

Mosaics of Knowledge: Representing Information in the Roman World by Andrew M. Riggsby

Jason C. Morris

Volume 2, numéro 1, 2021

URI : <https://id.erudit.org/iderudit/1087179ar>

DOI : <https://doi.org/10.33137/aestimatio.v2i1.37732>

[Aller au sommaire du numéro](#)

Éditeur(s)

Institute for Research in Classical Philosophy and Science

ISSN

1549-4470 (imprimé)

1549-4497 (numérique)

[Découvrir la revue](#)

Citer ce compte rendu

Morris, J. (2021). Compte rendu de [Mosaics of Knowledge: Representing Information in the Roman World by Andrew M. Riggsby]. *Aestimatio*, 2(1), 199–212. <https://doi.org/10.33137/aestimatio.v2i1.37732>

© Jason C. Morris, 2021



Ce document est protégé par la loi sur le droit d'auteur. L'utilisation des services d'Érudit (y compris la reproduction) est assujettie à sa politique d'utilisation que vous pouvez consulter en ligne.

<https://apropos.erudit.org/fr/usagers/politique-dutilisation/>

érudit

Cet article est diffusé et préservé par Érudit.

Érudit est un consortium interuniversitaire sans but lucratif composé de l'Université de Montréal, l'Université Laval et l'Université du Québec à Montréal. Il a pour mission la promotion et la valorisation de la recherche.

<https://www.erudit.org/fr/>

Mosaics of Knowledge: Representing Information in the Roman World by
Andrew M. Riggsby

Oxford/New York: Oxford University Press, 2019. Pp. xvi + 248, 8 pages of
plates. ISBN 978-01-9063-250-2. Cloth £47.99

Reviewed by

Jason C. Morris*

Independent Scholar

Baltimore, MD

Claudius.caecus@gmail.com

With *Mosaics of Knowledge*, Andrew Riggsby has produced a very ambitious and thought-provoking book. Like Daryn Lehoux's *What Did the Romans Know?* [2012], Riggsby's new book reminds us that the Romans did not see science or technology as we do. However, where Lehoux focuses on a philosophical exploration of how the Romans made sense of the natural world, and why they saw such a different world from the one that we do, Riggsby explores how the Romans understood and used several types of information technology. Here I summarize and comment on what I consider to be the key contributions of each chapter. At the end of the review, I will give some general comments on the book as a whole.

In the introduction, Riggsby explains that he has set out to investigate conceptual developments in Roman information technologies. More specifically, he focuses on Latin and visual forms of information technology used in the period before AD 300. Though some may question Riggsby's choice to focus primarily on Latin documents—since Antonia Sarri and others have demonstrated that Greek documentary practices had a profound impact on the ways in which the Romans used written documents—his choice is a sound method of restricting the scope of his data and structuring his study. As Riggsby points out, many forms of information technology are specialized uses of writing, and therefore linguistically specific. With the possible exception of Roman wall-paintings, every form of technology that Riggsby

* JASON MORRIS specializes in ancient science, technology, geography, and surveying, as well as in the social role of both technicians and technical literature in the Roman Empire. He gained his PhD in ancient history from the University of Leicester in 2016, and is at present adapting his PhD thesis into the monograph *Shaping the Roman Empire: Agrimensores and the Making of the Roman World*.

considers is embedded in the Latin alphabet, the Latin language, and the ways in which the Romans used writing.

Riggsby is primarily interested in ordered and nested lists, tables, measurements, and maps. He also devotes attention to how Roman painters communicated a sense of perspective in landscape paintings. To explore these forms of technology, Riggsby spends a great deal of time working out definitions for terms like “list”, “table”, and “map”. This devotion to definition is because Riggsby is trying to capture features of Roman practice that line up only approximately with any particular language’s lexicon, and which were generally not theorized in antiquity. Riggsby’s method of establishing his definitions and conducting his analysis of each type of technology involves evaluating its form and function along with the relationship between its function and form within Roman society. This is to say, he asks what functional features form a particular technology’s identity and, based on that information, how and why the Romans made use of it. Riggsby augments his methodology by drawing on concepts from information and library science, cognitive psychology, and art theory. His use of these modern, scientific tools means that Riggsby does not directly engage with the more philosophical bent of Lehoux’s scholarship; however, he does ask some of the same questions about how the Romans knew what they knew. This is particularly true in chapters 3 through 5.

