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A thesis presented for the degree of Doctor of Philosophy

Engineers Building Rome: A Group Picture

Department of Classics and Ancient History

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2024

Abstract

This thesis explores what individuals were connect to engineering works in Roman practice and in the Roman. It examines literary sources, epigraphical evidence, and material evidence using the cognitive anthropology lenses of community of practice and distributed cognition networks to shed light on the complex web of individuals connected to Roman engineering works. It begins by exploring diversity found within the engineering community of practice and exploring the benefits and challenges of etic and emic categorisations to understand engineering practice in the Roman world. The following chapters explore the role of engineering within a military context, the military's role as a training ground for engineers and the use of military engineering as a tool by those with greater political aims. The dichotomy and intersection of the role of engineering works in peace time is also examined. This thesis explores the impact of project management, the use of theoretical knowledge and practical ability and the engineer's role as a bridge between "doers" and "talkers". The connection between shaping the natural world and conceptions of *Romanitas* are also analyzed. The final chapter of the thesis investigates Roman responses to both engineering success and failure from the perspectives of those outside the community of practice and the engineers themselves. Key themes which emerge are the importance of virtue in the Roman understanding of engineering success and the contribution of Roman engineers to the *res publica*.

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Introduction

*With such an array of indispensable structures carrying so many waters, compare, if you will, the idle Pyramids or the useless, though famous, works of the Greeks!*¹

There are few things more evocative of ancient Rome in the modern imagination than the soaring walls of the Colosseum or the long arches of aqueducts marching their way across valleys from Spain to Syria. The enduring link between Rome and its construction projects is not derived only from a modern viewpoint but rather a longstanding connection that stretches back to the ancient Romans themselves. Engineering is fundamentally intertwined with both how we think about Ancient Romans today and how the Romans saw themselves. The central question of this thesis is what individuals in Roman practice and in the Roman imagination were involved in the work of engineering and in what ways were these people connected to each other.

I will explore the people who created these enduring symbols of Rome, focusing on the complex interworking between power and knowledge and what it meant to be involved in Roman engineering work. In exploring this question, a complex web of individuals from vastly different groups and social spheres in Roman society linked by threads of varying lengths and strengths to engineering work emerges. The threads that connect these different nodes to the central idea of “Roman Engineering” can be thought of as having two strands: one is the practical aspects of “doing” engineering work. The “doing” of engineering, the practical elements of creating the infrastructure in itself has a great deal of variety from the careful laying out of a water course to straight forward manual labour needed to move the raw materials to a

¹ Frontinus *De Aq.* 1.16 “Tot aquarum tam multis necessariis molibus pyramidas videlicet otiosas compares aut cetera inertia sed fama celebrata opera Graecorum”. trans. Loeb.

construction site. The second strand is the idea of engineering; if you will the “talking” strand. This second strand connects a whole new set of individuals to the work of engineering than has previously been fully appreciated in previous scholarship. This includes that authors of the technical texts who are increasingly being studied but also the audiences for these texts and at the edges of the nexus those who {thought about engineering as an important part of what it meant to be Roman}. As we shall see in the coming pages, these threads come in many varying weights and pushing on with this metaphor are dyed different colours. These two strands are often intertwined, and I contend that those connected with both strands can meaningfully be understood as Roman Engineers.

There has never been a shortage of attention paid to Roman engineering and technology with a particular flourishing in the Renaissance. This examination has spanned from the much read and applied study of architecture by Andrea Palladio in the 16th century to the recent quest to rediscover the underwater setting secrets of Roman concrete.² However, there has been less interest in the individuals responsible for these marvels and the social networks in which they were enmeshed. In this thesis, I bridge this disconnect by foregrounding the individuals involved in Roman engineering work and their place within the wider Roman world.

Studying Technology

Contemporary assessments of the state of ancient technologies have traditionally influenced the way we conceptualise Roman engineers. Moses Finley’s 1965 article “Technical Innovation and Economic Progress in the Ancient World” has historically been highly influential. Central to Finley’s assessment of the role of technology was the assertion that the

² On Palladian influence: Parissien 2000; Roman concrete: Brandon 2014.

economy from Classical Greece to the end of the Western Roman Empire did not change significantly. He argued that there was a “blockage” between the ideas conceived of by science and the technologies put into practical use in industries including farming, resource extraction and production of both food and finished goods.³ That is to say, the theoretical knowledge for far more advanced processes and technologies was available than was ever actually implemented. Finley suggested that the seeds of this “blockage” can be found in the common conviction starting from Aristotle that science and application should be strictly separated.⁴ He further argued that the “blockage” was caused in part by the disinterest of those with wealth to make large capital investment in technology and the consistent abundance of inexpensive labour.⁵ While Finley did incorporate some archaeological data, his main sources were textual evidence. He drew from a wide span of places and times, and included poetry, history and more technical texts. He concluded that throughout antiquity there was a contempt for artisan labour which cannot “be dismissed as empty rhetoric.”⁶

Though it was not the first to do so, Greene’s “Technological Innovation and Economic Progress in the Ancient World” challenged fundamentally this idea of “blockage”. It highlighted how archaeological discoveries in the intervening years had altered the understanding of the ancient economy since Finley’s article appeared. In particular, Greene argued for a far greater spread and integration of technology than previously thought.⁷ Greene notes that Finley was almost cavalier in his mixed use of sources, for example taking a quote from Xenophon and

³ The foundations to Finley's assessment were developed earlier in the 20th century by French scholars including Schuhl and Koyré. For more on the historiography: Cuomo 2022.

⁴ Finley 1965, 32.

⁵ Finley 1965, 43-44.

⁶ Finley 1965, 44.

⁷ Greene 2000, 31.

applying it to Roman Gaul.⁸ Throughout his article Greene’s background in archaeology and material culture is evident. Wilson’s 2002 “Machines, Power and the Ancient Economy” complements Greene’s work by demonstrating, largely through archaeological evidence, how water technology was central to economic success both in facilitating grain production and food processing, as well as in securing metal for coinage.⁹ Wilson highlighted the challenges of evaluating the use of technology from texts, arguing that the fact that more evidence of watermills from the 4th and 5th centuries CE exists, for instance, is due to an increase in the genera of texts which take interest in recording topics such as mills, rather than an actual increase in use.¹⁰ Wilson posited that the “blockage” theory was responsible for the long omission of architect or engineer as an archetypal Roman category or profession.¹¹

From De Camp, Landels and Hill, and to a lesser extent Burford, writing from the 1960s through to the turn of the century, to Oleson’s *Handbook of Engineering and Technology in the Classical World*, it is clear that a change in perspective on ancient technology has occurred.¹² Particularly the almost teleological narrative of progress towards civilization, most clearly evident in De Camp, is no longer supported.¹³ Moreover, the joint consideration of textual, epigraphical, visual representations and archaeological evidence is beginning to allow a better understanding of the ancient world. Our comprehension has advanced, not only at a large scale, such as the economic importance of mining technology for coin production, but also on a more personal level shedding light on the daily lives of segments of society traditionally less studied.

⁸ Greene 2000, 46.

⁹ Wilson 2002.

¹⁰ Wilson 2002, 41.

¹¹ Wilson 2002, 27.

¹² De Camp 1963; Finley 1965; Burford 1972; Landels 1978; Hill 1984; Oleson 2008.

¹³ First published in 1960s this book today feels dated and even at the time of its publication questions were raised concerning its attitudes to “civilization” and ethics: see Dales 1964. However, it has received broad readership and multiple reprintings and translations.

Considering the study of technology in general, we must recognize that far from being objective the history of technology is heavily “mythologized.” Technology and invention are closely linked in the English-speaking world. Generally histories of technology focus on some aspects of inventions which later prove to be successful: they highlight change rather than what remains consistent.¹⁴ Edgerton argues that there is a very pervasive narrative in how we understand technology and history which is captured in the statement: “Science and Technology museums [...] tell a story of novelty, firsts and of the future” while folkloric museums tell the story of the past.¹⁵ The narrative of technological advancement and change can result in a distorted view, in part because the highest levels of uptake of a technology are often long after its invention. In fact, this peak may come so far after innovation that the main period of use may fall well outside a technology’s place in the ‘story’ of technology. This is very sharply illustrated by horse power which was at its peak in the early part of the 20th century, long after the industrial steam revolution.¹⁶ To counter this distortion, Edgerton suggests that rather than thinking of the history of technology, it is more profitable to consider “technology in history – asking questions about the place of technology within wider historical processes.”¹⁷ This insight is particularly applicable to Roman engineering when studying ideas about invention. Recognizing this affinity for the novel allows us to temper older scholarship such as Hill and Landels that tend to imply that the Romans did not greatly contribute to inventions of new technology. Roman engineers’ application of known technology merits deeper consideration.

¹⁴ Edgerton 2007, 184.

¹⁵ Edgerton 2007, 28-9.

¹⁶ Edgerton 2007, 33.

¹⁷ Edgerton 2007, 211.

In the study of technology, whenever a technology is examined, there is a selection of what elements to consider and how to record them. These choices, whether active or subconscious, can offer a glimpse into the recorder's relationship with the technology and may even provide some indication as to their values. When Plutarch described the siege engines built by Archimedes for the defence of Syracuse he said: "To these he had by no means devoted himself as work worthy of his serious effort, but most of them were mere accessories of a geometry practised for amusement".¹⁸ The emphasis is firmly placed on the effortless of Archimedes' approach to mechanics, his true focus was the exploration of geometry. Here Plutarch shows a clear preference for the abstract over the applied. This is not a universal sentiment and in fact an affinity for the useful and the practical is an important aspect of Roman engineering. This affinity is seen explicitly in the passage from Frontinus which opens this introduction.¹⁹ Roby, in her study on ancient technical writing, notes that at different times and in different places, different cultures and even different authors highlight distinct and possibly dissimilar aspects of technology in their descriptions.²⁰ For instance, works may focus on the adherence to technical principles, the novelty of the device or its practical applications. Such preferences offer insight into cultural ideals and identity. Increasingly scholars of both technology and technical writing have sought to contextualize both from the more general point of view of the society using the technology in question and from the particular point of view of the author or source talking about the technology.²¹ Awareness of these connected though not necessarily identical outlooks of "doers" and "talker" inform how the study of technology is approached in this thesis. This project aims to fill the gap between the grow academic work on

¹⁸ Plutarch *Marcellus*, 14.7–8. trans. Loeb.

¹⁹ Frontinus *De Aq.* 1.16.

²⁰ Roby 2016.

²¹ E.g. Taub & Doody 2009; Cuomo 2007.

technical literature and studies of technical products. Considering technology within its wider cultural context renders it a valuable tool to strengthen our understanding of the ancient world.

Cognitive Anthropology

There have long been connections between Anthropology and Classics with a growing interest in applying cognitive theory to the field of Classics.²² This thesis draws on cognitive anthropology to examine the web of people connected to Roman engineering. In particular, the concepts of community of practice and distributed cognition are brought to bear on Roman engineering works and the individuals responsible for these projects.

The concept of distributed cognition, now firmly established in the field of cognitive anthropology was first put forth by Edwin Hutchins with influences from philosophers including Husserl, Heidegger and Merleau-Ponty.²³ Hutchins' key 1995 work *Cognition in the Wild* used naval navigation as the principal case investigated. A distributed cognition network is all of the elements both agents and objects which are needed to complete a given task. Distributed cognition emphasises not only a division of labour needed to complete complex tasks but also a distribution of cognition across different individuals and objects.²⁴ A distributed cognition approach shifts the focus from what an individual needs to know to function in society to what a society needs to know to function as a group.²⁵ One of the driving factors behind Hutchins' development was the difficulty in matching anthropologists' laboratory findings with practice in everyday settings. The impossibility of employing laboratory settings on historical cases makes a

²² E.g. Lloyd 1966, Lloyd & Vilaça 2019; Roby 2018 & 2019; Meineck et al. 2018.

²³ Anderson et al. 2019, 2. For more on Distributed Cognition see the A History of Distributed Cognition Project by the University of Edinburgh www.hdc.ed.ac.uk. Accessed 10 January 2025.

²⁴ For an interesting ancient consideration of how people and tools work together to accomplish a task see Aristotle, *Politics* 1253b24-38.

²⁵ Hutchins 1995, xii, xiv.

distributed cognition approach all the more valuable in these situations. By spending extended periods of time observing Navy navigators at work at sea, Hutchins sought to unpick the relation between the theoretical method of navigation and how it was practiced by real people in dynamic situations.²⁶ Hutchins asserts that official procedure documents, more than simply conveying information, were a way for the navigators to “represent themselves to themselves and others.”²⁷ This thesis will explore to what extent texts such as those by Vitruvius, Hyginus, Frontinus and others serve a similar purpose for Roman engineers. Like maritime navigation, engineering work encompasses technical precision, evaluation of evolving on site conditions and a balance of prescribed scientific necessity and individual choice. From his time embedded within a US Navy warship, Hutchins concluded that the naval seamen’s “way of doing things” was an essential part of their identity formation. He summarised the role of ways of doing in identity formation as: “We are the X. We are proud of what we are and what we do. We are unlike any other group.” The unspoken inference is “if you do something else you cannot be quite as good as we are.”²⁸ Throughout the thesis, I contend that this same premise applies well to Roman engineering, Roman society at large and Roman engineers in particular. *“We are the Roman engineers. We are proud of what we are and what we do. We are unlike any other group.”*

One of the key methods for exploring the nexus surrounding Roman engineering in this thesis is the “community of practice”. The concept of a community of practice, established by Lave & Wenger in 1991 has many similarities to distributed cognition networks but excludes nonhuman elements and focuses on the connections, similarities and differences between

²⁶ Hutchins 1995, 25.

²⁷ Hutchins 1995, 27 see also Geerts 1983 for more on thought and self representation.

²⁸ Hutchins 1995, 9. It has even been suggested that culture can be thought of as a kind of widely distributed memory (Roberts 1964).

individuals who participate in some group endeavour.²⁹ Practices are created by practitioners, meaning there is an intrinsic connection between what is being done and the people doing it.³⁰ Communities of practice are defined by having a shared domain, a community and a practice.³¹ These individuals may or may not recognise their membership in this community. Communities of practice are not homogeneous groups but rather are complex landscapes with internal boundaries formed on multiple social, cultural and competence based levels.³² Since initially being developed in modern contexts the concept of community of practice has fruitfully been applied to a wide range of historical and geographical settings, stretching as far afield as potters in the bronze age Aegean and the Royal Observatory at Greenwich in the 19th Century.³³ Both of these cases are of interest as they consider how the members of the community of practice near the centre and those further away are connected to the creation of knowledge and the transmission of techniques which previously had been seen as having a linear progression or single authorship. Considering Roman engineering works as a community of practice facilitates the exploration of the varied individuals who interacted directly and indirectly to accomplish them. Distributed cognition systems and communities of practice do not exist in a vacuum but are heavily influenced by their specific cultural and historical contexts. Particular kinds of social organisations permit individuals to combine their efforts to produce certain specific results.³⁴ Distributed cognition systems have the advantage that not every member of the team (or component of the system) needs to know how to do every element required to complete the task

²⁹ See Lave & Wenger 1991; Wenger 1998. esp. ch. 6. More on communities of practice in the modern setting: Wenger-Trayner 2020.

³⁰ Wenger-Trayner 2020.

³¹ Wendrich 2013, 5.

³² Wenger- Trayner 2020, 13-20.

³³ Gorogianni et al. 2016; Heggitt 2019. Other examples include Høgseth 213; Kapaczyk & Jucker 2014; Schniedewind 2024.

³⁴ Hutchins 1995, 75 & 354-5.

or even how all of the elements fit together. While there is a degree of risk that the task would become impossible if one component fails, this has the advantages of allowing for simplification and parallelisation of the tasks.³⁵ Knowledge can travel through a distributed cognition system in various directions, even though the social structures associated with them can be very hierarchical.³⁶ This can lead to a potential dissonance where one in nominal charge of a task has less understanding of how to accomplish it than those beneath them in the hierarchy (e.g. as Hutchins notes the non-commissioned officers may have a more in depth understanding of the navigation than the officers in charge).³⁷ This misalignment of knowledge capital and social capital is even greater in the ancient context when so often enslaved people were central to the completion of complex tasks.³⁸ A great advantage of examining the ancient world through the lens of distributed cognition is that it allows the historian to acknowledge hierarchies and divisions without endorsing them as each element in the system is needed to accomplish the task. As Cuomo has succinctly outlined, distributed cognition allows us to consider the inputs of all individuals despite their “vastly different social and epistemological positions” and serves to help avoid a flattening of these differences.³⁹ Moreover, distributed cognition “recognises asymmetries, both at the cognitive and the social level, and in fact at their interface, but because it also in a sense stands outside of them (it is after all an anthropological tool), it enables us to evaluate those asymmetries critically.”⁴⁰ Through the double lens of community of practice and distributed cognition we see the complex network of individuals linked to Roman engineering

³⁵ Hutchins 1995, 226.

³⁶ Hutchins 1995, 190.

³⁷ Hutchins 1995, 16.

³⁸ There is an ever-expanding body of work on the central role of enslaved people in the ancient world e.g. Schniedewind 2024, Schermaier 2023, Ismard 2015, George 2013, Blake 2012 & 2016, Joshel 2010. The role of enslaved versus free labour will be discussed further in chapter three.

³⁹ Cuomo forthcoming.

⁴⁰ Cuomo forthcoming.

where each can be conceived as a node in a stratified nexus with links of varying closeness and strength to engineering projects and processes and to one another.

A great advantage of this combined approach is that it allows us to see connections which the individuals involved might not be consciously aware of or may even have actively rejected. It helps us to recognize how groups who appear disconnected are in fact related to the work of engineering, allowing us to move past the social divisions and prejudices of the ancient world. Communities of practice allow us to acknowledge hierarchical differences without endorsing them or assuming that they are entirely rigid or impermeable. This approach allows us to identify who would have been touched by Roman engineering and helps us to understand why it played such an important part in what it meant to be Roman.

There are challenges of identifying communities of practice in the past. The evidence available is limited and we risk repeating the outlook of our sources or over generalising and flattening based on the little information we have. These were not always of interest to our sources and more over an important aspect of community of practice is exactly that it is about “practice” and practice is based on the doing of things and a portion of this is tacit knowledge which by its very definition it cannot readily be captured in written sources. Moreover, a community of practice, while certainly present in the ancient world, is ultimately a modern scholarly concept and historians must be cautious when imposing frameworks on to the past that are foreign to the people and periods being studied lest they introduce anachronism.

To summarise the pros of using a community of practice lens are:

- a) helps us to see the diverse group involved in engineering
- b) avoids repeating our sources unintentional (or intentional) biases and prejudices

c) recognises social differences

d) allows for complex interconnection

While the challenges are:

a) lack of information that we would need to fully understand the complexity and nuance of the community of practice

b) risk of superimposing modern and anachronistic framework and concept which the Romans would not only have never conceived of but would have rejected.

Ultimately, community of practice is a valid approach as it has been successfully used and accepted in a wide range of cases and it allows us to refocus on the ancient world seeing connection between groups who are often considered in isolation – it also offers a meaningful way to explore the people connected to engineering rather than just the technical elements of engineering.

Another concept found in the history of science, anthropology and management studies that is employed in this thesis is tacit knowledge. Simply put, tacit knowledge is all knowledge which cannot easily be articulated, the idea that there are things that we know but that are very difficult to explain using words alone. The idea that some elements of scientific knowledge were dependent on the individuals conducting the science was brought to the fore by Polanyi in his very influential *Personal knowledge* first published in the late 1950s and tacit knowledge as an academic concept clarified in his later *The Tacit Dimension*.⁴⁰ However the notion that some types of knowledge are difficult or impossible to share through a written medium are much older with examples of authors from the classical world voicing this challenge including Philo of Byzantium, Biton, Athenaeus Mechanicus and most germane to this thesis Vitruvius.⁴¹ The

importance of tacit knowledge has been recognised in scholarship on a huge range of human endeavours from the textile industry to tourism to archaeology and many more.⁴² More than just an academic concept, on some level, we often encounter tacit knowledge in everyday life. For instance, though you may well know how to ride a bike explaining in detail how to ride a bike without falling over is a very different thing. In addition, consider how much easier it is to learn something from watching a demonstration rather than just reading instructions or even think of how often we turn to YouTube for help learning new skills. Despite its ubiquity, the exact nature of tacit knowledge is not fully agreed upon by scholars. Questions such as could all knowledge become explicit knowledge under the correct conditions remain.⁴³ Intertwined in this discourse is the relevance of practical, personal and embodied knowledge. Some skills need to be practiced to be mastered, regardless of the possible clarity of instructions this type of knowledge can only be acquired through doing. Without aiming to resolve these deeper questions it is clear that in a world without YouTube the only way to either gain or benefit from tacit knowledge is to interact with the individuals who have this knowledge. In turn this generates communities of practice with their complex landscape of belonging and interconnection. For Roman engineering projects this means that engineers would need to interact closely with each other and many different stakeholders to complete their project bring multifaceted interpersonal relationships and power dynamics into play. There are of course severe challenges to fully understand tacit knowledge from the past since by its very definition it cannot adequately be captured through written mediums, a key source of evidence for the ancient world. Our ancient technical authors themselves note that some elements of their work cannot easily be described. This acknowledgement suggest that they were straddling the roles of “doers: and “talkers”. By

keeping the existence of tacit knowledge in mind as we interrogate the diverse types of sources available, we can come to a clearer understanding of engineering practice in the ancient world.

The concepts of tacit knowledge, community of practice and distributed cognition are closely interconnected and throughout this thesis I will rely on them to help untangle the complex web of individuals related to the practice of engineering and connected to engineering works in the Roman imagination.

Engineering, Building and Rome

In the passage from Frontinus which opens this thesis, the pride he takes in the success of the Roman aqueducts is palpable. The favourable contrast between the practical Roman aqueducts and the impressive but purportedly useless creations of the Egyptians and Greeks hints at an underlying connection between engineering and what it means to be Roman.⁴¹ Despite this affinity with utility and construction there is a strong tendency to ascribe grand engineering projects to their sponsors rather than the actual builders, engineers and architects. The emphasis on *utilitas* is a defining characteristic of the Roman imagination of engineering. As Taylor asserts, in this way construction differs from other types of art that could be sponsored, such as literary works. No one would ever claim that Augustus wrote the *Aeneid* although he was certainly Virgil's sponsor.⁴² The phenomenon must in part be due to the enormous resources needed to complete these projects - no one man could be responsible for building these great works alone. Rather they were collective endeavours which required careful amalgamation of a wide variety of skills and the combined labour of many individuals. How these individuals

⁴¹ For other themes in Frontinus' *De Aq.* König 2007.

⁴² Taylor 2003, 11.

worked together may be considered a community of practice, an idea that we will explore in chapter one. In her extensive study on Roman public building in Italy and Africa, Jouffroy's focus when considering “constructeurs” is on those commissioning and funding the projects rather than those actively building them.⁴³ This is not surprising as the vast majority of our evidence both literary and epigraphical is from the perspective of those commissioning the projects. Nevertheless, as proven by Cuomo in her work on architects in late antiquity, it is possible to bring the focus onto the perspectives of those actively engaged in the construction.⁴⁴

Since at least the second half of the last century, there has been an ever-growing demand to better understand the ancient world from perspectives beyond that of the mainly male elite whose writings had previously dominated the study of antiquity. This thesis aims to contribute to that understanding through the close examination of engineers, who as shall be discussed in the chapters to come, could serve as a liminal group bridging seemingly disparate elements with Roman society.⁴⁵ In particular, the understanding of personal and collective identity through the lens of a professional community is examined. In order to achieve this, a wide range of evidence has been taken into consideration beyond the literary evidence, including archaeological remains, epigraphical texts, material culture and experimental archaeology.

This work takes inspiration from and builds on the more recent surge in scholarly interest in labour and professionalism in the ancient world.⁴⁶ I have also drawn on the fields of history of science and technology, anthropology, and sociology. From a methodological standpoint, I

⁴³ Jouffroy 1986.

⁴⁴ Cuomo 2007, chapter 5.

⁴⁵ This thesis focuses on community of practice rather than class. On the unsettled question of class in the ancient world see Meyer 2012 & Wallace Hadrill 2013.

⁴⁶ This has included detailed studies on particular groups such as Flohr's 2013 *The World of the Fullo* and Hartmann's 2020 *The Scribes of Rome* and broader exploration of what professionalism might mean in an ancient context such as Stewart et al.'s 2020 *Skilled Labour & Professionalism in Ancient Greece and Rome*.

have taken heed of Taylor's holistic approach, attempting to consider the dynamic environment of construction projects in progress and engineering works in active use.⁴⁷ A guiding tenet of this project has been that as engineering is one of the first aspects that springs to mind when the general public thinks of Rome, it offers a powerful jumping off point to connect with broader aspects of life in the ancient world. The chronological scope of this thesis is from the first century BCE through to the about the third century CE although some earlier and later sources have been considered for context. This time scale roughly maps to the expansion of Rome and its increasing interaction with other cultures and the definition of Roman identity vis à vis different cultures when the key types of infrastructure associated with Roman engineering were in their heyday. Using this longer time scale allows us to see how things change and or stay the same. One of the striking things about Roman engineering that emerges from this study is that although techniques do changes and improve (in contradiction to the blockage theory presented above) the idea of engineering remains persistently important in Roman discourse as does the tension between being forward looking and innovative and keepings up respect for the *mos maiorum* and time-tested ways of a semi mythical golden age when Rome was not decadent or ruined by contact with outsiders.⁴⁸ This of course is not unique to engineering but rather a recurring theme in Roman discourse from visual arts and literature to political discourse. This shows how engineering was a central part of Roman understanding of the world and in many ways an important thread in the tapestry of Roman identity.

Geographically, a similarly wide net has been cast, exploring engineering across the Roman World from Britan in the West to Asia Minor in the East, North Africa to Germany. The

⁴⁷ Taylor 2003.

⁴⁸ More on the role of imported luxuries in Chapter Three

differences and similarities of engineering work in the centre versus the periphery are explored in Chapter Three. This broad scope was chosen as it highlights how engineering was both a cause and effect of the spread of Roman influence. Roman engineering did not exist in a vacuum and drew heavily on civilisations that came before and those that it encountered.⁴⁹ The Romans themselves were aware of this inheritance and Vitruvius articulates this very clearly:

But this encyclopaedia, your Highness, is not presented under my own name with the suppression of my authorities, nor have I set out to gain approbation by vituperating any man's ideas. For I owe great gratitude to all those who with an ocean of intellectual services which they gathered from all time, each in his department provided stores from which we, like those who draw water from a spring and use it for their own purposes, have gained the means of writing with more eloquence and readiness; and trusting in such authorities we venture to put together a new manual of architecture.⁵⁰

Throughout the text Vitruvius notes that he is drawing on Greek architects who have come before him and is aware of architectural accomplishments in the east (Greek temples and mausoleum at Halicarnassus).⁵¹ The passage from Frontinus which opens this chapter also clearly references other engineering work: the pyramids and the works of the Greek but he also notes that Rome's works are different in aim.

An expanded version of this project could benefit from comparing regional difference and tracing the spread of influence as the Romans encountered new techniques and then diffused them across their sphere of influence. Although notoriously difficult as our sources do tend to be

⁴⁹ For more on Egyptian engineering see La Loggia 2015; Egyptian and Mesopotamian: Wright 2000; Bragg 2017; for Greece: Cooper 2008, Martin 1965; Orlandos 1966-1968; Coulton 1977; Hellmann 2002; Miles 2016; Rhill & Tucker 1995. Greek and Roman Technologies often studied together e.g. Olsen 2008.

⁵⁰ Vitruvius *De Arch.*, Pref 7. 10 Ego vero, Caesar, neque alienis indicibus mutatis interposito nomine meo id profero corpus neque ullius cogitata vituperans institui ex eo me adprobare, sed omnibus scriptoribus infinitas ago gratias, quod egregiis ingeniorum sollertiis ex aevo conlatis abundantes alius alio genere copias praeparaverunt, unde nos uti fontibus haurientes aquam et ad propria proposita traducentes facundiores et expeditiores habemus ad scribendum facultates talibusque confidentes auctoribus audemus institutiones novas comparare. Trans. Loeb.

⁵¹ Vitruvius *De Arch.* 2.8.11.

Roman centric, a further intriguing area of exploration would surely be the adoption of Roman techniques by the peoples they encountered be it in peace or war.⁵² Equally of interest, would be to trace the (incredibly short in some cases) time it took for new ideas once developed in a particular location to permeate across the Roman Empire and indeed the degree to which regional variations remained or were eroded. Ultimately, one of the most remarkable things about Roman engineering that has come to light through this study is that over the course of some three centuries and a huge geographical spread it remains recognizably Roman.

One of the key goals of the thesis is to bring together literary, epigraphical and archaeological evidence to offer the most complete picture possible of the engineering community of practice and the ways that different individuals were connected to engineering work in the Roman imagination and in practice. It is essential to use these diverse types of evidence to get as accurate as possible a picture of the web surrounding engineering work. However, this approach is not without its challenges. Each different type of evidence needs to be carefully contextualised and handled with caution to avoid overgeneralisation or conflation. This presents the technical challenges attaining a sufficient degree of proficiency to accurately analyse inscriptions, literature and archaeological evidence within the scope of this project. Assessing the different pieces of evidence needs to be done judiciously to avoid “apples and oranges” comparison which are not only meaningless but could produce a misleading or even false picture. For all types of evidence there are some key factors which need to be kept in mind: the author or

⁵² We do get a glimpse of the exchange which was bilateral in Ceasars account of the Gallic war which are examined in Chapter Two.

maker's intention, their audience and how the information has come to preserved and or presented for consideration today.

In the case of literary texts, the genres, rhetorical aims of the author as well as what we know (or perhaps do not know) about the author need to be considered as do the reasons that these texts have been preserved and what errors might have crept in or what might have been omitted as a result of the interests of the intervening scribes. Inscriptions require a high degree of technical ability to read and date and we need to consider the epigraphic habit.⁵³ It is also important to question what inscription we are seeing and how we are categorizing them. As with literary sources, author and audience need to be considered. Only a relatively small number of inscriptions are connected to engineers and engineering so we need to question how representative these might be. Inscriptions have often been removed from their archaeological find context, making it impossible to know with total certainty how they were meant to be seen and important elements such as surrounding images which could have added nuance to our understanding may have been lost. In the case of archaeological evidence, an incredibly broad category (considering images on Trajan's column (as will be done in Chapter Two) is very different from tracing the construction stages of the Colosseum (as in Chapter Three)), once again audience and intent must be brought into play; while the on the surface archaeology may appear more objective the techniques of analysis and interests of the archaeologist need to be kept in mind and particularly with older archaeology reports we need to remember that areas of focus and interpretation have changed, so for example the layout of camps (Chapter Two) may well be presented very differently depending on when they were excavated. In

⁵³ Explored in detail in Chapter One.

summary, using many different types of evidence is important and allows this thesis to bring new insights to our understanding of Roman engineering, however it must be done judiciously to avoid conflation, simplification and flattening.

Through examining diverse types of evidence and in particular by applying the community of practice approach to engineering work this thesis hopes to expand our understanding of who was involved in Roman engineers' works and reveal a much more diverse and complex nexus of interaction and connection of individuals from diverse echelons of Roman society. I contend that within the broader community of practice of Roman engineering work engineers, those connected to both the practice and the idea of engineering, were a distinct group and they sought to celebrate this and share their accomplishment with one another on a level that may not have been fully appreciated by those outside of the group.

This thesis contributes to our understanding of the social history of Rome by underscoring how important the ability to shape the physical world was to both Roman self-understanding of what it meant to be Roman and how Romans were perceived by other contemporary societies. I also propose that Romans attached strong moral connotations to engineering success and failure such that some engineers held professional standards and felt a responsibility to support the *Res Publica*. While engineering is certainly not a uniquely Roman endeavour Romans placed special emphasis on the *utilitas* of their projects and used this as distinction between themselves and others that they encountered as they expanded.

The key findings of this study are that there was a complex nexus of individuals connected to the work of engineering in both practice and the Roman imagination that stretch from very humble labourers through highly skilled professionals to highest echelons including

leading statesmen and emperors. Roman Engineers were a distinct group with a sense of loyalty to and a desire to protect and advance the Res Publica. Romans attached great importance to the ability to shape the physical world and in their understanding of Roman identity this ability was a key part of how they constructed their identity. There was a strong correlation in Roman understanding between more failure and engineering failures so that for the Romans in many ways to be a good Roman was to be a good engineer.

The first chapter examines the web of individuals connected to Roman engineering work and looks to reconcile the different understandings emerging from literary and epigraphical sources. The second chapter explores the role of engineers in the military with special focus on the representation of engineers in Julius Caesar's *Gallic Wars*. The third chapter then examines Roman engineers in peace time considering if there was a sharp division between military and civilian engineers and what particular characteristics might have been needed to succeed as the latter. The final chapter examines the Roman response to both engineering successes and failures, questioning what this might have meant for the engineers involved and how this has impacted the modern understanding of Roman engineers.

Let us begin by turning our attention to what different types of individuals we find in the nexus surrounding Roman engineering works.

Chapter 1: The Web of Engineering

Engineer:

I) A person who makes engines, structures, or systems.

II) A person who contrives a scheme.

*Oxford English Dictionary*¹

Terminology

One of the questions this thesis seeks to answer is “who were Roman engineers” underling this question is a more basic one. Engineer is a relatively modern word and it is worth considering if it is appropriate to apply it to the ancient world. The understanding of a possible division between a culture being studied and those doing the studying is doubtless as old as the study of culture. The formal articulation of a concept of actors’ and observers’ categories as emic and etic respectively can be traced back to the anthropology of the 1950s.² Initially these terms were developed very specifically for the study of language and derive from phonetics and phonemics the processes of distinguishing and uttering different sounds which make up the building blocks of language.³ However their definitions quickly became far broader and etic or emic categorization was applied to all aspects of anthropological study. In these expanded definitions, etic categories seek to create an overarching system into which all aspects of human activity can be classified regardless of time or place; while emic categories are strictly based on the actors own understanding and definition and as such are only applicable to their own unique milieu.

¹ “engineer, n.”. Oxford English Dictionary.

² Pike 1954.

³ Jardine 2004, 263.

Since their emergence in the 1950s, there has been active debate on the relative merits of etic and emic based studies with fierce proponent on both sides.⁴ Over reliance on etic categories in anthropology risks creating a world view that would not only be incomprehensible to the people living it but contradictory to their experience.⁵ When applied to historical studies the use of etic categories further risks the introduction of anachronism. However, using exclusively emic approaches is all but impossible, even those who most strongly advocate for an emic approach often frame their studies in terms of such constructs as “Power, Change, Faith, Oppression, Work, Passion, Authority, Beauty, Violence, Love, Prestige” all of which have definitions which of course must be based on the observers understanding of these concepts making them etic to a degree.⁶ There has been a consensus in anthropology and the history of science that an emic approach is to be preferred as etic approaches tend to generalise and tempt the researcher into teleological and judgmental interpretations.⁷ Jardine has summarised this as: rather than seeking the spirit of the age historians should be looking for how agents in different roles perceived and understand their worlds.⁸ This thesis does indeed hope to help shed light on how different individuals involved with the practice of Roman engineering understood their world; however as with Jardine, I recognise the value that etic approaches can bring to this endeavour. When dealing with strictly literary sources a more emic approach may be justified however even in these cases, etic terms are often needed frame the overall study and to explain the emic categories used and while these emic terms can later be dropped the etic terms used to

⁴ On the history of the etic/emic debates, see: Harris 1976; Fisher & Werner 1978; Feleppa 1986; Headland 1990; Jardine 2004; Ginzburg 2012; Mostowlansky & Rota 2020. The debate around the importance and the possibility of drawing distinctions between actors’ and observers’ has ebbed and flowed over the 20th century and since the mid 1990s the importance placed on the etic/emic divide has waned in anthropology.

⁵ Jardine 2004, 267.

⁶ For an example of this approach Geertz 1973 see also Jardine 2004, 267.

⁷ Jardine 2004, 268.

⁸ Jardine 2004, 268.

define will often have residual effects on the readers understanding. Even in a text based investigation, the increasing importance of reception (how those coming after understood, viewed and interacted with the “works and deeds” of engineering) makes it clear that any one set of actors’ categories would be insufficient to produce as complete a picture as possible of ancient engineers.⁹ Further this thesis engages with material culture evidence for which actors’ vocabulary is not necessarily available.¹⁰ Equally important is the role of tacit knowledge in Roman engineering which by its very definition is not articulated by the actors themselves.¹¹

Clearly to build the most accurate and meaning full understanding of how different individuals were connected to Roman practice and the Roman imagination of engineering we will need to rely on a blend of etic and emic resources. As Jardine astutely argues, etic history is empty, failing to engage with the lived world of practitioners and presumes the irrelevance of these practitioners’ understanding of their world. While emic history without etics is blind as it “willfully blinds” itself to large swathes of available evidence to meaningful investigating the past.¹² Just as Vitruvius claims that to be successful an engineer required both study and inspiration, to understand the world of Roman engineering we must judiciously employ both etics and emics.¹³

What do we know about the ways in which ancient Greeks and Romans approached daily work? Compared with many cultures there is in fact a considerable amount of evidence at our disposal to help address this question and of late there has been a flurry of scholarship on the

⁹ Jardine 2004, 262.

¹⁰ Examples of using material culture to expand our understanding Gooding 1990; Sibum 1995; Voskuhl 1997; Staubermann 2000; Galison & Thompson 1999; Smith & Agar 1998.

¹¹ Jardine 2004, 262.

¹² Jardine 2004, 275.

¹³ Vitruvius *De Arch.*, 1.1.2.

subject.¹⁴ In terms of literary texts, while there may be relatively few descriptions of every day work (which is unsurprising as this information would have been all too well known by those to whom this was their daily reality or else consider unsuitable for commemoration in literature) there are many what might be called ethnographic texts in which customs and everyday tasks are compared and contrasted to those of the Greek and Roman readers.¹⁵ In addition there is rich vein of inscriptions, visual representations and archaeological evidence to explore.

In the past, a limited selection of literary texts have been privileged by scholars resulting in a propagation of the idea that there was a monolithic outlook to work and labour in the ancient world that was overarching negative. In this outlook, all tasks with the notable exception of subsistence farming were seen as “banausic” and as such degrading to those that undertook them. This attitude towards work is prevalent in some literary sources and can be traced back as far as classical Athens and has famously been expressed by Xenophon as:

“...for to be sure, the so-called banausic occupations are scorned and, naturally enough, held in low regard in our states. For they spoil the bodies of the workmen and the foremen, forcing them to sit still and stay indoors, and in some cases to spend the whole day by the fire. As their bodies become womanish their souls lose strength too. Moreover, these so-called banausic occupations leave no spare time for attention to one’s friends and city, so that those who follow them are reputed bad at dealing with friends and bad defenders of their country.”¹⁶

While this view is articulated in a relatively small number of texts by philosophers such as Plato, Aristotle and Xenophon himself this outlook persisted in some quarters through antiquity, later embraced by influential thinkers like Cicero who employed association to work to discredit political opponents, a trope often ticked up in Roman satire.¹⁷ This outlook has had a very strong

¹⁴ Examples included Stewart et al 2020; Verboven & Laes 2017; Lytle 2020; Flor 2013.

¹⁵ Lytle 2020.

¹⁶ Xenophon *Oec.* 4.2-3. Trans, Loeb.

¹⁷ Lytle 2020, 13.

influence on later scholars through the ages with Glotz writing in 1926 “think what you like of the work, the workman [in the eyes of the Greeks] is a degraded thing.”¹⁸ Building on the types of ideas expressed by Xenophon, there has been a tendency to read back class distinctions and class interest prevalent in 19th and 20th century Europe onto the ancient world.¹⁹ However even ancient literary source make it clear that there the ancient outlook on work was in fact more ambivalent the celebrated nature and popularity of the myths surrounding the Labours of Hercules being a key example. We also see work being described as noble when Thucydides’ Pericles states “with us it is not a shame for a man to acknowledge poverty, but the greater shame is for him not to do his best to avoid it.”²⁰

Clearly, we need to consider the wider context of Xenophon and Cicero’s writing and their rhetorical objectives before ascribing their attitudes towards work to ancient society broadly. Increasingly it has been argued that these views tell us more about elite attitudes towards new comers than the everyday perception of tradespeople in the ancient world.²¹ Skilled labours and skilled artisans and professionals were very visible in antiquity there is ample archaeological evidence for this and we will look at key example related to engineering the pages that follow.²² Well-esteemed professions and skills were of great importance to the *liberti*, who could thereby establish themselves in the society of a city.²³

In Roman discourse about work, despite the fact that member of the elite had well established business ventures run to maximise profits,²⁴ there is often a tendency to seek to

¹⁸ Glotz 1926, 161 quoted in Stewart 2020, 19.

¹⁹ Mayer 2020.

²⁰ Thucydides *History*, 2.40.

²¹ Tran 2017, 247.

²² Flohr 2020, 71; Mayer 2020, 94.

²³ For more on the role of *liberti* in engineering works see chapter 4. Also see Landskon 2020, 178 with further bibliography.

²⁴ On villas for optimized production Marzano 2007 & 2015 on money making among the elites Mayer 2020.

separate out lower status *mercenarius* those who worked directly for money from those who performed an *officium* (duty) for a society and might receive an honorarium as thanks for this.²⁵ But there seems to be a disconnect between this disdain for earning wages and work with the actual lived experience as evidence in inscriptions, archaeological remains and graffiti.²⁶ Further undermining the idea of work as something despised across the ancient world is the presence of both job titles and images of work and tools across the Roman world.²⁷ Moreover the breadth of professions captured including butchers, which might well be considered a dirty trade by modern views, are depicted with pride leading to further questions of how important the banalistic division was.²⁸ Roman with various levels of means and in a wide range of jobs sought to capture their work and celebrate it but to what extent can we see them as professionals?

There are many different definitions of profession and professional. At times it has been argued that these are strictly modern concepts profoundly enmeshed with sociological ideologies which emerged in early modern Europe and thus inapplicable to antiquity.²⁹ Stewart, Harris & Lewis have outlined some important characteristics of professionalism which can allow it to be a useful tool in developing our understanding of the ancient world:

Though each profession is distinct, all skilled workers share a common aim: to provide a service that (they believe) is of benefit to the public and for which they expect to be rewarded. Membership of a profession, or overall professional class, can form an important part of an individual's identity. In addition, professionals compete within a market, in which skill and knowledge is the prime commodity.³⁰

²⁵ Bond 2020, 127.

²⁶ Bond 2020, 128; Landskron 2020, 178.

²⁷ Joshel 1992; Coumo 2007, esp. Ch. 5; Sapirten 2020, 95-7; Landskron 2020, 178.

²⁸ Landskron 2020, 184; 197.

²⁹ See Stewart et al. 2020, 7-15 for a recent summation of this debate and Russel 2020, 254-247 for a collection of modern definitions. The discussion on etic and emic categorisation above is also relevant here.

³⁰ Stewart et al. 2020, 1-2.

In order for someone to qualify as skilled or professional there must be an acknowledgement in society if this skill and division of labour tends to lead to hierarchy of occupation in which some are seen as requiring more skill than others.³¹ Cicero is insistent about the illiberalism of work and that there are hierarchies of work which would be more or less suitable for people to undertake depending on their places in society:

But the professions in which either a higher liberal degree of intelligence is required or from which no small benefit to society is derived—medicine and architecture, for example, and teaching—these are proper for those whose social position they become.³²

For those who wished to be viewed with esteem in the eyes of the like of Cicero it would have been very important for their work to be seen as meeting the parameter of skilled and service to society. The notion of skill, τέχνη and *ars*, was firmly established in the ancient world and moreover the monetary value of technical skill is well attested in the fact the slaves with such skills commanded higher prices and in different wages assigned in the Diocletian price edicts where certain jobs seen as requiring more skill are remunerated more highly.³³ In order to avoid anachronism, it is important to note that not all aspects of modern professions are seen in ancient ones. In particular lacking any type of formal degrees or certificates the notion that ancient professions self-regulated, something that features in many modern definitions of professionalism is tenuous.³⁴ However the degree to which all modern profession are self-regulated or regulated at all is debated. Stuart et al convincingly concluded that: “If, indeed, it is

³¹ Stewart et al. 2020, 5-6.

³² Cicero *De Off* 1.150-151. There is a colossal amount of scholarship directed at exploring medicine in Ancient Greece and Rome through the lens of professionalism and others. This rich field of research could not be delt with within the confines of this project and is beyond the scope of this study. For an overview see Keyser and Scarborough 2018 and Singer and Rosen 2024.

³³ Examples for the Digests include 6.1.27–33; 7.1.27.2; 7.7.6.1; 9.2.27.29; 13.7.25; 17.1.26.8; 19.1.13.22; 19.1.43; 25.1.6; 32.12; 32.65.3 and *Cod.Iust.* 6.43.3 Cic. QRosc. 28. See also Sapirtein 2020, 103; Stewart et al. 2020, 2-6; Mayer 2020 104-106. See Groen-Vallinga and Tacoma 2016: 124–32 and Landskron 2020, 177 for comparison of different wage types.

³⁴ Stewart et al. 2020, 10-11.

possible to select a fundamental defining feature of professionals, it would be this desire to attain rewards and social status by virtue of the title of ‘skilled professional.’³⁵ It is abundantly clear that some attached to the web of engineering such as Vitruvius were very keen indeed to be defined as such. In the next section we will delve deeper into Vitruvius and what insights his writings reveal about how Roman engineering was perceived and practiced.

, “Engineer” is a broad term that encompasses many categories which themselves defy simple delineation. While, of course, an engineer is one who works in or undertakes engineering efforts, this simply shifts the question to: what is engineering? Unlike the case of engineers as individuals, there has been significant and steady scholarship on Roman engineering. Despite this, a consistent definition of Roman or more generally ancient engineering is not readily available. Previous studies such as those by De Camp, Landels and Hill offer no explicit definition nor does Oleson’s more recent *Oxford Handbook of Engineering and Technology in the Classical World*.³⁶ However, these studies do consistently cover the same types of activities, namely: construction (on a large scale), road networks, land surveying and water management, as well as military fortifications and engines.

Following this convention of what engineering is, those engaging in these activities will be the basis for who is to be considered an engineer, in this thesis. The unifying characteristic that these widely diverse activities share is the ability to shape the physical world. Individuals who engage in engineering not only possess theoretical knowledge but also have the ability to implement and adapt to practical situations. In her study of technology and society in the ancient Greek and Roman worlds, Rihll has highlighted that a strong divide between “doers” and

³⁵ Stewart et al. 2020, 12.

³⁶ Landels 1978; Hill 1984; De Camp 1963; Oleson 2008.

“talkers” existed in antiquity.³⁷ Theoretical knowledge allows for the conception of ideas and exploration of abstract problems. It is the purview of the “talker” to examine situations in the abstract. Conversely, practical knowledge involves the literal and physical completion of projects. The “doer” interacts with the material world. While such a strict dichotomy has limitations when applied to real life, it is a valuable lens through which to examine ancient understandings. To effect changes in the physical world requires project management knowledge and a mixture of theoretical and practical understanding.³⁸ We will explore how these skills and characteristics inform the identity of engineers. In broad strokes, “doing” can be understood to encompass the practice of engineering in the Roman world while “talking” corresponds to engineering culture.

It is not surprising that a plethora of different terms were used to describe those working in this broad spectrum of activities across the ancient Roman world. Not only are there many terms to consider, each one encompasses multiple meanings which often alter over time.³⁹ Therefore, my working definition of “engineer” will be based not on linguistic terminology, but on context and function.

When individuals interact with one another in a shared domain of human endeavour, communities of practice are formed. These communities of practice are shaped through mutual engagement, joint enterprise, and a shared repertoire.⁴⁰ Incorporation into a community of practice may or may not occur intentionally. By virtue of participating in like activities and

³⁷ Rihll 2013.

³⁸ The importance of project management for both ancient and modern engineers is noted by Hill 1984, 5.

³⁹ This can be seen in the wide application in both Latin and Greek of the verbs *aedifico* and κτιζω respectively to mean anything to do with building activities - construction, renovation, repair: Downey 1946, 27.

⁴⁰ See Wenger 1998. esp. ch. 6. More on communities of practice in the modern setting: Lave & Wenger 1991; Wenger-Trayner 2020.

pursuing similar objectives individuals become members regardless of their recognition of the community's existence. Considering engineers as a community of practice is beneficial as it helps to overcome the limitations of available sources and engage with the broad spectrum of individuals needed to achieve engineering projects. Within the community of practice individuals might come from widely disparate social and economic backgrounds including both free and enslaved individuals. Rather than privileging a narrow list of terms, literary, epigraphical and archaeological sources will be used to examine as many instances as possible of those working on the types of projects outlined above. The goal of this approach is to compare and contrast roles and sense of self across a community of practice that we will refer to as ancient Roman engineers.

To facilitate our investigation of this community of practice, we will examine terms which identify individuals with roles that correspond to our concept of engineering. Just as there are many ways to shape the physical world, there are as many terms to describe those who do the shaping. Vitruvius uses the term *architectus* throughout his influential *De Architectura*. Apollodorus of Damascus, credited with bridging the Danube and the construction of the imperial baths and forums under Trajan, is called *architekton* by Cassius Dio and *architectus* in the *Historia Augusta*.⁴¹ Many previous studies of ancient engineering have translated *architectus* as 'engineer' and MacDonald notes that architect and engineer may not have been sharply divided positions in the Roman world.⁴² However, other occupational titles are also included in these studies and meet the definition of engineer as set in this thesis. De Camp also

⁴¹ Danube bridge Procopius *Aed.* 4.6.13; imperial baths & forum Cassius Dio 69. 4; *Historia Augusta Hadrian* 19.

⁴² MacDonald 1985, 137.

considers *agrimensores*, translated as ‘surveyors’, and *libratores*, translated as ‘levellers’.⁴³ To this list of terms Landels’ study also adds the Greek *mechanikos*, translated as ‘machine-man’, as related to Hero of Alexandria, *fabri*, ‘builders’, for Roman military engineers and *Praefectus Fabrum* for the head of military engineering operations.⁴⁴ Downey, in his article on the training of Byzantine architects, traces a shift of the title given to the “chief designer and builder” from the Greek terms *architekton* to *mechanicus* during the later imperial period.⁴⁵ After this shift the *architectus* would have been subordinate to the *mechanicus*; regardless they both fall under the category of engineer. This diversity of roles persists today; for example, chemical and civil engineers’ work varies greatly yet both are engineers. Groen-Vallinga, in her study of social structures and the urban labour market of Roman Italy, compiled an extensive list of job titles based on “epigraphy, literature and legal sources”.⁴⁶ While Groen-Vallinga’s work is not focused on engineering, upon examination several terms from this list match the definition of an engineer as one who shapes the physical world through application of technical and practical knowledge: *aedifex/aedificator* (builder), *exstructor* and *structor* (also builder), *agrimensor* (land surveyor), *aquarius* (water supply worker), *ballistarius/ballistrarius* (ballista maker), *caementarius/cementarius* (bricklayer/mason), *faber automatarius* (maker of automata), *faber balneator* (workers in baths), *fontanarius* (water source worker), *librator* (land measurer/leveler), *machinarius/machinator* (engineer), *ensor aedificiorum* (building surveyor), *ensor/metator* (surveyor), *putearius* (fountain builder). Not all of these terms are evaluated to

⁴³ De Camp 1963, 173.

⁴⁴ Landels 1978, 200 & 209. For more on the *Praefectus Fabrum* see below.

⁴⁵ Downey 1946-48, 102-111.

⁴⁶ Groen-Vallinga 2017, 297-313.

equal extent in this thesis, but they all have the potential to designate engineers.⁴⁷ This wide variety of terms underscores the diversity of those in the Roman world who were connected to engineering works and potential members of the engineering community of practice. In order to capture as many aspects of the community of practice as possible I have implemented a broad approach to language and sources.

Etic categorizations need to be used carefully. It is important to acknowledge that there are anachronisms in the study of history and our interests are necessarily guided by the interests and preoccupations of our own milieu.⁴⁸ In particular, we need to be cautious of conflation between etic and emic categories, a danger which is heightened when the terminology is related etymologically.⁴⁹ The term *Praefectus Fabrum* offers an ideal case study on the dangers of such false friendship between actors' and observers' terminology. While *Praefectus Fabrum* may seem simple and self-explanatory - "chief engineer"; this title is not a straightforward job description but when carefully examined offers a nuanced glimpse into the Roman world. Given the limited evidence available, the role filled by these individuals has had many scholarly interpretations over the years, and any consensus of what the role entailed has been slow to form.⁵⁰ In literary sources, particularly those concerning the later Republic, the *Praefectus Fabrum* is often linked personally to a high-ranking official such as a consul. While examining the expectations of the title begins to elucidate the social aspect of *Praefecti Fabrum*, perhaps even more light can be shed on this topic by considering the lives of specific individuals known to history under this title. The earliest known attestations of particular individuals holding the

⁴⁷ *Mensores* and *agrimensores* could form the the subject of an entire study on their own in this these they will be considered as members of the engineering community of practice rather than undertaking a detailed examination of the technical and legal nature of land surveying. For a strong overview of *agrimensores* see Campbell 2000.

⁴⁸ Tosh 2003.

⁴⁹ Jardine 2004, 271.

⁵⁰ For an outline of previous scholarship see Breeze & Dobson 1993, 218 ff.

title *Praefectus Fabrum* appear in the first century BCE; they are recorded both by their contemporaries and by later authors.⁵¹ Varro, in the midst of a discussion on the prominence of different regions for the production of wine, discusses the experience of his *Praefectus Fabrum*, Libo Maricus, in growing vines on his estates in Faventia.⁵² While this does not shed light on what Libo Maricus may have done as *Praefectus Fabrum*, it makes it clear that after holding this title he had substantial means and was involved with fairly large-scale cultivation. It also highlights that *Praefectus Fabrum* was a distinguishing position which might prove useful in helping to identify an individual and that it was a role that could serve as a link to a patron. Libo Maricus is not a *Praefectus Fabrum* but rather Varro's *Praefectus Fabrum*, as demonstrated through the possessive use of "tuos". In another recorded instance of a *Praefectus Fabrum* Cicero, writing to his friend Appius Pulcher, demonstrates the amicable nature of the position.⁵³ Cicero writes that he sent his *Praefectus Fabrum* down one of two roads Pulcher might take while at the same time sending a friend of Pulcher's down the other. Both were instructed to inform Cicero which road Pulcher was using in order to allow Cicero to meet his travelling friend. Here the *Praefectus Fabrum*'s task was in no way connected to any engineering or building works. Once again, he was particularly identified as Cicero's (*meum*) *Praefectus Fabrum*. This further demonstrates that the *Praefectus Fabrum* was not only particularly linked to an important official personally, but also that in certain situations they could fill the same role as a friend of a friend. The relationship between the *Praefectus Fabrum* and the magistrate was

⁵¹ Cicero *Ad Att.*, 9.7.2; Cicero *Ad Fam.*, 3.7; Cicero *Pro Balbo*, 28; 63 & 64; Cicero *Pro Murena*, 35; 75; Cornelius Nepos *Atticus*, 12; Pliny *Nat. Hist.* 36.6.48; Plutarch *Cicero* 32; Varro *De Re Rustica*, 1.2.7; Velleius Paterculus, 2.76.

⁵² Varro *De Re Rustica*, 1.2.7: "In eo agro aliquotfariam in singula iugera dena cullea vini fiunt? Nonne item in agro Faventino, a quo ibi trecentariae appellantur vites, quod iugerum trecentas amphoras reddat? Simul aspicit me, Certe, inquit, Libo Marcius, praefectus fabrum tuos, in fundo suo Faventiae hanc multitudinem dicebat suas reddere vites." trans. Loeb.

⁵³ Cicero *Ad Fam.*, 3.7.

expected to remain central even after they had both left their posts, suggesting a level of affiliation that goes beyond organisational structure.

Interpersonal relationships are also at play in the case of Vibius, a *Praefectus Fabrum* under Cicero. In Plutarch's *Life of Cicero*, we are told Vibius was *Praefectus Fabrum* while Cicero was consul but after Cicero was banished, Vibius refused to receive him.⁵⁴ Plutarch highlights that Vibius had benefited from the position of *Praefectus Fabrum* and that Cicero had specifically been responsible for awarding it to him. The passage conveys that this relationship would normally have been a close one. Here as elsewhere, frequent use of possessive adjectives further underscores the expected closeness of this relationship, making Vibius' refusal of Cicero all the more shocking. Another instance of a late Republican *Praefectus Fabrum* is recorded in Cicero's own writings. Balbus, Cicero's legal client, was a close intimate of Caesar who appointed Balbus as his *Praefectus Fabrum*.⁵⁵ Cicero praised Balbus for his attentiveness in his duties (*officia observantiamque*) and loyalty (*fides*) to Caesar. Cicero highlights the connection between Balbus and Caesar stating that he is Caesar's (*suum*) *Praefectus Fabrum* and dearest man (*carissimum*). This passage not only underscores the intimacy between a high ranking official and the *Praefectus Fabrum*; it explicitly states that this position could be appointed by that official.⁵⁶ It is not clear, in this situation, what, if any, knowledge of construction and engineering would have been required or how it might have been obtained. These relationships demonstrate that perhaps in the late Republic social capital was the most important qualification to hold the title of *Praefectus Fabrum*.

⁵⁴ Plutarch *Cicero*, 32.

⁵⁵ Cicero *Pro Balbo*, 63 & 64.

⁵⁶ More on late republican *Praefectus Fabrum*: Welch 1995.

Writing later, Pliny the Elder reports that Mamurra, Caesar's *Praefectus Fabrum* in Gaul, was the first person in Rome to clad all his walls entirely in marble.⁵⁷ This shows once again that *Praefectus Fabrum* was a distinguishing title and that those who held it might be in positions of considerable wealth (if not a guarantee of good taste, based on the tone of Pliny's report). It is remarkable that while Pliny identifies Mamurra as the *Praefectus Fabrum* in Gaul, none of that army's considerable engineering feats are particularly connected with Mamurra either in Caesar's commentaries or elsewhere. This absence of an association to highly celebrated feats must invoke questions of how instrumental *Praefecti Fabrum* were in the completion of engineering projects.

Others have suggested that a *Praefectus Fabrum* could have been a senior officer on the staff of a field commander or imperial governor.⁵⁸ In this situation, the *Praefectus Fabrum* would have been someone with considerable experience within the army. These individuals could have accumulated knowledge and understanding of the operations and activities of the military engineers over the course of their careers. Sander argued for multiple posts with similar titles. He specifically identifies three categories: an "Engineer-Prefect" ("Ingenieur-Präfekt") responsible for the legions' building works, a military based adjutant role, and a bureaucratic step on the equestrian ladder, all recorded as *Praefectus Fabrum*.⁵⁹ He makes a reasonable case for distinctions between *Praefectus Fabrum* categories. For instance, he suggests that when a career path includes military ranks before and after *Praefectus Fabrum*, the title should also be considered as a military rank. It is probable that a dedicated career soldier such as a *primipilus*

⁵⁷ Pliny *Nat. Hist.*, 36.6.48. It was considered a serious possibility that Vitruvius and Mamurra were the same person however this is now seen as highly improbable see: Thielscher 1961; Baldwin 1990: 430-1; Anderson 1997: 40-41; Stevens & Hornblower 2015; Nichols 2017, 180 – 192.

⁵⁸ Breeze & Dobson 1993, 218.

⁵⁹ Sander 1962, 140-1. His main evidence is in Vegetius whose writings will be considered further below.

would have undertaken a *Praefectus Fabrum* role within a military context rather than a strictly political one. As seen above, *Praefecti Fabrum* could operate in a variety of different spheres but was not necessarily required to be an equal master of the political and practical. Further evidence of the political nature of the role of *Praefectus Fabrum* is found in the epigraphic record. Pflaum, in his studies of equestrian career trajectories, has noted that during the first century CE, many equestrians list a tenure as *Praefectus Fabrum* early in their careers.⁶⁰ As *Praefectus Fabrum*, the newcomers might have had direct access to those at the top of the Roman political scene while at the same time fulfilling the need to have military experience before entering the upper levels of politics themselves. As this role appears early in the career paths it must raise questions of whether the holder could have accumulated the technical knowledge and practical ability needed to be considered a master engineer. The transitory nature of the status of *Praefectus Fabrum* again highlights the perhaps driving political dimension of this role.

A description of precisely what might have been expected of the *Praefectus Fabrum* does not appear until Vegetius, writing in the 4th century CE. The role Vegetius outlines was extensive, the holder was entrusted with the oversight of winter camps, siege engines, weapon manufacturing and beyond.⁶¹ It is reasonable to wonder if Vegetius, writing centuries after the republican *Praefecti Fabrum* explored above, was particularly informed on the duties of the *Praefectus Fabrum* or rather inferred his description from the various tasks undertaken by military *fabri*. From the Republican era texts, it is not immediately obvious that any of these individuals were particularly involved with engineering or engineers apart from their title as *Praefectus Fabrum*. What is clear is that these were individuals who after holding this position

⁶⁰ Pflaum 1959, 196-7 & 218.

⁶¹ Vegetius, 2.11; see Breeze & Dobson 1993, 219.

often had substantial wealth in land and property. It is also plain that the connection between a leading official and his *Praefectus Fabrum* was seen as close and involved considerable patronage. The passages concerning Mamurra hint that *Praefecti Fabrum* could come under suspicion of abusing the privileges of the role for personal gain. There seems to be a potential parallel between the close relationship of *Praefecti Fabrum* and the commander, and potential condemnation for abuse of power through closeness to top officials - something that was often associated with scribes and other *apparitores*.⁶² Despite its seemingly simple definition, an overview of the historical record regarding the *Praefectus Fabrum* appears quite inconsistent. As what the literary sources tell us is extremely varied we will later turn to epigraphical sources to contextualize the evidence not only in regard to the role of *Praefecti Fabrum* but also engineers as a community. Clearly to translate every *Praefectus Fabrum* as “Chief Engineer” would be egregious anachronism and the worst type of conflating etic and emic categories however some *Praefecti Fabrum* do seem to have engaged in the practice of engineering and the persistence of the title suggest something of the prominence of engineering in the Roman imagination.

Engineers as Authors

The focus of this chapter is to explore and introduce the complex web of individuals connected to the practice of Roman Engineering. One of the primary methods to elucidate this network is through the study of ancient texts which have been preserved, recopied, edited and survived to the present day. While complete outsiders could write about the engineering works and perhaps those who undertook them, for this thesis which has as its aim to come to a better

⁶² See Hartmann 2020 on scribes.

understanding of Roman engineers, writers who by writing are necessary engaging with the perception of engineering and are “talkers” and are to some degree also involved in the practical aspects of engineering as “doers” are of particular interest.

In this section I will provide three case studies, Vitruvius, Frontinus and Apollodorus of Damascus. These three individuals have been selected as they represent a very diverse cross section chronologically but more importantly in the different balance between their connection to “doing” and “talking” and their positions within Roman society. All three of these writers could be considered professionals working to demonstrate their skills in a market with fierce competition for both skill and knowledge.⁶³

Vitruvius’ is the only treatise on architecture to survive from the ancient Mediterranean world. *De Architectura* offers three key answers to the question of who was a Roman engineer. First, an engineer is trained in a variety of disciplines with both hands-on skill and theoretical knowledge. Second, engineers have a shared group identity. Finally, engineers have an ethos to maintain not only their good name but also to contribute to the *res publica*. Vitruvius’ *De Architectura* provides the opportunity to study an individual who considered himself to be an engineer. From *De Architectura*, it is possible to form a distinct picture of Vitruvius as he wished to present himself to the world. *De Architectura* is a rich and wide-ranging work, which demonstrates the multifaceted nature of Roman engineering, attracting interdisciplinary scholarship from a variety of fields including art history, history of science, technology and architecture. While there has long been a scholarly interest in Vitruvius’ identity, authorial voice and use of rhetoric principles published in French, Italian and German scholarship, of late there

⁶³ See above and Stewart et al. 2020, 2 for more on professionals.

has been a surge of work published in English. This has coincided with a growing interest in exploring how authority is generated in ancient technical writing.⁶⁴ It is now accepted that Vitruvius' writing is not that of a simple workman whose every statement must be taken at face value but rather it should be considered a carefully crafted piece of literature with broader rhetorical and artistic aims. Vitruvius opened *De Architectura* by outlining his own personal career. He informs the reader that he was once in charge of the preparation and repair of ballistae, scorpions and other engines.⁶⁵ However, this was not a position he held alone: it was "along with M. Aurelius and P. Minidius and Cn. Cornelius."⁶⁶ From the very beginning of the work, *architecti* are presented as members of a joint enterprise.⁶⁷ Vitruvius also claims that part of his purpose in writing is the hope of cautioning his readers against charlatan *architecti*.⁶⁸ Vitruvius implicitly establishes three groups: the learned public, the true *architecti* and the charlatans. As Cuomo has shown, *De Architectura* creates a link between the first two groups while separating them both from the third.⁶⁹ Vitruvius' engineers form a group in which it is possible to share tacit knowledge and from which personal identities can be shaped. Through *De Architectura*, Vitruvius also contributed to the development of a wider Roman identity by making assertions on the correct Roman way to do things. There is a tendency to create at times an "us" and "them" mentality by presenting Greek techniques and understandings in contrast to their Roman equivalents. As Wallace-Hadrill succinctly puts it, Vitruvius is actively negotiating a Roman identity drawing on Greek history but "has no doubt about Roman superiority."⁷⁰ A

⁶⁴ E.g. König and Woolf 2017, Fögen 2009, Harris-McCoy 2017.

⁶⁵ Vitruvius *De Arch.*, 1.pref. 2.

⁶⁶ Vitruvius *De Arch.*, 1.pref. 2. For more the value of a true practitioner in the presence of "quacks" Stewarts et al. 2020, 21.

⁶⁷ Cuomo 2016, 141.

⁶⁸ Vitruvius *De Arch.*, 6.pref. 7.

⁶⁹ Cuomo 2016, 141.

