracco (1974), 279 (Sala Consilina) - fragmentary, recording the land commissioners, as in No. 13 (for the confusion of these stones in CIL see Bracco).
15. CIL I ${ }^{2} .696=$ VIII. $12535=$ ILS $28=I L L R P 475$ (near Carthage) - a copy dating from the imperial period of an earlier, fragmentary stone, recording [C. Sulpici] Galbae, [C. Pa]piri Carbonis, [L. Calpu]rni Besti[ae, IIIvir. a.i.a] (Board of Three for adjudicating and allocating lands).

Recovered stones vary in size from about 0.61 m to 0.92 m in height, and from 0.40 m to 0.55 m in diameter. For discussion of how the stones may have related to the layout of Gracchan land division, see Bracco (1979), 33-7; Grelle (1994), 253-5; cf. also de Martino (1984-5); there is a useful summary in Gargola, Lands, 147-74.

## B. STONES OF LATER DATE

1. $A E 1958.41$ (cf. Bonvicini, Studia Picena 26 (1958), 135) (Amandola) - quadrangular stone with lines intersecting at right angles carved on top, with the letters K(ardo) XIII D(ecumanus) IIII.
2. Bertacchi (1963) (Aquileia) - quadrangular stone with lines intersecting at right angles carved on top, with the letters PVBL XI IIII, which might refer to a public road or the dimensions of a publicly owned area. Bertacchi (op. cit., 116) speculates that the stone should be associated with a settlement by Augustus.
3. Ramilli (1965-66) (river Brenta, in the plain near Cittadella, possibly first century A.D.) - quadrangular stone with two lines meeting at right angles carved on the top; there is also an inscription:

IVSS TERN (which perhaps means Iuss(u) Ter(minus) N(ovatus) - 'by order, the boundary marker has been renewed')
$V($ ltra $) K$ (ardinem) VII
On the right side is inscribed: $S$ (inistra) $D$ (ecumanum) VIII.
4. Lazzaro (1971-72) (S. Pietro Viminario, imperial period) - quadrangular stone with two lines intersecting at right angles carved on the top; on one side (facing south at the time of discovery) is carved $S$ (inistra) $D$ (ecumanum) If; on another (facing north) $K$ (ardo).
5. Roffia in Misurare la terra; il caso mantovano (1984), 82-6 (Mantua, possibly first century A.D.) - quadrangular stone with two lines intersecting at right angles caryed on the top; there are inscriptions on three sides: one larger side has V(ltra) K(ardinem) IIII, one smaller side (on the left, looking at the stone) has $D$ (ecumanus) $I I$, the other (on the right, looking at the stone) $S$ (inistra) D(ecumanum).
6. Pagano and Villucci (1985) (Suessa Aurunca, late Republic?) - quadrangular stone with a line carved on top, indicating the boundary, which was straight at this point, and the inscription: Pub(licum) col(oniae) Camp(anorum) - 'public property of the colony of the Campanians'. The stone probably marked the boundary of public land belonging to the colony of Capua; for land allocations at Minturnae and Capua, see p. 387, n. 15; p. 382, n. 72.
7. Meyer (1983-84) (Shavei Tziyyon, Judaea, third century A.D.?) - a cylindrical stone, with a fragmentary inscription perhaps referring to 'right' or 'left' of $\Delta=D$ (ecumanus) XVI, and 'on the near side' or 'the far side' of (Kardo) XV. The stone may be associated with modifications to the land allocations at the colony of Ptolemais Veteranorum, which had been founded in the last years of Claudius' reign.
8. CIL VIII. $22786 \mathrm{a}-\mathrm{m}$ (cf. ILS 9375); CIL VIII.22789. Stones found near the road from Capsa to Tacapae, in southern Tunisia, A.D. 29/30; see Trousset (1978). Some stones give the designations of the centuriae they mark (a; e; f; g; h; $\mathrm{i} ; \mathrm{l} ; \mathrm{m} ; 22789$ ); others the number of the centuria ( $\mathrm{b} ; \mathrm{c} ; \mathrm{d}$ ), though these may be part of a different centuriation. CIL VIII. 22786 k has inscribed on top a representation of a land division grid.

Many so-called 'mute' stones have been found, apparently marking boundaries; see Pagano in Misurare, 231-4, citing a new discovery from Campania; also Pagano (1984). However, there are difficulties over the secure identification of such stones, since they can be confused with other types, for example stones used in olive-presses; see Liverani, MEFRA (1987).

## APPENDIX 3. EPIGRAPHIC EVIDENCE FOR THE SETTLEMENT OF LAND BOUNDARIES AND DISPUTES

Inscriptions are listed according to place of discovery, starting with Italy, then Spain and the West, the Eastern provinces and Africa.

## ITALY

## Region I

Jacques, Epigraphica (1987) (Latium) - records an attempt by Ostia to recover certain landed property from a private person (see Appendix 4, pp. 470).
CIL XIV. 2934 (Praeneste) - Postumius Julianus in his will bequeathed a named area of land to the citizens of Praeneste (A.D. 385).
CIL XIV. 4012 (Ficolea, east of Fidenae) - M. Consius Cerinthus at his own expense made level a piece of sloping ground and paved it, with precise details of the dimensions and location.
CIL XIV. 4063 = ILS 5943 (Fidenae) - marking the establishment of the boundary of public land of Fidenae.
C $247.32-5=\mathrm{L} 251.1-17$ (Ardea) - on the authority of Antoninus Pius, the boundary of the community was established by a military surveyor, through the agency of a chief centurion.
Pagano and Villucci (1985) (Suessa Aurunca) - see Appendix 2, No. B6.
CIL X. 787 (Pompeii) - M. Holconius Rufus and C. Egnatius Postumus undertook the building of a wall, with the extent defined ( 2 b.c.).
CIL X. 1018 = ILS 5942 (Pompeii) - on the instructions of Vespasian, T. Suedius Clemens, after examining the matter and taking measurements, restored to the community of Pompeii public areas occupied by private people.
CIL X. 1064 (Pompeii) - L. Avianius Flaccus Pontianus and Q. Spedius Firmus at their own expense repaired the public road, from the milestone outside the Stabian Gate to a statio within the territory of Pompeii.
Arangio Ruiz and Pugliese Carratelli, PP (1955), Tablets 78; 79 (Herculaneum) - record of the settlement of a boundary dispute between two private individuals.
CIL X. 1698 (Puteoli) - construction of a road to the boundaries (fines) of the community, and its paving at private expense.
CIL X. $3825=I L S 6308=I L L R P 482$ (Capua) - a number of large stones record how, on the orders of Caesar (probably Octavian in 36 B.c.) a furrow was ploughed to mark the boundary.
CIL X. 3828 = ILS 251 (Diana Tifatina, near Capua) - records the restoration by Vespasian, 'in accordance with the map of Augustus', of the boundaries of the lands granted to Diana Tifatina by Sulla.
CIL X. 4875 (Venafrum) - three inscriptions record land of the community subject to rent.
CIL X. 5853 (Ferentinum); cf. 5852 - in honour of A. Quinctilius Priscus, who had granted to the community three named farms and a meadow, the fruits of which could be exploited for the benefit of the citizens.
CIL X. $6430=I L S 5984$ (Circeii); cf. $A E 1992.260$ - defines land belonging to the community 'from the Promontory of Venus right up to the sea', from the eightieth boundary stone, for a length of 50 feet, with a width of 225 feet.

## Region II

CIL IX. 440 (Venusia) - possibly a definition of sacred and public land in the community.
CIL IX. 1455 (Ligures Baebiani) - list of estates and owners in the territory of Beneventum (see Champlin, Chiron (1981)).
CIL IX. 1556 (Beneventum) - P. Vedius Pollio grants land to Augustus and the community (cf. Dio 54.23).
CIL IX. 2165 (Arpaia = ?Caudium) - an inscription from the reign of Septimius Severus set up by the community of Beneventum near the western extremity of the ager Caudinus, celebrating its control of the land right up to the walls.
$A E 1945.85=1959.267$ (Canusium) - refers to Vespasian's restoration of the land of the municipium 'in accordance with the maps' in A.D. 76.

## Region IV

CIL IX. 2219 = ILS 5987 (Telesia) - demarcating the boundary between private property and the land of the community.
CIL IX. 2226 (Telesia) - records the provision by two citizens of wine and cakes for the community on the emperor's birthday, from the proceeds of rent on an area of land that they had bestowed.
CIL IX. 2241 (Telesia) - possibly refers to the restoration of part of the community's land.
CIL IX. 2827 = ILS 5982 (Histonium) - records the adjudication of a boundary dispute involving the community and a private person. The arbitrator, C. Helvidius Priscus, was perhaps the praetor of A.D. 70 . An old record, defining the boundary by means of landmarks, was invoked (see Appendix 4, p. 470).
CIL IX. 3929 (Alba Fucens) - a stone marking the territory (fines) of the community.
CIL IX. 3930 (Alba Fucens) - see above.

## Region V

CIL IX. 5144 (Castrum Novum) - records a public area belonging to the community.
CIL IX. $5420=$ FIRA $\mathrm{I}^{2} .75$ (Falerio) - a letter of Domitian, deciding a boundary dispute over subseciva between Falerio and Firmum, and citing an earlier letter of Augustus.

## Region VI

CIL XI. 5291 (Hispellum) - a stone marking the boundary of the colony.
AE 1990.328; cf. Alfieri et al., Picus 5 (1985), 9-50 (Aesis) - records how M. Octavius Asiaticus, in response to an honour accorded to him by the communities of Ancona, Pisaurum, and Aesis, built a road 16 feet wide connecting two existing roads; this passed through his own property and some of the land of Pisaurum, which he purchased. The measurements were noted in relation to the decumanus and other limites, the area was marked off with stones and wooden stakes, and a special right of way was established for magistrates of the communities and their families.

## Region IX

CIL V. 7493 (Chieri) - memorial of T. Sextius Basiliscus and his family, referring to its location 'on his own ground, within four boundary markers'.
CIL I ${ }^{2} .584=$ V. $7749=\operatorname{LLS} 5946=\operatorname{ILLRP} 517$ (Isoverde) - a decision of the brothers M. and Q. Minucius Rufus in respect of a boundary dispute in Liguria, with detailed consideration of boundaries, boundary marking techniques, and records (117 B.C.; see Appendix 4, p. 470).

## Region $\mathbf{X}$

CIL V. 1050 (Aquileia) - a private boundary stone marking a private area.
CIL V. 1469 (Aquileia) - marking a boundary up to the public limes by means of boundary stones.
CIL I ${ }^{2} .2501=\operatorname{ILLRP} 476$ (Galzignano) - the proconsul L. Caicilius (either L. Caecilius Metellus Calvus, consul in 142 b.C., or L. Caecilius Metellus Diadematus, consul in 117 b.c.) orders that boundary markers and the boundary are to be established between Patavium and Ateste.
CIL V. $2491=I L S 5944 \mathrm{a}=\operatorname{ILLRP} 476($ Euganean Hills, Mount Venda $)-$ as above.
CIL V. $2492=I L S 5944=$ ILLRP 476 (Teoli) - as above.
CIL V. 2490 = ILS 5945 = ILLRP 477 (Lobia, near Lonigo) - Sex. Atilius Saranus (cos. 136

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в.c.) orders that boundary markers and the boundary are to be established between Ateste and Vicetia.
CIL V. 2546 (Ateste) - records that the head or start of a limes had been changed.
CIL V. 3151 (Vicetia) - stone marking a public boundary.
CIL V. 4148 (Pedergnaga) - marking the erection of seven altars celebrating a pagus, in the territory of Cremona.
CIL V. 4166 (Leno) - marking a boundary between public and private land.
Zancan, AIV (1938-39) (Nanto) - quadrangular stone, apparently marking a boundary strip on private property.
Buchi, Aquileia (1978) (Verona) - quadrangular stone inscribed urb(anus) act(us) reg(ioni) pag(is) iust(us), apparently referring to one of the lines demarcating land divison in the territory of Verona; the stone also has $C C X X$; the latter may refer to the number of actus in a unit of measurement, the former to the total of iugera in a centuria.

## Region XI

AE 1977.328; cf. Baldacci, RAL 31 (1977), 336-47 (Vercelli) - recording the boundary of an area of land, marked by four stones, given by a private individual for communal and religious use.

## HISPANIA (LUSITANIA)

CIL II. 460 (S. Salvador, between Monsanto and Valverde) - recording the erection of Augustan boundary stones by Augustus between the Lancienses and the Igaeditani (A.D. 5).

AE 1976.273 (Peroviseu, perhaps identical with the above) - recording the erection of Augustan boundary stones by Augustus between the Lancienses and the Igaeditani (A.D. 5).

CIL II. $656=$ ILS 5972 (Valdecaballeros) - recording the erection, in the reign of Domitian, of boundary stones between the colonies of Augusta Emerita and Ucubis, which is about 200 km south-east of Emerita; but one community may have owned land distant from its main territory (see p. 349, n. 54; p. 379, n. 56).
García y Bellido, Arqueologia e Historia (1958), 18 (Montemolín) - possible Augustan boundary stone marking the land of Augusta Emerita.
Stylow, Gerión (1986), 308, with Sáez Fernández, Habis (1990), 222, n. 66; AE 1986.323; cf. Vaquerizo Gil, Rev. Est. Extr. 42, 131, no. 14 (Valdecaballeros) - recording the erection, in the reign of Vespasian, of a boundary stone between Lacimurga and Ucubis.
CIL II.857-8 (Mirobriga) - recording the establishment of Augustan boundary stones by Augustus between Mirobriga, Valluta, and Bletisa (A.D. 5/6).
CIL II. $859=$ ILS 5970 (Ledesma) - recording the establishment of Augustan boundary stones by Augustus between Bletisa, Mirobriga, and Salmantica.
CIL II. 5033 (near Mirobriga) - fragmentary Augustan boundary stone.
Vaz, Conimbriga (1979) (Goujoim) - recording the establishment, in the reign of Nerva, of a boundary stone between the Coilarni and the Arabrigenses.
Sáez Fernández, Habis (1990); cf. Gorges, MCV (1993) (Lacimurga) - fragment of a map showing centuriated land, the river Ana, and the adjacent territory of the Lacimurges.

## HISPANIA (BAETICA)

CIL II. 1438 = ILS 5971 (Ostippo) - recording a restoration by Claudius of boundary stones marking centuriated land (A.D. 49).
CIL II. 2349 = ILS 5973 (Stylow, Gerión (1986), 266-8); cf. also ILS addenda, vol. III, p. CLXXXVI (Villanueva de la Iara) - a boundary of three communities (trifinium), the Sacilienses, Eporenses, and Solienses, established by an arbitrator, confirmed by Hadrian.
AE 1977.440; cf. Cano Navas, Fuentes y Metodologia. Andalucia en la Antiguedad (1978), 347-53 (Priego) - recording in the reign of Domitian, through the agency of the proconsul, a boundary settlement, with an Augustan boundary stone, relating to Cisimbrium, which had received municipal status from Vespasian (A.D. 84).

## HISPANIA (TARRACONENSIS)

$E E$ VIII p. $408,131=I L S 5969$ (Castro Calbón) $=$ Le Roux, L'Armée romaine, p. 112, 1 stone demarcating the land assigned to the IV Cohort of Gauls and the community of Bedunia; cf. also Le Roux, op. cit., 2 (Soto De La Vega).
García y Bellido, $A E A$ (1961), 151-2; Le Roux, op. cit., pp. 112-14, 3; 6-9 (Sota De La Vega) - recording the erection, in the reign of Claudius, of boundary stones between the Fourth Cohort of Gauls and the community of Bedunia.
García y Bellido, op. cit.; Le Roux, op. cit., p. 113, 4-5 (Soto De La Vega) - recording the erection, in the reign of Claudius, of boundary stones between the Fourth Cohort of Gauls and the community of the Luggones.
CIL II. 2916 a-d = ILS 2454 = Le Roux, op. cit., pp. 109-10, 1-4 (Retortillo) - stones demarcating the land assigned to Legion IV Macedonica and the community of Iuliobriga. Other similar boundary stones are usefully catalogued by Le Roux, op. cit., 6-19.
CIL II. 4125 (Tarraco) - records a decision of the governor, L. Novius Rufus, in respect of a dispute between the inhabitants of two pagi, seemingly involving an inspection (A.D. 193).

CIL II. 5807 = ILS 2455 = Le Roux, op. cit., p. 110, 5 (Villasidro) - stone demarcating the land assigned to Legion IV Macedonica and the community of Segisamo.
$A E 1990.580$ (near Colmenar el Viejo) - boundary marker of the territory of Complutum.
Richardson, JRS (1983) (Contrebia) - bronze tablet recording the settlement of a dispute between communities concerning the sale of land for the construction of a canal, and the right of the Salluienses to mark out the course of the canal over the public and private land of the Sosinestani.
AE $1993.1035 \mathrm{a}-\mathrm{b}$; cf. R. García Rozas and J. A. Abásolo in J. Arce and F. Burkhalter (eds), Actas del XI congreso internacional de bronces antiguos, Madrid, Mayo-Junio 1990 (Madrid, 1993), 179-81, no. 5 (Fuentes de Ropel; now at Zamora) - a bronze record of a judgement about boundaries, giving a detailed description of the topography, with local place names and references to the limites.

## SARDINIA

CIL X. 7852 = ILS 5947; cf. Mastino, La Tavola di Esterzili (1993) (Esterzili) - a decision by the proconsul of Sardinia in A.D. 69, L. Helvius Agrippa, concerning a dispute between the Patulcenses and the Galillenses over occupation of a piece of land. The Galillenses won a series of postponements, arguing that they needed to bring old records from the imperial record office. Finally, they were ordered to vacate the land.
CIL X. 7930 = ILS 5983 (Sisiddu) - a stone marking the boundary of two communities, with their names on either side; on the narrow side of the stone the word olla (cooking-jar) appears, and this may be a reference to the practice of burying pieces of broken pottery under boundary markers.
EE VIII. 719 = ILS 5982a (Sanluri) - recording that boundaries had in time been erased between two estates, and perhaps that new boundary stones had been set up.
CIL X. 7931 (Sisiddu) - fragments of boundary stones found about 3 km apart.
CIL X. 7932 = (Sisiddu) - as above.
Notizie degli Scavi 1894, p. 153 = ILS 5983a (Cuglieri) - similar to CIL X.7931-2.
$A E 1993.849=A E 1992.890$ (Bortigali) - a possible reference to the extent of the territory (expressed by iura) of the Ilienses.

## CORSICA

CIL X. $8038=F I R A I^{2}, 72$ (northern Corsica) - a letter of Vespasian to the Vanacini stating that he has ordered his procurator, Claudius Clemens, to adjudicate on their boundary dispute with a neighbouring community, the Mariani, with the help of a land surveyor sent by the emperor (c. A.D. 72).

## ALPES COTTIAE

CIL XII. 75 (Eburodunum) - offering to Deus Mercurius Finitimus (of the boundary).

## GALLIA NARBONENSIS

CIL XII. 113 (cf. p. 805) = ILS 5957 (Alpes Graii) - on the authority of Vespasian, the legate of the army of Upper Germany, Cn. Pinarius Cornelius Clemens, established a boundary between the Viennenses and the Ceutrones in A.D. 74.
CIL XII. 531 a-i; cf. $I L S 5975$ (= h) (Aquae Sextiae) - stones marking the boundary of the territory of Aquae Sextiae and Arelate.
CIL XII. 594 (territory of Arelate) - referring to districts on the boundaries of the territory of Arelate.
CIL XII. 1244 (cf. add. p. 824); Piganiol, Documents, 79-81 (Arausio) - inscription describing how Vespasian provided for a survey of the territory and changes in land distribution, with a map to record the details in each centuria; large fragments of the map are preserved.
CIL XII. 2325 (Le Touvet) - recording a community boundary.

## GALLIA AQUITANIA

CIL XIII. 9023 (Prégilbert, near Auxerre) - perhaps indicating a boundary with the territory of Augustodunum (A.D. 259?).

## GALLIA BELGICA

CIL XIII. 4057 (Dalheim) - possibly a boundary stone of imperial land.

## GERMANIA INFERIOR

ILS 7071 (Colonia Agrippina) - fragmentary inscription recording a decision concerning the landholders on the first scamnum in the Lucretian vicus.

## GERMANIA SUPERIOR

CIL XIII. 6610 (Miltenberg) - possibly indicating a boundary between the Toutones and another community.
CIL XIII. 11645 (Tres Tabernae) - indicating a boundary involving some private property, with dimensions.
CIL XIII. 11646 (Tres Tabernae) - perhaps indicating a boundary between public and private property, with dimensions.

## RAETIA

CIL III. 11924 (Schwäbisch-Gmünd) - fragmentary stone referring to the lim(es) Raet(icus); cf. ILS 451 per limitem Raetiae.
CIL III.14370/10 (Regensburg) - an offering of Aurelius Artissius, aedil(is) territor(ii) (A.D. 178?).

## PANNONIA INFERIOR

CIL III. 10305 (Intercisa) - referring to the erection of a memorial in the territory of Aquincum.
CIL III. 10489 (Aquincum) - refers to the construction of a bath by Severus Alexander in the territory of Legion II Adiutrix.
Note also CIL III. 10596 (Salva) - refers to the Dux Val(eriae) limitis (A.D. 365/7).

## DALMATIA

(See Wilkes, AArch Slov (1974); for the historical context, Condurachi, Hommages à M. Renard II (1969)).

CIL III. 2882 (Corinium) - a centurion appointed judge on the agreement of the parties by the governor, L. Volusius Saturninus (c. A.D. 29-40), to decide the boundary between the Neditae and another community.
CIL III. $2883=I L S$ 5953a (Corinium) - the boundary between the Neditae and the Corinienses was settled by military surveyors, after a survey, on the instructions of the governor, A. Ducenius Geminus (A.D. 63-67).
CIL III. 15045/2 (Corinium) - another copy of the boundary settlement above.
CIL III. 9973 = ILS 5953 (Corinium) - on the basis of the edict of a previous governor, P. Cornelius Dolabella (A.D. 14-20), A. Ducenius Geminus instructed centurions to fix the boundary between the Neditae and the Corinienses.
JÖAI 12 (1909), Bb. 32 n .3 (Corinium) - refers to the settlement of a boundary by the decree of the governor, P. Cornelius Dolabella.
CIL III. 8472 = ILS 5948 (Jesenice) - L. Trebius Secundus, camp prefect, on the orders of the governor, L. Volusius Saturninus, who had made a ruling after calling his advisory council, set up boundary stones between the Onastini and the Narestini.
CIL III. 8473 (Jesenice) - fragment, probably relating to the boundary settlement above.
CIL III. 8663 = 3157 (cf. 14239/4) (Salona) - records how a veteran and ex-centurion opened at his own expense a public limes (serving as a road), previously closed because of the departure or death of the governor (A.D. 179).
CIL III.8716a (Salona) - fragmentary, possibly referring to the appointment of a judge.
CIL III. 9832 = ILS 5949 (Razvadje) - centurions appointed with the agreement of the parties by the governor, L. Volusius Saturninus, to resolve a dispute.
CIL III. 9833 (Oklaj) - fragmentary, probably a boundary stone.
CIL III. 9860 (between Grahovo and Glamoč) - a judge was appointed by the governor, Flavius Valerius Constantius (A.D. 282-284) to establish the boundary between the Salviates and the Stridonenses.
CIL III. $9864 \mathrm{a}=$ ILS 5950 (Vaganj) - the governor, L. Arruntius. Camillus Scribonianus (c. A.D. 41/2), appointed a centurion as judge, to establish the boundary and set up markers between the Sapuates and the [La]matini.
CIL III. 9938 = ILS 5951 (Dobropoljici) - five judges appointed by the governor, M. Pompeius Silvanus (A.D. 69-70), decided the boundary line between two communities, the Asseriates and the Alveritae.
CIL III. 12794 = ILS 5952 (Dubrava) - a centurion, on the orders of the governor, Piso (possibly the consul of A.D. 27; see Wilkes, Dalmatia, 83), had identified and restored the boundary stones between the Nerastini and the Pituntini.
CIL III. $13250=I L S 5968$ (near Burnum) - demarcating the land of the legion, and woodland belonging to a private person, through the agency of the procurator, Augustianus Bellicus.
CIL III. $14969 / 2$ (unknown) - fragmentary, referring to the pagus of Promona, apparently concerning the use of a source of water in the pagus.
CIL III. 15053 (Jablanac) - recording an agreed boundary between the Ortoplini and the Parentini.
JÖAI 8 (1905), Bb. 52-5 (Asseria) - recording the establishment of a boundary by a centurion on the orders of the governor, between the Sidrini and the Asseriates.
$J O ̈ A I ~ 12(1909), B b .29-31 \mathrm{n} .1$ (Asseria) - recording the establishment of a boundary between the Ansienses(?) and the Corinienses, by their agreement, after a survey on the orders of the governor, A. Ducenius Geminus.
JÖAI 12 (1909), Bb. 32 n .4 (near Karin) - boundary marked on natural rock: 'boundary of Nedinum'.
Betz, Untersuchungen, 34, n. 11 (unknown) - records how a governor restored a boundary(?) 'according to the map of Dolabella'.
B. Gabričević, VAHD 55 (1953), 103-4 (Šušnjar) - records how the governor had ordered C. Plotius Maximus to adjudicate the boundary line between the Barizaniates and the Lizaviates and make a decision on the setting up of boundary stones.
D. Sergejevski, Arch. Iug. 5 (1964), 93-5 (Kosijerevo) - the governor, L. Funisulanus Vettonianus (cos. A.D. 78?), ordered that a bridge and boundary stones should be restored on an estate, by a soldier.
Rad. Jug. Akad. znanosti i umjetnosti 339 (1965), 134; Vjesnik arh. muz. u. Zagr., 3rd ser. 3 (1968), 63-73; cf ILS 5953b (near Stinica) - records a boundary settlement between the Begi and the Ortoplini in accordance with the decree of the governor, P. Cornelius Dolabella.