In the first chapter, Riggsby explores the nature of ordered lists, indexed lists, tables of contents, and nested lists. Following Jack Goody’s research [1977], Riggsby argues that lists are specialized technologies of writing, which depend on both discontinuity and physical placement within a document to establish a precise beginning and ending so that a person can read them in various ways.

An important type of list that the modern world takes for granted is the table of contents. Riggsby, by looking at five surviving examples of Roman tables of contents, shows that the Romans only generated tables of contents for multi-book works that did not have a particular internal structure of their own. As Riggsby points out, these works tended to be confined to technical and encyclopedic texts such as Pliny the Elder’s *Natural History*. Riggsby further argues that Romans regarded the table of contents as a form of paratext or extraneous matter attached to the main body of an author’s work. According to Riggsby, the Romans were suspicious of such material and tended to avoid it. However, I suspect the Roman attitude to paratextual material was more contextual than Riggsby makes it out to be since technical

authors such as Vitruvius included a considerable amount of paratextual material in their work.

Another type of list that we tend to take for granted is alphabetic. Riggsby produces documentary evidence to show that while the Romans developed complex forms of alphabetization, they preferred to organize information in a list using topical categories such as geographic location or social order for intellectual and aesthetic appeal. They tended to reserve alphabetical order for utilitarian texts, such as educational or administrative documents, or for instances where such order allowed the author to assert himself as an intellectual authority.

The numbered list was by far the most common form of ordered list in the Roman world. However, Riggsby notes some interesting cultural restrictions on the ways in which the Romans used it. In administrative and legal documents, the numbered list was used only for the internal organization of the document itself. Nor did Romans use these numbered sections to cross reference, as modern scholars do with footnotes. Numbered sections were mentioned in a document or literary text to give authority as a technical specialist to the author. I would tend to agree with Riggsby that this cultural tendency stems from the absence of standardized texts produced by modern printing methods.

Lastly, the Romans seem to have used numbered lists to form nested lists, which is logical since nested lists are lists of lists; these were relatively common in antiquity. Riggsby focuses on five groups of lists that were three layers deep and therefore numbered for the sake of organization: military discharge certificates, Egyptian composite rolls, birth registers, Roman senatorial decrees, and the roster of Rome's grain dole. These collections of texts were almost exclusively official documents, and I think that Riggsby is correct when he argues that most were organized using the date or a sequential number assigned to the tabula or document collection, as well as numbers assigned to the individual documents included in the larger collection.

Nested lists are particularly important since they form part of the theoretical foundation for Riggsby's discussion of tables in chapter 2. This discussion builds on Riggsby's earlier article on the same subject and is one of the most structurally complex of the entire book [2018, 57–70]. This complexity is increased by the fact that some of the essential theoretical knowledge of cognitive psychology, which the reader needs to understand Riggsby's argument, comes near the end of the chapter.

For Riggsby, tables are a product of distributive cognition. Through the user's mental manipulation, tables redistribute information from lists into rows and columns that give a visible form to abstractions. By providing that visible form, they bring out structural or relational aspects of information, and allow the viewer to cut across categories of data. Though I recognize that the human brain has not changed much since Roman times, I am not sure that modern concepts such as this should be rigidly applied to ancient understandings of technology. Fortunately, Riggsby only uses his definition as a guide to look for signs of tabular thinking or structure in the form and function of ancient documents.

To demonstrate that the Romans understood the concept of tabular thinking, Riggsby quotes a passage from Varro's *On the Latin Language*, in which Varro explains to the reader how to "construct" a table that can be used to understand Latin grammatical forms. This table, as Riggsby points out, is a hypothetical construct that each reader has to build for themselves, and thus does not constitute proof that tables were common in the Roman world. Indeed, Riggsby can only point to one surviving indisputable example of a table from the Roman period: the Roman survey map called a *forma*. The *forma*, represented by a few bronze and marble fragments with numbered and lettered grid squares carved into them, were used to record the allocation of land to Roman veterans through the system known as centuriation. Through a close reading of numerous documents, Riggsby deduces that the Romans may have used tables to compile the records for the distribution of grain to veterans in the records of water distribution at Rome and in some military administrative documents. If he is correct about this, and I think that he is, then the *exempla* that he provides should be seen as widely scattered, showing neither a geographical localization nor clear evolution over time.