⁷⁰ Wallace-Hadrill 2008, 149.

high standard of professional ethics is a key characteristic of Vitruvius' *architecti*. He demonstrated a deep concern for public safety and he proposed that *architecti* should be held financially responsible for their projects.⁷¹ Vitruvius suggested that accountability is beneficial not only to the public but also aids the *architecti* themselves to establish a respectable and stable position in society. For Vitruvius, the scope of *architecti* as agents for the common good went far beyond supervising municipal affairs but rather cast them as leaders “from a savage and rustic life to a peaceful civilization.”⁷²

Based on the diverse contents of Vitruvius' work it is clear that *architectus* is a far more expansive profession than the modern “architect”. Vitruvius asserts that an *architectus* is trained from boyhood through “various apprenticeships” in many arts, including academic study.⁷³ He advocates that *architecti* master a wide variety of disciplines including music, medicine, history and philosophy.⁷⁴ In a poetic turn of phrase, he describes the slow accumulation of the requisite knowledge as the gradual ascent to the high altar of architecture.⁷⁵ While this diverse and rigorous assembly of subjects may seem daunting to achieve, it is not out of the question that Vitruvius did indeed personally have this challenging education.⁷⁶ In the preface to book six Vitruvius directly states how thankful he is that his parents set him on his path though good education.⁷⁷ According to Vitruvius, the role of an *architectus*:

⁷¹ Public safety measures suggested by Vitruvius include exclusion of wattle walls (*De Arch.*, 2.8.20); use of fire resistant wood (*De Arch.*, 2.9.16); proper theatre construction (*De Arch.*, 5.3.1-2). If costs overrun by more than a fourth of the original estimate Vitruvius proposes that the *architectus* should cover the costs (*De Arch.* 10.pref.1-4).

⁷² Vitruvius *De Arch.*, 2.1.1-7.

⁷³ Vitruvius *De Arch.*, 1.1.11; 1.1.1 & 1.1.7.

⁷⁴ Vitruvius *De Arch.*, 1.1.3.

⁷⁵ Vitruvius *De Arch.*, 1.1.11.

⁷⁶ For doubt as to the need for such an extensive education: MacMullen 1959, 211. In favour of accepting Vitruvius' curriculum: MacDonald 1982, 138 & McEwan 2003, 136.

⁷⁷ Vitruvius *De Arch.*, 6.pref. 3.

consists in craftsmanship and technology. Craftsmanship is continued and familiar practice, which is carried out by the hands in such material as is necessary for the purpose of a design. Technology sets forth and explains things wrought in accordance with technical skill and method.⁷⁸

In order to fulfil this role, the *architectus* required both theoretical and practical skills.⁷⁹

Vitruvius asserted that beyond a “readiness to learn” the successful *architectus* possessed a “natural gift”.⁸⁰ For Vitruvius these two factors were both necessary for the true engineer.

Vitruvius stated that he, as a true *architectus*, has followed this path.⁸¹ He continually cultivated a highly knowledgeable authorial persona, suggesting to the reader that he had indeed met the expectation of dedication to study and excellence laid out in his treatise.⁸² The role of Vitruvius’ *architectus* included synthesis and learning to see the interconnectivity of a wide range of disciplines.⁸³ It can be argued that the interdisciplinary nature of the *architectus*’ training and the emphasis on connectivity mirrors the assertion that the *architectus*’ work impacts the greater community and can play a role in shaping the public good.

Vitruvius presented himself as both a “doer” and a “talker.” It is the *architectus*’ responsibility to bridge the divide between theory and practice.⁸⁴ To a certain extent the simple

⁷⁸ Vitruvius *De Arch.*, 1.1.1 “Opera ea nascitur et fabrica et ratiocinatione. Fabrica est continuata ac trita usus meditatio, quae manibus perficitur e materia cuiuscumque generis opus est ad propositum deformationis. Ratiocinatio autem est, quae res fabricatas sollertiae ac rationis proportione demonstrare atque explicare potest.” trans. Loeb.

⁷⁹ Vitruvius *De Arch.*, 1.1.2 “Itaque architecti, qui sine **litteris** contenderant, ut manibus essent exercitati, non potuerunt efficere, ut haberent pro laboribus **auctoritatem**; qui autem **ratiocinationibus et litteris** solis confisi fuerunt, umbram non rem persecuti videntur”. trans Loeb. Looking at book ten, Cuomo highlights the importance for Vitruvius of an architect combining “theoretical and practical”: Cuomo 2016, 327.

⁸⁰ Vitruvius *De Arch.*, 1.1.2 “Quare videtur utraque parte exercitatus esse debere, qui se architectum profiteatur. Itaque eum etiam **ingeniosum** oportet esse et ad **disciplinam docilem**.” Trans. Loeb.

⁸¹ Vitruvius *De Arch.*, 6. pref.4.

⁸² This is accomplished in part through his demonstration of knowledge on such diverse topics as the Mausoleum at Halicarnassus (Vitruvius *De Arch.*, 2.8); climate’s effects on people (*De Arch.*, 6.1); the exact calculated circumference of the earth (*De Arch.*, 1.6.9).

⁸³ Vitruvius *De Arch.*, 1.1.12.

⁸⁴ Vitruvius *De Arch.*, 1.1.15-6.

existence of *De Architectura* with its erudite digressions and broad scope, attests to Vitruvius' position as a "talker". However, we also know that Vitruvius actively aspired to be classed among this group. In the preface to book nine, he explicitly stated that he had been inspired by Cicero's *De Oratore*, Lucretius' *De Rerum Natura* and Varro's *De Lingua Latina* and hoped that his writings would become categorised among these works.⁸⁵ Vitruvius sought to elevate architecture by negotiating between Greek theory and Roman practice.⁸⁶ Like Cicero, Lucretius and Verro, Vitruvius strove to establish Roman identity through the development of a Latin literature which codified and described the Roman world. All the while, a number of instances in the text, including the author's account of his own career, frame Vitruvius as a "doer". He noted that measurements in building works were derived from the human body.⁸⁷ The choice to embody measurements in a very tactile and perhaps even crude method seems to suggest a hands-on approach and human connection to a building site. Vitruvius also stated his own views on the usefulness of different techniques or machines, potentially indicating personal experience in these areas.⁸⁸ Frontinus, writing in the late 1st century CE, identifies Vitruvius as one of the people responsible for updating the water supply system at Rome under Augustus.⁸⁹ However, Vitruvius' treatment of water systems in book eight does not focus on or even explicitly mention his personal involvement in the water systems. Rather it interweaves considerations of philosophical writings on water and contemplation of the interaction between nature and culture.⁹⁰ Vitruvius intentionally integrated the abstract into his discussion while exploring the

⁸⁵ Vitruvius *De Arch.*, 9.pref. 17-18. See also Okanish 2019, 59-93.

⁸⁶ Wallace-Hadrill 2008, 144-5; 159.

⁸⁷ Vitruvius *De Arch.*, 3.1.5.

⁸⁸ Vitruvius *De Arch.*, 2.8.20 & 10.13.8.

⁸⁹ Frontinus *De Aq.*, 25.

⁹⁰ König 2016 further explores the motivations for Vitruvius' narrative choices in book eight and their implication for Vitruvius' wider aims in *De Architechura* to develop the relationship between the Emperor and the architect.

physical world. This combination of approaches highlights his role as a “doer” and a “talker” and ultimately his ideal of a Roman engineer as both.

To a certain extent *De Architectura* might be considered an instruction manual, as Vitruvius delivered a wide range of detailed information on construction projects and the methodology for their completion. Though he provided guidelines for construction, such as theatre layouts to allow for the best acoustics, in practice, he warned it might not always be possible to follow his instructions exactly. He assured his readers that an experienced *architectus* would be able to use judgement and ingenuity to make any necessary adjustments.⁹¹ It is this ability to adapt abstract precepts to changing physical conditions that implies that *architecti* as a group were both “doers” and “talkers”. Vitruvius marked the rarity of an individual versed in both spheres and presented engineers as highly virtuous and naturally gifted. *Sollertia*, a certain innate skill or quickness of mind, had to be developed through schooling and application to succeed. This *sollertia* was not an alternative to study but rather a prerequisite for it and the foundation which must ultimately be relied upon when the architect inevitably encountered a situation which stretched beyond his previous education.⁹² Though innate, *sollertia* could be further developed through exercise. Vitruvius writes “by daily work men had rendered their hands more hardened for building, and by practising their clever talents they had by habit acquired craftsmanship, then also the industry, which rooted itself in their minds”.⁹³ Clearly reading *De Architectura* alone would have been no substitute for either the innate spark of

⁹¹ Vitruvius *De Arch.*, 5.6.7.

⁹² König 2009, 44-45. Other instances of engineers’ *sollertia* *De Arch.*, 2. pref.1; 5.8.1; 7.pref.1; 10.8

⁹³ Vitruvius *De Arch.*, 2.1.6 “cotidie faciendo tritiores manus ad aedificandum perfecissent et sollertia ingenia exercendo per consuetudinem ad artes pervenissent, tum etiam industria in animis eorum adiecta perfecit...” trans. Loeb.

ingenuity and *sollertia* nor the hard earned craftsmanship. The ability to marshal these resources and adapt to real world conditions were the reserve of true Roman engineers.

Another example of the ability to adapt general principles to a specific case may be the basilica at Fanum which Vitruvius claimed to have built despite its nonconformity to the ideal basilica standards outlined in *De Architectura*.⁹⁴ Cuomo has noted that such adjustments need to be made according to principles and understanding brought to the project by the expert *architectus* through tacit knowledge.⁹⁵ Tacit knowledge encompasses all that is known but is difficult or impossible to meaningfully articulate.⁹⁶ There is a strong contextual element to the transfer or acquisition of tacit knowledge often seen through group learning and apprenticeship. In the case of *architecti*, this knowledge must be gained through multiple apprenticeships in diverse fields and accumulation of understanding within the community of practice.

The value of *De Architectura* as evidence to explore the identity of Roman engineers is dependent on what is being discussed in the treatise: the world as it is, a prescription of how *architecti* ought to behave in an ideal world, or something else entirely. Considering the rhetorical devices and demanding standards proposed in the text, interpretation of *De Architectura* as a direct unvarnished description of daily life seems highly improbable.⁹⁷ In part, Vitruvius' text is aspirational and something of a hopeful entrant into an intellectual landscape in which architecture can take its rightful place. *De Architectura* may also attempt to correct misconceptions of *architecti*. Nichols has suggested that much of the disdain for financial remuneration found in Vitruvius is a response to widely held stereotypes. Members of the

⁹⁴ Vitruvius *De Arch.* 5.1.4-6; Romano 2017, 56.

⁹⁵ Cuomo 2016, 137-40.

⁹⁶ Cuomo 2016, 126 and for early development of the notion of tacit knowledge, see Polanyi 1967.

⁹⁷ For just one example of rhetorical techniques regarding descriptive language see Nichols 2017, 130-132.

apparitores, a middling level of Roman administrator, like Vitruvius, were construed as motivated by desire for unseemly social advancement and shameless greed.⁹⁸ Vitruvius goes to extremes in refuting these stereotypes, depicting *architecti* as paragons of learning, moderation and wisdom. Romano convincingly argues that *De Architectura* blends idealized theory with real world limitations in an exploration of what might be possible for the *architectus* to achieve.⁹⁹ *De Architectura* is not a simple instruction manual nor is it a theoretical exercise divorced from reality but rather it aims to depict what could be. Vitruvius' purpose in writing *De Architectura* was doubtless multifaceted. As a "talker", in part he hoped through this work to become known to posterity.¹⁰⁰ Though he is a "doer", Vitruvius is more than the nameless and faceless craftsman described by Shapin and Burford.¹⁰¹ He depicted *architecti* as heroes and in his own case made it clear that his strength came from his carefully curated knowledge and his ability to share it in writing.¹⁰² Though as a guide to reality *De Architectura* has limitations, it elucidates how Vitruvius, a self-proclaimed engineer, defined his profession and how he wished to be perceived.

A very different character from Vitruvius, Frontinus offers another lens on the world of Roman engineering. Sextus Julius Frontinus was a central political figure of his day, holding the consulship three times.¹⁰³ He was charged by the emperor with the management of the water supply of the City of Rome.¹⁰⁴ This administrative role might have required limited technical

⁹⁸ Purcell 1983, 156-7; Nichols 2017, 72-80.

⁹⁹ Romano 2017.

¹⁰⁰ Vitruvius *De Arch.*, 6. pref. 5.

¹⁰¹ Burford 1972; Shapin 1989; more recent studies on particular craftsmen: Flohr 2013.

¹⁰² More on preface to Vitruvius *De Arch.*, book two including bibliography, see Formisano 2016.

¹⁰³ König 2007, 177.

¹⁰⁴ Frontinus *De Aquis*. 1.

knowledge but comprised important logistical responsibilities and the holder was required to keep a dynamic system operational. In *De Aquaedutu Urbis Ramaeis*, Frontinus details the history of the Roman aqueducts, their present condition including quantitative and qualitative assessments, and his plan for their maintenance and improvement.¹⁰⁵ Although in the preface Frontinus suggests that *De Aquaedutu* was written primarily to aid him in his role as *curator aquarum* and perhaps benefit future holders of this office, DeLaine has convincingly argued that the text is based on a speech that Frontinus gave in the senate.¹⁰⁶ Moreover, König has demonstrated that the treatise is in fact a carefully constructed exploration of the relationship between knowledge and power, not just between an administrator and his subordinates, but also the emperor and his senators, in the dynamic world of later first century Rome.¹⁰⁷ The very fact that *De Aquaedutu* survives to the present is powerful evidence that it was hardly a collection of private work notes. DeLaine asserts that the seemingly mundane lists and statistics found in *De Aquaedutu* were used by Frontinus to “generat[e] wonder and confirm [...] power.”¹⁰⁸ This suggests technical knowledge could be a valuable social commodity used to leverage power and influence.

Frontinus’ account of his tenure as the *curator aquarum* provides insight into project management at Rome. He describes the relationship between the *curator* and his subordinates:

For though the latter play a necessary role in the way of rendering assistance, yet they are, as it were, but the hands and tools of the directing head. Observing, therefore, the practice which I have followed in many offices, I have gathered in this sketch (into one systematic body, so to speak) such facts, hitherto scattered, as I have been able to get

¹⁰⁵ Frontinus *De Aquis*. 88; DeLaine 1996, 135.

¹⁰⁶ DeLaine 1996, 133.

¹⁰⁷ König 2007.

¹⁰⁸ DeLaine 1996, 139.

together, which bear on the general subject, and which might serve to guide me in my administration.¹⁰⁹

The metaphor of the body highlights the interconnection but also the clear distinction between the supervisor, cast as the head, and the actual workers, the hands. In this description, while both are needed for success there is firm delineation between roles with little overlap of duties.¹¹⁰ While to some extent Frontinus later nuances this division it is nevertheless prevalent throughout the text and beyond. In the world view presented in *De Aquaedutu Urbis Ramaeis*, society is divided into two categories, “doers” and “talkers”. Frontinus urged the *curator* to depend not only on personal experience but to seek the advice of the *architecti* assigned to his office and other trustworthy and reliable sources.¹¹¹ Clearly, these trusted advisors occupied a role that is not neatly accounted for in the body metaphor and intersects the roles of “doer” and “talker”. Though Frontinus undoubtedly considered himself primarily a politician and administrator, in these roles he actively engaged with engineers and sought to develop his understanding of the water system. Frontinus serves as an illustration of the boundaries of Roman engineering community of practice. It could be argued that Frontinus actively chose to increase his practical experience building his acumen as a “doer” to complement his skills as a “talker”. Frontinus emphasised the value of gaining firsthand knowledge and understanding of the systems he was placed in charge to allow him to work more efficiently with the *aquarii*, safeguard the resources of the state and thus uphold the *res publica*.

¹⁰⁹ Frontinus *De Aq.*, 2 “aliudve tam indecorum tolerabili viro, quam delegatum officium ex adiutorum agere praeceptis, quod fieri necesse est, quotiens imperitia praepositi ad illorum decurrit usum; quorum etsi necessariae partes sunt ad ministerium, tamen ut manus quaedam et instrumentum agentis. * lacuna Quapropter ea quae ad universam rem pertinentia contrahere potui, more iam per multa mihi officia servato in ordinem et velut corpus diducta in hunc commentarium contuli, quem pro formula administrationis respicere possem.” trans Loeb.

¹¹⁰ The same metaphor of the harmonious body with different social groups as its various parts is used by Livy to help resolve the conflict between the Plebeians and the Patricians during the conflict of the social orders: Livy, 2.32.9-11.

¹¹¹ Frontinus *De Aquis.*, 119.

While Frontinus' designation as an engineer has been debated, Apollodorus of Damascus is a central figure in the history of Roman engineering. We know Apollodorus by name which in itself is something of an anomaly. Likely born approximately 50 CE, Apollodorus flourished in Rome throughout the first part of the second century and is credited with building the forum and baths of Trajan.¹¹² We catch glimpses of Apollodorus in several different sources and aside from perhaps Vitruvius he is the Roman engineer about whom we know the most.

The *Historia Augusta* records that Hadrian "then consecrated this statue to the Sun, after removing the features of Nero, to whom it had previously been dedicated, and he also planned, with the assistance of the architect Apollodorus, to make a similar one for the Moon."¹¹³ Beyond the man's name there is not much to be learned about Apollodorus from this text but in naming him alone he is more known to us than almost any other Roman engineer. Luckily, we are able to gain more information from our other sources. Procopius reports:

The Roman Emperor Trajan, being of an impetuous and active temperament, seemed to be filled with resentment that his realm was not unlimited, but was bounded by the Ister River. So he was eager to span it with a bridge that he might be able to cross it and that there might be no obstacle to his going against the barbarians beyond it. How he built this bridge I shall not be at pains to relate, but shall let Apollodorus of Damascus, who was the master-builder of the whole work, describe the operation¹¹⁴

From this passage we can start to build a more complete picture of Apollodorus. We learn that Apollodorus was on military campaign with the emperor. This is something he has in common

¹¹² MacDonald 1977, 47; Whitehead 2008; Whitehead 2010; Purcell 2015.

¹¹³ *Historia Augusta Hadrian* 19.13 "cum hoc simulacrum post Neronis vultum, cui antea dicatum fuerat, Soli consecrasset, aliud tale Apollodoro architecto auctore facere Lunae molitus est." trans. Loeb.

¹¹⁴ Procopius. *Aed.* 4. 6. 11 -13 Trans Loeb. While we do not have anything from Procopius on how the bridge was built Cassius Dio 68.13.1-6 tells us in some detail about what the bridge was like though without mention of Apollodorus.

with Vitruvius, suggesting that the military was intimately connected with Roman engineering.¹¹⁵ We also learn that he was from Damascus. Engineers coming from the East is a well documented trope in the Roman world which was shared with other skilled professionals, such as doctors.¹¹⁶ We also learn the significant fact that Apollodorus wrote about his work constructing the famous bridge over the Danube. Here it is clear that Apollodorus was highly literate and had answered Vitruvius' call for Roman architects to document their achievements. Procopius invites us to learn about the "operation" of constructing the bridge from the engineer himself.

Unfortunately, this is not possible as the work is lost to history. However, "Apollodorus' Siege Matters" has been preserved through the 10th century Byzantine tradition of *Poliorketika* which brings together collections of both contemporary and classical works on siege warfare.¹¹⁷ "Apollodorus' Siege Matters" is a short treatise in which the author offers instruction on the construction of a wide variety of siege implements, ranging from rams and scaling ladders to drills and a floating assault raft. Lepper and Frere neatly articulate the general scholarly consensus that *Historia Augusta*, Procopius, Cassius Dio and the *Poliorketika*, most likely, all referred to the same Apollodorus. Although Apollodorus is not an uncommon name, the coincidence of more than one high profile engineer sharing it at a similar time would likely have been commented on in the sources.¹¹⁸ In the opening of the *Poliorketika*, Apollodorus writes that he is responding to an unnamed emperor's letter with requested "specimen designs useful for

¹¹⁵ Roman engineers in the military is the focus of the next chapter.

¹¹⁶ This assumption is clearly seen in Pliny *Ep.* 10.40.3 which will be examined in Chapter 4 on Success & Failure.

¹¹⁷ For more on the *Poliorketika* as a genre: Sullivan 2000.

¹¹⁸ Lepper & Frere 1988, 190-192 and followed by Whitehead 2010.

a siege”; he says that he has also included explanatory notes and is even sending an assistant to help overcome any ambiguities.¹¹⁹ He continues:

I also sent local builders and those otherwise competent at construction and making. This is because, having been with you in your battles, when I had the good fortune to have been well supplied with soldiers suited either by familiarity or dexterity to fine constructing, I know how versatile men and machines have to be to meet the needs that arise unexpectedly in wars.

If there is anything unclear in what I say in the descriptions applying to each apparatus, excuse me, master: the vocabulary of science will be unfamiliar to everyday speech, the tasks involve complex theory, and I myself am perhaps rather weak with words. Perhaps, though your natural genius puts this to rights, your graciousness forgives it.¹²⁰

Here once again in Apollodorus’ own words we get confirmation that he has been on campaign with the emperor. With this in mind, we might question the likelihood that such an experienced soldier and engineer would propose schemes as infeasible as a drill to undermine city walls or so unwieldy and far-fetched as the inflatable assault bridge. Later additions or alterations must be suspected. Blyth and Whitehead have, through applying both stylistic analysis and considering if the devices conform to both the known laws of physics and Apollodorus’ own injunction that the devices he describes will be “easily-procured, light, well made [and] quickly assembled by the available man power”, convincingly argued that although there have been significant later changes to the text as it exists today, these have largely been through addition rather than alteration and as such large sections of the text can safely be attributed to Apollodorus himself, including the introductory sections cited above.¹²¹

¹¹⁹ Apollodorus *Poliorketika* 137.1, numbering system following Wescher 1867 & Whitehead 2010.

¹²⁰ Apollodorus *Poliorketika* 138.8 trans. Whitehead 2010.

¹²¹ Apollodorus *Poliorketika* 137.3; Blyth 1992 & Whitehead 2010.

Carefully considering this opening gives a surprising amount of information into who Apollodorus was. In the very first sentence we are told “I read your letter about the machines.”¹²² On the most basic level this shows the Apollodorus was a man with an active correspondence. The fact that he is penning a reply to an emperor who has asked for his advice shows that he enjoyed a considerable, elevated position and that his expertise was valued.¹²³ From the rest of the introduction, we also learn that Apollodorus is not only in a position to send an assistant to the emperor, he also sends a group of workers. Clearly, to be able to direct such resources he is also a man of considerable financial means or at a minimum had been entrusted with the management of these resources. It is not unreasonable to speculate that he is working at the head of some sort of construction company where he has access to these workers and the authority to send them on secondment for the unknown duration of the emperor’s upcoming campaigns. Apollodorus was a director, managing plans and orchestrating the actions of his workers, “the hands” of his firm.

Before moving on to discuss the last piece of textual evidence we have for Apollodorus, let us pause for a moment to consider the assistant who accompanied this letter to the emperor. Apollodorus writes that “having shown (him) everything and worked in his presence” he will be able to assist with any questions that might arise from the enclosed designs.¹²⁴ Blyth has proposed that this young man might actually have been Apollodorus himself and the letter which makes up the treatise was actually written by his master and was a part of his papers preserved

¹²² Apollodorus *Polioretica* 137.1.

¹²³ The identity of the emperor in question still provokes debate: Whitehead 2008 205-208 enumerates the different scholarly preferences. I tend to find Trajan the most likely candidate as Apollodorus is known to have served on campaign with him.

¹²⁴ Apollodorus *Polioretica*, 137.2.

throughout his life as a keepsake.¹²⁵ Blyth bases the case for this identification on the assumption that Apollodorus was considerably older than Trajan and on the fact that in some of the manuscripts the text is titled “from Apollodorus” rather than “Apollodorus”. However, there is no firm evidence when Apollodorus was born and such variation in manuscripts is not uncommon. Therefore, the identification of the assistant as Apollodorus himself fails Ockham’s razor and is unlikely.¹²⁶ Nevertheless this assistant helps us to understand how technical expertise could be shared in a world where instant communication was not possible. We are specifically told that the designs have been “worked in his presence” allowing him to gain the needed experience and transfer of tacit knowledge. Even if he was not Apollodorus of Damascus, once in the presence of the emperor and presumably working alongside his military engineers, this individual was in possession of valuable technical acumen. This would have placed him in an ideal position to forward his own career.

Returning now to Apollodorus, Cassius Dio in his history of Hadrian’s reign writes that the emperor:

first banished and later put to death Apollodorus, the architect, who had built the various creations of Trajan in Rome—the forum, the odeum and the gymnasium. The reason assigned was that he had been guilty of some misdemeanour; but the true reason was that once when Trajan was consulting him on some point about the buildings he had said to Hadrian, who had interrupted with some remark: “Be off, and draw your gourds. You don’t understand any of these matters.” (It chanced that Hadrian at the time was pluming himself upon some such drawing.) When he became emperor, therefore, he remembered this slight and would not endure the man’s freedom of speech. He sent him the plan of the temple of Venus and Roma by way of showing him that a great work could be accomplished without his aid, and asked Apollodorus whether the proposed structure was satisfactory. The architect in his reply stated, first, in regard to the temple, that it ought to have been built on high ground and that the earth should have been excavated beneath it,

¹²⁵ Blyth 1992, 153-155.

¹²⁶ Whitehead 2010, 23-24.

so that it might have stood out more conspicuously on the Sacred Way from its higher position, and might also have accommodated the machines in its basement, so that they could be put together unobserved and brought into the theatre without anyone's being aware of them beforehand. Secondly, in regard to the statues, he said that they had been made too tall for the height of the cella. "For now," he said, "if the goddesses wish to get up and go out, they will be unable to do so." When he wrote this so bluntly to Hadrian, the emperor was both vexed and exceedingly grieved because he had fallen into a mistake that could not be righted, and he restrained neither his anger nor his grief, but slew the man.¹²⁷

This tale of the outspoken if incautious expert speaking truth to the jealous emperor at the eventual cost of his life has been a central part of the discussion of Apollodorus. However, there are serious reasons to approach this story with caution. It only appears in the portions of Cassius Dio which have been preserved through the intense mediation of the 11th century monk Ioannes Zonaras.¹²⁸ Indeed, the *Historia Augusta* vividly describes Hadrian showing off and being jealous of practitioners of all the arts yet the story of his retribution towards Apollodorus which would have so well supported this theme is omitted.¹²⁹ Moreover, Ridley has convincingly demonstrated that this anecdote is central to Cassius Dio's motif of depicting Hadrian as jealous and vindictive. The accusations Apollodorus allegedly levelled against Hadrian's construction appear almost verbatim in criticisms of other temples found in earlier literature. The practical impossibility of using the temple for theatre machinery and the fact that the same charge of the temple being too small for the god to stand up in, were levelled at Phidias regarding the temple at Olympia.¹³⁰ There is also strong evidence for continuity between public works under Trajan and Hadrian. This raises the question of how likely it was that Apollodorus was killed as a result of his alleged impudence. Despite this, it is still useful to take this account into consideration as

¹²⁷ Cassius. Dio 69. 4. trans. Loeb.

¹²⁸ Millar 1964, 1-3.

¹²⁹ *Historia Augusta - Hadrian*, 14-16.

¹³⁰ Ridley 1989 followed by Whitehead 2008, 205.

it is presented by Dio as a plausible scenario. In this scene Apollodorus' technical knowledge is not only respected by Hadrian: it causes the emperor great consternation that despite all his learning and enthusiasm he is not a professional and in this sphere he is second to Apollodorus.¹³¹

Intriguingly, Apollodorus of Damascus may be the sole Roman engineer we know of to be corporally immortalised in stone. There is a bearded portrait bust in the Munich Glyptothek from the period of Trajan/Hadrian which is inscribed with the name Apollodorus.¹³² While a name alone is hardly evidence beyond doubt that the bust is of the engineer, it has also been suggested that the bearded figure directly behind the emperor on the section of Trajan's column which shows his bridge over the Danube, is none other than Apollodorus.¹³³ The engineer's notoriety combined with these contextual clues create a plausible argument for identifying both of these images as Apollodorus.

In the case of Apollodorus of Damascus, a Roman engineer was a man with significant social and financial standing. He was someone who had travelled widely while on campaign and whose profession had brought him far from his home in the East to a position of responsibility at the very centre of Rome. He was in some respect a teacher, training assistants to be able to further disseminate his knowledge. His career was wide ranging and multifaceted comprising building bridges for the army, construction on a monumental scale in the capital, recording his works in text and more. If our only frame of reference was Apollodorus of Damascus then perhaps the true definition of a Roman engineer would be a craftsman of great renown with the

¹³¹ Cuomo 2007, 131-133.

¹³² Richter 1965, 286.

¹³³ Lepper & Frere 1988, 148 & plate LXXII.

skill to make even an emperor envious. However, in the breadth of all of Roman history the tale of one individual cannot even begin to tell the whole story. We must turn to the exploration of epigraphic evidence to allow us to delve deeper into our narrative on Roman engineering identity.

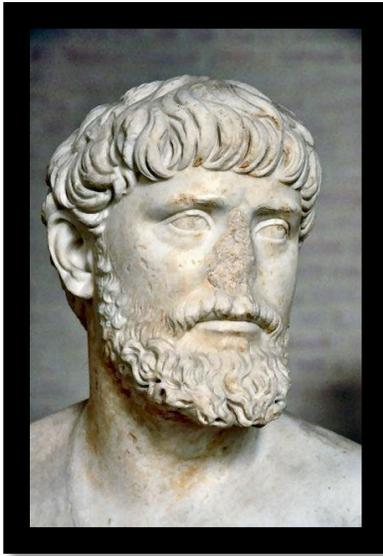


Figure 1 Apollodorus of Damascus - Munich Glyptothek

Epigraphic Sources

Up to this point we have relied mainly on texts to trace the web of individuals connect to Roman engineering. These texts of course were written by a specific and limited segment of the population and they reach us through the mediation of centuries of copyists selecting which works to transmit. These textual sources are invaluable yet highly restricted. Inscriptions represent another instrumental conduit for information on life in the ancient world. While there are still significant restrictions on who could or would engage in the creation of inscriptions, the sample size is far greater than literary sources. The epigraphic evidence is incredibly powerful as

it gives us a direct connection to the words of the people who commissioned them. Inscriptions are a very heterogeneous resource; many are highly formulaic in nature while others are incredibly personal. These dedications offer a unique opportunity to glimpse the lives of individual Roman engineers outside of the elite societal echelons in their own words. As Hope has underscored, as sources of information, inscriptions pose interesting paradoxes.¹³⁴ On the one hand, they are often very formulaic, using stock phrases and predictable imagery. On the other hand, they often record individual lives and offer a direct connection between the carver and the reader centuries later. Inscriptions could be in plain sight, part of everyday life, hardly noticed by passers-by but they could also be highly ritualized, symbolic and serve to create separation. Inscriptions also have a complex temporality: the act of carving words in stone is a clear desire to communicate to the future while capturing a real or desired present, frequently recalling the past through established modes and phrases.

In the case of epigraphic material, availability of evidence is dependent in part on locational and geographical conditions. For instance, we are limited to sites where researchers have chosen to undertake excavations. We must also take into account that certain environments are more plentiful in the stone needed for inscriptions and specific climates are better suited to preserving such etchings. These factors potentially somewhat distort the distribution of evidence available to modern researchers. While some of the discrepancies in the distribution of the epigraphic material, such as concentrations along major roadways, can be explained relatively easily, others, such as the vast difference between the numbers of surviving inscriptions from

¹³⁴ Hope 2014, 294-5.

Narbonne (over a thousand, some of which are linked to crafts and trades) and Paris (around fifty), despite the fact that these cities were of comparable size, are far more enigmatic.¹³⁵ The “epigraphic habit,” at its core the concept that certain groups at certain times are more likely to create inscriptions for social and cultural reasons, helps to explain the distribution of evidence. For example, Meyer has argued that the concentration of epigraphical material in North Africa is the result of a desire by the inhabitants to demonstrate their Roman citizenship through lawful inheritance and commemoration practices.¹³⁶ The converse appears to be true of Roman Britain where the epigraphic habit does not seem to have taken deep root beyond the military. In particular, commemorations by non-military elites are extremely rare.¹³⁷ Beltrán Lloris has highlighted that certain social groups such as freedmen were more likely to create epigraphs but conversely notes that an individuals’ personal experience and private emotions impact the choice to create commemorations.¹³⁸ It should also be noted that the deceased may not have approved the messages posthumously ascribed to them. Nevertheless, these sources give us an opportunity to view our subject through the eyes of those who actually knew them and wished to ensure that these people were distinguished as engineers for posterity.

Bearing in mind the important caveats of the epigraphic habit, analysis of inscriptions containing terms associated with Roman engineers sheds light on geographic spread, temporal location and personal identities. As we saw earlier, there are clearly many different terms to examine in the consideration Roman engineering works and the individuals connected to them. This broad approach to terminology will capture a more accurate picture of the multifaceted

¹³⁵ Bodel 2001, 9.

¹³⁶ Meyer 1990, 95-96.

¹³⁷ Mattingly 2008; Hope 2014, 288.

¹³⁸ Beltrán Lloris 2014, 144-145.

group of individuals involved in Roman engineering projects. Nevertheless, for practical purposes, balancing availability of evidence and diversity of activities inscriptions with the terms *agrimensor*, *aquarius*, *architectus*, *faber*, *librator*, *machinator*, *ensor aedificiorum*, *ensor*, *praefectus fabrum* and *structor*, were selected to be primarily investigated.

The following table analyses engineering job titles in inscriptions from the Epigraphik-Datenbank Claus/Slaby EDCS database (C/S).¹³⁹ Patterns and clusters based on chronology, geography and content are outlined below.

¹³⁹ The *Epigraphik-Datenbank Claus/Slaby* (*Epigraphic Database Claus-Slaby, EDCS*). <http://www.manfredclaus.de/> is “the most extensive digital resource for Latin inscriptions. It presently contains over 400,000 texts, constituting almost all published Latin texts.”: Elliott 2014, 80. I have used the dating and location information provided in this database as a starting point for categorization. The nature of the database search is limited to text in the inscription so visual imagery may not be fully accounted for here. The search results can be found in appendix A.

Table 1 Engineering Terminology

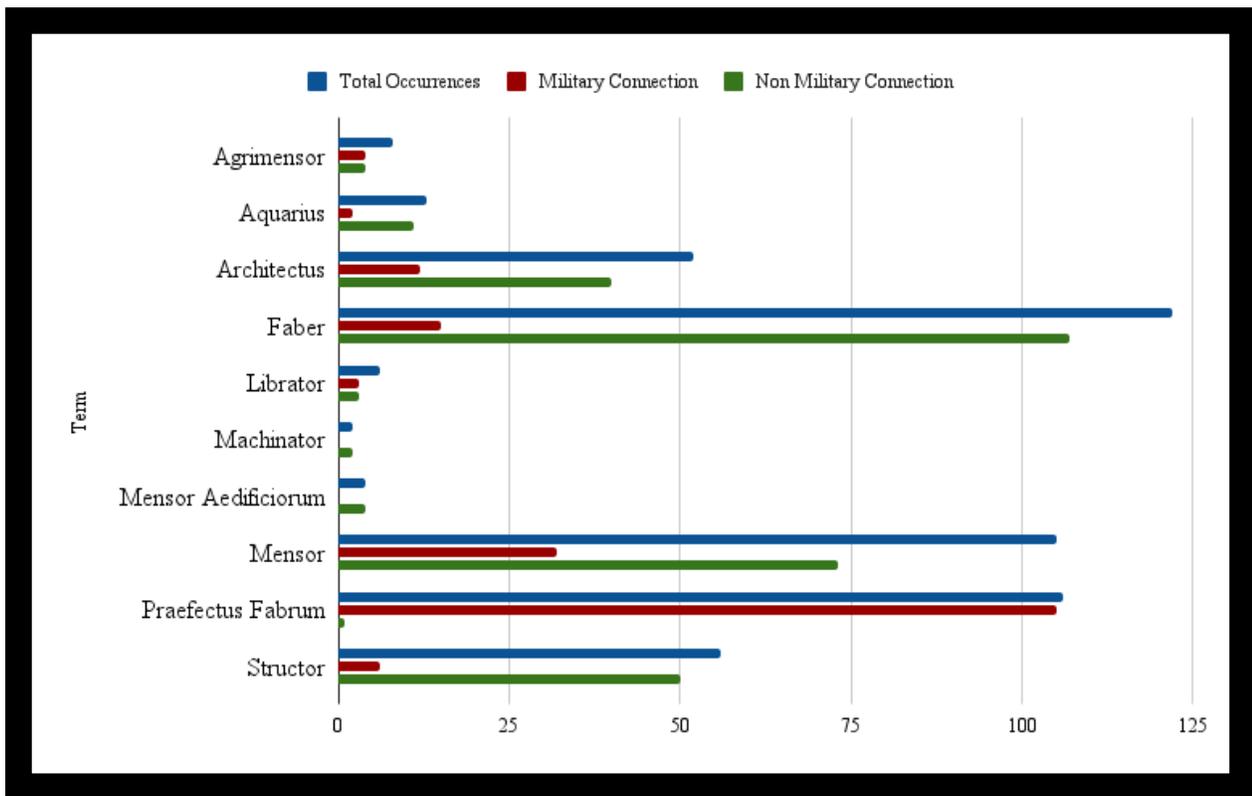


Table 2 Engineer Inscriptions

Term	Occurrences	Military Connection	Geographic Concentrations	Time	Remarks
<i>Agrimensor</i>	8	4	Spain: 2 Balkans: 2	1st BC Century BC to 3rd century CE	There are relatively few instances of this term in the epigraphical record, with only 8 currently identified; there are also instances of <i>ensor agrarius</i> or <i>ensor agrorum</i> included in the <i>ensor</i> category.
<i>Aquarius</i>	13	2	Rome: 11	1st & 2nd Century CE	Inscriptions using this term are found almost exclusively in the city of Rome itself indicating it was an urban role. Though this position appears to be that of a municipal city worker there are references to <i>aquarii</i> in military listings differentiating the holder from other individuals.
<i>Architectus</i>	52	12	Rome: 14 Italy (other than Rome): 19 Northern Britain: 3 France: 4 Germany: 6	1st century BCE to the 3rd century CE	There are inscriptions linking the term <i>architectus</i> to the military from Hispania, Moesia, Numidia, and Pannonia. Of the 6 occurrences found in Germany, five also directly reference the military. This suggests that in Germany <i>architecti</i> were directly linked to the army's presence there. This close connection to the military in the provinces contrasts with inscriptions from the city of Rome, where of the 14 occurrences only 2 directly reference the military. 2 <i>architectus</i> inscriptions also include the term <i>praefectus fabrum</i> (IGLFRPal 83 & CIL 11.6509 from Rome and Umbria respectively). There are 2 inscriptions that deal with <i>architectus navalis</i> (ILGN 232 from Gaul and CIL 10.06339 from Italy), there are also 3 instances of inscriptions with the term <i>faber navalis</i> (CIL 11.139 & InscrAqu-1.704 from Italy and IG-09-01-04, 01548 from Macedonia). Although five inscriptions from such a wide geographic area may not be sufficient to draw many conclusions, they do highlight that there is potential for interaction and overlap between the roles of <i>architectus</i> and <i>faber</i> .
<i>Faber</i>	122	15	Rome: 42 Italy (other than Rome): 49 Northern Britain: 4 Africa: 6 Southern France: 9	1st century BCE to the 3rd century CE	There is a geographic cluster of <i>faber</i> inscriptions from Southern France, many of which commemorate <i>fabri</i> in specific trades: <i>argentarius</i> (CIL 12, 04474), <i>limarius</i> (CIL 12, 04475), <i>tignarius</i> (CIL 12, 04477) and, <i>lapidarius</i> (ILGN 00580). There are also instances of <i>faber anularis</i> , <i>ferrarius</i> , <i>intestinaris</i> , <i>lectarius</i> , <i>oculararius</i> , and as noted above <i>navalis</i> . There are military <i>faber</i> inscriptions from Italy, Macedonia, and Moesia, 4 wooden writing tablets from Vindolanda and a grouping of 3 inscriptions from a single site in Africa Proconsularis: the inscriptions in this grouping are all dated 253-259 CE by C/S (OBuNjem 3, OBUjNjem 12, OBUjNjem 30).
<i>Librator</i>	6	3	North Africa: 3	1st century BCE to the 3rd century CE	The term <i>librator</i> was also connected to land surveying and on 3 occasions was expressly linked to water management (CIL 8.2728 & LBIRNA 491 in Africa and CIL 13.1827 in France). <i>Librator</i> Nonius Datus claims a key role in the construction of an aqueduct in North Africa on his cippus inscription (CIL 8.2728).
<i>Machinator</i>	2	0	Rome/Ostia: 2	c. 1st Century CE	There are few instances of the term <i>machinator</i> all found near urban settings suggesting this was an uncommon job title and strictly a position found in cities. There is an inscription commemorating two brother <i>machinatores</i> (CIL 6. 9533). While these individuals may or may not be biological brothers, they are certainly linked through their profession.

Term	Occurrences	Military Connection	Geographic Concentrations	Time	Remarks
<i>Mensor Aedificiorum</i>	4	0	Rome: 2 Latium/Campania: 2	1st -3rd century CE	Based on the position of building surveyors and the geographic location of these inscription in combination with the absence of reference to the military, it can be inferred that <i>mensor aedificiorum</i> was an urban role.
<i>Mensor</i>	105	32	Africa: 23	1st BCE Century BCE to 3rd century CE	The job of <i>mensor</i> implies land measurement however, at times this is expressly recorded through the inclusion of <i>agrorum</i> or <i>agrarius</i> or even specialized with <i>agrorum publicorum</i> CIL 8.12636. These inscriptions are found over a very broad geographic area. There is a clear concentration of <i>mentores</i> inscriptions in Africa. There are regional variations within this geographical grouping. The Numidian inscriptions tend to be expressly linked to the military while those from Africa Proconsularis are not.
<i>Praefectus Fabrum</i>	106	105	Italy (other than Rome): 64	1st century BCE to the 3rd century CE	Although the term <i>praefectus fabrum</i> returned over 100 results they need to be approached with more than the usual degree of caution. This title is part of the military organization and may have included very limited technical aspects. Many of these <i>praefectus fabrum</i> inscriptions are part of elaborate <i>cursus honorum</i> , other positions frequently mentioned in these inscriptions include both other military roles, in particular <i>praefectus equitum</i> (e.g. CIL 11. 709) and <i>tribunus militum</i> (e.g. CIL 13.6816), and priestly roles such as augur and a wide range of <i>flamines</i> and pontifices (e.g. CIL 5. 7605 & CIL 13. 1036). Geographically most of these inscriptions are from Italy, although only relatively few are from the city of Rome itself. There are also geographical clusters from Southern France, North Africa, Pannonia, and Germany.
<i>Structor</i>	56	6	Africa Proconsularis: 12 Rome: 22	1st BCE Century BCE to 3rd century CE	The term <i>structor</i> is predominantly a found in inscriptions without direct reference to the military but does appear in some military applications including letters from Vindolanda. The majority of the <i>structor</i> inscriptions are from the city of Rome implying, not surprisingly, that it was primarily an urban position.

The majority of inscriptions referencing Roman engineers are funerary. As these types of inscriptions are directly tied to individuals and are often highly personal in nature, they offer an intimate connection to the ancient world. The unique details they contain not only capture the

imagination but give concrete information about a far wider range of individuals than can be found in literary sources alone.

As some of the best-preserved evidence of Roman land surveying is found in North Africa it is not surprising that an inscription containing *agrimensor* was found in Carthage.¹⁴⁰ In line with the epigraphic tradition of North Africa, the age of the *agrimensor* is recorded. T. Flavius Dapnus lived to be 90 years old. He was an imperial freedman, illustrating that engineers could have been either free or enslaved people. Finally, this inscription commemorated that Dapnus was both an engineer and that he had piety, a quality which is mentioned twice. Roman *pietas* places particular emphasis not only on respect for the gods but also crucially on behaving dutifully towards your family and the broader community. This fits well with the assertion we find in *De Architectura* that the engineer had a responsibility to the *res publica*.¹⁴¹ In the case of Dapnus a Roman engineer was someone who lived to old age and was commemorated by those who came after for both his profession and his virtue.

As Vitruvius' self assigned job title, the term *architectus* represents an important link between the textual and epigraphic evidence available for Roman engineers. Just as Vitruvius stated he was associated with the military a significant portion of the *architecti* inscriptions contain explicit military references.¹⁴² A particularly notable example of a military *architectus* inscription is the case of Vedennius Moderatus whose rather imposing tombstone features a catapult.¹⁴³ Vedennius was a Roman engineer who served the army in Germany and Italy for over two decades and could afford a finely carved monument. This indicates that he travelled the

¹⁴⁰ *CIL* 8. 12639, Dilke 1962, 175.

¹⁴¹ Green & Scheid 2016.

¹⁴² Vitruvius *De Arch.* 1. pref. 2.

¹⁴³ *CIL* 6.2725. Verdenius Moderatus and his epitaph are considered further in chapter two.

empire and over the course of a long career could have accumulated a wide range of knowledge and skills not dissimilar to the path suggested in *De Architectura*. From the care and attention given to the construction of the monument and the emphasis on Vedennius' virtues it can be inferred that he was a respected member of the community.

There is further evidence of architects travelling with the army. Inscriptions from Germany and Scotland seem to indicate that an *architectus* named Amandus was present in both locations; illustrating that a Roman engineer was someone who might live and work in far spread locations across the empire.¹⁴⁴ The fact that one individual was identified on two separate occasions in far distant places implies that he brought his personal expertise to both locations, acting as a unifying factor and perhaps a vector of tacit knowledge. Conversely, each new posting may have presented an opportunity to gain new knowledge through diverse practical experience. A funerary inscription from Gaul commemorates Philippus *architectus maximus*.¹⁴⁵ The inclusion of the descriptor *maximus* alludes to a potential sense of professional competition between *architecti* or even some kind of professional hierarchy or ranking.

Architecti inscriptions are found across the Roman world yet there are signs of a shared sense of identity. For instance, inscriptions dedicated by *architecti* to the goddess Minerva can be found in Britain, Germany and Rome.¹⁴⁶ Minerva in many ways is the ultimate “doer”; as the goddess responsible for craft and art, she is deeply rooted in the physical world. However, born from the forehead of Jupiter she is also quite literally a brainchild, she was the goddess of wisdom and strategy firmly in the purview of “talkers”. A link between *architecti*, those

¹⁴⁴ *CIL* 13.7945 (Alternate reading Dessau. *ILS* 2459); *CIL* 7.1062.

¹⁴⁵ *CIL* 13.8082.

¹⁴⁶ *CIL* 10.8093; *CIL* 13.6403 and *CIL* 6.40910.

responsible for much of the army's building and weaponry, and a goddess of both war and handicraft, perhaps reflects their shared position as both "doers" and "talkers". Though it is possible that traveling individuals may have been responsible for these inscriptions, the choice to make these dedications across such a wide geographic area hints at a common perception of what was worthy of veneration for *architecti*.

The term which yielded the greatest number of results was *faber*. This very wide-ranging job title potentially encompassed individuals working independently on small-scale building and carpentry tasks, labourers with various degrees of skill working on elaborate construction projects, as well as tradespeople working in specific mediums, often denoted by additional adjectives. The vast majority of the *faber* inscriptions, particularly in the city of Rome, do not have a military connection. Of the inscriptions considered, just over a dozen are explicitly military, including groupings from Britain and Africa. Unlike the remaining examples of military *faber* inscriptions these two clusters are not funerary. This suggests that these individuals had specific skills worth recording, differentiating them from the average soldier. This value is further reinforced by a cluster of three funerary inscriptions from Misenum in Italy dedicated to *fabri duplicarii*. As with other soldiers ranked as *duplicarius* these *fabri* received more pay than the base rate. The widespread use of the term *faber* suggests an underlying sense of connection between these individuals despite a breadth of roles. From this desire to be associated with a singular title we may infer a sense of cooperation or even a community of practice.

Faber was clearly a distinct role with specialist knowledge worth recording in military records and on tombstones. However, it is impossible to know to what extent these individuals had theoretical knowledge or project management responsibilities. While they were not all engineers, circumstantial evidence strongly suggests that some *fabri* such as an individual from

Arles, Quintus Candidus Benignus, master builder and head of the builders' association, met the definition.¹⁴⁷ Known not only for his mastery of building, instrument making and water management but also his knowledge and discretion, Quintus Candidus Benignus appears to have been a learned expert in a variety of disciplines. The inscription claims that he was named the leader of the builders' association (*fab tig corp*) as he was the best (*summa*) as determined by his peers. This association is most likely a *collegium*, a multidimensional network with a certain professional aspect but also important social and religious ones. The role of *collegia* in the economy and their ability to set professional standards is uncertain. The difference between mediaeval guilds and *collegia* have led to emphasis being placed on *collegia* as primarily social institutions, but their potential influence on the economy has increasingly been recognised.¹⁴⁸ While it now seems likely that these *collegia* did have some impact and certain that their leadership enjoyed prestige their ability to impose standards remains debated. The existence of an association with selected leaders implies a sense of organized community and hierarchy for *fabri*.

¹⁴⁷ *CIL* 12.722. For more on this case Cuomo 2007, chapter 3.

¹⁴⁸ DeLaine 2003; Liu 2009; Verboven 2011; Liu 2013; Verboven 2017.



Figure 2 Two Structor Monuments

Like *faber*, the term *structor* may have been applied to individuals undertaking tasks of varying complexity requiring diverse skills and levels of ability. The inscriptions seem to suggest that this variation may have been reflected in the social standing of the individuals named. Some of these individuals seem to have been strictly “doers” while others may have also been “talkers”. Regardless, from the simple nameplate of Alexander *Structor* in Rome to the elaborate monument of a military *structor*¹⁴⁹ which depicts the tools of his trade in Germany, evidence from across the ancient world shows that those of vastly different stations chose to be commemorated as a *structor*.¹⁵⁰ We can once again extrapolate a perhaps unconscious level of fellowship and unification of like individuals.

Exploration of the epigraphic material has yielded evidence that being an engineer helped to define an individual’s identity over the course of their life and ultimately at their death. This

¹⁴⁹ *CIL* 6. 6353. Damage to the stone renders it difficult to decipher the individual’s name.

¹⁵⁰ *CIL* 13. 5209.

investigation has shown a concentration of military inscriptions in Germany and North Africa. It has also highlighted that some terms (*faber* and *structor*) are rarely associated with the military, while *architectus* is commonly associated with the military in the provinces but more rarely at Rome. This study has highlighted that engineers were often seen as virtuous members of their communities, worthy of respect. Some individuals recorded a wide range of expertise while others noted their specialisation. In both cases many of these inscriptions hint at a sense of community. While no specific insights relating to engineers were evident based on the chronology of the inscriptions, the appearance of the terms in the epigraphic record over such a wide timespan indicates a level of enduring importance.

Conclusion

In this chapter we have seen that the diversity amongst the individuals connected to the practice of Roman Engineering and in the Roman imagination was intense. This diversity is supported by the nuanced views of work and professionalism present in the Roman world. A Roman engineer was someone who shaped the physical world. Literary and epigraphic sources yield further insight into the identity of the Roman engineer. Apollodorus of Damascus illustrates that an engineer could reach the highest echelons of society being in direct contact with the emperor. Vitruvius paints a picture of engineers as a group versed in a wide range of disciplines with both practical and theoretical knowledge, sharing a professional ethos to advance the good of the *res publica*, and taking pride in their contributions. Frontinus offers understanding of project management, asserting clear delineation between the directors of a project and those who carry it out. However, this division between “talkers” and “doers” is not absolute. As evidenced

by epigraphical sources such as the funerary inscription of Quintus Candidus Benignus, an individual can be celebrated for both their knowledge and execution of projects. The epigraphic evidence demonstrates a wide range of specialisation and status, in sharp contrast to the ultra generalist *architecti* in Vitruvius. In the absence of any single term for engineer, let alone a regulating body, it must be defined through context and function.

In the web of engineering those who are connected to engineering works through both going and “talking” and “doing” play a special role reenforcing the connection of other nodes to the nexus. From the epigraphic and literary sources, a Roman engineer to some extent had both hands-on and theoretical knowledge, was a member of a group that shaped identity and possessed a professional ethos that served the public good. Through this chapter a recurring thread has been the army, and indeed the following chapter focuses on the role of the Roman military in shaping engineers and their place in society.

Chapter 2: Engineers in the Military

*For who is so averse to all noble and excellent performance as not to be inclined to take a little extra trouble to understand matters like this, of which when he has once read he will be well informed about one of those things really worth studying and worth knowing?*¹

Polybius introduced his study of the Roman army with the quotation above, calling it noble and excellent; a key element in Rome's military success, as we shall see, was the way it engaged with engineering works to meet its goals. The military was a critical section in the nexus of engineering practice and imagination in the Roman world. The Roman army was an object of considerable respect and interest in antiquity, and has continued to fascinate into the present day.² It has been described as the ultimate machine of conquest and in this chapter, we will explore the role of its engineers. I will consider the life of engineers within the military, recording Roman military engineering from the perspective of insiders and outsiders, and looking in particular at military engineers' self-presentation in the epigraphic record and what characteristics were particularly associated with Roman engineering.

From the moment any soldier joined the military until his discharge, his existence contributed to a vast system of documentation. Starting with enlistment papers and perhaps letters of recommendation to a particular unit, entering the military placed a soldier firmly into the bureaucratic record.³ Units kept rolls listing their members including their names, ranks and seniority, daily duty rosters, guard rotations and payrolls. Examples of all of these types of

¹ Polybius, 6.26.12. trans. Loeb.

² There is a wealth of literature available on the Roman Military for example: Goldsworthy 1996; Erdkamp 2007; Southern 2007; Howarth 2013; Sage 2013; Culham 2013; Breeze 2016; Drogula 2020; Armstrong 2020; Gauthier 2020 all with additional bibliography.

³ Phang 2007, 287-288.

records have been published in *Roman Military Records on Papyrus*.⁴ Egypt has exceptionally well-preserved records and the legions there had the unique feature of exclusively equestrian officers. However, beyond these important distinctions the broad behaviours and structures of the army were similar across the Roman world.⁵ Legions produced annual strength reports, *pridiani*, which detailed a unit's make-up, including changes in personnel since the last report, and gave information on the posting of each legion, the location of the unit's headquarters and how long it had been stationed there.⁶ Reports record that some soldiers received extra pay for special duties which would likely have included engineering responsibilities. These records offer an opportunity to better understand the life and perceived value of engineers within the military.

In this chapter, I will explore how the engineering community of practice interconnected with the Roman military and the role that engineering works played in Roman understandings of their own military success. We begin our exploration with the epigraphic and material evidence, through this type of evidence we are most able to identify the individuals responsible for engineering works on a practical on the ground capacity. This first section deals most directly with the “doers” of military engineering works. Widening the lens from the individual, through the examination of written source, we can strengthen our understanding of how those responsible for engineering works meshed with the larger organisation of the military. These types of sources also allow us to investigate the role that engineering played in the Roman understanding of their military and what importance they attached to engineering in relation to their military success. The chapter concludes by examining the different insights offered by the two broad categories of

⁴ For each type of document: *RMR* 1; 9; 12 & 15-17. For more on reconstructing the pay structure in the army see Speidel 1992.

⁵ Haensch 2012.

⁶ While the evidence for what a completed *pridianum* report might look like is fragmentary, Phang has presented possible idealized reconstructions: Phang 2007, 293-5.

material and literary evidence and their relation to the division of “doers” and “talkers” in the Roman world.

Epigraphy

The record-keeping needed to keep the massive Roman army operational combined with the strong epigraphic habit often associated with the Roman military offers an almost unique opportunity to examine the lives of those involved in Roman engineering works from an on the ground day to day level. In the military context, inscriptions could have the semi-official purpose of recording the completion of set military tasks or recording the strength and composition of a unit at a given time. For instance, on both the Antonine Wall and Hadrian’s Wall there are many examples of Centurial stones which bear the name or titles of a centurion and by their placement imply the men under his command were responsible for construction of that stretch. In Africa and Asia there is extensive epigraphic evidence for the military’s involvement in the construction of infrastructure including roads and water management systems.⁷ More elaborate dedications evoking the emperor and listing his titles are also found in buildings constructed by the army.⁸ Large stone inscriptions listing the names and ranks of members of different units from the fort at Lambaesis are finely carved. They seem to have the purpose of conveying the permanence and stability of the military establishment there.⁹ There are many simpler and less expensive means of recording a roll call; choosing to engrave them in stone on a monumental scale surely served a ceremonial function and was no doubt meant to impress. However, for those who transacted their daily business in the fort, the engineers, soldiers and regular visitors, habituation may have

⁷ E.g. *RIB* 3157; *RIB* 1.1341; *RIB* 1. 2203; *RIB* 1. 2200; *RIB* 1. 665; *RIB* 1.2198.

⁸ *RIB* 330 & *RIB* I 665; Also see Hope 2014, 296.

⁹ *CIL* 8.2555; 8.2556 & 8.2567.

dulled the sense of reverence somewhat, while for first-time viewers these inscriptions on a grand scale must have conveyed the strongest sense of awe.

It is valuable to spend a few moments considering the broader pattern of military inscriptions associated with engineers and engineering works. Based on the terminology for engineering jobs established in chapter one I have identified nearly 180 military engineering inscriptions.¹⁰ The distribution is relatively even across the time scope of this thesis, however there are some discernible geographic clusters. In particular, North Africa is very rich in inscriptions and in general as might be expected the provinces where the army was most active have the highest concentration of inscriptions. This underscores the role that inscriptions could have played in marking Roman presence in an area and contributing to a sense of Romanness there. Another observable trend is a concentration of *Praefecti Fabrum* in Rome emphasising the different nature of this position from the others considered.¹¹ As a group, the explicitly military inscriptions only make up only about a third of all inscriptions catalogued.¹² This suggests that while the military was an important factor in engineering works in the Roman world, there were others and by this metric it was not the primary one. Let us now consider some of the military inscriptions more closely.

¹⁰ See appendix A and the summary in table 2.

¹¹ See Chapter 1.

¹² 178 out of 474, although it should be noted that while inscriptions might not explicitly mention the military it is possible that other contextual information not recorded in the database could suggest a connection.

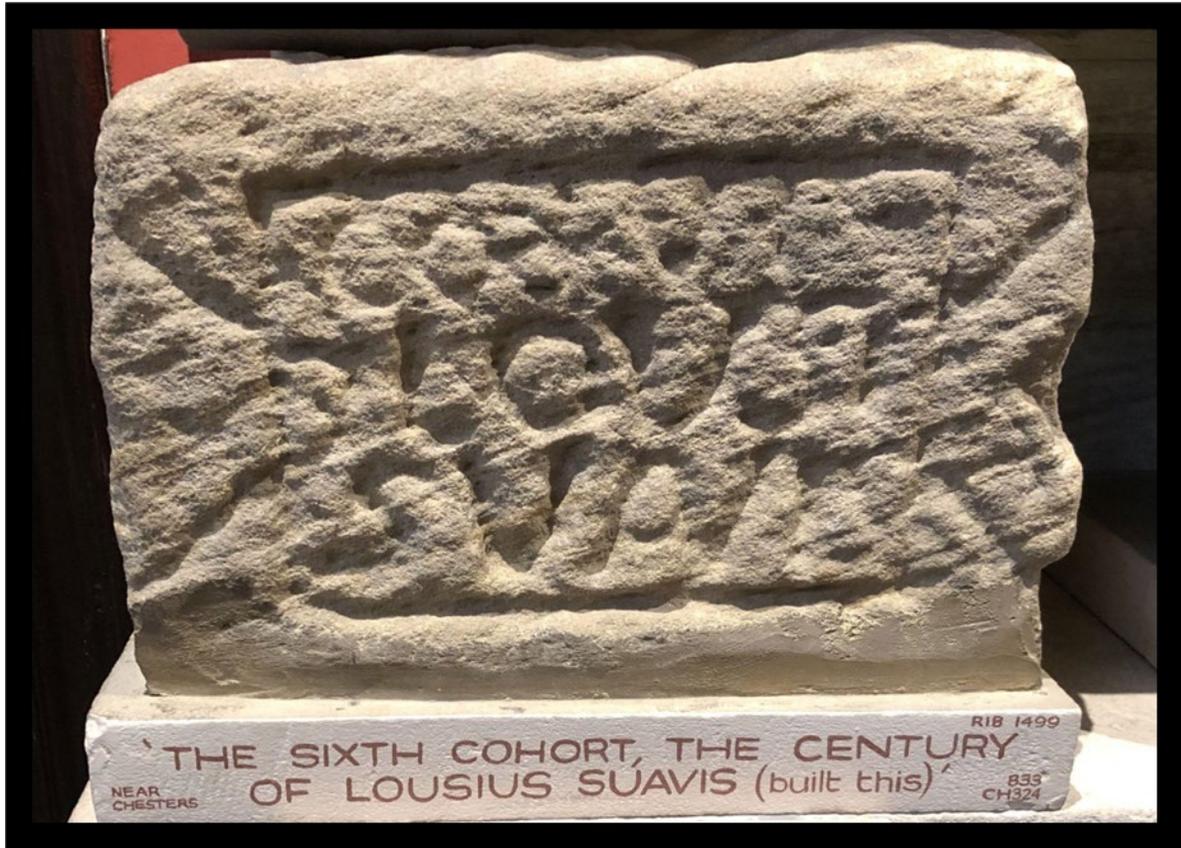


Figure 3 Century Stone Chester's Roman Fort

This section looks at military epigraphy broadly one category of inscriptions which we find frequently are building/infrastructures inscriptions, which are both documentary and symbolic in nature. These types of inscriptions rarely mention engineers explicitly and centrally, but we infer that the works they are attached to must have required the intervention of engineers. Placing mile markers could be seen on the one hand as a practical part of developing infrastructure for transportation, but it could also be a part of asserting control over the land and its people. The inclusion of the emperor's name including specific titles and honorifics on many of these markers supports viewing them as a symbol of imperial control. Inscribing the name of units stationed in a particular building could serve the mundane purpose of identifying their dwellings for logistics, but more than that, it could also be seen as quite literally putting the

military's mark on the built environment. Regardless of content, the very existence of inscriptions could also be a part of stamping authority to outsiders even if those in the military might have seen them as mundane.¹³ Being able to measure, adapt and even control the physical world was a central element to Roman identity and as we shall see engineers were key in facilitating this manifestation of *Romanitas*. The wide geographic and chronological spread of inscriptions proclaiming the construction projects undertaken by the Roman military suggests that taking part in such works was a consistent source of pride and hints at a central role for the engineers in charge of the projects in the army's daily lives.

One of the most common types of inscriptions are funerary markers. While these epitaphs are often quite sparse and formulaic, they, more than any other type of evidence at our disposal, offer a personal connection to individuals outside of the elite. As Hope has elegantly stated these markers "stood as an expression of individual identity, social mobility, and personal success."¹⁴ These monuments capture in stone how these individuals and those who commemorated them wanted to present themselves to eternity. These types of inscriptions allow to really consider engineers as individuals and shed light on the wide variety of experience and background of those individuals involved with the practice of engineering in the Roman military.

In the next section we will look at four diverse case studies of military engineers from across the Roman world: Marcus Julius Maximus, a *structor* from Vindonissa, a group of *mensores* from Lambaesis, Vedennius Moderatus, an *architectus* from Rome, and Samacius Serenus, *architectus* from Moesia. These case studies were selected as they show the diversity of individuals involved with engineering works within the Roman military context. Their wide

¹³ Hope 2014, 296.

¹⁴ Hope 2003, 87.

geographical spread highlights the scope of engineering across the Roman world and they all allow us to expand our understanding of Roman engineers as individuals.

The grave marker of Marcus Julius Maximus, *structor* of the eleventh legion, is remarkable as it offers an opportunity to connect to an individual *structor*, offering insight into what his commemorator Vegetius, a fellow legionary, felt was worthy of sharing to posterity about this man. It reads:

To Marcus Julius Maximus son of Marcus of the Quirina tribe from Augustus Nemetus Soldier of the 11th Legion Claudia Pious and Faithful, of 8 stipends, *Structor*, Vegetus a soldier of the same legion his heir made this.¹⁵

Although now badly damaged, the surviving half of this elaborate stele includes carvings of squares and dividers or compass in the lower right-hand corner. *Structor* is not the most common job title found in association with builders connected to the military, *faber* inscriptions being far more numerous. The quality and craftsmanship on display in this tombstone indicate that our *structor* and his commemorator were men of considerable means and as such likely holders of rank within the military. Clearly, the role of *structor* was of importance to Marcus Julius Maximus' identity as it was recorded both in words and through imagery. This choice allowed his profession to be communicated to the widest possible audience regardless of whether or not they could or chose to take the time to read the epitaph in full.¹⁶ The amount of abbreviation used in inscriptions generally (while of course in part a result of economic constraints) serves to narrow the audience for the inscription; a specific knowledge base is required to understand the message. The use of abbreviations introduces a barrier to

¹⁵ *CIL* 13.5209 - [M(arco) I]ulio M(arci) f(ilio) / [Qui]r(ina) Maxim(o) / [A]ugusto / [Ne]meto mil(iti) / [leg(ionis)] XI C(laudiae) P(iae) F(idelis) / [sti]p(endiorum) VIII stru[ctor] us / [Ve]getus mil(es) / [le]g(ionis) eiusdem / [h]eres eius feci(t)

¹⁶ See also Hope 2016, 291.

communication but also offers a greater level of inclusivity as the abbreviation can be learned without overall literary proficiency. Knowledge of these abbreviations could be a mark of belonging to a group and bolster shared group identity. Marcus Julius Maximus' marker is unique among the inscriptions, military or otherwise, at Vindonissa as it includes not only the written job title of *structor* but also the raised reliefs of dividers and squares. The choice of imagery suggests at least a passing understanding of the tool of the trade need to be a *structor*. This calls to mind the physical realities of working in construction where these tools would have been used day to day and allowed for the transfer of tacit knowledge between members of the community of practice. While there are no other professions attested in inscriptions at Vindonissa, there are examples from the same legion elsewhere in Moesia recording special ranks, such as Lucius Sertorius Firmus' elaborate tombstone where he is shown holding an eagle and is commemorated as *signifer* and *aquilifer*.¹⁷ Meanwhile the centurion Gaius Allius' tombstone at Vindonissa is richly decorated with *coronae*, torques, *armillae* and *phalerae*, suggesting that the *structor's* tools were held to have the same level of value as these more traditional marks of success in a military career.¹⁸ More than simply signs of wealth, *coronae*, torques, *armillae* and *phalerae* could be tied to specific levels of achievement or be symbolic of successfully completing a particular feat, such as saving a comrade's life.¹⁹ Though we cannot know, perhaps each square and compass represent a specific engineering accomplishment as well. As Cuomo has demonstrated, images on tombstones are more than simple snapshots of the daily activities of those they commemorate, they have ample scope for symbolism and multifaceted reading, multiple levels coexisting at the same time for the ancient viewer.²⁰ Being

¹⁷ *CIL* 13. 3375 See Pollard & Berry 2012, 178.