AE 1967.355 = J. J. Wilkes, Epig. Stud. 4 (1967), 119-21 (in the Ravni Kotari?) - records how a military tribune was appointed judge by the governor, on the authority of the emperor Vespasian.
CIL III. 3163 (unknown, now in Venice) - marking the boundary between the estate of Seius Severinus, a centurion, and Baebidius Titianus, along the course of a river.

## MOESIA

CIL III. 7587 (Kalajdžideré) - demarcating the territory of Callatis.
CIL III. 14214/33 (cf. Dacia n.s. 15 (1971), 325-33; an analysis of all relevant extant texts is provided by A. Avram, Dacia, n.s. 35 (1991), 103-37) (Callatis) - a boundary settlement recorded in Greek and Latin, containing a boundary description with a note of numbered boundary stones.
CIL III. $12483=$ ILS 724 (Troesmis) - celebrating imperial achievement in securing a section of the limes (A.D. 337-340).
CIL III. 12488 (Karaharman) - demarcating the land of two vici.
CIL III. 12491 (Pantelimon) - in honour of a man described as loci princeps in the territory of Capidava.
CIL III. 12507 (Azizie) - possibly demarcating a territorial boundary at Odessus.
CIL III. 12508 (Abrittus?) - demarcating the boundary of the land of a vicus.
CIL III. 13726 (Abrittus) - recording how a tribune of a cohort demarcated public meadow land.
CIL III. 13729 (Hadarča) - demarcating a territorial boundary with Thrace.
CIL III. 13734 (Adamclissi) - in honour of Constantine and Licinius for 'confirming the protection of the limes' (A.D. 315-319).
CIL III.14422/1 (Jajdži, near Svištov) - on the authority of Hadrian a boundary was established between the Moesians and Thracians by Antius Rufinus (A.D. 136).
CIL III. 12407 (Nedan) - as above.
CIL III. 749 (cf. add. p. 992) (Svistov) - as above.
CIL III p. 992 (Hodnica) - as above.
CIL III.14437/2; cf. AE 1957.333 (Adamclissi) - recording the erection of boundary stones in the territory of the Ausdecenses; this was to make a new demarcation of the territory and to confirm the exclusion of the Dacians, with whom the Ausdecenses had been in conflict during the Marcomannic wars of Marcus Aurelius, c. A.D. 177-179.
CIL III.14447; cf. $A E 1956.205$ (Isakceia) - demarcating the boundary of an estate.
SEG 1.329; SEG 24.1109 ; cf. $A J$ n. 68 (Histria) - recording the establishment of the boundary of the territory of the people of Histria by the governor, Laberius Maximus (A.D. 100 ). The detailed boundary description depends on natural landmarks, not boundary stones (see Appendix 4, p. 470). The inscription also quotes letters from earlier Roman governors.
AE 1969/70.567 (Smilec) - recording the setting up of a boundary stone at a particular location by a chief centurion on the instructions of the governor, M. Servilius Fabianus Maximus (A.D. 161-163 or 162-164).
AE 1980.809; cf. V. Pârvan, Ulmetum II, 2, p. 394, 31 (Ulmetum) - demarcating a piece of land, with a description of features of the boundary (third century A.D.).
AE 1984.777 (Staro Nagoričino) - stone with fragmentary inscription, apparently demarcating the territory of the Dardanians.

## MACEDONIA

CIL III. 586 (cf. 12306) $=$ ILS 5947a (between Lamia and Hypata) - recording a land dispute between these communities, in which the proconsul, Q. Gellius Sentius Augurinus, was instructed by Hadrian to consult surveyors and establish a boundary; there is a detailed boundary description based on natural features and landmarks (see Appendix 4, p. 470).
CIL III. 591 (cf. p. 989) $=I L S 5954$ (between Dium and Olosso) - on the authority of Trajan, a boundary settlement was established for the people of Dium and Olosso, with their agreement (A.D. 101).
CIL III. 14206/4 = ILS 5981 (near Serrhae) - demarcating the boundary between Philippi and Claudianum Artemidorum, on the authority of Trajan.

CIL III. 14406 d (Philippi) - establishing the boundary between Philippi and another people, on the authority of Hadrian.
IG IX.2.261 = AJ 46 (Cierium, in Thessaly) - C. Poppaeus Sabinus (governor of Moesia, A.D. 11-35) asks the koinon of Thessaly for a ruling in a boundary dispute between two cities.
Dunant and Pouilloux, Recherches sur l'histoire et les cultes de Thasos, 2, no. 186 (Thasos) a letter of Venuleius Pataecius, procurator of Vespasian, addressed to the council and people of Thasos concerning a boundary dispute; he sends a soldier (probably a military surveyor), and promises to settle the boundaries in person.
AE 1965.206 (Samothrace) - records the appointment of a iudex by Q. Annius Maximus, proconsul of Macedonia, to resolve a boundary dispute (A.D. 114).
$A E 1968.469=1992.1533$ (Petropege) - (second) stone marking the boundary between the Thracians and the people of Thasos, on the authority of Trajan (A.D. 101).

## ACHAEA

Syll 827 = Fouilles de Delphes III fasc. iv nos 290-9; cf. CIL III. 567 (Delphi) - recording in Latin and Greek a decision of the governor, C. Avidius Nigrinus, probably in A.D. 114, concerning the boundaries of the sacred land of Delphi and neighbouring communities. Nigrinus referred to the results of earlier surveys and demarcation of boundaries, and, in the case of the Amphissians and the people of Myania, a boundary description is quoted, including natural features and boundary markers. In the case of Antikyra, a detailed geographical description is given, with a note of landmarks and natural stones with inscriptions, serving as boundary markers (see Appendix 4, p. 470).
Syll ${ }^{3} 683$ (Olympia) - a victory monument of the Messenians recording the arbitration of Miletus in a boundary dispute between the Messenians and Lacedaemonians (c. 140 в.C.), in which L. Mummius, who had defeated Achaea in 146, had given a judgement.

IG V.1.1431 (Messenia) - the dispute between the Messenians and the Lacedaemonians continued (see Tacitus, Ann. 4.43), and this badly damaged inscription records the boundary line between the two communities, apparently settled in A.D. 78 by Monomitos, imperial freedman and surveyor.
IG IX.1.61 (Daulis in Phocis) - a boundary dispute over three areas of land between the community of Daulis and a private individual, settled by Flavius Eubulus, judge and boundary arbitrator, on the authority of the governor. A survey was conducted, documents consulted, and new boundary markers erected; a map of the settlement was to be engraved (A.d. 118).
AE 1913.2; cf. Aichinger, ZPE (1982), p. 196 (Perrhaebia) - a judge appointed by Trajan decides a boundary dispute between two communities, based on earlier records; the boundary is demarcated by markers and natural features.
IG VII. $2870=$ SEG 32.468; cf. Fossey, Euphrosyne (1981-82), 50-2 (Koroneia, Boeotia) records a decision by Antoninus Pius in a dispute over an area of common grazing land between Koroneia and a neighbouring community, Thisbe. A land surveyor had been appointed to measure out the land to which the Thisbians were entitled, in line with a previous decision (A.D. 155?).

## THRACIA

CIL III. 12329 (Deultum) - demarcating the territory of Deultum.
IGR I. 709 (Philippopolis) - boundary markers of the Cortocopii were established in the governorship of C. Julius Commodus, by Skeles, an arbiter and boundary-fixer (ópot́ćtos), in the reign of Antoninus Pius.
AE 1979.552; cf. L. Botoucharova, Arheologija 3 (1979), 37-40 (between Trud and Stroevo) demarcating the territory of a community (cf. also IGBulg. 1455; 1472), through the agency of the governor, Q. Atrius Clonius (A.D. 211/212).

ASIA
Syll 679 (cf. Sherk, RDGE, p. 44, n. 7) (Magnesia ad Maeandrum) - recording a boundary

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dispute between Magnesia and Priene, the intervention of the Roman Senate, and the arbitration of Mylasa (mid-second century b.C.).
CIL III. 12237 (Metropolis, Phrygia) - recording the setting up of boundary stones between two communities by the procurator.
CIL III. 13660 (near Metropolis, Phrygia) - fragmentary definition of a boundary.
CIL III.14192/6 (near Metropolis, Phrygia) - definition of a boundary.
CIL III. 14195/1 (Bojük Kadifa) - recording the restoration by Augustus of land to the temple of Diana.
Die Inschriften von Ephesos VII, 2 (1981), nos 3501-16 (Ephesus) - inscribed boundary stones (from Augustus to Trajan) recording the adjudication of the boundary of the land belonging to the temple of Artemis through the agency of the proconsul, who in some cases is said to have been present in person.
Laffi, Athenaeum (1971) (Aizanoi, Phrygia) - recording a dispute over the quantity of land sacred to the temple of Zeus and the size of individual allocations, on which the cultivators paid a rent in proportion. Surveyors were involved, and consideration was given to the practice in neighbouring territories, as the agrimensores often advise.
AE 1938.144; cf. Aichinger, ZPE (1982), 197 (Dorylaeum) - on the authority of Hadrian, under the agency of Julius Severus, legate of the proconsul, boundary markers were set up between Dorylaeum and Nicaea (before A.D. 130).
SEG 32 (1982). 1287 (Phrygia) - recording how a legionary tribune, on the instructions of the procurator, settled a land dispute between two communities; he went in person and observed the details, accompanied by a surveyor (A.D. 253-6).

## BITHYNIA AND PONTUS

AE 1983.898-905; cf. S. Şahin et al., Epigraphica Anatolica 1 (1983), 41-54 (Libyssa) - eight milestones dating from C. A.D. 239 to the reign of Diocletian. Nos 898 and 899 mention 'from Nicomedia to the boundary' (fines).

## GALATIA

OGIS 538; cf. G. E. Bean, AS 9 (1959), 84-8, no. 30; L. Robert, Hellenica 11-12 (1960), 596 (Sagalassus) - demarcating the boundary between Sagalassus and Tymbrianassus, as decided by the governor and procurator in A.D. 54-55.
CIL III. $6872=$ ILS 5967 (Sagalassus) - a stone marking the boundary between an imperial estate and the territory of Sagalassus. For the extent of Sagalassus' territory, see Mitchell, JRS (1976), 117-18.
Devreker, Latomus (1971) (Pessinus) - recording the survey of 'the whole land of the splendid city of Pessinus' by a chief centurion, on the instructions of Caracalla (A.D. 216).

## CILICIA

CIL III. 12119 (Cilician Gates) - stone with fragmentary inscription recording the restoration of a road and possibly a boundary.
AE 1966.486 (cf. E. Doblhofer, JÖAI 45 (1960), 39) (near Misis) - recording the establishment of boundaries between two communities (Mopsuhestia and Aegaeae) by the governor.

## SYRIA

CIL III. 180 (cf. p. 972) (near Byblos) - stones containing inscriptions, which record the name of the emperor Hadrian, a series of numbers, and other unexplained letters; on one there is a reference to types of trees which were frequently used to mark boundaries.
CIL III. $183=I L S 5974$ (Abrin, near Botrys) - recording the establishment of boundaries between land of Caesarea ad Libanum (probably outside its main territory) and Gigarta.

## MESOPOTAMIA

AE 1984.919; note also 920; cf. J. Wagner in S. Mitchell (ed.), Armies and Frontiers in Roman and Byzantine Anatolia (1983), 113-14 (near Kizilburç, on the Zeugma-Edessa road) - records that, on the authority of Septimius Severus, the procurator C. Julius Pacatianus established boundaries between the province of Osrhoene (formed after the eastern war in A.D. 195) and the kingdom of Abgarus.

## JUDAEA/SYRIA PALAESTINA

Applebaum in Judaea in Hellenistic and Roman Times, 70-1; cf. SCI 4 (1973), 125, n. 4 (Tel Jedru) - stone inscribed in Greek Г $\dot{\beta} \beta \alpha$, marking the boundary of Gaba Hippeon and Ptolemais.
Applebaum, op. cit. (Kefar Ata) -stone inscribed Pago Vicina(li), marking the boundary between pagi in the territory of Ptolemais.
SEG 32 (1982). 1499 (Caesarea Panias Philippi) - recording a boundary settlement relating to the territory of Caesarea and the temple of Pan, in the time of Diocletian.

ARABIA
CIL III.14149/11 (Petra) - a stone inscribed on four sides apparently recording land boundaries.

## EGYPT

SEG 30 (1980). 1781 (Dehmit, Lower Nubia) - recording a boundary settlement by an official appointed by the Prefect of Egypt in A.D. 111.

## CRETE AND CYRENAICA

CIL III. 14377 = IC I. $8.49=$ ILS 8091 (Cnossus) - records how Nero restored to Cnossus, through the agency of the procurator P. Licinius Secundus, five iugera of land granted by Augustus and confirmed by Claudius.
IC I.26, nos 2-3; cf. Baldwin Bowsky, CJ (1986-87), 227-8 (Rhizenia and Pyranthus) - two copies recording a survey and settlement of boundaries organized by L. Turpilius Dexter, proconsul of Crete and Cyrenaica, to restore to Gortyn public land appropriated by private persons (A.D. 63-64).
IC III.4, nos 9-10 (Itanus and Hierapytna) - a long-standing dispute over land, which had originated in 146 в.с. Three commissions sent by the Roman Senate considered the matter and eventually the city of Magnesia-on-the-Maeander was appointed to arbitrate.
AE 1969/70.635; cf. Ducrey, BCH 93 (1969) (Cnossus) - recording the settlement of a boundary dispute beween Capua, which had land near Cnossus, granted to it by Octavian, and Plotius Plebeius, a private citizen, with the agreement of both parties and in accordance with a wish expressed previously by the emperor Titus; boundary stones were set up through the agency of the procurator, Messius Campanus (A.D. 84).
AE 1974.682; cf. J. M. Reynolds, Libya Antiqua 8 (1971), 47-9 (Beit Thamir) - a stone with a Greek and Latin inscription recording the restoration to the Roman people by Claudius, through the agency of the governor L. Acilius Strabo, of land that had been appropriated by private persons (between A.D. 52 and 54). This process, if begun towards the end of Claudius' reign, will have been continued under Nero (see below).
AE 1974.677; cf. G. Pugliese Carratelli, Annuario Scuola Arch. Atene 39-40, 1961-62 (1963), p. 323, n. 190 (Cyrene). AE 1934.260, found near Gasr Taurgumi, has the same text in Greek and Latin - recording the restoration by Nero, through the agency of the governor L. Acilius Strabo, to the Roman people of land appropriated by private persons. Cf. also $A E 1974.683$ (probably referring to further restorations in the time of Vespasian) and 684.

## AFRICA PROCONSULARIS

(The proconsul of Africa was responsible for those parts of the region of Numidia not under the control of the legate of Legion III Augusta; see CIL VIII, pp. 467-8. The province of Numidia was not formally established until the reign of Septimius Severus.)
CIL VIII. 10567 (Henschir Srin) - marking land of a municipium from land owned by the emperor(?).
CIL VIII.10838; cf. 17407 = ILS 5976 (Djebel Edûgh) - stone marking the land of Hippo Regius and Cirta.
CIL VIII. $14280 \mathrm{a}-\mathrm{b}$ (Carthage) - two parts of the same fragmentary stone, referring to a limes in an obscure context.
CIL VIII. 15828 (Henchir Sidi Alî ben Abdallah) - possibly a boundary stone.
CIL VIII. $17521=4845=$ ILAlg 1, 467 (Oued El-Maiza, near Calama) - settlement of boundaries(?) on the instructions of Antoninus Pius, with the agreement of both parties, and by the decision of the governor, Claudius Julianus.
CIL VIII. 23910 (Henschir Zoubia) - referring to a boundary stone set up between the land of two communities, according to the map, possibly by a soldier of the XIII urban cohort based at Carthage.
CIL VIII. 25366 (El-Mahrine) - a numbered boundary stone
CIL VIII $25860=14882=I L T 1293$ (Ksar el Baghla, near Testour) - marking the boundary of the old and new province, on the authority of Vespasian.
CIL VIII. $25893 \mathrm{a}-\mathrm{b}=I L T 1302$ (Henchir Gataa) - two boundary stones, apparently found in their original positions, about 28-30 metres apart, demarcating imperial and private property.
CIL VIII. $25944=I L T 1321$ (Ain-Djemila) — perhaps demarcating imperial and public property.
CIL VIII. 25967 = ILS 5955 (Henchir-Chetlou) - marking the boundary of the old and new province on the authority of Vespasian.
CIL VIII. 25988 (on Mount Djebel Cheïdi) - fifteen square-shaped stones demarcating imperial estates and the land of the community of Thugga; one stone records that the work was done by an imperial freedman in charge of the surveyors, and is numbered; other stones too have a number, and were clearly part of a series of boundary markers.
CIL VIII. 26168 (Djebba) - marking public land of the community.
CIL VIIII 26169 (Djebba) - as above.
CIL VIII. $26274=I L T 1370$ (Henchir Duâmis) - recording land division between colonists and local inhabitants, and the establishment of a boundary.
CIL VIII. 27354 (west of Thugga) - boundary stone of uncertain significance.
CIL VIIII 27355 (Thugga) -as above.
CIL VIII. 27393 (Henchir el Hammadi) - as above
CIL VIII. 27459 (Djebel bu Kohêl) - on the authority of Antoninus Pius, a fixing of boundaries was made of a community's land.
CIL VIII. 27563 (Henchir-Aoud-ben-Dhaou) - apparently marking public land, with dimensions.
CIL VIII. $28073=I L S 5958 \mathrm{a}-\mathrm{b}$ (near Madaura) - on the authority of Trajan, the governor L. Minicius Natalis established the boundary between Madaura and the Musulamii (A.D. 104/105).

CIL VIII. 28074 (near Madaura) - badly damaged stone; as above(?).
$A E 1923.26$ (Kalaa es Senam) - on the authority of Trajan, the governor L. Minicius Natalis established a boundary between the Musulamii and Valeria Atticilla, with some dimensions given (A.D. 104).
CIL VIII. 4676 (Madaura) - records how, on the authority of Trajan, L. Minicius Natalis established a boundary between Madaura and another community.
CIL VIII. 10667 = ILS 5959 (Khanget Nasser); cf. VIII. 16692 - on the authority of Trajan, the governor L. Munatius Gallus re-arranged(?) boundaries for the Musulamii.
ILAlg 1, 2939 bis (Ksar Gurai) - on the authority of Trajan, the governor L. Acilius Strabo Clodius Nummus fixed boundaries between imperial property, Ammaedara, and the Musulamii (c. A.D. 116).
ILS 5976a (Blanda) - stone marking the land of Hippo Regius and Thabraca.

## AFRICA PROCONSULARIS (TRIPOLITANIA)

CIL VIII. 11051 (Turris Timezegeri) - fragmentary boundary marker.
Di Vita-Evrard, QuadArchLib (1979) (Djebel Tarhuna) - boundary stones marking a disputed section of the boundary between Lepcis Magna and Oea.
CIL VIII. 22765 = ILS 8923 (Ras-el-Aïn) - recording how the emperor Gallienus restored a military camp using soldiers from the 'Tripolitanian limes' c. A.D. 263.

## AFRICA PROCONSULARIS (BYZACENA)

CIL VIII. 11426 (Sufes) - fragmentary, possibly a public boundary stone - c(ippus) $p$ (ublicus). CIL VIII. $22786 \mathrm{a}-\mathrm{m} ; 22789$ (on the road from Capsa to Tacapae) - refer to the land division carried out by the proconsul Vibius Marsus after the defeat of Tacfarinas in a.d. 24 (see p. lix; and Appendix 2B, no. 8); every fifth stone names the governor and the III Augusta legion ( $\mathrm{a} ; \mathrm{f} ; \mathrm{k}$ ). The stones contain the designation of the decumanus and the kardo (a; e; f; g; h; i; l; m; 22789; and see pp. 385-7), or in some cases the number of the century ( $\mathrm{b} ; \mathrm{c} ; \mathrm{d}$; these stones may belong to a different land division).
CIL VIII. 22787 (at foot of Mount Djebel Stiah) - the wording of an earlier inscription obtrudes into a boundary settlement, which seems to refer to a boundary arrangement by Trajan between the Tacapitani and the Nybg(enoi?) (cf. VIII. 22786 e; 22788 f).
CIL VIII. 22788 a-f (Henchir Chenah) - a-d were carved on four sides of a stone, e-f on two sides of a stone originally positioned below the first; records a boundary settlement 'in accordance with the map(?)'.
CIL VIII. 23084 (Henschir es-Suâr, probably the ancient Municipium Aelium Abthugnitanum) on the authority of Vespasian, Rutilius Gallicus and Sentius Caecilianus defined the boundary (fines) of the province along the route of the old Fossa Regia.
CIL VIII. 23220 (Sbeitla) - marking public land of the municipium.
CIL VIII. 23221 (Sbeitla); cf. 23222-4 - marking public land of the municipium.
CIL VIII. 23395 = ILS 5966 (Henchir Abd-es-Selam) - recording Augustan boundary stones set up by an imperial reservist.
CIL VIII. 23634 (Thigibba) - refers to a burial site in land purchased(?) from Minatius Felix, with a definition of its boundaries.

## NUMIDIA

CIL VIII. $2615=$ ILS 1194 (Lambaesis) - relating the military exploits of the governor Decianus (A.D. 260), with a description of provincial boundaries and tribal locations.
CIL VIII. $7084=19431$ (Kroub) — boundary stone referring to the authority of Hadrian, lands received by the Cirtenses, separated from public land.
CIL VIII. $7085=19432$ (Cirta) - as above.
CIL VIII 7086 (Cirta) - the letters $A(\mathrm{ger}) P($ ublicus ) C(irtensium) are carved on a block.
CIL VIII. 7087 (Kroub) - stone block buried in the ground; as above.
CIL VIII. 7088 (near Cirta) - boundary stone referring to the authority of Trajan.
$C I L$ VIII. $7089=8211=I L S 5980($ Milah $)-$ stone with $A P C$ on the south side, facing Cirta, and on the north side $A\left(\right.$ gri $\left.^{\prime}\right) A($ ccept $i)$ ? $M$ (ilevitanorum).
CIL VIII. 7090 (Kroub) - stone, referring to the authority of Hadrian, $A$ AG SAP(?).
CIL VIII. 7148 (near Cirta) - carved on rock, defining the boundary of the Sallustian estate (fundus Sallustianus).
CIL VIII. 17688 (Khenschela) - a stone possibly marking public land.
CIL VIII. $18768=10821=$ ILS 5979 (Ain-el-Bordj) - a square stone with $A(g e r) P(u b l i c u s)$ $C$ (irtensium ) and $A(g r i) A($ ccept $)$ ? $C$ (irtensium) on the top, divided by a line, and $A A$ $C$ on the side.
CIL VIII. 19104 = ILS 5978 (Sigus) - a stone with A PC on one side, and on the other, 'On the authority of the emperor Hadrian, lands received by the Cirtenses, separated from public land'.
CIL VIII. 19132 = AE 1939.160 (Sigus) - boundary stone referring to the authority of P. Cassius Secundus (governor under Hadrian) and the public land of Sigus.

CIL VIII. 19133 = ILS 5977 (Sigus) - as above.
CIL VIII. 19134 = ILS 5977a (Sigus) - boundary stone referring to Cassius Secundus, the pub-
lic land of Sigus, and the allocated land of Sigus.
CIL VIII. 19329 (Aïn Tinn) - boundary stone referring to a(gri) a(ccepti) C(irtensium).
AE 1942-43.35 (Lambaesis) - records how boundary stones erected by a previous governor, C. Tullius Capito Pomponianus Plotius Firmus, were restored by an imperial slave and surveyor sent by the emperor, to resolve a dispute between two peoples, the Suppenses and the Vofricenses.