While I agree with Riggsby that the evidence shows that tables were not particularly prevalent in the Roman world, I find his explanation for why this was so to be less than complete. He first argues that tables are a specialized type of written document that require a cognitively complex understanding of representational conventions that only a few could appreciate. Therefore, only isolated individuals developed tabular thinking to solve particular localized problems at a particular time. Moreover, those individuals developed tables from what Riggsby calls living documents; texts that multiple users continuously augmented and rewrote. He further argues that this development was retarded in the Roman world because tables were more paratextual than lists, a contention that assumes that the Romans felt the

need to embed all their written communicative practices in linear texts. Finally, he contends that the Romans had a *horror vacui* or the conscious avoidance of blank space in the structure of a written document.

Because of recent scholarship, I am not fully convinced by Riggsby's last two points. First, Antonia Sarri has cogently argued that the Romans made use of blank space to structure and annotate documents [2018, 111–112]. Her observations suggest to me that the problems with blank space that Riggsby has identified are more complex than he allows them to be. For example, some of the problems that he identifies may stem from the process of transcribing a text from a written document to an inscribed stone. Some of the problems may also stem from more than one person's working on a single "living" document over an extended period.

Second, as I indicated above, I think that the issue of paratextual texts needs more consideration. Looking at the types of tables that he has identified as having a tabular structure shows that they were all produced either by scribes, soldiers trained as scribes, or land surveyors. All three form a restrictive group of technical professionals who were given specialized training through a system of apprenticeship that was quite different from schooling in either the ancient or modern sense. While little research has been done on the apprenticeships used to train literate craftspeople such as doctors, architects, or surveyors, my work on the Roman *agrimensores* leads me to suspect that tables and tabular thinking were primarily developed and used by technical specialists through their systems of apprenticeship [Mattern 2013, 38–45; Haris-Mccoy 2017, 115–120; Morris 2019, 122].

While Riggsby does not state it in so many words, technical training and the ways in which it differed from general education in the Roman world plays an important part in his discussion of measurements in chapter 3. As he remarks at the start of this ground-breaking chapter, Roman technical writers imagined a world that perhaps lacked universal standards, but in which all measurement could nonetheless be brought under control by a massive system of conversion formulae. Riggsby further contends that this ambition to control things through quantification failed because what truly mattered was where, what, why, and how things were measured in the Roman world. In other words, measurement was a matter of the particular context in which it was carried out.

To demonstrate this point, Riggsby looks at several "dimensions" of measurement that include volume, weight, length or distance, the passage of time, and price. It is here that Riggsby, like Lehoux, is interested in Roman

systems of knowing and the ways in which people in the Roman world established the “truth” of measurement.

To begin with, Riggsby argues that the Romans, rather than using metonymic units of measurement, frequently had recourse to proportional measurement. This meant that one person’s unit of measurement did not need to be the same as anyone else’s for a given procedure of measurement to work. This was important because people in the Roman world resisted the metonymic abstraction of units of measure. Such resistance was in part due to the fact that all units of measurement were derived from real things such as the human body. These units vary greatly from place to place, and the concrete model used to establish them often seems to have remained fixed in the minds of Roman measurers, in part perhaps because no particular standard foot was more authentically a foot than any other.

Furthermore, as Riggsby shows, the resistance to metonymic abstraction was also due to the absence of standardized units of measurement issued by the Roman administration. Riggsby does not provide a single concrete reason as to why Rome never regulated weights and measures across the empire. But one reason may have been the difficulty of establishing and enforcing a fixed, reproducible unit for each “dimension” of measurement that everyone in the empire would accept. The Roman authorities also liked to leave as much of the day-to-day work of administration to local civic governments as possible. However, while cities throughout the Roman world passed regulations to prevent people from tampering with their established systems of measurement, they also often let powerful private citizens either set the standards or provide the publicly available equipment used for weighing and measuring.

This tendency to localize and privatize metrology in antiquity meant that market forces had far less opportunity to regulate measurement than they do in the modern world. Instead of relying on a common set of conventions, mercantile agents negotiating in the marketplace would simply not assume that their units were the same as another person’s. Nor did they presume that two measures which looked similar were necessarily equal in practice. As a consequence, people tended to negotiate the system of weights and measures used as part of a transaction. In essence, a large part of buying and selling came down to a question of “my scale and weights or yours?”