¹⁸ *CIL* 13. 5206

¹⁹ More on military awards and decorations: Maxfield 1981.

²⁰ Cuomo 2007, 80-84; 96-97.

a *structor* was the element of Marcus Julius Maximus' identity that his comrades chose to most clearly memorialize. As a military *structor*, he would doubtless have taken part in many construction projects helping to shape the landscapes of the Roman empire, leaving his mark literally in stone.

This marker is from Vindonissa in modern-day Switzerland, an area with a strong military presence throughout the first century CE until the Legio XI Claudia Pia Fidelis, of which our *structor* was a member, left the settlement around the turn of the second century.²¹ While Vindonissa was a military hub, it was never exclusively an army-based community. Supporting the legion was a diverse settlement including local merchants, craftsmen and some of the soldiers' families who may have travelled with the unit. The bustling and multifaceted life of Vindonissa is illustrated by letters about craftswomen and a female innkeeper, infant burials under the centurions' houses, and small shoes and elaborate pins found in the fort's rubbish dump.²² Also from Vindonissa, there is a collection of wooden writing tablets, similar to those found at Vindolanda, although they are less completely published than their British counterparts. In many cases only the outside address rather than the interior content can be read. Regardless, the existence of these tablets supports the interpretation of Vindonissa as a communications hub and command post for the military and suggests a system not dissimilar to the conditions at Vindolanda.²³ When the legions eventually departed in response to new demands for military force elsewhere they left a considerable civilian population behind.²⁴ The works of Marcus

²¹ Stevens & Drinkwater 2016.

²² Allison 2013, 2; 7; 26; 104; 58.

²³ Summary of publications at Roman Inscriptions of Britain <https://romaninscriptionsofbritain.org/tabvindol/vol-I/introduction/ch2-b#tvIcIIfn14>

²⁴ Stevens & Drinkwater 2016. Although it has been extensively excavated, accessible precise archaeological data for Vindonissa is only slowly becoming available: Allison 2013, 28.

Julius Maximus, and his fellow *structores* would have been influential in shaping the physical world even after the departure of the army.

The next case study is a group of five monuments to *mentores* from Lambaesis in North Africa. In strong contrast to the limited number of inscriptions from Vindonissa, in Lambaesis there are thousands of recorded inscriptions, pointing to a strong local epigraphic habit both for those directly connected to the military and those without as explicit a connection.²⁵ The five inscriptions presented below explicitly state they were erected to commemorate *mentores* of the III Legion.

To the sacred spirits of the dead. Caius Cornificius Fortunatus *Mensor* of the 3rd Legion Augusta [made this] while he was alive for himself and his wife.²⁶

To the sacred spirits of the dead. Julia Fortunata lived 28 years and 10 months and 12 years with her husband. Cornificius Fortunatus *Mensor* of the 3rd Legion Augusta made this for his dearest wife.²⁷

To the sacred spirits of the dead. Lucius Longeius Felix Standard Bearer of the 3rd Legion Augusta lived 35 years. Marcus Modius Felix *Mensor* made this²⁸

To the sacred spirits of the dead. Marcus Modius Felix *Mensor* of the 3rd Legion Augusta lived 60 years. Arranius Saturninus made this²⁹

To the sacred spirits of the dead. Publius Aelius Alexander at Cibessos, soldier of the 3rd legion Augusta, of the pious century of Aemilius Silvanus, lived for 32 years. Publius Aelius Occavianus *Mensor* of the same legion [made it].³⁰

²⁵ There are some fifty inscriptions recorded in the *CIL* specifically from the *Castra Lambaesisitana* alone, including one recording the existence of a *collegium* of military scribes: *ILS* 9100.

²⁶ *CIL* 8.2856 - D(is) M(anibus) s(acrum) / C(aius) Cornificius / Fortunatus / mens(or) leg(ionis) III Aug(ustae) / se vivo sibi una / cum sponsa sua

²⁷ *CIL* 8.2857 - D(is) M(anibus) s(acrum) / Iulia Fortu/nata v(ixit) a(nnos) XXVIII m(enses) / X cum sponso suo / ann(os) XII v(ixit) Cornific(ius) / Fortunatus mens(or) leg(ionis) / III Aug(ustae) sponsae suae / karissimae fecit

²⁸ *CIL* 8.2935 - D(is) M(anibus) s(acrum) / L(ucio) Longeio / Felici imag(inifero) / leg(ionis) III Aug(ustae) / vixit a(nnos) XXXV / M(arcus) Modius Felix / men(sor) her(es) fec(it)

²⁹ *CIL* 8.2946 - [D(is) M(anibus) s(acrum)] / M(arcus) Modius / Felix me(n)/sor leg(ionis) III / Aug(ustae) vix(it) an(nos) / LX Arrani(us) / Saturnin(us) fe(cit)

³⁰ *CIL* 8.3028 - Domo Collina / Cibessos / d(is) M(anibus) s(acrum) / P(ublius) Aelius / Alexan(der) mil(es) / leg(ionis) III Aug(ustae) / |(centuria) Aemili / Silvani / pius vixit / an(nos) XXXXII / feci(t) P(ublius) Ael(ius) Occavia/nus me(n)sor leg(ionis) / eiusdem

Despite the clear interconnection of these five *mentores* inscriptions, they were not located side by side; while *CIL* 8.2856 and 8.2857 are recorded as being close to each other in the west necropolis, *CIL* 8.2953 was found on the *voie de Diana* and *CIL* 8.2946 is from the north necropolis while *CIL* 8.3028 is from *voie de sud ouest*.³¹ These inscriptions use remarkably similar language and contain overlapping names; that, along with the fact they are all from the same location, makes a strong case that they are from the same time period. These five individuals would likely have worked together and in various combination trained and learned alongside one another transmitting important tacit knowledge needed to perform the duties of a *mentor*. This grouping of five inscriptions offers an important insight into the lives of the *mentores* of Legio III. In two of the inscriptions the *mentor's* wife is honoured, this illustrates the multi-dimensional nature of the lives they led. This reminds us that while there has at times been a tendency to imagine the army living in isolation from civilians, the complexity of military communities including women and children is evident in the archaeological record as displayed above with the finds from Vindonissa.³² These were family men with wives and presumably children as well as members of the legion. The monuments themselves introduce us to complex individuals. *Mentor* Cornificius Fortunatus is rendered individual and human through his monument for his *dearest* wife. We can easily imagine the interlocked responsibilities and bonds that led Marcus Modius Felix, also a *mentor*, to commemorate the legion's standard bearer and later be commemorated in turn by Arranius Saturninus. The case of Marcus Modius Felix shows the connection within the 3rd Legion beyond the limits of *mentores*. Marcus Modius Felix is commemorated as being 60 years old; this suggests that he would likely have been a senior member of the legion and potentially in a high ranking position. Together this grouping

³¹ While there are no images available there is a facsimile of *CIL* 8.3028 which is described as an 1.25m high altar.

³² Allison 2013, 19-32.

highlights a community identity for those individuals who wished to commemorate and be commemorated as *mensores*. The most important connection of these individuals' lives were recorded on their tombstones including their families and their membership in the engineering community of practice.



Figure 4 Vedennius Moderatus

The next funerary inscription to consider is that of Vedennius Moderatus, whom we met in the previous chapter. A military *architectus* from Rome at the turn of the second century CE, Vedennius Moderatus' tombstone features an image of a catapult on the side and reads:

Gaius Vedennius Moderatus, son of Gaius, of the tribe Quirina, from Antium, soldier in the XVI Gallica for ten years, transferred to the ninth praetorian cohort, in which he served for eight years, honourably discharged, recalled by the emperor and made *evocatus Augusti*, architect of the imperial armoury, *evocatus* for 23 years, awarded

military honours twice, by the Divine Vespasian and by the Emperor Domitian Augustus Germanicus.³³

Vedennius Moderatus inscribed the details of his career at some length on his tombstone. It is informative to note that he transferred between units. This suggests that while the legion might have been the basic unit to which a soldier felt allegiance, this was not absolute and there was also a concept of the army as whole to which he belonged. Perhaps more significant is the fact that Vedennius Moderatus states that he was recalled by the emperor, leaving us to wonder if perhaps he was called back to the army because of his expertise with artillery.³⁴ This reinforces that *architecti* in the military, as described by Vitruvius, were responsible for artillery and the importance placed on this by the commissioners of the monument. The catapult is placed on the side of the monument in an area where garlands or other votive offerings are frequently depicted. Weapons were commonly offered as votives in antiquity and in particular a catapult washer has been excavated from the King's Spring at Bath.³⁵ While this engraving may in part be votive, the catapult in this image is pointing out towards the viewer; perhaps it could even be imagined as a symbolic means of guarding the tomb, threatening to fire on any who might disturb it. As with the other monuments present in this chapter, Vedennius Moderatus' demonstrates that being an *Architectus* was an important aspect of his identity. This tombstone also offers a corroboration to our textual sources regarding the duties of a military *architectus* managing artillery.

³³ CIL 6.2725: C(aius) Vedennius C(ai) f(iilius) / Qui(rina) Moderatus Antio / milit(avit) in leg(ione) XVI Gal(lica) a(nnos) X / tran(s)lat(us) in coh(ortem) IX pr(aetoriam) / in qua milit(avit) ann(os) VIII / missus honesta mission(e) / revoc(actus) ab Imp(eratore) fact(us) evoc(atus) Aug(usti) / arc(h)itect(us) armament(arii) Imp(eratoris) / evoc(atus) ann(os) XXIII / donis militarib(us) donat(us) / bis ab divo Vesp(asiano) et / Imp(eratore) Domitiano Aug(usto) Germ(anico) / trans. Campbell 2006.

³⁴ Bingham 2012, 58.

³⁵ Hening et al. 1988, 8-9. For an overview of the scholarship on catapults washers see Cuomo 2007, 57-58; votive objects in the King's Spring: Cousins 2013.



Figure 5 Samacius Serenus

Finally, Samacius Serenus' monument dates from the mid-second to mid-third century CE and was found in Moesia on the lower Danube in modern day Serbia.³⁶ Like Vedennius Moderatus he is identified as an *architectus*, however he chose to tell a different story. It reads:

To Invincible Mithras Quintus Samacius Serenus salaried *architectus* of the 11th Claudia legion put this up³⁷

Samacius Serenus notes that he was *salararius*, meaning that he received higher wages, doubtless an indicator of elevated rank and prestige. Although well worn, the Mithraic imagery of a bull and a hound surmounts this inscription, underlining that being an *architectus* was only

³⁶ Cary & Wilkes 2016.

³⁷ CIMRM-02, 02314 = ZPE-181-208 - Invicto Mithrae / Q(uitus) Samacius Serenus archite[c]/tus salariarius leg(ionis) XI Cl(audiae) posuit.

one element in Samacius Serenus' complex identity.³⁸ This neatly illustrates a common theme in Roman provincial inscriptions. The identities represented in the military inscriptions are often multifaceted, on the one hand they are distinctly and intentionally Roman in nature, delineating those described from the local population, but those commemorated or commemorating often are not originally from Rome.³⁹ These various threads of identity were often closely intertwined, for example worship of Mithras was closely connected to the military and in Roman Britain nearly all evidence of Mithraism can be directly linked to the army.⁴⁰ Evidence for Mithraic worship, though originally an eastern deity, can be found across the Roman world, transported by the soldiers who represented the majority of his followers. The case of Samacius Serenus clearly illustrates how being a military engineer could form a part of a complex and rich identity.

The Roman military created a vast repository of bureaucratic, epigraphic and archaeological evidence which affords a unique window into the lives of Roman engineers not only as a group, but as individuals. From the archaeological record, it is clear that camp building was a central part of activities undertaken by the army and that this work would have required the presence of engineers. We can also see that engineering works took place at the heart of military camps and that these communities were dynamic, including women and children, not just soldiers living in isolation. From inscriptions we encounter individual Roman engineers in ways that are not possible through any other medium. We see how they chose to be commemorated as engineers, depicted the tools of their trade with pride and were members of

³⁸ Though the association between Mithras and soldiers is well known Stoll states that less than 20 percent of worshipers were military men (presumably by looking at inscriptions, but it is not explicitly stated how this figure was established): Stoll 2007, 269. This suggests that the choice to include the Mithras and Mithraic imagery was far from automatic, highlighting the high degree of personal choice in what was included on memorials.

³⁹ Hope 2014, 297.

⁴⁰ Mattingly 2007, 217-8.

complex networks including both other engineers and wider military groups. We can see how they as individuals sought to cement their place in eternity as engineers.

Material Evidence

The Roman army famously constructed marching camps: earthwork fortifications that Roman legions prepared at the end of each day's march to secure their resting place. Specific individuals would have been responsible for establishing and maintaining the consistency and efficiency of encampment endeavour. It is likely that this was a role of the Roman engineers in the field. Alongside the literary descriptions of camps in Polybius, Hyginus, Caesar and elsewhere, a considerable number of camps have been identified by archaeologists based on remains of defensive ditches, camp fires and temporary ovens.⁴¹ As it has been estimated that it would have taken at least three hours each day to erect these defences, there has been debate on the usefulness of the practice of constructing marching camps.⁴² Goldsworthy highlights the camps' nature as offensive rather than defensive measures, aimed at intimidating the enemy into submission by illustrating the Romans' organisation, resolve and will to continue the fight.⁴³ A role in maintaining this edifice of control, structure and, more poetically, the inevitability of Roman successes would have fallen largely to the army's engineers.

To achieve this level of rigid adherence, Roman soldiers would have required great practice, diligence and leadership. Archaeological evidence demonstrates the existence of a possible training regime. Camps made of turf have been found dotted though Wales only a few miles from more permanent Roman army forts. These practice camps only consist of four

⁴¹ Goldsworthy 1996; Keppie 1998, 21-23 & 50; Bailey 2000; Alexander 2000; Davies & Jones 2006; Arabaolaza 2019; particularly on archaeology for camps in Wales: Davies 1968; Davies & Jones 2006.

⁴² Goldsworthy 1996, 112-113; Rankov 2007, 67-8.

⁴³ Goldsworthy 1996, 113.

corners separated by gates, suggesting that these were elements that needed to be practised to master.⁴⁴ The proximity of these constructions to permanent military establishments and the limited space inside them suggest that their value was in the process of constructing them rather than the finished product. These practice forts provided an opportunity for Roman engineers to gain tacit knowledge and hone their craft. For the most part it must be inferred that the Roman army engaged in the training of its engineers. However, there is an inscription from North Africa which includes an individual with the rank *discens libratorum* - someone in training to be a *librator*.⁴⁵ Without engineers' knowledge of construction as well as time and resource management, making camp each day would not have been possible. This idealisation of uniformity and structure hints at something about what it meant to be Roman, laying strong foundations and imposing your will on the landscape as reflected in their choice of engineering works.

As I have presented above, engineers played a vital role in laying out and building camp, an essential activity for the Roman army. As the empire expanded, some of these camps developed into permanent military bases, functioned as long term homes for soldiers and frequently formed the nucleus of broader communities. When interpreting the excavations of military bases, it can often be difficult to establish exactly what any given space was used for. Of particular interest for this study are the areas variously identified as *praetoria* (command centres for senior officers) and *fabricae* (workshops).⁴⁶ The fact that these two types of spaces are difficult to distinguish from each other shows that engineers worked at the heart of the camp.

⁴⁴ Davies 1968.

⁴⁵ *AE* 1942/43, 93 = *AE* 1973, 646; Shaw 1991, 71; Speidel 2001, 58.

⁴⁶ Allison 2013, 17-8.

While there may not have been overlap in personnel, both *fabricae* and *praetoria* were at the centre of military life, literally and figuratively, managing resources.

The monumental constructions of the Roman Empire could be seen as perhaps symbolic of the immovable ideals of Rome. Among the most important of these visual sources is the richly decorated Trajan's column. The monument depicts figures dressed as soldiers engaging in multiple scenes of army fortifications, sieges and even bridge construction. Erected as part of the redevelopment of the Forums undertaken by Apollodorus of Damascus in the time of Trajan, the construction of the column itself is an engineering masterpiece, evolving intense project management and technical skill.⁴⁷ There are stone working tools depicted on Trajan's Column, including in scenes xxxix and lx.⁴⁸ The vast majority of the Roman buildings are marked as stone, as illustrated through the use of cross hatching.⁴⁹ The veracity of this depiction is challenged by the impracticality of constructing with stone while on campaign. An alternative interpretation of the cross hatched blocks seen on the column is cut turf. However, this too poses severe logistical challenges.⁵⁰ Given the resources required, the idea that military fortifications were routinely made from either stone or extensive cut turf is highly questionable. However, there is no reason to assume that the "production team" of the column were ignorant of the methods employed on campaign. The decision to portray extensive Dacian and Roman buildings on Trajan's column is deliberate; 70% of the architecture on the monument is Roman.⁵¹ The

⁴⁷ For more on the construction of the column: Lancaster 1999.

⁴⁸ Numbering following Wolfram Thill, 2012 and Cichorius 1896; 1900.

⁴⁹ Wolfram Thill 2012, 28.

⁵⁰ It has been estimated that it would have taken some 12 acres/ over 48500 m² of cut turf to construct the rampart for the fort at Carlisle: McCarthy 1986, 34.

⁵¹ In contrast a far more limited depiction of Roman and foreign architecture can be seen on the column of Marcus Aurelius. See Coulston 1988, 145; 1990, 43-4; Wolfram Thill 2012, 40-41.

clear depiction of stone construction, a hallmark of technical skill and cultural sophistication, was a significant statement on Roman efficiency, permanence and stability.

There is an inscription found near the village of Tarlabsi in Northern Syria in an ancient quarry which gives the 4th Legion Scythica the titles “*operosa felix*”, i.e. ‘industrious’ or ‘laborious’ and ‘lucky’. Nowhere else are legions titled *operosa* and it has been suggested that this choice of epithet was somewhat sarcastic, reflecting that the soldiers were not best pleased with their workload in the quarry.⁵² Whether or not the “*operosa*” should be read as sincere, it cannot be doubted that the Roman legions and their engineers were very hard working and contributed to many formative infrastructure projects. The legions regularly undertook road works. There was an impressive 120,000km public roadway throughout the Empire at its height.⁵³ As the geographer Strabo put it: “The Romans gave particular attention to areas the Greeks neglected: paved roads...”⁵⁴ Roads were built and maintained with a diverse labour force and often under the supervision of military engineers.⁵⁵ We regularly find one *mentor* attached to each cohort, around ten in each legion.⁵⁶ If we take up the same metaphor that Frontinus used for the teams responsible for the aqueducts of Rome, we can infer that the *mentor* may have functioned as the “head”, using their knowledge and learned insights, to direct the “hands” of their units.

Roman roads served many purposes: they allowed not only the passage of armies and trade goods but Roman culture and law, overcoming natural obstacles and serving as a

⁵² *AE* 2001, 1956.

⁵³ Quilici 2008, 552.

⁵⁴ Strabo, 5.3.8.

⁵⁵ Chevalier 1997, 275.

⁵⁶ Shek 1974; Ben David 2019.

“technological metaphor for military triumph.”⁵⁷ In keeping with this theme of overcoming natural obstacles, Roman roads were designed to connect locations using a series of straight lines, largely regardless of the landscape and taking little notice of the amount of technical difficulties this approach caused.⁵⁸ This decision to impose a predetermined design onto the landscape rather than working with the topography the Roman approach to road building is much the same as the methodology for camp building described by Polybius, which prized constancy regardless of the topographic challenges. It has been argued that this dedication to straight lines in the face of elevation changes resulted in roads best suited for use by foot soldiers and as a demonstration of Roman ability to dominate the natural landscape rather than as a means for transporting goods.⁵⁹ Nevertheless, as the road network continued to develop the economy flourished.⁶⁰ The road networks were a point of pride for the Romans who saw themselves as benefiting from improved access to goods, culture and order.⁶¹ Milestones, along with recording distance to the next location, often included information about the emperor, magistrate and/or military unit who had undertaken the construction of that stretch of road. Thus road users were “constantly confronted with Roman power, as well as the Empire’s capacity for organisation and public welfare.”⁶² An impressive pattern of central roads connecting two points, first developed in Italy, eventually spread across the empire.⁶³ Roman roads can be seen as a circulatory system, connecting the hands and head of the Roman world, allowing not only Roman engineers

⁵⁷ Quilici 2008, 556.

⁵⁸ Quilici 2008, 554-556.

⁵⁹ Quilici 2008, 561.

⁶⁰ Adams 2012, 229-230; Kolb 2019, 10.

⁶¹ Kolb 2019, 9.

⁶² Kolb 2019, 12.

⁶³ Chevalier 1997; Quilici 2008, 574.

themselves to travel but also their knowledge. In contributing to this network, the Roman military engineers were helping to forward the *res publica* and disseminate *Romanitas*.

Roman military bridges could be both literal and metaphorical. In *Aquae Flaviae* in *Hispania Citerior* (modern day Chaves, Portugal), the Legion VII Gemina recorded the building of a bridge in conjunction with the local *civitates*, citizens. They noted the legion's name and title while dedicating the bridge itself to Vespasian.⁶⁴



Figure 6 Dedication inscription from Aquae Flaviae

In this inscription both the legion and the *civitates* pay tribute to the emperor. This highlights how the presence of military engineers and their works could have a lasting impression on both the physical landscape and its inhabitants. In the early republic and through the civil wars that

⁶⁴ *CIL* 2.2477 = *CIL* 2.5616. see D' Encarnação 1994, 221-223.

attended the creation of the principate, war, the army and military service were central to Roman life. Under the principate military service was no longer a near universal experience. The army moved to the periphery in both geographic and societal terms, and soldiers became a more distinct section of society.⁶⁵ As the army became more professionalised, there was a lower turnover of personnel, with soldiers serving for a fixed term often of around 25 years.⁶⁶ At the same time the duties of some military units shifted away from front line combat to include the creation and upkeep of civic infrastructure such as the bridge at *Aquae Flaviae*. It seems that limiting the turn-over of personnel and the willingness to employ the army as a labour force resulted in an increased engineering ability as gauged through success in besieging cities between the Republic and the principate.⁶⁷ Roman engineers were critical in the expansion of the Roman empire. More than simply acquiring territory through improved siege craft and strong logistics, engineers laid foundations for prolonged Roman occupation through the establishment of infrastructure and collaboration with local communities. Roman military engineers made their mark on the physical world and helped to embody Rome both in Italy and throughout the provinces.

Writing Military Engineering

Through the epigraphic record we are able to better understand who the individuals involved with the practice of Roman military engineering were as individuals, but we need to expand our sources to understand how these individuals were placed within the structure of the

⁶⁵ Rich 1993, 6.

⁶⁶ Le Bohec 1994, 58; Gilliver 2007, 186.

⁶⁷ Gilliver 2007, 147; Goldsworthy 2007, 80.

Roman Army. One of the earliest Roman army organisations is described by Livy when he discusses the Servian Constitution and the *exercitus centuriatus*. In the mid-sixth century BCE, King Servius organised Rome's citizenry, based on their financial standing, into an army divided into groupings of centuries.⁶⁸ The first class of centuries were made up of the wealthiest citizens providing the core of the army. However, as outlined in Livy's history, two centuries of experts to operate the engines of war were added to the eighty centuries of the first class: "Added to this class were two centuries of engineers, who would serve without arms, to whom the duty of supplying the engines in war was given."⁶⁹ By specifying that the *fabri* are to serve without weapons this passage indicates that operating the machines of war was their dedicated purpose, rather than a duty which could be undertaken by any soldier. Already this division suggests that *fabri* possessed specialised skills and provided expertise beyond those of the common man.

Moreover, the inclusion of these two centuries of *fabri* without arms underscores the value of the work they were engaged in. The tactical value of the engineers was considered high enough to forgo the contribution of two further centuries of regular soldiers. At this very early stage of Roman history, the army's engineers were divided into dedicated centuries. Having the centuries of *fabri* attached to the first class centuries offers two insights. First, from the perspective of military clout the engineers were seen as belonging to the main fighting force. Second, from the fact that the *fabri* centuries were attached to the group with the highest wealth requirement and containing the upper echelons of Roman society, it can be inferred that belonging to such a century was associated with a certain degree of prestige. Whether born to

⁶⁸ At this point the century was likely the main tactical unit of the army, closely related to the Phalanx.

⁶⁹ Livy 1.43.3. *additae huic classi duae fabrum centuriae, quae sine armis stipendia facerent; datum munus, ut machinas in bello ferrent.* trans. Loeb. The term Livy uses for those working the *machinas* is *faber*. As with Foster's Loeb edition, I have translated *ferrent* as 'supply' rather than 'carry' since attachment to the first class and the need for dedicated centuries suggests more specialised contribution than simple manual labour, cf. Ogilvie 1965, 169.

this group or elevated by knowledge, belonging to this rank could have facilitated interactions with individuals of considerable means.

The Servian army structure was based on wealth and individual soldiers were required to fund their own equipment, raising the question of how the engineers were selected. Considering that these armies were assembled for one campaigning season then dispersed, there was limited scope for extensive training. It seems more likely that having specific knowledge was the criterion to be selected for these centuries. Livy does not give any particular indication of the organisational structure within the engineers' *centuriae* or what other types of work the *fabri* might have engaged in. As has been long recognized, Livy would have had limited sources for the earliest portions of his *Histories*. We must consider how his discussion of Servius' army reforms might be reflections on later iterations of the army and serve the broader themes of his work.⁷⁰ There are clear anachronisms in his account: he describes the different wealth categories in terms of *aeris* (coins) despite the fact that coins were not yet minted at Rome. Thus wealth must have been measured by some other standard, cattle being a probable metric.⁷¹ The low quantity of available sources from this specific period makes it a challenge to be sure what works were being undertaken. However, we may be able to infer from similar sources what likely projects these engineers engaged in and what types of knowledge or training was required of them.

The organisation of the Servian army is also reported by Dionysius of Halicarnassus in his *Roman Antiquities*:

He ordered four unarmed centuries to follow those that were armed, two of them consisting of armourers and carpenters and of those whose business it was to prepare

⁷⁰ Availability of evidence for early Rome: Cornell 1995. On Livy: Ogilvie 1965; Luce 1978; Miles 2018.

⁷¹ Ogilvie 1965, 166-67.

everything that might be of use in time of war... The artisans were attached to the second class and divided according to their age, one of their centuries following the older centuries, and the other the younger centuries.⁷²

Though the process is somewhat vague it seems that the engineers here titled as armourers and carpenters were divided according to experience and paired off with fighting cohorts who were also divided by age. In this account the engineers were attached to the second of five wealth-based classes of centuries, indicating engineers were ranked among an elevated portion of society. Both Livy and Dionysius were writing centuries after the time of the army they were describing. It is likely that their highly systematised accounts reflect later Roman ideas about hierarchy and the political systems rather than providing an entirely accurate description of military affairs in the regal period.⁷³ Nevertheless, both these accounts posit that engineers were central to the Roman army and even in the earliest periods it was believed that they would have been necessary elements of its success.

By the time of the Punic wars and Polybius' in-depth description of the Roman military with which this chapter opened, the main organisational division of the army was no longer the century but the legion.⁷⁴ Beyond the legionary army described by Polybius by the late Republic auxiliary units had joined the Roman military. Auxiliaries by the time of Trajan, c. 107/8 CE, were a central element of the Roman Army and accounted for over half of its land forces.⁷⁵ However *fabri* and *mensores* are rarely if ever recorded as serving with these auxiliary units. Nor has my research identified similar alternative job titles among their ranks. Based on analysis of the archaeological record, Allison has argued that industrial activity widely defined to include

⁷² Dionysius of Halicarnassus *Roman Antiquities*, 4.17.3. trans. Loeb.

⁷³ For exploration of how the early Roman army was likely organised: Isaac 1994; Keppie 1998; Adams 1999 & 1995; Smith 2006, Potter 2011 & 2014.

⁷⁴ Polybius 6.19-26.

⁷⁵ Haynes 2013, 1.

manufacture of textiles and other finished products was more prevalent in smaller auxiliary forts than in legionary fortresses.⁷⁶ This could have several implications, one being that legions were less interested in these types of activities, or that they could be more efficiently supplied from outside sources. As auxiliary units certainly undertook activities that would have required engineers, this suggests that *fabri* and *ensores* had a special significance to the legions. This likely would have included standing within the legion and even possibly defined the holders as members of a distinct group within the unit. As we saw in chapter one, these individuals might also have felt affinity to and shared a sense of group identity with other *ensores* and *fabri* across legions.⁷⁷ Within the army and indeed within Roman society engineers seemed to recognize their fellows and perhaps unknowingly foster a community of practice.

A key factor in the Roman's military success according to Polybius was their commitment to making strong and carefully prescribed encampments.⁷⁸ From the evidence of the engineers with later Roman armies, it is clear that camp building was a major responsibility of the engineers. Polybius clearly outlines the differences between Greek and Roman approaches to encampments. According to Polybius, the Greeks focus on taking best advantage of natural features, while the Romans favour a repeatable and formulaic approach. This insistence on being able to shape the natural world is an important hallmark of Roman engineering which will be picked up by future authors writing about Roman military engineering. Polybius goes into great detail of how the camps were arranged, giving measurements for each section and continuously underlining the importance of consistency and regularity. The description he provides is informed by a rhetorical demand to create a heightened difference between the Greeks and the

⁷⁶ For a detailed breakdown of finds for each of the military bases in the study see Allison 2013, 289.

⁷⁷ More on legions as a centre of belonging: Tacitus *Ann.* 1.18 & Goldsworthy 1996, 252-254.

⁷⁸ Polybius 6.27-32.

Romans. Much the same can be said for Polybius' treatment of the Roman constitution, which he largely credits with Rome's newly gained dominance.⁷⁹ As Erskine has observed, the overarching theme of Polybius' book six is Rome's "overwhelming and ruthless" efficiency.⁸⁰ This efficiency hinges on the ability to deliver the same results in changing circumstances. In many ways Polybius' writing captures a broader flavour about Roman engineering and what makes it Roman is that it is useful. This emphasis is found in many Roman descriptions of their own engineering works for example Pliny the Elder describes the Cloaca Maxima as the most noteworthy achievement of all and rates the sewers of Rome explicitly as more impressive than Thebes.⁸¹ Romans do not go with the flow, they direct the flow – this is also seen on Trajan's column where in order to show that a building is Roman it is depicted as made of stone immutable even when there was no possibility that the building would ever have been made of stone in the Roman imagination Romans made good solid buildings and good solid building were Roman.

While interrogating the epigraphic record yields key insights into individual Roman engineers and allows us piece together some of their interpersonal connections we also have a range of literary sources at our disposal to help us understand how Romans considered engineering in a military context and what made it distinctly Roman. To this end we must consider how contemporary people from significantly different backgrounds might have perceived Roman military engineers. Here I will explore this concept through the gaze of someone writing from within the army, Caesar, an army engineer, Hyginus, and an outsider, Vegetius.

⁷⁹ Polybius 6.1-18.

⁸⁰ Erskine, 2013, 238.

⁸¹ Pliny the Elder 36.94 & 104

Many of the engineering projects completed at Caesar's orders over the course of his military exploits have acquired almost legendary fame. In some instances, Caesar recorded details of how these projects were completed. However, the people responsible for these achievements, apart from Caesar himself, can only be glimpsed obliquely, if at all through his writings. No engineer is mentioned by name in *The Gallic Wars*, nor is any one rank or type of soldier expressly identified as building any particular bridge or fortification. Nevertheless, throughout *The Gallic Wars*, the vital importance of bridges, siegeworks and defensive fortifications to Caesar's success is abundantly clear. Caesar's clever engineers helped him build his prowess on more than just the field of conquest. From Caesar's writing we can begin to develop an understanding of the importance Roman readers might have attached to engineering and what characteristics they associated with Roman engineering in particular. As we shall see below, he also actively used his engineering successes to construct a personal reputation for dispatch, competence and authority.

The Gallic Wars are presented in such a way that it is possible to read them as a straightforward account of events drawing on the administrative language of Rome. For example, Caesar avoided the use of synonyms: rivers are always *flumen*, never *fluvius* or *amnis*.⁸² He also took advantage of frequently used phrases with a repetitive syntax which were common in military reports and legal documents.⁸³ Caesar intentionally wrote in a style that conveyed the impression that he was providing an up-to-the-minute running account.⁸⁴ However, far from a bald recitation of facts, Caesar engaged vigorously with wider cultural themes including

⁸² Odelman 1972, 165-8; Nousek 2017, 3.

⁸³ Odelman 1972, 165-8; Nousek 2017, 3. Also see Odelman 1985 for further exploration of Caesar's deliberate linguistic choices, both for legalistic care of definitions and to maintain the text's bureaucratic tone. It is worth remembering however that the surviving corpus of indisputable bureaucratic texts from the same period to compare against is limited: Liénard 1974.

⁸⁴ Riggsby 2006.

conquest, virtue and what it meant to be Roman. This storification of the conflict afforded Caesar the opportunity to shape scattered campaigns and engagements into a coherent narrative. He provided his readers with a framework and context to understand his activities within the overarching narrative of transforming a vast untamed territory into an integrated part of the Roman empire.⁸⁵ This literary transformation echoes the physical transformation of landscapes through engineering wrought by Caesar's army.

Acknowledging the sophisticated literary styling and clearly evident political implications of Caesar's writing, begs the question: can *The Gallic Wars* be used as a historical source?⁸⁶ Certainly, some of the factual details are simply incorrect, for instance the tides on the British coast or the description of elks' lack of joints and the exaggerated size of the Arden Forest.⁸⁷ However, there were several channels of communication between Rome and Gaul throughout Caesar's campaigns. Regular official reports were sent to the senate. Significant political figures including Quintus Cicero, Mark Antony and Marcus Crassus would have moved between postings while presumably keeping up correspondence with friends and family.⁸⁸ Caesar could not have drastically altered the facts of his campaigns nor invented new exploits wholesale, yet he was free to frame events and omit as he saw fit. While there are obvious efforts to idealize *Romanitas*, a self-gratifying portrayal of Caesar and conscious omissions, there is no

⁸⁵ Raaflaub 2017, 20; Raaflaub & Damon 2017, xl.

⁸⁶ For an answer in the negative Rambaud 1953, 363-4. More on Caesar as propaganda: Collins 1972; Krebs 2017.

⁸⁷ Caesar *Gallic Wars*, 3.12; 6.27; 6.29, Hammond 1996, 236; Erickson 2002, 606; Krebs 2006, 111. Some editors have removed section 6.27 as a later addition. It was once very prevalent to assert that there were several later interpolations (particularly suspect were digressions on geography and ethnography) however, since the 1930s this view has fallen from favour, lacking any clear linguistic/structural evidence, but the possibility of later interpolation still attracts attention: see Riggsby 2006, 12 & Grillo & Krebs 2017, 5.

⁸⁸ Raaflaub & Damon 2017, xlvi – xlvi. For more extensive exploration of the nature of army reports at the time: Rambaud 1953, 19-43.

contemporary evidence of serious challenge to the events described in *The Gallic Wars*.⁸⁹

Therefore, while the engineering activity described in *The Gallic Wars* likely is grounded in real events, we might expect exaggerated accounts of the speed and precision of construction and inflation of Caesar's own role in these projects.

In *The Gallic Wars*, from a broader thematic outlook Caesar uses a variety of engineering projects to demonstrate that he is a master logician and that he can exert Roman will over the natural world. Below we will explore this application through fortifications, bridges and boats. From the very beginning of *The Gallic Wars* the key role of earthworks is evident. One of the initial tasks Caesar undertakes, as commander in Gaul, is a massive defensive construction:

In the meanwhile he used the legion which he had with him, and the troops which had concentrated from the Province, to construct a continuous wall, sixteen feet high, and a trench, from the Lake of Geneva, which flows into the river Rhone, to the Jura range, which separates the territory of the Sequani from the Helvetii, a distance of nineteen miles.⁹⁰

This passage offers early insight into the way Caesar views his engineers and soldiers which carries through all his writings. He deployed them as tools to accomplish his own plans. He used *ea legione ... militibus* in the instrumental ablative, thus the planning and strategy all belong to Caesar himself. He also used very specific distances and language including *perducit* and *lacu ... ad montem* which was associated with land surveying and known facts.⁹¹ In this way, he was

⁸⁹ Suetonius *Caesar* 56 records three contemporary reactions to Caesar's works: two are favorable and the third states that the historian Pollio found some fault with Caesar as too credulous of reports of others and too hasty with some details; the criticism is reported as minor. See also Raaflaub & Damon 2017, xlvii-xlviii.

⁹⁰ Caesar *Gallic Wars*, 1.8: "Interea ea legione quam secum habebat, militibusque qui ex provincia convenerant, a lacu Lemanno, qui in flumen Rhodanum influit, ad montem Iuram, qui fines Sequanorum ab Helvetiis dividit, milia passuum decem novem murum in altitudinem pedum sedecim fossamque perducit." trans. Loeb. On the use of specific distances and detailed measurements of land (whether or not they were accurate) as a means of presenting land as known and by extension conquered: Krebs 2006, 116-9. Further examples of earthworks include: Caesar *Gallic Wars*, 1.49; 2.5; 2.12; 2.30; 5.2; 5;40; 6.32; 7.11; 7.17; 7.22; 7.68-9; 7.72-3; 8.41.

⁹¹ Krebs 2006; Riggsby 2006.

able to render the vague and unknown vastness of the world into measured and by extension conquerable territory and to some degree assert Roman control over the land. In *The Gallic Wars*, Caesar presents the Roman army as capable of forming the natural world to their needs.

The skill and flexibility to succeed is displayed when fortifications had to be erected by a limited number of troops while under attack.⁹² Inclusion of this detail shows Caesar's good planning as a commander and his ability to divide his troops' energies judiciously. It also illustrates the existence of a well-developed system for the creation of fortifications which could be put into practice even in high pressure situations. The speed with which these fortifications were constructed suggests a well-rehearsed procedure in which many individuals seamlessly worked together. Caesar highlights both his army's ability to construct strong defensive works and their speed at doing so at Quintus Cicero's winter camp in 54 BCE.⁹³ Tacit knowledge would have been required in situations where there was no time for detailed instructions and limited opportunities for communication. The speed and efficiency are characteristics of engineering which are praised and presented as Roman throughout Caesar's writings and beyond.

Caesar outlined not only his army's construction of defensive fortification but also their offensive methods in siege warfare. Often these procedures were employed in tandem with the creation of defensive works to protect the Romans from reinforcements that may have arrived in hopes of lifting the siege. At the siege of Noviodunum, the speed at which the Roman army was able to construct its earthworks and besieging towers is credited with causing the enemy to choose to seek terms rather than continuing to resist.⁹⁴ This is further evidence of a well-

⁹² Caesar *Gallic Wars*, 1.49.

⁹³ Caesar *Gallic Wars*, 5.40.

⁹⁴ Caesar *Gallic Wars*, 2.12.

schooled approach to construction. Caesar credited a similar sense of awe in the Aduatuci at the Romans' ability to create siege works quickly at a distance and transfer them at speed to the battlefield, with the Gauls' choice to surrender.⁹⁵ The circumvallation of Alesia is a set piece in the legend of Caesar's exploits in Gaul. Although combining offensive and defensive earthworks was standard practice for Caesar's army, the scale of the works at Alesia is of particular note. These fortifications, which stretched over ten miles, replete with traps and snares, eventually resulted in the capture of Vercingetorix.⁹⁶ Whenever Caesar's army undertook the construction of fortifications, as they did frequently throughout the *The Gallic Wars*, they were actively shaping the world around them to their advantage. Caesar's writing presents a palpable tension between a desire to be pragmatic, embracing natural features of the landscape, and a desire to demonstrate Caesar's ability to intentionally engineer his own successes regardless of his environment. While both paths to success are present, it is Caesar's dominance over nature which serves to echo the dominance of Rome and acts as a hallmark of what it means to be Roman.

In the first season of Caesar's campaign in Gaul, he built a bridge across the Saone River to allow the army to pursue the Helvetii.⁹⁷ While doubtless the ability to cross the river was useful and an achievement in itself, the true value of this crossing was the speed with which it was undertaken. The Helvetii were so taken aback that the Romans had accomplished in just one day what had taken them twenty days to achieve that they sued for peace. The importance of speed is a recurring theme and *celeritas* a characteristic closely associated with Caesar; he is

⁹⁵ Caesar *Gallic Wars*, 2.30.

⁹⁶ Caesar *Gallic Wars*, 7.68-9 & 7.72-3.

⁹⁷ Caesar *Gallic Wars*, 1.13.

likened to lightening by Lucan.⁹⁸ While Caesar was keen to highlight the deficiency and general lack of refinement of his adversaries, it is worth noting the proficiency of Roman bridge building. One engineering exploit of Caesar's army in Gaul that has entered the realm of legend is the bridge built across the Rhine. Caesar describes the construction of this bridge in 55 BCE in far greater detail than any other of the bridges in *The Gallic Wars*. He described how the bridge was constructed using pilings and taking advantage of the strong currents to push the joints more firmly together. Speaking of himself Caesar wrote:

He proceeded to construct a bridge on the following plan. He caused pairs of balks eighteen inches thick, sharpened a little way from the base and measured to suit the depth of the river, to be coupled together at an interval of two feet. These he lowered into the river by means of rafts, and set fast, and drove home by rammers; not, like piles, straight up and down, but leaning forward at a uniform slope, so that they inclined in the direction of the stream. Opposite to these, again, were planted two balks coupled in the same fashion, at a distance of forty feet from base to base of each pair, slanted against the force and onrush of the stream. These pairs of balks had two-foot transoms let into them atop, filling the interval at which they were coupled, and were kept apart by a pair of braces on the outer side at each end. So, as they were held apart and contrariwise clamped together, the stability of the structure was so great and its character such that, the greater the force and thrust of the water, the tighter were the balks held in lock. These trestles were interconnected by timber laid over at right angles, and floored with long poles and wattlework. And further, piles were driven in aslant on the side facing down stream, thrust out below like a buttress and close joined with the whole structure, so as to take the force of the stream; and others likewise at a little distance above the bridge, so that if trunks of trees, or vessels, were launched by the natives to break down the structure, these fenders might lessen the force of such shocks, and prevent them from damaging the bridge.⁹⁹

⁹⁸ Lucan 1.151-55 & Krebs 2006, 126-7.

⁹⁹ Caesar *Gallic Wars*, 4.17.2-10: "Rationem pontis hanc instituit. Tigna bina sesquipedalia. paulum ab imo praecuta dimensa ad altitudinem fluminis intervallo pedum duorum inter se iungebat. Haec cum machinationibus immissa in flumen defixerat fistucisque adegerat, non sublicae modo directe ad perpendiculum, sed prone ac fastigate, ut secundum naturam fluminis procumberent iis item contraria duo ad eundem modum iuncta intervallo pedum quadragenum ab inferiore parte contra vim atque impetu fluminis conversa statuebat. ac nihilo setius sublicae et ad inferiorem partem fluminis oblique agebantur, quae pro ariete subiectae et cum omni opere coniunctae vim fluminis exciperent, et aliae item supra pontem mediocri spatio, ut, si arborum trunci sive naves deiciendi operis causa essent a barbaris missae, his defensoribus earum rerum vis minueretur neu ponti nocerent." trans. Loeb.

The extensive inclusion of details on both material and specifications of the bridge and techniques used is notable. Caesar even provided some rationale for design choices as though he had personally made each one. It is unlikely that Caesar alone actually made these decisions; however the rapidity with which this endeavour was actionable strongly suggests the presence of a group of skilled and experienced engineers.

This careful bridge design was put into practice by experts on a tight time scale, less than 10 days once materials were assembled.¹⁰⁰ Despite the great expenditure of materials, expertise, and energy to construct this bridge, after less than three weeks in Germany Caesar crossed back and destroyed the bridge.¹⁰¹ This conspicuous disregard for the resources expended in this construction was doubtless more than a simple fact of military exigency. Rather, it was a considered a demonstration of Caesar's power, helping to establish his importance and *dignitas*. Even geography was no obstacle to Caesar and his engineers. They were confident that the feat could be repeated as needed. While details are given of the great exploit of bridging the Rhine, following the set-back at Gergovia, Caesar simply states he "rebuilt the bridges" (*reficio*) over the Allier.¹⁰² This ability to suit the means of construction of the bridge to the occasion mirrors the adaptability used in construction earthworks, further evidencing the engineers' need to not only follow formulae but also demonstrate flexibility and decision making.

Caesar's foray into Germany, crossing into the then unknown, also placed Caesar in the tradition of great generals and conquerors like Alexander the Great and as such was an important step in building his fame.¹⁰³ Caesar stated that it would have been beneath both his personal

¹⁰⁰ Caesar *Gallic Wars*, 4.18.

¹⁰¹ Caesar *Gallic Wars*, 4.19.

¹⁰² Caesar *Gallic Wars*, 7.53.

¹⁰³ Krebs 2006, 127-30.

dignitas and that of the Roman people to cross the Rhine by any means other than a bridge.¹⁰⁴

This highlights how engineering could be tied to identity building. Conquering the elements, in this case a mighty river, was tied to what it meant to be an exemplary Roman and a part of Caesar's method for establishing his personal image and tying his own *dignitas* to that of the Roman people. This bridge was not only evidence of the Roman engineers' expertise and keen logistical management but also their role in crafting a cornerstone of Roman identity.

One might imagine that the individuals responsible for completing such a significant task as the bridge on the Rhine would have had a share in the prestige. However, none of the engineers are actually named in the account even though elsewhere Caesar did record the individual success of centurions.¹⁰⁵ This is different from the treatment of Apollodorus of Damascus under Trajan, once again underscoring how Caesar chose to foreground his own abilities and cast the engineers as mere tools he was wielding. Krebs suggests that the extensive discussion of the construction of the bridges across the Rhine is in a sense a space filler to make up for the lack of military action to report, and that the emphasis on the engineering success a clever deflection of the lack of military glory.¹⁰⁶ While it is clear that Caesar would have happily recorded a great set piece battle victory on the far side of the Rhine, such events were relatively rare and there is no reason to assume that the construction of the bridge itself was not seen as a fine accomplishment. The enormity of the undertaking represented by these bridges is intentionally emphasised by Caesar. This accomplishment would likely have reflected well on those involved in the construction. However, lacking documentation, this recognition must not

¹⁰⁴ Caesar *Gallic Wars*, 4.17.

¹⁰⁵ e.g. Baculus, Caesar *Gallic Wars*, 3.5; Pullo & Vorenus, Caesar *Gallic Wars*, 5.44 & Petronius, Caesar *Gallic Wars*, 7.50.

¹⁰⁶ Krebs 2006, 125-6.

have been as lasting or widespread as it might have been. As we will see throughout this thesis, this is just one of many cases where the commissioner of an engineering work is remembered while the names of those directly involved in its construction are lost to time.

The Gallic Wars cast the crossing of the Rhine as the ultimate Roman achievement and, since Caesar wished to present himself as the archetypal Roman, he alone must be given complete responsibility for this accomplishment. However, it is clear that in this construction, as in the other bridges undertaken in Gaul, many hands would have been needed to translate Caesar's designs into reality. That being said, the fact that Caesar is able to discuss the bridge in such detail implies that he had some level of technical knowledge and at a very minimum understood the limitations involved. In the balance of "doers" and "talker" Caesar's role seems heavily weighted to the talking. However, at least at its periphery, he too should be considered a member of the Roman engineering community of practice as a key element in the distributed cognition network need to accomplish these engineering works. .

Caesar's descriptions of his army's engineering feats are extensive and cover a wide range of activities. However, he did little to note the individuals responsible for physically accomplishing them. In Caesar's narrative, it is Caesar's good judgement, swift action, and superb organisation that allowed his army to succeed.¹⁰⁷ The army engineers in his account are largely presented as tools at his disposal and their personal knowledge and ability are elided from the narrative. However, critical evaluation of the dynamic nature of the engineering successes and the limitations of available communications suggests that individuals possessing a large breadth of tacit knowledge, practical skill and the ability to adapt to evolving situations would

¹⁰⁷ On Caesar's identification with *celeritas* Danon 2018.

have been needed. While it suited Caesar's broader objectives to present himself as near omnipotent and omnipresent, it is clear that skilled engineers were required to translate his visions into reality.

Writing in the late first to early second century CE, Hyginus offers a very different vantage to Roman military engineering than Caesar. However, much like Caesar, Hyginus does put emphasis on the importance of his role and helps to identify what elements of fortification are understood to be particularly Roman. The *Liber de munitionibus castrorum*, attributed to Hyginus, offers a complete handbook on how to fortify an army camp purportedly from his first-hand experience.¹⁰⁸ It includes directives for tackling some of the variations and complications which might arise in the field. For instance, Hyginus instructed his readers on the need to adjust to changing circumstances such as the late arrival of a body of troops.¹⁰⁹ Reminiscent of Vitruvius, in an attempt to capture his audience's goodwill and excuse any potential shortcomings of his text, Hyginus explained that he has captured to the best of his abilities a subject that is difficult to convey through written words. This is another reminder of the importance of tacit knowledge in the practice of ancient engineering. He asserted that he had read all the previous, unfortunately unnamed and now presumably lost, authors on the subject closely in preparing his little book.¹¹⁰ Unlike his predecessors, Hyginus promised his readers a start-to-finish guide to surveying a Roman camp, complete with a method for determining the

¹⁰⁸ The earliest manuscript which is from the sixth century CE is plagued with copying errors and jumping in mid-text and possibly cutting off before its conclusion; for more on scholarship to date: Campbell 2018.

¹⁰⁹ Hyginus *Fortifying a Roman Camp*, 37-40.

¹¹⁰ Hyginus *Fortifying a Roman Camp*, 45.

needed size of the camp based on the number of legions.¹¹¹ The author claimed to have devised this method himself and he seems to take great pride in imparting this knowledge to the reader.

Hyginus' writings are intended for readers who hold a similar or higher social position to himself. He addressed his readers, possibly fellow practitioners, as "lord" and "brother".¹¹² This address suggests that those laying out a camp must have held a certain position to be referred to as *dominus*. Quite literally, Hyginus' choice of words illustrates that there was a sense of fraternity between those who practised and sought to learn the secrets of Roman camp construction. Nonetheless, the text uses limited technical surveying languages which perhaps suggests that Hyginus had a more general audience in mind for his work. Hyginus informed his brother readers that a dedicated area should be marked out for the *classici*, responsible for building the roads to camp, to ensure they had efficient egress and the ability to leave the camp first.¹¹³ This area should be located close to the *fabrica* and to the *gromatici*, the people who practise the *ars* of orienting the camp.¹¹⁴ Sections 46 -7 of the text touch on the importance of experience in laying out the camp, suggesting that tutelage and tacit knowledge were necessary to acquire the skills to develop a well-ordered camp. While this acknowledgement suggests this book would have been insufficient to learn all the skills needed to lay out a camp, there was nevertheless an identifiable group to whom this book would have been of interest. Hyginus' *Fortifying a Roman Camp* elucidates some of the knowledge behind the engineering projects that feature so prominently in Caesar's writing. Although we do not know their names, many like

¹¹¹ Hyginus *Fortifying a Roman Camp*, 47. Richardson 2000 tests Hyginus' methodology for establishing the dimensions of a fort against the measurements of archaeological surveyed forts in Britain and finds it to be generally sound, although he raises questions as to the lack of technical surveying language and measurements by Hyginus.

¹¹² Hyginus *Fortifying a Roman Camp*, 45.1.

¹¹³ Hyginus *Fortifying a Roman Camp*, 24.2; 29.3; 30.2.

¹¹⁴ Hyginus *Fortifying a Roman Camp*, 12.2 & 24.2.

Hyginus must have accompanied Caesar on his campaigns, skilled men who could translate their knowledge into physical realities. While on a totally different scale to Caesar, the writing of this book put Hyginus into the same role of bridging the gap between “doers” and “talkers”, in his case seemingly more inclined to the “doer” side. In contrast with Caesar, Hyginus does not stress a narrative of dominance or a need to combat the environment, he instead wrote with an aim of informing his reader of more practical methodologies. Rather than using engineering feats as a device to forward political aims, Hyginus focused on presenting instruction highlighting the skill and knowledge of the engineer.

Vegetius' Epitome of Military Affairs (De Re Militari) offers a sweeping overview of the Roman army and gives some insight into how outsiders perceived the role of engineers in the military. This text presents the modern reader with a treasure trove of information and a host of challenges for interpretation in roughly equal measure. The prevailing view of scholars has been that the text was written in the late 380s CE, however, a recent study has concluded the cultural references and linguistic cues in the text point to a later mid-fifth century date of composition.¹¹⁵ While clearly aligned with Christianity, the military aspects of the text are secular and pragmatic with no sign of divine intervention.¹¹⁶ The text is dedicated to the emperor who while never explicitly named has frequently been identified as Theodosius I the Great.¹¹⁷ Following in the footsteps of Polybius, Vegetius attempted to explain why the Roman army had enjoyed such success and urged the current emperor to attempt to emulate these bygone glories.¹¹⁸ As might be expected from a text that claims to give an overview of all military science in a condensed

¹¹⁵ Late 4th century: Barnes 1979; Campbell 1987, 16; Allmand 2011; Tavares & Gonçalves 2015, 20. Mid 5th: Charles 2007.

¹¹⁶ Milner 1996, xxxvi.

¹¹⁷ Allmand 2011; Vegetius, 1.

¹¹⁸ Allmand 2011, 3.

form for the emperor, Vegetius' writings are broad-ranging. He addresses selection of recruits, placement of camps, schedules for felling trees for ship building, mitigation of shortages caused by a siege and much more besides.¹¹⁹ In this relatively short work that covers so much, details are often frustratingly sparse. While Vegetius seems to place particular emphasis on the selection and training of recruits, topics which could surely command extensive treatises in their own right, such as fortification towns and ship building, are merely touched upon.¹²⁰

Relatively little is known about Publius Vegetius Renatus, however from closely reading both the *De Re Militari* and his other surviving work, the *Mulomedicina*, a veterinary medical text, some details of his life can be established with a reasonable degree of certainty. His interest in and knowledge of horses, as evidenced by the *Mulomedicina*, suggests that he was a wealthy landholder, probably with ties to the west and Celtic/Celtic Iberian area.¹²¹ He was well-versed in the Latin classics but made few references to Greek sources, further suggesting a strong connection to the Western Empire.¹²² The majority of the manuscripts name the author as Flavius Vegetius Renatus, the name Flavius hints at connections to the imperial household. Vegetius was probably from the highest circles of the imperial bureaucracy as in the manuscript tradition he is described as an illustrious man (*vir illustris*) - at this period this terminology was used to identify senators - and a count (*comes*).¹²³ That being said, he opened *De Re Militari* by stating that the information that he is about to share has been gathered from various historians

¹¹⁹ Vegetius, 1.2-7; 1.22; 4.36; 4.9 & 4.11.

¹²⁰ Vegetius, 4.16 & 4.31-3.

¹²¹ Milner 1996, xxxi – xxxv.

¹²² Milner 1996, xxxvi.

¹²³ Reeve 2004, vii.

and teachers of military science rather than drawing on his own personal experiences.¹²⁴ Thus Vegetius offers a new lens through which to view Roman military engineers.

Vegetius claimed that his work was based on antiquarian records but it is clear to a modern reader that at times he was also drawing on the contemporary army of his day for information. The text of *De Re Militari* presents a tangle of contemporary observation, antiquarian research, and rhetorical positioning. Vegetius was a politician and, in a detailed study of the text, Milner convincingly asserts that the point of the work is not to give a history of the Roman army, but to create an argument for contemporary military reform.¹²⁵ Therefore the lack of clear delineation between the time periods of his sources is only of concern to modern historians, not to Vegetius himself or his peers.

Typically ancient authors only referred to the original source they quote while ignoring any intermediary authors who conveyed this information.¹²⁶ It appears that although Vegetius cites the encyclopedist Celsus, who wrote around the turn of the millennium, he was almost certainly accessing the information via Frontinus and Paternus or even more likely through epitomes of these later authors.¹²⁷ Vegetius likely rewrote and embellished earlier writing with the aim of delivering a compelling argument to his readers, specifically contemporary government audiences.¹²⁸ While Vegetius dedicated this work to the emperor, just as Vitruvius and Frontinus did, unlike them he claims time and again to be no expert in the matters he reports, but simply collecting, organising and condensing the writing of other experts.¹²⁹ This narrative

¹²⁴ Vegetius, pref. 1.

¹²⁵ Milner 1996, xxviii.

¹²⁶ Milner 1996, xix.

¹²⁷ Milner 1996, xxi.

¹²⁸ Milner 1996, xxvii-xxviii.

¹²⁹ Vegetius even mentions that Augustus was in the habit of having texts dedicated to him: Vegetius, 1. pref.

style also differs from Frontinus who emphasises his personal role in collecting some of the information presented in his texts. Further, it is a departure from Hyginus, who claims to be sharing a novel technique of his own devising for efficiently laying out a camp. A key motif throughout Vegetius' writing is the importance of citizen soldiery, while reducing the employment of mercenaries in the Roman army.¹³⁰ Vegetius also emphasises the reason for Rome's previous success as the discipline and drills of its armies.¹³¹ We must remember Vegetius' goals for writing and that he is reporting on events distant from his own time, nevertheless he offers insight into how Roman military engineers and their works were viewed by an outside observer.

Fortifying camp is an important aspect of the ideal Roman army as presented by Vegetius. As we have seen in Polybius, Caesar and Hyginus, fortified camps were a hallmark of the Roman army and even conveyed *Romanitas*. Vegetius continues in this vein, emphasising the importance of properly constructed camps not only in a dedicated section but also in the recruitment section of his text.¹³² Bearing in mind Vegetius' aim of recruiting a Roman citizen army, this combination of themes further serves to underscore that properly fortified camps were seen as a part of what it meant to be Roman. From this variation in camp fortification, it is clear Vegetius is not simply reporting the findings of earlier authors, and it is equally clear that the services of engineers remained relevant to the Roman Army and citizenship at large. For Vegetius, to construct a proper Roman camp served to make the land Roman, imbuing it with the *Romanitas* of the armies of previous generations.

¹³⁰ Milner 1996, xxxix & Anglo 2002, 248-249.

¹³¹ E.g. Vegetius, 1.1.

¹³² Vegetius, 1.21-25 & 3.8.

Despite not being an engineer himself or even in the army, Vegetius provides by far the most extensive explanation of the role of the *Praefectus Fabrorum*.¹³³ In fact, *De Re Militari* is the only known literary source which gives details of the *Praefectus Fabrorum* undertaking engineering works. Vegetius writes:

Moreover the legion has engineers, carpenters, masons, wagon-makers, blacksmiths, painters and other artificers, ready-prepared to construct buildings for winter camp, or siege-engines, wooden towers and other devices for storming enemy cities or defending our own, to fabricate new arms, wagons and other kinds of torsion-engines, or repair them when damaged. They used to have workshops, too, for shields, cuirasses and bows, in which arrows, missiles, helmets and arms of every type were made...The particular officer responsible for these matters was the Prefect of engineers.¹³⁴

As described by Vegetius, the *Praefectus Fabrorum* was an officer with extensive responsibilities in the legion, charged with the oversight of “engineers, carpenters, masons, wagon-makers, blacksmiths, painters and other artificers.”¹³⁵ According to Vegetius, this officer was responsible for ensuring that all the material that the legion might need was well maintained and readily available. In order to ensure that standards were maintained, the *Praefectus Fabrorum* would have required excellent organisational ability. Beyond the apparent need to manage limited resources, working with so many different experts would have required strong project management skills. Vegetius also reported that the *Praefectus Fabrorum* was charged with the construction of winter camps and the undermining of opposing fortifications. Given the

¹³³ Vegetius uses *Fabrorum* rather than *Fabrum* more common in earlier sources.

¹³⁴ Vegetius, 2.11 “Habet praeterea legio fabros tignarios structores carpentarios ferrarios, pictores reliquosque artifices ad hibernorum aedificia fabricanda, ad machinas turres ligneas ceteraque, quibus uel expugnantur aduersariorum ciuitates uel defenduntur propriae, praeparatos, qui arma uehicula ceteraque genera tormentorum uel noua facerent uel quassata repararent. Habebant etiam fabricas scutarias loricarias arcuarias, in quibus sagittae missibilia cassides omniaque armorum genera formabantur. ...Horum iudex proprius erat praefectus fabrum.” trans. Milner 1996.

¹³⁵ Vegetius, 3.11 *fabros tignarios structores carpentarios ferrarios, pictores reliquosque artifices*. trans. Milner 1996.

incredible variety of responsibilities in the *Praefectus Fabrorum*'s portfolio it seems unlikely that he could have been an expert in all of them.

As discussed above, in the Late Republic and Early Empire the *Praefectus Fabrum* often appears to serve as an aide-de-camp, perhaps even a largely honorary position. There is little indication that they undertook any of the activities outlined by Vegetius. It seems plausible that Vegetius had come up with his list of duties by extrapolating from the title, prefect of “*fabri*”, to guess at what they might have done, rather than reporting the duties of a specific officer in the legion historically.¹³⁶ While this probable inaccuracy lessens Vegetius' credibility as a source for the daily life of Roman military engineers, his description of the responsibilities of the *Praefectus Fabrorum* sheds valuable light on what sort of engineering activities high ranking civilians thought were undertaken by the Roman legions.

Writing from very different perspectives, Caesar, Hyginus and Vegetius all underscore the importance of engineering work as part of the Roman army's activities. Through their writing key characteristics of speed, utility and replicability emerge as hallmarks of Roman engineering. The audiences for these text would have included those outside the military and likely the engineering community of practice through them an additional threads are added to nexus surrounding engineering works as these readers would come to associate engineering with the Roman military.

Conclusion

In this chapter, I have explored how engineering works were related to the military in both Roman practice and in the Roman imagination. Through examination of the epigraphic

¹³⁶ Milner 1996, 43.

source, we are able to meet on a very granular level some of the individuals directly responsible for the “doing” of Roman engineering works. The picture that emerges is of a diverse of individuals who were member of a community of practice and were proud of their work and wanted their connection to it to be commemorated to posterity. We also see familial and religious connections honoured bring to light the multifaceted nature of these individuals’ identities. From studying over 170 inscriptions linked to both the military and engineering works the broad chronological scope and geographic spread of military engineering works is made clear. The creation of fortified camps was a characteristic hallmark of the Roman army and contributed to a demonstration of *Romanitas* which was only possible through the diligent practice of engineers. The use of engineering to convey a sense of Romanness is also seen in Trajan’s Column where engineering works feature prominently and Roman works are depicted made of stone to reflect Roman control and ability to shape the natural world to their will.

Roman military engineers have been written about from many diverse perspectives from antiquity up to the present day. Caesar, writing of his own military exploits, used the success of his engineers to illustrate his extensive management skills, establish his reputation for swift action and augment his *dignitas*. Through careful examination of his discussion of fortification, bridges and boat building it is possible to glimpse the balance of expert and less skilled labour at Caesar’s disposal. Caesar wrote of the engineer works in a level of detail and familiarity which place him within the engineering community of practice and an element of the distributed cognition network. Through the writing of Hyginus, it appears that there was a broader viewership interested in learning the knowledge of Roman military engineers, and that these engineers took pride in their own understanding. The writings of Vegetius illustrate the central role of engineering in the success of Roman armies as understood by outsiders. Inscriptions and

archaeological evidence offer a different glimpse into the world of Roman military engineers. Through their extensive work on infrastructure projects, military engineers both literally and figuratively built the Roman empire, linking far flung populations and helping to create connections between local and military command structures. Funerary inscriptions introduce individual engineers and preserve some element of their personal and group identities.

Engineering works and engineers were a key part of the Roman army and its success. They needed to work quickly and adapt to changing situations. Through the literary sources we can see how the knowledge and ability of these individuals could be perceived as a tool by their commanders to achieve their personal goals and be moulded to match wider narratives. We can also see the pride taken in sharing personal knowledge through written works to other members of the community of practice. Exploring inscriptions sheds light on the interconnections between individuals who shared roles and underscores how being an engineer could be an important part of an individual's personal identity. Roman military engineers helped to translate the ideas of generals into reality by shaping the physical world in a central demonstration of *Romanitas*. In the literary sources we primarily see engineers presented as a tool wielded by the Roman army to achieve greatness. However, when we consider the epigraphic record engineers emerge as complex individuals with multifaceted identity encompassing family ties, religious affiliations and pride in their individual professional accomplishments.

Chapter 3: Engineers in Peace

***In hot haste rushes a contractor with mules and porters; a huge crane is hoisting now a stone and now a beam.*¹**

The quote above comes from the leading Augustan poet Horace's description of a bustling street in Rome. In this section of his *Epistles*, the poet sought to evoke the teeming life of Rome, dynamic and ever evolving. Construction was everywhere and at the heart of this industry were contractors, architects and engineers. The previous chapter considered how engineers lived and worked within a military context. In this chapter, we will turn our attention to engineers in peace.² When it comes to engineering and technology both today and in the ancient world, the spheres of war and peace are rarely completely separate. This was certainly the case from Roman engineers. The most well-known Roman engineer of them all, Vitruvius, spent the early stages of his career as a military engineer responsible for management of siege equipment though his expertise spanned the manifold fields covered in his *De Architectura*.³ As we saw in Chapter One, Apollodorus of Damascus was responsible for Trajan's military fortifications and bridges and his development of the Forum at Rome. The difference between engineers in the military and engineers in peacetime is not a wholesale change in the cast of characters but rather the situations in which they found themselves. This chapter explores what conditions might have been like on a building site and the legal framework surrounding

¹ Horace *Ep.* 2.2.72: "festinat calidus mulis gerulisque redemptor, torquet nunc lapidem, nunc ingens machina tignum." trans. Loeb.

² An alternative title for this chapter could have been engineers in a civilian context, this has two disadvantages, most importantly it risks being conflated with the modern discipline of civil engineering which includes many activities such as bridge and road construction which as we saw in the previous chapter were in the Roman world often undertaken by military engineers. Less importantly, engineers in a civilian context also lacks the poetic expansiveness of "engineers in peace".