## FINES NUMIDIAE (THE PROVINCIAL BOUNDARY OF NUMIDIA)

CIL VIII. 10047 = ILS 488 (Tunis) - milestone marking the restoration of a decayed road by Maximinus right up to the boundary (finis) of the province of Numidia; number LXX (A.D. 237).

CIL VIII. 22009 (Ksar Tir) - as above.
CIL VIII. 22020 (Henchir Zezia) - as above; number LX.
CIL VIII. $22056=10075$ (Agbia) - as above; number LXXXII.
CIL VIII. 22073 = 10083 (Sidi bu Atilah, near Agbia) - as above; number LXXXVI.
CIL VIII. 22123 (Sidi bou Garnoug) - as above; number CXI.

## MAURETANIA CAESARIENSIS (REGION OF SITIFIS)

CIL VIII. $8369=$ ILS 5961 (Didjelli) - referring to boundary stones placed between the Igilgilitani, in whose territory is the castellum Victoriae, and the Zimizes, so that the Zimizes should know, on the authority of the procurator, that they may not use the castellum, whose perimeter dimensions are given (A.D. 128).
CIL VIII. 8810 (Bordj Medjana) - fragmentary inscription, seemingly about the setting up of boundary stones.
CIL VIII. $8811=20618=$ ILS 5964 (Satar, near Medjana) - on the instructions of the governor, a public(?) boundary is established between imperial property and the land of a community.
CIL VIII. 8812 (cf. also p. 1946) = ILS 5965 (Bou-Areridj) - in the reign of Severus Alexander, on the instructions of the procurator, through the work of a surveyor, land once belonging to Matidia Augusta, with its boundaries defined, was granted to colonists (the Kasturrenses).
CIL VIII. 8813 (Guerria) - through the goodwill of Hadrian, land was allocated to the Numidian people by the procurator C. Petronius Celer (A.D. 137).
CIL VIII. 8814 = ILS 5960 (Guerria) - as above.
CIL VIII. 10322 (Philippeville) - refers to the paving of a new road by the landholders in the territory of Cirta (cf. p. 373, n. 25).

## MAURETANIA CAESARIENSIS (REGION OF CAESAREA)

CIL VIII. 9025 (Auzia) - fragmentary stone refers to L. Julius Capito as 'in charge of the boundary (limes)'; see below.
CIL VIII. 9755 (Portus Magnus) - centurion in charge of the limes(?).
CIL VIII. 9790 (cf. p. 2048) = ILS 3251 (Arbal) - procurator of the emperor 'in charge of the limes'.
CIL VIII. 9791 (Arbal) - as above.
CIL VIII.20817-8 = ILS 5962-5962a (Auzia) - marking a limes between Mauretania and Africa, perhaps relating to the military responsibilities of the Comes Africae and the Dux Mauretaniae.
CIL VIII. 21031 (Caesarea) - memorial to a man who came 'to discover boundaries in Caesariensis(?)'.
CIL VIII 21663 = ILS 5963 (Er-Rahel) - on the authority of Hadrian boundary stones were placed by the procurator, C. Petronius Celer, to demarcate two local areas (A.D. 137).
AE 1940.20 (Zucchabar) - a boundary stone of the colony.
AE 1975.952; cf. Leveau, REA (1974) (Sidi Bouzid) - marking a boundary between a community and a veteran.
AE 1985.972; cf. Bouchenaki and Février, Bull. Arch. Alg. (1985) (near Tipasa) - marking the
restoration by Septimius Severus of land and immunity to the Thuddenses or Thudedenses and the erection of boundary markers (between A.D. 202 and 209).

Scuderi, Athenaeum (1991) analyses boundary disputes in the Republic from the evidence of senatorial decrees. For a short general account of evidence relating to the external boundaries of communities, see Paz López Paz, La Ciudad romana (1994), 3-31. Gasperini, Archeologia Classica (1958), usefully summarizes the evidence for stones inscribed in honour of the god Terminus. For evidence relating to provincial limites (not included in the above unless simple boundary stones or of special interest), see Dizionario epigrafico vol. IV 1074 ff . (fasc. 34 43) (1959-1985); Forni in Sordi (ed.), Il confine nel mondo classico; Isaac, JRS (1988).

## APPENDIX 4. BOUNDARY MARKING

There can be no more typical aspect of the writings of the agrimensores than the setting up and interpretation of boundary markers (termini). This topic engages the attention of all the major authors and is particularly common in the later treatises (Frontinus - C 3.23-6; $5.13-22=$ T $2.8-11 ; 4.12-19=$ L 5.6-9; 10.1-11.2; Agennius Urbicus - C 27.43-29.2; 29.31-3; 31.36-44 = T 30.15-21; 32.1-4; 34.9-17 = L 71.19-24; 73.11-14; 75.6-13; Hyginus 1 С 77.10-39; 79.26-38; 81.6-36; 85.40-87.25; 93.16-34; 93.40-95.39 = Т 71.10-72.26; 74.4-19; $75.10-76.18 ; 81.11-82.23 ; 89.6-90.12 ; 90.19-92.16=$ L 111.16-112.21; 114.11-24; 281.12-282.22; 118.9-119.19; 126.9-127.11; 127.18-129.11; Siculus Flaccus - C 105.40-119.18; 119.35-40; $131.26-34 ; 133.9-28=$ T $102.16-116.5 ; 116.25-117.4 ; 128.8-18 ; 129.11-130.4=$ L $138.18-151.27$ and $152.18-21 ; 152.28-153.6 ; 163.20-164.2 ; 164.25-165.17$; Hyginus 2 - C 139.1-35; $153.32-155.20 ; 155.21-3=\mathrm{T} 136.11-138.13 ; 157.18-159.17 ; 159.18-20=\mathrm{L} 171.14-173.15$; 194.17-196.14; 196.15-17; Misurare, 135-9; 231-4). Those collected in the Corpus almost without exception concentrate on the appearance, significance, and identification of boundary stones and other methods of boundary marking. Some authors appear to be describing their personal surveying practices and issue direct guidance to other surveyors (e.g. C $267.28-37=$ L 364.25-365.3). This concern with boundaries and the clear demarcation of property persists throughout the imperial period, and is also illustrated by the many boundary stones and related inscriptions that have been discovered (see e.g. Appendices 2 and 3).

There was a religious festival on 23 February in honour of the god Terminus, to whom boundaries were reputedly a concern, and who was traditionally associated with Jupiter and the confines of the Roman state (Dumézil, La Religion romaine archaïque (1966), 203-6; Piccaluga, Terminus (1974)). Ovid summarizes the key association with landholding and boundaries (Fasti 2.639-84; Siculus Flaccus - C 107.36-109.7 = T 105.5-24 = L 141.4-22); the marker, be it stone or wood, received offerings from the two landholders whose fields it divided, and was a symbol of trust in rural areas, providing a definite limes. Moreover, it safeguarded not only individual fields, but also the boundaries of peoples, cities, and kingdoms. Silvanus, a spirit of the woodland, was also identified with boundaries. In Dolabella's opinion all farms had three statues of Silvanus - domesticus, presumably representing the life and house inside the holding, agrestis, consecrated to shepherds, perhaps representing life outside the holding, and orientalis, associated with common boundaries (C 223.12-17 = L 302.13-19). The quasireligious sanctity of boundaries and their markers is also seen in the setting up of altars between communities ( $\mathrm{C} 157.21-9=\mathrm{T} 162.1-6=\mathrm{L} 199.1-5$ ), and there were severe penalties for moving termini (see below). This concept was taken up by Christians. A late writer seemingly associates Christ with the 'peace of established boundaries' (C 265.18-24 = L 362.24-9; p. 447, n. 36).

Limites created the overall pattern of the entire field-system in land division, and, of course, have sometimes left striking remains, especially if viewed from the air. But to demarcate limites and other internal boundaries on all kinds of land with appropriate and recognizable termini, which settlers could see every day on the ground, was also the responsibility of the land surveyor. Marking out the confines of individual centuriae, with stones inscribed to show their place in the overall scheme, was a specialist aspect of surveying practice (see pp. 385-7; Appendix 2). Without their markers, limites could become unrecognizable (C 119.35-8 $=$ T $116.25-117.2=$ L 152.28-153.4), or, in the case of some Gracchan and Sullan foundations, the boundary stones might remain to guide or confuse new layouts (C 133.22-8 = T 129.25-130.4 = L 165.10-17).

It was probably commonplace for individual settlers to demarcate their properties with some kind of marker (official or unofficial), at least from the late Republic, and in my view much earlier (see further below). The Liber Coloniarum describes how at the triumviral foundation of Florentia, veterans marked their allocations by setting up boundary stones (C 169.10-11 = L 213.11-13). At Graviscae, Tiberius erected boundary stones at short intervals between private properties ( $\mathrm{C} 173.10-12=\mathrm{L} 220.4-5$ ). Augustus recommended that individual allocations in his settlements should be marked with wooden poles (C 139.10-11 $=\mathrm{T} 137.1-3$ $=\mathrm{L}$ 172.4-7). This of course does not mean that individual allocations had not been marked before. Augustus was doubtless trying to ensure that a consistent attempt was made to mark each veteran's land. Stones were presumably used when available. The agrimensores confirm that the use of private boundary markers was common in the imperial period. They write about boundary stones without feeling any need to distinguish where they were used, but sometimes clearly refer to stones demarcating boundaries between individual properties (C 29.31-9; $81.6-10 ; 107.28-109.7 ; 109.10-11 ; 17-20 ; 117.39-119.1 ; 131.28-9=\mathrm{T} 32.1-10 ; 75.10-15$;
$104.14-105.24 ; \quad 106.3-4 ; \quad 106.11-14 ; \quad 115.6-15 ; \quad 128.10-12=\mathrm{L} \quad 73.11-20 ; \quad 281.12-17$; $140.11-141.22 ; 142.3-4 ; 142.10-14 ; 151.6-16 ; 163.21-4)$. The sacrifice made to Terminus, as described by Siculus Flaccus, is obviously part of a cult intended primarily for private individuals, that is, landholders with a communal boundary, not the state or community (C 107.36-109.7 = T 105.5-24 = L 141.4-22).

In fixing boundaries, surveyors worked according to certain principles, which may be summarized as follows: (i) a boundary-marking method that was unambiguous and fitted in with the natural terrain should be used; this therefore might combine natural landscape features with man-made landmarks; (ii) different types of marker could be used in one piece of land, with the result that one system could take over from another; (iii) certain types of boundary marking might be more appropriate in certain categories of land; for example, in divided and allocated lands more formal methods would be used, while in ager occupatorius natural features of the landscape would be more common. However, surveyors seem prepared to use most types of marker indiscriminately, as they became available; (iv) surveyors kept in mind two general guiding features - the agreement of landholders and the practice of the local area; consequently, some apparently unusual methods of boundary marking could be acceptable

Natural features employed as markers are listed and discussed in the treatises: rivers, ditches, mountains, mountain ridges, terraces, watersheds, trees, hedges, thorn bushes, differences in cultivation. Of these the most complicated involved differences in cultivation and the remains of old boundaries, where, for example, several properties had been combined in one (C 129.7-24); terraces (definition and treatment by landholders - C 109.37-46 = T 107.3-13 $=$ L 143.3-13); trees (their type, ownership and planting; the marking of trees; the use of larger trees to denote boundaries, and the interpretation of the significance of rows of trees - C 111.1-113.10 = T $107.14-109.18=\mathrm{L} 143.14-145.18$ ); thorn bushes (history and purpose of planting - C 113.43-115.3 = T 111.12-18 = L 147.12-18); ditches (custom of area; purpose of the ditch, since some were used for drainage - C 115.4-25; 117.1-8 = T 111.19-112.23; $113.23-30=\mathrm{L} 147.19-148.20 ; 149.21-8$ ); rivers (what status does a river have as a boundary? Can people own land on both sides? Does it mark a boundary for its entire course? C 117.16-38 = T 114.7-115.5 = L 150.7-151.5). The object was to teach surveyors to distinguish true boundary markers from accidental features that resembled a marker, or had been fraudulently arranged to do so.

Man-made objects such as tombs, limites in the form of raised balks, walls, and roads provided visible evidence of the direction of a boundary. Much depended on whether a tomb was adjacent to a boundary, and sometimes buried symbols were used as an additional guide (C 107.17-22; 223.32-40 = T 104.3-9 = L 139.23-140.6; 303.12-21); in the case of walls, the nature of the terrain and the size of the wall might help explain why a wall had been built (C 115.27-46; 117.9-15 = T 112.25-113.22; 113.31-114.6 = L 148.22-149.20; 149.29-150.6); in the case of roads, the important questions concerned the type of road, namely, whether it was a road bisecting property, a road bounding a property and providing rights of way, or a shared road maintained by two landholders ( $\mathrm{C} 113.11-42=\mathrm{T} 109.19-111.11=\mathrm{L}$ 145.19-147.11)

However, boundaries were most commonly marked with stones, or wooden stakes, often called sacrificales, which may have originated in the practice of fencing off areas for religious observances. Stones naturally occurring on a boundary were sometimes used, generally with an inscription (on mountains the topmost rocks were sometimes carved in situ C $223.4-11=\mathrm{L} 302.4-12$ ), but it seems that normally the placing of a boundary stone was an act of careful deliberation and preparation. The effectiveness of a boundary stone depended on the ability of subsequent surveyors to recognize it, and correctly interpret its significance. So, boundary stones had certain recognized shapes, and were carefully carved, often containing symbols or short inscriptions; sometimes non-native stones were used to emphasize their purpose as markers (C 107.9-10 = T $103.12-14=\mathrm{L} 139.12-14)$. Stones were supposed to mark certain types of boundary, or natural phenomena and landmarks on or within boundaries; for example, a stone with an eagle carved on top indicated a boundary cut across a mountain (C) $227.3-5=\mathrm{L} 305.3-5$ ), a square-shaped stone with a hole in its side denoted a spring (C $227.13-15=\mathrm{L} 305.13-15$ ); as Dilke points out, this special stone would be essential to indicate the whereabouts of a spring that might dry up in the hot Mediterranean summer ( $R L S$, 104). These boundary stones are described in great detail by later writers, and it may be that in this respect surveying practice had developed along more theoretical and systematic lines. However, the letter codes described in the Corpus Agrimensorum Romanorum are complicated and may indeed have been difficult to identify on the ground (L 357-359).

Gracchan cadastral stones that have been discovered are cylindrical in shape (see

Appendix 2, A). However, we hear that certain emperors used squared stones (Nero, Vespasian, Trajan - C $255.27-8=$ L $348.10-12$ ), and most of the later stones that have come to light are quadrangular (see Appendix 2, B). Manuscript illustrations show stones in a variety of shapes (L figs 270-322; cf. also Ills 204-27). At all times the dimensions of boundary stones were important, including the proportions above and below ground. For example, Augustus laid down that boundary stones should be buried $11 / 2$ feet in the earth and protrude $21 / 2$ feet (C 255.19-24). In certain cases the distance stones were set apart from one another was in proportion to the length of the boundary itself (see especially p. 407, n. 30).

The description given by Hyginus 1, of a theoretical territorial boundary with a combination of natural landscape features and monuments ( $\mathrm{C} 79.27-39=\mathrm{T} 74.4-19=\mathrm{L} 114.11-24$ ), is illustrated in the real world by the decision of Laberius Maximus, governor of Moesia in A.D. 100, in respect of the boundaries of Histria (Appendix 3, p. 460). He uses named topographical features - a lake, a mountain ridge, the confluence of two rivers, the course of one, three more rivers, and a distance in miles.

Similarly, Q. Gellius Sentius Augurinus, proconsul of Macedonia, settled a boundary dispute between the peoples of Lamia and Hypata after summoning representatives of both communities and consulting a land surveyor; he defined the boundary with a combination of named natural features (spring, river, cultivated land) and man-made objects (shrine, tomb, monument), all identified by name (Appendix 3, p. 460).

The long inscription recording a decision of M. Minucius Rufus (cos. 110 b.c.) and his brother Q. Minucius Rufus, on a boundary dispute between the people of Genua and the Veturii Langenes in Liguria, reveals a scrupulously detailed report with many references to named springs, streams, rivers (the phrase rivus rectus appears, which is used specifically of a boundary-marking stream by Siculus Flaccus - C 117.31-2 $=$ T $114.25-6=\mathrm{L} 150.24-5$ ), mountains, valleys, and no fewer than twenty-three specifically identified boundary stones (Appendix 3, p. 455).

In the case in which C. Helvidius Priscus (possibly praetor in A.D. 70) gave judgement in a dispute between one Tillius Sassius and the municipium of Histonium, both parties were represented, and an old record of a previous decision in A.D. 19 was consulted. This referred to landmarks, namely, trees, a ditch, a communal road, a terrace, and gave precise distances, though the frail document had been damaged at a vital point (Appendix 3, p. 455).

Around A.D. 114 we find C. Avidius Nigrinus, legate of the emperor, dealing with a boundary dispute between the communities of Delphi and Anticyra and noting that, in respect of an earlier decision, through lapse of time details of ownership and some of the local place names had changed, and that this was being exploited to their own advantage by both parties. Nigrinus employed personal testimony and documents to establish what he thought was a fair decision, using topographical features (with precise details on divergences in nomenclature); natural stones as markers still existed, one with a Greek inscription, the other damaged; these were given great significance, as age brought them credibility; and from this a straight boundary was established defining the respective lands on the left and right.

Perhaps the most interesting inscription describing boundary marking concerns an attempt by the community of Ostia to recover bona caduca in the form of landed property from a private person (see Appendix 3, p 454). The judge's decision defined how the boundary of the land 'from the marked stone moves away from the road(?), towards the right to the reservoir(?), which can be considered to be the reservoir of Volissius (Crocus), and thence in a straight line to the corner of the marsh ... and from that corner to another ancient stone ... the boundary line, which had not been demarcated by any stones or boundary markers set inside, cuts the road of Crocus and leaves the property at this point'. The judge goes on to speak of the 'authority of the limites'. It looks as if the judge has consulted a land surveyor in order to define the site under dispute; the boundary was then identified by a combination of natural landmarks, man-made objects, and boundary stones, especially those that were longestablished.

It is important that these documents, which cover a period of several hundred years, reveal a consistent methodology in boundary marking and identification, and also a similar use of technical language. Moreover, they fit in closely with the writings in the Corpus Agrimensorum Romanorum, bringing some confirmation to those texts, and suggest that surveyors were normally called in to establish the facts on which the provincial governor or other magistrate made his decision.

For a useful investigation of boundary-marking techniques and the difficulty of identifying boundary stones in the Sallentine peninsula, see Compatangelo, Un cadastre de pierre
(1989), 55-134; for an evaluation of boundary-marking methods described by Hyginus 1 and Siculus Flaccus, and the development of surveying practice in this respect, see Toneatto, Sodalitas (1984).

Moving boundary stones with malicious intent was a serious offence. The earliest law concerning interference with termini was ascribed to the king Numa Pompilius (Dionysius Hal. 2.74; Plutarch, Numa 16; Roman Questions 15; useful bibliography in MacCormack, RIDA (1979)); it established boundaries for individuals, boundary stones for private and public properties, and punishment for those who moved or destroyed such stones. The significance of some of the legislation is unclear, and the evidence may be overlaid by views and aspirations of a later age. Nevertheless, it seems plausible that landholders even in the early period would speedily desire to demarcate their land.

The erection of boundary stones is next mentioned in the Lex Agraria (111 b.c.), and in the Lex Mamilia (Crawford, Statutes, 2, 97; 54, III; V; cf. the use of boundary stones to demarcate the space round an aqueduct (Lex Quinctia of 9 b.c.) - Crawford, ibid., 63, 25; 35). The Lex Mamilia, which was probably part of Caesar's agrarian legislation of 59 b.C. (Crawford, Athenaeum, 1989), seems to refer to stones on the boundaries of private properties (Chap. III, which mentions the replacement of missing boundary markers by individuals on their land) and markers on the boundary of a community's territory (Chap. V). The offence of maliciously removing boundary stones involved a fine payable in part to the local treasury and in part to the man instrumental in securing a conviction. These stones are defined as quique termini hac lege statuti erunt, which might subsume all boundary stones mentioned, including those demarcating private land. The object was surely not only to deter vandalism but also to protect landholders against encroachment (cf. MacCormack, op. cit., 253-4).

Under an agrarian law of Nerva, penalties were laid down for slaves who deliberately moved boundary stones (Digest 47.21.3.1). Subsequently, a rescript of Hadrian (ibid. 21.2) confirmed that the moving of boundary stones (clearly any type of stone) was a serious offence if it could be demonstrated that the motive was to alter the line of a boundary, and laid down that culprits of high rank should be relegated. Men of lower degree acting as agents were to be sent to the mines. Lesser punishment was fixed if stones had been moved through ignorance (i.e. that they were boundary stones), or by accident (i.e. the culprits may have recognized the stone but had no malicious designs on boundaries). It is possible that Hadrian was here confirming the general relevance of earlier laws that may have been introduced with reference to the establishment of individual communities.

To move or destroy a boundary stone was originally a religious offence; then it became part of the legal process with set penalties. If it is right that there were many private boundary stones or markers demarcating private land, it surely follows that the law applied to them. It was up to a judge to decide if any of the stones called in question had validity (cf. C $109.18-23=\mathrm{T} 106.12-18=\mathrm{L} 142.12-17$ ), and to decide the line of the true boundary if necessary. If he was dealing with the removal of boundary markers he could also investigate the true nature of the boundary (Digest 10.1.4.4, under the heading Finium regundorum -- 'On the establishment of boundaries'). In this context, surveyors were often called upon to assist a judge in his decision by identifying markers and defining a boundary, site, or area under dispute (see also Appendix 6). Although Frontinus lists De positione terminorum as a separate dispute (C $5.13-22=\mathrm{T} 4.12-19=\mathrm{L} 10.1-11.2$ ), it is clear from his writings that boundary markers were central to the resolution of many disputes affecting ordinary people, and that landholders looked upon them as a strong guarantee of their property. It was only in the golden age of Saturn, according to Tibullus, that 'no boundary stone stood on the land to designate each man's own' (1.3.43-4).

## APPENDIX 5. TYPES OF LAND

Frontinus defined three types of land according to the method of surveying employed: divided and allocated, land with only the outer boundary surveyed, land left unsurveyed (arcifinius). The first was the land of the colonies, normally divided by limites and allocated to individuals by name, the second was land distributed as a defined block to a community or individual, while arcifinius was bounded by natural landmarks, only gradually acquiring some boundary markers because of disputes where it adjoined other land (C 3.3-5.3 = T 1.3-3.15 = L 1.3-8.9). Hyginus 1 and 2 and Siculus Flaccus confirm the importance of surveying definitions based on types of land, though they link this to the history of Roman conquest, land confiscation, and colonization in Italy. They also introduce the term ager quaestorius (land sold off by the state through the agency of the quaestors). In what follows, I owe much to Gargola's perceptive treatment of the sale and lease of public lands, and the exploitation of certain types of such land through the private initiative of individual Roman citizens (Lands, 114-46).

Hyginus 1 closely associates ager arcifinius or arcifinalis with ager occupatorius (C $83.18-28=\mathrm{T} 78.5-17=\mathrm{L} 284.7-17$ ), and Siculus Flaccus suggests that they were identical and that the difference was terminological ( $\mathrm{C} 105.27-39=\mathrm{T} 102.1-15=\mathrm{L} 138.3-17$ ). The possible derivations of the words suggest the violent context of early Roman history. Varro derived arcifinalis from arcere in the sense of 'warding off', that is, by occupying land the farmer kept at bay the enemy, or perhaps even his neighbours ( $\mathrm{C} 3.27-8 ; 83.19-20=\mathrm{T} 2.12-13 ; 78.7-8=$ L 6.1-2; 284.8-9). Isidore thought that it was so named because its boundaries were protected by the barrier of rivers, mountains, and trees (C 273.12-14 = L 369.15-17). Ager occupatorius was so called because it was occupied (occupare) by the victorious Roman people (C 105.27-9 $=\mathrm{T} 102.2-3=\mathrm{L} 138.3-5$; in what follows I use occupatorius, taking it as synonymous with arcifinius). According to Siculus Flaccus, the Romans confiscated the land of peoples who had been defeated and ejected, and declared formal jurisdiction over it. Then individuals or small groups of settlers occupied the land as best they could. The unofficial infiltration into land on the periphery of Roman control by men, who became in effect frontier farmers, probably preceded colonization organized by the central government, and indeed the development of colonization may owe much to experience gained in this way. We may surmise that this land on the periphery of Roman control was not properly annexed or allocated, because Rome at first did not have the time or resources to do so. Hyginus 1 emphasizes the violence and danger of these early settlements. The government may well have been too optimistic about the scope and effectiveness of its conquests. Although the previous inhabitants had normally been expelled from ager occupatorius, permanent exclusion was by no means assured, and when settlers occupied it, fighting where they had to, they tended to hold the land along natural defensible lines, like streams or hills - 'the physical boundary of a victory was where one side retreated to when defeated, or wherever it succeeded in making a stand' (C $83.24-5=\mathrm{T} 78.12-14=\mathrm{L} 284.12-14$ ). Settlers took land as it suited them, not just what they needed then, but what they thought they might need or be able to cultivate in the future (discussion in Burdese, Studi sull'ager publicus (1952), 13-36).