All of this meant that there was a preference for simplification in the units of measurement used, and a frequent though often covert recourse to rough approximations in the measurements made. According to Riggsby, Romans

preferred to simplify calculations by using just a few common units such as the foot and mile, even when highly exacting theoretical systems of measurement existed. The one exception to this tendency was among technical professionals such as surveyors and architects, who may have made use of the full range of available metrological systems. However, even technical experts often rounded figures to the nearest half or whole number when providing information to include in a report or inscribe on a public monument. Part of the reason for this was that people in antiquity, like many people today, simply were not interested in exact measurements. Moreover, even if they did care, the average person in the Roman world lacked the time, tools, and necessary skills to check measurements down to the last digit.

In light of this, it is perhaps surprising to find rather exact measurements in some contexts. For example, some people recorded the life-span of a loved one down to the exact number of days that they lived. Since time was only inexactly measured in the Roman world, it is unlikely that most people truly had access to such detailed information. Riggsby explains this tendency to detail as an appeal to the authority of precise measurement or to what Riggsby terms “precisionism”.

In his fourth chapter, Riggsby steps away from the usual areas of science and technology to look at the work of one particular group of craftspeople, Roman painters. He specifically focuses on how they communicated the concept of space in landscape paintings. Such a topic might suggest that the chapter is of more interest to art historians than historians of science, but he introduces some principles of color use and orientation that are important for his discussion of maps in chapter 5.

Riggsby devotes the first third of the chapter to a discussion of how space has been understood in paintings by art historians over the last three decades. However, most of the chapter is given over to the close examination of how space is presented in three sets of paintings dating to around 20 BC: a group of paintings originally from a columbarium found on the grounds of the Villa Doria Pamphilj in Rome, another group from the walls of the suburban villa found under the Villa Farnesina, also in Rome, and some stucco ceiling reliefs again from the “villa under the Farnesina”.

Using these collections, Riggsby illustrates four features used by Roman artists to convey a sense of depth or distance in their paintings, none of which seem controversial to me: superposition, “atmospheric perspective”, depth of relief, and distinctive perspectives in scale. Superposition, or stacking, involves layering elements in the picture so that they overlap, making

the foremost figure appear closer to the viewer than those behind it. The concept of “atmospheric perspective” involves using color effects to articulate local spatial relations. When two figures overlap or nearly so in Roman paintings, the one in “front” is typically rendered in a dark red, while the one “behind” is in a less intense and usually bluer hue. Where color is not part of a presentation, such as in the Farnesina reliefs, the height of a relief carving is used to convey the same sense of depth.

As Riggsby explains it, distinctive perspectives in scale involves two concepts. First, it requires the viewer to understand that looking up at a picture equates to looking further into the distance. Second, drawing on that first principle, it also entails painting buildings and objects further up the wall smaller than those lower down so that they seem further away. As Riggsby admits, none of these tools provides mathematical perspective, but combined they do communicate the concept of three-dimensional space in a two-dimensional medium.

In many ways the fifth chapter of the book brings together some of the elements of chapters 3 and 4. Most of the chapter is given over to an analytic discussion of Roman maps, but Riggsby also considers the Romans’ use of data graphics, textual illustrations, and architectural plans to put maps into the broader context of information technology.

He begins the discussion by noting that most forms of symbolic or conventionalized data graphics, such as the scatterplot, pie chart, bar graph, timeline, and musical staff notation, all evolved in the context of printing technology. Furthermore, Riggsby argues that it is unlikely that the Romans would have developed such tools since they were generally suspicious of reducing real-world situations to disembodied numbers, something that all the data graphics mentioned here do. As Riggsby rightly notes, the only tools that the Romans used that might be said to function like a data graphic are the faces of the sundial and the wind rose [155–157].

Having disposed of data graphics, Riggsby moves on to the rare instances in which textual illustrations are found in Latin literature. This discussion is one of the few weak points in the book. He observes that books in antiquity had to be copied by hand, and citing the evidence of Pliny the Elder, he argues that illustrations were hard to reproduce since they required technical specialists. This of course does not mean that Latin texts were never illustrated, but it does restrict the contexts in which illustrations were used.