³ Vitruvius *De Arch.*, 1. pref.

construction contracts. Through case studies of two of the most iconic types of peacetime Roman infrastructure, amphitheatres and aqueducts, I consider what attributes would have been needed for engineers to flourish outside of the military and explore how Roman engineers shaped the Roman world and contributed to a sense of Roman identity.

Contracts

Before any construction project can begin, decisions need to be made about what actually should be built and how the necessary resources are to be marshalled. There are many different strategies to determine these crucial initial steps. By exploring how projects were commissioned and carried out we can develop our understanding of what life might have been like on building sites for Roman engineers.

Under Roman law, there were two main types of contracts available for construction projects. The first was the *stipulatio*, a very specific legal format which requires a set formulation of agreement to be spoken aloud. Notably it is a unilateral agreement, meaning that it only was binding in one direction: one party agreeing to deliver a good or service to another. In order to include a payment to the first party a second distinct and separate *stipulatio* was required.⁴ Not least because of its oral nature, we have only limited information on this type of contract. The majority of the information we do have comes from the *Digests* of Justinian, compiled in the sixth century; there is ample possibility that the format and popularity of this type of contract may have fluctuated over time.⁵ Given the ephemeral and complex nature of a *stipulatio*, it is not surprising that the more common type of contract for building was the *locatio*

⁴ Martin 1989; Anderson 1997, 68-70.

⁵ E.g. *Digesta*, 13.4.2.5; 19.2.30.3; 45.1.75.7; for further examples and discussion: Martin 1989.

conductio. In this type of contract, one party agrees to deliver specific goods or services to the other in exchange for a set sum of money following an inspection (*probatio*) that the product meets the agreed terms. As a group whose role bridged the worlds of “doers” and “talkers”, the most successful Roman engineers would doubtless have been versed in contract law and the implications of these agreements.

As Brunt has explored, *locatio conductio* contracts were a very important legal mechanism well beyond the realm of construction and maintenance of infrastructure.⁶ In these contracts, the work could either be carried out by the principals themselves or subcontracted further. However, the more work the holder of the contract was able to undertake themselves, the more control they would have been able to exert to ensure that works passed the *probatio* to guarantee payment. Contractors were not always at total liberty to subcontract works. Frontinus reports that those bidding on a contract for the maintenance of the water supply at Rome were required to maintain a set level of permanent enslaved workmen to be eligible to bid.⁷ We can infer from this type of condition that there was a certain level of commercial success or reputability required to be engaged by the people of Rome.

Some of these contracts were quite literally set down in stone and are preserved in the epigraphic record. While various fragments survive from around the Roman world, by far the most complete is the *Lex Puteolana* which documents the contract for the construction of a wall around the temple of Serapis in Puteoli in southern Italy near Naples.⁸ This inscription is presented in three columns and covers in extensive detail the work that is to be undertaken:

⁶ On the *publicani* Brunt 1990.

⁷ Frontinus *De Aq.*, 96.

⁸ *Lex Puteolana*: CIL 1.698 = ILS 5317. Other examples: repair of the Via Caecilia in the first century BCE : ILS 7599.

The Second Contract of Public Works. The contract for the construction of a wall in the building lot which is in front of the Temple of Serapis across the road. He who undertakes the work must provide bondsmen and register their estates as securities according to the decision of the *duoviri*.

In the building lot across the road, let the contractor open a gap [for a gateway] in the middle of the wall which is near the street; let him make it 6 feet wide and 7 feet high. ...The substance that he will use in the structure, let him make from clay mixed with one quarter part of slaked lime. And let him lay rough tiles that are not larger than the dry rough tiles weighing 15 pounds, nor make the corner tiles higher than 4.5 inches.

...

And let him give back a clean site according to the requirements of the work. ... Whatever 20 members on oath approve, let it be approved; what the same men do not approve, let it not be approved. The day [for the beginning] of work: the first of next November. The day for payment: half part will be given when the estates [for security] have been satisfactorily registered; the other half part will be paid when the work is completed and approved. Gaius Blossius, son of Quintus, [undertakes the contract for] 1500 sestertii, and pledges [himself as surety]. Quintus Fuficius son of Quintus; Gnaeus Tettius son of Quintus; Gaius Granius son of Gaius; Tiberius Crassicius.⁹

This contract is titled the “Second Contract of Public Works” (*Operum Lex II*). Perhaps building contracts were numbered starting at one each new year; as 105 BCE was nearly a century after Puteoli was established, there must have been more than one previous construction project. The

⁹ *CIL* 1.698: operum lex II / lex parieti faciendo in area quae est ante / aedem Serapi trans viam qui redemerit / praedes dato praediaque subsignato / duumvirum arbitrato / in area trans viam paries qui est propter / viam in eo pariete / medio ostiei lumen / aperito latum p(edes) VI altum p(edes) VII facito ex eo ... / pariete{m} opstruito et parieti qui nunc est propter / viam marginem perpetuom(!) inponito eosq(ue) parietes / marginesque omnes quae lita non erunt calce / harenato lita politaque et calce uda dealbata recte / facito quod opus structile fiet in te[r]ra calcis / restinctai partem quartam indito nive maiorem / caementa(m) struito quam quae caementa arda / pendat p(ondo) XV nive angolaria(m) altiorem |(trientem) |(semunciam) facito // locumque purum pro eo opere reddito ...hoc opus omne facito arbitrato duovir(um) / et duovira[!]ium qui in consilio esse / solent Puteoleis dum ni minus viginti / adsient cum ea res consuletur quod / eorum viginti iurati probaverint probum / esto quod ieis inprobarint inprobum esto / dies operis K(alendis) Novembr(ibus) primeis dies pe<c=Q>un(iae) / pars dimidia dabitur ubei praedia satis / subsignata erunt altera pars dimidia solvetur / opere effecto probatoque C(aius) Blossius Q(uinti) f(ilius) / |(sestertiis) MD idem praes(tat?) Q(uintus) Fuficius Q(uinti) f(ilius) / Cn(aeus) Tetteius Q(uinti) f(ilius) C(aius) <G=C>ranius C(ai) f(ilius) Ti(berius) Crassicius Trans Hmphrey et al. 1998.

number of projects undertaken would depend on the colony's size and present fortunes. As this is by far the most complete building contract known from the Roman world, it is tempting to consider it as the common model, however the rarity of this type of inscription suggests that there is something exceptional about it and we should approach it with caution. Clearly there was something special about this contract for it to have been published in stone rather than simply kept in a local archive. One potential explanation is that this construct was successfully carried out and it was intended as a model for future contracts. This in itself would not require it to be published in stone but additional factors such as a desire to advertise that the city invested in its public buildings and that they dealt in good faith, demonstrating transparency, could have motivated the choice to display it. This inscription could be seen as a celebration for the city of Puteoli, a reminder of the duties of the *duoviri* and the broader council and as a message to visitors about the character of the town.

The opening lines give the date of the contract, listing years since the foundation of the colony, the current local *duoviri* and the consuls at Rome. This allows us to securely date the contract and identifies N. Fufidius and M. Pullius as responsible for the decisions surrounding the project on behalf of the colony. The other key figure identified is Gaius Blossius, son of Quintus, who has been contracted to undertake the work. This contract describes in detail the agreement between the colony and an individual. Blossius is responsible for carrying out the construction and in return he will be paid 1500 sestertii, but he has to offer not only his own estate but those of four bondsmen named at the end of the contract as security against his failure to complete the works to the stipulations of the contract. Clearly, while this project must have been profitable for Blossius and perhaps his supporters too, there was a definite element of financial and doubtless reputational risk should the project fail. Enthusiastic amateurs might

quickly have found themselves responsible for paying into the town's coffers rather than profiting from them. Not only Blossius but his supporters too must have had confidence in his ability to deliver this project. Blossius' business acumen, reputability and technical ability represent key attributes needed for an engineer to succeed in peace.

The contract from Puteoli includes detailed specifics for almost every element of the project. From the location ("the building lot which is in front of the Temple of Serapis across the road"), and the dimensions of the walls to within a quarter of a foot, to the materials to be used including set types of wood (oak and fir) and specific methods of fastening (iron clamps), nothing is left unstipulated. Even the mixture of lime in the mortar to be used is specified as are certain aesthetic details, such as that the doors must match those at the Temple of Honour, and the inclusion of a *cymatium*. This level of specification suggests that both those drawing up the contract and those agreeing to take it on would have required a fairly high degree of understanding and competence in construction.¹⁰ It is difficult to know who on the council would have had this acumen, as no expert is stipulated either by name or position as an overseer other than the *duoviri*, placing considerable reliance on their understanding of the building works. In addition, the contract repeatedly states explicitly that "the same person" (*eisdem*) will be responsible for the different elements of the construction. Therefore, although the contractor could and indeed would need to rely on employees (free or enslaved) and/or subcontract out part of the work, ultimately the contract is for the project in its entirety and the contractor would only be paid the full amount when the work was completed to the council's satisfaction. This level of technical specification at least raises the possibility of engineers working for the colony's

¹⁰ Similar levels of detail are found in the records from the construction of the temple of Apollo at Didyma, also recorded in stone inscriptions: see *SEG* 66.1215 and Günther & Prignitz 2016.

council, as it seems likely that these details may have been beyond the *duoviri*' scope of expertise. These *duoviri* were public officials, the local equivalent of the consuls at Rome; the main qualification for these roles would certainly have been political rather than technical in nature, leaving the question of to what extent could they have accurately assessed the finished product or given input to the contract. If this were the case, it would mean that engineers would have been dealing with engineers shape the experience of the Roman people.

According to the *Lex Puteolana*, the contractor agreed to return a clean site and took on the responsibility for moving and setting up certain shrines, statues, and altars. This means that in addition to understanding the construction itself, they would have needed to employ broader project management and maintain ongoing control of the site from the commencement of the project to its completion. While the scope of the project is very clearly set out in the contract as are the start date for the work and the remuneration for it, there is, surprisingly, no time scale identified for its completion. Perhaps the withholding of the final payment was seen as a sufficient stimulus to ensure that the project was completed as quickly as possible. There is also a mechanism by which the scope of the project could be altered; the whole project was to be undertaken by the decision of the *duoviri* and the council as long as there were at least 20 members who approved changes. Potentially this may place the contractor in a precarious position as his estate and those of his bondsmen are pledged against the successful completion of the project, but the council has the option to change the terms without his consultation. This eventuality must have been mitigated to a degree by the requirement for both parties in a *locatio conductio* to act in good faith (*ex bona fide*) which was enshrined in Roman law.¹¹ As upstanding members of the community with a commitment to advancing the *res publica* Roman

¹¹ Anderson 1997, 71.

engineers could not have expected to succeed in their career if their reputation was brought into question regardless of the financial impacts.

While the *Lex Puteolana* concerns a public building, a similar process of contracting for private building was in operation through the Roman world. In this sphere too, the responsibility for making sure that the final product matched the requisites of the owner fell heavily on the contractor. In one known case, Cicero, while inspecting work on his brother Quintus' villa, found that much of the work was not to his satisfaction. As a result, the contractor, Diphilus, was forced to pull down columns and redo the work:

The columns placed by Diphilus are neither straight nor properly aligned. He will pull them down, of course. One day he may learn how to use a rule and plumb line. To be sure, I hope Diphilus' job will be finished in a few months.¹²

One can imagine here Diphilus' chagrin at needing to redo parts of the work while under the terms of the *locatio conductio* he would still receive the same amount of pay. As far as we can judge, costs plus contracts were uncommon. One can further imagine that it would have been most unpleasant for Diphilus to be told to learn to use a plumb-line by Cicero whose own knowledge of the practical use of tools might be presumed to be minimal. Vitruvius notes in the introduction to Book Ten that an unscrupulous architect could deceive a proprietor.¹³ For while it was accepted that a respectable *paterfamilias* should have a general understanding of every element needed to run his affairs, including building, it is clear that in practice he tended to rely on contractors. We learn through his writings that Cicero contracted at least six different professionals to take on building works for himself and his brother. There is a substantial amount of legal content in the *Digests* surrounding building contract law aimed at formalising

¹² Cicero *Q. fr.* 3.1.1-2: "columnas neque rectas neque e regione Diphilus conlocarat. eas scilicet demolietur. aliquando perpendiculo et linea discet uti. omnino spero paucis mensibus opus Diphili perfectum fore." trans. Loeb.

¹³ Vitruvius *De Arch.*, 10. pref.

agreements and protecting both owners and builders.¹⁴ This suggests that Roman builders or at the very least foremen or leaders were of sufficient educational and social standing to engage with the legal system. However, in the contractual system it would not have been practical for Diphilus to do anything but aim to meet Cicero's request to ensure that he would be paid and not risk forfeiting his security and good reputation.

In his introduction to book ten of *De Architectura*, Vitruvius yearns for stiffer penalties against those who failed to deliver their projects on time and on budget saying: "Would that the Gods had impelled the Roman people to make such a law ... architects themselves, controlled by the fear of a penalty, would be more careful in calculating and declaring the amount of the cost".¹⁵ Despite Vitruvius' impassioned statement, it is important to remember that the system of *locatio conductio* places by far the majority of the burden on the contractor to provide the agreed construction. Should they fail to do so, not only would they receive no pay, but often they faced financial penalties associated with noncompliance and reputational ruin. We must imagine the need for any contractor to be fairly savvy as a businessperson in order to make contracts that on the one hand allowed them to make a profit and on the other were seen as inexpensive enough to be chosen by the landowner. Once again in the introduction to book ten, Vitruvius notes that a lack of knowledge by proprietors can lead to extravagant bills being levelled by contractors.¹⁶ Vitruvius was concerned that his own reputation and that of all architects would be ruined by charlatans taking advantage of the limitation in the technical understanding of the *paterfamilias*. He advocated for even stricter penalties on contractors for false representation and failure to

¹⁴ Marin 1989.

¹⁵ Vitruvius *De Arch.*, 10. pref. 1-2.

¹⁶ Vitruvius *De Arch.*, 10. pref.

deliver. He believed true architects should have both the technical ability and project management skills to deliver projects while still maintaining a livelihood for themselves.

A contract system dominated Roman civil construction for both public and private building projects throughout the Republic and well into the Empire. In this system the contractor provided sureties to build projects to a high degree of specification and was paid in full only upon completion of the project and after the final work was inspected and deemed to have met the terms laid out in the contract. This meant that those taking on these contracts needed to have both a head for business and the technical understanding to meet the requirements, or else judge them to be impractical for the offered remuneration and reject them or risk great financial loss. Despite this it appears that at times proprietors might make their feelings known and openly question the contractors' abilities.

Public Works

In the Republic, major public building works were carried out by the Senate entering into *locatio* contracts mainly under the responsibility of the censors. As censors were only put in place every five years and their term in office, as with other Republican positions, was shorter than the time needed to complete grand projects, the system was far from perfect. In order to operate it depended on a large degree of flexibility and variation from project to project. On occasion, special provisions were made to allow censors to see a project through to completion or censors were put in place before the next five-year cycle to allow new major developments to get underway.¹⁷ Despite the limitations of the system, it persisted into the late Republic, with many of the grander building projects at Rome being led and financed by elite families as part of

¹⁷ Diodorus 20.36; Livy 9.29.5 & Frontinus *De Aq.*, 1.6.

the struggle to gain political dominance. It was not until Agrippa was appointed as *Curator Aquarum* by Augustus in 33 BCE that we have any hint of a full-time construction workforce employed by the Roman state.¹⁸ Although Augustus undertook an extensive building campaign, in keeping with his desire to maintain the appearance of Republican structures he acted *ex auctoritate senatus* continuing to contract out works rather than further developing anything resembling a public works department.¹⁹ However, workforces employed by various *curatores* appointed by Augustus gradually began to take on more and more responsibility for the construction of public works which were increasingly undertaken only at the behest of the emperors.²⁰ These workforces would almost certainly have included engineers.

By the time of Claudius, public works were being carried out *ex auctoritate Caesaris*, on the authority of Caesar, having discarded the Republican facade.²¹ Nero, in the aftermath of the great fire of 64 CE, undertook the management the reconstruction himself rather than contract it out and the Flavians continued to exert active control of public building so that by the time of Domitian the *opera Caesaris*, a public works department, seems to have been in full force.²² Though the exact nature and structure of the *opera Caesaris* are opaque, it is apparent that over time it became more and more responsible for large scale construction projects at Rome and as such many engineers would have been within its ranks. In the private sphere there is no reason to suppose that the system of *locatio* contracting underwent any great change well into late antiquity. Therefore, there remained scope for engineers to work as part of the *opera Caesaris*,

¹⁸ Frontinus *De Aq.*, 1.98.

¹⁹ Vitruvius *De Arch.*, 1. Pref. 2; *Res Gestae*, 4.12-16.

²⁰ This is particularly true at Rome itself as is explored below in the provinces greater latitude existed for the local elites to commission and sometimes pay for public works.

²¹ *CIL* 6.3154-5.

²² Tacitus *Ann.* 15. 43; Suetonius *Nero* 16, 38-39; *Vespasian* 8.5, 9; *CIL* VI 9034; Strong 1968; Anderson 1997, 69; Senseney 2015.

for other contractors and perhaps for themselves. In this multifaceted system, Roman architecture and construction bloomed, resulting in elevation of both the quantity and quality of building projects, some of which continue to impress to this day.

Roman Amphitheatres: The ecosystem of monument projects in the capital

There is no type of construction more quintessentially Roman than the amphitheatre. Its cultural significance both to the Romans themselves and as an enduring hallmark of their civilization in the modern world is hard to overstate. Indeed the presence of an amphitheatre is often used as an archaeological hallmark of Romanization; they can be found across the Roman world.²³ As the largest example of its kind and located at the very heart of the capital, no one building is more evocative of ancient Rome than the Colosseum or Flavian Amphitheatre. Modern estimates put the capacity of the Colosseum at around 50,000, roughly half that of the Circus Maximus but far greater than any other amphitheatre known before or until hundreds of years later.²⁴ As Martial wrote, when compared to other wonders of the world “all labour yields to Caesar’s amphitheatre: Fame will tell of one work instead of them all.”²⁵ Once completed the amphitheatre was a microcosm of the Roman world bringing together all ranks and orders of society into one location.²⁶ Through its construction the Colosseum offers a window into the hierarchical world of Roman engineers and an enduring example of the role infrastructure can play in creating both community and identity. As we will see in the following pages, large scale

²³ Futrell 1997; Bomgardner 2000; Welch 2007, 197-9; Wilmott 2008.

²⁴ Bomgardner 2000, 31; Claridge 2010, 314.

²⁵ Martial *Liber Spectaculorum*, 1 7-8: “Omnis Caesareo cedit labor amphitheatro: unum pro cunctis Fama loquetur opus.” Evidence for which Caesar is being referred to in the *Liber Spectacularum* is not conclusive. Some poems such as this one, are clearly more likely describing Titus as it would be very fitting for the inauguration of the Colosseum. Other poems such as 9 & 26 which both feature rhinoceroses suggest that Domitian, who minted coins with rhinoceroses on them, was the man in question. In any case it seems more important that the Caesar is the embodiment of imperial power than any particular man. For more see Coleman 2006, lxiv.

²⁶ Edmonson 1996, 82.

projects such as the Colosseum were only possible thanks to the contributions of diverse individuals all, members of a community of practice and all connected to varying degrees to the practice of engineering. This complex ecosystem included the highest levels of Roman society who commissioned the project, enslaved practitioners, and both unskilled and skilled labourers. Ensuring that all elements of this distributed cognition system were successfully brought together would have required very active and efficient project “managers” another requisite group in ecosystem needed to deliver construction projects on this scale. Each of these groups will be examined in more detail below, at this point, it is important to stress the diversity of these groups although all were required to make the project possible their roles were very different and as such their connections the practice of engineering were also different.

The custom of calling the Flavian Amphitheatre the Colosseum was an extension of its proximity to the 30m colossal statue originally of Nero, however it would also be appropriate were it to derive from the enormity of the undertaking. It is estimated to have taken some 100,000 cubic meters of travertine and 300 tonnes of iron clamps to build.²⁷ However, the initial construction was completed at a record pace between 5 and 7 years of work, in order to be ready for the inaugural games in 80 CE under the Emperor Titus.²⁸ This seems to rival even the rapidity of Caesar’s military engineering feats. While less than a decade is certainly an impressive turnaround time for the construction of a large-scale stone amphitheatre, it represents a considerable increase in lead time when compared to previous games locations. Before the construction of the Colosseum when shows were being held in the *forum Romanorum* teams of carpenters would have erected temporary seating in a process that might have taken around a

²⁷ Claridge 2010, 312.

²⁸ Pearson 1973, 83.

week.²⁹ The importance attached to speed of construction of the Colosseum is evidenced by the lack of detail in finishing, especially on the higher levels, suggesting that the overall completion of the project was of paramount concern.³⁰ Despite this the very continued existence and cultural prominence of the structure is testament to the overall soundness of the construction.

As with any major construction project, plans and designs would have been critical for the successful completion of the massive amphitheatre. There are two main theories of how the plans for the Colosseum could have been laid out. One theory, championed by Hallier, is based on tracing a series of segments of a circle with a module of 26 Roman feet, while the other, preferred by Wilson Jones, is based on 3:4:5 Pythagorean triangles and a module of 30 Roman feet.³¹ The “module” is a unit of measure established for a given project which differs from project to project and that allows for easier execution of plans. All dimensions of the buildings were measured out in terms of multiples of the module.³² Both the circle- and triangle-based schemes have their merits and could reasonably have been used to construct the Colosseum as it stands today. However, neither one of these methods results in a perfect match to the physical dimensions.³³ Without the original planning documents which are long lost to time, there is no way to be sure if either of these methods was in fact used.³⁴ However, as either of these techniques and indeed others could have successfully resulted in the construction of the

²⁹ Welch 2007, 56-7.

³⁰ Pearson 1973, 86.

³¹ For Hallier see Bombardner 2000, 26; Wilson Jones 1993.

³² In the case of the Colosseum and indeed all examples of which I am aware the module has been established retroactively from measurements of the finished project, as records of the modules used have not survived.

³³ For a full discussion of both methods and their merits see Bomgardner 2000, 26 – 29.

³⁴ Though we do not know what exact types of preplanning documents were produced for the construction of the Colosseum, Vitruvius presents a variety of different types of architectural drawings at *de Arch.*, 1.2.2, general plans (*formae*) appear in Suetonius *Div. Jul.*, 31 and scale models were likely used in other construction projects such as the Baths of Caracalla, see DeLaine 1997, 66. For more on architectural drawings in antiquity, Senseney 2011.

Colosseum, it would have been up to the architects to use their professional knowledge and experience to select the method that would have been most appropriate.

Regardless of how a design was laid out, much like civil engineers today, Roman architects needed to devise an overall plan for the project, including removing any previous construction and preparing the ground. The importance of project management to successful the success practice of engineering must be emphasised. In the case of the Colosseum this included draining of an enormous lake that had been part of Nero's pleasure garden, demolishing porticoes, removing a public fountain and ensuring that there was adequate drainage to prevent the lake from reforming.³⁵ An invisible but significant engineering achievement is the complex drainage system below the foundations and within the walls of the Colosseum which has been key to the building's longevity.³⁶ There are more than 20 central trunk water channels within this system. Each channel has a unique system of pipes branching off it to form a pipe tree; none of the over 20 pipe trees for the plumbing of the Colosseum are the same.³⁷ Both lead and clay pipes were used and a wide range of makers' stamps have been found from both the original construction and later repairs. This originality indicates that in each case the engineers on scene would have needed to evaluate the situation and design an appropriate tree, rather than simply repeatedly following a prescribed plan. This once again highlights the need for engineers to exercise judgment and flexibility in order to complete a task as quickly and efficiently as possible.

Sadly, there was no behind-the-scenes documentary crew on the construction site of the Colosseum, however, Taylor offers a necessarily speculative overview of how the construction

³⁵ Panella 1990, 75-81; On the fountains: Longfellow 2011, 31-9.

³⁶ Pearson 1973, 80.

³⁷ Taylor 2003, 162-3.

might have progressed. He emphasises that there is no one correct way of how the building could have been undertaken but he does provide one that seems logical and plausible.³⁸ He is very mindful of the actual logistical challenges of working conditions: where did the scaffolds go? How much room would there have been for the crane guy ropes and capstans? How could the greatest number of people be kept working at all times? How did the architects balance the need for skilled and unskilled labour? How was the flow of materials managed? He convincingly concludes that the lower levels of the Colosseum would each have been completed to an initial rough standard, allowing construction on the upper levels to commence concurrently with the finishing of the lower sections. Roman engineers working on monumental construction would have needed project, labour and resource management skills at least equal to their technical knowledge in order to succeed.

The highly symmetrical nature of the Colosseum suggests that it would have been possible to train different crews to specialise in one aspect of the construction, for example stairwells, and then have this crew build that feature repeatedly.³⁹ Not only would this limit the scope of training needed by any one individual, it would also allow crews to optimise performance through subsequent practice. Additionally, this methodology would allow multiple crews to work on their speciality simultaneously, further expediting progress. It is clear that the architects and engineers of the Colosseum must have been expert logisticians, they would have needed to establish and keep to long-range plans all the while, adapting to conditions as they arose at both the micro and the macro levels. For example, navigating material shortages and adjusting specifications when it was determined that more structural support was needed. Brick

³⁸ Taylor 2003, 133-173.

³⁹ Bomgardner 2000, 30. For more on the building process with independent crews see Lancaster 2005.

reinforcements from the times of Domitian, Hadrian and Antoninus Pius have all been found.⁴⁰ Constructing the Colosseum was not a task that was simply concluded and then left alone; extensive renovation and repairs, response to fire and other damage were needed and the area below the arena floor was reconfigured at different points. Each of these developments relied on the skills of engineers. This demonstrates that even after the initial constitution engineers continued to analyse structural integrity and adapt to conditions.

Although not from the construction of the Colosseum, we have some evidence of what may have been at stake for the builders and later operators to deliver functioning amphitheatres and impressive games. Suetonius claims that Claudius forced poorly performing carpenters and technicians to fight in the games as punishment for poor workmanship.⁴¹ With these severe consequences in mind let us now turn our attention to the intrepid engineers who devoted their careers and perhaps their very lives to the construction of the Colosseum.

As we shall explore below, labour forces in antiquity were dynamic and it is challenging to definitively establish their composition. Clearly not all members of the labour force of the Colosseum would have been engineers, but equally many individuals would indeed have been engineers as defined in this thesis. Earlier we explored how to define a Roman engineer, and throughout relevant scholarship there has been a tendency, which I have followed, to use “architect” as a synonym for “engineer.” However, I would contend that from the perspective of the ancient world while all those who used the title “architect” were engineers as defined in this thesis, many who did not use the title should also be considered engineers on the basis of using technical knowledge and project management to alter the physical world.

⁴⁰ For more on the different brick stamps found at the Colosseum: Rea 2001, 156-158. For more on brick stamps and the brick industry more generally: Aubert 1994, 217-244.

⁴¹ Suetonius *Claud.*, 34; Bomgardner 2000, 22.

While “who built the Colosseum?” is a simple question to ask, it is not nearly so easy to answer. In the broadest strokes we can identify three groups of people who were central to the construction of the Colosseum. Firstly, Flavian emperors: we know most about these figures as individuals because of their social status as the most elite of the elite. Their euergetism and political objectives gave the initial impetus to the project, but their direct involvement may have been limited. Secondly, contractors and architects would have been directly responsible for the project. While no one name is definitively attached to this group, strong circumstantial evidence suggests that *redemptor* Quintus Haterius Tychicus and others like him played a significant role in translating the will of the Flavian Emperors into reality. Finally, the crews of skilled and unskilled labourers (both free and enslaved) whose names and identities are largely lost to time were ultimately responsible for the physical construction of the project. Each of these groups were necessary for the construction of the Colosseum. In the next sections, we will explore and further define the roles of these groups in turn.

All three Flavian emperors - Vespasian, Titus and Domitian - played important roles in the construction of the Colosseum. Vespasian conceived and commissioned the project. Titus oversaw much of the construction and presided over the inaugural games. Domitian managed and executed the finalisation of the build and saw the Colosseum brought into use as the foremost amphitheatre in the Roman world. Famously the very first Roman Emperor Augustus found Rome a city of brick but left it a city of marble.⁴² Moreover, in his *Res Gestae* Augustus listed his building works at length including extensive construction and restoration of temples, the curia, works on the forum, theatres, basilicas and notably refurbished the aqueducts.⁴³ In

⁴² *ut iure sit gloriatus marmoream se relinquere, quam latericiam accepisset* Suet. Aug. 28

⁴³ Res Gest. 19-20. For more on Augustus' construction programme Purcell 1996; Favro 1996; Favro 2005;

Suetonius' account Augustus was particularly interested in making "adorned as the dignity of the empire demanded."⁴⁴ This level of statement on the changes wrought by the emperor over the very fabric of the city is on a scale completely different than any that could be made through other means such as art or literature alone. This is rebuilding is something that would have reached everyone in the city regardless of their position and on a daily basis they would interact with the changes brought about by Augustus. At least in the case of the water supply and the forums, far from simply aesthetic changes these were material upgrades to the city's infrastructure. With out engineers, their technical knowledge and resource management, these projects would not have been possible. Projects which were only possible with engineers were a critical tool for emperors to communicate with the populus, stressing the regime's priorities and making a permanent stamp on the cityscape. The statements made through engineering project could be very complex seeking to link or distance current rulers from the past but the nature of some projects as fundamentally useful could also allow them to transcend the associations which became attached to the emperor who commissioned them.⁴⁵ For Roman emperors a building program could serve as a powerful socioeconomic and political tool. However, construction projects could either cement an emperor's place in history as champion of progress and growth or be used against them as evidence of despotism and megalomania.

The emperors' decision to invest such enormous quantities of resources into building projects in general and in particular the Colosseum was doubtless multifaceted. Some Flavian building work such as the rebuilding of the Temple of Jupiter Capitolinus was designed to be

⁴⁴ He found the city *Urbem neque pro maiestate imperii ornatam* and changed it Suet. Aug. 28

⁴⁵ In the final chapter, will explore how the assessment of engineering works as successes or failures could become heavily entrenched in moral judgments.

restorative, both literally and figuratively, returning the Capital to what it had been before the destruction of the civil wars, under whose shadow Vespasian came to the throne.⁴⁶ Architecture can act as an effective diversion from political strife. While a great deal of discontent persisted in the empire and the wounds of the conflict between Vespasian and Vitellius, his rival for the imperial title, were far from healed, the reconstruction and consecration of the Capitoline temple presented the *res publica* as one and at peace.⁴⁷ Skill in construction was a major point of pride for the Romans and was a part of their self identification. For Roman political leaders, engaging in successful projects such as the restoration of the Temple of Jupiter Capitolinus and the construction of the Colosseum could help to cement their positions.

The Colosseum was also partially a triumphal monument to Flavian conquests. Not only were spectators and participants drawn from around the empire, there was a literal triumphal arch above the grand entrance.⁴⁸ A large inscription which was most likely originally displayed over one of the main entrances, proclaimed that the Colosseum was dedicated by Vespasian and highlighted that it was built with profits from the Judean campaign as an extension of his triumph.⁴⁹ Other projects, such as the restoration of an impressive Augustan sundial, suggest a desire to highlight the Flavians' connection to the early Julio-Claudians with the overall aim of presenting an image of stability and continuity.⁵⁰ The commission of this restoration and respect for Roman tradition also served to distance the Flavians from the more recent perceived excesses of Nero's reign. Highlighting this connection to Augustus invites a comparison between

⁴⁶ This temple is depicted on coins: *RIC* II² 323; Gallia 2016, 151.

⁴⁷ Fredrick 2003, 200.

⁴⁸ See coin *RIC* 11² 210 no.184; Martial *De Spectaculis*, 3.5-22; Coleman 2006, 38-41; Welch 2007, 136-41; Gallia 2016, 154.

⁴⁹ *CIL* 6.40454a = *AE* 1995, 111b. The brass letters which made up this inscription have been lost but the message had been reconstructed based on the holes left from where they were affixed: Coleman 2006, lxx & Claridge 2010, 315.

⁵⁰ Gallia 2016, 160 & 162.

Augustus' claims of restoring the Republic while actually forging the principate, and Vespasian's assertion of restoring the principate while ushering in a new phase in the history of Imperial Rome.⁵¹ In both the case of Augustus and Vespasian, it is clear that construction could be employed to help curate the narrative of a leader's regime. Although the finished projects tend to be remembered under the names of the political leaders who commissioned them, skilled architects and engineers would have been needed to achieve this success.

The first permanent amphitheatres were found in army installations and often temporary encampments erected some form of arena. The thematic tie between gladiatorial combat and actual military feats of arms was evident to the Romans and the army was an avid audience for the games.⁵² As Vespasian came to power through military prowess, an amphitheatre which would have greatly appealed to the soldiery who supported him, while evoking his own military skills, would have been a natural choice for the Flavians to show their arrival in the ultimate position of power.⁵³

The Colosseum itself was built on the grounds of Nero's infamous Golden House and large elements of Nero's grandiose designs were incorporated by the Flavian engineers. Even a 30 metre tall bronze statue of Nero was repurposed. Reportedly sculptors altered its features to look less like Nero, perhaps instead invoking Sol Invictus and the unconquerable spirit of Rome.⁵⁴ The gardens and lake of the Golden House had probably been accessible to the public. However, the Colosseum was designed to be seen as beneficial to the people of Rome and a meaningful departure from Nero's degenerate ways. The message of the project was that the new

⁵¹ Gunderson 2003, 642-3 & Suetonius *Vesp.*, 9.1.

⁵² Welch 2007.

⁵³ Bumgardner 2000, 4.

⁵⁴ Pliny *Nat. His.*, 34.45; Gallia 2016, 149.

Flavian amphitheatre, a lavish and extravagant exposition of the wealth of the empire, not unlike the Golden House, celebrated the Roman people instead of one man's hubris.⁵⁵

The massive investment of both time and resources into the amphitheatre are evidence for the importance the Flavians placed on it as a tool and symbol of their reign.⁵⁶ This investment offered the imperial stamp of approval on the games, always favoured by the masses but now transformed into high culture.⁵⁷ The very design of the amphitheatre placed the emperor at the physical centre of proceedings as both the one presenting the games and the one to whom the spectacle was presented. The emperor saw and was seen by the people, projecting an image of power and through this projection building power.⁵⁸ While Vespasian was the first to engage the engineers who built the Colosseum, it was in fact Titus who presided over the inaugural games and likely reaped public favour and acclaim from this undertaking. Evidence of continued construction, maintenance and repair suggest that Domitian, even though his reign ended in ignominy, invested in the Colosseum and tried to use this feat of engineering to placate his people. A grand project such as the Colosseum would take considerable time and be dependent on a complex system of logistical delivery which was beyond the disposal of any one individual even if they were the emperor of Rome.⁵⁹ Architects, engineers, contractors and many others had important roles to play in order to make the Flavian Amphitheatre a reality; it is to these that we now turn our attention.

A key destination for visitors across the centuries, the ruins of the Colosseum are among the most prominent remains of the ancient capital still visible in Rome today. For much of the

⁵⁵ Pearson 1973, 83.; Gallia 2016, 154-5.

⁵⁶ Gunderson 2003, 656-7.

⁵⁷ Welch 2002; Gallia 2016, 155.

⁵⁸ Gunderson 2003, 639-640 & 641.

⁵⁹ Gallia 2016, 150.

20th Century, the story that an individual named Gaudentius was the architect of the Colosseum gained widespread acclaim with visitors.⁶⁰ This popularity is likely in part due to the sensational claim that Gaudentius later embraced Christianity and was martyred in his own arena. While it is clear to see why the deep irony of the architect as a victim of his own creation was an emotive success with tourists, this tale is not substantiated by any further evidence. The original translation has failed to live up to closer inspection and while Gaudentius may have embraced Christianity he did not design or build the Colosseum.⁶¹ However, epigraphical and visual evidence does allow us to identify a more likely candidate, if not for the designer, but at the very least for a prominent figure in the construction of the Colosseum.

Quintus Haterius Tychicus built an impressive family tomb on the Via Labicana on the outskirts of Rome and through inscription and visual evidence we are able to conclude that he was likely part of the construction of the Colosseum.⁶² The Haterii were not from an elite background and their names suggest that they were formerly enslaved. They have not left a record of any significant contribution to the military or political life of Rome but through their work as building contractors they certainly left an enduring mark on the landscape of the city itself. Tychicus was a prominent building contractor in the time of the Flavians and the decorations of the tomb suggest the Colosseum was among his projects.

Discovered by chance and excavated in 1848, with a brief second excavation in 1970, the tomb of the Haterii featured a wealth of sculptural decorations, including a full body portrait of a

⁶⁰ This theory was based on an inscription from the catacombs of Sta Martina interpreted in the 18th century by Giovanni Marangoni: Hopkins & Beard 2011, 2 & 144.

⁶¹ Pearson 1973, 75-6.

⁶² Although the cognomen is not visible on the tomb itself Coarelli convincingly argues that the Haterii of this tomb belong to the same family as the *redemptor* Quintus Haterius Tychicus named in the now lost inscription *CIL* 6.607: Coarelli 1979, 266-8. Tomb reliefs arachne.dainst.org/entity/1081229 & arachne.dainst.org/entity/1081227

priestess and an abundance of floral decoration.⁶³ The central figure commemorated in the tomb, as commissioned by Haterius, is the matriarch Hateria. References to her children who predeceased her are also featured in the tomb decoration. Haterius, in line with others of his social level, chose to be depicted in a portrait bust as an old man, warts and all.⁶⁴ This choice suggests that Haterius wanted to emphasize his knowledge and experience - not only were these characteristics long respected at Rome, but also further reinforce the narrative that he had the qualities of a master engineer. More importantly, among the rich decorations of the tomb is a large relief depicting a series of buildings including temples, a triumphal arch and the Colosseum. This relief as seen below is usually understood to be something of a catalogue of the Haterii's building projects.⁶⁵

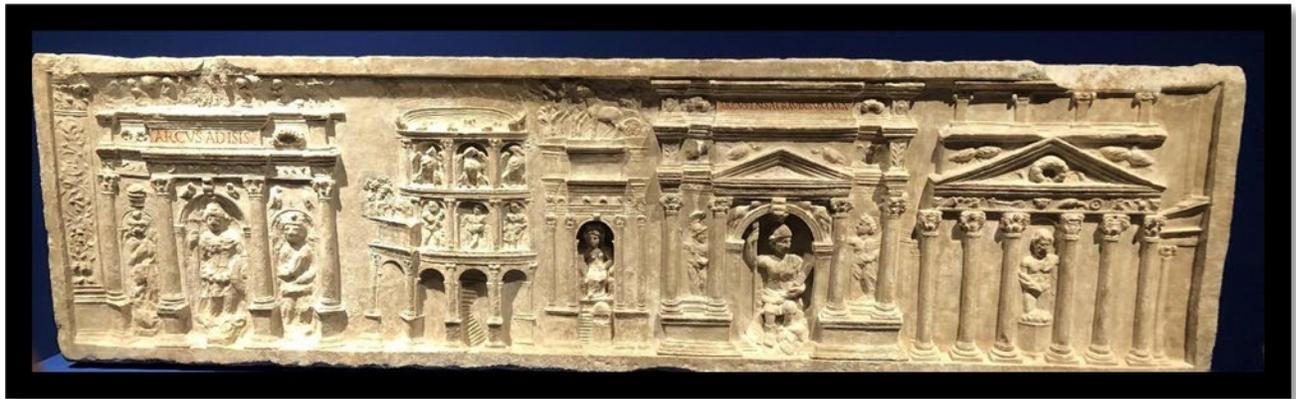


Figure 7 Building relief from the Tomb of the Haterii

There is ample precedent for professional representation in tombs. Perhaps the most famous example is the tomb of Eurysaces located in Rome which incorporates huge bread ovens

⁶³ Leach 2006 highlights a narrative of the tomb which focusses on the spiritual life of the family and the hope of an afterlife.

⁶⁴ Meyer 2012, 131. With caution of drawing too strict divisions of social status based on portraiture see Petersen 2006 and Clarke 2006.

⁶⁵ Sinn and Freyberger 1996, 71. Leach 2006 offers a different interpretation suggesting that this could have been a depiction of the major monuments the funeral procession would have passed on its way out of the city to the tomb.

into its design. These motifs highlight not only Eurysaces' profession as a baker but also his wish to immortalize his devotion to his trade.⁶⁶ Not only did the high quality of the carvings in the tomb on the Via Labicana allow the Haterii to display their wealth, their choice of subject was an opportunity to showcase their success in business. The relief of the buildings was likely repurposed from a different setting as the reverse face, which would have been to the wall in the tomb, is also finished and shaped. Many of the other decorative elements also appear to have been altered from their original purpose before being included in the Haterii tomb.⁶⁷ This in itself could also be a hint at the family's profession. As notable construction contractors, perhaps they had various elements prepared for, but not used in, other commissions at their disposal. This use of material initially destined for other projects may even be interpreted as use of spolia from the family's work. We once again see a possible parallel to the tomb of Eurysaces, where kneading machines were repurposed as exterior adornment for the tomb.⁶⁸ If the Haterii's building relief was placed on the exterior of their tomb, where it would be seen by passers-by, this would indicate the family's wish to display their connection to the building industry and their enduring pride in their work.⁶⁹ Nonetheless, due to the piecemeal nature of the rediscovery of the tomb and its poor state of preservation, it is not possible to be sure where the particular decorative elements were placed originally. Nevertheless, from the building relief we can infer that the Haterii were wealthy, involved in the construction industry and could have taken part in a large-scale architecture project such as the Colosseum.

⁶⁶ For images of the Tomb of the Baker: Arachne ID 5787 and analysis: Petersen 2006, 84-122. Other examples of depictions of work: Clarke 2003, 125-129 & Sapirstein 2020, 52-56.

⁶⁷ Sinn & Freyberger 1996.

⁶⁸ On Spolia and tombs see Petersen 2006, 112.

⁶⁹ Reitz-Joosse 2022, 68. Meyer concludes that it was actually on the outside of the tomb: Meyer 2012, 131. while Leach 2006 preferred an interior placement. Ultimately the evidence is inconclusive.



Figure 8 Tomb-Crane relief from the Tomb of the Haterii

Even more striking is the famous tomb-crane relief which further supports the Haterii's connection to the construction industry. It depicts a huge crane towering beside a grand multi-story tomb.⁷⁰ This type of crane depiction is unusual, the only known comparable example was a relief found in the ruins of a theatre in Capua, showing a much smaller crane with two figures treading the wheel to lift a column. The Capuan crane appears above the dedicatory inscription made by Lucceius Peculiaris, a *redemptor*, contractor.⁷¹ The fact that the Capuan crane relief was commissioned by a *redemptor* supports the conclusion that the tomb on the Via Labicana is that of the *redemptor* Quintus Haterius Tychicus named in *CIL* 6.607 although the cognomen does not appear in the tomb itself. The center of the tomb-crane relief shows an elaborate multi

⁷⁰ Tomb-Crane Relief: the Tomb of the Haterii Museo Gregoriano Profano Cat. 9997.

⁷¹ *CIL* 10.3821 see Zimmer 1982, no 82 and De Nuccio and Ungaro 2002, 515–17. For other *redemptores* see Anderson 1997, 103-112. A different type of crane, without a treadwheel, has recently been excavated in the synagogue at Horvat Huqoq and is likely from a later date, see Magness et al. 2018, 115-117.

story tomb richly decorated and replete with mythological figures, culminating with the matriarch Hateria reclining on a couch in what seems to be the afterlife. The tomb in the relief is even grander than the one that the Haterii actually constructed. In the tomb relief, deceased children play among statues of mythical heroes and floral garlands. On the left side, the massive crane stands to the same height as the already completed tomb. In sharp relief to the illusory depictions of the afterlife, the crane closely matches the description of lifting machines given by Vitruvius in book ten of *De Architectura*. In fact, the Haterii crane depiction is so detailed that it served as the basis for a fully functional large-scale reconstruction built in Germany by experimental archaeologists in the 1980's.⁷² Furthering Haterius' candidacy as an eminent Roman builder, the Haterii crane relief depicts a machine that was powered by at least five people walking in an immense treadmill. Indeed possession of such a specialist and massive piece of equipment as the crane would have been a key asset to the Haterii as construction contractors.⁷³ This crane could have been invaluable in major construction projects such as that of the Colosseum.

The reason for the inclusion of the crane has been debated since the tomb's discovery. It is clear that the depicted tomb is fully constructed, yet the crane is in active use, there are the five figures within the wheel and two perched aloft, near the scene of reclining Hateria. Sinn and Freyberger, in their detailed assessment of the contents of the tomb of the Haterii, have asserted that there is no direct connection between the construction of the depicted tomb and the crane, but rather that the crane was included for its symbolic virtue.⁷⁴ Symbolic interpretations have included a reference to upward social mobility, virility and as a representation of a ceremony to

⁷² Vitruvius *De Arch.* 10.2.5–7; Meighörner-Schardt & Blumenthal 1989.

⁷³ DeLaine 2006, 247-8.

⁷⁴ Sinn and Freyberger 1996, 56.

commemorate or facilitate Hateria's transition to the afterlife.⁷⁵ More prosaically, Ulrich suggests that the crane is incidental to the overall decorative themes of the tomb, included simply to show the family's connection to the building industry and their wealth.⁷⁶ However, yet another theory argues that the ceremony taking place at the top of the crane is related to "topping out", a celebration for the completion of the construction project.⁷⁷ The crane could well have fulfilled all of these symbolic purposes and more, however since the desire for loved ones to successfully transition to the afterlife was surely common but the depiction of a crane is so unusual, it must suggest the family's connection to the building industry was an important consideration in its inclusion.

While the crane has much potential symbolic significance it is also a source of more practical information about the nature of Roman building sites. The spokes on the lifting wheel seem to be held in place by heavy pegs, which means that individual components could be replaced if needed and that the crane could have been disassembled to allow it to be moved from place to place, both between construction sites and through narrow passages as construction advanced.⁷⁸ The ability to repair, reposition and remove this type of crane would have made it ideal for projects, such as the Colosseum, carried out on a huge scale and with tight timelines. Landels suggests that the baskets seen at the top of the crane could have been used to protect the wooden jib or even as a buffer to prevent damage to the already completed portions of the building.⁷⁹ It could even be that the foliage atop the crane served as a buffer allowing the

⁷⁵ Jensen 1978, 180-5 for a Bacchic interpretation drawing on Livy's description of Bacchic ritual Livy, 39.13.13. Ambrosetti 1960, 1112-1114 suggests that the men are in the process of releasing birds to symbolise a transition to a new life.

⁷⁶ Ulrich 2007.

⁷⁷ Adam 1984; Reitz-Joosse 2022, 49.

⁷⁸ Ulrich 2007, 211-12.

⁷⁹ Landels 1978, 93.

operators to judge the proximity to the finished building. Landels also considers the men “up aloft” noting that they are barefoot, a sensible way to proceed in rigging. He further notes that one of the men is wearing a leather cap, positing that this could be a precursor to a hard hat. These inclusions of best practices further suggest that this relief aims to depict a realistic building site. Landels draws attention to what extreme skill would be needed to operate this type of equipment, as it would require both fine adjustments and brute force to avoid causing serious accidents or significant damage. The multifaceted nature of the relief is exemplified by its pursuit of both the ethereal through the depiction of an ascent to the afterlife and the practical in its illustration of a functioning crane. The images from the tomb of the Haterii evoke an intermingling of worlds, suggesting an understanding of the spiritual and physical in a way echoing the collaboration of “doer” and “talker”.

The scale and detail of the tomb of the Haterii is testament to how much wealth could be accumulated through involvement in grand construction projects at Rome. The abundant clues to the Haterii’s connection to the building trade demonstrate how a profession could be such an integral part of a family’s identity that there they were eager to commemorate it in the most lasting ways possible. Though likely of humble origins they were able to amass a great deal of wealth which they displayed in their family tomb. As a *redemptor* Haterius would have needed to manage his resources, including machines such as the crane depicted in his tomb and the skilled and less skilled workers needed to operate it. We can confidently conclude that the Haterii were among those responsible for building the Colosseum and apart from the Flavian emperors, Quintus Haterius Tychicus’ name is the only one which has reached us through history.

Of course the Colosseum could never have been built without a substantial labour force. Despite their critical role we know very little about who actually made up these building crews. As they were not subjects of interest for the mostly elite writers on whom we depend for literary sources, a broader consideration of conditions within the building industry at Rome is needed to begin to understand what the work force might have looked like. An important initial consideration is that the work force required to build the Colosseum must have been a mix of highly skilled, low skilled and unskilled workers. In her extensive study on the baths of Caracalla, DeLaine estimated that over 70% of the individual workers needed on the Baths of Caracalla would have been skilled while only approximately a quarter could have been low- or un-skilled.⁸⁰ This challenges the idea often found in the popular imagination of large unskilled slave crews erecting monuments in the ancient world. Moreover, it is clear that the proportion of skilled to unskilled labour needed would vary over the course of a project. At some stages, such as early on in the project when raw materials would need to be transported, the labour force would have been dominated by unskilled or low skilled workers, while the later finishes would necessitate a higher proportion of skilled craftsmen.⁸¹ On the site of the Colosseum we must then imagine a dynamic workforce composed of both skilled and unskilled labourers changing over the course of the project and ultimately responsible for the physical construction.

It may be tempting to assume that the simplest solution to the need for a large-scale unskilled workforce would be to simply rely on slave labour of which there was no shortage at Rome, and in the past this assumption had been widely accepted. Plutarch relates that Crassus

⁸⁰ These estimates are based on labour productivity tables from the 19th century modified to better reflect ancient conditions: DeLaine 1997, 196–197.

⁸¹ DeLaine 1997, 196–197 & 201–202; for consideration on the proportion of skilled to non-skilled labour in military construction: Shirley 2001, 141.

augmented his fortune by buying cut-rate property and then renovating it with gangs of enslaved workers skilled in architecture and construction. It should be noted that at least part of Plutarch's motivation for including this story is to demonstrate that Crassus was unique and thus his methods should not be taken as a general case.⁸² Conversely, much of the building work at Rome, particularly relating to construction in concrete, which was a major element in the construction of the Colosseum, was both unskilled and seasonal. As Brunt has demonstrated, it would have been cost prohibitive to keep enslaved labourers year-round when compared to hiring day wage workers.⁸³ And perhaps counter intuitively to modern sensibilities, skilled workers were more likely to have been enslaved than the unskilled. As seen at the Baths of Trajan in Rome, at least some Roman builders generated records of daily progress by marking the date on the structures as work advanced.⁸⁴ This tracking system could well have been used to generate a sort of progress report and even payroll. In the case of the construction of the arena at Tibur, north of Rome, the construction was in part completed through the donation of 200 *operae* or man-days of labour by M. Tullius Rufus.⁸⁵ This demonstrates that it was not unusual for a workforce to be paid. The existence of the specific term *operae* to connote a day's wages suggests that there was a practical mechanism to pay a labourer for his actual contribution on a project. Especially considering the seasonality of construction, it would have been more

⁸² Futrell 2000, 144; Plutarch *Cras.*, 2.

⁸³ Brunt 1980. The case is different for maintaining existing infrastructure such as aqueducts and Frontinus reports that there was a full-time fixed number of slaves which different contractors used to keep up the city's water supply: Front. *De Aq.*, 2.96 Further discussion of the role of slave labour in maintenance as opposed to construction: see Bruun 1991, esp. pg. 190-195. See Epstein 2008 for a similar case in Classical Athens.

⁸⁴ Volpe 2002; Volpe and Rossi 2012.

⁸⁵ *CIL* 14.4259 Huius pater ad amphitheatrum dedicationem HS CC(milia) n(ummum) / et operas n(umero) CC // M(arco) Tullio / M(arci) filio Cam(ilia) / Rufo filio / M(arci) Tulli Blaesi / Tullia / Beronice [ma]ter / et Tullia / Blaesilla soror / l(ocus) d(atus) s(enatus) c(onsulto) There had been a unit measurement of labour input in days since the Republic (*operae*): see Harris 2007, 528.

economical for project leaders to avoid the financial burden of maintaining a large enslaved workforce.

Engineers could have been free or enslaved and as far we can judge from the sources there is minimal distinction drawn between the two. For example, of the six architects identified in Cicero's writings one, Vitellius Chrysippus, is a freedman, Corvus is a slave and the other four's status remains unspecified.⁸⁶ The *columbarium* of the Statilii Tauri, a wealthy family with attachments to public construction at Rome, included several slave builders, as well as freedmen who were probably skilled ex-slaves retained in the family's economic circle.⁸⁷ Despite the wide variety of socioeconomic factors that would have defined these individuals' roles on a personal level we see them defined by the same title.

Beyond the economic consideration, there could also have been political reasoning behind the choice of labour force used on a project. As we have seen above, the Colosseum was in part meant to be a celebration of the Flavians' success. It is possible that as an extension of their role in Vespasian's triumph, some prisoners from the Judean campaigns may have been employed as forced labour.⁸⁸ However, Cassius Dio and Suetonius recount that Vespasian rejected the use of a labour-saving device for hauling heavy construction loads as it would have prevented him from feeding his lesser subjects (*plebicula*).⁸⁹ Building projects could be a way to curry favour with the masses. Not only would they benefit from the completed project, but also

⁸⁶ Freedman Vitellius Chrysippus: *Att.*, 2.4.7; 13.29.1; 14.9.1; *Fam.*, 7.14.1; Slave Corvus: *Att.*, 14.3.1; Unknown Clautius: *Att.*, 12.18.1; 12.36.2; Unknown Nimsus *Q.fr.*, 2.2.2; Rufius *Fam.*, 7.20.1; Vitellius Cyrus *Att.*, 2.3.2; *Q.fr.*, 2.2.2; *Mil.*, 46; See further Bernard 2017, 85.

⁸⁷ Martin 1989, 64; Anderson 1997 78; Bernard 2017, 65.

⁸⁸ Pearson 1973, 85; Futrell 2000, 115. Those sentenced to works (*damnatio in metallum*) as punishment for various crimes worked in imperial mines and quarries so could have also contributed to the construction of the colosseum, see Bernard 2017, 67-68 & Hirt 2010.

⁸⁹ Suetonius *Vesp.* 18 and Dio 66.10.2, see Brunt, 1989; Futrell 2000, 146-7 & Lo Cascio 2007, 632-633. For a more sceptical outlook on imperial building projects as a "new deal" style public support programme: Bernard 2017, 66.

the construction itself was undertaken by the lower part of society who would be paid for their labour. This double benefit would be lost if the Colosseum was built exclusively by slave labour. The Colosseum was a key political tool for the Flavians and they would also have wanted to benefit from the construction by including some citizens in its labour force. In order for Rome to maintain its large population given the high mortality rate of urban dwellers, it has long been agreed that a steady stream of migration to the city would have been needed. Bernard convincingly argues that the grain dole in the city was unlikely to have been a sufficient draw for migrants; rather an important factor was the hope of wage work, though this may often have proven to be a disappointed hope.⁹⁰ Through monumental construction projects such as the Colosseum, the topography of the city of Rome was altered. As sources of wages drawing immigration, the construction industry also contributed to shaping the population of the city. The Colosseum would have had multifaceted influence on the lives of the individuals in its construction crews. Construction may have drawn them to the city as newcomers, would have provided paid employment and ultimately they would have been a part of the target audience for the games and impacted by their sociopolitical power.

No one individual was responsible for the construction of the Colosseum, rather it was a logistical masterpiece with inputs from the highest elites through the burgeoning wealthy tradesmen and contractors, to unskilled labourers. The Flavian Emperors, the contractors and the crews were bound through intersecting objectives of personal and societal betterment. The builders of the Colosseum displayed immense project, labour and resource management skills to

⁹⁰ Bernard 2016, on grain doles as a driver for migration. The situation in Rome for labour availability, as with so much else, would have been different than for most smaller cities, which would doubtless have had to draw *ad hoc* on whatever labour resources were available, likely including irregular waged labour from those whose main life support was agriculture. See Erdkamp 1999.

balance the complex geographical, cultural and political implications of their undertaking. They functioned much like city planners and civil engineers of today and embody the prowess of Roman engineering. The tomb of the *redemptor*, Quintus Haterius Tychicus, not only identifies him as one of the contractors responsible for the Colosseum but also celebrates the Haterii's pride in their professional success and desire to be immortalised as figures in the construction industry. From the case study of the Colosseum, it is clear that Roman engineers in peacetime would have needed to work within dynamic teams and exercise strong project management skills in order to succeed. We see a particular focus on financial constraints and need for profitability in contrast to their work within a military context. This work was a benefit to the *res publica* and continues to shape the landscape and people of Rome today.

Water Management: Roman outside the city of Rome

The next case study takes us away from Rome to explore engineering projects undertaken in peace time in the provinces. As a remarkably well preserved site with extensive interest from archaeologists, Aphrodisias offers a wide variety of evidence. This concentration of sources is amplified by the fact that a rich epigraphic habit existed amongst its inhabitants. However, it should be noted that beyond its extensive examination Aphrodisias should not be considered particularly unique and discovery there may reflect behaviour across the provinces. The existence of such examples outside of the capital furthers the position that engineers and documentation of their engineering feats could serve as a vector for *Romanitas*.

Beyond amphitheatres, the other great infrastructure hallmark of Roman society was an abundant supply of water in city centres. The image of the arched aqueducts crossing the valleys are often indelibly linked with the idea of Roman engineering. The Romans themselves were

very proud of the utility of their engineering works. Frontinus famously stated “With such an array of indispensable structures carrying so many waters, compare, if you will, the idle Pyramids or the useless, though famous, works of the Greeks!”⁹¹ While Cicero wrote in *De Officiis*: “expenses are again better justified when they are made for walls, docks, harbours, aqueducts, and all those works, which are of use for the community.”⁹² The emphasis Cicero places on that construction projects that are “of use” being more worthwhile is seen again when Pliny the Elder called the *Cloaca Maxima* “the most noteworthy achievement of all,” in his description of Rome.⁹³ This sentiment was later echoed by Strabo who reported that while Romans honoured the beauty of their cities, they were most concerned with practical matters including infrastructure as well as waste and water management. He writes of Rome:

So much, then, for the blessings with which nature supplies the city; but the Romans have added still others, which are the result of their foresight; [...] And water is brought into the city through the aqueducts in such quantities that veritable rivers flow through the city and the sewers; and almost every house has cisterns, and service-pipes, and copious fountains.⁹⁴

Indeed for a Roman city the consistent supply of abundant water was not only a practical matter but rather an important status symbol and requisite to attain the highest levels of prestige. Small settlements could petition to be considered cities based on the quality of their water infrastructure.⁹⁵ By this measure, engineers were of critical importance to cities in keeping up their status. The engineers were contributing to the good of the *res publica* both practically by

⁹¹ Frontinus *De Aq.* 1.16 trans. Loeb.

⁹² Cicero *Off.* 2.60

⁹³ *opus omnium dictu maximum* Pliny the elder 36.104

⁹⁴ Strabo, 5.3.8 trans. Loeb; *CIL* 3.352.

⁹⁵ Kerschbaum 2022, 169. More on the balance between practicality and luxury in water supply: Wilson 2008, 308-309. For prestige attached to running water for individuals: Wilson 1995. For a strong emphasis on the status component of aqueducts: Levaeu 1987. For the water supply in Africa as a control mechanism: Levaeu & Paillet 1977; Shaw 1984. On the hierarchies of cities: Corbier 1991, 221-224.

ensuring a good water supply and by protecting their city's reputation among their neighbours and the wider Roman world. Let us now look at the example of Aphrodisias.

An abundant supply of water was needed to fully partake in the Roman urban lifestyle and it was an important status symbol.⁹⁶ It is of little surprise that the city of Aphrodisias, in modern day Turkey, was keen to build aqueducts to secure its own water supply. In the extensive excavations of the remarkably preserved city, remains of three aqueducts have been found from the Roman period. They carry water from the Isiklar river to the north seven kilometres away via a tunnel, the Seki springs approximately eight and half kilometres to the east and the Timeles (Yenider Cayi) river over twenty five kilometres to the east.⁹⁷ The Timeles aqueduct is the most impressive aqueduct at Aphrodisias, bringing water from the neighbouring valley of the Yenidere Çayı into the city. As described by Commito & Rojas, "it was a major piece of Roman engineering, more than 25km long, running in tunnels up to 50m deep, and crossing at least a dozen bridges, which ranged in height from 5m to nearly 30m."⁹⁸ This achievement was commemorated in coins minted in the city in the second century CE which depict a reclining water deity labelled "Timeles."⁹⁹ The inclusion of the eponymous deity on Aphrodisian coinage suggests that this newly established connection was a point of pride for the people of the city. The circulation of the currency would allow this engineering feat to be known through the Roman world. This river would not have reached Aphrodisias without the intervention of the engineers.

⁹⁶ It should be noted that Roman engineers did not invent water management, and their knowledge and techniques built on foundations laid by others but the emphasis on utility and centrality of abundant water was a signifier of *Romanitas*. More on ancient water management across cultures see Crouch 1993, Angelakis et al. 2012 Polizzi et al. 2022.

⁹⁷ Wilson 2016a, 101.

⁹⁸ Commito & Rojas 2012, 239.

⁹⁹ Commito & Rojas 2012, 241.



Figure 9 Early second century CE coin depicting a river god labelled Tivels

The placement of spoil heaps along the course of the aqueduct suggests that it was constructed by sinking multiple shafts and then digging connections between them. This technique allowed for more area to be worked on simultaneously while also offering more opportunities to accurately survey the project and ensure that the grade and orientation of digging was correct.¹⁰⁰ Without the guidance and expertise of engineers this could quickly have turned into a disaster of missed alignment and cost overruns.

Such enormous undertakings required a great deal of resources, both of expertise and capital to bring them to fruition. Assembling funds from different sources was usually needed for large capital projects in the provinces.¹⁰¹ In the case of the Hadrianic Baths likely constructed in conjunction with the Tivels aqueduct, Wilson has assembled a dossier of eleven groups of inscriptions that demonstrate the complex system of funding arrangements. These groupings

¹⁰⁰ Commito & Rojas 2012, 258.

¹⁰¹ Coleman 2008, 34.

included private gifts to the project at large, special tax exemptions granted by the emperor so funds could be directed to the project, and specific sponsorships of certain elements by private donors needed to bring this project to completion.¹⁰² Without these complex funding assemblages, grand infrastructure projects in the provinces would not have been possible. The diversity of sources suggests that beyond technical skills, project leaders would also have required complex balancing and negotiation skills to ensure the many stakeholders were satisfied and remained committed to the projects.

The first item in Wilson's dossier on the Hadrianic Baths is a large formal dedicatory inscription in Greek relating to the construction of baths and atrium by the people of Aphrodisias.¹⁰³ This inscription records that the people of Aphrodisias built the baths through "the favour of the Augusti, the *hyle* of the Eusebian Baths, and the property of Attalis, daughter of Menekrates."¹⁰⁴ In this one inscription, it is made clear that no one source of funds was sufficient to take on the desired project. The "favour of Augustus" in this case could refer to a relaxation of taxes, a redirection of funds usually used in service to the imperial cult, a direct contribution of imperial funds or some combination of the three. The "*hyle* of the Eusebian Baths" is equally enigmatic. *Hyle* can mean building materials; in which case, this would mean that the Eusebian baths had been demolished and their materials reused in the construction of the newer Hadrianic baths.¹⁰⁵ *Hyle* can also be translated as forest or timber.¹⁰⁶ If this were the case, it would mean that a woodland previously servicing the Eusebian baths was redirected for the purposes of construction material, fuel or even potentially sold to help finance the new

¹⁰² Wilson 2016b, 189. For more on earlier architectural benefactors at Aphrodisias see Tomas 2020.

¹⁰³ This marble *tabula ansata* was discovered in the East court of the Hadrianic Baths during the excavations in 1913 and rediscovered in 1985. The tablet measures 1.51m x 0.85m x .25m (*Iaph2007* 5.6=SEG 1995.1504).

¹⁰⁴ *Iaph2007* 5.6=SEG 1995.1504 Translation after Wilson and Reynolds.

¹⁰⁵ most often wood, LSJ sense III.

¹⁰⁶ LSJ sense I and II respectively.

project.¹⁰⁷ The *hyle* was a resource which the town council of Aphrodisias had at its disposal and chose to allocate to the new bath project, meaning that they had a direct financial stake in this project coming to a successful completion. The third source of funds outlined in the inscription is the “property of Attalis”. As the property was bequeathed to the city rather than to an heir it allowed project planners to disburse the funds as they saw fit to facilitate their endeavours. Unlike in military contexts where the army’s objectives alone needed to be considered, the many different sources of funds in peacetime meant that there were many different groups to whom the engineers and architects would have been beholden.

The complexity of the organisation and management of the Hadrianic Baths project is made clear by the rest of the inscription which names four leading citizens as responsible for the oversight of the works on the baths and the atrium: Titus Flavius Menandros, Lysimachos, Hypsikles and Aristokles. The high status of these men is evident through the listing of their lineage, in one case going back three generations in the inscription. The inscription also records that in some cases proxies stepped in to finish the project, suggesting that this was more than just an honorific post - some active involvement must have been required as demonstrated by the multigenerational involvement. In the case of T. F. Menandros, his son Flavius Attalos completed the task and for Lysimachos his brothers Attalos and Pytheas stepped in; the remaining members seem to have stayed with the project to completion. It is less clear what, if any, technical ability or knowledge would have been needed by those in charge. The fact that those called in to help complete the work on the bath and atrium were family members might suggest that standing in the community was the most important qualification. However, it is also worth bearing in mind that in antiquity trades were very often family affairs and if the overseers

¹⁰⁷ For more on the sense of *hyle* see Wilson 2016b, 182.

had been selected based on special skills or knowledge the most apt substitutes may well have come from their direct families.