Boundaries in ager occupatorius were designated by natural features, such as trees, bushes, ridges, watersheds, rivers, and ditches; some boundary stones were used (there was a type of boundary stone called arcifinium - C $247.18=\mathrm{L} 250.32$ ), but more often wooden stakes. There was, however, no formal demarcation or registration of land holdings and no official bronze map of settlements, since no survey had been conducted. Individual landholders sometimes made a map privately, which of course could not be binding on their neighbours.

The huge quantity of land that the state acquired by conquest in the early period led to increasing intervention. Ager quaestorius was so named because the Roman people instructed the quaestors to sell off land captured from a defeated enemy, once it had been measured and divided by limites into blocks of fifty iugera, as had apparently occurred in the land of the Sabines (C 83.29-37; 103.37-105.7; 119.30-121.19 = T 78.18-79.4; 100.7-19; 116.20-118.10 = L 115.15-116.4; 136.14-137.4; 152.23-154.7). Doubtless, ager quaestorius was originally captured land not required by the state for distribution to colonists, but from which it wished to profit. Regulations were imposed on ager quaestorius, presumably in respect of its tenure, but they lapsed with the passage of time and were not systematically enforced by the state.

The writers in the Corpus Agrimensorum Romanorum use the terms occupatorius, arcifinalis, and quaestorius simply as technical surveying definitions, in that different types of land affected the job of the surveyors, in boundary marking, in keeping records, and in the nature of the disputes with which they had to deal. As far as they are concerned, these definitions
carry no implication of a formal or permanent legal status established through the policy of the Roman state (see Botteri, Cahiers du Centre G. Glotz (1992), 51-4).

It is true, however, that ager occupatorius, some of which probably was gradually absorbed into the territory of neighbouring communities, remained ultimately in the control of the Roman state. Moreover, private individuals who exploited ager occupatorius were held to have possessio (see Jolowicz and Nicholas, Historical Introduction to the Study of Roman Law (1972), 259-63), but could not acquire ownership by usucapio. From time to time 'laws concerning the quantity of land' (leges de modo agrorum) were issued, which laid down the quantity of land an individual could cultivate and the number of animals he could pasture on land owned by the state, though these rules were rarely strictly enforced.

Some have argued that ager occupatorius was subject to a rent (vectigal), which denoted that it remained the property of the state. This is based on Appian's account of the developing pattern of landholding in Italy and the Romans' exploitation of captured lands; he notes that, after subduing the Italian peoples, they founded colonies on conquered land, either by building new towns or by occupying existing ones, and that land from conquered peoples was assigned to the colonies (partly as a reward; cf. Livy 2.48.2; 4.49.11), or sold or leased. In respect of land not in cultivation (ápyós), anyone willing to work it was invited to do so, for a percentage of the annual crops ( $B C 1.7$ ). Now, there is no justification for identifying this land with ager occupatorius. Such a tax in the early Republic is not mentioned by the agrimensores, though they thoroughly discuss occupatorius (though see below, p. 474), and it is difficult to see how this revenue could have been collected over a wide area without a complex bureaucratic process. Appian may be referring to a specific, possibly short-lived, measure directed at certain limited areas of land (discussion in Tibiletti, Athenaeum (1948), 183-9, who accepts the idea of a vectigal on occupatorius; contrast Zancan, Ager publicus (1935), 10-11; Burdese, Studi sull'ager publicus (1952), 63-8; see now Botteri, Cahiers du Centre G. Glotz (1992), 51-2; and for a bibliographical summary, note Hermon, Athenaeum (1994)).

In the case of ager quaestorius, we are told that since boundary stones eventually became displaced or destroyed and the boundary lines obscured, the land reverted to the condition of occupatorius with no formal record of land holdings; here too, much was probably absorbed into colonial territory, or appropriated by private individuals (see below, p. 474). However, it has been suggested that the Roman state also retained control over ager quaestorius (symbolized by a vectigal), and conferred only the right of occupancy (see Rudorff in Lachmann, Feldmesser II, 285-8). But the legal texts cited do not support this view. Digest 18.1.25.1 and 19.1.11.2 discuss only the vendor's liability for eviction; likewise, 12.4.16 proves nothing about ager quaestorius; 41.1.16 notes that after the defeat of the enemy, land taken by individuals has boundaries 'so that it may be discerned what was given and to whom, what was sold, and what remained as public property'. So, far from supporting Rudorff's view that ager quaestorius remained public property, this passage indicates that land was divided into three distinct categories - granted, sold, or public property.

Rudorff also emphasizes a passage of Livy (31.13.5; see Briscoe, Commentary on Livy XXXI-XXXIII (1973), 93; Toynbee, Hannibal's Legacy (1965) II, 248-50), which refers to 200 B.C., when creditors, who had lent money to the state during the wars with Hannibal, wanted to buy up the large quantities of land then for sale, and needed repayment of their loans to accomplish this; as a compromise the Senate granted them the usufruct of public land within the fiftieth milestone from the city at a nominal rent of one as per iugerum - 'in order to demonstrate that it was public land, so that if anyone, when the people were able to pay back the loan, wished to have cash rather than land, he might restore the land to the people'. But there is no indication that this is ager quaestorius, and, being within 50 miles of the city itself, can hardly be recently captured land. Moreover, it is clearly an exceptional case, demonstrated by the fact that the land was called trientabulum, and, although it theoretically remained public property, it is the buyers who reserve the right to sell the land back if they wish (contra Rudorff, op. cit., 287-8).

Furthermore, the case of Cures Sabini (Liber Coloniarum - 193.28-39), where land sold by the quaestors was subsequently surveyed by Caesar, presumably for distribution to settlers, does not necessarily support Rudorff's view. We do not know what had happened in the intervening period, and it is possible that Caesar had confiscated or bought up the land.

Now, it is true that Hyginus 1 refers to conditions imposed by the Roman people on ager quaestorius. But these may have concerned sub-division of the fifty iugera plots, and most of them with the passage of time became defunct ( $\mathrm{C} 83.33-8=\mathrm{T} 78.23-79.4=\mathrm{L} 115.20-116.4$ ). It is clear that quaestorian land was in practice often reduced to the status of ager occupato-
rius (cf. C $83.35-7 ; 119.35-40 ; 121.14-19=$ T $79.3-4 ; 116.25-117.4 ; 118.4-10=$ L $116.2-4$; 152.23-153.6; 154.1-7). In addition, Hyginus 1 and Siculus Flaccus speak of the 'sale' (vendere) of ager quaestorius (C 83.29-33; 119.30-3; 121.16-17 = T 78.18-23; 116.20-3; 118.6-7 = L 115.15-20; 152.23-5; 154.3-4), whereas other types of land were leased (locare) by the censors. On the other hand, these terms are difficult to distinguish clearly, and it is possible that sale of the land was for a limited period and did not affect the overall rights of the state (see Burdese, Studi sull'ager publicus (1952), 42-8). Gargola (Lands, 117-19) speculates that the distinction between sale and lease depended merely on the way in which the payments were arranged. Public land sold in this way realized a substantial cash price and then an annual token rent, whereas public land leased realized only a substantial annual rent.

Finally, Hyginus 1 classifies separately lands yielding revenue (agri vectigales), either for the benefit of the Roman people or a local community (see also p. 360, n. 20), distinct from quaestorian and other categories of land (C $83.38-85.15=\mathrm{T} 79.5-80.6=\mathrm{L} 116.5-117.4$ ). It must be admitted, however, that elsewhere there is some inconsistency in the manuscripts in respect of a distinction between agri vectigales and agri quaestoriz; at $\mathrm{C} 97.33=\mathrm{T} 94.17=\mathrm{L} 131.11$, MS B has quaestoris vectigalib., while MS G has quaestoriis et vectigalibus; see also C $93.10=$ $\mathrm{T} 88.19=\mathrm{L} 125.19$, where Blume and Lachmann wish to read quaestoriis et vectigalibus in place of B's quaestorib. vectigalibus. Other references to ager vectigalis in the Corpus Agrimensorum Romanorum: С 83.7 ; $38 ; 161.29-30 ; 34 ; 37-8 ; 163.1-2=\mathrm{T} 77.16 ; 79.5 ; 167.17 ; 168.5,9-10$; $169.5=\mathrm{L} 283.19 ; 116.5 ; 204.16 ; 205.5,9-10 ; 206.3$; see in general Bove, Ricerche sugli "Agri Vectigales" (1960).

In conclusion, in strict legal terms public land disposed of at auction remained the property of the Roman people. Similarly, the public property of local communities was in principle inalienable, and at Urso public land even if 'sold' remained the property of the colony (Lex Vrsonensis - Crawford, Statutes, no. 25, LXXXII). But it remains unclear what status lands originally designated as quaestorian had, or if they were regularly subject to a vectigal denoting that they remained under public control. It is possible, however, that some quaestorian lands subject to vectigal existed, either as a temporary arrangement, or because they had subsequently been sold on and then rented out.

It is interesting that surveying writers of the first century A.D. and later believed that the words quaestorius, arcifinius, and occupatorius needed definition and explanation, in terms that suggested their continuing relevance. Indeed the phrase more arcifinio was used by Hyginus 2 (C $143.15 ; 38=\mathrm{T} 142.19 ; 144.7=\mathrm{L} 178.9 ; 179.17$ ) to explain landholding where formal boundary marking did not exist. Of course this terminology had a continuing historical relevance, and ager quaestorius was interesting to surveyors because it involved the division of land into squares. On the other hand, ager occupatorius or arcifinalis may still have existed at the extremity of Roman territory, and it is notable that Hyginus 2 proposed a new method for the demarcation of land defined as arcifinalis but yielding revenue (it may have been occupied and then sub-let). He presumably had in mind recently acquired land that was a challenge to the skills of contemporary surveyors ( $\mathrm{C} 161.29-163.28=\mathrm{T} 167.17-171.4=\mathrm{L}$ 204.16-208.4).

## APPENDIX 6. SURVEYORS AND THE LAW

The investigation of land disputes was a significant part of a surveyor's activities. This is apparent from the attention given to this topic in the Corpus Agrimensorum Romanorum, and also to the related topic of the establishment and identification of boundaries. The surveying writers expected that a land surveyor should know what the law was and how it worked (C 21.29-30 $=$ T $24.17-18=\mathrm{L} 63.27-8$ ), and understand legal practice in respect of cases that he was likely to encounter. In particular, surveyors were required to know certain laws and ordnances, where to find them, and how to consult and interpret them: the lex Mamilia (C 5.22; $23.46 ; 31.17=\mathrm{T} 5.1 ; 27.5 ; 33.14=\mathrm{L} 11.5 ; 66.15 ; 74.17$ ), laws concerning the establishment of colonies and their territorial rights ( $\mathrm{C} 99.33 ; 133.33-4=\mathrm{T} 97.9 ; 130.10-11=\mathrm{L} 133.17$; 165.23-4), edicts, letters, and other provisions relating to changes in the pattern of landholding (C 85.36-9 $=\mathrm{T} 81.7-10=\mathrm{L} 118.5-8$ ), the record of imperial benefactions ( $\mathrm{C} 159.43=\mathrm{T} 165.18-19=$ L 203.1-2), and lists of subseciva (C $159.30=$ T $165.4=\mathrm{L} 202.5$ ). Hyginus 1 rather repetitiously advises surveyors to seek the original text of the laws relating to the foundation of settlements, and then cites an example of how the text of a law should be dealt with, namely, the question of jurisdiction over land that had been taken from another community and then divided and allocated ( $\mathrm{C} 85.40-87.25=\mathrm{T} 81.11-82.23=\mathrm{L} 118.9$; 119.19; see p. 362, n. 23). His approach is based on a closely argued interpretation of the precise wording of the text of the law. Clearly much of a surveyor's job consisted of collation and analysis of legal and related documents.

However, the writers do recognize a distinction between the responsibilities that a surveyor might expect to exercise and matters that came under the auspices of the normal legal process (ius ordinarium). The ius ordinarium would be encountered in cases relating to ownership or possession of land (C 7.2; 31.27-8; 37.4-5, 24, 34, 44; 97.4-5 = T 6.12; 34.1; 39.4, 25; $40.11,22 ; 93.5-6=\mathrm{L} 16.2 ; 74.30 ; 79.3,30 ; 80.14,25 ; 130.1-2$ ), territorial rights ( $\mathrm{C} 41.43=$ T $44.24=\mathrm{L} 84.11$ ), sacred and religious places (C 9.3-4; 45.23 $=$ T 9.14; 47.25 $=\mathrm{L} 22.10$; 87.11-12), the passage of rain water (C 9.12; 21.19; $47.1=\mathrm{T} 10.1-2 ; 24.4 ; 48.26=\mathrm{L} 10.1-2$; 63.14-15; 88.18-20), roads and rights of way (C 9.15-16; 47.26-7; 99.46-101.1 $=$ T 10.5-6; 49.24; 97.23-98.2 = L 24.4-5; 89.23-4; 134.7-13), alluvial land (C 39.29-30 = T 42.3-5 = L $82.7-10$ ), and sewers ( $\mathrm{C} 47.11-13=\mathrm{T} 49.9=88.29-89.2$ ). By ius ordinarium the writers seem to mean that the question would be decided by a judge (iudex) after the presentation of a case by advocates representing the parties involved, i.e., by forensic skill. This process might or might not require the expert advice of a surveyor, who therefore played a secondary role. The iudex was a legal official empowered to decide cases brought to law, whereas the surveyor had no independent jurisdiction. The surveyor was the servant of the law and was, for example, prevented from pursuing an enquiry about an area if it had been occupied for a sufficiently long time ( $\mathrm{C} 33.18-22=\mathrm{T} 35.11-16=\mathrm{L} 76.3-8$ ).

But there was good reason for a iudex to consult a surveyor in any dispute involving the measurement of land or the delineation or confirmation of boundaries. In addition, the surveyor could be asked to give advice by one of the parties involved. Even in matters that related strictly to legal rights, like ownership, occupation, or old titles, a surveyor could be important in establishing the exact area under dispute, or in judging the validity and trustworthiness of old documents and maps. So, it need not be significant that Frontinus does not specify a role for surveyors in, e.g., disputes over possessio ( $\mathrm{C} 7.3-4=\mathrm{T} 6.13-14=\mathrm{L} 17.3-4$; cf. C $65.31-8=$ T $63.30-64.2=\mathrm{L} 16.18-24$ ). He presumably thought that he could not define exactly what skills a surveyor might have to deploy here; that would be up to a judge or magistrate to decide, and then the surveyor would proceed using the appropriate methods outlined elsewhere. Frontinus and other surveying writers are not prescriptive, and do not seek to compile a legal textbook, but simply offer advice on possible difficulties facing a surveyor.

The texts illustrate how surveyors were able to help in various circumstances. So, in the case of appropriation and ownership of common pasture land, surveying skill would be needed to confirm the extent of the land in question (C 37.14-21; 34-9 = T 39.14-22; 40.11-16 $=$ L 79.19-27; 80.13-19). Alluvial land and the depredations of rivers were matters for lawyers, and Hyginus 1 cites the view of Cassius Longinus, iuris auctor, on land removed by a river (C $91.28-41=\mathrm{T}$ 87.12-88.3 = L 124.11-125.4). Nevertheless, surveyors had a limited role in examining the relationship of rivers and landholders and the width assigned to rivers within a settlement (C 39.28-30; 41.14-24 = T 42.3-5; 43.15-44.2 = L 82.7-9; 83.12-23). Urbicus speculates that jurists and surveyors might need to discuss whether to measure only the official allocations in a settlement, or all the land, right up to the river (C 41.25-7 $=$ T 44.3-5 $=\mathrm{L} 83.24-6$ ). Similarly, the problems caused by the passage of rain water needed surveying expertise if a
boundary was involved ( $\mathrm{C} 47.1-10=\mathrm{T} 48.26-49.8=\mathrm{L} 88.18-28$ ). Even in public disputes involving the territory of communities, surveyors would often be called upon, particularly to establish the extent of an area (C 41.43-6; 45.3-6 = T 44.24-45.2; 47.5-8 = L 84.11-15; 86.12-15). A surveyor could expect to be be called in whenever any difficulty arose, for example, in the interpretation of maps (C 99.44-101.3 $=\mathrm{T} 97.23-98.5=\mathrm{L} 134.7-13$, on roads and rights of way).

Surveyors were indeed keen to emphasize the importance of their responsibilities, and with great pride Urbicus ( $\mathrm{C} 47.33-45=\mathrm{T} 50.3-19=\mathrm{L} 90.1-18$ ) invokes the integrity and skill of the profession, and sets out the qualities and character needed to act as an adjudicator (presumably when asked by a judge), or to give evidence in court (as an expert witness, or on behalf of a party in a dispute). The presentation of evidence to a judge was an important duty for a surveyor; he must know the relevant law and organize his contribution so as not to confuse the judge and make the whole issue more obscure (C 21.29-33 = T $24.17-22=\mathrm{L} 63.27-32$ ).

Now, the distinction between the role of the iudex and the surveyor will not always have been clear-cut. It should be noted that the iudex or arbiter, a position that was virtually indistinguishable, were selected from the album iudicum, the list of those deemed eligible to serve as jurors, though the arbiter, often chosen for his particular expertise, could perhaps be taken from outside the album (Buckland, TRL, 636). In the imperial period, extra decuriae had been added to the album by Augustus and Caligula, including people outside the highest social classes. It seems that if a surveyor was wealthy enough to be in the album, there was nothing to prevent his serving as iudex or arbiter, provided that there were no objections from the parties in litigation. Urbicus seems to refer to the possibility of enrolling a surveyor as arbiter in a boundary dispute ( $\mathrm{C} 31.20-6=\mathrm{T} 33 \cdot 18-25=\mathrm{L} 74.21-8$; see p. 338, n. 26). He would then be acting legally as a iudex or arbiter, not as an agrimensor, and must decide whether to use his own expertise where required or seek further advice.

There was also the arbiter ex compromisso (see Talamanca, Ricerche (1958); Paricio, RIDA (1984)), an extra-judicial position set up without reference to the courts by the agreement of the parties in dispute. Since anyone could hold this position, the arbiter ex compromisso might be an expert, or he might summon the assistance of an expert (Digest 4.8; cf. especially 4.8.44 - a boundary dispute). In a fragmentary record from Herculaneum, we find an account of an arbitration procedure in A.D. 69 , in which an arbiter ex compromisso agrees to act in a boundary dispute between two landholders, and then summons the assistance of a surveyor, L. Opsius Herma (see Appendix 3, p. 454). Again, in a dispute between a private individual and the community of Histonium, C. Helvidius Priscus (possibly the praetor of A.D. 70) acted as arbiter ex compromisso and announced a decision (now lost) based on an old document, which cited a settlement of a similar boundary dispute in A.D. 19, with a detailed description of boundary demarcation (Appendix 3, p. 455).

The Digest heading 'Establishment of Boundaries' (Finium regundorum - 10.1) deals with rural property, and has been much discussed by modern scholars, in respect of its origins, scope, and consequences (see especially Buckland, $R D$ (1936); Hinrichs, Institutionen, 191-221; Pikulska, $R D$ (1990); Behrends, Feldmesskunst, 192-280, especially 244-72; there is an excellent account of the relationship of finium regundorum and the writings of the land surveyors, by Knütel in Behrends, Feldmesskunst, 285-308, though his approach has been contested by Hinrichs, $Z R G$ (1994); see also de Nardis (1994), ch. 4). Now, surveyors were most commonly employed in land measurement and the demarcation and identification of boundaries, and it is reasonable to ask if the texts in the Corpus Agrimensorum Romanorum can help in the problems associated with finium regundorum. In Frontinus and Urbicus, boundary (finis) and site (locus) are presented as the two central aspects of all disputes (C $5.5-12 ; 23.27-9=\mathrm{T} 4.2-11$; 26.11-14 = L 9.2-11; 65.19-22), though Hyginus 1 merely includes them in his list of disputes (C $91.19-20=\mathrm{T} 86.21-87.3=\mathrm{L} \quad 123.17-124.2$ ). Disputes de fine generally concerned the line demarcating the land of adjoining neighbours (it was the surveyor's job to identify this and make it absolutely clear), and the five or six feet area of a common boundary, defined in the Lex Mamilia, which served as a right of way and was not subject to usucapio (according to Cicero (Leg. 1.55), in the question of fixing boundaries, the Lex Mamilia had replaced the multiple arbiters provided for in the Twelve Tablets with one). Disputes de loco concerned a stretch of land of greater extent, generally beyond the five or six feet limit (C 5.20-31; 93.12-22; $95.40-97.12=$ T $4.20-5.15 ; 89.1-16 ; 92.17-93.15=\mathrm{L} 11.3-13.6 ; 126.3-18 ; 129.12-130.11$ ). This distinction was intended to produce a clear definition for surveyors and a framework within which a dispute could be analysed. But in practice it is obvious from their writings that boundaries and their demarcation form the basis of much of what surveyors did; every type of
dispute involved a survey of the boundary. Normally, a boundary came into dispute if markers had been uprooted or effaced, or if the system of demarcation had been changed, with consequent risk of infringement on someone's property, or if an area of land appeared not to tally with existing maps. Moreover, if a site or tract of land came under dispute, eventually it would have to be defined, in which case it might itself become part of a new boundary.

Indeed surveying writers shed little light on the question of finium regundorum, because they had a limited technical objective relevant to the performance of a surveyor's duties, and were not attempting to explain wider legal issues. Furthermore, since the writers cannot be placed in a clear chronological context, and since they give individual opinions and advice, it is difficult to relate them to general historical developments in the law.

The legal texts preserved in the Digest, as we have them, suggest that an actio finium regundorum included disputes involving both finis and locus in adjoining rural holdings, and was not constrained by the Lex Mamilia, which applied specific rules for one type of boundary. It was part of the cognitio process in which a formula was issued to a iudex, and in which therefore there was no scope for the arbiter ex compromisso. The object of the law was doubtless to protect the land allocations of colonists from alienation and encroachment. The judge was entitled to proclaim by adiudicatio the line of the boundaries, either confirming or establishing a new boundary, which would involve the allocation of some land to one party, with or without compensation to the other party. In this case there would be need of the professional skill of the land surveyor.

## APPENDIX 7. ITALIAN PROVINCES AND COMMUNITIES IN THE LIBER COLONIARVM

Below are listed in alphabetical order Italian provinces and communities cited in the Liber Coloniarum (see also Map 2). A community cited more than once is here recorded where it first appears, with cross references. * indicates a community of uncertain location not included on Map 2.