As Riggsby points out, with the exception of an illustrated edition of Varro's lost lives of great men, illustrations primarily appear in utilitarian contexts. Prominent examples include the *Corpus Agrimensorum Romanorum* (Writings of the Roman land surveyors), Vitruvius' work on architecture, botanical literature, and possibly a series of sex manuals.

From this range of data, Riggsby deduces that illustrations were not particularly common in Latin literary texts, and that when illustrations were included they were schematic or geometrical in nature. Drawing on Pierre Gros' work on Vitruvius, he also argues that Roman concepts of discourse among the political elite influenced where, when, and how illustrations were used in Latin literature.

Riggsby's discussion of textual illustrations and their use would have benefited from some engagement with Courtney Roby's recent study of mechanical diagrams in Greek technical literature [2016, 152–191]. Roby shows that there was a complicated relationship between diagrams and the written texts within which they were embedded, and that this relationship allowed technical literature to transcend a particular audience. Riggsby's third point—on influence—deserves further investigation. However, his first two arguments—that illustrations were uncommon and schematic—seem to me to be inconclusive at best. The only actual examples of illustrations in a Latin text that might be taken directly from the Roman period are preserved in the sixth-century manuscript of the *Corpus Agrimensorum Romanorum*. We only know about illustrations in other Latin works like Vitruvius' because they are either mentioned directly by the author or because other internal clues in the text suggest that an illustration was included in antiquity. Without such clues it is impossible to state whether or not illustrations were part of a text.

Where Riggsby's study of textual illustrations may be less than convincing, his examination of architectural plans is nothing less than outstanding. To begin with, he has compiled the most comprehensive catalog of surviving Roman architectural plans known to me. Using this catalog, which is situated at the end of the chapter, Riggsby distinguishes between three different types of plan. The first type, which he calls "part-oriented", focuses attention on the subcomponents of a structure through labeling. A second type, which he calls "building-oriented", presents structures as totalities. The third type, to which he does not give a specific name, models only particular components of a building.

The first and third types of plan seem to have been used as “blueprints”. Plans of the first type, which contained exact measurements and which were at least sometimes color-coded, may have also been used to advertise a patron’s euergetism. In such cases, the exact measurements can be seen as an example of the precisionism discussed in chapter 3.

The “building-oriented” plans focus on the built environment, illustrating man-made structures in the urban environment. They are largely iconic in their mode of representation, but there are also crucial symbolic/conventional features that give them the appearance of a floor plan. An interesting feature of these plans is that they seem to be drawn to scale, but this is deceptive. A comparison between the numerical lengths given on the plans shows that they do not correspond to the length of the sections of the building displayed. This means that the figures on the plans are not generally drawn to a uniform scale, no matter how neatly executed they appear.

Plans like these are not simply reproductions of what the drafter has seen. Nor are they simplifications or even composites of the kinds of things seen. These plans, regardless of how much observation and measurement went into their preparation, are necessarily works of imagination. Riggsby deduces that they were produced to document property ownership and water rights in and around the city of Rome. However, as his discussion of the *Forma Urbis Romae* shows, they could equally have been produced for propagandistic purposes.

Riggsby begins his discussion of maps proper by observing that scholars such as Kai Brodersen have ruled out the Romans’ use of such documents on the grounds that the surviving examples are either “one-dimensional” and/or not precisely to scale. He rightly feels that such a restrictive understanding of maps does more harm than good for two reasons. First, many modern maps are not precisely to scale, and yet they are considered maps. Second, this very narrow view of what counts as a cartographic representation of space stems from an unduly narrow take on what counts as space itself. As Riggsby shows in the case of landscape paintings in chapter 4, one needs to expand the definition to take in a different cultural view of mapping. For the purposes of his study, Riggsby defines a map as describing some physical space by establishing parallels between elements of the map and of reality. In other words, a map needs to “look like” the world in some sense, but it need not establish a systematic, mathematical projection between map and reality.

As with landscape paintings, it is important to understand that Roman maps created coherence by starting at the local level and building outward. Next, as part of that process, any attempt to attach distances or sizes to objects represented was necessarily an approximation in keeping with the discussion of measurements in chapter 3. As Riggsby points out, none of our complete representations gives a standard scale to convert represented length into actual distance. For this reason, what Roman maps did best was provide the viewer with a sense of proportional relationships.