The next three entries in Wilson's dossier are dedicatory inscriptions on basins found in various areas of the baths. These are fragmentary inscriptions which dedicate the basins on behalf of the donors variously to the gods and emperors. This shows that individual elements of grand scale projects could be funded by individuals. This "crowd source" approach to funding is further shown in entries 5 through 9. These detail different architectural elements dedicated by different individuals, including groupings of columns from the "room of the 20 columns", commemorating 14 columns given by brothers Nestor and Zenon to the *demos* from their own funds and 6 columns donated by Artemon again to the people from his own funds.¹⁰⁸ In addition, there are also some 16 dedications for columns in the East Court.¹⁰⁹ Perhaps most interestingly from a social point of view, 19 dedications for base, perhaps of caryatids, mostly by women who are often identified with important civic roles including high priestess, flower bearer and daughter of the city have also been found.¹¹⁰ Decorative elements such as door surrounds and marble entablatures are also recorded as being donated by specific individuals, in particular the marble entablature of the east court is dedicated to the emperor by a certain Aphrodite from the funds left to her in a bequest,¹¹¹ while Pereitas Attalos dedicated a door surround from his own funds.¹¹² The final two groups of inscriptions in Wilson's dossier pertain to the donation of different decorative statues. Engineers would have been needed to facilitate the building project

¹⁰⁸ *I Aph2007* 5.205.

¹⁰⁹ *I Aph2007* 5.2 See Wilson 2016b, 185.

¹¹⁰ See Wilson 2016b, 186-7.

¹¹¹ *I Aph2007* 5.5.

¹¹² *I Aph2007* 5.207 & 5.208.

and provide the framework on which the donors contributed to the ornamentation and proudly displayed their commitment to the *res publica*.

While most of this crowd-sourced funding may seem to be of a more aesthetic or decorative nature, the tenth item in the dossier is a statue base which records that a donor whose name has not been preserved set up a group of statues and “from their own funds and *the pipework and all the water supply for the baths.*”¹¹³ This clearly shows that very integral elements of a public construction project could be funded by private donors. Moreover, the donation of such a critical, wide sweeping and yet nonspecific element as “all the water supply” might have involved some level of technical knowledge too. Indeed Wilson has suggested that as the list of benefactors included the leading families of the city they also included the owners of the marble quarries known to have been in operation near the city at the time and that this might have influenced their choice of donation.¹¹⁴ If Wilson’s suggestion is correct then it follows reasonably that the now unknown donor may well have had vested interest and/or training in water management which led them to select the pipe work as their contribution to the city’s new baths. The skills of the technical “doers” were often overshadowed by the names of the political leaders who commissioned building projects. There is some irony that even in a case where so many donors’ inscriptions survive to document decorative contributions, the name of the individual who was key to the technical functioning of the bath and may well have been an engineer, is lost.

In some ancient cities collections of public documents carved in stone were displayed and in the theatre of Aphrodisias there is a large collection of inscriptions dealing with the city’s

¹¹³ Emphasis is mine: Smith 2007, B10 and Wilson 2016b, 188.

¹¹⁴ Wilson 2016b, 192.

relationship with Rome.¹¹⁵ Not far from the Hadrianic baths a large marble panel nearly one square metre was discovered broken in two in the roadway.¹¹⁶ Though it is not clear where this panel was originally displayed there are the remains of nail holes which would have allowed it to be displayed like those in the theatre at Aphrodisias. A collection of at least four letters received from Emperor Hadrian have been recorded on the panel. All of the letters appear to have been inscribed by the same person and as the connection between the content of the letter is not obvious, perhaps the unifying factor is Hadrian himself. Reynolds has speculated that the inscription could have been crafted in advance of an imperial visit.¹¹⁷ In one of the letters, regarding the Timeles aqueduct, Hadrian writes:

I concede that you should take money from the high priests instead of gladiatorial shows; not only do I concede but I praise your proposal. The supervisors who will be chosen by you for the water channel will be able to get advice and help on those matters on which they need them from my procurator Pompeius Severus, to whom I have written.¹¹⁸

The high priests' reaction to this new allocation of their funds has been the subject of considerable debate with which has yet to reach a final resolution.¹¹⁹ It is clear that although the emperor is supporting the project he is not doing so with any direct imperial funds. Moreover, although Hadrian offers the services of his procurator, the supervisors are to be chosen by the "council and people of Aphrodisias" to whom the letter is addressed. This gives us clear insight into how a major engineering project in the provinces might have been handled. While the emperor's approval was sought, the local authorities might have needed to look for novel or creative solutions to actually raise these funds. From the letters it seems clear that rather than

¹¹⁵ For more on the inscriptions in the theatre: Cormack 1954; Reynolds 1982; *I Aph2007* 12.1111. For more on the Archive Wall at Aphrodisias see Graham 2021.

¹¹⁶ Reynolds 2000, 5.

¹¹⁷ Reynolds 2000.

¹¹⁸ Letter 3 (II. 27-41) trans. Reynolds 2000, 17.

¹¹⁹ Reynolds 2000; Carter 2003, 85; Coleman 2008, 33; Wilson 2016b, 189.

implementing a grand empire-wide infrastructure plan, the Emperor is responding to a specific request from the people of the Aphrodisias.¹²⁰ On the ground this would have meant that local expertise would have been needed and that the project management would likely have fallen to local engineers. This is something quite different from the Emperor's direct expenditure on projects in the capital or even projects undertaken by the army.

Conclusions

There was a strong overlap not only between the skills needed for Roman military engineers and engineers in peacetime, but also in the personnel themselves. Many of the most famous Roman engineers including Vitruvius and Apollodorus of Damascus worked on both civil projects and with the military. However certain qualities were especially needed for an engineer to succeed in peace. In addition to technical knowledge, peacetime engineers would need even more acute project management skills and business acumen to succeed. The communities of practice that were responsible for the completion of engineering works were complex and diverse ecosystems made up of members from many different social groups. Engineers, those connected to both the everyday practice of engineering and aware of its broader social aims and implications would have needed to negotiate relationships with many different stakeholders all the while marshalling limited resources and ensuring that sufficient technical expertise (whether their own or that of enslaved or hired practitioners) was brought to bear on projects whose scale and utility were the source of considerable pride in the collective Roman imagination.

¹²⁰ For more on the scale of imperial planning: Kerschbaum 2022.

Throughout the Roman world most major building took place through a flexible system of contracts, *locatio conductio*, in which one party promised to remunerate the other for services rendered. In this system, a contractor would need to have the business wherewithal to offer a price that was attractive to proprietors and the technical expertise to deliver the agreed project or face both reputational damage and loss of financial stability. For those who were able to strike the correct balance between affordability and quality, like Quintus Haterius Tychicus, it was possible to rise socially and amass substantial wealth. The legal system shows evidence that it was designed in such a way as to protect both proprietors and contractors, suggesting that the architects and engineers involved were of a relatively elevated educational and social status so as to be able to engage with the legal system.

Perhaps the most famous of all Roman engineering feats is the construction of the Colosseum. It was built through the combined efforts of the Flavian Emperors, contractors like Quintus Haterius Tychicus and diverse on-site crews. For the emperors, the construction, much like Caesar's use of military engineering, was an opportunity to advance their political agenda and curate the narrative of their reigns. This placed engineers in an important role as mediators between the Emperors' vision and reality. Among those responsible for bringing this project to fruition was Quintus Haterius Tychicus who through the tomb of the Haterii proclaimed not only his family's wealth but also their connection to the building industry and their desire to commemorate this connection in perpetuity. Haterius must have successfully managed resources including equipment such as the complex crane included in the decoration of the tomb of the Haterii, in order to achieve his success. Images of active ancient building sites are rare but when they do occur they tend to feature groups of workers whose importance is indicated through scale

and placement, with higher status individuals larger and in the centre.¹²¹ Building projects required the collaboration of many, which could develop into communities of practice. Should we ever discover an illustration of the construction of the Colosseum it would be fitting to find Haterius at its centre.

The labour market or lack thereof in antiquity has been greatly debated. For decades it had been assumed that market forces were not at work and the ancient economy simply relied on an abundance of readily available enslaved labour. However as the 20th century became the 21st this view has been successfully challenged. It is now clear that free urban workers would have expected to earn wages and skilled workers would have earned more than their unskilled counterparts.¹²² The political desirability of engaging with the masses along with seasonality making wage labour more economically advantageous than relying on enslaved unskilled labour contributed to the inclusion of free citizen workers in the construction crews. However, enslaved workers with expertise would also have formed a portion of the dynamic labour force employed in building the Colosseum. Monumental building projects may have helped to draw newcomers to the City of Rome in hope of work and members of the building crews could well have been among the spectators in the Colosseum upon its completion.

Water supply management was an important hallmark of Roman urban life and through the creation and maintenance of these systems engineers had a crucial role in keeping up the *res publica*. As seen in the case study of the City of Aphrodisias, in modern day Turkey, outside of Rome, though the emperor played a role, individual cities initiated and financed infrastructure projects. The projects were funded through a combination of local resources, imperial

¹²¹ Meredith 2023 for examples.

¹²² ‘Skilled’ wages included specialized labourers, not just engineers or foremen: see Bernard 2017, for an overview of the course of the debate with bibliography.

contributions and donations from individuals. Engineers working in peacetime in the provinces would have needed excellent project management skills to make the most of these limited resources and doubtless a fair degree of diplomacy and negotiation skills as well to ensure the satisfaction of such diverse stakeholders.

Bernard writes that “Roman architecture was relatively homogeneous across the Empire - it remained (and remains) recognizably Roman. No other pre-modern Western culture achieved similar homogeneity across such an extensive geographical space. Considering the diverse forms of labour on which Roman building depended, that fact becomes all the more impressive.”¹²³ The ability to successfully shape the natural world was an important aspect of *Romanitas*. As noted by Strabo and in keeping with the themes presented by Polybius, Roman engineers not only took advantage of the natural landscape but actively bent it to their will. Through their work Roman engineers were critical in shaping the Romans’ sense of self identity. But what happened if Roman engineers fell short of these expectations? We will explore Roman engineers in success and failure in the next chapter.

¹²³ Bernard 2017, 86.

Chapter 4: Success and Failure

*But the first essential is for you to send out a water-engineer or an architect to prevent another failure.*¹

We have seen how Roman engineering projects and the ability to shape and control the natural world could be an expression of *Romanitas*. We have also explored how individuals often showed pride in their work and chose to be identified as engineers. But what happened when projects did not go to plan? In particular, how might Roman engineers and those around them react in the face of devastating failure? Equally, how did Roman engineers define success? This chapter aims to consider success and failure from an inside perspective through the inscription of Nonius Datus and the writings of Vitruvius. I will then turn to examination of failures as seen by those outside the engineering profession through case studies including the theatre collapse at Fidenae, Nero's construction programme and Pliny's experiences as governor of Pontus and Bithynia. These cases differ in time and scope allowing us to address different kinds of failures and the responses to them. While expertise was an important factor, ultimately at Rome, whether success or failure, engineering was a reflection of the morality of the engineers, commissioners and even a projection of the state of Rome itself.

¹ Pliny *Ep.* 10.37: "Sed in primis necessarium est mitti a te vel aquilegem vel architectum, ne rursus eveniat quod accidit."

Vitruvius

Throughout his ten books on architecture, Vitruvius offers detailed instructions on how a wide range of architectural activities should be carried out for best results. He frequently offers explanations for why tasks should be completed in the manner he suggests, but he rarely presents concrete examples of what happens when the best practices he espouses are not followed. In Vitruvius' outlook engineers should be able to overcome obstacles and be conscious of their limitations by virtue of their training and professional commitment to the *res publica*. Failures are most likely the outcomes of projects undertaken by imposters rather than true Roman architects as defined by Vitruvius.

Vitruvius offers two examples of engineering failures from the city of Rome itself. He first relates the consequences of incorrectly managing moisture in wall construction. He directs readers to visit some of the tombs on the outskirts of the city where slippage between the facings and the core of the walls has caused visible damage.² Vitruvius explains that this is caused by the moisture in the mortar being absorbed by the rubble core of the wall, resulting in its disintegration. He goes on to provide a straightforward technical solution to this problem, using iron and lead clamps to secure the facings. The second example involves the incorrect overuse of vermilion as paint on exterior walls exposed to direct sunlight.³ Once again, Vitruvius offers a technical solution of how to prevent vermilion from fading in the sunlight; it must be covered with a protective layer of wax. However, Vitruvius also questions whether it was ever appropriate to use such expensive pigment so wantonly. Vitruvius suggests here there has been a failure not only in technical understanding but also a moral failure with both the architect and the

² Vitruvius *De Arch.*, 2.8.2-4.

³ Vitruvius *De Arch.*, 7.9.2-3.

proprietor failing to exercise proper levels of restraint and decorum.⁴ Throughout *De Architectura*, Vitruvius warns against expenditure on flashy projects overseen by ignorant and shallow architects, interpreting these as signs of decadence, decline and decay.⁵ In the instance of the tomb walls, Vitruvius views moisture management as a technical challenge which can be overcome with adequate training. However in the second case, it is evident that for Vitruvius engineering failures can have both technical and moral components.

Vitruvius draws on the Greek past to present engineering failures that were averted through conscientious decision making. During a siege of Rhodes, the architect Diognetus refused to accept the townspeople's request that he build a defensive siege engine equal to the one their attackers had wrought. Callias, a rival architect from Aradus, had previously dazzled the citizens of Rhodes with plans for a machine which, mounted on their city walls, would allow them to destroy attacking siege engines. Impressed by his promises, they revoked Diognetus' salary and assigned it to Callias instead. However, when the time came and the people of Rhodes found themselves besieged by King Demetrius, Callias could not deliver on his promises. The enormous 360,000-pound siege engine designed by Epimachus for King Demetrius was too great to be thwarted by Callias' proposed machine. The people of Rhodes returned to Diognetus and begged him to help. Initially he refused but eventually agreed to aid them, insisting however that it would be futile to attempt to rival an offensive siege engine with an equal defensive one. Instead, he instructed that the citizens must rely on proper strategy and defensive tactics. Diognetus ordered that a section of the city wall should be damaged to bait the attackers. He then directed the townspeople to soak the ground around this area. Drawn into Diognetus' trap, the

⁴ Nichols 2017, 163-179.

⁵ Nichols 2017, 144.

massive siege engine was soon bogged down and incapacitated.⁶ It would have been a failure for Diogenetus to simply do as the townspeople asked. As an architect it was his responsibility to bring his personal expertise to bear and foresee the practicalities of their request. Diogenetus was responsible for the functionality of the device, not just whether or not it was theoretically possible to create. Vitruvius summarizes this episode saying, “In defence therefore not only machines but, far more, is sound advice needed.”⁷ Vitruvius draws attention to Diogenetus active contribution to solving the problem.⁸ This statement could well be applied more broadly to Vitruvius’ ethos of engineering: not only is technical knowledge needed, strategy and discretion must also be applied.⁹

The episode above shows that for Vitruvius some engineering failures could be prevented by thinking through a project all the way to its completion. Callias should have considered the limitations of his device before accepting the appointment. Likewise, Epimachus should have foreseen the dangers of creating such a heavy piece of machinery. In both cases Vitruvius presents a foil to his ideal engineer, someone who fails to utilize their skills to the fullest to conceive of future challenges. In the opening to book two of *De Architectura*, Vitruvius presents another potential counterbalance to his ideal engineer. He explains how Macedonian architect, Dinocrates, presented an ambitious plan to Alexander the Great to transform a mountain into an enormous statue of a man with a full city in its hand.¹⁰ While Alexander admired the grand scale of the plan, he immediately rejected it as infeasible as it did not take into account the logistics of providing water for the inhabitants of the future city. For Vitruvius, there is failure when an

⁶ Vitruvius *De Arch.*, 10.16.3-8.

⁷ Vitruvius *De Arch.*, 10.16.8: “Ita in repugnatoriis rebus non tantum machinae, sed etiam maxime consilia sunt comparanda.” trans. Loeb modified.

⁸ See Cuomo 2010.

⁹ See chapter 1.

¹⁰ Vitruvius *De Arch.*, 2. pref. 1-4.

architect does not take into account every aspect of a project he proposes or accepts the undertaking of a project which is beyond his capability to deliver.¹¹ However Dinocrates is not without confidence and skill, *cogitationibus et sollertia*, and although Alexander ultimately rejects his mountain city plan he does see Dinocrates' virtues and ultimately asks him to lay out the City of Alexandria.¹² Another aspect of this anecdote, as raised by Oksanish, can help to shed light on Vitruvius' understanding of engineering failure. Dinocrates proposed his scheme for the purpose of gaining fame and Alexander's approval, rather than out of a desire to solve a problem or otherwise support society.¹³ This is deeply at odds with Vitruvius' model engineers' disregard for fame and dedication to the *res publica*. This episode further calls Dinocrates' morals into question as he attempted to use his physical allure to catch Alexander's attention. Clad in only a lion skin, to evoke Hercules, Dinocrates ambushed Alexander on the roadside to pitch the city project. Vitruvius rebuffs the use of physical attributes or pageantry relying instead on his *scientia* and writing to gain approval. There is an undertone here that Vitruvius will be depending on substance over artifice.¹⁴ Vitruvius reminds his audience that he is old and that time has taken a toll on his looks which, as Formisano has argued, makes a clear break with the semi mythical milieu of Alexander and a mountain sized statue. Vitruvius transports his reader back to the physical world where his skills and knowledge as an architect are highly valuable.¹⁵ In Vitruvius' eyes, an engineer flirts with failure when he places personal benefit at the centre of his projects rather than aiming to faithfully implant best practice, admirably represent the brotherhood of engineers and diligently advance the *res publica*.

¹¹ Courrént 2014, 59-61.

¹² For a more positive assessment of Dinocrates and the importance of "sollertia" for Vitruvius: König 2009.

¹³ Oksanish 2019, 153-155.

¹⁴ Fögen 2009, 138 highlights the dichotomy between Dinocrates and Vitruvius.

¹⁵ Formisano 2016.

Vitruvius holds that engineering projects need to be carried out with care taken for strength, utility and grace.¹⁶ In reading Vitruvius, it is clear that many potential engineering failures can be avoided by carefully paying attention to all details of the project at hand. Furthermore, paying attention to what is fit, proper and moral can also help to avoid embarrassing failures such as the case with the vermilion paint. For Vitruvius, engineering successes needed to be grounded in the real world and take into account the physical truths of the natural world. Ultimately, for Vitruvius engineering failures are the outcome of a lack of expertise: either an architect has not been consulted or self-proclaimed architects have taken on work that is beyond their ability out of pride or greed, in which case engineering failure can be representative of moral failing as well.

Nonius Datus

Engineering success was perceived as a manifestation of Roman virtuosity requiring both “doing” and “talking”. It is quite rare to get the story of an engineering project directly from the Roman engineers themselves but in the case of Nonius Datus we have one such example. His writing offers a particularly pertinent insight for this chapter as he recounts his work on a project that encountered both engineering successes and failures. Datus was only able to triumph by applying a combination of skills.

In the late 130s CE, an aqueduct was constructed to bring water some 25kms from the springs at Toudja to the town of Saldae in North Africa.¹⁷ As a feat of engineering this is remarkable in its own right, passing by way of a tunnel for several kilometers through the

¹⁶ Vitruvius *De Arc.*, 1.3.2.

¹⁷ Laporte 1996, 747 & Shaw 1997, 69 -70.

mountains to transport water to the town.¹⁸ However, it is the story of its construction recorded on an intriguing cippus, excavated from the ruins of the ancient town of Lambaesis several miles away from Saldae by the French military in the mid 19th century, which offers a window into how Roman engineers defined success. This cippus was an impressive hexagonal pillar of which sadly only three sides survive. Each of the surviving faces is topped with a goddess: *Patientia*, *Virtus* and *Spes* (Patience, Courage and Hope).¹⁹ The inscription tells how the surveyor and veteran of the Third Legion Augusta, Nonius Datus, after originally laying out the course to be tunnelled for the aqueduct was asked to return to resolve issues on the construction site. Two tunnels which had been dug for the project ran a greater length than the breadth of the mountain they were trying to cross yet did not connect. Nonius Datus relates that he was able to correct the directional deviations and motivate his crews through competition to ensure a speedy completion of the project. Datus controls the narrative of his success by authoring the cippus inscription. It reads:

So that **my labour** about this aqueduct at Saldae is seen more clearly, I have placed some letters below.²⁰

There is frequent use of first person underlined with the inclusion *ego* throughout the inscription. There is also a fair degree of technical language and specific detail relating to the topography and location of the tunnel:

It became clear that the passages had departed from a straight line, to the extent that the upper passage made for the right towards the south, and the lower passage similarly made for its right towards the north. Therefore the two parts, having left the straight line, were missing (each other). But the straight line had been marked out with stakes on top of the mountain from east to west. So that no mistake may be inflicted on the reader concerning

¹⁸ On ancient tunnelling Grewe 1996.

¹⁹ On the nature of *Patientia* Kaster 2002.

²⁰ *CIL* 8.2728 = *ILS* 5795: "ut lucidius **labor meus** circa duc(tum) hoc Saldense pareret, aliquas epistulas subieci" translation after Cuomo 2011 & Adams 2016.

the passages, let us understand as follows that which is designated ‘upper’ and that which is designated ‘lower’. The upper is the part where the tunnel receives the water, while the lower is that where it releases it.²¹

As Cuomo has noted, this level of detail would likely have had little meaning to the average Roman, particularly considering that the monument was put up nowhere near the tunnel it is describing.²² However, the cippus was erected in Lambaesis, a city, as we have seen in chapter 2, which had a lively community of *mensores*. Fellow engineers would have understood Nonius Datus’ descriptions and not only been impressed by his success but also appreciated his perseverance and ingenuity. A sense of connection with those who have sought to overcome the same challenges has persisted through the centuries, with modern hydraulic engineers such as Ortloff drawn to study ancient engineering through a sense of belonging to a shared brotherhood of engineers despite the time and distance which separates them from the practitioners who have gone before, including Nonius Datus.²³ Through the content of the inscription it is very clear that Nonius Datus was the architect not only of the aqueduct but also of the monument as well. Datus has curated the narrative of the project as we know it.

The section of the cippus which survives includes two letters from the officials in charge of the aqueduct project, in which the procurator asks for Nonius Datus to come to Saldae. Datus is asked for by name and identified as both a legionary veteran and a surveyor, *librator*.²⁴ Both these professions are noted with equal importance to his self identity. Datus proceeds to explain

²¹ *CIL* 8.2728 = *ILS* 5795: “apparuit fossuras a rigorem errasse, adeo ut superior fossura dextram petit ad meridiem uersus, inferior similiter dextram suam petit at septentrionem: duae ergo partes relicto rigore errabant. rigor autem depalatus erat supra montem ab orientem in occidentem. ne quis tamen legenti error fiat de fossuris, quot est scriptum ‘superior’ et ‘inferior’ sic intellegamus: superior est pars qua cuniculus aquam recipit, inferior qua emittit.” Trans Adam 2016.

²² Cuomo 2011.

²³ Ortloff 2009, 5-6.

²⁴ On the role of the arm in North Africa Fentress 1979 & Cherry 1998.

that when he arrived at Saldae, the procurator was on the verge of abandoning the tunnelling project because of the difficulties. The response of the procurator when faced with impending failure of the engineering project was to call for expert assistance. Datus travelled some distance, facing danger on the roads to manage the work. In the creation of the cippus there is a clear sense that Nonius Datus is taking proprietary pride in the completion of the project. The inscription is headed by three virtues: Patience, the ability to endure, Courage, the ability and skill to take on challenges, and Hope, the ability to conceive of success. As Cuomo has convincingly argued, Nonius Datus' success had a strong moral component and required a mingling of technical understanding and the ability to manage a project to completion.²⁵ One of the letters records that an official:

inspected the aqueduct, [which was] definitely unfinished, but [a thing] of great achievement, and that cannot be completed without the supervision of Nonius Datus, who dealt with it both diligently and loyally.²⁶

Once again Nonius Datus' accomplishments are couched in terms of virtues; it is not his technical ability which is remarked upon but his diligence (*diligentia*) and loyalty (*fidelitas*). Nonius is proud of his work and happy to highlight the difficulties that he has overcome to complete the project. He also chooses to prominently feature the virtues which would have been essential to his success in his monument. He shared this monument with people who would have understood the obstacles he faced to achieve his goals. For Roman engineers themselves successes were to be celebrated and commemorated, perhaps the more so if they were nearly failures. They chose to commemorate not only the outcomes to which they lent their technical knowledge but also their ability to manage personnel and the virtues to which they aspired.

²⁵ Cuomo 2011.

²⁶ *CIL* 8.2728 = *ILS* 5795: "aquae ductum bene inchoatum sed magni operis inspexi et quod absolui sine curam Noni Dati non potest, qui it simul diligenter et fideliter tractavit." trans. Cuomo 2011.

Fidenae

In Vitruvius and Nonius Datus we have the opportunity to hear engineers' insider perspectives on success. The outsiders' perspective can be examined through consideration of a known historical engineering failure recorded by ancient historians. At Fidenae, a city a short distance from Rome, in 27 CE during a heavily attended gladiator show the wooden amphitheatre collapsed, causing mass casualties. Recorded by Suetonius, Tacitus and briefly Cassius Dio, this event is amongst the best documented examples of an engineering failure in the Roman period.²⁷ Engineering disasters were of such importance and could so impact the Roman people that they required response through acts of government. This event illustrates that at Rome engineering failure could have severe political consequences not just for the offending engineers and those who oversaw their work, but even the emperor himself. Through this case we learn that physical disasters were often interpreted as failures of leadership and seen as disrespectful to the *res publica*.

Though the disaster at Fidenae may not be a prevalent episode in the cultural imagination of today, it represents one of the greatest losses of public life in peacetime in the Roman world. As for the scale of the disaster as understood by ancient Romans, Suetonius writes that when the mad emperor Caligula bemoaned the lack of disasters during his own reign, he equated the collapse at Fidenae with the Roman nightmare of Varus' loss of three legions in the Teutoburg Forest.²⁸ Suetonius reports that 20,000 people were killed while Tacitus places the casualties at 50,000.²⁹ For context, modern estimates for the capacity of the Colosseum, hailed at the time of

²⁷ Suetonius, *Tiberius* 40; Tacitus *Ann.*, 4.62-63; Cassius Dio 58.1.1a.

²⁸ Suetonius *Gaius*, 31.

²⁹ Suetonius *Tib.*, 40; Tacitus *Ann.*, 4.63; Dio does not give a figure.

its construction as an unprecedented engineering achievement, range from 50,000 to 80,000. The modern concept of maximum occupancy capacities likely did not have meaning for the Romans and certainly capacity does not seem to be a major concern for ancient authors.³⁰ Instead our sources turn their attention to the culpability of the emperor in failing to prevent such a disaster and ultimately hold him responsible.

The overall narrative of the disaster at Fidenae found in ancient historians' accounts is very similar, however each offers a particular nuance in how the story is told through which factors they choose to emphasize. Though at this time Fidenae was not an important town itself, it was located just 8 km outside of Rome.³¹ With the vast population of Rome close at hand and fewer public spectacles being produced at the time, crowds flocked to the ill-fated event. The structure failed, collapsing both inwardly and outwardly, resulting in mass casualties of spectators and others in close proximity. In addition to the information from the ancient historical accounts, all written decades after the event, recently, computer modelling has been applied to pictorial representations of wooden amphitheatres from this period with the details from the historic sources, in an attempt to better understand the mechanism of the collapse.

Tacitus provides a dramatic retelling of event, vividly painting the human impact of the collapse and its aftermath:

The amateurs of such amusements, debarred from their pleasures under the reign of Tiberius, poured to the place, men and women, old and young, the stream swollen because the town lay near. This increased the gravity of the catastrophe, as the unwieldy fabric was packed when it collapsed, breaking inward or sagging outward, and

³⁰ It is notoriously difficult to determine the capacity of ancient venues bearing in mind there could have been mainly tiered undivided bench seating with a small mixture of more premium seating: Dodge 2021, 421.

³¹ Salmon & Potter 2016.

precipitating and burying a vast crowd of human beings, intent on the spectacle or standing around.³²

He also describes how *Atilius*, a *libertinus*, had hastily erected the wooden amphitheatre failing to properly take into account the suitability of the ground or to properly affix the wooden superstructure.

A certain *Atilius*, of the freedman class, who had begun an amphitheatre at *Fidenae*, in order to give a gladiatorial show, failed both to lay the foundation in solid ground and to secure the fastenings of the wooden structure above; the reason being that he had embarked on the enterprise, not from a superabundance of wealth nor to court the favours of his townsmen, but with an eye to sordid gain.³³

Tacitus places the blame for the disaster on *Atilius*, the show's promotor, and condemns his greed. In *Suetonius'* telling, he does not specifically name a perpetrator but does recount the emperor's reaction to the disaster:

because of a disaster at *Fidenae*, where more than twenty thousand spectators had perished through the collapse of the amphitheatre during a gladiatorial show. So [*Tiberius*] crossed to the mainland and made himself accessible to all, the more willingly because he had given orders on leaving the city that no one was to disturb him, and during the whole trip had repulsed those who tried to approach him.³⁴

Dio goes farther, placing the emperor at the centre of his account and directly blaming *Tiberius* for the tragedy as he had failed to properly provide for the people's needs at *Rome*:

[*Tiberius*] caused the Romans a great deal of calamity, since he wasted the lives of men both in the public service and for his private whim. For example, he decided to banish the hunting spectacles from the city; and when in consequence some persons attempted to

³² Tacitus *Ann.*, 4.62: "adfluxere avidi talium, imperitante Tiberio procul voluptatibus habiti, virile ac muliebre secus, omnis aetas, ob propinquitatem loci effusius; unde gravior pestis fuit, conferta mole, dein convulsa, dum ruit intus aut in exteriora effunditur immensamque vim mortalium, spectaculo intentos aut qui circum adstabant, praecipuus trahit atque operit." trans. Loeb.

³³ Tacitus *Ann.*, 4.62: "Nam coepto apud *Fidenam* amphitheatro *Atilius* quidam libertini generis, quo spectaculum gladiatorum celebraret, neque fundamenta per solidum subdidit, neque firmis nexibus ligneam compagem superstruxit, ut qui non abundantia pecuniae nec municipali ambitione, sed in sordidam mercedem id negotium quaesivisset." trans. Loeb.

³⁴ *Suetonius Tiberius* 40: "qua apud *Fidenas* supra viginti hominum milia gladiatorio munere amphitheatri ruina perierant, transiit in continentem potestatemque omnibus adeundi sui fecit; tanto magis, quod urbe egrediens ne quis se interpellaret edixerat ac toto itinere adeuntis submoverat." trans. Loeb.

exhibit them outside, they perished in the ruins of their own theatres, which had been constructed of boards.³⁵

Napolitano & Monce's digital reconstructions of the disaster helps us to visualize the nature of the structure's dual failings and the resulting carnage described by the historical accounts. Their CAD model, based on the available descriptions and pictorial evidence for later wooden amphitheatres on Trajan's column, provides insight as to what steps could have been taken to prevent the disaster. Recreating the probable dimension and structure of the building, they hypothesize that the collapse likely involved a complete bifurcation of the upper and lower sections of the amphitheatre's wooden frame.³⁶ In this way some portions of the structure could have collapsed inwards while others fell outwards, harming the crowds gathered outside, as described by Tacitus.

³⁵ Cassius Dio 58.1.1a. trans. Loeb.

³⁶ Napolitano & Monce 2018.



Figure 10 Cross-sectional view of a segment of the amphitheatre at Fidenae

All of the historical sources emphasise the scale and gravity of the disaster at Fidenae and to varying extents implicate the emperor Tiberius as responsible for the tragedy. Only Tacitus, who deals with this episode at the greatest length, gives details about the man responsible for constructing the amphitheatre. This suggests that for the Romans, engineering projects, regardless of their commissioners, were a political enterprise and failures would ultimately reverberate to the highest political offices.

Who was responsible for this disaster? The answer to this question is multifaceted and dependent on what element of the tragedy we choose to address. Cassius Dio suggests that Tiberius was responsible for the disaster as he failed to provide sufficient spectacles in Rome. This neglect resulted in the overcrowding of shoddy, unprofessional theatres outside of the capital.³⁷ Indeed the Emperor chose to make an appearance at the site of the collapse, taking a

³⁷ Cassius Dio, 58.1.1a.

great deal of time to meet with anyone who asked, perhaps signalling that on some level he acknowledged his responsibility and felt a need to make amends.³⁸ Suetonius states that due to constant “entreaties” the disaster caused Tiberius to return from Capri even though he had just arrived there.³⁹ This detail provides evidence that the people had a strong desire to see a response from Tiberius. Suetonius reports in the next line that Tiberius returned to Capri and let the affairs of state slide following the disaster. This highlights that for Suetonius, Tiberius was not the most attentive of leaders, nor over-interested in currying favour with the general public. This made Tiberius' involvement at Fidenae all the more remarkable, perhaps he himself recognised the scale and severity of the disaster. Tiberius concluded that although he was able to allow the general affairs of state to progress with limited involvement, he felt no choice but to come to the scene of the collapse in hope of mitigating the damage to his perception by the public. There is a resemblance to a modern head of state visiting the scene of a natural disaster – they are responsible for picking up the pieces rather than having caused the problem, although of course sometimes these leaders' actions in planning for or responding to the disaster are in question. In this case any blame attached to Tiberius comes from failing to provide better games at more substantial venues at Rome.

While all our ancient sources to some degree name Tiberius as at fault, we cannot speak of engineering failure without considering those responsible for the physical structure. Tacitus, who explored the incident at length in his writings, provides us with a figure who may be more directly responsible for the condition of the amphitheatre at the Fidenae. Atilius was of the *libertini genus* and the only information regarding him comes from the description in Tacitus.

³⁸ Suetonius *Tib.*, 40.

³⁹ Suetonius *Tib.*, 40.

Libertini genus is a fairly unusual identifier, appearing one other time in Tacitus and once in Suetonius.⁴⁰ This terminology could mean either that Atilius was a freedman or perhaps that his parents were. In either case it is clear that Atilius could not have come from a background with a long history of political prominence at Rome. Tacitus makes a point of informing his readers of Atilius' relatively new social status. Organising games would certainly have generated public notice and local elites would likely have been guests, making it a possible launching pad for a political career.⁴¹ Atilius may well have hoped to establish himself with the upper echelons of local society with his games, but he instead became infamous. It should be noted that elsewhere in Tacitus' writing, he is very critical of freedmen and makes a case for them as agents of instability and social discord within the Roman state.⁴² Atilius' status would have done little to ingratiate him to Tacitus and may have contributed to Tacitus' decision to include this particular detail in his assessment of the tragedy. Tacitus is scathing in his description of Atilius' motive for taking on this project. He condemns the freedman not because he was wealthy or because he aimed to engage the community, but rather because he claims Atilius sought to make a personal profit.⁴³ There is a clear implication that Atilius was cutting corners in order to reduce costs and maximize profitability.

While we do know that Atilius was attached to the amphitheatre at the Fidenae, it is not clear whether he was personally involved with its construction. Regardless, it is evident that sufficiently qualified engineers were not engaged to complete the project.⁴⁴ Vitruvius claims that an architect must bring his personal expertise, creativity and judgment to ensure the success

⁴⁰ Tacitus *Ann.*, 2.85.4 & Suetonius *Aug.*, 44.1; Woodman 2018, 289 & Cels-Saint-Hilaire 2002.

⁴¹ See Chamberlin 2007 for discussion of the potential profitability of putting on such shows.

⁴² Tacitus *Hist.* 2.92; 5.9; *Ann.* 2.12.3; 13.2.3 and 13.26-27; López Barja de Quiroga 1995.

⁴³ Tacitus, *Ann.*, 4.62: *ut qui non abundantia pecuniae nec municipali ambitione sed in sordidam mercedem id negotium quaesivisset.* See Woodman 2018, 290-1.

⁴⁴ From our limited sources no architect or engineer is directly named.

of a theatre project, something that did not occur at Fidenae.⁴⁵ Moreover, Vitruvius highlights the importance of keeping the health and safety of the theatre's audience foremost in the selection of location and providing for safe entrances and exits, contributing to the idea that the architect has a responsibility to the public good.⁴⁶ Atilius allegedly set out to make profit rather than to benefit the community, and utterly failed to protect the public. The engineers who worked on this project exercised a similar disregard for the *res publica*.

Given the information available to us, both Atilius and Tiberius could be held accountable for the disaster at Fidenae. Much like in the case of successes the names of those who actually constructed engineering failures are lost to history, instead their patrons are either venerated or vilified.

Games and spectacles in the arena were a central element of Roman culture. Welsh presents a convincing case that construction of a permanent stone oval arena was particularly Roman. As such the construction of these amphitheatres could help to solidify the Roman presence in any given area.⁴⁷ As alluded to in the Colosseum section of this thesis, amphitheatres along with the games inside them served as a tool to create and reinforce Roman identity. Given this cultural significance, the instability and fatally impermanent nature of the construction at Fidenae added additional layers to the tragedy. By taking part in what should have been an identity-affirming activity the people of Fidenae lost their lives. Edmondson clearly illustrates the unique role of theatres and to an even greater extent amphitheatres for bringing all elements of Roman society together into one place - even criminals had a place there, albeit

⁴⁵ Vitruvius *De Arch.*, 5.6.7.

⁴⁶ Vitruvius *De Arch.*, 5.3.3.

⁴⁷ Welsh 1994.

involuntary.⁴⁸ Rawson also highlights how the *Lex Julia Theatralis*, which she argues also governed amphitheatres, while designed to assert the divisions between spectators, nevertheless did not exclude any group.⁴⁹ Thus it is clear that the disaster at Fidenae would have touched a wide range of individuals and groups, both locals and those who travelled in from Rome to see the spectacle. Even those who did not personally attend the event might have been caught up literally in the collapse outside the amphitheatre or figuratively in the rush of people who descended in the town after the incident. The great loss of life would have sent shock waves through the wider community and be seen as an atrocity. Given the cultural importance of the events it is not surprising that leaders all the way up to the emperor were called upon to answer for the disaster.

In certain circumstances, an engineering disaster could be seen as dangerous to public safety and as damaging to the *res publica* as war. Tacitus explicitly references that at the collapse of Fidenae : “the casualties of some great wars were equalled by an unexpected disaster.”⁵⁰ Woodman highlights how Tacitus employs well known rhetorical tropes of besieged cities to create his description of the disaster.⁵¹ Tacitus’ emphasis on the wailing and general distress of women and children can arguably be attributed to a desire to bend his account of the engineering failure to a greater narrative of disregard for the Roman people. In Tacitus’ telling, Atilius was held responsible for the horrific events and banished, putting an end to any political ambitions the freedman may have harboured.⁵² However, Woodman claims that the only source material for this event is the much shorter account in Suetonius. He posits that all additional

⁴⁸ Edmondson 1996, 81-98.

⁴⁹ Rawson 1989.

⁵⁰ Tacitus *Ann.*, 4.62: “ingentium bellorum cladem aequavit malum improvisum ” trans. Loeb.

⁵¹ See Woodman 2018, 288.

⁵² Tacitus *Ann.*, 4.63: “Atilius in exilium actus est” trans. Loeb.

information, including the culpability of Atilius, was furnished from Tacitus' own imagination to help support his broader rhetorical aims in the *Annals*.⁵³ However, there has long been a strand of scholarly opinion which argues that Tacitus actively referenced the *acta senatus* and other legal documents to obtain historical details for his writing, an opinion which is now widely accepted.⁵⁴ Barnes in particular selects the inclusion of Atilius' name and the senate's ban on certain people giving shows as examples of Tacitus' consultation of *acta senatus*.⁵⁵ Though it may be impossible to ascertain beyond any doubt whether Tacitus referenced the *acta* in the particular case of the Fidenae episode, it is clear that it was believable to his readers that the senate would have enacted legislation to restrict the construction of theatres. A response to engineering failure could be through legislation:

and for the future it was provided by a decree of the senate that no one with a fortune less than four hundred thousand sesterces should present a gladiatorial display, and that no amphitheatre was to be built except on ground of tried solidity.⁵⁶

Unfortunately, we are not told how ground should be proven to be firm nor who would be responsible for enforcing this law. Nevertheless, it is evident that Romans saw engineering projects as something that could be governed by laws which were adapted based on previous failings. As we have seen in chapter three, engineering projects relied on more than pure technical expertise to be successful. Selecting the correct site, ensuring that sufficient funds were available for the necessary materials and securing competent labour were all of the utmost importance. At Fidenae many if not all of the key requirements were not met. The emphasis on ensuring that projects were properly managed from the selection of the site, through construction

⁵³ Woodman 2018, 288.

⁵⁴ Syme 1958; Barnes 1998; Potter 2012; O'Gorman 2016.

⁵⁵ Barnes 1998, 139-40.

⁵⁶ Tacitus *Ann.*, 4.63: "cautumque in posterum senatus consulto ne quis gladiatorium munus ederet cui minor quadringentorum milium res neve amphitheatrum imponeretur nisi solo firmitatis spectatae." trans. Loeb.

to the operation of the final project is emphasized by Vitruvius. In the Roman imagination the conception of successful engineering was closely intertwined with successful project management, this is logical since without project management the engineering works would struggle to effect the physical world on any scale and would remain largely in the realm of the imagination.

Despite the devastation of the collapse at Fidenae the construction of wooden amphitheatres was not abandoned. Not only did the practice continue in smaller cities but also in the city of Rome itself. Years later, even emperor Nero constructed his amphitheatre out of wood to no particular comment.⁵⁷ From this we can see that when faced with engineering failures the response could on the one hand be far reaching. However, they could also be relatively limited. We do not see any requirements on who would be responsible for establishing what grounds were suitable for construction.⁵⁸ And certainly, the construction of large scale amphitheatres from wood continued.⁵⁹ From the case at Fidenae, it is clear that Roman responses to engineering failures could be multifaceted. On the one hand there is a punitive element. Atilius was banished, ruining his reputation and ending any political aspirations he may have held. On the other there is a preventative element, legislation as a response. The senate set a minimum amount of capital required to put on exhibitions and set regulations for where amphitheatres could be built.

⁵⁷ Tacitus *Ann.*, 13.31; Suetonius *Nero*, 12.2-3.

⁵⁸ Further instances of the consideration of the suitability of ground for building will be explored below concerning Pliny in Bithynia.

⁵⁹ Wooden construction generally continued to be an important element in the Roman engineer's repertoire. See Mehrotra & Branko 2015 for detailed engineering evaluations of depictions of later Roman wooden bridges.

While the Romans took great pride in their engineering accomplishments, at times they faced severe setbacks and failures. We can see evidence of response to failure through legislation. In the case of the collapse of the amphitheatre at Fidenae, the majority of the blame and consequences fell upon Atilius, the man responsible for the construction project. His status as a member of the freedman class made him susceptible to criticisms from the established elite and perhaps an easy scapegoat. Clearly, any hopes of a further political career for Atilius were utterly ruined. We do not know what consequences other individuals directly involved in the construction encountered. At the minimum, given the widespread recording of the disaster, those involved would not be highly recommended to undertake similar tasks. The public outcry and Tiberius' return further emphasise the political dimension of Roman reaction to engineering failure. If engineering success could be parlayed into political capital the reverse appears to be equally true. Here we see that engineering failure is tied to political failure. Lack of technical ability is not what is most strongly decried by ancient sources. Instead self-seeking ambition and lack of provision for the needs of the people at Rome, are condemned as the ultimate symptom of greater moral failings.

Nero's Projects

Elsewhere we have seen that using engineering to overcome natural obstacles and shape the physical world could be portrayed as virtuous and contributing to both *dignitas* and *Romanitas*. This is particularly the case with Caesar's bridge construction and camp fortification and with the depiction of Roman buildings in stone on Trajan's column. However, this is not the only way that altering the natural world was perceived by the Romans. There is a coexisting trend to see attempts to control the natural world as excessive, luxurious, vainglorious and ultimately ruinous. The Romans were not alone in this at times paradoxical view, Greek sources

also contend with the simultaneous understanding that engineering works that shaped the physical world were both to be admired and condemned as a subversion to the natural order and perhaps an affront to the gods. The various accounts of the episode of Xerxes crossing the Hellespont capture many different shades of this understanding.⁶⁰ A central component in the Roman evaluation of whether a project was vainglorious or noble is whether it was undertaken for the public good or personal gain.

Romans saw luxury as a dangerous and corrosive force that made a people weak, undermined the social fabric, damaged their ability to defend themselves and as a result was ultimately a threat to their existence.⁶¹ Moreover, luxury was understood to be something external that crept into Rome from abroad, following its absence in a mythical past.⁶² Rhetoric against luxury as a destructive force can be found throughout the ancient world, with strong roots in Classical Athens.⁶³ This connection to Greek philosophy, so esteemed by certain elements of the Roman elite, may also have contributed to diatribes against luxury put forth by some members of the senatorial class, although they certainly lived to standards that would have been luxurious compared to the majority of Romans. However, for the Romans there was an important difference between luxury and magnificence: luxury was using wealth to satisfy personal and private desires.⁶⁴ Magnificence was in the service of the public and was not only an acceptable but a desirable trait. This distinction is clearly articulated by Cicero:

The Roman people loathe private luxury, but they love public splendour. They do not like extravagant banquets but much less do they like shabbiness and meanness; they take into

⁶⁰ Romm 2006.

⁶¹ Wallace-Hadrill 2008, 315-317.

⁶² Liv. 39.6.7; Cicero *Rep.* 2.7.

⁶³ Aristotle *EN* 4.4 1122a-23a, Demosthenes *Third Olynthiac* 25; *Against Androtion* 76. Also see Edwards 1993, 140-1.

⁶⁴ Vitruvius *De Arch.*, 7.5 advocating for using nature as a guide and not going overboard with fanciful decorations; Zanda 2011; Berry 1994, 84-86.

account the variety of obligations and circumstances and recognize the alternation of work and pleasure.⁶⁵

However there were limits to the Roman tolerance for expenditure and once crossed even magnificence can become wanton luxury.⁶⁶

To describe building works as defying nature could be either high praise or condemnation.⁶⁷ The differentiating feature tends to be if the project was intended for the public or the private good. For instance, Augustus boasts in the *Res Gestae* that he spent his money on building temples rather than his private residences.⁶⁸ Despite this there is ample evidence that his choice of home was nevertheless impressive. Augustus' residence featured carved laurels, oak crowns and could only be reached by walking through the forum, up the Palatine Hill, past many other great houses.⁶⁹ Our understanding of the public and private are likely quite different from the understanding held by Augustus and the Romans who came before and after him.⁷⁰ The house of a politician was seen as an extension of their public work. When Livius Drusus was building his house his architect offered to build it in such a way that he would be free from the public gaze, safe from all espionage, and that no one could look down into it. Livius replied, "If you possess the skill you must build my house in such a way that whatever I do shall be seen by all."⁷¹ A politician's house was not a private enterprise but rather a part of his public persona and thus potentially an opportunity to display acceptable magnificence.⁷² Projects which displayed a

⁶⁵Cicero *Mur.* 76: "Odit populus Romanus privatam luxuriam, publicam magnificentiam diligit; non amat profusas epulas, sordis et inhumanitatem multo minus; distinguit rationem officiorum ac temporum, vicissitudinem laboris ac voluptatis." trans. Loeb. More examples of the public - private divide: Hor *Carm.*, 2.25; Sallust *Cat.*, 9.2.

⁶⁶ Cicero *De Off.*, 2.60 & Cicero *Pis.*

⁶⁷ Edwards 1993, 142.

⁶⁸ E.g. *Res Gestae* 21.

⁶⁹ Edwards 1996, 166-8.

⁷⁰ Roman ideas of the public and private and distinctions between domestic and private: Milnor 2005, 16-35.

⁷¹ Velleius Paterculus, 2.14.2-4: "tu vero, inquit, si quid in te artis est, ita compone domum meam, ut, quidquid agam, ab omnibus perspici possit". trans. Loeb, also see Cicero *De Off.*, 1.128-9 on the importance of a public official having a grand house.

⁷² Vitruvius *De Arch.*, 1.2.9 & 6.5.2.

politician's success could be understood to reflect the success of the *res publica* and as such a morally acceptable use of engineering skill and endeavour.

Elsner has shown that Roman writers such as Suetonius and Pliny the Elder often use emperors' building programs as evidence for the overall characterization of the emperor they are depicting.⁷³ As such the building programs of Caligula and Nero are depicted in similar terms as the model of bad emperors. Despite the narrative of Nero as a self centred despot, his building works were, unlike the theatre at Fidenae, structurally sound, innovative, completed by competent engineers, and for lack of a better word "good".⁷⁴ As Elsner succinctly puts it, "Nero only became an outrageous and prodigal builder when he fell from power".⁷⁵ Indeed many of his construction projects, notably his baths, remained in use and, on the basis of later Trajanic and Severan brick stamps, were used and maintained long after his death, not even being renamed.⁷⁶ This reflects a common trend where the majority of buildings commissioned by emperors later condemned to *Damnatio Memoriae* were not destroyed after their commissioners' fall from grace. Despite the strength of the propagandistic ties attached to emperors' building programs, Davies convincingly argues that in the Roman mind, buildings' utilitarian value outweighed their association with the disgraced emperors.⁷⁷ The argument that subsequent regimes would be more likely to adopt buildings that would need to be replaced if demolished is reasonable. This phenomenon is demonstrated through the continued use of the bath complexes of Caracalla, even after his fall from grace. The types of works least likely to be destroyed thanks to their utilitarian nature include bridges, fountains, aqueducts and baths. On the other hand,

⁷³ Elsner 1994, 117.

⁷⁴ Elsner 1994, 118-120; Davies 2000, 42.

⁷⁵ Elsner 1994, 123.

⁷⁶ Davies 2000, 35 & 42.

⁷⁷ Davies 2000, 34-5.

monuments such as triumphal arches whose usefulness was so directly tied to their builders, were more likely to be pulled down.⁷⁸ These selections highlight the theme that when the Roman people benefit from an engineering feat its usefulness outweighs its connection to a particular commissioner. Conversely when an engineering project focuses on the glorification of an individual then it may be considered a failure, regardless of the engineer's innovation and successes overcoming challenges in the physical world.

Despite the presence of ample palatial residences already available to him, Nero began building the famous or perhaps infamous “Golden House”, shortly after the fire of 64 CE.⁷⁹ Overlooking the forum from the Palatine Hill, this property of unrivalled luxury and splendour is described as having a triple colonnade a mile long and a vestibule more than one hundred and twenty feet high. Richly decorated throughout with gold, gems and mother of pearl, the palace also featured vast gardens and man-made water features.⁸⁰ We are told by Suetonius that nowhere was the emperor’s wastefulness more evident than in his architecture.⁸¹ However, depictions of Nero tend to be very polarised and in his role as an example of a “bad emperor” the entirety of his regime, perhaps unjustly, is often framed in a negative light.⁸² Ball argues that Nero’s architects, while not the first to use concrete, developed a new understanding of the material and through innovative techniques created striking designs which would not have been possible using previous methods. With the increased confidence in the use of concrete and this medium’s flexibility the architects could create interestingly shaped rooms, thus shifting the

⁷⁸ Davies 2000, 31-7.

⁷⁹ Ball 2003, 1-2.

⁸⁰ Suetonius *Nero*, 31; Tact. *Annals* 15.42. For descriptions of the buildings and archaeological remains Warden 1981; MacDonald 1982; Ball 2003; Perrin 2011 & Villedieu 2011.

⁸¹ Suetonius *Nero*, 31.

⁸² Schultz 2019, 3.

focus to the interior from the exterior of their designs.⁸³ The Golden House's octagon suite is a prime example of the builders' advance in technical understanding. This ushered in an important development in Roman architecture, moving away from previous Greek-inspired designs. This significant change has been labelled the "Neronian Architectural Revolution".⁸⁴ On this evidence alone, it is tempting to evaluate Nero's projects as successes, however that is far from the impression given by our ancient reports who record them as frittering away resources and ruinously prodigal.⁸⁵

In Tacitus' *Annals*, Servius and Celer are called Nero's architects and engineers in the plural, which leaves open for interpretation whether, as has sometimes been asserted, Servius was the architect and Celer was the engineer. Alternatively, both individuals could have held both titles, perhaps taking on different roles at different times. Both interpretations are possible from a grammatical standpoint and as we have little other information on which to base our understanding any decision must be speculative.⁸⁶ The fact that this distinction is not made clear supports the decision within this thesis to consider engineers and architects at Rome both as roles at the centre of the Roman engineers' community of practice. Tacitus names Celer and Servius as the individuals responsible for building Nero's audacious palace.⁸⁷ He notes their willingness to take on challenges that "even nature thought impossible". But where others may have called these builders courageous, or at least hopeful, there is instead a disapproving tone in the description. Tacitus says they "fooled" away gold on such projects as attempting to connect Lake Avernus to the sea. This ties well with the other descriptions of Nero's extravagance and

⁸³ Ball 2003, 26.

⁸⁴ Ball 2003, 24-5.

⁸⁵ Tacit *Ann.*, 15.42 *inludere* & Suetonius *Nero*, 31 *damnosior*.

⁸⁶ Ball 2003, 259.

⁸⁷ Tacitus, *Ann.*, 15.42.

impracticality. Nero had a strong taste for innovation and the discussion of Celer and Servius, in antiquity, whether positive or negative is coached in terms of their novelty and innovation.⁸⁸

The names Severus and Celer have been found stamped into a large water pipe dating from after Nero's death. Bruun has argued convincingly that this pipe refers to the same people responsible for the Golden House.⁸⁹ This would mean that they continued to be involved with large scale projects after Nero, further reinforcing the conclusion that it was Nero's politics, not his engineering projects, where he failed.

Despite his extravagance and contrary to popular belief, Nero did show some concern for the public good through the rebuilding following the great fire of 64 AD. He offered rewards to those who rebuilt blocks of houses to set standards by given deadlines. He also took steps to make sure that public water supply would be more readily available in case of future fire and mandated detached homes and additional fire fighting equipment.⁹⁰ However these steps were not without consequences nor universally applauded. Beyond the concerns that the new streets offered less shade noted by Tacitus, Newbold has explored how the changes would likely have resulted in less accommodation being offered at higher rents forcing many into poor, more crowded and less sanitary living conditions.⁹¹ Even when Nero seems to attempt a project with the public good in mind, the overall perception of his character as a bad emperor is so intense that these are also drawn into disrepute. These ancient perceptions further emphasise the understanding of engineering as a moral endeavour.

⁸⁸ Ball 2003, 25.

⁸⁹ Bruun 2007.

⁹⁰ Tacitus *Ann.*, 15. 43.

⁹¹ Newbold 1974.

As Vitruvius outlines, houses at Rome were often seen as an analogy for their owners, a reflection of their wealth and relationship with the community.⁹² Thus attacking a person's house was a common and simple method to attack the owner. This is famously seen in the case of the destruction of Cicero's house by his enemy Claudius during Cicero's exile. Criticising overly luxurious houses can be found as far back as Cato the Elder and continued to be a main theme in moralising poetry and prose into the first century.⁹³ In the case of an emperor, criticising his buildings could be a vehicle for criticising the arbitrariness of his power.⁹⁴ Should an Emperor's works be seen to cross the line from celebrating the emperor as the head of the Roman state to glorifying the man himself, this tumbled from magnificence to luxury. Considering an emperor's place in Roman society it is to be expected his residence must be magnificent, commensurate with both his power and the status of Rome. However, Nero failed to recognize the grandeur of his home as a reflection of the quality of the Romans as a people. Suetonius reports that in regard to the Golden House, the emperor "deigned to say nothing more in the way of approval than that he was at last beginning to be housed like a human being."⁹⁵ Nero does not seem to grasp that only by acknowledging the grandeur of the palace and therefore the grandeur of his people, including those who were able to create it, could the enormous expenditure needed for its construction be justified.

While some of Nero's engineering projects may have been branded failures due to his moral shortcomings, others may be considered failures in a more typical sense of the term as well. We are told by Suetonius that Nero attempted to murder his mother, Agrippina, by means

⁹² On a house reflecting its owner in every aspect: Vitruvius *De Arch.*, 6.5.1-2; Nichols 2017 esp. chapter 3.

⁹³ Edwards 1993, 139.

⁹⁴ Edwards 1993, 139.

⁹⁵ Suetonius *Nero*, 31: "diceret quasi hominem tandem habitare coepisse." trans. Loeb.

of a device to drop the ceiling of her bed chamber onto her as she slept. When this failed, he resorted to the construction of a boat that was designed to come apart and drown her.⁹⁶ Tacitus tells the story of the boat in greater detail. He reports that a freedman, Anicetus, the commander of the fleet at Misenum, told Nero that it would be simple to create a boat with a section that would give way without warning. Prior to his role as commander of the fleet, Anicetus was a tutor to the young Nero and reportedly he and Agrippina hated each other.⁹⁷ This suggests that he may have had his own selfish motivations for wishing to orchestrate Agrippina's death. Specifically, Tacitus says that Anicetus employed *ingenium*, a term which Vitruvius predominantly considers a contributing factor to engineering successes, to attempt this underhanded deed. However, in this case, the project was not correctly managed, the scheme was attempted on a calm night and the mechanism was triggered too close to the land allowing Agrippina to swim to shore. Before we call Anicetus' planning and engineering skills into question we must remember Tacitus' potential political motives for imparting these details. Just as in the case of the disaster at Fidenae, once again only Tacitus' account specifically identifies potentially culpable parties by name. While it is not contested that Anicetus was a freedman who held the prestigious title of prefect of the fleet at Misenum, it is notable that no other account of this incident mentions him. Anicetus' inclusion can in part be attributed to the greater detail of Tacitus' writings. However, the significance of Tacitus' concern surrounding the growing influence of freedmen on the upper echelons of Roman society is doubtless also a contributing factor. Regardless of who may have conceived of the boat's design, Nero's attempt to kill his

⁹⁶ Suetonius *Nero*, 34.

⁹⁷ Tacitus *Ann.*, 14.3. The story of the boat is also sketched in Cassius Dio 61.12-14.

mother by engineering means is doubly a failure: both unable to achieve its goal or to contribute to the public good.

Building was one of the main ways that an emperor could literally make his mark on Rome and show what kind of ruler he intended to be. In much Roman writing, there is a connection between “excessive” or “perverse” building and tyranny, which can often be seen through “building mania” attributed to “bad” emperors.⁹⁸ However, as Elsner highlights, emperors faced a difficult balancing act between showing their magnificence and grandeur and being profligate, wanton and outrageous. Emperors had to confront the challenge of determining how engineering feats would be perceived by the Roman public. This endeavour was further complicated by the Roman spirit of competitiveness which regularly saw emperors attempting to surpass their predecessors.⁹⁹ Suetonius used the Golden House as a stand-in for all of Nero’s other shortcomings and crimes. Despite the extended bad press of both ancient poets and historians there is little evidence that the Flavians undertook any large-scale destruction of the Golden House. It was even recorded that Otho, during his short time as emperor, set aside a sizable sum to complete its construction, although Suetonius suggests that this decision contributed to him being haunted by the ghost of his predecessor, Galba.¹⁰⁰ Cassius Dio tells us that Vespasian sought to build a rapport with the people receiving them in the Gardens of Sallust, away from the excesses of the Golden House.¹⁰¹ Despite Vespasian’s dislike for the ostentatious palace, it was for a time his primary residence and records are unclear as to the exact timeline of its demolition.¹⁰² Vespasian went to some lengths to distance himself from the failures of Nero.

⁹⁸ Edwards 1996, 169.

⁹⁹ Elsner 1994, 115-6.

¹⁰⁰ Suetonius *Otho*, 7.

¹⁰¹ Cassius Dio 65.10.4.

¹⁰² Edwards 1996, 170.

Arguably the construction of the Colosseum was undertaken with just such an aim. This is in the classic mould of a “good” emperor building for the public while living modestly.¹⁰³ We can surmise that in order to succeed a good engineer, much like a good emperor, must take on his building projects with the goal of benefiting the people and strengthening the *res publica*.

Pliny in Bithynia

The Epistles of Pliny the Younger to Emperor Trajan, while he was governor of Bithynia and Pontus, offer a unique opportunity to explore Roman responses to engineering failure from the perspective of the Imperial administration. Presented in the tenth and final book of Pliny’s epistles, the letters were sent back to Rome and many of the emperor’s replies capture a wide snapshot of the duties and activities of a Roman provincial governor in the early 2nd century CE. Pliny was posted to Pontus and Bithynia on assignment by Trajan through a special order of the senate to restore order and propriety surrounding the financial affairs of the province.¹⁰⁴ Through these letters, we see that for Romans along with the political and moral concerns surrounding engineering failure, financial costs were also of high concern. Pliny appears confident that through the application of Roman expertise any engineering problem could have been resolved or prevented altogether.

The question of whether Trajan himself, a civil servant or perhaps even Pliny wrote the replies to Pliny’s letters has been much debated and remains in part unresolved. Although there was staff to help handle the huge volume of letters at Rome, emperors were understood to be central to letter writing practice and were expected to receive letters in person. Emperors were

¹⁰³ Edwards 1996, 171.

¹⁰⁴ See *CIL* 5.5262 & Pliny *Ep.* 10.117; Millar 1977, 325-328.

required to be the driving force behind the content of letters and presumed at a minimum to literally sign off on all imperial correspondence.¹⁰⁵ Sherwin-White maintained that the replies were largely drafted by a bureaucrat but finalized and sometimes amended by the emperor himself.¹⁰⁶ Recent analysis of the members of the Emperor's staff including *ab epistulis* and *libellis* and their roles supports this conclusion.¹⁰⁷ While it may not be possible to conclusively settle the debate, it seems reasonable that at the very least Trajan approved the content of his replies to Pliny.

The collection of correspondence between a provincial governor and the emperor, found in book ten of Pliny's collected letters, is without parallel. This book is not a chronological sequel to the first nine books of Pliny's letters which are a far more conventional collection. Rather book ten offers a parallel narrative starting at about the same time as events described in book one and all of the correspondence is between Pliny and the Emperor.¹⁰⁸ Some scholars, such as Woolf, have highlighted that all of Pliny's letters, including book ten, are carefully arranged. He argues that the letters are presented as part of a rhetorical program and not a representative sample of average correspondence between a governor and an emperor. As such book ten should not be treated as a documentary archive.¹⁰⁹ However, this runs contrary to the arguments put forward by Sherwin-White in his landmark commentary on the letters, followed by Williams, that the letters of book ten were collected and only lightly edited by an unknown

¹⁰⁵ Millar 1977, 213-228.

¹⁰⁶ Sherwin-White 1966.

¹⁰⁷ Davenport and Kelly 2022, 121-28.

¹⁰⁸ Woolf 2006, 98. For more on how conventional or not the first nine books are and ways to approach their study see Gibson & Morello 2012.

¹⁰⁹ Woolf 2006, 93-3.

hand quickly following Pliny's presumed sudden death.¹¹⁰ Madsen proposes that the letters are presented in a sufficiently chronological order for them to be used to provide a rough itinerary of Pliny's time in the province but he also suggests that they were composed with their eventual publication in mind. In this interpretation, book ten, rather than recording up-to-the-minute communication between Pliny and Trajan, was composed in part as a record to posterity.¹¹¹ Regardless of the fact that letters could have taken in the region of six weeks to reach their destination, all of Trajan's replies immediately follow the letter they pertain to in the collection. This further suggests that the Epistles are not presented in strict chronological order but rather arranged for clarity. Realistically, it would have been challenging for Pliny to wait, perhaps for months, to make decisions pertaining to his governorship. As Pliny was specifically selected to address issues in the province and we can assume he had at least some level of autonomy, it is likely that Pliny used his letters to drive a narrative of his time in office rather than to seek guidance or approval alone.¹¹² The few other letters from emperors that survive are not dissimilar to those found in book ten and Laven has made a very convincing argument that book ten should be considered a genuine if curated correspondence between an emperor and his official in the provinces.¹¹³ While book ten of Pliny's letters does not offer an unfiltered snapshot of daily operations, it does provide insight into the imperial Roman government's response to engineering failure in the provinces.

Engineering challenges quickly became a focus as Pliny began his governorship. The entirety of letter 37 is dedicated to the question of how water supply at Nicomedia should be

¹¹⁰ Williams 1990, 3; Sherwin-White 1966. While there is no evidence for who the editor of book ten might have been (assuming it wasn't Pliny himself) there has been a desire/hope/wish to see Suetonius as his protégé involved here. See Williams 1990, 4.

¹¹¹ Madsen 2009, 13-6.

¹¹² Millar et al. 2004, 38-40; Gibson 2020, 208-209.

¹¹³ Laven 2018. More on reading book ten Woolf 2015 & 2006; Stadter 2006; Noreña 2007 & Gibson 2020.

secured. This letter comes in the first third of the collection. Bearing in mind that the letters have been curated and most likely rearranged, this letter still likely comes from the early portion of Pliny's governorship of Pontus and Bithynia. As with many of the letters in book ten of the epistles, letter 37 is relatively short and tends to keep to one central theme. Pliny informs Trajan that two attempts to provide water to the city have failed at great expense. This demonstrates that from the outset Pliny was concerned with correcting engineering shortcomings in his province.

Pliny writes:

The citizens of Nicomedia, Sir, have spent 3,318,000 sesterces on an aqueduct which they abandoned before it was finished and finally demolished. Then they made a grant of 200,000 sesterces towards another one, but this too was abandoned, so that even after squandering such enormous sums they must still spend more money if they are to have a water supply.¹¹⁴

Pliny highlights the financial repercussions of engineering failures by opening the letter detailing the costs of the two previous attempts and the need for yet more money to be spent to complete the task of securing the water supply.¹¹⁵ As a preliminary response to this failure Pliny has inspected the previous attempts himself and believes that a third effort could prove successful, provided it is undertaken with the support of experts:

I have been myself to look at the spring which could supply pure water to be brought along an aqueduct, as originally intended, if the supply is not to be confined to the lower-lying parts of the town. There are very few arches still standing, but others could be built out of the blocks of stone taken from the earlier construction, and I think some ought to be made of brick, which would be easier and cheaper. But the first essential is for you to send out a water-engineer or an architect to prevent a third failure.¹¹⁶

¹¹⁴ Pliny *Ep.* 10.3: "In aquae ductum, domine, Nicomedenses impenderunt HS |XXX| CCCXVIII, qui imperfectus adhuc omissus, destructus etiam est; rursus in alium ductum erogata sunt CC. Hoc quoque relicto novo impendio est opus, ut aquam habeant, qui tantam pecuniam male perdiderunt." trans. Loeb.

¹¹⁵ This is a huge sum of money but likely nowhere near enough to complete the aqueduct and more funds would likely have been needed: Levaeu 1990, 153.