## APULIA

AECAE (C $165.29=$ L 210.8)
AECLANUM (C 165.25; $203.4=$ L 210.4; 261.5)
ARPI (C 165.32; $201.37=$ L 210.10; 260.23)
AUSCULUM (C 165.32; 201.33 = L 210.10; 260.18)
CANUSIUM (C 165.29; 201.39 = L 210.8; 260.25)
COLLATIA (C 165.33; 203.1 = L 210.10; 261.3)
COMPSA (C 165.28; $201.42=$ L 210.7; 261.1)
GARGANUS (area round Mount Garganus) (C $165.34=\mathrm{L} 210.11$ )
HERDONIA (C 165.32; $201.37=$ L 210.10; 260.23)
LUCERIA (C 167.1; $203.7=$ L 210.15; 261.9)
SALAPIA (C 165.33; 203.10 = L 210.11; 261.12)
SIPONTUM (C 165.33; 203.13 = L 210.11; 261.14)
TEANUM APULUM (C 165.36; 203.15 = L 210.14; 261.16)
URIUM(?) (C $203.36=$ L 262.11)
VENUSIA (C $165.28 ; 203.18=$ L $210.7 ; 261.19)$
VIBINUM $(\mathrm{C} 165.29=\mathrm{L} 210.8)$

## CALABRIA

*AUSTRANUM(?) (C $167.6=\mathrm{L} 211.2)$
BARIUM (C 167.7; 203.36 = L 211.2; 262.11)
BRUNDISIUM $(\mathrm{C} 203.30=\mathrm{L} 262.6)$
BUTUNTUM (C $203.33=$ L 262.9)
CAELIA (C $203.33=$ L 262.9)
EGNATIA $(\mathrm{C} 203.34=\mathrm{L} 262.9)$
GENUSIA (C $203.33=\mathrm{L} 262.9)$
HYDRUNTUM (C $203.37=$ L 262.11 )
LUPIAE (C 167.6; $203.34=$ L 211.2; 262.9)
METAPONTUM (C $203.34=$ L 262.10 )
RUBI (C $203.35=$ L 262.10)
RUDIAE (C $203.35=$ L 262.10)
TARENTUM (C 167.6; 203.35 = L 211.2; 262.10)
URIA(?) (C $203.34=$ L 262.10 )
VERETUM (C 203.36 = L 262.11)

## CAMPANIA

ABELLA (C $181.8=\mathrm{L}$ 230.18)
ABELLINUM (C 179.30 $=\mathrm{L}$ 229.16)
ACERRAE (C $179.35=\mathrm{L} 229.21$ )
AEFULAE (C $181.11=$ L 230.21)
AESERNIA (C 183.20; 201.21 = L 233.14; 260.7)
ALETRIUM (C $179.43=\mathrm{L} 230.7$ )
ALLIFAE (C $181.15=\mathrm{L} 231.3$ )
ANAGNIA (C $181.5=\mathrm{L} 230.15)$
ANTIUM (C $179.33=$ L 229.19)
AQUINUM (C 179.27 = L 229.13)
ARDEA (C 181.13; $247.32=$ L 231.1; 251.1)
ARICIA (C $181.1=\mathrm{L} 230.10$ )

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*ASETIUM (C \(181.3=\mathrm{L} 230.13\) )
ATELLA (C \(179.38=\) L 230.1)
ATINA (C \(179.40=\mathrm{L} 230.4\) )
BOVIANUM (C 181.20; 201.10 = L 231.8; 259.23)
BOVILLAE (C \(181.23=\) L 231.11)
CAIATIA(?) (C \(183.16=\mathrm{L} 233.10)\)
CALATIA (C \(181.36=\mathrm{L} 232.3\) )
CALES (C \(181.46=\mathrm{L} 232.13\) )
CAPITULUM (C \(183.5=\mathrm{L} 232.20\) )
CAPUA (C \(181.31=\mathrm{L} 231.19)\)
CASINUM (C \(183.3=\mathrm{L} 232.17\) )
CASTRIMOENIUM (C \(183.9=233.3\) )
CAUDIUM (C \(181.39=\) L 232.6 )
CEREATAE MARIANAE (C \(183.12=\mathrm{L} 233.7\) )
CUMAE (C \(181.43=\) L 232.10 )
*DIVINOS(?) (C \(183.18=\mathrm{L} 233.12)\)
FABRATERIA (C \(183.30=\mathrm{L} 234.6\) )
FERENTINUM (C \(183.27=\) L 234.3)
FORMIAE (C \(183.35=\mathrm{L} 234.11\) )
FORUM POPILII (C \(183.24=\) L 233.18 )
FRUSINO (C \(183.22=\) L 233.16)
FUNDI (C \(183.32=\) L 234.8)
GABII (C \(183.39=\) L 234.15 )
INTERAMNA LIRENAS (C \(183.42=\) L 234.18)
LANUVIUM (C 185.4 = L 235.4)
LAUROLAVINIUM (LAVINIUM) (C \(183.45=\) L 234.21)
LIGURES BAEBIANI (C \(185.8=\mathrm{L} 235.9\) )
LIGURES CORNELIANI (C \(185.8=\) L 235.9)
LITERNUM (C \(185.2=\mathrm{L}\) 235.1)
MINTURNAE (C \(185.11=\) L 235.12)
NEAPOLIS (C \(185.14=\mathrm{L} 235.15\) )
NOLA (C \(185.22=\) L 236.3)
NUCERIA CONSTANTIA (C \(185.18=\) L 235.20)
OSTIA (C \(185.27=\) L 236.7 )
PRAENESTE (C \(185.34=\mathrm{L} 236.14)\)
PRIVERNUM (C \(185.37=\) L 236.18)
PUTEOLI (C \(185.31=\) L 236.11)
SAEPINUM (C \(187.6=\mathrm{L} 237.14)\)
SETIA (C \(187.15=\) L 237.23 )
SIGNIA (C \(187.12=\mathrm{L} 237.20\) )
SINUESSA (C \(187.1=\mathrm{L} 237.8\) )
SORA (C \(187.9=\) L 237.17 )
SUESSA AURUNCA (C \(187.3=\) L 237.11)
SUESSULA (C \(185.44=\) L 237.5)
SURRENTUM (C \(185.40=\) L 236.22)
TARRACINA (C \(187.26=\) L 238.12)
TEANUM SIDICINUM (C \(187.21=\) L 238.6 )
TELESIA \((\mathrm{C} 187.18=\mathrm{L} 238.3)\)
TERVENTUM \((\mathrm{C} 187.28=\mathrm{L} 238.14)\)
TREBULA (C \(187.31=\mathrm{L} 238.17\) )
TUSCULUM \((\mathrm{C} 187.24=\mathrm{L} 238.10)\)
ULUBRAE (C \(187.36=\) L 239.1)
VELITRAE (C \(187.33=\mathrm{L} 238.19\) )
VENAFRUM (C \(187.42=\) L 239.7)
VERULAE (C \(187.46=\) L 239.11)
VOLTURNUM (C \(187.39=\) L 239.4)
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LUCANIA and the DISTRICT of the BRUTTII
ATINA (C $165.6=$ L 209.6)

BENEVENTUM (C 165.22; 181.17 = L 210.1; 231.5)
BUXENTUM (C 165.13 = L 209.14)
CLAMPETIA (C $165.20=\mathrm{L} 209.21)$
CONSENTIA (C $165.15=\mathrm{L} 209.16$ )
CONSILINUM (C $165.7=$ L 209.6)
GRUMENTUM (C $165.8=\mathrm{L}$ 209.8)
PAESTUM (C $165.6=\mathrm{L} 209.6$ )
POTENTIA (C $165.6=\mathrm{L} 209.6$ )
TEGIANUM (C $165.7=\mathrm{L} 209.7$ )
VELIA (ELEA) (C $165.10=\mathrm{L} 209.10)$
VIBO VALENTIA (C $165.18=\mathrm{L}$ 209.19)
VOLCEI (C $165.6=$ L 209.6)

## PICENUM

AEQUICULI (a district) (C $195.36=\mathrm{L} 255.17$ )
ALBA FUCENS (C 193.16; $241.13=$ L 253.5; 244.13)
ANCONA (C 177.2; 26; $193.14=$ L 225.4; 227.1; 253.3)
ASCULUM (C 177.28; $191.44=$ L 227.4; 252.14)
ATERNUM (C $177.25 ; 193.26=$ L 226.13; 253.15)
ATTIDIUM (C $189.20 ; 191.39=$ L $240.10 ; 252.8$ )
AUXIMUM (C 177.27; 193.12 = L 227.3; 253.1)
CAMERINUM (C 189.16; $197.14=$ L 240.7; 256.16)
CARSEOLI (C 189.8; $193.45=$ L 239.20; 254.10)
CASTELLUM FIRMANORUM (C $195.12=$ L 254.23)
CASTRUM NOVUM (C 177.24; $195.8=$ L 226.13; 254.20)
CASTRUM TRUENTUM (C $177.24=\mathrm{L} 226.13$ )
CINGULUM (C $195.14=\mathrm{L} 254.25)$
CUPRA (C 177.24; $195.10=$ L 226.13; 254.21)
CURES SABINI (C $193.28=\mathrm{L} 253.17$ )
FALERIO (C 177.34; $197.5=$ L 227.11; 256.6)
FANUM FORTUNAE (C 197.11 = L 256.13)
FIDENAE (C 195.46 = L 255.28)
FIRMUM PICENUM (C 177.20; $197.2=\mathrm{L} 226.9 ; 256.3$ )
FISCELLUS(?) (area round Mount Fiscellus) (C $197.1=\mathrm{L} 256.1$ )
FORUM NOVUM (C $195.40=$ L 255.21 )
HADRIA (C 177.34; $191.34=$ L 227.11; 252.2)
INTERAMNA NAHARS (C $177.15=\mathrm{L} 226.5$ )
INTERAMNIA PRAETUTTIORUM (C 177.15; $199.36=$ L 226.5; 259.1)
LUCUS FERONIAE (C $197.17=$ L 256.19)
MATILICA (C 189.18; $197.26=$ L 240.8; 257.1)
NOMENTUM (C $197.28=\mathrm{L} 257.3$ )
NUMANA (C $197.33=$ L 257.7)
NURSIA (C 177.34; $197.30=$ L 227.11; 257.5)
OSTRA (C $197.34=\mathrm{L} 257.9)$
PAUSULUM (C 177.23; 197.37 = L 226.11; 257.13)
PINNA (C 177.34; 197.35 = L 227.12; 257.11)
PISAURUM (C 199.3 = L 257.23)
POTENTIA (C 177.22; 197.40, $45=$ L $226.11 ; 257.15,19$ )
REATE (C $199.6=\mathrm{L}$ 257.26)
RICINA (C 177.23; 199.11 = L 226.11; 258.4)
SENA GALLICA (C 177.22; $199.18=$ L 226.11; 258.10)
SENTINUM (C $199.14=$ L 258.6 )
SEPTEMPEDA (C 189.19; 199.22 = L 240.9; 258.13)
SPOLETIUM (C $177.10=\mathrm{L} 225.15$ )
TEATE MARRUCINORUM (C $199.32=$ L 258.24)
TIBUR (C $199.27=$ L 258.18)
TOLENTINUM (C 177.19; $199.44=$ L 226.8; 259.9)
TREBULA MUTUESCA or SUFFENAS (?) (C $199.29=$ L 258.21)
TREIA (C $201.1=\mathrm{L}$ 259.12)

TUFICUM (C $199.42=$ L 259.7)
URBS SALVIA POLLENTINORUM (C $177.16=\mathrm{L} 226.6$ )
*VERAGRANUM (BEREGRANUM?) (C $201.3=$ L 259.14)

## SAMNIUM

ANTINUM or ANXANUM (C $201.9=$ L 259:21)
AUFIDENA (C 201.5 = L 259.17)
CLUVIAE (C $201.15=\mathrm{L} 260.1$ )
FICOLEA(?) $(\mathrm{C} 197.1=\mathrm{L} 256.1)$
HISTONIUM (C $201.24=\mathrm{L} 260.10)$
IUVANUM $(\mathrm{C} 201.26=\mathrm{L} 260.12)$
LARINUM (C $201.28=$ L 260.14)

## SICILIA

LEUCOPETRA (C $167.25=\mathrm{L}$ 211.21)
PANORMUS (C $167.17=\mathrm{L} 211.13$ )
SEGESTA (C $167.24=$ L 211.21)

## TUSCIA

AMERIA (C $175.38=\mathrm{L} 224.11$ )
ARRETIUM (C 169.28 = L 215.3)
*CAMPI TIBERIANI (C 171.37; $193.40=$ L 218.9; 254.5)
CAPENA (C $171.5 ; 195.28=\mathrm{L} 216.11 ; 255.9)$
FALERII (C $171.16=\mathrm{L} 217.5$ )
FERENTIS $(\mathrm{C} 169.43=\mathrm{L} 216.3)$
FLORENTIA (C $169.4=\mathrm{L} 213.6$ )
GRAVISCAE (C $173.8=$ L 220.1)
HISPELLUM (C $175.32=$ L 224.6)
LUNA (C $175.23=$ L 223.14)
NEPET (C 171.25= L 217.15)
PORTUS (C $175.5=\mathrm{L} 222.11$ )
SUTRIUM (C $171.27=\mathrm{L} 217.17$ )
TARQUINII (C 171.43 = L 219.1)
TIFERNUM (C 175.27 = L 224.1)
TUDER (C $169.15=\mathrm{L} 214.3$ )
VEII (C $173.16=$ L 220.8)
VOLATERRAE (C $169.21=$ L 214.10)

## VALERIA

AMITERNUM (C $177.41=\mathrm{L} 228.4)$
AVEIA (C $179.7=\mathrm{L} 228.16$ )
CORFINIUM (C 179.8; 195.21, 31; $201.17=$ L 228.18; 255.3, 12; 260.3)
MARRUVIUM (C 179.21; 197.20 = L 229.6; 256.23)
PELTUINUM (C 179.19; $197.42=$ L 229.4; 257.16)
SULMO (C 179.23; 201.30 = L 229.8; 260.16)
SUPERAEQUUM (C 179.16; 199.24 = L 229.1; 258.15)

## APPENDIX 8. TABLE OF MEASUREMENTS

The table contains common Roman measurements cited in this book.

## Linear Measures

digitus (finger) - a finger-breadth, conventionally reckoned to be $1 / 16$ of a pes (c. 18.5 mm ) palma (palm) - breadth of the palm of the hand, roughly equivalent to four fingers pes (foot) - a Roman foot ( 29.57 cm )
cubitus or cubitum (forearm) - c. $1 \frac{1}{2}$ feet $(0.44 \mathrm{~m})$ (distance from elbow to the tip of the middle finger)
gradus (step) - c. $21 / 2$ feet ( 0.74 m )
passus (pace) - 5 feet ( 1.48 m ) (the equivalent of a double pace)
milia passuum (thousands of paces; also miliarium) - a Roman mile ( 1.48 km )
pertica or decempeda - 10 feet ( 2.96 m )
actus - 120 feet ( 35.5 m )
stadium - 625 feet ( 185 m )
Fractions of a foot were often expressed by uncia (a twelfth part); one twelfth of a pes (c. 25 mm ) was expressed by the symbol - Other terms were based on this unit:

| term | no. of unciae | symbol |
| :--- | :---: | :--- |
| sextans | 2 | 2 |
| quadrans | 3 | $z$ |
| triens | 4 | $2 z$ |
| quincunx | 5 | $2 z$ |
| semis | 6 | 5 |
| septunx | 7 | $5-$ |
| bes | 8 | 52 |
| dodrans | 9 | $5 z$ |
| dextans | 10 | 522 |
| deunx | 11 | 52 |

Uncia was subdivided as follows:

| term | fraction of uncia | symbol |
| :--- | :---: | :--- |
| semuncia | $1 / 2$ | $\Sigma$ |
| sicilicus | $1 / 4$ | 0 |
| sextula | $1 / 6$ | 2 |
| scripulum or scrupulum | $1 / 24$ | 3 |

## Measurements of Area

1 square actus -120 by 120 feet $=14,400$ square feet ( 0.126 ha )
iugerum - 2 square actus $=28,800$ square feet ( 0.252 ha )
heredium ( 2 iugera) - 57,600 square feet ( 0.504 ha )
centuria ( 100 heredia) $-5,760,000$ square feet $=200$ iugera $(50.4 \mathrm{ha})$.
See also Diagram 2.

DIAGRAMS

DIAGRAM 1: THE PRINCIPAL MANUSCRIPTS OF THE CORPVS AGRIMENSORVM ROMANORVM


DIAGRAM 2: UNITS OF MEASUREMENT



DIAGRAM 3: MEASUREMENT OF LAND OF UNEVEN BOUNDARY

$\mathrm{ABCD}=$ central measured area
$\left.\begin{array}{l}\text { WXY } \\ \text { WYZ }\end{array}\right\}=$ examples of right-angled triangles for measurement on the boundary

DIAGRAM 4: MEASUREMENT OF A STRAIGHT LINE INTERRUPTED BY AN OBSTACLE (Adapted from Hinrichs, in Behrends, Feldmesskunst 354)

$\mathrm{AB}=$ measured rigor interrupted by obstacle
$\mathrm{X}_{1}+\mathrm{X}_{2}=\mathrm{Y}_{1}+\mathrm{Y}_{2}+\mathrm{Y}_{3}$
$\mathrm{T}=$ Interversura (a turn)

DIAGRAM 5: MEASUREMENT OF PARALLEL STRAIGHT LINES (Adapted from Hinrichs, in Behrends, Feldmesskunst 356)


FIRST RIGOR (CENTRAL MEASURED AREA)
S = Signum (a marker)
P = Perpendicular

## DIAGRAM 6a: MEASUREMENT ACROSS A WIDE VALLEY (i)



DIAGRAM 6b: MEASUREMENT ACROSS A WIDE VALLEY (ii)


DIAGRAM 6c: MEASUREMENT ACROSS A WIDE VALLEY (iii) (Taken from Hinrichs, in Behrends, Feldmesskunst 358)


DIAGRAM 6d: MEASUREMENT ACROSS A WIDE VALLEY (iv) (Adapted from Moscatelli, RSA (1979), 84)


## DIAGRAM 7: MEASUREMENT ACROSS A NARROW VALLEY



DIAGRAM 8: DESIGNATION OF CENTURIAE ACCORDING TO HYGINUS 1


## DIAGRAM 9: OBSERVATION ZONES OF SOOTHSAYERS



DIAGRAM 10: QUINTARII


DIAGRAM 11: AUGUSTUS' PLAN FOR DESIGNATING LIMITES

$\alpha$-DM KM
$\beta$-DM K II
$\gamma-$ D II K II
$\delta-$ KM D II

DIAGRAM 12: DESIGNATION OF CENTURIAE ACCORDING TO HYGINUS 2

(i) ABCD - Four central centuriae
(ii) Examples of designations on stones
$\alpha-\mathrm{DM} \mathrm{KM}$
$\beta$ - DM K II
$\gamma-$ DD I VK I
$\delta-\mathrm{KM}$ D II
$\varepsilon-$ SD I VK I
$\zeta-$ SD I KK I
$\eta$ - DD I KK I
$\theta$ - D II K II
1-D II K III $\}$ if placed
к - K II D III
$\lambda$ - DD II VK II

## DIAGRAM 13: ORIENTATION USING A SUNDIAL


$\mathrm{A}=$ Gnomon
$\mathrm{AB}=$ Shadow marked as it shortens and enters the circumference of the circle
$\mathrm{AC}=$ Shadow marked as it lengthens and leaves the circumference of the circle
$\mathrm{AD}=$ Line bisecting BC ; its continuation marks the kardo; any line drawn at rightangles to this marks a decumanus

DIAGRAM 14: ORIENTATION USING SOLID GEOMETRY (Taken from Dilke, Imago Mundi $(1967), 18)$


DIAGRAM 15: THE ESTABLISHMENT OF PARALLEL LINES (Adapted from Hinrichs, Institutionen 104)


DIAGRAM 16: THE DIVISION OF LAND BY STRIGAE AND SCAMNA (i) (After Mommsen, Hermes (1892), 100)


1. Scamna - I-IV and XI-XIV

Strigae - V-X
2. Marker stones:
at A-DM KM
at B - DM LIMES II
at D - KM LIMES II
at C - D.D. V.K.
SCAMNA QUATTUOR STRIGA UNA SCAMNA DUO

DIAGRAM 17: THE DIVISION OF LAND BY STRIGAE AND SCAMNA (ii)


1. Strigae - I-IV $\left.\begin{array}{l}\text { Scamna - V-VIII }\end{array}\right\}$ dimensions exempli gratia
2. Marker stones:
at A - DM KM
at B - DM LIMES II
at D - KM LIMES II
at C - D.D. V.K.
FIRST STRIGA FIRST SCAMNUM

DIAGRAM 18: THE GROMA AS RECONSTRUCTED BY DELLA CORTE FROM METAL PARTS FOUND AT POMPEII (Monumenti Antichi, 1922)


## GLOSSARY

All measurements are in Roman feet ( 1 Roman foot $=11.6 \mathrm{in}$. or 29.57 cm ) unless otherwise specified.