To illustrate these points, Riggsby analyzes four examples of Roman cartography: the *Forma Urbis Romae*, the surveyor's *forma* (or map) from Orange, the Map of Agrippa, and the *Tabula Peutingeriana* or Peutinger map as it is commonly known. Riggsby's discussion of the *Forma Urbis Romae* (*FUR*) draws on his discussion of architectural plans earlier in the chapter. He persuasively argues that the *FUR* was a marble map of Rome made with a measurable scale of between 1 to 240 and 1 to 250. The scale varied in part because the carving techniques used did not allow for exact accuracy, and in part because the map was compiled from several different survey maps that were probably made at different periods. Riggsby speculates that the individual survey maps may be reflected in some of the "building-oriented" plans discussed above. However, like most other scholars, he feels that the *FUR* was constructed for propagandist purposes rather than as a record of Rome's urban infrastructure at any particular period.

Riggsby's discussion of the *forma* from Orange is somewhat more problematic. He demonstrates a sound grasp of centuriation, and clearly explains the system of coordinates used to locate individual units within the grid of *limits* or boundary roads that form the grid in the landscape. He also correctly deduces that a tabular reading of the grid locations depends on a geographic and, therefore a cartographic, reading of the document since the layout of the grid depends on the topographic features depicted on the plan. He also contends that the map has a compressed scale with a ratio of six to seven, suggesting that the map has been compressed along the top edge. A point that he overlooks is that the grid on the map has also been rotated some eight to ten degrees so that it appears to be oriented due north when in reality the colonial field system is oriented a little west of north. This may be an example of Roman approximation, but there are reasons to think that the slight change in alignment was deliberate.

To begin with, it is important to separate centuriation and Roman surveying. As Julian Dubouloz has demonstrated in his study of the *forma* from Orange, centuriation was a system of land management that depended upon

surveying, and not a system of surveying in its own right [Dubouloz 2012]. I along with others have argued that Roman surveying was in fact a dynamic system that involved connecting points in the landscape with lines of sight to enclose and map zones of habitation using Euclidian mathematics [Chouquer 2010, 89–92; Morris 2019, 123–128]. This means that Roman surveyors did not necessarily have to centuriate land in order to map it. The largest known uncenturiated civic territory that we can document as being surveyed and mapped by Roman surveyors was probably about 60 kilometers (37 miles) across, though circumstantial evidence suggests that they enclosed and mapped much larger areas [Morris 2019, 125–126, 135–139]. An important factor in considering the surveyor's *forma*, which Riggsby seems to understand without fully explaining, is that they did not strictly reproduce the landscape as people experienced it. As both Courtney Roby and I have recently argued, the surveyor's *forma* was a document that depended upon mathematics to transpose an inexact correspondence between the imperfect state of a real-world object perceived by our senses and the abstract conception of that object which exists only in the mind [Roby 2014, 24–25; Morris 2019, 130–131]. In other words, the surveyor's *forma* represented aspects of the real world, but depicted them as part of a preconceived conceptual framework. Such a framework suggests that the foreshortening of the *forma* from Orange, along with the rotation of the centuriation grid's alignment, was done deliberately both to make the map easier to read and to fit the mapped landscape into a preconceived conception of the world.

Riggsby addresses the Romans' conception of the world and their attitudes to world geography by looking at the so-called Map of Agrippa and the Peutinger map. In treating the first of these two documents, he presents some of the testimonial evidence for its existence, and reviews the state of scholarship on it. He then uses a philological approach to the textual evidence in Pliny the Elder to argue that the Map of Agrippa was indeed a graphic depiction of the world accompanied by a written commentary and not just a textual description. While I agree with Riggsby's interpretation, I am not sure that his arguments are any more or less persuasive than those of other scholars who have used a similar method to examine the evidence for this lost artifact.