¹¹⁶ Pliny *Ep.*, 10.38: "Ipse perveni ad fontem purissimum, ex quo videtur aqua debere perducī, sicut initio temptatum erat, arcuato opere, ne tantum ad plana civitatis et humilia perveniat. Manent adhuc paucissimi arcus: possunt et

It is notable that Pliny inspects the site personally. Before taking up his post in Bithynia, Pliny had served as the curator of the bed and banks of the Tiber and sewers of Rome. Though we do not know how technically involved this position might have been, Pliny seems to demonstrate some level of water management knowledge.¹¹⁷ Williams argues that aqueducts were still a novelty in the region and that cities would have relied instead on wells and rainwater cisterns.¹¹⁸ Sherwin-White assumes that prior to this time there was no external supply of water to Nicomedia and the local builders' unfamiliarity with aqueduct construction led to the previous failures as well as the difficulties with other water-based projects in the area.¹¹⁹ In any case calling in a Roman expert was seen as the *necessary first* step. It is worth pausing briefly to consider the "romanness" of the expert Pliny requests. Many members of the engineering community of practice, particularly enslaved or freed practitioners had Greek names or at the very least were bilingual (much of our technical literature from the Roman world is written in Greek). However, the fact that Pliny is reaching out to the Roman state to send an expert to address challenges arising from choosing to build infrastructure to create a style of living and construction in line with Roman ideal of *utilitas* and cost effectiveness is key. By this point being born in Italy was not the sole aspect of being Roman. Pliny uses strong language to highlight the need for an expert response to this engineering failure.

erigi quidam lapide quadrato, qui ex superiore opere detractus est; aliqua pars, ut mihi videtur, testaceo opere agenda erit, id enim et facilius et vilius. Sed in primis necessarium est mitti a te vel aquilegem vel architectum, ne rursus eveniat quod accidit". trans. Loeb.

¹¹⁷ *CIL* 5.5262; Syme 1958, 79; Sherwin-White 1966, 38 & 79; Briley 2000, 1-17.

¹¹⁸ William 1990, 99.

¹¹⁹ Sherwin-White 1966, 613.

However, it is not clear if Trajan places the same emphasis on how to respond in regard to the aqueduct. In his reply, while Trajan recognises the importance of securing the water supply, he leaves the correction of the situation to Pliny, writing:

Steps must be taken to provide Nicomedia with a water supply, and I am sure you will apply yourself to the task in the right way.¹²⁰

Pliny's urgent request for an expert to be sent out is not directly acknowledged and as we shall see presently Trajan is hesitant to dispatch additional resources from the capital. Rather the focus of the Emperor's response is on the financial aspect. He writes:

But for goodness' sake apply yourself no less to finding out whose fault it is that Nicomedia has wasted so much money up to date. It may be that people have profited by this starting and abandoning of aqueducts. Let me know the result of your inquiry.¹²¹

If Pliny was able to ascertain who was at fault or if there was any bad faith in the previous failures of the aqueducts, his report to Trajan has not been recorded. Trajan's emphasis on uncovering if there had been profit from the repeated failure highlights that while a failed engineering project might be costly to its sponsors it could offer benefits to the unscrupulous. This aligns with the constant concerns of Vitruvius over charlatans claiming to be architects and Frontinus' fear of thefts from the aqueducts at Rome. Through the episode of the aqueduct at Nicomedia, Pliny highlights the importance of acquiring Roman expertise to complete the project. From Trajan's reply, the potential for immoral practice to result in deliberate engineering failure is brought to the fore. Engineering projects could involve a great deal of resources, often

¹²⁰ Pliny *Ep.*, 10.38: "Curandum est, ut aqua in Nicomedensem civitatem perducatur. Vere credo te ea, qua debebis, diligentia hoc opus adgressurum." trans. Loeb.

¹²¹ Pliny *Ep.*, 10.38: "Sed medius fidius ad eandem diligentiam tuam pertinet inquirere, quorum vitio ad hoc tempus tantam pecuniam Nicomedenses perdiderint, ne, dum inter se gratificantur, et incohaverint aquae ductus et reliquerint. Quid itaque compereris, perfer in notitiam meam." Trans. Loeb.

from local governments. In the hands of those lacking the necessary expertise or, worse, unscrupulous actors these funds would be wasted and result in failure.

Nicomedia was not the only city under Pliny's jurisdiction which struggled with engineering failures. Pliny reports a series of troubled projects in Nicaea and the neighbouring towns. In letter 39 he writes:

The theatre at Nicaea, Sir, is more than half built but is still unfinished, and has already cost more than ten million sesterces, or so I am told - I have not yet examined the relevant accounts. I am afraid it may be money wasted. The building is sinking and showing immense cracks, either because the soil is damp and soft or the stone used was poor and friable. We shall certainly have to consider whether it is to be finished or abandoned, or even demolished, as the foundations and substructure intended to hold up the building may have cost a lot but look none too solid to me.¹²²

As in his previous letter, Pliny emphasizes the spiralling costs of the project while taking it upon himself to make an initial inspection. Although not an expert he offers his initial impressions that the building despite the money spent on it is unfit. Tellingly despite the ban imposed by the Senate following the collapse at Fidenae, this is seemingly another instance of a theatre being constructed on unsuitable ground. In the same letter, Pliny goes on to describe other troubled projects including a gymnasium:

The citizens of Nicaea have also begun to rebuild their gymnasium (which was destroyed by fire before my arrival) on a much larger and more extensive scale than before. They have already spent a large sum, which may be to little purpose, for the buildings are badly planned and too scattered. Moreover, an architect—admittedly a rival of the one who drew up the

¹²² Pliny *Ep.*, 10.39: "Theatrum, domine, Nicaeae maxima iam parte constructum, imperfectum tamen, sestertium (ut audio; neque enim ratio operis excussa est) amplius centies hausit: vereor ne frustra. Ingentibus enim rimis desedit et hiat, sive in causa solum umidum et molle, sive lapis ipse gracilis et putris: dignum est certe deliberatione, sitne faciendum an sit relinquendum an etiam destruendum. Nam fulturae ac substructiones, quibus subinde suscipitur, non tam firmae mihi quam sumptuosae videntur". trans. Loeb.

designs—has given the opinion that the walls cannot support the superstructure in spite of being twenty-two feet thick, as the rubble core has no facing of brick.¹²³

Again, in this case we see the cost of construction is emphasised. However, in this instance an expert had already offered the opinion that the project was unsound. In this letter, Pliny provides a more detailed appraisal of the construction's shortcomings, even highlighting structural concerns that we see specifically condemned by Vitruvius.¹²⁴ This level of knowledge suggests that Pliny was satisfied with the engineering acumen of local architects. On this occasion Pliny did not ask for an expert from the capital to be summoned to assess the gymnasium's issues. Pliny does acknowledge the rivalry between architects which underscores the competitive nature of engineers operating outside of the army. While it was unlikely that the engineers Pliny consulted to address the concerns at Nicaea were familiar with Vitruvius' writing, their diagnosis suggests that they were operating with the broad Roman engineering community of practice which Vitruvius tried to capture. Pliny's emphasis that there was competition between engineers for the projects at Nicaea further suggests that the bad practices of charlatans which so concerned Vitruvius at Rome were also potentially at play in Bithynia and Pontus.

The final project covered in letter 39 is the construction of a bath complex being undertaken by the citizens of Claudiopolis. Pliny himself sponsored a bath house in his hometown of Comum and Trajan notably undertook the construction of a monumental bath

¹²³ Pliny *Ep.*, 10.39: "Iidem Nicaeenses gymnasium incendio amissum ante adventum meum restituere coeperunt, longe numerosius laxiusque quam fuerat, et iam aliquantum erogaverunt; periculum est, ne parum utiliter; incompositum enim et sparsum est. Praeterea architectus, sane aemulus eius a quo opus inchoatum est, adfirmat parietes quamquam viginti et duos pedes latos imposita onera sustinere non posse, quia sint caemento medii farti nec testaceo opere praecincti". trans. Loeb.

¹²⁴ Vitruvius *De Arch.*, 2.8.

complex at Rome.¹²⁵ The creation of such a complex would have been attractive to the citizens of Claudiopolis, keeping them in step with the trends in the capital, although it seems their technical ability was not quite equal to the task. The fashion for bathing facilities may have contributed to a desire to salvage this project. While keeping costs in the foreground, Pliny concludes the letter by once again asking that the emperor dispatch an expert:

I am therefore compelled to ask you to send out an architect to inspect both theatre and bath and decide whether it will be more practicable, in view of what has already been spent, to keep to the original plans and finish both buildings as best we can, or to make any necessary alterations and changes of site so that we do not throw away more money in an attempt to make some use of the original outlay.¹²⁶

In letter 40, the emperor is more explicit in his denial of Pliny's request for the deployment of external experts, replying:

The future of the unfinished theatre at Nicaea can best be settled by you on the spot [...] As for the bath at Claudiopolis, which you say has been started in an unsuitable site, you must decide yourself what advice to give. You cannot lack architects: every province has skilled men trained for this work. It is a mistake to think they can be sent out more quickly from Rome when they usually come to us from Greece.¹²⁷

Both Pliny and Trajan seem cautiously optimistic that all of these challenges can be overcome given the correct application of resources. Where they differ is the source of these assets. Trajan assures Pliny that the province is already sufficiently supplied with experts and any shortcomings

¹²⁵ *CIL* 5.5262; Gibson 2020, 186-170. For an overview of Trajan's building Jenkyns 2013, 345-64.

¹²⁶ Pliny *Ep.*, 10.40: "Ergo cum timeam ne illic publica pecunia, hic, quod est omni pecunia pretiosius, munus tuum male collocetur, cogor petere a te non solum ob theatrum, verum etiam ob haec balinea mittas architectum, dispecturum utrum sit utilius post sumptum qui factus est quoquo modo consummare opera, ut incohata sunt, an quae videntur emendanda corrigere, quae transferenda transferre, ne dum servare volumus quod impensum est, male impendamus quod addendum est". trans. Loeb.

¹²⁷ Pliny *Ep.*, 10.40: "Quid oporteat fieri circa theatrum, quod incohatum apud Nicaeenses est, in re praesenti optime deliberabis et constitues.... Quid Claudiopolitanis circa balineum quod parum, ut scribis, idoneo loco incohaverunt suadendum sit, tu constitues. Architecti tibi deesse non possunt. Nulla provincia non et peritos et ingeniosos homines habet; modo ne existimes brevius esse ab urbe mitti, cum ex Graecia etiam ad nos venire soliti sint." trans. Loeb.

must be closely examined for wilful wrongdoing.¹²⁸ Alternatively, Pliny, particularly on the matter of water-based projects, possibly drawing on his time as curator of the banks of the Tiber and sewers, seems convinced that only experts direct from Rome will be sufficient to ensure success. Trajan places the burden of decision on Pliny's own judgment. However, Pliny as a "talker" can articulate the issues but he needs the bridging of an engineer to facilitate the doing. Both doing and talking are essential for engineering success and either in isolation may lead to failure. The ultimate outcome of a project is determined by the involvement of appropriate personnel.

Trajan's decision to dispatch Pliny to Pontus and Bithynia was largely spurred by suspected financial impropriety in the province. As such there is little surprise that both men place the monetary costs of engineering projects at the centre of their discussion. While the epistles between Pliny and Trajan cannot be considered a candid snapshot of day to day governance they do shed light on the central authority's response to engineering failure. Primarily the Emperor placed both the blame and the duty of rectifying the problems on the local engineers. Trajan is often quick to question the motives of those undertaking projects which are not successful. He suggests that they may have acted in bad faith with a view to private profit, to some extent echoing the focus on morality as a determinant of success which has been presented in the sections above. Pliny is perhaps more sympathetic, allowing that an unfamiliarity with requirements and lack of technical knowledge may have caused the provincial projects to fail. He seems to argue they possibly could be rectified with the services of Roman experts. Either way the failures encountered in Bithynia and Pontus rest on the shoulders of inappropriate personnel,

¹²⁸ This is made very clear in letters 17 and 18: when Pliny requests a *mentor* he is informed that the *mentores* at Rome are busy working in the capital and that there are enough *mentores* in each province.

lacking either moral rectitude, personal ability or both. To ensure success it is likely that a good Roman engineer possessed morality, management skills and technical ability.

Conclusion

For Romans, both engineering successes and failures had a strong moral dimension. On the rare occasions we see engineers' own accounts of their successes, as in the case of Nonius Datus, it is evident that they took great pride in their accomplishments and looked to share the story of success within their community of fellow engineers. Datus surmounts his story with depictions of the virtues Patience, Courage and Hope. It follows that when failures do occur rarely are they attributed to a simple lack of technical ability. Vitruvius, ever weary of aspersions being cast on the profession of architects and eager to underline their contribution to the *res publica*, presents failures as the outcome of a lack of expertise. Either a true architect has not been properly consulted or self-proclaimed architects have taken on work that is beyond their ability out of pride or greed. As such for Vitruvius success and morality go hand in hand. For Roman engineers, success was to be celebrated and was the outcome of combining technical and management skills in virtuous harmony.

From an outside perspective engineering failures such as the disaster at Fidenae could be truly devastating, with casualties equated to the destruction of war. In such cases, the blame for the failure could reverberate to the highest echelons of the political system where the emperor himself may be held accountable. As demonstrated by the reported ruin and banishment of Atilius, those closer to the disaster also faced punitive action. Responses could also be practical with legislation enacted by the senate following the disaster in the hopes of limiting the construction of certain types of projects. Engineering success could be employed to gain political

capital. However, engineering failures could tarnish or even destroy a burgeoning political career. Ancient authors note technical failings but reserve their greatest condemnations for the motivations which led to unsuccessful engineering projects being undertaken to begin with.

As the ultimate commissioner of projects, the overall perception of an emperor's reign was an important factor in interpreting whether his building projects would be considered successes or failures. Overcoming natural obstacles and displaying magnificence were applauded in the service of the glorification of Rome. However, similar projects were deemed failures when they served to promote an emperor's personal aggrandisement or were considered luxury as defined by the Romans. As such even technically successful projects such as Nero's Golden House could be considered failures. Much like a good emperor, a good engineer had to consider the impact of his projects on the *res publica* to determine their successes.

Through Pliny's epistles to Trajan during his time as governor in Pontus and Bithynia, we see that the imperial government's response to engineering failure could be focussed on their financial implications. Throughout the letters, it is clear that Trajan believed that there were sufficient resources in the province to address the issues that Pliny encountered. The emperor questioned the motives of local personnel which he felt led to the failures. In contrast, Pliny places an emphasis on the need for Roman experts to be dispatched, particularly to deal with water engineering challenges. For both Trajan and Pliny there is an assumption that through proper allocation of resources and Roman expertise engineering failure can be avoided. The reputation of Roman engineers for producing successful outcomes spread across the ancient world, whether at Rome or in the provinces; they were expected to display technical ability, management skills and moral judgment.

To be successful in shaping the physical world was part of what it meant to be Roman. When engineering failures occurred they could seriously challenge Roman self conception. Responses were multifaceted, including legislation, political censure and public outcry. Ultimately for Romans engineering success, failure and morality were inexorably linked. Failures were damaging to the wellbeing of the *res publica* while successes contributed to Rome's strength.

Conclusion

***The extraordinary greatness of the Roman Empire manifests itself above all in three things: the aqueducts, the paved roads, and the construction of the drains.*¹**

This thesis began by mapping the complex web of connection that linked a wide range of individuals to the practice and concept of engineering in the Roman world. Through the examination of literary and epigraphic sources, the first chapter explored the definition of the term engineer and challenges and benefits of using etic and emic categories to study the ancient world. Ultimately, community of practice and distributed cognition networks were identified as key tools to better understand how engineering projects were carried out in the Roman world. In chapter two, I then studied literary texts, technical treatises and the epigraphical record to explore a Roman engineer's role in the military and draw out what aspects of Roman military engineering made it particularly Roman. Chapter three analysed building contracts and the construction of iconic Roman infrastructure in the capital and in the provinces to understand Roman engineers' roles in peace time. Finally, chapter four investigated virtue as an engineering trait, the intersection of politics and engineering and how the imperial government approached engineering failure to determine how Roman engineers defined success. Each of these chapters contribute a different element to the overall group picture of Roman engineers.

The conception of the identity of a Roman engineer speaks to the greater understanding of what it means to be Roman. Demonstrating an ability to dominate the natural world and bending the environment to the Roman will, Caesar and Polybius used engineering as a means to cement narratives which furthered political aims. Alternately individual practitioners often celebrated their adaptability and pragmatism when addressing environmental obstacles. These

¹ Dionysius of Halicarnassus, *Ant. Rom.* 3.67.5 trans. Quilici 2008.

seemingly contradictory approaches to the natural world were brought together by the conviction that *Romanitas* was intertwined with success. A Roman engineer is someone who shaped the natural world using a combination of theoretical knowledge and practical ability. This shaping goes beyond mere competence in construction and making. Though technical practitioners were often seen as having low social status, Roman engineers at times held elevated social positions and their expertise was valued by the upper echelon, including emperors. A true Roman engineer bridged the gap between “doers” and “talkers”. They combined the ability to literally build with knowledge and adaptability to create lasting impacts which not only identify them as engineers but also guide our understanding of how successful engineering is interwoven with the concept of Roman identity.

Traditional study on engineering provides insight into our modern understanding of who belongs within the category of Roman engineers. Thanks to their extensive writings on engineering topics and the repeated use of titles which can be translated to terms we associate with the field, Vitruvius and Apollodorus of Damascus are famously classified as engineers. Under my definition, there is no doubt these individuals should be included in the fellowship of engineering. However, there is no one specific set of terms or single translation which allows us to identify who would have been considered an engineer at Rome. Solely relying on literal interpretations excludes a wide breadth of individuals who should also be considered engineers. For instance, as a result of his extensive military and political career the engineering aspects of Julius Caesar are seldom adequately acknowledged. Looking at individuals such as Caesar, who may not traditionally be considered engineers, allows us to grasp the diversity of the community of practice at Rome and throughout the provinces. In an exploration of the epigraphical record, we see a variety of individuals who chose to self identify as engineers and wished for their

contribution to *Romanitas* to be recorded in perpetuity. While the inclusion of their profession on their tombs would have allowed the broader community to recognise them as engineers, it would have been particularly meaningful to those within their own community and speaks to the existence of a fellowship of engineering.

Key traits exemplified by those who meet our definition of a Roman engineer include: completing training, gaining tacit knowledge, developing hands-on skill and exercising theoretical understanding. From a literary perspective we see this described in Vitruvius' exhortation to study and practice, while the army records a *discens libratorum* (a trainee surveyor), highlighting that the army was a key place for Roman engineers to gain skills and develop knowledge. In contributing to military endeavours such as road works and water management systems, the Roman military engineers helped to fortify the *res publica* and disseminate *Romanitas*, goals ultimately shared by all true Roman engineers regardless of their military affiliation.

Project management was an essential skill for Roman engineers to master in order to succeed, particularly in peace time when diverse stakeholders needed to be brought together to complete projects. If directed successfully, a career in the building trade could lead to wealth and status like that attained by the Haterii. When Nonius Datus recorded his successful intervention in the construction of an aqueduct in North Africa, he underscored his technical ability, management skills and the virtues of patience, courage and hope.

The various types of evidence available offer different lenses through which to glimpse the complexity of the Roman engineering community of practice. Excepting the rarer documentation provided by self identified practitioners such as Vitruvius and tales of impertinence from notable figures like Apollodorus of Damascus, literary sources tend to depict

engineers as mere tools carrying out the objectives of leaders or patrons. In some ancient sources the presence of engineers is seemingly omitted entirely. However, exploring epigraphic evidence we see these individuals as multifaceted characters with complex identities including familial links and religious affiliations. Those within and around the engineering community of practice found their profession to be worth sharing and intermingled their engineering success with reference to wider moral virtue.

A central aspect of the figure of the engineer in the Roman imagination is above all morality. Absolute morality and concern for the public good were central to Vitruvius' interpretation of what it meant to be a true Roman engineer. Vitruvius reviled charlatans who he claimed brought the profession into disrepute, condemning their lack of virtue even more than the shortcomings of their technical ability. When engineering projects encountered failure they were almost always couched in terms of moral failures and conversely successes were enshrined in virtue. Engineering failure was a symptom of moral decay while success signalled virtue and *Romanitas*.

Engineers are often studied in relief to their work rather than in conjunction with it. It is only by combining literary and epigraphic sources and considering a community as a functioning body that we are able to understand the symbiotic impacts of practitioners and community. Not only did these individuals impact Rome but the nature of their work also impacted them as individuals and as Romans. The very fact that the literary sources tell a different story from epigraphical evidence sheds light on how the Roman engineering community of practice was perceived by non practitioners. The emphasis on the engineering success of the Romans by both the Romans themselves like Cicero and Pliny the Elder as well as outsiders like Strabo and

Dionysius of Halicarnassus demonstrate a tension between the importance of engineering to Roman identity and how ancient Romans perceived engineers.

The Roman perception of the world tended to divide individuals into those that interacted with the material - “doers” and those who examined situations in the abstract - “talkers”. As engineers possessed both technical knowledge and practical ability, they functioned as a rare bridge between “doers” and “talkers”. Through this investigation key traits of Roman engineers emerged: combining innate talent, learned skills and flexible application. This thesis traced the many threads of the web of individuals connected to the practice of engineering in the Roman world and in the Roman imagination. Those connected to engineering work by both practical element and theoretical understanding should rightly be considered engineers, By tracing this tapestry, a clearer image of how Roman engineering projects were undertaken has emerge and light has been shed on the role engineering played in the modern and ancient conceptions of what it meant to be Roman.

Bibliography

- Adam, J-P. 1984. *La Construction Romaine, Matériaux et Techniques*. Paris: Picard.
- Adams, J. N. 1995. 'The Language of the Vindolanda Writing Tablets: An Interim Report'. *Journal of Roman Studies* 85: 86–134.
- . 1999. 'The Poets of Bu Njem: Language, Culture and the Centurionate'. *Journal of Roman Studies* 89: 109–34.
- , ed. 2016. 'Surveyor's Inscription From Algeria (CIL VIII.2728 = 18122 = ILS 5795), Commemorating the Construction of an Aqueduct, c. 153'. In *An Anthology of Informal Latin, 200 BC–AD 900*, 1st ed., 293–306. Cambridge University Press.
- Adloff, F, K Gerund, and D. Kaldewey, eds. 2015. *Revealing tacit knowledge: embodiment and explication*. Presence and Tacit Knowledge, v. 2. Bielefeld: Transcript Verlag.
- Agar, J., and C. Smith, eds. 1998. *Making Space for Science: Territorial Themes in the Shaping of Knowledge*. 1st ed. 1998. Science, Technology and Medicine in Modern History. London: Palgrave Macmillan UK.
- Alexander, D. 2000. 'Excavation of Neolithic Pits, Later Prehistoric Structures and a Roman Temporary Camp along the Line of the A96 Kintore and Blackburn Bypass, Aberdeenshire'. *Proceedings of the Society of Antiquaries of Scotland* 130: 11–75.
- Allison, P. M. 2013. *People and Spaces in Roman Military Bases*. Cambridge, New York: Cambridge University Press.
- Allmand, C. 2011. *The De Re Militari of Vegetius: The Reception, Transmission and Legacy of a Roman Text in the Middle Ages*. Cambridge: Cambridge University Press.
- Ambrosetti, G. 1960. 'Monumento Degli Haterii'. In *Enciclopedia Dell'Arte Antica, Classica e Orientale*, 3:1112–15. Rome.
- Anderson, J. C. 1997. *Roman Architecture and Society*. Johns Hopkins University Press.
- Anderson, M., D. L. Cairns, and M. Sprevak, eds. 2019. *Distributed Cognition in Classical Antiquity*. The Edinburgh History of Distributed Cognition. Edinburgh: Edinburgh University Press.
- Angelakis, Andreas, Larry Mays, and D Koutsoyiannis. 2014. *Evolution of Water Supply Through the Millennia*. London: IWA Publishing.
- Anglo, S. 2002. 'Vegetius' "De Re Militari": The Triumph of Mediocrity'. *The Antiquaries Journal* 82: 247–67.
- Arabaolaza, I. 2019. 'A Roman Marching Camp in Ayr'. *Britannia* 50: 330–49.
- Armstrong, J. 2020. 'Organized Chaos Manipuli , Socii , and the Roman Army c. 300'. In *Romans at War: Soldiers, Citizens and Society in the Roman Republic*, edited by Jeremy Armstrong and Michael P. Fronda, 76–98. Routledge Monographs in Classical Studies. London: Routledge, Taylor & Francis Group.
- Aubert, Jean-Jacques. 1994. *Business Managers in Ancient Rome: A Social and Economic Study of Institores, 200 B.C.-A.D. 250*. Columbia Studies in the Classical Tradition, vol. 21. Leiden ; New York: Brill.

- Bagg, A. M. 2017. 'Assyrian Technology'. In *A Companion to Assyria*, edited by E. Frahm, 1st ed., 511–21. Chichester: Wiley.
- Bailey, G. B. 2000. 'Excavations on the Roman Temporary Camps at the Three Bridges, Camelon, Falkirk'. *Proceedings of the Society of Antiquaries of Scotland* 130: 469–98.
- Baldwin, B. 1990. 'The Date, Identity, and Career of Vitruvius'. *Latomus* 1990: 424–34.
- Ball, L. F. 2003. *The Domus Aurea and the Roman Architectural Revolution*. Cambridge: Cambridge University Press.
- Barnes, T. D. 1979. 'The Date of Vegetius'. *Phoenix* 33 (3): 254–57.
- . 1998. 'Tacitus and the "Senatus Consultum de Cn. Pisone Patre"'. *Phoenix* 52 (1/2): 125–48.
- Beltrán Lloris, F. 2014. "'Epigraphic Habit" in the Roman World'. In *The Oxford Handbook of Roman Epigraphy*, edited by C. Bruun and J. Edmondson, 131–48. Oxford: Oxford University Press.
- Ben David, C. 2019. 'Milestones near Roman Army Installations in Desert Areas of the Provinces of Palaestina and Arabia'. In *Roman Roads: New Evidence - New Perspectives*, edited by A. Kolb, 3–21. Berlin: De Gruyter.
- Bernard, S. G. 2016. 'Food Distributions and Immigration in Imperial Rome'. In *Migration and Mobility in the Early Roman Empire*, edited by L. de Ligt and L.E. Tacoma, 50–71. Leiden: Brill.
- . 2017. 'Workers in the Roman Imperial Building Industry'. In *Work, Labour, and Professions in the Roman World*, edited by K. Verboven and C. Laes, 62–86. Impact of Empire (Roman Empire, c. 200 B.C.-A.D. 476) (Series) 23. Leiden; Boston: Brill.
- Berry, C. J. 1994. *The Idea of Luxury: A Conceptual and Historical Investigation*. 1st ed. Cambridge: Cambridge University Press.
- Bingham, S. 2012. *The Praetorian Guard: A History of Rome's Elite Special Forces*. London: I. B. Tauris & Company, Limited.
- Birley, A. R. 2000. *Onomasticon to the Younger Pliny: Letters and Panegyric*. Reprint 2012. Leipzig: B.G. Teubner.
- Blake, S. 2012. 'Now You See Them: Slaves and Other Objects as Elements of the Roman Master'. *Helios* 39: 193–211.
- . 2016. 'In Manus: Pliny's Letters and the Arts of Mastery'. In *Roman Literary Cultures. Domestic Politics, Revolutionary Poetics, Civic Spectacle*, edited by A. Keith and J. Edmondson, 89–107. Toronto: University of Toronto Press.
- Blyth, P. H. 1992. 'Apollodorus of Damascus and the Poliorcetica'. *Greek, Roman and Byzantine Studies* 33 (2): 127–58.
- Bodel, J. P., ed. 2001. *Epigraphic Evidence: Ancient History from Inscriptions*. Approaching the Ancient World. London; New York: Routledge.
- Bomgardner, D. L. 2000. *The Story of the Roman Amphitheatre*. New York: Routledge.
- Bond, S. E. 2020. 'Work and Society'. In *A Cultural History of Work in Antiquity*, edited by E. Lytle, First edition, 127–42. A Cultural History of Work, volume 1. London: Bloomsbury Publishing.
- Brandon, C. J. 2014. *Building for Eternity: The History and Technology of Roman Concrete Engineering in the Sea*. Oxford: Oxbow Books.

- Breeze, D. J., and B. Dobson. 1993. *Roman Officers and Frontiers*. Mavors. Roman Army Researches; v.10. Stuttgart: Franz Steiner.
- Breeze, David John. 2016. *The Roman Army*. Classical World Series. London: Bloomsbury Academic.
- Brunt, P. A. 1980. 'Free Labour and Public Works at Rome'. *Journal of Roman Studies* 70: 81–100.
- . 1990. *Roman Imperial Themes*. Oxford: Clarendon Press.
- Bruun, C. 1991. *The Water Supply of Ancient Rome: A Study of Roman Imperial Administration*. Commentationes Humanarum Litterarum 93. Helsinki: Societas Scientiarum Fennica.
- . 2007. 'Nero's "Architects", Severus and Celer, and Residence Patterns in Rome'. *Scripta Classica Israelica* 26: 73–86.
- Burford, A. 1972. *Craftsmen in Greek and Roman Society*. Aspects of Greek and Roman Life. London: Thames & Hudson.
- Campbell, B. 1987. 'Teach Yourself How to Be a General'. *Journal of Roman Studies* 77: 13–29.
- Campbell, D. 2018. *Fortifying a Roman Camp: The Liber de Munitionibus Castrorum of Hyginus*. Glasgow: Bocca della Verità Publishing.
- Cascio, E. 2007. 'The Early Roman Empire: The State and the Economy'. In *The Cambridge Economic History of the Greco-Roman World*, edited by W. Scheidel, R. P. Saller, and I. Morris, 619–47. Cambridge: Cambridge University Press.
- Cels Saint-Helaire, J. 2002. 'Le sens du mot "libertinus", i : quelques réflexions'. *Latomus* 61 (2): 285–94.
- Chamberland, G. 2007. 'A Gladiatorial Show Produced in Sordidam Mercedem (Tacitus "Ann." 4.62)'. *Phoenix* 61 (1/2): 136–49.
- Charles, M. B. 2007. *Vegetius in Context: Establishing the Date of the Epitoma Rei Militaris*. Historia (Wiesbaden, Germany). Einzelschriften; Heft 194. Stuttgart: Franz Steiner Verlag.
- Cherry, D. 1998. *Frontier and Society in Roman North Africa*. Oxford: New York: Clarendon Press; Oxford University Press.
- Chevallier, R. 1997. *Les Voies Romains*. Paris: Picard.
- Cichorius, C. 1896. *Die Reliefs Der Traianssäule*. Vol. 2. Berlin: G. Reimer.
- . 1900. *Die Reliefs Der Traianssäule*. Vol. 3. Berlin: G. Reimer.
- Claridge, A. 2010. *Rome: An Oxford Archaeological Guide*. Oxford: Oxford University Press.
- Clarke, J. R. 2006. *Art in the Lives of Ordinary Romans: Visual Representation and Non-Elite Viewers in Italy, 100 B.C.-A.D. 315*. University of California Press.
- Clay, C. 2004. 'Iconoclasm in Roman Chester: The Significance of the Mutilated Tombstones from the North Wall'. *Journal of the British Archaeological Association* 157 (1): 1–16.
- Coleman, K. 2006. *M. Valerii Martialis Liber Spectaculorum*. Oxford: Oxford University Press.
- Coleman, K. 2008. 'Exchanging Gladiators for an Aqueduct at Aphrodisias ("SEG" 50.1096)'. *Acta Classica* 51: 31–46.
- Colin, A., and W. Scheidel. 2012. 'Transport'. In *The Cambridge Companion to the Roman Economy*, 299–290. Cambridge: Cambridge University Press.
- Collins, H.M. 2010. *Tacit and Explicit Knowledge*. Chicago: University of Chicago Press.

- Collins, J. H. 1972. 'Caesar as Political Propagandist'. In *Aufstieg Und Niedergang Der Römischen Welt (ANRW)*, edited by H. Temporini and Wolfgang Haase, 1.1:922–66. Berlin, Boston: De Gruyter.
- Commito, A., and F. Rojas. 2012. 'Aqueducts'. In *The Aphrodisias Regional Survey*, edited by C. J. Ratté and P. D. De Staebler, 239–308. Aphrodisias 5. Mainz: Philipp von Zabern.
- Cooper, F.A. 2008. 'Greek Engineering and Construction'. In *The Oxford Handbook of Engineering and Technology in the Classical World*, edited by J. P. Oleson, 1. issued as an Oxford Univ. Press paperback, 225–55. Oxford: Oxford University Press.
- Cormack, J. M. R. 1954. 'Epigraphic Evidence for the Water-Supply of Aphrodisias'. *The Annual of the British School at Athens* 49: 9–10.
- Cornell, T. 1995. *The Beginnings of Rome: Italy and Rome from the Bronze Age to the Punic Wars (c.1000–264 BC)*. London: Routledge.
- Coulston, J.C.N. 1988. 'Trajan's Column: The Sculpting and Relief Contents of a Roman Propaganda Monument'. PhD diss, Newcastle University.
- . 1990. 'Trajan's Column: The Sculpting and Relief Contents of a Roman Propaganda Monument'. In *Architecture and Architectural Sculpture in the Roman Empire*, edited by M. Henig, 39–50. Oxford: Oxford University Committee for Archaeology.
- Coulton, J.J. 1977. *Ancient Greek Architects at Work*. Ithaca: Cornell University Press.
- Courrént, M. 2014. 'Apaturius et Dinocrate, deux exemples à ne pas suivre. extravagance et critique d'art dans le De architectura de Vitruve'. In *Extravagances: écarts et normes dans les textes grecs et latins: actes du colloque de Louvain-la-Neuve (16-17 mai 2013)*, edited by P.-A. Deproost. Collection 'Structures et pouvoirs des imaginaires'. Paris: L'Harmattan.
- . 2016. 'Vitruve et Les Naturales Quaestiones: La Théorie de la Matière dans le de Architectura'. *Arethusa* 49 (2): 251–62.
- Cousins, E.H. 2014. 'Votive Objects and Ritual Practice at the King's Spring at Bath'. In *TRAC 2013. Proceedings of the Twenty-Third Annual Theoretical Roman Archaeology Conference, King's College, London 2013*, edited by J Pearce, C Barron, J Lundock, and J Yoo, 52–64. Oxford: Oxbow Books.
- Crouch, Dora P. 1993. *Water Management in Ancient Greek Cities*. New York: Oxford University Press.
- Culham, P. 2013. 'Imperial Rome at War'. In *The Oxford Handbook of Warfare in the Classical World*, edited by B. Campbell and L. A. Tritle, 1st ed., 236–60. Oxford: Oxford University Press.
- Cuomo, S. 2007. *Technology and Culture in Greek and Roman Antiquity*. Key Themes in Ancient History. Cambridge: University Press.
- . 2010. 'Skills and Virtues in Vitruvius' Book 10'. In *War in Words*, edited by M. Formisano and H. Böhme, 309–32. Berlin: DE GRUYTER.
- . 2011. 'A Roman Engineer's Tales'. *Journal of Roman Studies* 101: 143–65.
- . 2016. 'Tacit Knowledge in Vitruvius'. *Arethusa* 49 (2): 125–43.
- . 2022. 'Technological Progress'. In *The Cambridge Companion to the Ancient Greek Economy*, edited by Sitta von Reden, 392–403. Cambridge Companions to the Ancient World. New York: Cambridge University Press.

- . In Press. ‘Collaboration in Mathematical Texts and Practices: A Distributed Cognition Approach’. In *Collaboration in Ancient Literature*, edited by T. Kearey, T. Nelson, and M. Leventhal. Cambridge University Press.
- D’ Encarnação, J. 1994. ‘Apostilas Epigráficas’. *Humanitas* 46: 217–30.
- Dales, G. F. 1964. ‘The Ancient Engineers. L. Sprague DeCamp’. *Journal of Near Eastern Studies* 23 (2): 136–39.
- Damon, C. 2017. *Studies on the Text of Caesar’s Bellum Civile*. Oxford: University Press.
- Danon, B. 2018. ‘A Quantitative Analysis of Caesar’s Representation of Celeritas’. *Acta Classica* 61: 16–35.
- Davenport, C., and B. Kelly. 2022. ‘Administration, Finances, and the Court’. In *The Roman Emperor and His Court c. 30 BC–c. AD 300*, edited by B. Kelly and A. Hug, 115–45. Cambridge: Cambridge University Press.
- Davies, J. L., and R. H. Jones. 2006. *Roman Camps in Wales and the Marches*. Cardiff: University of Wales Press.
- Davies, P. J. E. 2000. “‘What Worse than Nero, What Better than His Baths?’” *Damnatio Memoriae and Roman Architecture*. In *From Caligula to Constantine: Tyranny and Transformation in Roman Portraiture*, edited by E. R. Varner. Atlanta: Michael C. Carlos Museum.
- Davies, R. W. 1968. ‘Roman Wales and Roman Military Practice-Camps’. *Archaeologia Cambrensis* 117: 103–20.
- De Camp, L. S. 1963. *The Ancient Engineers*. New York: Ballantine Books.
- De Nuccio, M., and L. Ungaro, eds. 2002. *I Marmi Colorati Della Roma Imperiale*. Venice: Marsilio.
- DeLaine, J. 1997. *The Baths of Caracalla: A Study in the Design, Construction, and Economics of Large-Scale Building Projects in Imperial Rome*. Journal of Roman Archaeology. Supplementary Series; No. 25. Portsmouth: Journal of Roman Archaeology.
- . 2003. ‘The Builders of Roman Ostia: Organisation, Status and Society’. In *Proceedings of the First International Congress on Construction History, Madrid, 20th-24th January 2003*, edited by S Huerta Fernández, 723–32. Madrid: Instituto Juan de Herrera, Escuela Técnica Superior de Arquitectura.
- . 2006. ‘The Cost of Creation: Technology At The Service Of Construction’. In *Innovazione Tecnica e Progresso Economico Nel Mondo Romano*, edited by L Lo Cascio, 237–52. Bari: Edipuglia.
- Dessau, H. 1892. *Inscriptiones Latinae Selectae*. 3 vols. Berlin: Berolini Apud Weidmannos.
- Dilke, O. A. W. 1962. ‘The Roman Surveyors’. *Greece & Rome* 9 (2): 170–80.
- Dodge, H. 2021. ‘The Colosseum’. In *The Oxford Handbook Sport and Spectacle in the Ancient World*, edited by T. F. Scanlon and A. Futrell, 412–25. Oxford: Oxford University Press.
- Downey, G. 1946a. ‘Byzantine Architects Their Training and Methods’. *Byzantion* 18: 99–118.
- . 1946b. ‘On Some Post-Classical Greek Architectural Terms’. *Transactions and Proceedings of the American Philological Association* 77: 22–34.
- Drogula, F. K. 2020. ‘The Institutionalization of Warfare in Early Rome’. In *Romans at War: Soldiers, Citizens and Society in the Roman Republic*, edited by Jeremy Armstrong and Michael P.

- Fronza, 17–34. Routledge Monographs in Classical Studies. London: Routledge, Taylor & Francis Group.
- Eck, W. 1997. ‘Auf Der Suche Nach Architekten in Der Römischen Welt - MICHAEL DONDERER, DIE ARCHITEKTEN DER SPÄTEN RÖMISCHEN REPUBLIK UND DER KAISERZEIT. EPIGRAPHISCHE ZEUGNISSE (Erlanger Forschungen Reihe A. Geisteswissenschaften Band 69). 355 Seiten, 72 Tafeln. ISBN 3-930-357-08-9.’ *Journal of Roman Archaeology* 10: 399–404.
- Edgerton, D. L. 2007. *The Shock of the Old: Technology and Global History since 1900*. Oxford: Oxford University Press.
- Edmondson, J.C. 1996. ‘Dynamic Arenas: Gladiatorial Presentations in the City of Rome and the Construction of Roman Society during the Early Empire’. In *Roman Theater and Society*, edited by William J. Slater, 69–112. Ann Arbor: University of Michigan Press.
- Edwards, C. 1993. *The Politics of Immorality in Ancient Rome*. Cambridge: Cambridge University Press.
- Elliott, T. 2014. ‘Epigraphy and Digital Resources’. In *The Oxford Handbook of Roman Epigraphy*, edited by C. Bruun and J. Edmondson, 78–86. Oxford: Oxford University Press.
- Elsner, J. 1994. ‘Constructing Decadence: The Representation of Nero as Imperial Builder’. In *Reflections of Nero: Culture, History, & Representation*, edited by J. Elsner and J. Masters, 112–28. Chapel Hill: University of North Carolina Press.
- . 2018. ‘Ornament, Figure and Mise En Abyme on Roman Sarcophagi’. In *Ornament and Figure in Graeco-Roman Art*, edited by N. Dietrich and M. Squire, 353–92. Berlin: De Gruyter.
- Epstein, S. 2008. ‘Why Did Attic Building Projects Employ Free Laborers Rather than Slaves?’ *Zeitschrift Für Papyrologie Und Epigraphik* 166: 108–22.
- Erdkamp, P. 1999. ‘Agriculture, Underemployment, and the Cost of Rural Labour in the Roman World’. *The Classical Quarterly* 49 (2): 556–72.
- Erdkamp, P., ed. 2007. *A Companion to the Roman Army*. Blackwell Companions to the Ancient World. Malden, MA ; Oxford: Blackwell.
- Erickson, B. 2002. ‘Falling Masts, Rising Masters: The Ethnography of Virtue in Caesar’s Account of the Veneti’. *American Journal of Philology* 123 (4): 601–22.
- Erskine, A. 2013. ‘How to Rule the World: Polybius Book 6 Reconsidered’. In *Polybius and His World*, edited by B. Gibson and T. Harrison, 230–45. Oxford University Press.
- Favro, Diane. 1996. *The Urban Image of Augustan Rome*. Cambridge: Cambridge Univ. Press.
- . 2005. ‘Making Rome A World City’. In *The Cambridge Companion to the Age of Augustus*, edited by Karl Galinsky, 1st ed., 234–63. Cambridge University Press.
- Feleppa, R. 1978. ‘Emics, Etics and Social Objectivity’. *Current Anthropology* 27: 243–55.
- Fentress, E. W. B. 1979. *Numidia and the Roman Army: Social, Military and Economic Aspects of the Frontier Zone*. BAR 53. Oxford: British archaeological reports.
- Finley, M I. 1965. ‘Technical Innovation and Economic Progress in the Ancient World’. *The Economic History Review* 18 (1): 29–45.
- Fisher, L. E., and O. Werner. 1978. ‘Explaining Explanation: Tension in American Anthropology’. *Journal of Anthropological Research* 34: 194–218.

- Flohr, M. 2013. *The World of the Fullo: Work, Economy, and Society in Roman Italy*. First edition. Oxford Studies on the Roman Economy. Oxford: University Press.
- . 2020. ‘Work and Workplaces’. In *A Cultural History of Work in Antiquity*, edited by E. Lytle, First edition, 57–72. A Cultural History of Work, volume 1. London: Bloomsbury Publishing.
- Fögen, T. 2009. *Wissen, Kommunikation und Selbstdarstellung: zur Struktur und Charakteristik römischer Fachtexte der frühen Kaiserzeit*. Zetemata, Heft 134. München: Beck.
- Formisano, M. 2016. ‘Reading Dismemberment: Vitruvius, Dinocrates, and the Macrotext’. *Arethusa* 49 (2): 145–59.
- Formisano, M., and S. Cuomo. 2016. ‘Introduction’. *Arethusa* 49 (2): 121–23.
- Forsythe, G. 1999. *Livy Abd Early Rome: A Study in Historical Method and Judgment*. Stuttgart: Franz Steiner Verlag.
- Fredrick, D. 2003. ‘Architecture and Surveillamnce in Flavian Rome’. In *Flavian Rome: Cultue, Image, Text*, edited by A. J. Boyle and W. J. Dominik. Leiden: Brill.
- Futrell, A. 1997. *Blood in the Arena*. Austin: University of Texas Press.
- Galison, P., and E. A. Thompson, eds. 1999. *The Architecture of Science*. Cambridge, Mass: MIT Press.
- Gallia, A. 2016. ‘Remaking Rome’. In *A Companion to the Flavian Age of Imperial Rome*, edited by A. Zissos. Chichester: Wiley & Blackwell.
- Gardner, J. F. 1983. ‘The “Gallic Menace” in Caesar’s Propaganda’. *Greece & Rome* 30 (2): 181–89.
- Gascoigne, N, and T Thornton. 2014. *Tacit Knowledge*. 0 ed. Oxford: Routledge.
- Gauthier, F. 2020. ‘The Transformation of the Roman Army in the Last Decades of the Republic’. In *Romans at War: Soldiers, Citizens and Society in the Roman Republic*, edited by Jeremy Armstrong and Michael P. Fronda, 283–96. Routledge Monographs in Classical Studies. London: Routledge, Taylor & Francis Group.
- Geertz, C. 1973. *The Interpretation Of Cultures*. New York: Basic Books.
- . 1983. *Local Knowledge: Further Essays in Interpretive Anthropology*. New York: Basic Books.
- George, M., ed. 2013. *Roman Slavery and Roman Material Culture*. Phoenix Supplementary Volume 52. Toronto: University of Toronto Press.
- Gibson, R. K. 2020. *Man of High Empire: The Life of Pliny the Younger*. New York: Oxford University Press.
- Gibson, R., and R. Morello. 2012. *Reading the Letters of Pliny the Younger: An Introduction*. Cambridge: Cambridge University Press.
- Gilliver, C. M. 2007. ‘Battle’. In *The Cambridge History of Greek and Roman Warfare: Volume 2: Rome from the Late Republic to the Late Empire*, edited by M. Whitby, H. van Wees, and P. Sabin, 2:122–57. Cambridge: Cambridge University Press.
- Ginzburg, C. 2012. ‘Our Words, and Theirs: A Reflection on the Historian’s Craft, Today’. In *Historical Knowledge. In Quest of Theory, Method and Evidence*, edited by S. Fellman and M. Rahikainen, 97–11. Cambridge: Cambridge Scholars Publishing.
- Glötz, G. 1926. *Ancient Greece at Work*. London: Kegan Paul.
- Goldsworthy, A. K. 1996. *The Roman Army at War 100 BC - AD 200*. Oxford Classical Monographs. Oxford: Clarendon Press.

- Gooding, D. C. 1990. *Experiment and the Making of Meaning: Human Agency in Scientific Observation and Experiment*. Science and Philosophy Ser, v. 5. Dordrecht: Springer Netherlands.
- Gorogianni, E., N. Abell, and J. Hilditch. 2016. 'Reconsidering Technological Transmission: The Introduction of the Potter's Wheel at Ayia Irini, Kea, Greece'. *American Journal of Archaeology* 120 (2): 195–220.
- Graham, A. S. 2021. 'Reading Visual Cues on the So-Called Archive Wall at Aphrodisias: A Cognitive Approach to Monumental Documents'. *American Journal of Archaeology* 125 (4): 571–601.
- Greene, K. 2000. 'Technological Innovation and Economic Progress in the Ancient World: M. I. Finley Re-Considered'. *The Economic History Review* 53 (1): 29–59.
- Greene, W. C., and J. Scheid. 2016. 'Pietas'. In *Oxford Research Encyclopedia of Classics*.
- Grewe, K. 1998. *Licht am Ende des Tunnels: Planung und Trassierung im antiken Tunnelbau*. Zaberns Bildbände zur Archäologie. Mainz am Rhein: Verlag Philipp von Zabern.
- Grillo, L., and C. B. Krebs. 2017. 'Introduction: Caesarian Questions: Then, Now, Hence'. In *The Cambridge Companion to the Writings of Julius Caesar*, edited by L. Grillo and C. B. Krebs, 1–10. Cambridge: Cambridge University Press.
- Groen-Vallinga, M.G., and L.E. Tacoma. 2017. 'The Value of Labour: Diocletian's Price Edict'. In *Work, Labour, and Professions in the Roman World*, edited by Koenraad Verboven and Christian Laes, 104–32. Impact of Empire, volume 23. Leiden: Brill.
- Gros, P. 1994. 'Munus non ingratum. Le traité vitruvien et la notion de service'. In *Le projet de Vitruve. Objet, destinataires et réception du De architectura Actes du colloque international de Rome (26-27 mars 1993)*, 75–90. Rome: Publications de l'École française de Rome.
- Gunderson, E. 2003. 'The Flavian Amphitheatre: All the World as Stage'. In *Flavian Rome: Culture, Image, Text*, edited by A. J. Boyle and W.J. Dominik. Leiden: Brill.
- Günther, W., and S. Prignitz. 2016. 'Ein neuer Jahresbericht über Baumaßnahmen am Tempel des Apollon von Didyma'. *Chiron* 46: 157–75.
- Haensch, R. 2012. 'The Roman Army in Egypt'. In *The Oxford Handbook of Roman Egypt*, edited by C. Riggs, 68–82. Oxford: Oxford University Press.
- Hall, L. G. H. 1998. 'Ratio and Romanitas in the Bellum Gallicum'. In *Julius Caesar as Artful Reporter: The War Commentaries as Political Instruments*, edited by K. Welch and A. Powell. London: Duckworth.
- Hammond, C. 1996. *Julius Caesar: Seven Commentaries on The Gallic War: With an Eighth Commentary by Aulus Hirtius: With an Eighth Commentary by Aulus Hirtius*. Oxford World's Classics: *Julius Caesar: Seven Commentaries on The Gallic War: With an Eighth Commentary by Aulus Hirtius*. Oxford: Oxford University Press.
- Harris, M. 1976. 'History and Significance of the Emic/Eticdistinction'. *Annual Review of Anthropology* 5: 329–50.
- Harris, W. V. 2007. 'The Late Republic'. In *The Cambridge Economic History of the Greco-Roman World*, edited by W. Scheidel, I. Morris, and R. P. Saller, 511–40. Cambridge: Cambridge University Press.

- Harris-McCoy, D. 2017. 'Making and Defending Claims to Authority in Vitruvius' De Architectura'. In *Authority and Expertise in Ancient Scientific Culture*, edited by J. König and G. Woolf, 1st ed., 107–28. Cambridge: Cambridge University Press.
- Hartmann, B. 2020. *The Scribes of Rome: A Cultural and Social History of the Scribae*. Cambridge: Cambridge University Press.
- Haynes, I. 2013. *Blood of the Provinces: The Roman Auxilia and the Making of Provincial Society from Augustus to the Severans*. Oxford: Oxford University Press.
- . 2016. 'Identity and the Military Community in Roman Britain'. In *The Oxford Handbook of Roman Britain*, edited by M. Millett, L. Revell, and A. Moore, 448–63. Oxford: Oxford University Press.
- Headland, T. N. 1990. 'Introduction'. In *Emics and Etics: The Insider/Outsider Debate*, edited by T. N. Headland, M. Harris, and K. L. Pike. Newbury Park: SAGE Publications.
- Hellmann, M.C. 2002. *L'Architecture Grecque. Vol. 1, Les Principes de La Construction*. Paris: Picard.
- Henig, M., D. Brown, N. Sunter, L. Allason-Jones, and D. Baatz. 1988. 'The Small Objects'. In *The Temple of Sulis Minerva at Bath Vol. 2*, edited by Barry W. Cunliffe, 5–54. Monograph (University of Oxford. Committee for Archaeology); No. 7. Oxford: University Committee for Archaeology.
- Higgitt, R. 2019. "'Greenwich near London": The Royal Observatory and Its London Networks in the Seventeenth and Eighteenth Centuries'. *The British Journal for the History of Science* 52 (2): 297–322.
- Hill, D. R. 1984. *A History of Engineering in Classical and Medieval Times*. London: Croom Helm.
- Hirt, A. M. 2010. *Imperial Mines and Quarries in the Roman World: Organizational Aspects, 27 BC–AD 235*. Oxford: Oxford Classical Monographs.
- Høgseth, H. B. 2013. 'Knowledge Transfer: The Craftmen's Abstraction'. In *Archaeology and Apprenticeship: Body Knowledge, Identity, and Communities of Practice*, edited by Willeke Wendrich. Tucson: University of Arizona Press.
- Hope, V. 2003. 'Trophies and Tombstones: Commemorating the Roman Soldier'. *World Archaeology* 35 (1): 79–97.
- . 2014. 'Inscriptions and Identity'. In *The Oxford Handbook of Roman Britain*, edited by M. Millett, L. Revell, and A. Moore, 1:285–302. Oxford: Oxford University Press.
- Hopkins, K., and M. Beard. 2011. *The Colosseum*. London: Profile Books.
- Howarth, Randall S. 2013. 'War and Warfare in Ancient Rome'. In *The Oxford Handbook of Warfare in the Classical World*, edited by Brian Campbell and Lawrence A. Tritle, 1st ed., 29–45. Oxford: Oxford University Press.
- Howley, J. A. 2018. *Aulus Gellius and Roman Reading Culture: Text, Presence, and Imperial Knowledge in the Noctes Atticae*. Cambridge, United Kingdom: Cambridge University Press.
- Humphrey, J. W., J. P. Oleson, and A. N. Sherwood. 1998. *Greek and Roman Technology: A Sourcebook: Annotated Translations of Greek and Latin Texts and Documents*. London; New York: Routledge.
- Hutchins, E. 1995. *Cognition in the Wild*. The MIT Press.

- Isaac, B. 1994. 'Inscriptions from Southern Jordan'. *Scripta Classica Israelica* 13: 163–68.
- Ismard, P. 2015. *La démocratie contre les experts: les esclaves publics en Grèce ancienne*. L' univers historique. Paris: Éd. du Seuil.
- Jardine, Nick. 2004. 'Etics and Emics (Not to Mention Anemics and Emetics) in the History of the Sciences'. *History of Science* 42 (3): 261–78.
- Jenkyns, R. 2013. *God, Space, and City in the Roman Imagination*. Oxford: Oxford University Press.
- Jensen, W. C. 1978. 'The Sculptures from the Tomb Of the Haterii'. University of Michigan.
- Joshel, S. R. 1992. *Work, Identity, and Legal Status at Rome: A Study of Occupational Inscriptions*. Norman: University of Oklahoma Press.
- Joshel, Sandra Rae. 2010. *Slavery in the Roman World*. Cambridge Introduction to Roman Civilization. New York, N.Y: Cambridge University Press.
- Jouffroy, H. 1986. *La construction publique en Italie et dans l'Afrique romaine*. Études et travaux 2. Strasbourg: AECR.
- Keppie, L. 1998. *The Making of the Roman Army*. London: Routledge.
- Kerschbaum, S. 2022. 'Romanization and Beyond: Aqueducts and Their Multilayered Impact on Political and Urban Landscapes in Roman Asia Minor'. In *The Impact of the Roman Empire on Landscapes: Proceedings of the Fourteenth Workshop of the International Network Impact of Empire (Mainz, June 12-15, 2019)*, edited by M. Horster and N. Hächler, 154–72. Leiden: Brill.
- Keyser, Paul Turquand, and John Scarborough. 2018. *The Oxford Handbook of Science and Medicine in the Classical World*. Oxford Handbooks. New York: Oxford university press.
- Kolb, A. 2019. 'Via Ducta – Roman Road Building: An Introduction to Its Significance, the Sources and the State of Research'. In *Roman Roads: New Evidence - New Perspectives*, edited by A. Kolb, 3–21. Berlin: De Gruyter.
- König, A. 2007. *Knowledge and Power in Frontinus' On Aqueducts*. Edited by J. König and T. Whitmarsh. Cambridge: Cambridge University Press.
- . 2009. 'From Architect to Emperor: Vitruvius and His Addressee in the De Architectura'. In *Authorial Voices in Greco-Roman Technical Writing*, edited by L. Taub and A. Doody, 31–52. Trier: Wissenschaftlicher Verlag Trier.
- . 2016. 'Tracing the Ebb and Flow of de Architectura 8'. *Arethusa* 49 (2): 161–81.
- König, J., and G. Woolf, eds. 2017. *Authority and Expertise in Ancient Scientific Culture*. 1st ed. Cambridge: Cambridge University Press.
- Kopaczyk, J., and A. H. Jucker, eds. 2013. *Communities of Practice in the History of English*. Pragmatics & Beyond, Volume 235. Amsterdam: John Benjamins.
- Krebs, C. B. 2006. 'Imaginary Geography in Caesar's Bellum Gallicum'. *American Journal of Philology* 127 (1): 111–36.
- . 2017. 'More Than Words. The *Commentarii* in Their Propagandistic Context'. In *The Cambridge Companion to the Writings of Julius Caesar*, edited by L. Grillo and C. B. Krebs, 29–42. Cambridge: Cambridge University Press.
- La Liggia, A. S. 2015. *Engineering and Construction in Egypt's Early Dynastic Period*. Leuven: Peeters.

- Lancaster, L. C. 1999. 'Building Trajan's Column'. *American Journal of Archaeology* 103 (3): 419–39.
- . 2005. 'The Process of Building the Colosseum: The Site, Materials, and Construction Techniques'. *Journal of Roman Archaeology* 18: 57–82.
- Landels, J. G. 1978. *Engineering in the Ancient World*. London: Chatto & Windus.
- Landskron, A. 2020. 'The Perception of "Skills" in Ostia: The Evidence of Monuments and Written Sources'. In *Skilled Labour and Professionalism in Ancient Greece and Rome*, edited by E Stewart, E Harris, and D Lewis, 1st ed., 175–202. Cambridge: Cambridge University Press.
- Laporte, J.P. 1996. 'Notes Sur l'aqueduc de Saldae (Bougie)'. In *L'Africa Romana II*, edited by M. Khanoussi, P. Ruggeri, and C. Vismara. Ozieri: Editrice Il Torchietto.
- Lavan, M. 2018. 'Pliny Epistles 10 and Imperial Correspondence: The Empire of Letters'. In *Roman Literature under Nerva, Trajan and Hadrian*, edited by A König and C Whitton, 1st ed., 280–301. Cambridge: Cambridge University Press.
- Lave, Jean, and Etienne Wenger. 1991. *Situated Learning Legitimate Peripheral Participation*. Learning in Doing: Social, Cognitive and Computational Perspectives. Cambridge: University Press.
- Le Bohec, Yann. 1994. *The Imperial Roman Army*. London: Batsford.
- Leach, E. W. 2006. 'Freedman and Imortality in the Tomb of the Haterii'. In *The Art of Citizens, Soldiers and Freedmen in the Roman World*, edited by E. D'Ambra and P. R. Metraux. Oxford: Archaeopress.
- Lepper, F. A., and S. S Frere. 1988. *Trajan's Column: A New Edition of the Cichorius Plates*. Gloucester: Alan Sutton.
- Leveau, P. 1991. 'Reserch on Roman Aquaducts in the Past Ten Years'. In *Future Currents in Aqueduct Studies*, edited by A. T. Hodge, 149–62. Collected Classical Papers 2. Leeds: F. Cairns.
- Leveau, P., and J. L. Paillet. 1983. 'Alimentation En Eau et Développement Urbain à Caesarea de Maurétanie'. In *Journées d'études Sur Les Aqueducs Romains. Tagung Über Römische Wasserversorgungsanlagen, Lyons, 26–28 Mai, 1977*, edited by J. P. Boucher, 231–34. Paris: Société d'édition Les Belles Lettres.
- Liénard, Edmond. 1974. 'Review: Études sur quelques reflets du style administratif chez César'. *L'Antiquité Classique* 43: 475–77.
- Liu, J. 2009. *Collegia Centonariorum: The Guilds of Textile Dealers in the Roman West*. Leiden: Brill.
- . 2013. 'Professional Associations'. In *The Cambridge Companion to Ancient Rome*, edited by P. Erdkamp, 352–68. Cambridge Companions to the Ancient World. Cambridge: Cambridge University Press.
- Lloyd, G. E. R. 1966. *Polarity and Analogy: Two Types of Argumentation in Early Greek Thought*. Repr. Cambridge: Cambridge Univ. Press.
- Lloyd, G. E. R., and A. Vilaça, eds. 2019. 'Science in the Forest, Science in the Past'. *HAU. Journal of Ethnographic Theory* 9.
- Longfellow, B. 2011. *The Baths of Caracalla: A Study in the Design, Construction, and Economics of Large-Scale Building Projects in Imperial Rome*. Cambridge: Cambridge University Press.
- López Barja de Quiroga, P. 1995. 'Freedmen Social Mobility in Roman Italy'. *Historia: Zeitschrift Für Alte Geschichte* 44.

- Luce, T. J. 1978. *Livy: The Composition of His History*. Livy. Princeton: Princeton University Press.
- . 1993. ‘Livy, Augustus and the Forum Augustum’. In *Between Republic and Empire: Interpretations of Augustus and His Principate*, edited by Kurt A. Raaflaub, Mark Toher, G. W. Bowersock, and G. W. Bowersock, 1. paperback printing, 123–38. Berkeley, Calif.: Univ. of California Press.
- Lytle, E. 2020. ‘Introduction’. In *A Cultural History of Work in Antiquity*, edited by E. Lytle, First edition, 1–18. A Cultural History of Work, volume 1. London: Bloomsbury Publishing.
- Lytle, Ephraim, ed. 2020. *A Cultural History of Work in Antiquity*. First edition. A Cultural History of Work, volume 1. London, England: Bloomsbury Academic.
- MacDonald, W. L. 1977. ‘Roman Architects’. In *The Architect: Chapters in the History of the Profession*, edited by S. Kostof, 28–58. Cary: Oxford University Press USA - OSO.
- . 1982. *The Architecture of the Roman Empire*. Rev. ed. Yale Publications in the History of Art 17. New Haven; London: Yale University Press.
- MacMullen, R. 1959. ‘Roman Imperial Building in the Provinces’. *Harvard Studies in Classical Philology* 64: 207.
- Madsen, J. M. 2009. *Eager to Be Roman: Greek Response to Roman Rule in Pontus and Bithynia*. New York: Bloomsbury.
- Magness, J., S. Kisilevitz, M. Grey, D. Mizza, Daniel Schindler, M. Wells, K. Britt, et al. 2018. ‘The Huqoq Excavation Project: 2014–2017 Interim Report’. *Bulletin of the American Society of Overseas Research* 380: 61–131.
- Martin, R. 1965. *Manuel d’architecture Grecque, I: Matériaux et Techniques*. Paris: Picard.
- Martin, S. D. 1989. *The Roman Jurists and the Organization of Private Building in the Late Republic and Early Empire*. Collection Latomus; v. 204. Bruxelles: Latomus.
- Marzano, A. 2007. *Roman Villas in Central Italy: A Social and Economic History*. Columbia Studies in the Classical Tradition, v. 30. Boston: Brill.
- . 2015. ‘The Variety of Villa Production: From Agriculture to Aquaculture.’ In *Ownership and Exploitation of Land and Natural Resources in the Roman World*, edited by Paul Erdkamp, Koenraad Verboven, and Arjan Zuiderhoek, First edition. Oxford Studies on the Roman Economy. Oxford, United Kingdom ; New York, NY, United States of America: Oxford University Press.
- Matthews, K. J. 2004. ‘Chester’s Amphitheatre after Rome: A Centre of Christian Worship?’’. *Cheshire History* 43: 12–27.
- Mattingly, D. 2008. ‘Urbanism, Epigraphy and Identity in the Towns of Britain under Roman Rule’. In *A Roman Miscellany: Essays in Honour of Anthony R. Birley on His Seventieth Birthday*, edited by H. M. Schellenberg, V.-E. Hirschmann, and A. Kriekhaus, 53–72. Monograph Series Akanthina 3. Gdańsk: Foundation for the Development of Gdańsk University.
- Maxfield, V. A. 1981. *The Military Decorations of the Roman Army*. London: Batsford.
- Mayer, E. 2020. ‘Money Making, “Avarice”, and Elite Strategies of Distinction in the Roman World’. In *Skilled Labour and Professionalism in Ancient Greece and Rome*, edited by E Stewart, E Harris, and D Lewis, 1st ed., 94–126. Cambridge: Cambridge University Press.

- McCarthy, M.R. 1986. 'Woodland and Roman Forts'. *Britania* 17.
- McEwen, I. K. 2003. *Vitruvius: Writing the Body of Architecture*. Cambridge, Mass: MIT Press.
- Mehrotra, A., and B. Glisic. 2015. 'Reconstruction of the Appearance and Structural System of Trajan's Bridge'. *Journal of Cultural Heritage* 16 (1): 65–72.
- Meighörner-Schardt, W., and H. Blumenthal, eds. 1989. *Räderwerk Römerkran: zur Rekonstruktion e. römischen Baukrans*. Bonn: Bouvier.
- Meineck, Peter, William Michael Short, and Jennifer Devereaux, eds. 2018. *The Routledge Handbook of Classics and Cognitive Theory*. 1st ed. London: Routledge.
- Meredith, H. 2023. 'Making Anonymity Visible through the Use of Scale: Honoring the Conspicuously Absent with Laboring Bodies in 4th-8th Century CE Construction Scenes'. In *Scale and the Study of Late Antiquity: Collected Essays from the 14th Meeting of Shifting Frontiers*, edited by K. Sessa and K. Uhalde, 105–18. *Munera* 53. Bari: Edipuglia.
- Meyer, E. 2012. *The Ancient Middle Classes: Urban Life and Aesthetics in the Roman Empire, 100 BCE–250 CE*. Cambridge, MA: Harvard University Press.
- Meyer, E. A. 1990. 'Explaining the Epigraphic Habit in the Roman Empire: The Evidence of Epitaphs'. *Journal of Roman Studies* 80: 74–96.
- . 2011. 'Epigraphy and Communication'. In *The Oxford Handbook of Social Relations in the Roman World*, edited by M. Peachin, 191–226. Oxford: Oxford University Press.
- Miles, G. B. 2018. *Livy: Reconstructing Early Rome*. Ithaca: Cornell University Press.
- Miles, Margaret M. 2016. *A Companion to Greek Architecture*. 1st ed. Blackwell Companions to the Ancient World Ser. Somerset: John Wiley & Sons.
- Millar, F. 1964. *A Study of Cassius Dio*. Oxford: Sandpiper.
- . 1977. *The Emperor in the Roman World*. London: Duckworth.
- Millett, M., L. Revell, and A. J. Moore, eds. 2016. *The Oxford Handbook of Roman Britain*. Oxford: Oxford University Press.
- Milner, N. P. 1996. *Epitome of Military Science*. 2nd rev. ed. Translated Texts for Historians; v.16. Liverpool: Liverpool University Press.
- Milnor, K. 2005. *Gender, Domesticity, and the Age of Augustus*. Oxford: Oxford University Press.
- Mostafa, R., and S Klepper. 2018. 'Industrial Development Through Tacit Knowledge Seeding: Evidence from the Bangladesh Garment Industry'. *Management Science* 64 (2): 613–32.
- Mostowlansky, T., and A. Rota. 2020. 'Emic and Etic'. Edited by F. Stein. *Cambridge Encyclopedia of Anthropology*, November.
- Napolitano, R., and M. Monce. 2018. 'Failure at Fidenae: Understanding the Site of the Largest Structural Disaster of the Roman World'. *Digital Applications in Archaeology and Cultural Heritage* 10: e00077.
- Newbold, R.F. 1974. 'Some Social and Economic Consequences of the A.D. 64 Fire at Rome'. *Latomus* 33: 858–69.
- Nichols, M. 2010. 'Contemporary Perspectives on Luxury Building in Second-Century BC Rome'. *Papers of the British School at Rome* 78: 39–61.