Abluvio - the erosion of soil by a river
Acnua - see actus quadratus
Actus (plural actus) - a measurement of length of 120 feet; a road or right of way for driving carts or cattle
Actus quadratus - an area 120 feet square ( 14,400 square feet), or half a iugerum; also known as acnua or fundus
Aes - a record on bronze containing details of land allocations; see commentarius, forma, libri aeris, tabulae
Ager - field; land
Ager publicus - land owned by the Roman state
Agrimensor - a land surveyor; literally, 'land measurer'
Alluvio - the deposit of soil by a river
Ambitus - a space of $2 \frac{1}{2}$ feet between neighbouring buildings to provide a right of way to or around them; literally, 'a going round'
Angulus - angle or corner
Angulus clusaris - the corner that 'closed' a centuria, that is, the corner furthest away from the central point of the survey; it contained a stone on which was inscribed the designation of the centuria in accordance with its position in the overall scheme
Arbores ante missae - trees previously planted and subsequently left untouched, or possibly trees set in front (i.e., conspicuously positioned), in order to demarcate a boundary
Arca - a square or rectangular boundary marker often hollowed out; literally, 'box', 'chest'
Arcifinius (ager arcifinius) - land on the periphery of Roman territory, which was occupied informally. It was unsurveyed, with irregular boundaries usually demarcated by natural features. The name may be derived from arceo in the sense of 'warding off the enemy, or from arcus in the sense of 'wavy' or 'curving'. This land was sometimes identified with (ager) occupatorius (q.v.)
Attina - a pile of stones in the shape of a wall, used to mark a boundary
Botontinus - a pile of earth used to mark a boundary
Cardo - see Kardo
Casa - a cottage; in late Latin, an estate or farm, or the main building on a farm
Casae litterarum - a late treatise describing different types of estate, each of which is associated with a letter of the alphabet
Castellum - a fort or fortified settlement
Centuria (century) - a unit of land division created by the intersection at right angles of four limites (q.v.), often measuring 20 actus square and containing 200 iugera ( 50.4 ha ); named 'century' because in early Rome each traditionally contained 100 allotments of 2 iugera
Centuriatio - see limitatio
Chorobates - an instrument used for levelling, i.e. measuring horizonatal distances over uneven ground; literally 'land-walker' (Greek)
Cippus - a boundary stone, or a stone used specifically to demarcate the land attached to a tomb
Colonia - a self-administering community of settlers (in the early period usually Latins, though there were a few small colonies of Roman citizens) established by decision of the Roman state. After 181 b.c. colonies were exclusively of Roman citizens, who had full rights of local government and jurisdiction, while retaining their citizenship. Especially in the late Republic and afterwards, colonists often consisted of veteran soldiers, and colonies were increasingly established overseas. The honorary status of colony could be conferred by the emperor
Colonus - a farmer, tenant farmer, settler in a colony (from colere - 'to till')
Commentarius (plural commentarii) a commentary or record of a higher magistrate relating to his duties and decisions; record of the founder of a colony relating to land allocation, which accompanied the map of the settlement
Conciliabulum - a small settlement, less extensive than a municipium (q.v.), with no territory, perhaps set up as a centre of administration in districts where the nearest self-govern-
ing colony or municipium was inconveniently remote for the rural Roman inhabitants. See also forum, praefectura
Culina - an area set aside by communities on the edge of the town for the funerals of the poor
Cultellatio (verb cultellare) - a technique for including sloping ground in a survey by measuring horizontal distances by means of vertical and horizontal rods; possibly derived from culter (knife)
Decempeda - a surveyor's ten-foot measuring rod (cf. pertica)
Decumanus or Decimanus - the name given to the limes (q.v.) dividing individual centuriae, often running from east to west, and forming part of a set of parallel limites; it intersected the kardo (q.v.) at right angles to form the framework of the land division system; decumanus perhaps means 'large', in the sense common in old Latin
Decumanus maximus (DM) - the main and widest limes, often running from east to west, which intersected the kardo maximus at right angles, marking the central point of the survey
Decus or Decussis - derived from decem (X); in surveying the intersection of two lines in the form of an X; an X-mark on stones or trees to indicate a turn on a boundary
Dioptra - an instrument for surveying or making astronomical observations; literally 'sighter' (Greek)
Dominium - ownership of an object or land, distinct from mere possession (possessio) (q.v.); see also proprietas
Edictum - a proclamation issued by a magistrate, most notably by the praetor at the commencement of his year of office, setting out the principles that he intended to apply in his judicial activities. An emperor's edict, which had the force of law, conveyed, without a specific addressee, statements and orders relating to officials and private individuals
Epistula - in the imperial period, a formal letter sent by an emperor usually to an official, in response to a request for advice
Ferramentum - the iron base of a surveying instrument (groma q.v.), often used to describe the whole device
Finis (plural fines) - a boundary between territories or landholders; (plural) land or territory within specified limits; literally 'end'
Forma - a map, normally in bronze, of a surveyed area; literally 'shape'
Forum - a commercial or market centre in a district where the nearest colony or municipium was too remote for the rural Roman inhabitants; it sometimes developed naturally from local needs or was sometimes set up by government initiative, perhaps to supply armies or travellers on official business; see also conciliabulum, praefectura
Fundus - an area of 14,400 square feet (see actus quadratus); also landed property, farm, estate
Gallicus (limes) - a name sometimes given to a limes (q.v.) associated in some way with Gaul
Gamma - the Greek letter gamma; in surveying, with reference to the right-angled shape of the capital letter, a mark on stones or trees to indicate a corner on a boundary
Geometres - in Greek, a land-measurer; geometer
Groma - an instrument for surveying straight lines and right angles; it was derived from the Greek gnoma, related to gnomon, a sundial pointer; see also ferramentum
Gromatici - Late Empire name for land surveyors; based on groma (q.v.).
Heredium - a heritable plot of land, traditionally of two iugera
Indiviso or Pro indiviso - a term used in some provinces to refer to land not allocated to individuals but often left as common pasture land for a number of farms or persons; in Italy sometimes called communalia or communia
Intercisivus (limes) - a lesser limes (q.v.), dividing land into individual holdings
Interdictum - an order issued through his imperium by a magistrate in response to a claimant, enjoining on another party a certain course of action; it was intended to bring a rapid end to a dispute, but if the other party did not comply, the dispute went to trial under the normal legal process
Iter - pathway, road, journey, right of way for walking
Iugerum - a measurement of area consisting of 2 square actus $(240 \times 120$ feet $)=28,800$ square feet ( 0.252 ha); a iugerum was capable of being ploughed by a yoke of oxen (iugum) in a day, and 2 iugera comprised a heredium ( 0.504 ha ) (q.v.), traditionally one man's heritable plot of land
Kardo (Cardo) - the name given to the limes (q.v.) dividing individual centuriae, often running from north to south, and forming part of a set of parallel limites; it intersected the
decumanus (q.v.) at right angles to form the framework of the land division system; kardo means 'hinge', and was often associated with one of the pivotal points on which the universe allegedly rotated round the earth
Kardo maximus (KM) - the main and widest limes often running from north to south, which intersected the decumanus maximus at right angles, marking the central point of the survey
Lacinia - 'fringe', 'edge', 'strip', 'border'; in surveying, land allocated in strips
Laterculi - see plinthides
Latifundium - a large estate
Libra - in surveying, a unit of land measurement in Gallia Narbonensis (cf. parallela); normally, one pound weight, a pair of scales, a plumb-line level
Libri aeris - mapping registers associated with the bronze map (forma q.v.), containing details of land allocations in a settlement
Limes (plural limites) - a man-made boundary or balk, uncultivated and wide enough to form a road or pathway, which divided centuriae or other land division units from one another. Although east-west limites were normally called decumani and north-south kardines, they were also given names according to their role and position in the land division; see decumanus, decumanus maximus, Gallicus, intercisivus, kardo, kardo maximus, linearius, maritimus, montanus, quintarius, subruncivus. Before the fourth century A.D., limes was also used in a non-surveying sense, occasionally to indicate a military road, and more generally a demarcated land border of the Empire; from the fourth century onwards limes could refer to a frontier district
Limitatio - the process of establishing intersecting limites to divide land into centuriae; also known as centuriatio
Linearius - a name used outside Italy for the subruncivus (limes) (q.v.)
Locus - a place or location; in surveying it can have a more precise technical meaning, 'site', as part of a larger tract of land
Maritimus (limes) - a limes (q.v.) running towards the sea
Mensor - in general, a measurer; a corn measurer; a land or building surveyor
Meta or Moeta - a cone-shaped turning-post in the Circus; a surveyor's movable mark
-Metator - a surveyor; military surveyor
Modus - a measured quantity; an area of land
Montanus (limes) - a limes (q.v.) running towards mountains
Municipium (plural municipia) - in origin possibly an Italian community that formed an alliance with Rome, though later the status was conferred on conquered peoples in Italy, and came to denote an inferior form of citizenship. After the grant of Roman citizenship to Italy in 89 b.c., each of the new communities was a municipium of Roman citizens. By the last quarter of the first century b.C., municipium, which included not only the town but also the surrrounding agricultural area, had come to refer to any Italian community (excluding colonies) that was autonomous in local government and jurisdiction. Municipal status was also conferred on loyal communities in the provinces, and in the imperial period this practice increased as Latin rights or Roman citizenship were extended; charters were granted, defining the status and arranging the government of municipia
Norma - a square used by builders or surveyors to make a right angle
Occupatorius (ager occupatorius) - land that the Romans occupied (occupare) for their own use after defeating the enemy; it was unsurveyed, with irregular boundaries, and was sometimes identified with arcifinius (q.v.)
Pagus - a country district; village
Parallela - a unit of land measurement in Gallia Narbonensis; cf. libra
Passus - a pace or stride; in the measurement of distance, the equivalent of a double pace ( $=5$ Roman feet); mille passus $=1,000$ paces, or one Roman mile ( 1.48 km .)
Pertica - a surveyor's ten feet long measuring-rod; the total area of land measured and allocated
Pes - in linear measurement, a foot ( 29.57 cm )
Plethron - in Greek an area of land of 100 feet square ( $=10,000$ square feet)
Plinthides - in surveying, blocks of square-shaped land, each often containing 50 iugera; in Cyrene they contained 1,250 iugera, on lands bequeathed to Rome by King Ptolemy; also known as laterculi
Possessio - possession of an object or land, distinct from ownership (dominium; proprietas) (q.v.)

Praefectura - a community of Roman citizens (colony, municipium, conciliabulum, forum) to which Rome had sent out legal officials (praefecti iuri dicundo) to help with jurisdiction, because it was too distant from Rome to apply to the praetor for assistance. The practice had been abolished by 44 b.c., but the name sometimes remained. Surveying writers usually employ praefectura to refer to land that had been allocated to the settlers of a colony after confiscation from the territory of a neighbouring community
Principia - headquarters building in a military camp
Proprietas - ownership of an object or land, distinct from mere possession (possessio) (q.v.); see also dominium
Quadrifinium - a place where the boundaries of four properties or territories met
Quaestorius (ager quaestorius) - land occupied by Rome after the defeat of the original inhabitants; it was divided up into units of 50 iugera, and sold off by the state through the agency of the quaestors
Quintarius - every fifth limes (q.v.) after the decumanus maximus and kardo maximus; it was wider than the other secondary limites
Rigor - a man-made straight line forming a boundary, with no width; rigor could also refer to a natural straight line, like a ridge of hills
Saltus - according to Siculus Flaccus 25 centuriae (normally 5,000 iugera), according to Varro, 4 centuriae ( 800 iugera); more generally, an estate or a tract of woodland and pasture
Scamnum - originally a 'bench', or a 'ridge' left in ploughing; in surveying, it was a rectangle of land broader than it was long from the direction of sighting, and was often combined with strigae (q.v.) in a system of land division
Sciotherum - the vertical rod or pole used to mark the time of day in a sun dial; in Greek, literally a 'shadow-catcher'
Scorpio or Scorofio - in surveying, a pile of stones used to mark a boundary
Scripulum or Scrupulum - $1 / 24$ of an uncia, $1 / 288$ of a libra (pound); in measurement, $1 / 288$ of a iugerum $=100$ square feet
Servitus - in law, an easement or servitude on a property, by which the owner was required to grant certain defined rights to another individual, especially in respect of rights of way
Striga - originally a 'windrow' or 'swath'; in surveying, it was a rectangle of land longer than it was broad from the direction of sighting, and was often combined with scamna (q.v.) in a system of land division
Subruncivus (limes) - a term applied to the limites intervening between the decumanus maximus (q.v.) or the kardo maximus (q.v.) and the quintarius (q.v.), and thereafter between quintarii, and marking off individual centuriae; the word means 'weeded', which implies that it had to be kept clear; outside Italy described as linearius
Subsecivum - land unsuitable for allocation to settlers, either situated between the centuriae and the outer boundary of a community's territory, or within centuriae; literally 'cut away below' or 'cut off'
Supercilium - eyebrow; brow (of a hill); in surveying, a terrace, either man-made or natural, which often served as a boundary
Tabulae aeris - bronze records associated with the bronze map (forma q.v.), containing details of land allocations in a settlement
Tabularium - a public record office in which all records including those relating to land allocations were kept; the tabularium or sanctuarium principis was the imperial record office in Rome
Terminus - a boundary marker; in Roman religion, the boundary marker was regarded as a holy object, and Terminus was worshipped as the spirit of all boundary markers
Territorium - all the land within the boundaries of a community, over which it had jurisdiction
Tetrans - a quadrant; in surveying, the point of intersection of two lines
Tiburtinus (lapis) - Travertine stone, a durable limestone quarried near Tibur and often used as a boundary marker
Trifinium - a place where the boundaries of three properties or territories met
Usucapio - in law, a process by which ownership (dominium or proprietas) of something could be attained by being in continuous possession (possessio) of it for a fixed amount of time
Varatio - the process of diagonal sighting
Vectigalis (ager vectigalis) - land yielding revenue for the Roman state or a colony or mииісіріит

Versus or Vorsus - literally a 'turning'; 'furrow', 'row', or 'line'; in Oscan and Umbrian an area of land 100 feet square $(=10,000$ square feet); cf. plethron; in Dalmatia, an area of 8,640 square feet
Via publica - a publicly maintained road
Vicus - village; district in a town
Villa - a dwelling associated with a rural estate or farm

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MAPS


MAP 1. Italy: topography and provinces cited in Liber Coloniarum.


MAP 2. Italy: Communities cited in Liber Coloniarum.

## PLATES

## PLATE I



Tombstone of the surveyor Lucius Aebutius Faustus, from Eporedia (Ivrea), showing a dismantled groma.


Aerial photograph of north-east Italy south of the river Po, near Caesena (Cesena) (A), showing the river Savio (B); the Via Aemilia (C-D), the foothills of the Apennines (bottom right), and land division in units of 20 by 20 actus, a section of which is indicated by the circle; the system is preserved by a series of parallel roads.


Aerial photograph of Istria at the head of the Adriatic, near Pola, showing land division in units of 20 by 20 actus, an example of which is indicated, preserved by minor roads and field boundaries.


Aerial photograph of Iader (Zadar) in Dalmatia, showing land division in units of 20 by 20 actus, preserved by stone walls built along the roads.

PLATE V


Aerial photograph of La Marsa, near Carthage in Africa, showing a land division unit (ABCD) of 20 by 20 actus, preserved by roads in continuous use. Signs of internal divisions can still be seen ( $\mathrm{E}-\mathrm{F}$ and $\mathrm{G}-\mathrm{H}$ ).


Aerial photograph of part of the Campanian plain looking NNE, showing Mount Tifata, the river Volturno (enclosing modern Capua in a meander), and land division to the north, east, and south of Santa Maria Capua Vetere (ancient Capua) in the plain.

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[^0]:    ${ }^{1}$ See Mortet, Un nowveau texte des traités d'arpentage et de géométrie d'Epaphroditus et Vitruvius Rufus (1896); and now Guillaumin, Balbus (1996).
    ${ }^{2}$ Grillone, De munitionibus castrorum (1977); Lenoir, Pseudo-Hygin. Des fortifications du camp (1979); see below p. xxxvi.
    ${ }^{3}$ Bubnov, Gerberti opera mathematica (1899), 494-553.
    ${ }^{4}$ In what follows, the editions of Lachmann and Thulin are designated by L or T and the page and line number, and the corresponding reference in this work by C and the page and line number in the translation.
    ${ }^{5}$ Frontinus-Behrends et al., Frontin (1998); Siculus Flaccus-Clavel-Lévêque, SF; Hyginus 2 (Gromaticus)-Clavel-Lévêque, $H G$; note also Resina Sola, Frontino. De agri mensura 1 (1983). Part of the work of Marcus Junius Nipsus (L 285-301) has been translated with a commentary by Bouma (1993); see also Dilke, Caesarodunum (1974).
    ${ }^{6}$ See Appendix 1 for a summary of the contents of the Corpus Agrimensorum Romanorum.

[^1]:    ${ }^{7}$ Still fundamental to the history of the text of the Corpus Agrimensorum Romanorum are Mommsen, BJ (1895) = Gesammelte Schriften VII (1909); Thulin, ‘Die Handschriften'; 'Humanistische Handschriften'; Göteborgs Kungl. Vetenskaps- och Vitterhets-Samhälles Handlingar (1911-12). Excellent short accounts are found in Carder, Art. Hist., 4-35; Reeve in Reynolds (ed.), Texts and Transmission: A Survey of the Latin Classics (1983), 1-6. There is a very detailed survey in the work of Toneatto: MEFRM (1982); in Clavel-Lévêque, Cadastres 21-50; Miscellanea 4. Univ. di Trieste (Fac. di Magistero) (1983); GFF (1988); in Behrends, Feldmesskunst 26-65; and see now Codices Artis Mensoriae (1994-5).
    See Diagram 1 for a schematic representation of the main manuscripts relating to the Corpus Agrimensorum Romanorum.
    ${ }_{8}$ Thulin, op. cit. (n. 7), 'Die Handschriften', 3-5; 10-39. Only Hyginus 2 appears in all three groups of manuscripts relating to the Agrimensores: AB; P; FEH (see below). Toneatto (in Clavel-Lévêque, Cadastres 43-5) thought it unlikely that technical manuals of this kind can have had a single archetype. He argued that each compilation could have been based on several different versions. This may go too far, but it is certainly right that modern texts may be too dependent on the philological skills of Lachmann and Thulin, who reconstructed and often rearranged the manuscripts. Uncertainty about the internal layout and provenance of the texts compounds the difficulty of an analysis of the development of writing on land survey.
    ${ }^{9}$ A facsimile of A has been published by Butzmann, Corpus Agrimensorum Romanorum, Codex Arcerianus A der Herzog-August-Bibliothek zu Wolfenbüttel (Cod. Guelf. 36. 23a), Codices Graeci et Latini Photographice Depicti 22 (1970). Toneatto, op. cit. (n. 7), surmised that the two parts of MS AB did not necessarily complement each other, but may have been two separate manuscripts that up to a point contained similar treatises.
    ${ }^{10}$ See Thulin, op. cit. (n. 7), 'Humanistische Handschriften', 419-22.
    ${ }^{11}$ Thulin, ibid., 425-31.

[^2]:    ${ }^{12}$ Thulin, op. cit. (n. 7), 'Die Handschriften', 69-72.
    ${ }^{13}$ Thulin, ibid., 41-59; see also Mütherich, Aachener Kunstblätter (1974).
    ${ }^{14}$ Thulin, ibid., 42-4; 58-69.
    ${ }^{15}$ Thulin, ibid., 72-7; 95-101.
    ${ }^{16}$ See Reeve, op. cit. (n. 7), p. 3 and n. 14; p. 5 and n. 21, who designates this manuscript H.
    ${ }^{17}$ See Thulin, op. cit. (n. 7), 'Die Handschriften', 7-10, who perhaps overstates the value of this text (cf. Josephson, Casae Litterarum, 115; 120).
    ${ }^{18}$ Reeve, op. cit. (n. 7), 4-5.

[^3]:    ${ }^{19}$ See Castagnoli, MAL (1943); Dilke, Geographical Journal (1961); Imago Mundi (1967); RLS 112-25; 127-32; GRM 91-101; in Behrends, Feldmesskunst, 345-6; Carder, Art Hist., esp. 167-204.
    ${ }^{20}$ See, e.g., pp. 393, n. 33.
    ${ }^{21}$ Ills $1-5 ; 7-11 ; 18-19 ; 21-2 ; 32 ; 40-1 ; 46 ; 48-50 ; 51-2 ; 73 ; 78 ; 119 ; 123-7 ; 129-31$ (= Thulin, figs $1-5 ; 7-11$; 18-19; 21-2; 32; 41-2; 47; 49-51; 52-3; 74; 79; 122; 126-30; 132-4).
    ${ }^{22}$ Ills 16; 25-31; 33 (measuring limites over horizontal distances); 65-72; 74-7; 85-7; 105 (designating limites); 106-9; 113; 136; 137-9 ( $=$ Thulin, figs $16 ; 25-31 ; 33 ; 66-73 ; 75-8 ; 86-8 ; 107 ; 108-11 ; 115 ; 137 ; 139-41$ ).
    ${ }^{23}$ Ills 79-84; 114-18; 140-1 ( $=$ Thulin, figs $80-5 ; 116-21 ; 142-3$ ).
    ${ }^{24}$ Ills $6 ; 12-15 ; 17 ; 20 ; 23-4 ; 35 ; 53-5 ; 63-4 ; 120-2$ ( $=$ Thulin, figs $6 ; 12-15 ; 17 ; 20 ; 23-4 ; 36 ; 54-6 ; 64-5 ; 123-5$ ).
    ${ }^{25}$ Ills 34; 37; 38-9; 42-3; 47; 57-9; 61-2 (individual buildings); 88-96; 111-12 (= Thulin, figs 35; 37; 39-40; 43-4; 48; 58-60; 62-3; 89-97; 113-14).
    ${ }^{26}$ Ills 128; 132a and b; 133; 134; 135 ( $=$ Thulin, figs 131; 135; 135a; 136; 136a).
    ${ }^{27}$ Ills $97-104 ; 110$ ( $=$ Thulin, figs 98-104; 112).
    ${ }^{28}$ Lachmann, Feldmesser vol. I, illustrations pp. 26-40 (see Ills 142-260).

[^4]:    ${ }^{29}$ Straightforward diagrams-see e.g. Ills 3-5; 10; 12-13; 44-6; 121-2; 126; 131 (= Thulin figs 3-5; 10; 12-13; 45-7; 124-5; 129; 134). Pictorial representations-see below, n. 34.
    ${ }^{30}$ See Campbell, JRS (1996), 86-90.
    ${ }^{31}$ Sáez Fernández, Habis (1990); Clavel-Lévêque, Estudios de la Antigüedad (1993); Gorges, MCV (1993).
    ${ }^{32}$ Piganiol, Documents; Dilke, RLS, 159-77. One other ancient surveying map, probably from the early Ptolemaic period, is preserved on a fragmentary demotic papyrus. It is apparently a land map from Aphroditopolis, depicting the town, the river, and landholdings with annotations (Spiegelberg, Die demotischen Denkmäler, vol. 2: Die demotischen Papyri (1908), no. 31163).
    ${ }^{33}$ Ills 12-13; 121-2; 123; 126; 131 ( $=$ Thulin, figs 12-13; 124-5; 126; 129; 134).
    ${ }^{34}$ Pictorial illustrations seemingly based on a tradition of topographic landscape painting-e.g. Ills $6 ; 28 ; 33$; $35 ; 42 ; 61-2 ; 71 ; 98$ ( $=$ Thulin, figs $6 ; 28 ; 33 ; 36 ; 43 ; 62-3 ; 72 ; 98$ a). Pictorial illustrations probably derived from chorographic topography -e.g. Ills 43; 47; 57-9; 88-96; 105; 111-12; 132a and b; 134 ( $=$ Thulin, figs 44; 48; $58-60 ; 89 ; 90-7 ; 107 ; 113 ; 114 ; 135-6)$. These examples often contain a diagrammatic element, and are sometimes difficult to distinguish from illustrations in which the principal element is a diagram, to which a picture has been added-Ills $2 ; 11 ; 14-24 ; 36-9 ; 53 ; 68 ; 97 ; 108 ; 119-20 ; 125 ; 127-30$ ( $=$ Thulin, figs $2 ; 11 ; 14-24 ; 37-40 ; 54 ; 69$; 98; 110; 122-3; 128; 130-3).

[^5]:    ${ }^{35}$ 3.6, translation by Milner, Vegetius: Epitome of Military Science (1993), 71. For military maps, see Sherk, 'Military Maps', 558-62.
    ${ }^{36}$ Levi, Itineraria Picta, Contributo allo studio della Tabula Peutingeriana (1967), esp. 65-162; 173-7.
    ${ }^{37}$ Cumont, Syria (1925); Dilke, GRM, 120-2.
    ${ }^{38}$ See p. 397, n. 48. For the contribution of land survey maps to cartography, see Dilke, GRM, 91-101; see also Talbert, JRS (1987).
    ${ }^{39}$ De Architectura 1.1.4. However, he may be referring to architect's plans rather than a textbook.
    ${ }^{40}$ See also below, n. 92.

[^6]:    ${ }^{41}$ Dilke in Behrends, Feldmesskunst, 345-6, suggested that maps of Tarracina (Ill. $91=$ Thulin, fig. 92) and Minturnae (Ill. $88=$ Thulin, fig. 89) relating to Hyginus 2, and also the map of Mount Massicus (III. $34=$ Thulin, fig. 35) relating to Urbicus, all preserved in MS P, had an archetype composed at the time when the authors were writing. But he accepted that they were probably altered later.
    ${ }^{42}$ Carder, Art Hist., 189-204.
    ${ }^{43}$ See further below, pp. xxixff.
    ${ }^{44}$ Note that at Ill. $128=$ Thulin, fig. 131, the use of $u t$ in the inscriptions attached to the illustration indicates that this scenario was being presented as an example of a possible situation, despite the use of 'real' names.

[^7]:    ${ }^{45}$ See PIR ${ }^{2}$ I.322; Eck in Wasserversorgung im antiken Rom (1982); Christ in Xenia. Festschrift R. Werner (1989).
    ${ }^{46}$ On the Strategemata, see Campbell, JRS (1987), 14-15. For the De Aquis, see Hodge, Roman Aqueducts and Water Supply (1992); Evans, Water Distribution in Ancient Rome: the Evidence of Frontinus (1994).
    ${ }^{47}$ Martial 10.58.1-6; Aelian, pref. 3.
    ${ }^{48}$ Costas Rodriguez, Frontini Index (1985), p. II.
    ${ }^{49}$ See for example, Rose, A Handbook of Latin Literature (1949), 435; Duff, Literary History of Rome (1960), 339. It is impossible to prove authorship by a comparison of style and vocabulary in the De Aquis and Strategemata and in the surveying treatises. This is partly because of the peculiar technical nature of the gromatic texts, and also because the surviving texts of Frontinus have certainly been subject to much editing and excerpting, so that it is difficult to know how much of Frontinus' exact wording we have.

[^8]:    ${ }^{50}$ Frontinus, De Aquis pref. 1.
    ${ }^{51}$ See below, pp. xlix-lii.
    ${ }_{53}$ As suggested, e.g., by Eck, op. cit. (n. 45), 53.
    ${ }_{54}^{53}$ Hodge, op. cit. (n. 46), 16-18.
    ${ }^{54}$ De Aquis pref. 2. He may himself have overseen on behalf of the emperor the foundation of a new settlement. For the responsibilities of the founder or his agent, see Campbell, JRS (1996), 94-8.
    ${ }^{55}$ cf. for example C $29.24-5 \& 3.23-5$ (T 31.22-3 \& 2.8-12 = L 72.17-18 \& 5.6-8); C 37.15-16 \& 5.45-7.1 (T $39.15-16 \& 6.9-10=$ L $79.20-1 \& 15.6-7$ ); C $45.16-20 \& 5.2-3$ (T 47.18-20 \& 3.14-15 = L 87.4-7 \& 8.7-8).
    ${ }_{57}^{56}$ See below, pp. xxxiff.
    ${ }^{57}$ Lachmann, Feldmesser, vol. II, 112-31.

[^9]:    ${ }^{58}$ It is worth noting that in some of the passages of Urbicus that Lachmann ascribed to Frontinus, that author seems to be more personal than in the texts that have come down under his name ( $\mathrm{C} 3-15=\mathrm{T} 1-19$ ), using the personal pronoun, giving direct advice, and identifying himself with the surveying profession e.g. C 35.41-6; $47.33-49.1=$ T $38.20-5 ; 50.3-19=$ L 78.22-7; 90.1-18. In the view of Grelle, Stipendium vel tributum (1963), 33-5, Urbicus was using material from another surveying writer, possibly of the Flavian era, or indeed later than Frontinus.
    ${ }^{59}$ Lachmann, op. cit. (n. 57), noted that manuscripts F (Iuli Frontini Siculi liber primus) and P50 (liber Frontini secundus) suggest that two books of Frontinus were extant. But manuscript headings in the Corpus are frequently unreliable ( F inexplicably mentions Siculi), and this detail may be merely the interpretation of a copyist. Urbicus (C 21.41-2 = T $25.3-4=\mathrm{L} 64.11-12$ ), in a passage that in Lachmann's view is based on Frontinus, refers to one book written to instruct practitioners and another (alius) devoted to the skill of land survey. Lachmann strangely wanted to interpret alius as 'second', but even if that is correct, there is no indication that in this passage Urbicus was quoting from Frontinus.
    ${ }^{60}$ Thulin (RhM (1913)) believed that Frontinus may have written a second book with a more detailed treatment, the only part of which to survive is a treatment of land disputes partly preserved in Urbicus' treatise. But this view also depends on a doubtful interpretation of Urbicus (C 21.41-2; see above, n. 59).
    ${ }^{61}$ It should be noted, however, that the headings printed by Thulin give a misleading impression of order; of the four, two were added by him (C 9.27; 13.3 = T 10.19; 15.5), and at C $3.2=\mathrm{T} 1.1$, De Agrorum Qualitate of MS A was probably the excerptor's title for the whole work.
    ${ }^{62}$ Except where specified, I confine myself to material transmitted under Frontinus' name (C 3-15 = T 1-19).
    ${ }^{63}$ It is possible that C $5-9=\mathrm{T} 4-10$ was an epitome of a more detailed treatment of land disputes, some of which is incorporated in the text of Urbicus (C 27-49 = T 30-51).