To negotiate the complex issues involved in interpreting the Peutinger map and its depiction of the Roman road system, Riggsby first argues that a description or depiction of a network of roads is cognitively distinctive and is more complex than its linear components are individually. He notes that experiments on types of diagrams have shown that those with multiple

pathways among pairs of points are harder to process than those with only unique paths. He further contends that sets of lines are more like full maps than they are like individual lines. On this basis, the road network is less a practical guide and more a graphic illustration of the extensive and intensive reach of Roman power. While I think Riggsby is on to something here, proving this contention beyond dispute will take further engagement with recent work done by cognitive psychologists on the ways in which the brain encodes spatial information into memory through pattern processing to generate mental models of the environment.

Stepping beyond the issue of the road network on the Peutinger map, Riggsby observes that the document's creator goes to some cartographic lengths to center Rome and Italy in both the empire and the world. He further notes that the peculiar shape of this map is possible only if we imagine a mapmaker who already had a complex preconceived geographic vision of the world. As he further observes, the mapmaker compressed and expanded the various landmasses in idiosyncratic ways, but preserved their basic topological structure—including, importantly, the ways the coastlines, rivers, and mountain ranges are arranged relative to one another. Finally, Riggsby points out that pairs of sites that are north and south of each other in reality tend to remain so on the map. This suggests that the map is surprisingly regular in representing longitude.

While scholars have long recognized that the Romans could calculate latitude, and incorporated it into their cosmological thinking, their use of longitude is a very different matter. Scholars, including the author of this review, have long held that the Romans did not have an accurate method of calculating longitude [Morris 2019, 127–129]. However, if Riggsby is correct in arguing that the Peutinger map regularly presents longitude as well as latitudinal relationships properly, we will have to rethink our understanding of the Roman geographic consciousness and their use of cartography.

In a lengthy conclusion, Riggsby ties many of the threads of the disparate chapters together, as I have done here. He also argues that scholars should take a fresh look at Roman science with a more open-minded understanding of what constitutes science in the ancient world. To round things out, Riggsby provides an informed assessment of where scholars should go in the study of Roman science and the ways in which they can use *mosaics of knowledge* to get there.

By arguing for a more open-ended understanding of not just Roman cartography but Roman science, Riggsby more than justifies the publication of

Mosaics of Knowledge. However, the book goes well beyond that limited objective. It provides the first systematic look at how Romans used metrology. It also provides one of the first examinations of how Romans used tables and other forms of information technology.

The book has been well-produced by Oxford University Press. It is lavishly illustrated with 29 black-and-white photographs and eight color plates, all of which are of a higher quality than what I have come to expect from OUP. The typeface, if small, is neatly printed and of a high quality. Riggsby can take pride in an impressive work that should stimulate scholarly conversations in the years to come.

BIBLIOGRAPHY

- Chouquer, G. 2010. *La terre dans le monde romain: Anthropologie, droit, géographie*. Paris.
- Dubouloz, J. 2012. “Terres, territoire et juridiction dans les cités de l’Occident romain. Le regard des arpenteurs”. Pp. 79–128 in J. Dubouloz and A. Ingold edd. *Faire la preuve de la propriété droits et savoirs en Méditerranée (antiquité – temps modernes)*. Rome.
- Goody, J. 1977. *The Domestication of the Savage Mind*. Cambridge, UK.
- Haris-McCoy, D. 2017. “Making and Defending Claims to Authority in Vitruvius’ *De architectura*”. Pp. 115–120 in J. König and G. Woolf edd. *Authority and Expertise in Ancient Scientific Culture*. Cambridge, UK.
- Lehoux, D. 2012. *What Did the Romans Know? An Inquiry into Science and Worldmaking*. Chicago.
- Mattern, S. P. 2013. *Prince of Medicine: Galen in the Roman World*. Oxford.
- Morris, J. 2019. “*Forma factus est: Agrimensores and the Power of Geography*”. *Phoenix* 72.1–2:122.
- Riggsby, A. M. 2018. “Cognitive Aspects of Information Technology in the Roman World”. Pp. 57–70 in M. Anderson, D. Cairns, and M. Sprevak edd. *Distributed Cognition in Classical Antiquity*. Edinburgh.
- Roby, C. 2014. “Experiencing Geometry in Roman Surveyors’ Texts”. *Nuncius* 29: 24–25.
- 2016. *Technical Ekphrasis in Ancient Science and Literature: The Written Machine between Alexandria and Rome*. Cambridge, UK.
- Sarri, A. 2018. *Material Aspects of Letter Writing in the Graeco-Roman World, 500 BC – AD 300*. Berlin.