- Nichols, M. F. 2016. 'Vitruvius on Vermilion: Faberius's Domestic Decor and the Invective Tradition'. *Arethusa* 49 (2): 317–33.
- . 2017. *Author and Audience in Vitruvius' De Architectura*. Greek Culture in the Roman World. Cambridge, United Kingdom ; New York, NY USA: Cambridge University Press.
- Noreña, C. .F. 2007. 'The Social Economy of Pliny's Correspondence with Trajan'. *American Journal of Philology* 128 (2): 239–77.
- Nousek, D. L. 2017. 'Genres and Generic Contaminations: The Commentarii'. In *The Cambridge Companion to the Writings of Julius Caesar*, edited by C. B. Krebs and L. Grillo, 97–109. Cambridge: Cambridge University Press.
- Odelman, E. 1972. *Etudes Sur Quelques Reflets Du Style Administratif Chez Cesar*. Stockholm: Stockholm Universitet.
- . 1985. 'Aspects Du Vocabulaire de Cesar'. *Eranos* 83: 147–54.
- Ogilvie, R.M. 1965. *A Commentary on Livy: Books 1–5: Books 1–5. A Commentary on Livy: Books 1–5*. Oxford: Oxford University Press.
- O'Gorman, E. 2016. 'Tacitus(1), Roman Historian'. In *Oxford Research Encyclopedia of Classics*. Oxford University Press.
- Oksanish, J. 2019. *Vitruvian Man: Rome under Construction*. Oxford: Oxford University Press.
- Oleson, J. P., ed. 2008. *Oxford Handbook of Engineering and Technology in the Classical World*. Oxford; New York: Oxford University Press.
- Orlandos, A. 1966. *Les Matériaux de Construction et La Technique Architecturale Des Anciens Grecs*. 2 vols. Paris: De Boccard.
- Orloff, C. R. 2009. *Water Engineering in the Ancient World: Archaeological and Climate Perspectives on Societies of Ancient South America, the Middle East, and South-East Asia*. Oxford: Oxford University Press.
- Panella, C. 1990. 'La Valle Del Colosseo Nell'Antichità'. *Bollettino Di Archeologia* 2: 34–88.
- Parissien, S., ed. 2000. *Palladian Style*. Repr. in paperback. London: Phaidon.
- Pearson, J. 1973. *Arena: The Story of the Colosseum*. London: Thames & Hudson.
- Perrin, Y. 2011. 'La Domus Aurea Sur l'Esquilin: L'apport Des Estampilles Sur Briques à La Chronologie Des Vestiges'. In *Corolla Epigraphica: Hommages Au Professeur Yves Burnand II.*, edited by C. Deroux, 602–11. Brussels: Éditions Latomus 331.
- Petch, D.F. 1971. *Deva Victrix*. London: Ginn & Co. Ltd.
- Petersen, L. H. 2006. *The Freedman in Roman Art and Art History*. Cambridge: Cambridge University Press.
- Pflaum, H.-G. 1950. *Les procurateurs équestres sous le Haut-Empire romain*. Paris: A. Maisonneuve.
- Phang, S. E. 2007. 'Military Documents, Languages and Literacy'. In *A Companion to the Roman Army*, edited by P. Erdkamp, 286–305. Oxford: Blackwell.
- Pike, K. L. 1954. *Language in Relation to a Unified Theory of the Structure of Human Behavior, Part I: Preliminary Edition*. Glendale: Summer Institute of Linguistics.

- Pinch, T, H. M. Collins, and L Carbone. 1997. '4. Cutting Up Skills: Estimating Difficulty as an Element of Surgical and Other Abilities'. In *Between Craft and Science*, edited by S. R. Barley and J. E. Orr, 101–12. Ithaca: Cornell University Press.
- Pitassi, M. 2009. *The Navies of Rome*. Woodbridge: Boydell Press.
- Polanyi, Michael. 1958. *Personal Knowledge: Towards a Post-Critical Philosophy*. London: Routledge & Kegan Paul.
- . 1967. *The Tacit Dimension*. London: Routledge & Kegan Paul.
- Polizzi, Giovanni, Vincent Ollivier, and Sophie Bouffier, eds. 2022. *From Hydrology to Hydroarchaeology in the Ancient Mediterranean: An Interdisciplinary Approach*. Oxford: Archaeopress.
- Pollard, N., and J. Berry. 2012. *The Complete Roman Legions*. London: Thames & Hudson.
- Potter, D. 2011. 'The Roman Army'. In *The Oxford Handbook of Social Relations in the Roman World*, edited by M. Peachin, 516–34. Oxford: Oxford University Press.
- . 2014. 'The Roman Army and Navy'. In *The Cambridge Companion to the Roman Republic*, edited by H. I. Flower, 2nd ed., 54–77. Cambridge: Cambridge University Press.
- Potter, David. 2012. 'Tacitus' Sources'. In *A Companion to Tacitus*, edited by V. E. Pagán, 125–40. Chichester Malden: Wiley-Blackwell.
- Purcell, N. 1983. 'The Apparitores: A Study in Social Mobility'. *Papers of the British School at Rome* 51: 125–73.
- . 2015. 'Apollodorus (7), of Damascus, Greek Architect for Trajan, 2nd Cent. CE'. In *Oxford Research Encyclopedia of Classics*.
- Purcell, Nicholas. 1996. 'Rome and Its Development under Augustus and His Successors'. In *The Cambridge Ancient History*, edited by Alan K. Bowman, Edward Champlin, and Andrew Lintott, 2nd ed., 782–811. Cambridge University Press.
- Quilici, L. 2008. 'Land Transport, Part 1: Roads and Bridges'. In *The Oxford Handbook of Engineering and Technology in the Classical World*, edited by J Oleson, 551–79. Oxford: Oxford University Press.
- Raaflaub, K. A. 2017. 'Caesar, Literature, and Politics at the End of the Republic'. In *The Cambridge Companion to the Writings of Julius Caesar*, edited by L. Grillo and C. B. Krebs, 13–28. Cambridge: Cambridge University Press.
- Rambaud, M. 1953. *L'art de la déformation historique dans les Commentaires de César*. Annales de l'Université de Lyon 3 sér, Lettres; Fasc. 23. Paris: Société d'Édition les Belles Lettres.
- Rankov, B. 2007. 'Military Forces'. In *The Cambridge History of Greek and Roman Warfare. Volume 2, Rome from the Late Republic to the Late Empire*, edited by P. A. G. Sabin, H. van Wees, and M. Whitby, 30–75. Cambridge: Cambridge University Press.
- Rao, Y, J Xie, and X Xu. 2024. 'Facilitating "Migrant-Local" Tacit Knowledge Transfer in Rural Tourism Development: A Longitudinal Case Study'. *Tourism Management* 100 (February): 104836.
- Rawson, E. 1987. 'Discrimina Ordinum : The Lex Julia Theatralis'. *Papers of the British School at Rome* 55: 83–114.

- Rea, R. 2001. 'The Architecture and Function of the Colosseum'. In *The Colosseum*, edited by A. Gabucci, translated by M. Becker. Los Angeles: Getty Publications.
- Reeve, M. 2004. *Vegetius: Epitoma Rei Militaris*. Oxford: Oxford University Press.
- Reitz-Joosse, B. 2022. *Building in Words: Representations of the Process of Construction in Latin Literature*. Oxford: Oxford University Press.
- Reynolds, J. 1995. 'The Dedication of a Bath Building at Carian Aphrodisias'. In *Studia in Honorem Georgii Mihailov*, edited by A Fol and et al., 397–402. Sophia: St Kliment Ohridski University Press.
- . 2000. 'New Letters from Hadrian to Aphrodisias: Trials, Taxes, Gladiators and an Aqueduct'. *Journal of Roman Archaeology* 13: 5–20.
- Rich, J. 1993. 'Introduction'. In *War and Society in the Roman World*, edited by J. Rich and G. Shipley, 1–8. Leicester-Nottingham Studies in Ancient Society; v. 5. London: Routledge.
- Richardson, A. 2000. 'The Numerical Basis of Roman Camps'. *Oxford Journal of Archaeology* 19 (4): 425–37.
- Richter, G. M. A. 1965. *The Portraits of the Greeks*. 3 vols. London: Phaidon Press.
- Ridley, R. 1989. 'The Fate of an Architect: Apollodoros of Damascus'. *Athenaeum* 67: 555–65.
- Riggsby, A. M. 2006. *Caesar in Gaul and Rome: War in Words*. Austin: University of Texas Press.
- Rihll, T. E. 2013. *Technology and Society in the Ancient Greek and Roman Worlds*. Historical Perspectives on Technology, Society, and Culture 10. Washington, D.C: American Historical Association, Society for the History of Technology.
- Rihll, T. E., and J. V. Tucker. 1995. 'Greek Engineering: The Case of Eupalinos' Tunnel'. In *The Greek World*, edited by A. Powell, 403–31. London: Routledge.
- Roberts, J, and W Goodenough. 1964. 'The Self-Manegment of Cultures'. In *Explorations in Cultural Anthropology, Essays in Honor of George Peter Murdock*. New York: McGraw-Hill.
- Roby, C. 2016. *Technical Ekphrasis in Greek and Roman Science and Literature: The Written Machine between Alexandria and Rome*. Cambridge: Cambridge University Press.
- . 2018. 'Physical Sciences: Ptolemy's Extended Mind'. In *Revolutions and Continuities in Greek Mathematics*, edited by M. Sialaros, 67–88. Berlin: De Gruyter.
- . 2019. 'Physical Sciences: Ptolemy's Extended Mind'. In *Distributed Cognition in Classical Antiquity*, edited by M. Anderson, D. Cairns, and M. Sprevak, 37–56. Edinburgh University Press.
- . 2023. 'Terminology in the Wild: Enactive Meaning-Making in the Roman Survey'. In *Coming to Terms: Approaches to (Ancient) Terminologies*, edited by Markus Asper, 41–66. De Gruyter.
- Romano, E. 2017. 'Si Qui Voluerit: Vitruvius on Architecture as "the Art of the Possible"'. In *Knowledge, Text and Practice in Ancient Technical Writing*, edited by M. Formisano and P. van der Eijk, 53–67. Cambridge: Cambridge University Press.
- Romm, J. 2006. 'Herodotus and the Natural World'. In *The Cambridge Companion to Herodotus*, edited by C. Dewald and J. Marincola, 178–91. Cambridge Companions to Literature. Cambridge: Cambridge University Press.

- Russell, B. 2020. 'Roman Sculptors at Work: Professional Practitioners?' In *Skilled Labour and Professionalism in Ancient Greece and Rome*, edited by E Stewart, E Harris, and D Lewis, 1st ed., 243–66. Cambridge: Cambridge University Press.
- Saddington, D.B. 2007. 'Classes: The Evolution of the Roman Imperial Fleets'. In *A Companion to the Roman Army*, edited by P. Erdkamp, 201–34. Oxford: Blackwell.
- Sage, Michael. 2013. 'The Rise of Rome'. In *The Oxford Handbook of Warfare in the Classical World*, edited by Brian Campbell and Lawrence A. Tritle, 1st ed., 216–35. Oxford: Oxford University Press.
- Salmon, E. T., and T. W. Potter. 2016. 'Fidenae'. In *Oxford Research Encyclopedia of Classics*, by E. T. Salmon and T. W. Potter. Oxford University Press.
- Sander, E. 1962. 'Der praefectus fabrum und die Legionsfabriken'. *Bonner Jahebucher* 162: 139–61.
- Sapirstein, P. 2020. 'Picturing Work'. In *A Cultural History of Work in Antiquity*, edited by E. Lytle, 1st edition, 33–56. London; New York; Oxford; New Delhi; Sydney: Bloomsbury Academic.
- Sapirstein, P. 2020. 'Work, Skill and Technology'. In *A Cultural History of Work in Antiquity*, edited by E. Lytle, First edition, 73–94. A Cultural History of Work, volume 1. London: Bloomsbury Publishing.
- Scheidel, W. 2008. 'The Comparative Economics of Slavery in the Greco-Roman World'. In *Slave Systems: Ancient and Modern*, edited by E. Dal Lago and C. Katsari, 105–26. Cambridge: Cambridge University Press.
- Schermaier, Martin, ed. 2023. *The Position of Roman Slaves: Social Realities and Legal Differences*. Dependency and Slavery Studies 6. Berlin/Boston: De Gruyter.
- Schniedewind, W. M. 2024. *Who Really Wrote the Bible: The Story of the Scribes*. Princeton: Princeton University Press.
- Schulz, V. 2019. *Deconstructing Imperial Representation: Tacitus, Cassius Dio, and Suetonius on Nero and Domitian*. Boston: Brill.
- Senseny, J. R. 2015. 'Architects'. In *Oxford Classical Dictionary*.
- Shapin, S. 1989. 'The Invisible Technician'. *American Scientist* 77 (6): 554–63.
- Shaw, B. D. 1984. 'Water and Society in the Ancient Maghrib: Technology, Property and Development'. *Antiquités Africaines* 20 (1): 121–73.
- Sherk, R. 1974. 'Roman Geographical Exploration and Military Maps'. *Aufstieg Und Niedergang Der Römischen Welt* II 1: 534–62.
- Sherwin-White, A. N. 1962. 'Trajan's Replies to Pliny: Authorship and Necessity'. *Journal of Roman Studies* 52 (1–2): 114–25.
- . 1966. *The Letters of Pliny: A Historical and Social Commentary*. Oxford: Clarendon Press.
- Shirley, E. A. M. 2001. *Building a Roman Legionary Fortress*. Stroud: Tempus.
- Sibum, H.O. 1995. 'Reworking the Mechanical Value of Heat: Instruments of Precision and Gestures of Accuracy in Early Victorian England'. *Studies in History and Philosophy of Science* 24: 76–106.
- Singer, P. N., and Ralph Mark Rosen, eds. 2024. *The Oxford Handbook of Galen*. Oxford Handbooks Online. New York, NY: Oxford University Press.

- Sinn, F, and K Freyberger S. 1996. *Die Grabdenkmäler II: Die Ausstattung Des Hateriergrabes (Vatikanische Museen, Museo Gregoriano Profano Ex Lateranense: Katalog Der Skulpturen, Vol. I.2)*. Mainz: Von Zabern.
- Smith, C. J. 2006. *The Roman Clan: The Gens from Ancient Ideology to Modern Anthropology*. The W.B. Stanford Memorial Lectures. Cambridge: Cambridge University Press.
- Smith, R. R. R. 2007. 'Statue Life in the Hadrianic Baths at Aphrodisias, AD 100 600: Local Context and Historical Meaning'. In *Statuen in der Spätantike*, edited by F. A. Bauer and Christian Witschel, 203–35. Spätantike, frühes Christentum, Byzanz, Bd. 23. Wiesbaden: Reichert.
- Southern, Pat. 2007. *The Roman Army: A Social and Institutional History*. 1st ed. Oxford: Oxford University Press.
- Speidel, M. A. 1992. 'Roman Army Pay Scales'. *Journal of Roman Studies* 82 (November): 87–106.
- Stadter, P.A. 2006. 'Pliny and the Ideology of Empire: The Correspondence with Trajan'. *Prometheus* 32: 61–76.
- Staubermann, K. 2000. 'The Trouble with the Instrument: Zollner's Photometer'. *Journal for the History of Astronomy* 21: 323–38.
- Stevens, C. E., and J. F. Drinkwater. 2016. 'Vindonissa'. In *Oxford Research Encyclopedia of Classics*, by C. E. Stevens and J. F. Drinkwater. Oxford: Oxford University Press.
- Stevens, Courtenay Edward, and Simon Hornblower. 2015. 'Mamurra, of Formiae'. In *Oxford Research Encyclopedia of Classics*, by Courtenay Edward Stevens and Simon Hornblower. Oxford University Press.
- Stewart, E., E. Harris, and D. Lewis, eds. 2020a. *Skilled Labour and Professionalism in Ancient Greece and Rome*. Cambridge: Cambridge University Press.
- Stewart, E, E Harris, and D Lewis. 2020b. 'Introduction'. In *Skilled Labour and Professionalism in Ancient Greece and Rome*, edited by E Stewart, E Harris, and D Lewis, 1st ed., 1–26. Cambridge University Press.
- Strong, D. E. 1968. 'The Administration of Public Building In Rome During The Late Republic and Early Empire'. *Bulletin of the Institute of Classical Studies* 15 (1): 97–109.
- Sullivan, D. F. 2000. *Sigecraft: Two Tenth-Century Instruction Manuals by 'Heron of Byzantium'*. Washington, D.C: Dumbarton Oaks.
- Syme, R. 1958. *Tacitus*. Special ed. for Sandpiper Books. Oxford: Clarendon Press.
- Taub, L., and A. Doody, eds. 2009. *Authorial Voices in Greco-Roman Technical Writing*. Trier: Wissenschaftlicher Verlag Trier.
- Tavares, W. J. B., and A. T. M. Gonçalves. 2015. 'Formation of a Roman Soldier in the Fourth Century A.D. and the Foundation of a Military Paideia: Rethinking the Vegetius Epitoma Rei Militaris'. *Acta Scientiarum. Education* 37 (1): 15.
- Taylor, R. 2003. *Roman Builders: A Study in Architectural Process*. Cambridge: Cambridge University Press.
- Tehrani, J, and F Riede. 2008. 'Towards an Archaeology of Pedagogy: Learning, Teaching and the Generation of Material Culture Traditions'. *World Archaeology* 40 (3): 316–31.
- Thielscher, P. 1961. 'Vitruvius'. In *Realencyclopädie Der Classischen Altertumswissenschaft*. Vol. 9a.1.

- Tomas, J. 2020. 'Variation in Representation through Architectural Benefaction under Roman Rule: Five Cases from the Province of Asia c. 40B.C.-A.D.68'. Durham University.
- Tosh, N. 2003. 'Anachronism and Retrospective Explanation: In Defence of a Present-Centred History of Science'. *Studies in History and Philosophy of Science* 34: 647–59.
- Tran, N. 2017. 'Ars and Doctrina: The Socioeconomic Identity of Roman Skilled Workers (First Century BC–Third Century AD)'. In *Work, Labour, and Professions in the Roman World*, edited by Koenraad Verboven and Christian Laes, 246–61. Impact of Empire, volume 23. Leiden: Brill.
- Ulrich, Roger B. 2008. *Roman Woodworking*. New Haven: Yale University Press.
- Verboven, K. 2011. 'Introduction: Professional Collegia: Guilds or Social Clubs?' *Ancient Society* 41: 187–95.
- . 2017. 'Guilds and the Organisation of Urban Populations During the Principate'. In *Work, Labour, and Professions in the Roman World*, edited by K Verboven and C Laes, 172–202. Impact of Empire (Roman Empire, c. 200 B.C.-A.D. 476) (Series) 23. Leiden; Boston: Brill.
- Verboven, K., and C. Laes, eds. 2017. *Work, Labour, and Professions in the Roman World*. Impact of Empire, volume 23. Leiden: Brill.
- Villedieu, F. 2011. 'Une Construction Néronienne Mise Au Jour Sur Le Site de La Vigna Barberini: La Cenatio Rotunda de La Domus Aurea?' *Neronia Electronica* 1.
- Volpe, R. 2002. 'Un Antico Giornale Di Cantiere Delle Terme Di Traiano'. *Mitteilungen Des Deutschen Archaeologischen Instituts, Römische Abteilung* 109: 377–94.
- Volpe, R., and F. M. Rossi. 2012. 'Nuovi Dati Sull'essedra Sud-Ovest Delle Terme Di Traiano Sul Colle Oppio: Percorsi, Iscrizioni Dipinte e Tempi Di Costruzione'. In *Arqueología de La Construcción III. Los Procesos Constructivos En El Mundo Romano: La Economía de Las Obras.*, edited by S. Camporeale, H Dessales, and A. Pizzo, 69–81. Madrid: Consejo Superior de Investigaciones Científicas, Instituto de Arqueología de Mérida Università di Siena, Dipartimento di Archeologia e Storia delle Arti École Normale Supérieure, Département des Sciences de l'Antiquité.
- Voskul, A. 1997. 'Recreating Herschel's Actinometry: An Essay in the Historiography of Experimental Practice'. *The British Journal for the History of Science* 30: 337–55.
- Wallace-Hadrill, A. 2008. *Rome's Cultural Revolution*. Cambridge: Cambridge University Press.
- . 2013. 'Trying to Define and Identify the Roman "Middle Classes"'. *Journal of Roman Archaeology* 26: 605–9.
- Warden, P. G. 1981. 'The Domus Aurea Reconsidered'. *Journal of the Society of Architectural Historians* 40 (4): 271–78.
- Welch, K. 1994. 'The Roman Arena in Late-Republican Italy: A New Interpretation'. *Journal of Roman Archaeology* 7: 59–80.
- Welch, K. E. 1970. 'The Office of Praefectus Fabrum in the Late Republic'. *Chiron*, January, 131-146 Seiten.
- . 2007. *The Roman Amphitheatre: From Its Origins to the Colosseum*. Cambridge: Cambridge University Press.

- Wendrich, Willeke, ed. 2013. *Archaeology and Apprenticeship: Body Knowledge, Identity, and Communities of Practice*. Tucson: University of Arizona Press.
- Wenger, E. 1998. *Communities of Practice: Learning, Meaning, and Identity*. Learning in Doing. Cambridge: Cambridge University Press.
- Wenger-Trayner, E. 2020. *Learning to Make a Difference: Value Creation in Social Learning Spaces*. Cambridge: Cambridge University Press.
- Wescher, C. 1867. *Poliorcétique Des Grecs: Traités Théoriques - Récits Historiques*. Paris: Imprimerie impériale.
- Wesch-Klein, G. 2007. 'Recruits and Veterans'. In *A Companion to the Roman Army*, edited by P. Erdkamp, 435–51. Blackwell Companions to the Ancient World. Oxford: Blackwell.
- Whitehead, D. 2008. 'Apollodorus' Poliorketika: Author, Date, Dedicatée'. In *A Roman Miscellany: Essays in Honour of Anthony R. Birley on His Seventieth Birthday*, edited by H. M. Schellenberg, V.-E. Hirschmann, and A. Kriekhaus, 204–12. Monograph Series Akanthina 3. Gdańsk: Foundation for the Development of Gdańsk University.
- . 2010. *Apollodorus Mechanicus, Siege-matters (Poliorkētika): translated with introduction and commentary*. Geschichte. Stuttgart: Franz Steiner Verlag.
- Williams, W. 1990. *Pliny: Correspondance with Trajan from Bithynia*. Warminster: Aris & Phillips.
- Wilmott, T. 2008. *The Roman Amphitheatre in Britain*. Stroud: Tempus.
- Wilson, A. 1995. 'Running Water and Social Status in North Africa'. In *Noth Africa from Antiquity to Islam: Papers of a Conference Held at Bristol, October 1994*, edited by M. Horton and T. Wiedemann, 52–56. Bristol: Center of Mediterranean Studies.
- . 2002. 'Machines, Power and the Ancient Economy'. *The Journal of Roman Studies* 92: 1–32.
- . 2008. 'Hydraulic Engineering and Water Supply'. In *Oxford Handbook of Engineering and Technology in the Classical World*, edited by J. P. Oleson, 285–318. Oxford; New York: Oxford University Press.
- . 2016a. 'The Olympian (Hadianic) Baths: Layout, Operation and Financing'. In *Aphrodisias Papers. 5, Excavation and Research at Aphrodisias, 2006-2012*, edited by R. R. R. Smith, A. Sokolicek, and K. E. Welch, 168–94. Journal of Roman Archaeology. Supplementary Series, Number 103. Portsmouth, Rhode Island: Journal of Roman Archaeology, L.L.C.
- . 2016b. 'Water, Nymphs, and a Palm Grove: Monumental Water Display at Aphrodisias'. In *Aphrodisias Papers. 5, Excavation and Research at Aphrodisias, 2006-2012*, edited by R. R. R. Smith, A. Sokolicek, and K. E. Welch, 77–90. Journal of Roman Archaeology. Supplementary Series, Number 103. Portsmouth, Rhode Island: Journal of Roman Archaeology, L.L.C.
- Wilson Jones, M. 1993. 'Designing Amphitheatres'. *Römische Mitteilungen* 100: 391–441.
- Wolfram Thill, E. 2010. 'Civilization Under Construction: Depictions of Architecture on the Column of Trajan'. *American Journal of Archaeology* 114 (1): 27–43.
- Woodman, A. J. 2018. *The Annals of Tacitus: Book 4*. Cambridge: Cambridge University Press.
- Woolf, G. 2006. 'Pliny's Province'. In *Rome and the Black Sea Region: Domination, Romanisation, Resistance*, edited by Tønnes Bekker-Nielsen, 93–108. Black Sea Studies 5. Aarhus: Aarhus University Press.

- . 2015. 'Pliny/Trajan and the Poetics of Empire'. *Classical Philology* 110 (2): 132–51.
- Wright, G. R. H. 2000. *Ancient Building Technology*. *Technology and Change in History*, v. 4, 7. Leiden; Boston: Brill.
- Zanda, E. 2011. *Fighting Hydra-like Luxury: Sumptuary Regulation in the Roman Republic*. London: Bloomsbury Publishing.
- Zimmer, Gerhard. 1982. *Römische Berufsdarstellungen*. *Archäologische Forschungen* ; Bd. 12. Berlin: Mann.

Image References

Figure 1 Apollodorus of Damascus

Munich Glyptothek <https://www.livius.org/pictures/a/roman-portraits/apollodorus-of-damascus/>

Figure 2 Two Structor Monuments

Roma, Museo Nazionale Romano, Mag. Epigr. L, 4, 3 esterno, inv. 33269 Sara MELONI
http://www.edr-edr.it/edr_programmi/view_img.php?id_nr=111972
[https://db.edcs.eu/epigr/bilder.php?s_language=en&bild=\\$TR_CIL_13_05209_1.jpg;\\$TR_CIL_13_05209_2.jpg;\\$TitHelv_00496.jpg&nr=1](https://db.edcs.eu/epigr/bilder.php?s_language=en&bild=$TR_CIL_13_05209_1.jpg;$TR_CIL_13_05209_2.jpg;$TitHelv_00496.jpg&nr=1)

Figure 3 Dedication inscription from Aquae Flaviae

Bruno Esteves https://commons.wikimedia.org/wiki/File:Coluna_Ponte_Romana_Chaves.jpg

Figure 4 Century Stone Chester's Roman Fort

Chester's Roman Fort 833CH324 author's image

Figure 5 Tombstone of Marcus Julius Maximus

[https://db.edcs.eu/epigr/bilder.php?s_language=en&bild=\\$TR_CIL_13_05209_1.jpg;\\$TR_CIL_13_05209_2.jpg;\\$TitHelv_00496.jpg&nr=1](https://db.edcs.eu/epigr/bilder.php?s_language=en&bild=$TR_CIL_13_05209_1.jpg;$TR_CIL_13_05209_2.jpg;$TitHelv_00496.jpg&nr=1)

Figure 6 Vedennius Moderatus

Musei Vaticani, Museo Chiaramonti, Galleria, Scomparto XL. Dedicata a Caius Vedennius Moderatus,. 81-96 d.C. Rinvenuta nel 1816 sulla via Nomentana.
Fabrizio Garrisi https://commons.wikimedia.org/wiki/File:40-04_Dedica_a_Caius_Vedennius_Moderatus,_81-96_d.C._-FG.jpg

Figure 7 Samacius Serenus

[https://db.edcs.eu/epigr/bilder.php?s_language=en&bild=\\$IscM-04_00108.jpg;pp](https://db.edcs.eu/epigr/bilder.php?s_language=en&bild=$IscM-04_00108.jpg;pp)

Figure 8 Building relief from the Tomb of the Haterii

Museo Gregoriano Profano Cat. 9998 – author's image also see:
arachne.dainst.org/entity/1081227

Figure 9 Tomb-Crane relief from the Tomb of the Haterii

Museo Gregoriano Profano Cat. 9997 – image:
www.museivaticani.va/content/museivaticani/en/collezioni/musei/museo-gregoriano-profano/Mausoleo-degli-Haterii.html#&gid=1&pid=1 and arachne.dainst.org/catalog/79/41965

Figure 10 Early second century CE coin depicting a river god labelled Timeles
Imhoof-Blumer, Fluss-und Meergötter (supra n. 2) nos. 291, 292, pl. IX no. 28 (Aphrodisias) in
Commito & Rojas 2012

Figure 11 Cross-sectional view of a segment of the amphitheatre at Fidenae
Napolitano & Monce 2018

Appendix A

AGRIMENSOR								
Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text
CIL 08, 12639	101 - 200	Africa proconsularis	Carthago	Funerary				Dis Manib(us) sacr(um) / T(itus) Flavius Dapnus Aug(usti) / lib(ertus) agrimensor pius / vix(it) ann(os) LXXXX / Iulia Fortunata viro... text continues
CIL 02, *00128	69 - 117	Baetica (spain)	Carmona / Carmo		Yes		collegia	Cerer(i) Frugif(erae) sac(rum) / colleg(ium) agrimensor(um) Carmonens(ium) et cent(uriae) / Albores Volces Agstes Ligyes / colleg(ium) agrimensor(um) Segobiens(ium) et centur(iae)... text continues
CIL 02-05, 00351 = CIL 02, 01598	-30 - 14	Baetica (spain)	Nueva-Carteya	Funerary				L(ocus) p(edum) CXX / Q(uintus) Iulius P(ubli) f(ilius) Gal(eria) / Rufus agrimensor / Siccaenas
CIL 03, 01189	193 - 275	Dacia(romania)	Alba Iulia / Apulum		Yes			li]br(arius) / [3] b(ene)[f(iciarius)] c(onsularis) / [//] / Aur(elius) Iustu[s] / Aur(elius) Lucilius agr(imensor) / Val(erius) Romulus /... text continues
CIL 08, 08812	-	Mauretania Caesariensis	El-Guerria / Equizetum					D(omino) n(ostro) / Imp(eratore) Cae(sare) M(arco) Au(relio) Severo Ale(xandro) / Pio Felice / Aug(usto) termina<t=C>(io) [a]/grorum defeni/<t=C>ionis Matidiae ad/signantur colo/nis... text continues

AE 2014, 01137	151 - 200	Moesia inferior(serbia)	Montana / Mikhaylovgrad / Mihailovgrad / Municipium Montanensium	Votive	Yes			I(ovi) O(ptimo) M(aximo) / et Numini / Aug(usti) T(itus) Cl(audius) / Tiber(i)n(u)s / mil(es) agri/men(sor) leg(ionis) X[I] / Cl(audiae) posuit
Chiron-1994-374 = AE 1994, 01424 = Mirkovic-2017, 00081	151 - 230	Pannonia inferior(croatia)	Sremska Mitrovica / Mitrovicz / Sirmium	Votive	Yes			I(ovi) O(ptimo) M(aximo) / G(aius!) Annius / Quietus agri(mensor) / mill[e]s leg(ionis) X Ge(minae) P(iae) F(idelis) / benef(iciarius) co(n)s(ularis) /... text continues
NSA-1920-38	1 - 70	Roma	Roma					C(aius) Iuliu[s 3] / Ias[on] / agri[mensor(?)]
AQUARIUS								
Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text
IIBrindisi 00093 = AE 1964, 00138 = AE 1966, 00099	41 - 100	Apulia et Calabria / Regio II	Brindisi / Brundisium	Funerary				D(is) M(anibus) / Felix public(us) / Brun(disorum) ser(vus) aqua[r(ius)] / v(ixit) a(nnos) XXXVIII
Philippi 00177 = CIPh-02-01, 00225 = AE 1923, 00087 = AE 1974, 00588	1 - 300	Macedonia	Philippoi / Krinides / Philippi	Votive				I(ovi) O(ptimo) M(aximo) s(acrum) v(otum) i(ussu) de(i) f(ecit) s(ub) te(stimonio) / sac(erdotis) / Sec(undus) col(oniae) ser(vus) aqu(arius) ite(m) vot(um) s(olvit)
CIL 06, 00131 (p 3003, 3755, 4118) = D 03253 = Alumnus 00699	218 - 218	Roma	Roma	Votive				Diana / Cariciana / M(arcus) Aurelius Caricus / aquarius huius loci / cum libertis et alum/nis sigill<um=O> Dianae / dedic(avit?)... text continues
CIL 06, 00551 (p 3005) = CIL 06, 30792	201 - 300	Roma	Roma	Votive				Nymp(his) Sanc(tis) sac(rum) Epictetus / aquarius Aug(usti) n(ostri)

CIL 06, 01057 (p 3071, 3777, 4320, 4340) = CIL 06, 01058 = CIL 06, 31234 = D 02157 = CBI 00900 = AnalEpi p 93 = AE 1977, +00154 = Velestino-2015, p 113	205 - 210	Roma	Roma		Yes		Imp(eratori) Caesar(i) M(arco) Aurelio / Antonino Pio Felici / Aug(usto) trib(unicia) pot(estate) XIII imp(eratori) II / co(n)s(uli) III proco(n)s(uli) /... text continues
CIL 06, 02345 (p 3828) = D 01975	101 - 300	Roma	Roma	Funerary			D(is) M(anibus) / Laetus publicus populi / Romani [3] aquarius / aquae An{n}ionis veteris / castelli viae Latinae contra /... text continues
CIL 06, 02467 (p 3369) = Epigraphica-2007-341 = AE 2007, 00210	1 - 70	Roma	Roma	Funerary	Yes		Furinia Sabina fecit / C(aio) Fundanio Sabino con/iugi suo de se bene merent{t}i / militi praetoriano coh(ortis) II / (centuria)... text continues
CIL 06, 03935	29 - 50	Roma	Roma				Primus / Ti(beri) Caesar(is) Matern(i) / aquar(ius)
CIL 06, 03936	1 - 50	Roma	Roma				Secundio Iuliae Aug(ustae) / aquarius dat olla(m) / Advenae coniugi piae
CIL 06, 07973	101 - 200	Roma	Roma	Funerary			D(is) M(anibus) / Agathemero Aug(usti) lib(erto) fecer(unt) / Asia coniugi suo b(ene) m(erenti) et / Panthagathus Caes(aris) n(ostris) ser(vus) aqua/rius... text continues
CIL 06, 08653	81 - 150	Roma	Roma	Funerary			D(is) M(anibus) / Primo / qui vix(it) ann(os) II / m(enses) III Belambelus / a<q=C>uarius ex do/mu Tiberiana / et... text continues
RPAA-2005/06-467b	31 - 70	Roma	Roma	Funerary			Grathus Caes(aris) / servus ex nemore C[ai] / et Luci posuit Abasca/ntus aquarius

								Caes(aris) ser/v(u)s / d(is) M(anibus) s(acrum)
ARCHITECTUS								
Publication	Date	Province	Place	Type	Military	Photo on Claus/Slaby	Other Terms	Text
ILTun 01085	-	Africa proconsularis	Carthago	Funerary				arc]hitectus / [pius vi]x(it) ann(os) / [3]X h(ic) s(itus) e(st)
CIL 09, 01052	-	Apulia et Calabria / Regio II	Frigento / Frequentum / Aeclanum					C(aius) Antistius / [I]sochrysus / architectu[s]
CIL 07, 01065 = RIB-01, 02096 = D 04744 (p 183) = CSIR-GB-01-04, 00013	142 - 161	Britannia	Birrens / Blatobulgium	Votive				Deae / Harimel/lae sac(rum) Ga/midiahus / arc(h)it(ectus) v(otum) s(olvit) l(ibens) l(aetus) m(erito)
CIL 07, 01062	119 - 161	Britannia	Birrens / Blatobulgium					Brigantiae s(acrum) Amandus / arc(h)itectus ex imperio imp(eratum)
RIB-01, 01542	122 - 300	Britannia	Carrawburgh / Brocolitia	Votive			Minervae	Minervae / Quin[t]us / architect(us) / v(otum) s(olvit) l(ibens) m(erito)
CIL 10, 08093 = D 05539 = IGrumentum p 330 = AE 2006, +00356	-	Bruttium et Lucania / Regio III	Grumento Nova / Grumentum					T(itus) Vettius Q(uinti) f(ilius) / Ser(gia) architectus / porticus de pe<c=Q>(unia) / pagan(ica) faciund(as) / coer(avit) / A(ulo) Hirtio C(aio)... text continues
CIL 11, 02134 = ZPE-68-186 = Chiusi 00316	-	Etruria / Regio VII	Chiusi / Clusium					C(aius) Acilius L(uci) f(ilius) / Treb(onia) nat(us) / archit(ectus)
CIL 12, 00186 = ILN-02-A, 00021 = CAG-06, p 147	-	Gallia Narbonensis	Antibes / Antipolis					Sex(tus) Iul(ius) Cae[3] / architect(us) or[
CIL 12, 00723 = CAG-13-05, p 680	-	Gallia Narbonensis	Arles / Arelate				naval	C]oelius D[3] / [ar]chitectus nav[alis] / [sib]i et Coelio [3] / Monimiae matr[i et] / Frontoni Nic[

ILGN 00232 = CAG-26, p 400 = ILN-07, 00185	-	Gallia Narbonensis	Luc-en-Diois / Lucus Augusti	Signature			mosaic	Q(uintus) Amiteius / architect(us) / fecit
CIL 12, 02993 = CAG-30-03, p 685*	-	Gallia Narbonensis	Sernhac	Funerary			maximus	Philippus / architectus / maximus / hic situs / est
CIL 13, 08082 = CSIR-D-03-01, 00035 = Lehner- 1918, 00630 = Grabstelen 00033	-	Germania inferior	Bonn / Bonna	Funerary	Yes			D(is) M(anibus) / Iul(io) Paterno / mil(iti) leg(ionis) XXII Pr(imigeniae) / P(iae) F(idelis) stip(endiorum) XXXIII / Opponius Iustus / archit(ectus)... text continues
Ness-Lieb 00201 = Epigraphica-1957-3 = AE 1953, 00093 = AE 1960, 00160 = FeRA-2019-38-3	101 - 130	Germania inferior	Bonn / Bonna		Yes		Nemesi	Nemesi D<i=E>a/nae Publius / Publi Claudia / Savaria A<q=C>u(i)/leiensis Opponi(us) / Iustus archit(ectus) / leg(ionis) XXII P(rimigeniae) P(iae) F(idelis)
CIL 13, 06680 = D 02421 = CSIR-D- 02-04, 00036 = GeA 00135	151 - 200	Germania superior	Mainz / Mogontiacum	Votive	Yes		Armorum	Genio |(centuriae) / Nigidi / Censorini / Ael(ius) Verin(us) / architec(tus) / Geminius / Primus c(ustos) a(rmorum) / ex voto... text continues
FBW-1977-328	-	Germania superior	Baden-Baden / Aquae	Votive	Yes		Minervae	Minervae / Val(erius) Perimus / arc(hitectus) c(o)ho(rtis) et / Vittalis lap{p}/idari(us) ex vot{t}o / et sui lap{p}idar(ii)
CIL 13, 06403 = RSO 00152 = Wagner-01, p 287 = DHR 00024	151 - 250	Germania superior	Heidelberg	Votive			Neptune	In h(onorem) d(omus) d(ivinae) / Neptuno / (a)edem cum / signo Val(erius) / Paternus / arc(hitectus) et Aeli/us Macer ex... text continues
EDCS 00783 {Manfred Clauss}	-	Germania superior	Strasbourg / Strassburg / Argentorate	Funerary	Yes			C(aius) Caprius / C(ai) f(ilius) Ultinia / Tolosa Iulianu/s / mil(es) leg(ionis) VIII Aug(ustae) / arc(h)itectus / Flaviovilu / Proc(u)li... text continues

CIL 02, 02559 (p XLV, LXXX, 707) = CIL 02, 05639 = D 07728 = CIRG-01, 00002 = CCIRupestres 00045 = MiliariHispanico 00524 = AE 1990, 00544 = AE 2003, +00824 = AE 2016, +00635 = AE 2016, +00636	-	Hispania citerior	A Coruna / La Coruna / Brigantium		Maybe		Marti / Aug(usto) sacr(um) / G(aius!) Sevius / Lupus / architectus / Aemiensis / Lusitanus ex vo(to)
CIL 10, 04587 = CIL 01, 01576 (p 1009) = ILLRP 00559 = IATrebula 00054	-80 -- 51	Latium et Campania / Regio I	Caiazzo / Caiatia				M(arcus) Herennius M(arci) f(ilius) Gallus / Q(uintus) Vesperius Q(uinti) f(ilius) duovir(i) / quinq(uennales) / d(e) d(ecurionum) s(ententia) f(aciundum) c(uraverunt) eidemq(ue)... text continues
NSA-1939-127-158 = NELirina 00027 = AE 2013, 00204	-	Latium et Campania / Regio I	Cassino / Casinum				Tit[3]arus arc(h)it[ectus]
CIL 10, 01443 = D 05637 = Engfer-2017, 00052	-20 --1	Latium et Campania / Regio I	Ercolano / Resina / Herculaneum	Dedication		Theater	L(ucius) Annius L(uci) f(ilius) Mammianus Rufus Ilvir quinq(uennalis) theatr(um) orch(estram) s(ua) p(ecunia) / P(ublius) N(umisius) P(ubli) f(ilius) arc[hi]te[ctus]
CIL 10, 01446 = D 05637b	-20 --1	Latium et Campania / Regio I	Ercolano / Resina / Herculaneum				] P(ublius) Nu[misius] P(ubli) f(ilius) Men(enia) architectus
CIL 10, 06126	-50 -20	Latium et Campania / Regio I	Formia / Formiae				C(aius) Postumius Pollio / architectus
CIL 04, 04716	1 - 79	Latium et Campania / Regio I	Pompei				Cresce(n)s architectus
CIL 04, 04755 = GraffPomp 00569	1 - 79	Latium et Campania / Regio I	Pompei				Cresce(n)s architectus

CIL 10, 00841 (p 967) = D 05638a = PompIn 00035	-2 - 10	Latium et Campania / Regio I	Pompei					M(arcus) Artorius M(arci) l(ibertus) Primus / architectus
CIL 10, 08146 (p 1006)	-	Latium et Campania / Regio I	Pompei					Ave Quartila da bis salv(u)s sis Gra(te) Gratus architec(tus) s(alutem) p(atronae?) s(uae?) ego Felix [fe]ci(?)
CIL 10, 01614 (p 1009) = D 07731a = AE 2005, +00336	-	Latium et Campania / Regio I	Pozzuoli / Puteoli					L(ucius) Cocceius L(uci) / C(ai) Postumi l(ibertus) / Auctus arc(h)itect(us)
CIL 10, 05371 = CLE 00118 = D 07734 = ILLRP-S, 00120 = AE 1991, 00420	-	Latium et Campania / Regio I	Santi Cosma e Damiano / Interamna Lirenas	Funerary			naval	Vivit / Q(uintus) Caelius Sp(uri) filius vivi(t) / architectus navalis / vivit / uxor Camidia M(arci) l(iberta) / Ap<hr=RH>odisia / ... text continues
CIL 10, 06339 = D 07731	-27 - - 14	Latium et Campania / Regio I	Terracina / Tarracina			Facsimile of text		C(aius) Postumius C(ai) f(ilius) / Pollio / architectus
AE 1994, 01566 = AE 1998, 01223 = AE 1999, 00115	71 - 117	Macedonia	Durres / Dyrrachium					L(ucius) Tutili/u(s) Rufus / arc(h)itectus
CIMRM-02, 02314 = ZPE-181-208 = IScM-04, 00108 = AE 1936, 00012	171 - 230	Moesia inferior (Bulgaria)	Silistra / Silistria / Durostorum	Votive	Yes	Text and mythras imagery		Invicto Mithrae / Q(uintus) Samacius Serenus archite[c]tus salariarius leg(ionis) XI Cl(audiae) posuit
CIL 08, 02850 (p 1740)	-	Numidia	Lambaesis	Funerary	Yes			D(is) M(anibus) s(acrum) / M(arcus) Cornelius Festus / mil(es) leg(ionis) III Aug(ustae) / architectus vi<x=C>/s}it an{n}nis XXX
CSIR-Oe-01-04, 00383 = Hild 00267 = Legio-XV-Apo 00081 = MaCarnuntum 00211 = AEA 2003, +00002 = AEA 2006, +00003 = AE	81 - 114	Pannonia superior (Hungary)	Petronell-Carnuntum / Carnuntum	Funerary	Yes	Tools		Q(uintus) Valerius / Seius mil(es) l(egionis) XV / Ap(ollinaris) arc(h)i(tectus) Vien(na) / an(norum) XL sti(pendiorum) IX / h(ic) s(itus) e(st)... text continues

1929, 00213 = AEA 2016/17, +00056								
AIRoma-07, 00004 = AE 1966, 00034	14 - 50	Roma	Roma					[Hi]larionis divi Aug(usti) l(iberti) / [3] T(iti) l(ibertus) architectus
CIL 06, 02725 (p 3835) = CIL 06, 37189 = D 02034 (p 176) = IDRE-01, 00002 = Chioffi-2018, p 38,16	96 - 105	Roma	Roma	Funerary	Yes	Text and arches	very grand	C(aius) Vedennius C(ai) f(ilius) / Qui(rina) Moderatus Antio / milit(avit) in leg(ione) XVI Gal(lica) a(nnos) X / tran(s)lat(us) in coh(ortem)... text continues
CIL 06, 04714 (p 3416, 3505, 3850, 3909) = CIL 06, 10395 = CIL 01, p 0069 = InscrIt-13-01, 00023 = AE 2016, 00136	14 - 50	Roma	Roma	Funerary		Facsimile of text		]M[3] / [3]A[3] / [L(ucio) Passieno] C(aio) Calv[isio co(n)s(ulibus)] / [3] Ero[s] / [3] Y[3] / [3] V[3] / [3]... text continues
CIL 06, 04884 (p 3850) = D 07917a	41 - 60	Roma	Roma	Funerary		Text		Sotericus arc(hitectus?) / Aug(usti) Caes(aris) Lucer() / empt(ae) de Pinario Rufo / ol(lae) quae fuit Porci / Philargyri
CIL 06, 05738 = CIL 10, *01088,066	-	Roma	Roma	Funerary				D(is) M(anibus) / Aureliae Fortunatae / feminae incomparabi/li et de se bene me/renti / Anicetus Augg(ustorum) lib(ertus) / verna architec(tus)... text continues
CIL 06, 08724 (p 3463, 3891) = D 07733 = DM p 187	71 - 100	Roma	Roma	Funerary		Text		C(aio) Iulio / Luciferi filio / Posphoro / architect(us) Aug(usti) / Claudia Stratonice / uxor viro / opt<i=U>mo
CIL 06, 08725 = Mander 00108	-	Roma	Roma	Funerary				D(is) M(anibus) / Auliae Laodices / filiae dulcissimae / Rusticus Aug(usti) lib(ertus) / architectus pater / infelicissimus quae / vix(it)... text continues

CIL 06, 09151 = AE 1965, +00262	41 - 80	Roma	Roma	Funerary		Text	two separate archetects in this one one a a free man and the other a slave	Ti(berio) Claudio Ti(beri) f(ilio) Vitali / Ti(berius) Claudius Vitalis architec(tus) / Claudia Ti(beri) l(iberta) Primigenia / Claudia Ti(beri) et |(mulieris)... text continues
CIL 06, 09152 (p 3469) = AE 1965, +00262	41 - 80	Roma	Roma	Funerary		Facsimile of text		Ti(berius) Claudius C(ai) l(ibertus) Ianuarius vixit ann(os) X mens(es) VI dies XIII in hoc mon<u=I>mento / conditus est / Ti(berius)... text continues
CIL 06, 09154 = AE 2000, +00132	-	Roma	Roma	Funerary				C(aius) Licinius M[3] / Alexander architec[tus 3] / Licinia Epicharis u[xor 3] / C(aius) Licinius C(ai) l(ibertus) Epityncha[nus] / Licinia... text continues
CIL 06, 31145 = Denkm 00009	137 - 137	Roma	Roma		Yes	Text	armorum	Iovi Op[t]imo / Maximo Iunoni / Minervae Marti / Victoriae Herculi / Fortunae Mercurio / Felicitati Saluti Fatis / Campestribus... text continues
CIL 06, 40910 = CIL 01, 02961 = AE 1971, 00061 = AE 2000, +00251 = AE 2003, +00019	-65 - - 20	Roma	Roma			Text	Censoris & Praefectus fabrum	L(ucius) Cornelius L(uci) f(ilius) Vot(uria) / Q(uinti) Catuli co(n)s(ulis) praef(ectus) fabr(um) / censoris architectus
IGLFRPal 00083 = AE 1996, 00189	154 - 160	Roma	Roma			Text		Te]rentius S[3] / hono[rati] // C(aius) Cincius Firmus / Q(uintus) Fabius Bassus / Sex(tus) Kaneius Atimetus / Cn(aeus) Asinius Ingenu(u)s... text continues
RomaVecc 00209	1 - 100	Roma	Roma					M(arcus) Aetrius M(arci) l(ibertus) Protus / architectus / arbitratu / Hostiliae N(umeri) l(ibertae) Quintae / concubinae

CIL 09, 02986 (p 1243)	1 - 100	Samnium / Regio IV	La Roma / Pagus Urbanus					Elegans architectus
Fano-01, 00007 = AnalEpi p 254 = Engfer-2017, 00322 = AE 1983, 00380 = AE 1999, +00602	131 - 170	Umbria / Regio VI	Lucrezia / Pisaurum		Yes	Text	Preafectus fabrum	[C(aius) Cupp]ienus C(ai) f(ilius) Pol(lia) / [Terminalis] praef(ectus) coh(ortis) III Bracarum [in Syr(ia) Pal]aes(tina) praef(ectus) fab(rum) archit(ectus) / signum m[armor(eum)... text continues
CIL 11, 06509 (p 1400) = CIL 01, 02124 (p 1081) = ILLRP 00660	-	Umbria / Regio VI	Sarsina / Sassina					] M(arcus) Caesellius / [3 f(ilius) IIIvir(i) quinqu(ennales) de] s(enatus) s(ententia) faciund(um) coir(averunt) / [murum] longum p(edes) |(mille) / [3]eri... text continues
CIL 05, 03464 (p 1075) = D 07730 = AE 1999, +00725	-	Venetia et Histria / Regio X	Verona			Text		C(aio) Gavio C(ai) f(ilio) / Straboni // M(arco) Gavio C(ai) f(ilio) / Macro // Gaviae M(arci) f(iliae) // L(ucius) Vitruvius... text continues
CAEMENTARIUS								
Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text
AE 1997, 01591	201-300	Africa proconsularis	Ain Jannet / Totia	Funerary				D(is) M(anibus) s(acrum) / P(ublius) Iulilus Sa[3]/nus Maximi/nus vixit a(nnum) / men(ses) III hora(s) / IIII caement[arius(?)] h(ic) s(itus)
CONSTRUCTOR								
Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text
ICUR-07, 20231c	301-350	Roma	Roma	Funerary				cons]tructo[r 3] / [3] qui vi[xit 3] / [3]d[

EXTRACTOR								
Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text
IRT 00871 = LBIRNA 00752 = AE 1996, 01697	331 -370	Africa proconsularis	Ain Wif / Ayn Wif / Thenadassa					In his [p]r(a)ed[iis Li]cin[i U]rbenti [Vic]toris ex[st]/ruct[or]is to[3]ni[3] incursi[o]/ni barbarorum seu gentilium [3]n[3]enti s[uis] / i<m=N>pensis cons[1]nte[3] decem et [3]... text continues
CIL 12, 00972 = ILCV 01809 = CLE 00791 = CAG-13- 05, p 562	-	Gallia Narbonensis	Arles / Arelate					] ex(s)tractor tem/pli quo corporis artos / orna sepulc{h}ralis / retinet cum pace / perenni quique [
FABER								
Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text
NSA-1921-34 = AE 1976, 00205	1 - 70	Aemilia / Regio VIII	Bologna / Bononia	Funerary		Text	anularius	C(aius) Camonius / C(ai) f(ilius) Gratus / faber anular(ius)
CIL 11, 06838 = D 07676 = AE 1896, 00114	1 - 50	Aemilia / Regio VIII	Bologna / Bononia	Funerary		Text	lapidarius	Viv(i) / C(aius) Volusius / C(ai) l(ibertus) Iucundus / tabularius / Heidia T(iti) l(iberta) Auge / Q(uintus) Baebius Q(uinti) f(ilius)... text continues
CIL 11, 00139 = D 07725 = AE 1972, 00185	-	Aemilia / Regio VIII	Ravenna				navalis	P(ublius) Longidienus P(ubli) f(ilius) Cam(ilia) / faber navalis se vivo constit/uit et Longidienae P(ubli) l(ibertae) Stactini // P(ublius) Longidienus P(ubli)... text continues
CIL 11, 00085	-	Aemilia / Regio VIII	Ravenna	Funerary	Yes			A(ulo) Papi[ri]o / Vernaculo / Ro(man) civitate d(onato) / n(atione) D<a=E>lm(ata) /

							vix(it) ann(os) XXXXVI / mil(itavit) ann(os) XXVI /... text continues
CIL 11, 06737	-	Aemilia / Regio VIII	Ravenna				]didiu[s 3] / [3 f]aber II[3] / [3 n]at(ione) Nic[3] / [3]a[] / Aug(usto?) sa[cr(um)] / Diopanth(u)s / Cittin(is) Dio/phanti fil(ius) Fa/ber v(otum) s(olvit) l(ibens) a(nimo) / et Saturno / palma(m)... text continues
IL Afr 00256 = ILPBardo 00344 = Saturne-01, p 117 = AE 1912, 00181 = AE 2012, +00141	-	Africa proconsularis	Khasbat, Hr. / el-Kasba, Hr. / al-Kasbat, Hr. / Thuburbo Maius	Funerary			XIII Kal(endas) [I]unias n(umerus) [3] / in his [(sesquiplarius) I / [(equites) VI / optio I / quintanari(i) X[3] /... text continues
OBuNjem 00003	253 - 259	Africa proconsularis	Abu Nujaym / Chol / Bu Njem / Bou-Ngem / Gholaiia / Golas	Military list	Yes	balneus	] / ad pr(a)epositu(m) I / faber I / (a)egri II / Aurel(ius) Celestinus / Cecil(ius) Rogatus / reliqui repungent... text continues
OBuNjem 00030	253 - 259	Africa proconsularis	Abu Nujaym / Chol / Bu Njem / Bou-Ngem / Gholaiia / Golas	Military list	Yes	balneus	Pr(idie) Kal(endas) Octo[b]res [n(umerus) L]XIII / in h[i]s [libra]riu[s I] / [6] / [6] / [6] / [6] / [3]I... text continues
OBuNjem 00012	253 - 259	Africa proconsularis	Abu Nujaym / Chol / Bu Njem / Bou-Ngem / Gholaiia / Golas	Military list	Yes		]ninus Faberi/anus p(ius) v(ixit) a(nnos) VI / o(ssa) t(ibi) b(ene) q(uiescant) t(erra) t(ibi) l(evis) s(it) h(ic) s(itus) e(st)
CIL 08, 26833a = MAD 00319	-	Africa proconsularis	Dougga / Thugga	Funerary		a child	Pilipus Cepalo(nis) / faber [3]s / Alex {s} and(rinus)
AE 2006, 00346	-130 - - 70	Apulia et Calabria / Regio II	Ordona / Herdonia			Text	Auctus / Theophi[li] ser(vus) / faber / vix(it) ann[os]?
AE 1972, 00101	1 - 50	Apulia et Calabria / Regio II	Taranto / Taras / Neptunia / Tarentum	Funerary		Text	Teucr(us) fab(er)
EE-08-01, 00242,59	-	Apulia et Calabria / Regio II	Taranto / Taras / Neptunia / Tarentum				

SupIt-20, 00177 = AE 1981, 00259	1 - 30	Apulia et Calabria / Regio II	Venosa / Venusia			Text		T(itus) Petronius C(ai) f(iilius) / Hor(atia) Faber
CIL 13, 00623 = ILA-Bordeaux 00113 = CAG-32-02, p 235	222 - 235	Aquitani(c)a	Bordeaux / Burdigala	Funerary		Figure		[D(is)] M(anibus) / [Fa]vor / [3] def(unctus) an(norum) XXX / [3] faber / [3] Medi]omatrix / [3 p]at(er?) / CI
CIL 13, 03701	-	Belgica	Trier / Augusta Treverorum	Funerary				Faber [3 hic] / paus[at 3 qui] / vix {s}[it 3] / M[
: Vindolanda 00003 = Vindolanda 00160	-	Britannia	Chesterholm / Vindolanda	Military list	Yes	Text	a tablet	]em[3] / [3]riu[3] / [3]utarius [3] / [3]arium [3] / [3]us adiuu[3] / [3]arium [3] / [3]s faber |(centuria) V[3]... text continues
Vindolanda 00440 (p 3, 160)	-	Britannia	Chesterholm / Vindolanda		Yes	Text	a tablet	[[3 ferrum]] / [Veldebius fab[er]] / sudari[um]
Vindolanda 00862 = AE 2010, 00812 = AE 2011, +00641	-	Britannia	Chesterholm / Vindolanda	Military list	Yes	Text	a tablet	XII K(alendas) Maia[s 3]fa[3] / [o]pus fabricae / |(centuria) Firmi / [v]ocridem factam ad vetu/ram iussu Musuruni |(centurionis) / [c]ircolas... text continues
ZPE-170-272 = AE 2009, 00752	-	Britannia	Chesterholm / Vindolanda	Military list	Yes		a tablet	XII K(alendas) Mai[a]s [3] Batav[orum(?)] / [3] opus fabricae / [3]m[3]abue[1]us / [3] faber [3] / [1]amalus [3]asus[1]runi / [3]lac[3]p[3]a[3]us[3]XVIII... text continues
CIL 03, 01948	1 - 150	Dalmatia	Solin / Salona	Votive			maybe name	Iovi O(p)<t=E>imo / Maximo / C(a)elesti Patrono / G(aius!) Caesius Corym/bus et Faberia / Cara v(otum) s(olverunt) l(ibentes) m(erito)
CIL 03, 02318	151 - 300	Dalmatia	Solin / Salona	Funerary			maybe name	D(is) M(anibus) s(acrum) / Faberia Euty/chia Faberiae / Fortunatae / patronae b(ene) m(erenti) / titulum / posui

CIL 11, 02037	-130 -- 71	Etruria / Regio VII	Perugia / Perusia			facsimile of text		A(ulus) Caitho C(ai) f(ilius) Faber
CIL 11, 02067	-	Etruria / Regio VII	Perugia / Perusia			facsimile of text		C(aius) Petronius / Sex(ti) f(ilius) Faber
CAG-13-01, p 151 = AE 1996, 00994 = AE 2001, 01321	-	Gallia Narbonensis	Berre-l'Etang					T(itus) Vibius Vicison[3] / V(o)contius Faber [
CIL 12, 04474 = CAG-11-01, p 457	-	Gallia Narbonensis	Narbonne / Narbo				argentarius	C(aius) Corne[l(ius)] / Philonicus / faber argent(arius)
ILGN 00580 = CAG-11-01, p 435	-	Gallia Narbonensis	Narbonne / Narbo	Funerary		Text	lapidarius	Viv<u=O>nt / T(itus) Attius / Quartus faber / lapidarius / p(edes) q(uoquoversus) XV
CIL 12, 04475 (p 846) = D 07720 = CAG-11-01, p 232	-	Gallia Narbonensis	Narbonne / Narbo	Funerary			Limarius	[Q(uintus)] Baebius Q(uinti) / l(ibertus) Tertius / faber limarius / in suo hic / requiescit
CIL 12, 04789 = CAG-11-01, p 458	-	Gallia Narbonensis	Narbonne / Narbo	Funerary			maybe name	Vivit / Faberia / C(ai) l(iberta) / Bacc[h]is // |(Obita) / Gavia L(uci) l(iberta)] / Quieta
CIL 12, 04477 (p 846) = CAG-11-01, p 207	-	Gallia Narbonensis	Narbonne / Narbo			Text	tignarius	[n() l(iberto) Rufio faber tig[narius] / [3] patrono Cassiae Sp(uri) f(iliae) [3] / [3] hic [siti sunt(?)]
Esperandieu 08729 = CAG-13-02, p 396	-	Gallia Narbonensis	Saint-Remy-de-Provence / Glanum / Clanum					Ferrarius faber
CIL 13, 07532 = D 03209 = CSIR-D-02-09, 00051	-	Germania superior	Bad Kreuznach / Cruciniacum			Text		In ho(norem) d(omus) d(ivinae) / Mercurio / et Maiiae(!) ca/ducium et / aram Masc/lius Satto / [f]aber ex vo/[t]o v(otum)... text continues
CartNova 00153 = AE 1977, 00458	-30 - 14	Hispania citerior	Cartagena / Carthago Nova				lapidarius	M(arcus) Messius / M(arci) l(ibertus) Samalo / faber lapi/darius

CIL 14, 02252	-100 - -1	Latium et Campania / Regio I	Albano Laziale / Albanum		Yes		maybe name Faberius	C(aius) Faberius mil(es) et Sedilia Iunoni da(n)t
CIL 10, 03790	-26 - - 26	Latium et Campania / Regio I	Capua / Casilinum			facsimile of text	Eros Faber and musicians so maybe something else here	Imp(eratore) Caesar(e) / T(ito) Statil(io) co(n)s(ulibus) / his ministri / faciun(dum) coe(raverunt) // L(ucius) Popillius Sp(uri) f(ilius) / L(ucius) Popillius... text continues
CIL 10, 03957 = D 07625	31 - 100	Latium et Campania / Regio I	Capua / Casilinum	Funerary		facsimile of text	Faber intestinarius	M(arcus) Avidius M(arci) l(ibertus) Aesopus sibi et / Avidiae M(arci) l(ibertae) Zosimae coniugi / fab(er) intestin(arius) / h(oc) m(onumentum) s(ive)... text continues
CIL 10, 03780 = CIL 01, 00679 (p 930, 932) = D 03341 = ILLRP 00716 = RECapua 00091 = Caro 00069	-104 - - 104	Latium et Campania / Regio I	Capua / Casilinum			Text	only f faber seems to be a lot of reconstruction	]nius L(uci) f(ilius) / [3]ius L(uci) f(ilius) / [3 Ho]rtionius Cn(aci) f(ilius) / [3 Eg]natus P(ubli) f(ilius) gla(diarius?) / [3]us... text continues
CIL 10, 03782 = CIL 01, 00685 (p 930, 932) = D 05641 = ILLRP 00710	-108 - - 105	Latium et Campania / Regio I	Capua / Casilinum			Text		] N(umeri) f(ilius)] faber / [3]sius St(ati) f(ilius) / M(arcus) Fisius C(ai) f(ilius) / M(arcus) Baibilis L(uci) f(ilius) // M(arcus)... text continues
AE 1988, 00312	131 - 250	Latium et Campania / Regio I	Miseno / Misenon / Miseno / Misenum	Funerary	Yes	Text	duplicarius	D(is) M(anibus) / L(uci) Archibi Magni fab(er) / duplic(arius) III(triere) Virtute milit(avit) ann(os) XXX vix(it) ann(os) LX / Iulia Eustathia... text continues
CIL 10, 03426 = LIKelsey 00030	101 - 230	Latium et Campania / Regio I	Miseno / Misenon / Miseno / Misenum	Funerary	Yes	Text	duplicarius	D(is) M(anibus) / Marciae Euhodiae / vix(it) ann(os) XL men(ses) III / Barbius Firmus faber / dupl(icarius)

								III(quadriere) Dacico patro(nus)... text continues
CIL 10, 03422	151 - 250	Latium et Campania / Regio I	Miseno / Misenon / Miseno / Misenum	Funerary	Yes	Text	duplicarius from Africa	D(is) M(anibus) / C(ai) Arule(ni) Restituti / manip(ularis) III(triere) Libertat(e) / nat(ione) Afer mil(itavit) ann(os) X / vixit ann(os) XXX... text continues
CIL 10, 03420	31 - 100	Latium et Campania / Regio I	Miseno / Misenon / Miseno / Misenum	Funerary	Yes			M(arcus) Plotius Firmus / faber ex III(quadriere) Venere / vixit annis LXVIII / milit(avit) annis XXXXIIX / M(arcus) Plotius Augustalis... text continues
ZPE-111-285 = AE 1996, 00302	101 - 300	Latium et Campania / Regio I	Ostia Antica	Funerary		Text	tignarius	T(itus) Stalilius Tauri l(ibertus) / Antiochus fab(er) tignarius
CIL 04, 07147	-	Latium et Campania / Regio I	Pompei					M(a)r(ce)ll(u)m / Ilvir(um) iter(um) faber / vig<i=V>la et roga d(ignum) r(ei) p(ublicae) o(ro) v(os) f(aciatis)
CIL 10, 01922 = Alumnus 00459	151 - 250	Latium et Campania / Regio I	Pozzuoli / Puteoli	Funerary		Text	intestintinarius	D(is) M(anibus) / G(aius!) Atilius Fortu/natus faber in/testinarius q(ui) v(ixit) / an(n)is XXXI f(ecit) Iulius Felicis/simus alum(no) mere(nti)
CIL 10, 01923	1 - 70	Latium et Campania / Regio I	Pozzuoli / Puteoli	Funerary		Text	tignarius	C(aius) Caesonius Demetrius / faber tignarius sibi et Nympe/ni conlibertae suae et C(aio) Caesonio / Metrophani l(iberto) et Secundae l(ibertae)... text continues
CIL 10, 00557 (p 1005) = InscrIt-01-01, 00238 = AE 2005, +00146 = AE 2005, 00224 = AE 2005, 00326	41 - 60	Latium et Campania / Regio I	Salerno / Salernum					L(ucius) Appuleius LL(uciorum) l(ibertus) Salvius fa<b=I>er Poside L(ucius) Appuleius LL(uciorum) l(ibertus) Felix {XII NA} L(ucius) Appuleius