[^10]:    ${ }^{64}$ Hinrichs (Institutionen, 164) argued that Frontinus' work was that of a high-ranking man, presumably aimed at higher office holders, while the other writers were men of lesser account who spoke of 'our profession' and wrote as active practitioners of surveying.
    ${ }^{65}$ Frontinus ( $\mathrm{C} 3.6=\mathrm{T} 1.6=\mathrm{L} 2.1$ )-Hyginus 1 ( $\mathrm{C} 85.21-5=\mathrm{T} 80.14-19=\mathrm{L} 117.12-17$ ); Siculus Flaccus ( C $121.20-4=$ T $118.11-15=$ L $154.8-12$ ).
    ${ }^{66}$ Frontinus (C $5.23=\mathrm{T} 5.3=\mathrm{L} 12.1$ ) and Urbicus (C 29-31 $=$ T $32-3=\mathrm{L} 73-4$ )-Hyginus 1 (C $93.12=\mathrm{T}$ 89.1 = L 126. 3); Urbicus ( $\mathrm{C} 31.5-13=\mathrm{T} 33.1-11=\mathrm{L} 73.1-74.10$ )-Hyginus $1(\mathrm{C} 93.26-7=\mathrm{T} 90.3-5=\mathrm{L} 127.2-4)$.
    ${ }^{67}$ Frontinus (C $7.27=\mathrm{T} 8.7=\mathrm{L} 20.3$ ) and Urbicus (C $39.1=\mathrm{T} 40.24=\mathrm{L} 81.3$ )-Hyginus $1(\mathrm{C} 99.18=\mathrm{T} 96.11$ $=\mathrm{L}$ 132.24); Siculus Flaccus ( $\mathrm{C} 123.14-15=\mathrm{T} 120.1=\mathrm{L} 155.25$ ).
    ${ }^{68}$ Frontinus (C $7.7=\mathrm{T} 7.1=\mathrm{L} 17.1$ ) and Urbicus (C 41-3 = T 44-6 $=\mathrm{L} 84-5$ )-Hyginus 1 (C $99.33=\mathrm{T} 97.9$ $=\mathrm{L}$ 133.17).
    ${ }^{69}$ Frontinus $(\mathrm{C} 11.15-16=\mathrm{T} 13.6=\mathrm{L} 29.16)$-Siculus Flaccus $(\mathrm{C} 121.1-2=\mathrm{T} 117.14=\mathrm{L} 153.16)$.
    ${ }^{70}$ Frontinus (C $11.26=$ T $14.1=$ L 30.14 )-Siculus Flaccus ( $\mathrm{C} 121.10=$ T $117.26=153.26$ ).
    ${ }^{71}$ Frontinus ( $\mathrm{C} 7.5=\mathrm{T} 6.15=\mathrm{L} 16.5$ ) and Urbicus $(\mathrm{C} 39-41=\mathrm{T} 42-4=\mathrm{L} 82-4)$-Hyginus 1 (C $91.21=\mathrm{T}$ $87.4=$ L 124.3).
    ${ }_{72}$ Frontinus $(\mathrm{C} 9.28=\mathrm{T} 10.20=\mathrm{L} 27.13)-\mathrm{C} 135.8=\mathrm{T} 131.8=\mathrm{L} 166.8$.
    ${ }^{73}$ Frontinus (C 9.31; 11.1; 37; 40-2 = T 11.4; 12.5; 14.14, 17-19 = L 28.1; 29.1; 31. 4, 7-9)-C $137.21=\mathrm{T} 135.1$ $=\mathrm{L} 170.3$.
    ${ }^{74}$ Frontinus $(\mathrm{C} 9.35=\mathrm{T} 11.9=\mathrm{L} 28.5)-\mathrm{C} 135.18=\mathrm{T} 132.6=\mathrm{L} 167.3$.
    ${ }^{75}$ Frontinus $(\mathrm{C} 11.6=\mathrm{T} 12.11=\mathrm{L} 29.7)-\mathrm{C} 135.27=\mathrm{T} 132.18=\mathrm{L} 167.15$.
    ${ }^{76}$ Frontinus ( $\mathrm{C} 5.2 ; 7.46-9.1=\mathrm{T} 3.14 ; 9.10=\mathrm{L} 8.7$; 22.6)-C $157.15 ; 159.20=\mathrm{T} 161.17 ; 164.12=\mathrm{L} 198.16$; 201.13.

[^11]:    ${ }^{77}$ Thulin, following Lachmann, held that the text preserved in manuscripts AB (L 77.20-90.21; T 37.13-51.3 $=$ C 35.17-49.4) was the second part of Urbicus' treatise. Therefore the beginning of MS B, which has no title, appears in Thulin's text at T 37.13 (B1) $=$ C 35.17 . MS A, part of which is missing for the text of Urbicus, begins also at T 37.13 (A163) $=$ C 35.17. The second part of MS B (B39-91) is taken as the beginning of the treatise (T $20.5-37.10=\mathrm{C} 17.4-35.14$ ), though with three further re-arrangements: (i) both Lachmann and Thulin judged that B83-91 formed part of the introduction to the treatise, and consequently this appears at L 59.4-62.15; T $20.5-23.1=\mathrm{C} 17.4-19.45$; (ii) for T 49.26-51.3 (= C 47.28-49.4), see below, n. 81; (iii) Thulin argued that part of MS B (75-83) had been misplaced in Urbicus' treatise, and, with further rearrangements, should be included in the text of Hyginus 1. Lachmann prints it separately under the heading Agrorum quae sit inspectio (L 281-4). See below, n. 94, and p. 359, n. 8.

    I have printed the text of Urbicus as it appears in Thulin's edition, and the validity of his arrangement, with which I am mainly in agreement, is discussed where appropriate in the notes. It should be noted that there are several serious gaps in the extant text of Urbicus: L $62.15=\mathrm{T} 23.1=\mathrm{C} 19.45$; $65.13=\mathrm{T} 26.3=\mathrm{C} 23.21$; L $67.15=$ T $27.27=$ C $25.19 ;$ L $70.9=$ T $30.11=$ C 27.39 ; $72.22=$ T $31.27=$ C 29.27 ; L $74.15=$ T $33.12=\mathrm{C}$ 31.15 ; $\mathrm{L} 76.18=\mathrm{T} 35.27=\mathrm{C} 33.31 ; \mathrm{L} 77.19=\mathrm{T} 37.11=\mathrm{C} 35.15$.
    ${ }_{78}$ See below, pp. xxxiv.

[^12]:    ${ }^{79}$ De Nardis, The Writings of the Roman Land Surveyors (1994), ch. 4, esp. 191-233.
    ${ }^{80}$ See above, p. xxviii, with nn. 55, 58. For Hyginus 1, cf. C $39.16-26=$ T $41.16-26=$ L $81.22-82.4$ and C $99.26-30=\mathrm{T} 96.21-97.5=\mathrm{L} 133.9-13 . \mathrm{C} 39.28-41.42=\mathrm{T} 42.3-44.23=\mathrm{L} 82.7-84.10$ and $\mathrm{C} 91.21-93.9=\mathrm{T}$ 87.3-88.18 = L 124.3-125.18.
    ${ }^{81}$ I accept Thulin's suggestion (T 26 apparatus criticus) that the text at $\mathrm{T} 49.26-51.3$ (B36-8; A178-9) $=\mathrm{C}$ $47.28-49.4$ should be moved to $\mathrm{T} 26.5=\mathrm{C} 23.22$. This fits in better with Urbicus' plan of his treatise-an account of genera of landholding and then the partes and qualitates of land disputes ( $\mathrm{T} 22.3-5=\mathrm{C} 19.15-17$ ). At T $24.13-16=\mathrm{C} 21.26-8$ he states his intention to examine the types (genera) of land dispute in the lands already mentioned, confirming that the various forms of landholding were an introduction to this. So the genera of land disputes should have followed this section, and preceded the discussion of the details of individual land disputes. If this is correct, it follows that at $\mathrm{T} 26.3=\mathrm{C} 23.21$ the missing text will have contained a list of genera of disputes. And, on Thulin's re-arrangement, that will be picked up by Satis...dilucide genera controversiarum exposui (T 49.26).
    ${ }^{82}$ Frontinus simply places a dispute over boundary stones at the head of his list of fifteen disputes (C 5.13). In my view, Urbicus is not making a fundamental change. He seeks to emphasize the dispute about boundary stones by taking it out of context, because boundary stones are crucial to the definition of both boundary and site.

[^13]:    ${ }^{83}$ For theoretical definitions in Urbicus, see p. 336, n. 13.
    ${ }^{84}$ For technical vocabulary, see p. 337, n. 17. Urbicus' attempt to explain when a transcendentia is necessary, unnecessary, or 'insubstantial' (interibilis) is largely incomprehensible. At times Urbicus seems to be confused by his own definitions. So, at C 25.24-6 and 27.13-15, transcendentia seems to be equated with effectus (see p.337, n. 14).
    ${ }^{85}$ As eighth, ninth, and tenth dispute Urbicus has de subsecivis (10th in Frontinus), de alluvione (8th in Frontinus), de iure territorii (9th in Frontinus). This may be the result of careless copying by Urbicus, or may be connected with his determination to group disputes according to their status. So, the dispute de iure territorii has been moved to join the other disputes associated with status iniectivus, in which Urbicus places it. Disputes de subsecivis and de alluvione are grouped under status effectivus, though this does not explain why their order has been reversed in their new location.
    ${ }_{87}^{86}$ See above, p. xxix; also de Nardis, op. cit. (n. 79), 111-30.
    ${ }^{87}$ Urbicus' tone gives an impression of the lecture-room or rhetorical school. Cf. the quasi-philosophical account of truth and falsehood, which is only loosely attached to the main theme ( $\mathrm{C} 35.2-14=\mathrm{T} 36.19-37.10=$ L 77.6-18).
    ${ }_{88}$ That is, status and effectus; see p. 356, n. 41.

[^14]:    ${ }^{89}$ See above, p. xxxi.
    ${ }^{90}$ Thulin, $\operatorname{RhM}$ (1913), 113, noted that the author quotes verbatim two laws (C $63.34-5$ and $65.36-8=C T$ 2.26 .3 and 26.1 ( $=$ CJ 3.39.3)), and argued that his work should be associated with the publication of either the Codex Theodosianus (438) or the Codex Iustinianus (534). For the author's background, see Thulin, ibid., 110.
    ${ }_{91}^{91}$ See above, n. 88.
    ${ }^{92}$ See above, p. xxv. It is notable that this is the only extant reference in a surveying writer to the use of diagrams deliberately collected for illustrative purposes.
    ${ }^{93}$ It is possible, however, that the Commentum was to some extent also intended to supply a kind of general education, as seems to be hinted in the opening paragraph ( $\mathrm{C} 51.4-9=\mathrm{T} 51.10-52.2=\mathrm{L} 1.10-16$ ). For its purpose, see also Mommsen, $B J$ (1895), 276-7 = GS VII 468-9.

[^15]:    ${ }^{94}$ Thulin, Eranos (1910), argued on the basis of contents and style; disputed by Toneatto, Sodalitas. Scritti in onore di $A$. Guarino (1984), 1611-12. For detailed discussion see p. 359, n. 8.
    ${ }_{95}$ Campbell, JRS (1996), 77.
    ${ }_{97}^{96}$ C $97.4-5=$ T $93.5-6=\mathrm{L}$ 130.1-2; cf. fides professionis ( $\mathrm{C} 95.38=$ T $92.14-15=\mathrm{L} 129.9-10$ ).
    ${ }^{97}$ Hyginus records that in a previous work he had collected imperial decisions dealing with the land (C 99.30-2).
    ${ }_{98}$ The language throughout expresses polite instruction or recommendation, e.g., and passim, 'you place...' (C $77.10=\mathrm{T} 71.10=\mathrm{L} 111.16$ ); oportet ( $\mathrm{C} 77.29=\mathrm{T} 72.14=\mathrm{L} 112.9$ ); debet $(\mathrm{C} 77.20=\mathrm{T} 72.5=\mathrm{L} 112.3)$; diligenter praemoneo ( $\mathrm{C} 91.13=\mathrm{T} 86.15=\mathrm{L} 123.14$ ); gerundive ( $\mathrm{C} 89.37=\mathrm{T} 85.11=\mathrm{L} 122.9$ ); subjunctive of command (C $81.1=\mathrm{T} 75.5=\mathrm{L} 281.7$ ); identification with the surveyor ( $\mathrm{C} 99.24-5=\mathrm{T} 96.20=\mathrm{L} 133.8$ ); direct advice (C $99.34-5=$ T 97.11 = L 133.19-de quibus quid possumus aliud suadere). See also Campbell, JRS (1996), 79-80.
    ${ }^{99}$ This is based on the textual arrangement of Thulin, discussed above (n. 94).

[^16]:    ${ }^{100}$ C $135.1=$ T $131.1=$ L 166.1. For the manuscript tradition of treatises ascribed to Hyginus, see Toneatto, Miscellanea 4 (Università degli Studi di Trieste) (1983).
    ${ }^{101}$ The heading of MS P has confused the author with Gaius Julius Hyginus, freedman of the emperor Augustus and subsequently librarian of the Palatine library; cf. Campbell, JRS (1996), 77-8.
    ${ }^{102}$ Gemoll (Hermes (1876), 164-78, esp. 168-70) made the classic case for distinguishing between the two authors; he argued mainly on the basis of linguistic differences in the use of words or phrases like nam et, hoc est, id est; moreover, in Hyginus 2 instructions are usually given in the first person plural, while in Hyginus 1 there is much more variation; Hyginus 2 makes few references to previous statements, while in Hyginus 1 there are many such cross-references. Such arguments are subjective and are especially difficult in brief, technical treatises, where the subject matter may require certain types of vocabulary. Of course writers also change their minds, vary their style of writing, and use new words. Finally, the number of examples of verbal differences cited by Gemoll is in my view too small to make this kind of comparison helpful. So, no certainty is possible.

    A treatise, the beginning and end of which have been lost, is contained in MS A, where it follows without a break some fragments of geometry, all of which are loosely ascribed to Hyginus 2. In the sixteenth century a copyist gave it the title De Munitionibus Castrorum, because it deals with the methods for measuring out a military camp and setting up its defences. It is generally agreed that this work was not written by either Hyginus 1 or Hyginus 2 (Schanz-Hosius, Geschichte der römischen Literatur ${ }^{4}$ II (1935), 801-2; Lenoir, Pseudo-Hygin. Des fortifications du camp (1979), vii-viii; 111-33; see also Toneatto, op. cit. (n. 100)).

[^17]:    ${ }^{103}$ For a translation (into French) and commentary, see Clavel-Lévêque, $H G$.
    ${ }^{104}$ Campbell, JRS (1996), 78. For a translation (into French) and commentary, see Clavel-Lévêque, $S F$.
    ${ }^{105}$ See C $119.13,19 ; 127.23 ; 129.37-46 ; 131.11,17$ = T $115.28 ; 116.6 ; 124.9 ; 126.26-127.5 ; 127.18,26=$ L 152.1 ; 152.5; 159.26; 162.9-19; 163.3, 10. This activity may have involved some fieldwork, at Pisaurum (C $125.16=\mathrm{T}$ $122.3=$ L 157.21 ), Beneventum ( $\mathrm{C} 127.18-21=$ T $124.3-6=$ L 159.20-3), and Nola (C 129.32-3 $=$ T 126.19-21 $=\mathrm{L} 162.3$ ).

[^18]:    ${ }^{106}$ For a brief discussion of this problem, see Campbell, JRS (1996), 78-80.
    ${ }^{107}$ See $O L D$ s.v. comprehendo 7; contineo 8.
    ${ }^{108}$ In surveying writers it generally means 'type' or 'character'; see, e.g.,., Urbicus (C 19.15-17; 27.2-5 $=$ T $22.3-5 ; 28.30-29.3=\mathrm{L} 61.7-9 ; 68.25-8$ ), Commentum (C 51.15-16, 21; $53.15=\mathrm{T} 52.8-10,15 ; 54.2-3=\mathrm{L} 1.23-4$; 2.4; 3.17); Hyginus 1 ( $\mathrm{C} 81.43-5=\mathrm{T} 77.3-5=\mathrm{L} 283.7-9$ ); Siculus Flaccus (C $111.22-3$; $115.42-3=\mathrm{T} 108.10-11$; 113.17-18 = L 144.10-11; 149.16); Balbus (C $207.1=$ L 93.13-15).
    ${ }^{109}$ It seems to me that Hyginus 1 uses condicio in this general sense at C $91.16=\mathrm{T} 86.17=\mathrm{L} 123.16$ (hae sunt condiciones agrorum); a general connotation is also present in Siculus Flaccus C $103.4=$ T $98.8=$ L 134.16 condiciones agrorum per totam Italiam diversas esse). I cannot accept that condicio here has a technical meaning, defining in juridical or administrative terms the legal status of the land (as argued by de Nardis, op. cit. (n. 79), 42-3). Frontinus' use of condicio (C 5.6-7, 20; 7.5-6, 37-9; $11.44=\mathrm{T} 4.3-5,20 ; 6.15-16 ; 7.5-6 ; 8.20-9.2 ; 14.22-3$ $=\mathrm{L} 9.4-5 ; \mathrm{I} 1.3 ; 16.5-6 ; 18.2 ; 21.4-6 ; 26.5-6)$ is equally difficult to pin down and is best translated in the broad non-technical sense of 'characteristic' or 'consideration'.
    ${ }^{110}$ See above, p. xxxiii.

[^19]:    ${ }^{111}$. Hyginus 1 makes a brief statement of his rationale in presenting material in a certain order (C 91.16-18; 99.33-4 = T 86.17-21; 97.9-11 = L 123.16-18; 133.17-18). Cf. Urbicus (C 21.26-7 = T 24.13-14 = L 63.23-5).
    ${ }^{112 .}$ See Lachmann, Feldmesser Vol. II, 131-4; Guillaumin, Balbus.

[^20]:    ${ }^{113}$ For detailed discussion of the Liber Coloniarum, see Mommsen, in Lachmann, Feldmesser, vol. II, 145-214 = GS V, 146-99; Pais, Colonizzazione, 145-362; Thomsen, Italic Regions, 261-310; Grelle in Behrends, Feldmesskunst, 67-85; there is also a useful summary in Dilke, RLS, 185-7; Keppie, CVSI, 8-12.
    ${ }^{114}$ See pp. 191-203, and commentary, pp. 428-32. The second section of the Liber Coloniarum contains only the districts of Picenum, Samnium, Apulia, and Calabria. It is usually dated to the second part of the fourth century or the beginning of the fifth century, i.e., after Samnium was administratively separated from Campania, but before the division of Flaminia and Picenum (see Thomsen, Italic Regions, 296-7).

[^21]:    ${ }^{115}$ For this view see p. 402, n. 1.
    ${ }^{116}$ See Campbell, JRS (1996), 94-8.
    ${ }^{117}$ See pp. 402, n. 1; 406, n. 21.
    ${ }^{118}$ Campbell, JRS (1996), 95, and n. 97. Thomsen (Italic Regions, 271) is right to identify the liber regionum (C 179.27; 199.8-9) with either the liber Augusti Caesaris et Neronis or the liber Balbi.
    ${ }^{119}$ At L 244-51 Lachmann included material collected from MS J and two different sections of MS A (55-7; 190-3). This is inserted between what he designated as books one and two of the Liber Coloniarum. In this edition, this material is printed at pp. 241-7. See further, p. 443, n. 1.
    ${ }^{120}$ Discussion in commentary, pp. 413-27.

[^22]:    ${ }_{121}^{121}$ See p. 387, n. 15.
    ${ }_{122}^{122}$ See especially, Hermes (1883), $174=G S V$ (1908), 217.
    ${ }^{123}$ The identification of more Roman field-systems in Italy affords an opportunity to test information supplied by the Liber; see further below, pp. Ivii-ix. In the commentary to the Liber, I have attempted to give a guide to its general reliability for individual sites.

[^23]:    ${ }^{124}$ Guidance-see e.g. Ć $173.28-37 ; 179.5-6 ; 191.5-7 ; 193.37-9 ; 203.17,25-8=$ L 221.5-11; 228.13-15; 242.4-6; 254.3-4; 261.17; 261.26-262.4; doctrina-C 195.34-5 = L 255.15-16; cf. also C $201.40=$ L 260.26; citing of sources-C $167.27 ; 177.9 ; 179.24,26 ; 199.3-9=$ L $211.23 ; 225.14 ; 229.10-11,12 ; 258.2 ;$ cf. C $203.28 ; 38=$ L 262.4 , 12; cross-references are frequently employed to illustrate the layout and status of communities.
    Thomsen (Italic Regions, 297) thought that in each region except for Campania, in which the communities are arranged in strict alphabetical order, entries were organized according to 'gromatic considerations'. What he meant by this is obscure to me. Facts about the survey of the territory of communities are listed in varying degrees of detail, but the presentation of this material does not readily fall into any pattern.

[^24]:    ${ }^{125}$ See the translation by Bouma, op. cit. (n. 5); Dilke, Caesarodunum (1974).
    ${ }^{126}$ See Josephson, Casae Litterarum.
    ${ }^{127}$ The suggestion of a school exercise was made by Mommsen (BJ (1895), 466-7), referring specifically to C $233-7=\mathrm{L} 327.4-331.7$; he also noted the 'barbarische Sprache' and general vacuousness of the contents.

[^25]:    ${ }^{128}$ Dilke, RLS, 31-4; Classen, ICS (1994), and see below, p. 326, n. 25.
    ${ }_{139}^{129}$ Herodotus 2.109; Diodorus Siculus 1.81.2; Strabo 17.787
    ${ }^{130}$ See Jameson in Murray and Price, The Greek City (1990), 172-5, with fig. 14. Note also the evocative book by Hanson, The Other Greeks (1995), on Greek agricultural life, especially 194-6; Osborne, Classical Landscape with Figures: The Ancient Greek City and its Countryside (1987).
    ${ }^{131}$ Dilke, RLS, 26-30.

[^26]:    ${ }^{132}$ Though perhaps not written by him; see p. 445, n. 13
    ${ }^{133}$ See Syme, $\operatorname{JRS}(1937)=R P \mathrm{I}, 31-41$, esp. 38-41. Decidius Saxa may have been a centurion or an eques, and possibly served as one of the commission of seven set up under the land bill of Antony in 44 b.c. to divide Italian lands. For the military surveyor, see also Lucan, Bellum Civile 1.381-2: 'Castra super Tusci si ponere Thybridis undas/ Hesperios audax veniam metator in agros'.

[^27]:    ${ }^{134}$ Amores 3.8.41-2; cf. Metam. 1.135-6: 'The meticulous surveyor marked out with a long limes the ground that had previously belonged to everyone, just like sunlight and air'. Ovid emphasizes the adjective cautus by placing it at the start of the line. For the ploughing of the first furrow, see Misurare, 140-2; Gargola, Lands, 73-5; 165-6; Eckstein, CSCA (1979), argued that the ritual ploughing ceremony was held to constitute the formal founding of a colony.
    ${ }^{135}$ Silvae 4.3.40-2.
    ${ }^{136}$ See below, pp. liv-v.
    ${ }^{137}$ Cicero (De Off. 1.151 ) thought that medicine, architecture, and teaching were worthwhile and respectable occupations for those people who were socially fitted for them.
    ${ }^{138}$ See above, p. xxviii.
    ${ }^{139} R R$ 5.1.3-4. Cf. also Varro ( $R R 1.10 .2$ ) who mentions the frequent use of technical terminology by surveyors in land measurement.

[^28]:    ${ }^{140}$ FIR $^{2}$ I, no. 72.
    ${ }^{141}$ Pliny, Ep. 10.17B; mensor here may refer to a quantity surveyor (see Sherwin-White, The Letters of Pliny (1966), 584), but doubtless quantity surveyors received a similar all-round training and had a similar status; 18 ('I (Trajan) have scarcely enough surveyors for the public works that are in progress in Rome and the vicinity. But dependable surveyors can be found in every province, and if you make diligent enquiries you will not be short of them'); 40 (architects-'No province lacks skilled and trained men'); 62 (engineers).
    An inscription from Smyrna, which mentions a man of twenty-two as 'best in the law, and first of land measurers' (Malay and Gül, ZPE (1983), 283), may in fact refer to his skill in geometry.
    ${ }^{142}$ CIL V. $6786=$ ILS 7736 (see PI. I). The freedman status of Aebutius suggests that he cannot have been a military surveyor (most of whom seem to be ordinary soldiers), and the weapons carved at the top of the tombstone may conventionally represent valour rather than military service.
    We may also note the work of Balbus, probably from the late first or early second century A.D. (above, pp. $\mathrm{xxxix}-\mathrm{xl}$ ), in which he speaks highly of the standing of his profession and the interest in it.
    ${ }^{143}$ ILS 5795. Translation in Campbell, The Roman Army: A Sourcebook (1994), 125-6.

[^29]:    ${ }^{144}$ Digest 10.1.8; 1.4 (Paul).
    ${ }^{145}$ Digest 11.6. An action in factum meant that if the simple fact on which a plaintiff based his case was proved, the judge could condemn the defendant. The procedure permitted the praetor to grant an action in situations not previously protected by the law.
    ${ }^{146}$ Septimius Severus laid down that architects should be subject to the same provision, and Ulpian thought that accountants should also be included (Digest 11.6.7. 3-4).
    ${ }^{147}$ C $47.46-49.1=$ T $50.17-19=\mathrm{L} 90.16-18$, and see above, p. xxxii.
    ${ }^{148}$ See for example, Livy, $9.28 .8 ; 10.21 .9 ; 32.29 .4 ; 34.45 .2$ (in this case a consul in office, Ti. Sempronius Longus, served as a commissioner); 34.53.2; 37.46.10. In the period after the proposed Rullan land bill in 63 b.c., commissioners could have imperium. For the families of founders, see MacKendrick, Athenaeum (1954), esp. 225-6.

[^30]:    ${ }^{149}$ Agrar. 2.32; 34; 45; 53; see Nicolet, Latomus (1970)
    ${ }^{150}$ CIL I. 1109 = XIV. 23 (Ostia); 1244 (Naples); II. 1598 (Baetica); III. 1220 (Dacia); 2124 (Salonae); 2128 (Salonae); 6041 (Berytus); IV. 5405 (Pompeii); 5407 (Pompeii); V. 3155 (Vicetia); 5315 (Comum); 6786 (=ILS 7736 ) (Eporedia); 8319 (Aquileia); VI.198; 905; 3988; 6321; 8912; 8913; 9619; 9620; 9621 (all from Rome); VII. 420 ( $=$ RIB 1024) (Piercebridge); VIII.8812; 12636; 12637; 12638 (=ILS 7738a); 12639; 12912; 12913; 24690; 25988 (= ILS 9387) (all from Africa); IX. 699 (Sipontum); 821 (Luceria); XII. 4490 (Narbo); IG V(i).1431, 40 (Messene); IGR I.709, 8 (Philippopolis); AE 1942-3.35 (Africa); 1980.53 (Rome); 1982.896 (Asia); Arrangio Ruiz and Pugliese Carratelli, PP (1955), no. 79 (Herculaneum). See RE VII (1912), s.v. gromatici col. 1891; RE XV 1 (1931), s.v. mensor cols. 956-7; Hinrichs, Institutionen, 158-70; Sherk, 'Military maps', 546, n. 37.

    Some surveyors have Greek names, but Hinrichs' suggestion (Institutionen, 165; cf. 107-12) that there was a surveying school in Alexandria in the imperial period is speculative. In any case, the surveying writers of the Corpus appear to be distinctly Roman, in their methods and interests, and in their view of landholding. For the influence of Greek land measuring on Roman practices, see above, pp. xlv-xlvi.
    ${ }^{151}$ Freedmen (those marked * are imperial freedmen)-CIL I.1109; 1244; V.3155; 6786; VI.8912*; 8913*; VIII.12639*; 25988*; XII.4490*; IG V(i).1431, 40*; AE 1980.53*.

    Slaves (those marked * are imperial slaves)-CIL III.2128*; VI.9621; VIII.12912*; 12913*; 12637*; 24690*; IX.699; 821; AE 1942-3.35*.

    Possibly freemen-CIL II.1598; III.2124; 6041; V.5315; VI.198; VIII.8812; 12638; IGR I.709, 8. None of these appears to be of senatorial or equestrian rank.
    ${ }^{52}$ CIL VIII. $25988=$ ILS 9387.
    ${ }^{153}$ CIL VIII. 8812.
    ${ }^{154}$ CIL V.5315. For a surveyor employed privately, see Digest 10.1.4.1 (see above, p. xlviii).

[^31]:    ${ }^{155}$ See above, p. xlviii. Hinrichs' attempt to place surveyors in categories-'in the service of the imperial tabularia', 'in the service of communities', and 'independent' (Institutionen, 160-70), is in my view too schematic. Furthermore, the evidence he assembles ( $160-1$ ) fails to show that there was a regular system for attaching surveyors to the office of imperial officials; his best support is found in: (i) the series of grave inscriptions of surveyors (mainly imperial slaves or freedmen) from Carthage in Africa Proconsularis, perhaps dating to the late first century a.d. (CIL VIII.12636-9; 12912-3; 24690). But this evidence tells us only that surveyors attached to the imperial household were operating here, not their official position or normal role; (ii) the inscription from Piercebridge in Britain (CIL VII.420), which mentions Attonius Quintianus, a surveyor ex CC imp, which Mommsen expanded to ex ducenario imperatoris. This expression is unparalleled and the interpretation uncertain. In any case, it need not mean that Quintianus was permanently attached to the office of the procurator.

    There is no reason why imperial freedmen could not work where they chose, and there is only one apparent example of a freeman working as mensor publicus (CIL V.5315), as noted above, p. 1 .
    ${ }^{156}$ For military surveyors and their functions, see Sherk, 'Military maps', 534-62. He argued (549) that each legion had eleven surveyors, on the basis of an inscription from Viminacium (CIL III.8112, A.D. 228), where eleven are named in a list that is complete. Each cohort then would have one surveyor, with two in the first cohort which was probably double in size. But it is an unwarranted assumption that this inscription is typical; it may be that additional surveyors were serving in this legion for reasons unknown to us. Moreover, it tells us nothing about normal legionary practice in the first two centuries A.D. Eleven surveyors per legion would mean that in the late second century there were 363 legionary surveyors alone, yet in Africa Nonius Datus was apparently the only military surveyor available (above, p. xlviii). Similarly $A E 1904.72$ (Sherk, op. cit., 548) cannot be taken as demonstrating that nine surveyors were the normal complement of the III Augusta.
    ${ }^{157}$ C $247.32-5=$ L 251.1-17.
    ${ }_{159}^{158}$ Above, p. xlviii.
    ${ }^{159}$ See Appendix 3.
    ${ }^{160}$ The procedures are described in the De Munitionibus Castrorum (see Lenel, Pseudo-Hygin (1979)).
    ${ }^{161}$ De Mun. Cast. 12; Hyginus 2 (C 143.41-6).
    ${ }^{162}$ For the building of Roman roads, see Chevallier, Roman Roads (1989), esp. ch. 2.

[^32]:    ${ }^{163} A E 1947.61$ (Verona). Sherk, op. cit. (n. 156), 550, took [ch]orographiar(ius) as the equivalent of mensor. However, Nicolet, MEFRA (1988), understood the text as '[ch]orographiar(um) [ite]m caelatori', translating as 'engraver of maps'.
    This section on the duties of military surveyors owes much to Sherk, op. cit., 550-8. Sherk speculates that surveyors, who had been trained in the army, became civilian surveyors after their discharge; there is no evidence for this.
    ${ }^{164}$ Jones (LRE, 1013-14) translates geometra as 'surveyor'. The usual term in the Late Empire for 'surveyor' was agrimensor or gromaticus; mensor had come to refer to a billeting officer (see Jones, LRE, 367-9; 581-2).
    ${ }^{165}$ CJ 3.39.3 = CTh. 2.26.1.
    ${ }^{166}$ Variae 3.52.

[^33]:    ${ }^{167}$ Dilke's analysis of the training of land surveyors ( $R L S, 47-65$ ) is based on material gleaned from the texts in the Corpus.
    ${ }^{168}$ See above, p. xlvii.

[^34]:    ${ }^{169}$ Discussion of this theme can be found in: Dilke, RLS, 133-77; Hinrichs, Institutionen, 23-157; ClavelLévêque, Cadastres, 51-183; Chouquer, Structures agraires, 3-57; Gabba, Athenaeum (1985); idem in Behrends, Feldmesskunst, 398-409; Chouquer and Favory, LAR, 101-67; Galsterer in Feldmesskunst, 412-28; Gargola, Lands, is excellent on the state apparatus that oversaw the division and allocation of land, and the procedures involved; see esp. chs 8-9; Campbell, JRS (1996); below, Appendix 5.
    ${ }_{171}^{170}$ See p. 339, n. 30
    ${ }_{172}^{17}$ Appian, BC 1.96. For the numbers settled, see Brunt, $I M, 300-12$.
    ${ }^{172}$ See Brunt, IM, 255-9; 319-44; 473-512; Keppie, CSVI, 49-86.

[^35]:    ${ }^{173}$ Lines 71-3. Cf. 9.4; Propertius 4.1.127-30; Appian, BC 5.12. This period is well characterized by Dyson, Community and Society in Roman Italy (1992), 89-96; see also Keppie, CVSI, 101-33.
    ${ }^{174} R G 16 ; 28$. Augustus refers to twenty-eight colonies in Italy, and foundations in Africa, Sicily, Macedonia, both Spanish provinces, Achaea, Asia, Syria, Gallia Narbonensis, Pisidia. For strategic locations, see Campbell, $J R S$ (1996), 82. For the position of Aosta, see Keppie, CVSI, 205-6. Direct association with distributing land to soldiers is illustrated by a coin minted after the Perusine War of 41 b.c., on which Octavian is depicted with a military standard, a legionary eagle, a plough, and a decempeda (land-measuring pole); see Crawford, Roman Republican Coinage I (1974), 529-30, no. 525.
    ${ }_{176}$ See Campbell, JRS (1996), 94-8.
    ${ }_{176}^{177}$ Discussion in Mann, Legionary Recruitment and Veteran Settlement (1983); Keppie, PBSR (1984).
    ${ }^{177}$ AE 1975.251.
    ${ }^{178}$ SEG XVII. $584=$ Smallwood, Documents Illustrating the Reigns of Nerva, Trajan and Hadrian (1966), no. 313; translation in Campbell, The Roman Army: A Sourcebook (1994), 220.

[^36]:    ${ }^{179}$ ILS $6105=M W 486$; translation in Campbell, op. cit. (n. 178), 218
    ${ }^{180}$ Gift of land-Urbicus (C $37.29=$ T $40.5-6=$ L $80.5-6$ ); $I L S 5960$ (Hadrian); $L L S 5965$ (Severus Alexander). Change in status-(C $43.7-13=\mathrm{T} 45.9-15=\mathrm{L} 84.22-28$ ). Restoring land-Smallwood, Documents Illustrating the Reigns of Gaius Claudius and Nero (1967), no. 388.
    ${ }_{182}^{181}$ See Appendix 3.
    ${ }^{182}$ See p. 344, n. 47.
    ${ }^{183}$ Discussion in Campbell, JRS (1996), 80-94.

[^37]:    ${ }_{184}^{184}$ Appendix 2.
    ${ }^{185}$ Appendix 3.
    ${ }_{186}$ CIL XI. 1147 ( $=$ ILS 6675); CIL IX. 1455 ( $=$ ILS 6509).
    ${ }^{187}$ See Sáez Fernández, Habis (1990); Clavel-Lévêque, Estudios de la Antigüedad (1993); Gorges, MCV (1993); above p. xxiv.
    ${ }_{188}^{188}$ Piganiol, Documents; Dilke, RLS, 159-77; see also p. 379, n. 55.
    ${ }^{189}$ Note especially the splendid work of John Bradford, Ancient Landscapes (see Pls II-V); and, in a military context, Kennedy and Riley, Rome's Desert Frontier from the Air (1990). In general, the introductory study by Wilson, Air Photo Interpretation for Archaeologists (1982), is helpful and stimulating; cf. also Chevallier, Bibliographie des applications archéologiques de la photographie aérienne (1957); Favory, Dossiers de l'archéologie (1980); Chouquer in Léva (ed.), Photographie aérienne (1982).

[^38]:    ${ }^{190}$ In recent years Clavel-Lévêque and other scholars (especially in Cadastres), and Chouquer (Structures agraires, and, with Favory, $L A R$ ) have sought to combine aerial photography with the use of maps and detailed on-site investigation, to examine Roman field-systems. See also, Gasparri, AION (1989); (1990). Furthermore, computer-assisted analysis of settlement patterns and the layout of limites has been developed by Peterson (in Rahtz (ed.), Computer Applications and Quantitative Methods in Archaeology (1988); in Huggett and Ryan (eds), Computer Applications and Quantitative Methods in Archaeology (1995)). He has also pursued an interesting theory concerning trigonometrical links between Roman roads and the layout of field-systems, which might permit the identification of centuriation even if there is no obvious grid (in Guillaumin, Mathématiques dans l'antiquité (1992), 185-96). The precise mathematical proportions of the layout of centuriation sites has also been explored by Clavel-Lévêque (in Guillaumin, Mathématiques dans l'antiquité, 161-76).

    For attempts to work out the layout of a field-system on the basis of discovered boundary stones, see Ramilli, AIV (1965-66)—Cittadella; Trousset, AntAfr (1978)-Tunisia; Meyer, SCI (1983/4)-Shavei Tziyyon in Israel.

    For place names at Hispellum, cf. Castagnoli, $R A L$ (1956), 377. For the use of medieval terminology in the analysis of Roman field-systems, with special reference to the region of Emilia, see Calzolari, Miscellanea di studi archeologici e di antichità (1983); note also the interesting use of the evidence of medieval documents relating to land close to Capua (Gentile, La romanità dell'agro campano alla luce dei suoi nomi locali (1971), 41).

    There is a general bibiliographical review (1958-68) of work on centuriation in Italy-Brizio, Archeologia Classica (1969); see also Paz López Paz, La Ciudad romana (1994), 337-87. Sections B and C of the bibliography in this volume note investigations carried out in some of the more significant and interesting sites in Italy and the provinces, where Roman field-systems have possibly been identified. For a summary see now ClavelLévêque and Vignot, Atlas historique (1998).
    ${ }^{191}$ See Gabba, Athenaeum (1985), 276-80; he believed that much was the work of Augustus. See too Keppie, CVSI, 187-95. There are also substantial remains of land division south of the river Po (cf. Bradford, Ancient Landscapes, 156-65; below, Pl. II).
    ${ }^{192}$ Investigation into possible Roman field-systems in Spain is being enthusiastically pursued; see in general Estudios sobre centuriaciones romanas en España (1974); López Paz, La Ciudad romana (1994). Note also Augusta Emerita (Mérida)—p. 345, n. 47; Gerunda (Girona)—Plana-Mallart, Estudios de la Antiguedad (1993), 99-117; near Barcelona-Aguilar Guillén, ibid., 119-31; area of Cerdanya-Olesti Vila, ibid., 133-54; near GranadaMarin Díaz et al., ibid., 155-73.

[^39]:    ${ }^{193}$ See Bradford, Ancient Landscapes, 175-93; Wilkes, Dalmatia (1969), 220-30; Keppie, CVSI, 203-4, arguing that Pola was a colony of Julius Caesar; Pls III-IV.
    ${ }^{194}$ For evidence relating to the subdivision of centuriae, see p. 340, n. 30.
    ${ }^{195}$ Barthel, BJ (1911), argued that a huge, inter-connected field-system had the intersection of its DM and KM between Ammaedara and Djebel Bou Hanech; see now Bradford, Ancient Landscapes, 193-207; Caillemer and Chevallier, Annales (1954; 1957); Atlas des centuriations romaines de Tunisie (1959); Chevallier, MEFR (1958); Trousset, AntAfr (1977); (1978); Wightman in Pedley (1980); Duval, Recherches archéologiques à Haïdra (1982); Misurare, 250-3; Favory in Clavel-Lévêque, Cadastres, 131-5; Peyras, AntAfr (1983); also Actes du III Colloque (1986); Chouquer, LAR, 96-7; below, Pl. V. For possible field-systems in Algeria, of. Soyer, AntAfr (1973); (1976); also in Clavel-Lévêque, Cadastres, 336-9.

[^40]:    ${ }^{196}$ Chouquer, Structures agraires, 14.
    ${ }^{197}$ Hyginus 1 (C 83.29-37); Siculus Flaccus (C 103.37-105.3).
    ${ }^{198}$ Chouquer, Structures agraires, 169-71.
    ${ }^{199}$ I am prepared to accept Chouquer's general contention that in the Augustan era the size of centuriae may have been smaller than in the late Republic (see Structures agraires, 253), although I have doubts about the methodology employed for dating individual systems; see p. 412, n. 79. Note also the comments of Patterson in his review of Chouquer in $J R S$ (1991), 215.
    ${ }^{200}$ Discussion in Campbell, JRS (1996), 82-4; 94-8.

[^41]:    ${ }^{201}$ See further, Camṕbell, JRS (1996), 85-6, and p. 399, n. 54.
    ${ }^{202}$ For the conceptualization of space by the drawing of lines, see Nicolet, L'inventaire du monde (1988), esp. chs 7-8; Purcell, JRS (1990), 178-82. For land division as a demonstration of the conqueror's power, see Purcell in Blagg and Millett, The Early Roman Empire in the West (1990), 7-29; Whittaker, Frontiers of the Roman Empire (1994), ch. 1.
    ${ }^{203}$ Jacques, Epigraphica (1987), esp. 56.
    ${ }^{204}$ For the importance of pasture land in the Republic and its occupation by the rich, see Crawford, The Roman Republic, 100-4.

[^42]:    * Brackets designate a manuscript cited for only part of the page; see also Index 5.

    Cross-references to the Commentum are not noted here. See pp. 51-75, where quotations from Frontinus are set in different type.
    5-6 cf. Hyginus 184.19 ; Sic. Flacc. 120.19
    20-1 cf. Sic. Flacc. 104.29
    24 of. Urbicus 38.1-8; Hyginus 198.16-17; Sic. Flacc. 122.12-17
    32 cf. Hyginus 2156.10

[^43]:    1－2 cf．Hyginus 2 156．13－14
    28 cf．Hyginus 196.25
    33 cf．Hyginus 198.10
    34－7 cf．Urbicus 36．6－8
    37－8 cf．Urbicus 36．11－13

[^44]:    1－2 cf．Urbicus 36．16－17
    17 cf．Hyginus 186.29
    19－20 cf．Sic．Flacc．104．15－16
    32－5 of．Hyginus 2 156．10－11

[^45]:    1－4 cf．Hyginus 2 136．18；24－6
    5－7 cf．Hyginus 2 131．24－5
    9－15 cf．Hyginus 2 131．24－9
    11－12 cf．Sic．Flacc．118．35－6
    12－15 cf．Sic．Flacc．120．2－3
    29－31 cf．Hyginus 2 136．18－19；144．28－9
    31－2 cf．Hyginus 2 136．22－4
    35－p．12．1 cf．Sic．Flacc．126．26－8

[^46]:    20－2 cf．Frontin． 4.4
    23－7 cf．Urbicus 28．8－10
    32 cf．Frontin． 4.19

[^47]:    1 cf．Frontin． 4.34
    6－8 cf．Frontin．4．34－6
    10－11 of．Frontin． 4.38
    13－15 cf．Comm．64．10－12
    16－17 cf．Frontin．6．1－2
    29 cf．Frontin． 6.3

[^48]:    1 cf．Frontin．6．21；Hyginus 198.15
    4－5 cf．Frontin．2．24－7
    7－8 cf．Frontin． 2.24
    13－20 cf．Hyginus 1 98．22－7；Comm．56．22－5
    15－16 cf．Frontin． 2.35
    22 cf．Frontin．6．5；Hyginus $190.18 f f$.
    33 cf．Hyginus 190.23 ff ．

[^49]:    4－7 cf．Hyginus 2 134．31ff．
    8－23 cf．Hyginus 2 152．28ff．
    24－6 cf．Hyginus 2 140．3ff．
    27－31 cf．Hyginus 2 138．27ff．
    31－2 cf．Hyginus 2 154．8－9

[^50]:    16－17 cf．Sic．Flacc． 106.22 ff ．
    24－6 cf．Hyginus $194.30-96.3$

[^51]:    18 cf．Frontin．6．5－6；Urbicus 38．22ff．
    18－20 cf．Sic．Flacc．116．23－6
    23 cf．Urbicus 38.33
    27－9 cf．Sic．Flacc．116．27－9
    31－p． 92.5 cf．Sic．Flacc．124．11－22

[^52]:    10 cf．Frontin．4．19；Urbicus 28．24ff．；Sic．Flacc．104．34ff．
    22－9 cf．Sic．Flacc．106．6－13
    24 cf．Urbicus 30．5－11
    34－7 cf．Sic．Flacc．110．18－23

[^53]:    2－3 cf．Sic．Flacc．104．38－106．2
    4－9 cf．Sic．Flacc．114．3ff．
    14 cf．Sic．Flace．112．34－114．2
    15－17 cf．Urbicus 28．31－6；Sic．Flacc．108．28－34
    18－20 cf．Sic．Flacc．108．9－18
    25 cf．Sic．Flacc． 106.6
    28 cf．Frontin．4．28；Urbicus 30.15 ff ．

[^54]:    15 cf．Frontin．6．21；Urbicus 38.1
    28 cf．Frontin．6．7；Urbicus 40.33
    29－34 cf．Sic．Flacc．130．23－8
    37 cf．Frontin．8．12；Urbicus 46.10

[^55]:    10ff. cf. Hyginus 194.18-20
    19-23 cf. Hyginus 1 96.20-4
    28-34 cf. Urbicus 28.31-6; Hyginus 1 94.15-17

[^56]:    9－12 cf．Frontin．10．21－4
    19 cf．Frontin．2．5；Hyginus 184.19
    35－6 cf．Hyginus $184.20-1$

[^57]:    3－4 cf．Hyginus 1 84．20－1
    12－16 cf．Frontin．2．24－9

[^58]:    4－6 cf．Hyginus 1 84．9－13
    6－10 cf．Hyginus $186.33-88.1$
    11－22 cf．Hyginus 1 90．31－92．5
    23－p． 126.5 cf．Hyginus $188.4-9$

[^59]:    1－6 cf．Hyginus 198．15－21
    7－11 cf．Hyginus $182.6-9 ; 84.14-17$
    12－14 cf．Hyginus $184.25-9$
    17－18 cf．Hyginus $198.24-5$
    23－8 cf．Hyginus $198.32-4$
    36－8 cf．Hyginus $186.22-9$

[^60]:    1-4 cf. Hyginus 1 84.27-30
    16-21 cf. Hyginus 2 142.6-11
    22-5 cf. Hyginus 186.22-4

[^61]:    3-4 cf. Frontin. 8.13
    8 cf. Hyginus 1 76.6-7
    15 cf. Frontin. 8.26-7
    18 cf. Frontin. 10.29
    22-6 cf. Frontin. 10.31-3
    28-9 cf. Frontin. 10.22-5; Sic. Flacc. 126.6-17
    32-3 cf. Sic. Flacc. 126.18-23

[^62]:    22-4 cf. Hyginus 1 76.5-7
    24-5 cf. Hyginus 1 76.25-6
    32-p. 154.6 cf. Hyginus $176.8-23$

[^63]:    8-9 cf. Hyginus 176.31-2
    34-p. 156.2 cf. Urbicus 42.31-4

[^64]:    6-9 cf. Hyginus 182.6-9; Sic. Flacc. 130.7-11
    13-14 cf. Frontin. 4.1-2
    25ff. cf. Hyginus 178.5-17

[^65]:    11－12 cf．Hyginus $178.1-2$
    15 cf．Frontin．8．1－2
    15－17 cf．Sic．Flacc．124．4－6
    $26-7$ cf．Sic．Flacc．122．11ff．

[^66]:    2ff. cf. Hyginus 192.20 ff .; Sic. Flacc. 106.19ff.; Nomina Lapidum 246.1ff.; Ordines finitionum 248.3ff.; Gaius and Theodosius 252.2ff.; Expositio limitum 260.19ff.

[^67]:    22