							LL(uciurorum) |(mulierum) l(ibertus) [3]... text continues
CIL 10, 06428 = D 05774 = AnalEpi p 251 = Engfer-2017, 00028 = Coppola-1989, 00137 = Broccoli-1982, 00105	1 - 50	Latium et Campania / Regio I	Terracina / Tarracina				Name Faberius L(ucius) Faberius C(ai) f(ilius) Pom(ptina) Murena / augur IIIvir aed(ilis) / aqua quae fluebat lacu co<I=N>legit et salientem in lacu... text continues
CIL 10, 04916 = Venafrum 00093	1 - 70	Latium et Campania / Regio I	Venafro / Venafrum	Funerary			Sex(tus) Aulenus Sex(ti) l(ibertus) / Fuscus faber sibi / et Aulena Sex(ti) l(ibertae) / Laini et suis / in fro(n)te... text continues
CIL 05, 07647 = InscrIt-09-01, 00190 = Piemonte 00063 = AE 1998, +00516 = AE 2007, +00564	1 - 100	Liguria / Regio IX	Fossano	Funerary		Man with a wheel and bed scene	V(ivus) f(ecit) / Q(uintus) Minicius / Faber / ab assequ(a)esitum / VIvir Aug(ustalis) / re<q=C>uie et memoriae / diuturnae... text continues
AE 2008, 00900 = AE 2010, +00947 = AE 2013, +01069 = ILGL-Aed-D 00024 = AE 2015, +00853	171 - 230	Lugdunensis	Rontecolon / Haedui	Votive			I(ovi) O(ptimo) M(aximo) / Criciro / saltuarius / Prisciacen/sium / ex v(oto) s(olvit) l(ibens) m(erito) / Sabellus / faber f(ecit)
IG-09-01-04, 01548 = AE 2001, 01789	1 - 100	Macedonia	Sami	Funerary	Yes		II XI [3] / [3] ann(is) XXX // Ditius Pa[3] / faber nava[li]s / militavit a(nnos) XXXV / domo Savona /... text continues
AntAfr-2002/03-426 = AE 2003, 02028	101 - 130	Mauretania Caesariensis	Bejaia / Bougie / Saldae	Funerary			Name Faberia D(is) M(anibus) s(acrum) / Faberia Sa/turnina / vixit an/nis LXXXV / h(ic) d(eposita)
CIL 08, 20692	-	Mauretania Caesariensis	Bejaia / Bougie / Saldae	Funerary			Name Faberius P(ublius) Faberius / P(ubli) f(ilius) Fabia Sec/undus vix(it) / an(nos) VII h(ic) s(itus) e(st)
MEFR-1964-150 = AE 2016, 01974	269 - 296	Mauretania Caesariensis	Ras el Oued / Tocqueville / Ain	Funerary			maybe name D(is) M(anibus) s(acrum) / Iul(ius) Felix Fa/ber Iuli Felicis filius / vix {s} it an(n)i/s

			Toumella / Thamallula					XXX a(nno) p(rovinciae) CCLVII Ac() Urb(ana) uxo(r)... text continues
CIL 03, 01652 = IMS-02, 00093	101 - 130	Moesia superior (bulkans)	Smederevo / Vinceia / Viminacium	Funerary	Yes		argentarius	C(aius) Refidius C(ai) l(ibertus) / Eutyclus fa(ber) arg(entarius) vixit / [6] / h(ic) s(itus) e(st) / C(aius) Refidius Rufus /... text continues
CIL 08, 04487 = D 07724	-	Numidia	Tobna / Tubunae					] Faber / ferrarius sibi fecit / dedicavit et titula/vit ita fecimus quot / fili(i) nostri non fac/iunt
CIL 09, 05862 = Piceno-Au, 00006	1 - 50	Picenum / Regio V	Osimo / Auximum			Text	tignarius	[C(aius)] Ploti[us] / C(ai) l(ibertus) Alex/ander tig(nuarius) / faber
SupIt-23-P, 00044 = Piceno-Po, 00001	-200 -- 176	Picenum / Regio V	Porto Recanati / Potentia	Funerary		on a pot		Sosia faber
CIL 06, *00937	-	Roma	Roma	Funerary		Text	a corinthis	Lucrinae Iucundae / P(ublius) Lucrinus P(ubli) l(ibertus) Thalamus / a corinthis faber / loc(us) e<m=N>p(tus) est |(denariis) X(milibus) m(onetae) argent(eae)... text continues
AE 1928, 00077 = AE 1928, +00078	71 - 150	Roma	Roma	Funerary		Text	argentarius	Sex(tus) Rubrius Log[ismus] / faber argentar[ius] / sibi et / Rubriae Aerae libertae suae et / Sex(to) Rubrio Saturnino filio... text continues
CIL 06, 02226 (p 3306, 3827) = D 06077	1 - 200	Roma	Roma	Funerary		Text	argentarius	Curtilius Hermeros / fecit sibi et / Curtiliae Thetidi / coniugi suae carissimae / et libertis libertabusque / suis posterisque... text continues
CIL 06, 09390 (p 3895)	31 - 70	Roma	Roma	Funerary		Text	argentarius	L(ucius) Gavidius Eros / faber arg(entarius) v(ixit) a(nnos) LXX / Gavidia Cleopatra / patrono fecit

CIL 06, 09392 = AE 2000, +00132	-	Roma	Roma				argentarius	L(ucius) Vetilius L(uci) l(ibertus) Nestor / faber argentarius / Vetilia L(uci) l(iberta) Chrysarium
CIL 06, 09393 (p 3895, 4174) = D 07696	-	Roma	Roma	Funerary			argentarius	Janus / [post aedem] Castoris decurio / [3]iniana / [3 Nice]phor faber arg(entarius) / [3 ad Vo]rtumnum / [3] vixit... text continues
GLEUSA p 14	1 - 50	Roma	Roma			Person holding something	argentarius	P(ublius) Curtilius P(ubli) l(ibertus) Agat[hus] / faber argentarius
NSA-1919-283 = AE 1920, 00104	-30 - 50	Roma	Roma			man's head	argentarius	L(ucius) Petronius L(uci) f(ilius) Pal(atina) / patronus / faber argentar(ius)
CIL 06, 09397	1 - 50	Roma	Roma	Funerary		Text	eburar	Q(uintus) Considius Eumolpus / faber eb<o=V>rar(ius)
CIL 06, 09401 (p 3431)	-	Roma	Roma				intestintinarius	] Faustus fabe[r] / [3] intestinarius [
CIL 06, 07882 (p 3853) = D 07719 = Massaro-2015, p 1119	1 - 50	Roma	Roma	Funerary		Text	lectarius	V(ivus) L(ucius) Hostilius L(uci) l(ibertus) Amphio / faber lectarius / ab clo(a)ca maxima sibi et / |(obiit) L(ucio) Hostilio Pamphilo... text continues
CIL 06, 09462a (p 3470) = CIL 06, 13402 = CIL 06, 34065b	1 - 50	Roma	Roma			Text	lots of freedmen/women with various jobs	Hesiodos lect(icarius) l(ibertus) / Ambactus tect(or) l(ibertus) / Syntropus hor(rearius) l(ibertus) / Prima ornat(rix) l(iberta) / Alcim(us) polit(or) l(ibertus) /... text continues
CIL 06, 17485 = CIL 06, *01816 (p 254*) = CERossi 00061 = AE 1997, +00160	101 - 200	Roma	Roma	Funerary		Text	Name Faberia	D(is) M(anibus) / C(ai) Faberi C(ai) f(ili) / Pal(atina) Galeni / v(ixit) a(nnos) II m(enses) VI d(ies) V / Faberia... text continues

CIL 06, 17486 (p 3521)	101 - 300	Roma	Roma	Funerary			Name Faberia	] / Faberio / Hermadi/oni Faberi/a Coete pa/trono bene / merenti fe/cit vix(it) / an(nos) XXXX / mens(es) III
CIL 06, 17489 (p 3521) = CIL 06, 34108	-	Roma	Roma	Funerary			Name Faberia	D(is) M(anibus) / Faberiae Coete / Cl(audius) Sabinus / coniugi / opt<i=U>mae / b(ene) m(erenti) f(ecit)
CIL 06, 28690	-	Roma	Roma	Funerary			Name Faberia	D(is) M(anibus) / P(ublio) Vettio / Vitali / Faberia / Euphrosyne / coniugi b(ene) m(erenti)
CIL 06, 36468 = Alumnus 00620	101 - 200	Roma	Roma	Funerary			Name Faberiae	D(is) M(anibus) / C(aius) [T]ullius Maron fecit sibi et / [T]ullio Aelio et [T]ulliae S[y]m[f]aerus(a)e / alumnis suis et /... text continues
CIL 06, 17487 = Erpetti 00022	51 - 100	Roma	Roma	Funerary			Name Faberio/Faberiae	D(is) M(anibus) / C(aio) Faberio Hermeti / Faberiae Irene / C(aio) Faberio Casto / C(aio) Faberio Eutycho / sibi et... text continues
CIL 06, 17488	-	Roma	Roma	Funerary			Name Faberio/Faberiae	L(ucius) Faberius L(uci) f(ilius) Fal(erna) / Rufus sibi et / L(ucio) Faberio patri / Faberiae Nice matri
CIL 06, 40890 = CIL 01, 00588 (p 833, 913) = IG-14, 00951 (p 695) = IGUR-01, 00001 = IGRRP-01, 00118 = ILLRP 00513 = ZPE-135-77 = SEG-51, 01427 = AE 1948, 00064 = AE 2005, +00055 = AE 2010, +00052	-78 - - 78	Roma	Roma	Decree		Text	Name Faberius	[Co(n)s(ulibus) Q(uinto) Lutatio Q(uinti) f(ilio) Catulo et M(arco) Aemilio Q(uinti) f(ilio) M(arci) n(epote) Lepido pr(aetore) urbano et inter peregrinos L(ucio)... text continues
CIL 06, 09402 (p 3469, 3895) =	51 - 150	Roma	Roma	Funerary		Text	oculararius	Dis Manibus / L(ucio) Licinio L(uci) f(ilius) Stato{i}ria/no

ILMN-01, 00133 = D 07714								L(ucius) Licinius L(uci) l(ibertus) Patroclus / faber oculariarius / frat(ri) cariss(imo) f(ecit)
CIL 06, 06354 (p 3851) = D 07623	1 - 50	Roma	Roma	Funerary		Text	structor parietarius	T(itus) Statilius Nicep(h)or / faber struct(or) parietar(ius)
CIL 06, 06364	1 - 50	Roma	Roma	Funerary		Text	tignarius	Anteros / faber tig(nuarius)
CIL 06, 06365	1 - 50	Roma	Roma	Funerary		Text	tignarius	Flaccus faber / tignuarius / Cornelianus
CIL 06, 09410 (p 3469)	-	Roma	Roma				tignarius	L(ucius) Appuleius L(uci) l(ibertus) / Libanus / faber tignuarius
CIL 06, 09409 (p 3469, 3895) = D 07239	1 - 50	Roma	Roma	Funerary			tignarius magister	M(arcus) Allius / Apollonius / faber tignuarius / mag(ister) in fam(ilia) praef(ectus) dec(uriae?) / vix(it) an(nos) LX
CIL 06, 03969	-25 - 50	Roma	Roma	Funerary		Text		Bitus / Maternus / faber // C(aius) Iulius / Rufus
CIL 06, 04443	1 - 50	Roma	Roma	Funerary		Text		[3] Tauriscu[s 3] / [3] faber [3] / [3]posis Octavia [3] / [3] Aemilius Taur[3]
CIL 06, 04446 (p 3416)	1 - 40	Roma	Roma	Funerary		Text		P[[h3m]] / [[Messallae]] / [[faber]] // Sabinus / Messallae / insul(arius)
CIL 06, 05866 = CIL 06, *00847	1 - 50	Roma	Roma	Funerary		facsimile of text		Anthusa Asclepiad(is) / Caesaris ser(vi) marm(orarii) f(ilia) / vixit annos VII / C(aius) Iulius Dav<u=O>s / faber // Cerdo
CIL 06, 06283	1 - 50	Roma	Roma	Funerary		Text		Bassus / fab(er)
CIL 06, 06284	1 - 50	Roma	Roma	Funerary		Text		Gratus fa[ber] / h(ic) o(ssa) [s(ita) s(unt)]
CIL 06, 06285	1 - 50	Roma	Roma	Funerary		Text		Zabda / faber
CIL 06, 07405 (p 3431)	-30 - 30	Roma	Roma	Funerary				Hilarus / faber

CIL 06, 09102 = ILMN-01, 00124 = Pittori 00006 = ZPE-136-279 = AE 2001, 00197	-30 - 50	Roma	Roma			Text	Libertorum et famil[[iae 3]] // d(ecurio) Fe[3] l(ibertus) / d(ecurio) [3]ochus l(ibertus) / [d(ecurio) 3]icius l(ibertus) / [d(ecurio) 3]us l(ibertus)... text continues
CIL 06, 09386 (p 3469, 3471) = CIL 06, 33807 = CIL 06, *01687a (p 2253*)	1 - 50	Roma	Roma	Funerary		Text	Cocceiae / Niceni / dedit Anoptes / faber // Anoptes / faber
CIL 06, 09389 = ILCV 00631 = ICUR-10, 27157	301 - 350	Roma	Roma	Funerary			Renatus faber / in pace
CIL 06, 34474 = AE 2005, +00234	31 - 70	Roma	Roma	Funerary			L(ucius) Appuleius L(uci) l(ibertus) / Salvius fab(er) Posi(de) / L(ucius) Appuleius LL(uciorum) l(ibertus) / Felix {sina} / in f(ronte) p(edes)... text continues
ICUR-01, 02223 = ILCV 03785 = AnalEpi p 43	351 - 400	Roma	Roma	Funerary			Eu<b=P>andrio faber qui / vixit annos pl(us) min(us) LV / depositus i<n=M> pace ref(r)iger(i)o / VII K(a)l(endas) Dec(embres) die Martis... text continues
ICUR-04, 12176d	301 - 500	Roma	Roma				]CARA / [3]ter / [3]faber
RAC-1926-105	101 - 200	Roma	Roma	Funerary			[D(is)] M(anibus) / [3] lib(ertae) Victoriae / [3]e meritae et / [3] Iucundae / [3] ben]e merenti et / [3]... text continues
ZPE-62-239 = AE 1987, 00335	-	Samnium / Regio IV	Capistrello				T(itus) Vibiedi[us 3] / faber [3] / [3] fi[lio]
CIL 01, 03230 = CIL 09, p 678 (p 1433) = CLE 00017 = ImagIt-01, p 273	-	Samnium / Regio IV	Corfinio / Pentima / Corfinium	Funerary			Pes pros euf incubat / casnar oisa aetate / C(aius) Anaes solois des forte / faber

CIL 01, 01824 (p 1045, 1047) = EE-08-01, 00194	-	Samnium / Regio IV	Scanzano / Alba Fucens	Funerary			L(ucius) Vettius M[3] / Varvelus fab(er) [3] / Staatia Q(uinti) f(ilia) [3] / ux{s}or h[ic] / su(n)t sepult[i] / [
CIL 09, 02546 (p 974) = CIL 09, 06619 = Campedelli 00091 = Engfer-2017, 00253 = AE 1959, 00276	-50 - 50	Samnium / Regio IV	Sepino / Saepinum			facsimile of text	C(aius) Papiu[s 3 f(ilius) 3 F]aber C(aius) [3] f(ilius) Sc[3 f]or[u]m sternendum s(ua) p(ecunia) c(uraverunt)
Wiegels-03, 00084 = AE 1997, 01313a	316 - 316	Thracia	Svirkovo / Enieri				Of(ficinator) Maximus f(aber) a Sir(mio) vas(cularius)
Mennella-2017a, p 363	51 - 100	Transpadana / Regio XI	Novara / Novaria	Funerary		Text	carpentarius D(is) {O} M(anibus) / Iustinus / Iusti l(ibertus) Hilar(ius) / faber carpe(ntarius) l(seu)s) sibi et / Verae Metiliae / Veri... text continues
CIL 11, 05438 (p 1388) = ERAssisi 00170	-27 - 14	Umbria / Regio VI	Assisi / Asisium	Funerary		Text	L(ucius) Parconius L(uci) f(ilius) / Faber / Venelia T(iti) l(iberta) Hilara / dedit
Ciotti-1978, 00001 = AE 2013, 00453	201 - 250	Umbria / Regio VI	San Gemini / Carsulae			Text	Leonteum cu<m=A> signo et cetero cultu exornatum / ex permissu sanctissimi ordinis ex pec(unia) sua / a solo fecerunt leones... text continues
CIL 11, 04236 (p 1366) = SupIt-19, p 75	-	Umbria / Regio VI	Terni / Interamna Nahars				ferrarius A(ulus) Salienus A(uli) f(ilius) Clu(stumina) Gallus / faber ferrarius
CIL 11, 04237 = SupIt-19, p 75 = AE 1997, +00484	71 - 200	Umbria / Regio VI	Terni / Interamna Nahars	Funerary		Text	ferrarius Q(uintus) Septim[ius] / Q(uinti) l(ibertus) Firmus / se vivo sibi et / Memmiae / Adiutae uxo(ri) b(ene) m(erenti) // Faber... text continues
CIL 05, 02328	-	Venetia et Histria / Regio X	Adria / Atria				L(ucius) Carisius Q(uinti) f(ilius) / Faber

IIAdria 00014	1 - 50	Venetia et Histria / Regio X	Adria / Atria	Funerary		T something else too but poor photo		[C(aius)] Accius C(ai) f(ilius) Faber
InscrAqu-01, 00703 = IEAquil 00172 = Grabalt 00093 = AE 1932, 00001	1 - 50	Venetia et Histria / Regio X	Aquileia	Funerary		Text	aciarius	V(ivus) f(ecit) / L(ucius) Herennius M(ani) f(ilius) / faber aciarius / M(anio) Herennio C(ai) f(ilio) patri / Coeliae C(ai) f(iliae)... text continues
InscrAqu-01, 00704 = IEAquil 00294	51 - 100	Venetia et Histria / Regio X	Aquileia			T maybe something else too	navalis	P(ublius) Cattius / [3] f(ilius) Salvius / viv<u=O>s fecit / [e]t suis omn[ib(us)] / Ofeliae C(ai) f(iliae) / Tertiae uxori... text continues
AN-1992-9 = AE 1992, 00709	1 - 50	Venetia et Histria / Regio X	Aquileia	Funerary/Votive		Text		T[ri]v[iis(?)] / Domn(abus) / Caius / Vardius / faber / v(otum) s(olvit) l(ibens) m(erito)
CIL 05, 01030 = InscrAqu-01, 00702 = IEAquil 00288 = AE 2008, +00550	-25 - 25	Venetia et Histria / Regio X	Aquileia	Funerary		Text		L(ucius) Firmius T(iti) f(ilius) / faber
CIL 05, 08804 = Pais 00442	-	Venetia et Histria / Regio X	Belluno / Bellunum	Funerary/Votive		Text		]ionius / Faber / Loucciano / v(otum) s(olvit) l(ibens) m(erito)
CIL 05, 04216 = InscrIt-10-05, 00022	-	Venetia et Histria / Regio X	Brescia / Brixia	Funerary/Votive		Text	tignuarius	Sex(tus) Cunopennus / Secundus / faber tignuar(ius) / Herculi / v(otum) s(olvit) l(ibens) m(erito)
CIL 05, 04225 = InscrIt-10-05, 00033	-	Venetia et Histria / Regio X	Brescia / Brixia	Funerary/Votive		Text		Iunonibus / v(otum) s(olvit) l(ibens) m(erito) / Mestrius / faber
CIL 05, 03306	-	Venetia et Histria / Regio X	Verona	Funerary/Votive				3] Augustis / [sac]rum / [3] C(ai) f(ilius) Faber / [3]F
LIBRATOR								
Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text

CIL 13, 01827 = CLE 01770 = CAG- 69-02, p 800	-	Lugdunensis	Lyon / Lugdunum				aquarum	Au]gusti l(ibertus) l(ibrator) aquarum [3] / [3] m(ilia) p(asuum)] / [3 m]ens clara recessit / [3 epigr]amma dedit / [3... text continues
LBIRNA 00491 = AE 1942/43, 00093 = AE 1973, 00646	-	Numidia	Ain Cherchar / Ain Charchar	Votive		Facsimile of text	aquae ductus	L(ucius) Apronius / Pius leg(atus) Aug(usti) / pr(o) pr(aetore) co(n)s(ul) des(ignatus) / v(otum) quo[d] / coepto op[ere] / aquae ductu[s]... text continues
CIL 08, 02728 = CIL 08, 18122 = D 05795 = Freis 00101 = JRS-2011-144 = Buonopane-2016b, p 39 = AE 1941, 00117 = AE 1942/43, +00093 = AE 1996, 01802 = AE 1999, +00080 = AE 2012, +01797 = AE 2016, +01951	-	Numidia	Lambaesis	Dedication	Yes	Text and people and decoration		] // Patientia // Virtus // Spes // [//] / [Varius Clemens Valerio] // Etrusco et Salditane(!) ci/vitas... text continues
CIL 08, 02934 = D 02422	-	Numidia	Lambaesis	Funerary	Yes			D(is) M(anibus) s(acrum) / Lollius Vic/tor librator / leg(ionis) III Aug(ustae) / stipendior(um) / XI ann(orum) XXXIII / mat(er) f(ecit)... text continues
CIL 06, 02454 (p 3835) = D 02060	101 - 150	Roma	Roma	Funerary	Yes	Text	tesserarii	D(is) M(anibus) / C(ai) Aeli C(ai) f(ili) Gal(eria) Aeliani Sego[briga] / libratoris et tesserar[i] / coh(ortis) II pr(aetoriae) evocato Augus[ti]... text continues
CIL 10, 07818 = SRD 00299 = Porra 00300	-	Sardinia	Pirri	Funerary			magistro liberatori	D(is) M(anibus) / Secundino Caio / mag(istro) lib{e}ratori

MACHINATOR

Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text
NSA-1953-302 = AE 1988, 00221	1 - 50	Latium et Campania / Regio I	Ostia Antica	Funerary				L(ucius) Quinctius L(uci) l(ibertus) / Nicephorus machinator / L(ucius) Quinctius L(uci) l(ibertus) Achiba / Quinctia L(uci) l(iberta) Salvia / L(ucius)... text continues
CIL 06, 09533 (p 3470, 3895) = CIL 06, 33810 = IG-14, 01497 = D 07727 = IGUR-03, 01174 = IGUR-04, p 165 = AE 1991, 00075a	101 - 200	Roma	Roma	Funerary		Text and very fine columns decorations		[D(is)] M(anibus) / C(aio) Baebio Mu/saeo machinatori / C(aius) Baebius Symbiotes / fratri et conliberto / merentissimo // "GR"

MENSOR AEDIFICORUM

Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text
CIL 14, 03032	1 - 50	Latium et Campania / Regio I	Palestrina / Praeneste					Q(uintus) Cacuriu[s 3] / mensor aed[ificiorum] / Corneliae Ver[3] / Q(uintus) Cacurius [3] / Rogatus HS XX[3] / Cacuria |(mulieris)... text continues
CIL 10, *00130 = InscrIt-01-01, *00008	-	Latium et Campania / Regio I	Salerno / Salernum	Funerary				Dis Manib(us) sac(rum) / Plautillae Faustinae / quae vixit annis XXXIII / cives Casinat(us) P(ublius) Plausurni/us Gratus Sarator co(n)s(ul) /... text continues
CIL 06, 09625 (p 3470) = CIL 06, 26174	-	Roma	Roma	Funerary				A(ulus) Sempronius Laetus mensor / aedificiorum sibi et / Semproniae Metrothae uxori et / Oresti et Orestillo libertis carissimis et... text continues

CIL 06, 36868 = CIL 06, 38398 = CEACelio 00409 = AE 1900, 00135 = AE 2001, +00219 = AE 2001, 00479 = AE 2010, +00135	101 - 200	Roma	Roma					Text	Silva[no et Dia]nae Aug(ustis) / L(ucius) Postum[iu]s Fusc[ianu]s me(n)sor ae[dificiorum] / Augg(ustorum) aed[i]culas ma[r]moratas mu[rum cum] / columne[is] triclea delphicam... text continues
MENSOR									
Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms		Text
CICBardo 00100 = AE 2000, 01743	-	Africa proconsularis							Iuss<u=O> d(e)i miserico[r]diae(?)] domina Iscrispina(!) I[3] / fecit Victor [3]rianoru(m) ex mensore fec[it]
AE 1912, 00061 = AE 1998, 01552	373 - 373	Africa proconsularis	Amiraute						Pos(t) cons(ulatum) / Mod[esti et Arinthei] / XIII [Kal(endas) Mart(ias)] Felix mens[or] / olei [fori Kar]thag(iniensis) sus[ce]pimus / per nav(i)c(u)lam... text continues
AE 1998, 01553a	373 - 373	Africa proconsularis	Amiraute						III Idus April(es) Ertoriot[3] / [3]CC r(eprobo) VIII // [Pos(t) cons(ulatum)] / M[odesto et Arinthei] / v[3] / XVII K[al(endas)... text continues
AE 1912, 00063	-	Africa proconsularis	Carthago						Pos(t) cons(ulatum) / Modesto(!) et Arinthei / III Nonas Mar(tias) Felix mensor olei fori / Karthag(inis) s[us]ce[pim]u[s] p[er] naucla /... text continues
CIL 08, 12636 (p 2459) = AE 1968, +00559a	151 - 200	Africa proconsularis	Carthago	Funerary				agrorum publicorum	D(is) M(anibus) s(acrum) / P(ublius) Aelius Victor / me(n)sor agror(um) p(ublicorum) v(ixit) / annis

							XXXXVIII / Quartio frater p(ius) f(ecit)... text continues
CIL 08, 12637 = AntAfr-1973-133	101 - 200	Africa proconsularis	Carthago	Funerary			Di{i}s Manibus / sacr(um) / Didymus Aug(usti) ser(vus) / mensor agrarius / pius vix(it) an(nos) XLVI / h(ic) s(itus) e(st)... text continues
CIL 08, 12638 = D 07738a = ILTun 00901	-	Africa proconsularis	Carthago	Funerary			D(is) M(anibus) s(acrum) / T(itus) Flavius Apsens / me(n)sor agror(um) / pius vix(it) a(nnos) XXVI / h(ic) s(itus) e(st)
CIL 08, 12639 = AntAfr-1973-133	101 - 200	Africa proconsularis	Carthago	Funerary			Dis Manib(us) sacr(um) / T(itus) Flavius Dapnus Aug(usti) / lib(ertus) agrimensor pius / vix(it) ann(os) LXXXX / Iulia Fortunata viro... text continues
CIL 08, 12912 = AE 1888, 00162f	-	Africa proconsularis	Carthago	Funerary			D(is) M(anibus) s(acrum) / Felix Aug(usti) serv<u=O>s / mensor agrarius / pius vix(it) an(nos) XXXV / h(ic) s(itus) e(st)
CIL 08, 12913	-	Africa proconsularis	Carthago	Funerary			D(is) M(anibus) s(acrum) / Victor Caes(aris) n(ostri) ser(vus) / mens(or) agrar(ius) pius / vix(it) an(nos) LXV h(ic) s(itus) e(st)
CIL 08, 24690 = AntAfr-1973-133	101 - 200	Africa proconsularis	Carthago	Funerary			Dis Manibus sacr(um) / Romanus Aug(usti) mens(or) / agrarius pius vixit / annis L h(ic) s(itus) e(st)
CIL 08, 25988,02b = D 09387c = AE 1907, 00174	-	Africa proconsularis	Djebel Cheidi / Gebel Cheidi				Civit(atis) Thugg(ensis) / t(ermini) p(ositi) per Tiberino / Aug(usti) l(iberto) praeposito / me(n)sorum
CIL 08, 25988,07b	-	Africa proconsularis	Djebel Cheidi / Gebel Cheidi				Civit(atis) Thugg(ensis) / t(ermini) p(ositi) per Tiberino / Aug(usti) l(iberto) praeposito / me(n)sorum

CIL 08, 25988, 12b	-	Africa proconsularis	Djebel Cheidi / Gebel Cheidi				Civit(atis) / Thugg(ensis) / [t(ermi) p(osit)] per Tiberino / Aug(usti) l(iberto) praeposito / me(n)soribus
CIL 08, 12421 (p 2432) = D 05071 = ILTun 00766 = AE 1941, +00157 = AE 1999, +01755	-	Africa proconsularis	Draa el Gamra, Hr. / Gor				Mens<o=U>r(i) / P(ublio) Ligario Maximi Ligari fil(io) Potito / decurioni et magistrato annuali ci/vitatis suae Goritanae qui ex sua li/beralitate... text continues
BCTH-1941/42-271 = EConfines 00069 = AE 1942/43, 00035 = AE 1983, 00944	-	Africa proconsularis	Moussa, Hr. / Thugga				servum mensorem Iussu Imp(eratoris) Caes(aris) / Traiani Hadria(ni) Aug(usti) termini / repositi Capito(nis) Pomponian(i) / per Peregrinum / Aug(usti) ser(vum) mentor/em missum... text continues
CIL 08, 00261 = CIL 08, 11428 = Legio-XV-Apo 00161 = Alumnus 00087	-	Africa proconsularis	Sbiba / Sabibah / Sufes	Funerary	Yes		geometrae Pu]denti men[sori(?)] / [geometr]ae(?) leg(ionis?) XV [Apol(linaris?)] / [in P]annonia [3] / [3 Traia]no(?) Opt[imo(?) 3] / [3] alumno [3]... text continues
CIL 09, 00821 = D 06480	101 - 150	Apulia et Calabria / Regio II	Lucera / Luceria	Funerary			servo public mentori D(is) M(anibus) / Felici s(eruo) p(ublico) mentori / [3]TICIPVI / [
CIL 09, 00699 = D 06476 = AE 2001, +00870	131 - 170	Apulia et Calabria / Regio II	Siponto / Sipontum	Funerary			servo verna mentori D(is) M(anibus) s(acrum) / Liberalis col(onorum) / col(oniae) Sip(onti) ser(vus) ar<c=K>ar(ius) / qui et ante egit rationem / alimentariam sub... text continues
CIL 02, *00128 = CILA-02-04, *00031 = HEp 1999, 00504 = HEp 2003/04, 00588	69 - 117	Baetica (Spain)	Carmona / Carmo	Funerary College			agrimensorum Cerer(i) Frugif(erae) sac(rum) / colleg(ium) agrimensor(um) Carmonens(ium) et cent(uriae) / Albores Volces Agstes Ligyes / colleg(ium) agrimensor(um) Segobiens(ium) et centur(iae)... text continues

CIL 02-05, 00351 = CIL 02, 01598 (p 703, 871) = D 07738	30 - 14	Baetica (Spain)	Nueva-Carteya			Text	agrimensor	L(ocus) p(edum) CXX / Q(uintus) Iulius P(ubli) f(ilius) Gal(eria) / Rufus agrimensor / Siccaenas
CIL 13, 04227	-	Belgica	Kesslingen / Treveri	Funerary		Text		P(ublio) Sincor(io) / Dubitato et Memo/raliae Sacrillae / parentib(us) defunct(is) / Dubitati / Mensor et Mora/tus et sibi vivi
Vindolanda 00650 = AE 1994, 01135 = AE 1999, +00971 = AE 2013, +00936	92 - 97	Britannia	Chesterholm / Vindolanda	Letter		Text	a tablet mensori	] / ut remittat meos denarios / cum [1]assic[3] citra / conscientiam praefecti / sui saluta Verecundam / et Sanctum... text continues
CIL 07, 00420 = RIB-01, 01024	71 - 300	Britannia	Piercebridge / Bremesio			Facsimile of text		D(eo) M(arti) / Condati / Attonius / Quintianus / men(sor) evoc(atus) imp(eratum) / ex ius(su) sol(vit) l(ibens) a(nimo)
ZPE-59-120 = AE 1983, 00941 = AE 1985, 00843	71 - 130	Creta et Cyrenaica	Cyrenae	Funerary	Yes			M(arcus) Aemiliu[s] / M(arci) f(ilius) Macer / tur(ma) Anic(i) V[3]/ian(i) me(n)s(or) c(o)h[o]/rtis (!) Hispan/orum an(n)o/[r]um XXXX aer/a XIIX fra[ter] /... text continues
ILD 00285 = CERom-08, 00468 = CERom-13, 00620 = AE 1987, 00837	108 - 270	Dacia	Sarmizegetusa / Sarmizegethusa / Burgort / Varhely					Loc(us) menso[r]is(?) 3]
ILD 00474	167 - 275	Dacia	Turda / Potaissa		Yes	Text	legionis	I(ovi) O(ptimo) M(aximo) Capit(olino) / vot(u)m libe(ns) / a(nimo?) r(?) solvit Au/rel(ius) Castor / mensor leg(ionis) / V Mac(edonicae) P(iae)
CIL 03, 01189 = IDR-03-05-02, 00453 = CBI 00501	193 - 275	Dacia	Alba Iulia / Apulum		Yes		librarius duplicarius agrimensor	li]br(arius) / [3] b(ene)[f(iciarius)] c(onsularis) / [//] / Aur(elius) Iustu[s] / Aur(elius) Lucilius

								agr(imensor) / Val(erius) Romulus /... text continues
CIL 03, 01220 = IDR-03-05-01, 00382	211 - 275	Dacia	Alba Iulia / Apulum	Funerary				Aur(elius) Ma/ximil[i]a[nus] / mensor
CIL 03, 02124	151 - 300	Dalmatia	Solin / Salona	Funerary				D(is) M(anibus) / C(aius) Iulius / Aprilis / me(n)sor
CIL 03, 02128	151 - 300	Dalmatia	Solin / Salona	Funerary				D(is) M(anibus) / Saturnino / Aug(usti) n(ostri) vern(a) / mensori / Florentina / coniux / b(ene) m(erenti)
CIL 11, 01737 = AE 1995, 00496	71 - 200	Etruria / Regio VII	Volterra / Volaterrae	Votive				Bellonae sacr(um) / Donax Aug(usti) lib(ertus) / me(n)sor d(onum) d(edit)
CIL 12, 04490 = CAG-11-01, p 282	-	Gallia Narbonensis	Narbonne / Narbo	Funerary				D(is) M(anibus) / M(arco) Ulpio / Eutycheti / Aug(usti) lib(erto) / me(n)sori / liberti / patrono / merentissimo
Finke 00236 = Kropp-05-01-04-10 = Kropp-05-01-04- 11 = DTM p 188 = AE 1927, 00068 = AE 1927, 00069	101 - 150	Germania superior	Bad Kreuznach / Cruciniacum					Potitus Fuscii adv[ersarius(?)] / Ivisum Valli Marullum / Pusionis Maxsumus(!) Priuni / [Ne]rvinum Paterni Matu/rum Suavis Turicum Ma/cr Sulpicium Secundani... text continues
CIL 13, 06538 (4, p 100) = Grabstelen 00152 = AHB p 473 = Grbic 00041 = H- S 00416 = AE 2012, +01106	151 - 250	Germania superior	Mainhardt	Funerary	Yes	Text	cohortis	D(is) M(anibus) / Maximo Dasan/tis mensori coh(ortis) I / Asturum |(centuria) Coe[3]/uni Quin[t]ini s[ti]/pendiorum XVIII / an(n)orum XXXVIII / c(ivis)... text continues
CIL 13, 06748	201 - 300	Germania superior	Mainz / Mogontiacum			Text		]CAQ Mensor / [nu]minibu[s]
CIL 13, 07007 = CIL 12, *00261e	201 - 300	Germania superior	Mainz / Mogontiacum	Funerary			frumenti numeris	D(is) M(anibus) / Primniae Comitil/lae quae vixit / annis XX cives / Mediomatrix /

								Maternius Nem/ausus strator / co(n)s(ularis) et... text continues
CIL 10, 06638 = InscrIt-13-01, 00031 = InscrIt-13-02, 00026 = Gummerus-01, 00223 = ZPE-132-312 = AE 2000, +00055 = AE 2014, +00304	-	Latium et Campania / Regio I	Anzio / Antium			Text	college?	]bus m[// [Ti(berio) Caesare Aug(usto) co(n)s(ule)] / [3] II / [3]s II / [3]s Lycorei f(ilius?) / [3] II... text continues
CIL 14, 00409 = IPOstie-B, 00339 = D 06146 = EAOR-04, 00039 = Epigrafia-02, p 553 = CBI 00859 = Questori 00004 = AE 1999, +00407 = Licordari-2018, 00001	101 - 150	Latium et Campania / Regio I	Fiumicino / Portus			Text and very fine decoration	mentor(um) frumentarior(um) curatorum	Cn(aeo) Sentio Cn(aei) fil(io) / Cn(aei) n(epoti) Ter(etina) Felici / dec(urionum) decr(eto) aedilicio adl(ecto) d(ecurionum) d(ecreto) d(ecurioni) adl(ecto) / q(uaestori)... text continues
CIL 01, 02702 (p 845, 934, 935) = ILLRP 00742 = IMinturnae 00025 = AnalEpi p 202 = Epigraphica-2016-58 = AE 1934, 00250 = AE 1936, +00127 = AE 1938, +00142 = AE 1945, +00078 = AE 1948, +00082 = FTD-04, p 123	-100 - - 51	Latium et Campania / Regio I	Minturno / Minturnae			Text	servus mentor	P(ublio) Hirrio M(arci) f(ilio) / P(ublio) Stahio P(ubli) f(ilio) / duovir(is) / heisce mag(istreis) / Merc(urio) Fel(ici) d(onum) d(ant) /... text continues
CIL 14, 00002 (p 481) = D 03339	197 - 197	Latium et Campania / Regio I	Ostia Antica				corporis mentorum aditoru,	Monitu sanctissimae Cereris et Nympharum hic puteus factus omni sumptu // C(ai) Caecili Onesimi / patro(ni) et q(uin)q(uennalis) p(er)p(etui) c(orporis)... text continues

CIL 14, 00023 (p 612) = CIL 01, 01423 (p 981) = D 03005	-100 - 44	Latium et Campania / Regio I	Ostia Antica					Iovi Opt<i=U>mo / Maximo ex viso / aram aedificavit / P(ublius) Cornelius P(ubli) l(ibertus) Trupo / me(n)sor / prec(ario)
CIL 14, 00154 = D 01431 = ELOstia p 234	198 - 211	Latium et Campania / Regio I	Ostia Antica			Text and large figure	corpus mensorum	Q(uito) Acilio C(ai) fil(io) Pap(iria) / Fusco v(iro) e(gregio) / procurat(ori) annon(ae) / Augg[[g(ustorum)] nn[[n(ostrorum) p(atrono) c(oloniae)]] Ost(iensis) procur(atori) /... text continues
CIL 14, 00172 (p 481, 613) = D 01429 = Praetores 00004a	184 - 184	Latium et Campania / Regio I	Ostia Antica		Yes	Text	corpus mensorum frumentariorum	Q(uito) Petronio Q(uiti) f(ilio) / Meliori / proc(uratori) annon(ae) adiutori curatoris / alvei Tiberis et cloacarum / curatori rei publ(icae)... text continues
CIL 14, 00289	-	Latium et Campania / Regio I	Ostia Antica				corporis mensorum frumentarior	omnibus honorib]us functo / [3] q(uin)q(uennali) corpor(is) mensor(um) / [frumenta]rior(um) nauticarior(um) Ost(iensium) / [3 A]emilius Trophimas / T(itus) Aemilius Felix... text continues
CIL 14, 00303 (p 614) = CIL 14, 04620 = D 06169 = Questori 00009 = AE 1913, 00191	131 - 160	Latium et Campania / Regio I	Ostia Antica			Text	praefecto fabrum tignuariorum Ostis patrono corporum mensorum frumentariorum	P(ublio) Aufidio P(ubli) f(ilio) Quirina / Forti / [d(ecreto) d(ecurionum?) decu]rioni adlecto Iiviro / [quaesto]ri aerari(i) Ostiensium IIII / [praefe]cto... text continues
CIL 14, 00309 (p 614) = EE-09, p 335 = D 06163	101 - 200	Latium et Campania / Regio I	Ostia Antica	Funerary		Text and bedside scene	corporis mensorum	Dis Manibus / L(ucius) Calpurnius Chius sevir Aug(ustalis) / et quinquennalis / idem quinq(uennalis) corporis mensor(um) / frumentarior(um)

								Ostiens(ium) et... text continues
CIL 14, 00363 (p 482, 615)	138 - 161	Latium et Campania / Regio I	Ostia Antica				officer of corporum navium marinarum et mensorum frumentariorum	C(aio) Granio / C(ai) fil(io) Quir(ina) / Maturo / decur(ionum) decr(eto) / decurioni gratis / adlecto p(atrono) / corpor(um) [[ato]]... text continues
CIL 14, 00364 (p 615)	138 - 161	Latium et Campania / Regio I	Ostia Antica	Funerary			corporis mensorum & navium marinarum	[D(is)] M(anibus) / [C(aio) Granio] C(ai) f(ilio) Quir(ina) Maturo / [decurioni et duum]viro Ostiensium / [corp]oris mensorum Ost(iensium) / [3]rum... text continues
CIL 14, 00438	-	Latium et Campania / Regio I	Ostia Antica	Funerary			corporis mensorum frumentariorum	D(is) M(anibus) / Varenes Blastenis coniugis bene merenti et sibi / fecit Antius Successus ite<m=N>que Antiae Success(a)e / filiae dulcissimae... text continues
CIL 14, 04139	151 - 250	Latium et Campania / Regio I	Ostia Antica				corporis mensorum	fr]ument(um?) [3] / [3 corp]or(is?) me<n=M>[sor(um?) 3] / [3] Abascant[
CIL 14, 04140 = D 06155	171 - 200	Latium et Campania / Regio I	Ostia Antica			Text	corporum mensorum frumentorum adiutorum	Q(uinto) Aeronio / Antiocho / sevir(o) August(ali) / et q(uin)q(uennali) eiusdem / ordinis idem / q(uin)q(uennali) corp(or)um mensor(um) / frum(entorum)... text continues
CIL 14, 04452 = D 09507 = ELOstia p 237 = AE 1913, 00189	249 - 249	Latium et Campania / Regio I	Ostia Antica			Text	patrono corporis mensorum corporis pistorum	P(ublio) Flavio P(ubli) fil(io) Pal(atina) / Prisco e(gregio) v(iro) / equestris ordinis / religiosa disciplina / ad centena provecto /... text continues

CIL 14, 04612	-	Latium et Campania / Regio I	Ostia Antica				me]ns(ores?) fru[mentar(iorum?)
CIL 14, 04623 = EE-09, 00464	-	Latium et Campania / Regio I	Ostia Antica	Funerary			corporis mensorum frumentorum D(is) M(anibus) [3] / Sex(tus) Av[ienius] Sex(ti) fil(ius) [3] / [L]ivian[us d(ecurionum) d(ecreto)] dec(urio) alle[ct(us) q(uin)q(uennalis?)] / [corp(or)is m]ensor(um) frum(entariorum)]... text continues
ILOP 00107 = AE 2009, 00192 = AE 2015, +00226	151 - 230	Latium et Campania / Regio I	Ostia Antica			Text and columns	corporis mensorum frumentorum] / Tr(omentina?) [3]as / sevir August(alis) / idem q(uin)q(uennalis) item / q(uin)q(uennalis) ordinis / Augustalium / et patronus /... text continues
MDAI(R)-1999-335 = AE 1999, 00410	171 - 230	Latium et Campania / Regio I	Ostia Antica	Funerary		Text and wavy lines	corporis mensorum nauticorum D(is) M(anibus) // Sex(to) Avienio / Zosimo / sevir Aug(ustali) idem / q(uin)q(uennali) item q(uin)q(uennali) corp(or)is / mens(or)um naut(icorum) Ost(iensium)... text continues
NSA-1938-62 = SdOstia-03, p 150 = AE 1939, +00071 = AE 1939, 00147	14 - 37	Latium et Campania / Regio I	Ostia Antica	Funerary		Text	C(aius) Iulius C(ai) et L(uci) Sertori l(ibertus) Apella / sepulc{h}rum inferundi humandi leiberteis / leibertabusque suis et leibertorum leiberteis /... text continues
NSA-1953-252	161 - 170	Latium et Campania / Regio I	Ostia Antica			Text	frumentarii [Imp(eratori) Caesari] / [M(arco) Aurelio Antonino Aug(usto)] / [pont(ifici) max(imo) trib(unicia) pot(estate) X]XV / [imp(eratori) V co(n)s(uli) III p(atri) p(atriciae)]... text continues

NSA-1953-266 = AE 1955, 00175	231 - 270	Latium et Campania / Regio I	Ostia Antica			Facsimile of text	corpus mensorum frumentorum	P(ublio) Flavio Pal(atina) / [Prisco v(iro)] e(gregio) / [q(uin)q(uennali) c(ensoria) p(otestate) p(atrono) col(oniae) sacer(doti)] Geni(i) / [colon(iae) Ost(iensis) 3] civium... text continues
NSA-1953-297 = SdOstia-04, p 35 = AE 1988, 00212	-	Latium et Campania / Regio I	Ostia Antica			Text	corpus mensorum	] / [dec(reto) dec(urionum)] decurion[i g]ratis adl(ecto) [cor]pus me(n)sorum / [fr]umentar(iorum) / patrono et q(uin)q(uennali) perpetuo / ob plurima eius... text continues
SdOstia-04, p 35 = Ostia 00023b	-	Latium et Campania / Regio I	Ostia Antica			Text	patrono corporis mensorum	]imo / [3] statuum / [3] Laurentio v(iro) p(erfectissimo) / [3 patro]no corpo(ris) mensorum / [3 o]b contemplatione(m) meritor(um) /... text continues
CIL 04, 05405	-	Latium et Campania / Regio I	Pompei					Agilis / mensor
CIL 04, 05407	-	Latium et Campania / Regio I	Pompei					Primus / men(sor)
CIL 10, 01930 = CIL 01, 01623 (p 1013) = D 07739 = ILLRP 00801	-60 - 31	Latium et Campania / Regio I	Pozzuoli / Puteoli	Funerary		Text		] Stlaccius C(ai) l(ibertus) A[3] / mensor idem sacoma[rius] / sibi et su{e}is / [3] Stlaccius A(uli) l(ibertus) Maric[3] /... text continues
CIL 01, 00589 (p 723, 739, 833, 915) = ILMN-01, 00030 = D 00038 (p 169) = Chiron-2011-91 = AE 1990, 00021	-60 - - 41	Latium et Campania / Regio I	Teano / Teanum Sidicinum			Text		[1] Mess[ius 3] f(ilius) Stichus / [me]nsor(?) abavos / patris mei / [Iu]noni Populona[e] / sacrum
CIL 05, 07368 = IDRE-01, 00140	251 - 300	Liguria / Regio IX	Tortona / Dertona	Funerary	Yes			D(is) M(anibus) / et perpetu(a)e / felicitati / Aur(eliae) Vitelliae /

								Aur(elius) Quintia/nus [m]e(n)sor / leg(ionis) V M(acedonicae) coni/ugi carissim(a)e... text continues
CAG-71-01, p 176 = ILGL-Aed 00195	-	Lugdunensis (fance)	Autun / Augustodunum / Haedui				gnomon	] gnomon [3] / [3] mensor[
ILGL-Aed 00196 = AE 2015, 00895	-	Lugdunensis (fance)	Autun / Augustodunum / Haedui				Text	]o Atilian[3] / [3]icevila[3] / [3]nono[3] / [3]VN[3] / [3] Narusni[3] / [3]us Auguria[3] / [3]ICI mensor [3]/cus restitu[3] /... text continues
EE-09, 00163 = ICERV 00372	301 - 500	Lusitania	Badajoz					] / mensoris aedem et porticus
CIL 02, 06337 = CILA-02-04, 01043 = ERBeturi 00152 = AE 1997, 00786 = HEp 1997, 00142 = Navarro-2017, 00246	-	Lusitania	Dehesa del Santo / Emerita	Funerary			Text	L(ucio) Nor[bano 3] / Mens[ori Iivir(o?) q(uin)q(uennali?)] / bis Iivir(o) [c(olonorum) c(oloniae) Aug(ustae) Emer(itae?) et] / L(ucio) Norbano [3] /... text continues
CIL 03, 00586 = CIL 03, 12306 = D 05947a	117 - 139	Macedonia	Lamia, Zeitoun / Lamia			Yes		Q(uinto) Gellio Sentio Augurino procons(ule) decreta / ex tabellis recitata Kalendis Marti(i)s cum Optimus Maximusque / princeps Traianus Hadrianus Aug(ustus)... text continues
Conrad 00368 = AE 2004, 01258	201 - 300	Moesia inferior (hungary)	Iwanowo / Ivanovo / Trimammium	Funerary		Yes	legionis	D(is) M(anibus) / Aur(elio) Muciano / discente me(n)/sore leg(ionis) I / Ital(icae) vix(it) / ann(os) XX mil(itavit) / ann(os) I[
IMS-02, 00040 = GeA 00434 = AE 1973, 00471	252 - 252	Moesia superior (balkins)	Kostolac / Kostolatz / Viminacium			Yes	Text	legionis Scholae / Genio men/sorum et leg(ionis) VII / Cl(audiae) pro salute / dd(ominorum) nn(ostrorum) Augg(ustorum) / Alexander For/tunati

								disp(ensator) horr(eorum)... text continues
IMS-02, 00126 = D 09091 = AE 1907, 00041	151 - 300	Moesia superior (balkins)	Kostolac / Kostolatz / Viminacium	Funerary	Yes	Text and winged figuer with torches	trictic legionis	D(is) M(anibus) / Aur(elius) Vitalis veter(anus) ex / mensore tritici / leg(ionis) VII Cl(audiae) et Aurel(ia) / Macedonia coniunx /... text continues
CIL 03, 08112 = CIL 03, 12656 = IMS-02, 00058 = GeA 00437	228 - 228	Moesia superior (balkins)	Smederevo / Vinceia / Viminacium		Yes			] / [pro salute] / [Imp(eratoris) Caes(aris)] / [M(arci) Aur(eli) Seve]/[ri Alexan]/[dri Au]g(usti) n[ostr]i / et leg(ionis) V[II] / Cl(audiae)... text continues
IMS-02, 00045	151 - 300	Moesia superior (balkins)	Smederevo / Vinceia / Viminacium		Yes	Text	trictic legionis	] / Ael(ius) Vita[li]s / vet(eranus) ex me[ns(ore) tr]itici leg(ionis) V[II] Cl(audiae) pr[o salute sua [3] / [vo]t(um) p[os]ui[t
AE 1904, 00072	-	Numidia	Lambaesis					Mensores / Abbonius Mucrubius / Sallustius Ianuarius / Arruntius Maximus / Afranius Lucius / Cossutius Gududus / Octavius Saturninus /... text continues
CBI 00779 = AE 1917/18, 00029 = AE 1992, 01872 = AntAfr-1992-155	-	Numidia	Lambaesis		Yes	Text	frumentarius	]S Aproni[3] / [3]rgilius Felix / coh(orte) I / [3]ilius Primus me(n)s(or) frum(entarius) / L(ucius) Nonius Florus cand(idatus) cas(tris) /... text continues
CIL 08, 02564 = CIL 08, 18052 = D 00470 = CBI 00782 = AE 1947, +00201 = AE 1978, 00889 = AE 2016, +01828	-	Numidia	Lambaesis	Army list			librarius duplicarius	[Pro salute d(omini) n(ostr]i) Imp(eratoris) Caes(aris)] / [M(arci) Aureli Antonini] / [Pii Fel(icis) Aug(usti) pont(ificis) max(imi)] / p(atris) p(atriciae) trib(unicia)... text continues
CIL 08, 02856 = CIL 08, 18150	-	Numidia	Lambaesis	Funerary	Yes		legionis	D(is) M(anibus) s(acrum) / C(aius) Cornificius /

							Fortunatus / mens(or) leg(ionis) III Aug(ustae) / se vivo sibi una / cum... text continues
CIL 08, 02857 = CIL 08, 18151	-	Numidia	Lambaesis	Funerary	Yes	legionis	D(is) M(anibus) s(acrum) / Iulia Fortu/nata v(ixit) a(nnos) XXVIII m(enses) / X cum sponso suo / ann(os) XII v(ixit) Cornific(ius)... text continues
CIL 08, 02935 (p 1740)	-	Numidia	Lambaesis	Funerary	Yes	legionis	D(is) M(anibus) s(acrum) / L(ucio) Longeio / Felici imag(inifero) / leg(ionis) III Aug(ustae) / vixit a(nnos) XXXV / M(arcus) Modius... text continues
CIL 08, 02946 (p 1740)	-	Numidia	Lambaesis	Funerary	Yes	legionis	[D(is) M(anibus) s(acrum)] / M(arcus) Modius / Felix me(n)/sor leg(ionis) III / Aug(ustae) vix(it) an(nos) / LX Arrani(us) / Saturnin(us)... text continues
CIL 08, 03028 = CIL 08, 18161	-	Numidia	Lambaesis	Funerary	Yes	legionis	Domo Collina / Cibessos / d(is) M(anibus) s(acrum) / P(ublius) Aelius / Alexan/der mil(es) / leg(ionis) III Aug(ustae) / |(centuria)... text continues
CIL 03, 03433 = TitAq-01, 00114	101 - 300	Pannonia inferior	Budapest / Aquincum			legionis	I(ovi) O(ptimo) M(aximo) / Ael(ius) Rufus / me(n)sor / l(egionis) II Ad(iutricis) / v(otum) s(olvit) l(ibens) m(erito)
TitAq-02, 00569	231 - 300	Pannonia inferior	Budapest / Aquincum	Funerary		Text	D(is) M(anibus) / Aureli(a)e Aureli(a)e qu(a)e / vix(it) mens(es) VIII Aurel(ius) / Deipas mens(or) et Ael(ia) Cas/i<l=I>la parentes fili(a)e dulc(issimae)... text continues

CIL 03, 10976 = RIU-02, 00391 = Brigetio p 69 = GeA 00314	131 - 300	Pannonia superior	Komarom / Komorn / Brigetio		Yes			Genio / mensor(um) s(acrum) / [le]g(io) I Adi(utrix) / [1]ER[
ILSlov-01, 00060 = AIJ 00229 = AE 1938, 00153	240 - 240	Pannonia superior	Velika Vas / Neviodonum		Yes	Text	legionis	P(ublius) Maximius / Maternus / mensor leg(ionis) / X G(eminiae) ar(am) d(edicavit) civibus / suis Sabino et / Venusto co(n)s(ulibus)... text continues
CIL 06, 00022 (p 3755, 4094) = D 03816	117 - 230	Roma	Roma				maybe not	Annonae Sanctae / Aelius Vitalio / mensor perpetuus / dignissimo / corpori{s} pistorum / siliginariorum / d(onum) d(edit)
CIL 06, 00085a (p 3003, 3755, 4107) = D 03399	198 - 198	Roma	Roma			Text	Mchinariis	M(arcus) Ael(ius) M(arci) f(ilius) Rusticus rect(or) / imm(unis) II hon(oratus) III / in diem vitae suae / me(n)sorib(us) mach(inariis) f(rumenti)... text continues
CIL 06, 00198 (p 3004, 3755, 4133) = CIL 06, 30712c = CIL 06, 36747c = ILMN-01, 00005 = DM p 159 = D 06052 = AE 1999, +00191	70 - 71	Roma	Roma			Text		Victoriae / Imp(eratoris) Caesaris Vespasiani / Augusti / sacrum / trib(us) Suc(cusanae) corp(or)is Iuliani / C(aius) Iulius Hermes mensor / ... text continues
CIL 06, 00905 (p 4304)	14 - 29	Roma	Roma					Ti(berio) Augusto / Iuliae Augustae / sacr(um) / L(ucius) Postumius Primus / mensor / d(e) s(ua) p(ecunia)
CIL 06, 02379 (p 3320, 3832) = CIL 06, 32520 = CIL 11, *00618,06 = CIL 11, *00806d = CLE 01670 = Philippi 00762 = CIPh-02-	159 - 161	Roma	Roma			Text	2 mensors	]tes / [3] patre vidisse / [3] lacertis / [3]t ipse / [3]dalas amici / [3]e mira / [3]to / ... text continues

01, p 399 = AIIRoma-09, 00089 = Oderzo-app, 00010 = AE 1968, 00026 = AE 1999, +00421								
CIL 06, 02385b01 (p 868, 3320, 3339) = CIL 06, 02385b03 = CIL 06, 02385b04 = CIL 06, 02385b06 = CIL 06, 02385b07 = CIL 06, 02385b08 = CIL 06, 02385b11 = CIL 06, 02385b13 = CIL 06, 02385b15 = CIL 06, 02385b16 = CIL 06, 02385b20 = CIL 06, 02385b26 = CIL 06, 02393c = CIL 06, 02393d = CIL 06, 02394a = CIL 06, 02394b = CIL 06, 02394c = CIL 06, 02396 = CIL 06, 02401 = CIL 06, 32536,18 = IDRE-01, 00035 = CBI 00916 = Visocnik-01, 00026 = ZPE-190-159 = AE 2013, +01189 = AE 2014, +00133a = AE 2014, +00657 = Velestino-2015, p 109	201 - 225	Roma	Roma	Army list	Yes	Text	disc(ente) mens(oris)	Pa[latin]ae(?) // Summ[a a] coh[ort(alibus) conl(ata) HS m(ilia) n(umum)] XIV / DC[CXXXI s(emis)] / singuli c[ont]ul(erunt) |(denarios) XX aer(is) |(quadrantem)... text continues
CIL 06, 02518 (p 3369)	101 - 180	Roma	Roma	Funerary	Yes		cohortis	D(is) M(anibus) / M(arcus) Ulpus M(arci) f(ilius) / Iul(ia) Verus / Emona / me(n)sor coh(ortis) / III pr(aetoriae)

								v(ixit) an(nos)... text continues
CIL 06, 02692 (p 3370, 3835) = D 02058	121 - 200	Roma	Roma		Yes		cohortis	T(ito) Aelio Callis/tiano fratri / rarissimo mi/liti coh(ortis) VIII pr(aetoriae) / T(itus) Aelius Lucre/tianus frater / mentor coh(ortis) / eiusdem
CIL 06, 02754 (p 3835) = D 02059 = AE 2014, +00657	76 - 125	Roma	Roma	Funerary	Yes	Text and a wreath	librarius	M(arcus) Troianius / M(arci) f(ilius) Marcellus / Luc(o) Aug(usti) mil(es) / coh(ortis) X pr(aetoriae) |(centuria) / Scipionis / men(sor) lib(rarius)... text continues
CIL 06, 03606 (p 3407, 3847) = D 02422a	-	Roma	Roma	Funerary	Yes		audiutor mentoris agrarii	D(is) M(anibus) / L(ucius) Iulius Priscus / miles leg(ionis) I adiutor / me(n)sor(is) agrari(i)
CIL 06, 03988	-25 - 25	Roma	Roma	Funerary		Text	decurio	Diadumenus Liviae / mentor dec(urio) dat / Lochiadi Liviae sarcinatr(ici) coniugi suae
CIL 06, 04244	1 - 50	Roma	Roma			Facsimile of text		[3]e |(mulieris) l(ibertae) / [3]e ad / [3] dedit // Ma Liviae l(iberta) / dat / Diadumenus mens(or) / matri
CIL 06, 06321	1 - 50	Roma	Roma	Funerary		Text		Laches / mentor / vix {s}it an(n)o(s) XVII
CIL 06, 08912	-	Roma	Roma	Funerary				Ossa / Elegantis Aug(usti) / l(iberti) mentoris / Iulia Arescusa / l(iberto) eius
CIL 06, 08913	-	Roma	Roma	Funerary				Ti(berius) Iulius Aug(usti) et Aug(ustae) l(ibertus) / Pelagius mentor / sibi et suis / Cispiae C(ai) l(ibertae) Mycale / C(aio)... text continues
CIL 06, 09619 (p 3470)	51 - 200	Roma	Roma	Funerary			collega	D(is) M(anibus) / Aristo me(n)sori / ob multa merita Secun/dus collega titu/lum posuit b(ene) m(erenti) f(ecit)

CIL 06, 09620	1 - 50	Roma	Roma	Funerary		Text		Dis Manibus / Helici mensori / Volusia Fau(s)tina / contubernal[i] / suo fecit
CIL 06, 09621 = Schiavi 00089	51 - 100	Roma	Roma	Funerary				D(is) M(anibus) / Alexandriae / Phlogius / Q(uinti) Volusi ser(vus) / mensor fecit / et sibi
CIL 06, 09626 (p 3895) = D 07267	-	Roma	Roma	Funerary			collegae corpore mensorum machinariorum	D(is) M(anibus) / C(aius) Turius C(ai) f(ilius) Lollianus / quitquit ex corpore mensorum / machinariorum funeratici nomi/ne sequetur reliqu(u)m penes... text continues
CIL 06, 09627	-	Roma	Roma	Funerary				[D(is)] M(anibus) / [3] M(arco) C(aio) Cornelio C(ai) f(ilio) Agrippino / [3] H]onorato filio mensor / [3]IM negotiator vinaria /... text continues
CIL 06, 33883 (p 3896) = CIL 11, *00156,14 = D 07268	1 - 130	Roma	Roma	Funerary		Text and columns	Mensores machinarii frumenti	Q(uinto) Iulio Q(uinti) f(ilio) Pal(atina) / Herculatio Tauro / honorato immuni / me(n)sores machina/ri(i) frumenti publi/ci in solacium / Q(uinti)... text continues
CIL 06, 37758	-	Roma	Roma	Funerary				] / Aufidiae |(mulieris) l(ibertae) Erotidi matri / Aufidiae |(mulieris) l(ibertae) Selenioni sorori et / Aufidiae |(mulieris) l(ibertae) Elate nepti... text continues
CIL 06, 39822 = AE 1980, 00053	31 - 70	Roma	Roma			Text		Pro salute Caesaris / domini n(ostri) Bonae Deae / Feliculae Agresti fanum / multo tempore dirutum ac / derelictum de... text continues
LMentana-01, 00052	1 - 200	Roma	Roma			Text		[3]aecus mensor / [3]rentibus

CIL 05, 05315	-	Transpadana / Regio XI	Como / Comum	Funerary			publici	D(is) M(anibus) / Caesenni Eugeni / mensoris / publici / Florentius / libertus
CIL 05, 06786 = InscrIt-11-02, 00011 = D 07736 = Tribu p 296 = Piemonte 00043 = AE 1998, +00598	-	Transpadana / Regio XI	Ivrea / Eporedia	Funerary		Text and perhaps tools		[Tr]ib(u) Claudia / [L(ucius)] Aebutius L(uci) l(ibertus) / [F]austus mensor / VIvir sibi et / Arriae Q(uinti) l(ibertae) Auctae /... text continues
CIL 11, 04890 = SupIt-29, p 285	-30 - -1	Umbria / Regio VI	Spoletio / Spoletium			Text		[3]ius Mensor / [
CIL 11, 06066	-30 - -1	Umbria / Regio VI	Urbino / Urvinum Mataurense			Text	maybe name? pontifex	L(ucius) Seius C(ai) f(ilius) / Ste(latina) Mensor / pontifex
CIL 05, 00936 = CIL 05, 00937 = InscrAqu-02, 02756 = D 02423 = IEAquil 00091	31 - 60	Venetia et Histria / Regio X	Aquileia	Funerary	Yes	Text		L(ucius) Titius / L(uci) f(ilius) Vot(uria) / veteranus / leg(ionis) VIII Aug(ustae) / stipendiorum / XXV mensor / frumenti v(ivus)... text continues
InscrAqu-03, 03504	51 - 100	Venetia et Histria / Regio X	Aquileia	Funerary		Text		] / mensori[s 3] / et eorum [3] / quibus ei F[3] / [i]n perpetuo [3] / [l(ocus)] m(onumenti) in... text continues
CIL 05, 03155	-	Venetia et Histria / Regio X	Aquileia	Funerary				P(ublio) Aelio P(ubli) l(iberto) / Lygdo mensori / Lepidiae L(uci) l(ibertae) / Gemellae / uxori / Lygdamo / nepoti /... text continues
PRAEFECTUS FABRUM								
Publication	Date	Province	Place	Type	Military	Photo on Claus/Slaby	Other Terms	Text
CIL 02-05, 01022 = CIL 02, 05439 (p 1038) = CIL 02, 05439a = CIL 01, 00594 (p 724, 833, 916) = CILA-02-02, 00611 = D 06087 =	-44 - - 44	Baetica (Spain)	Osuna / Urso			Text		cui quis ita ma]/num inicere iussus erit iudicati iure man/us iniectio esto itque ei s(ine) f(raude) s(ua) facere liceto vin/dex... text continues

Freis 00042 = Hiberia p 199 = EAOR-07, 00001 = AE 1946, 00123 = AE 1946, +00163 = AE 1950, 00050 = AE 1951, 00032 = AE 1951, +00048 = AE 1952, +00120 = AE 1997, 00826 = AE 1998, 00742 = AE 2006, +00463 = AE 2016, +00035 = Tyche-2018-145								
CIL 08, 15519 = CIL 08, 26475 = Dougga 00068 = ILTun 01393 = LBIRNA 00027 = Aounallah-2016, p 121	36 - 41	Africa proconsularis	Dougga / Thugga		Yes	Facsimile of text	augur "in germania" PF tribunus	] / [sac]rum / L(ucius) Iulius L(uci) f(ilius) Cor(nelia) Crassus aed(iliciis) orn(amentis) tr(ibunus) mil(itum) / leg(ionis) XXI Rapacis in Germ(ania)... text continues
CIL 05, 04921 = InscrIt-10-05, 01146 = D 06099a = MEFR-2012-226	26 - 26	Venetia et Histria / Regio X	Ponte Zanano / Trumplini		Yes			L(ucio) Silano flam(ine) Mart(iali) / C(aio) Vellaeo Tutore co(n)s(ulibus) / pridie Non(as) Decemb(res) / civitas Apisa Maius hospitium / fecit... text continues
Corinth-08-03, 00131	1 - 30	Achaia	Corinth / Korinthos / Corinthus		Yes		balineo	[Q(uintus) Gr]anius Q(uinti) f(ilius) Bassus p[roc(urator) Aug(usti)] / [ei]usdem comes praef(ectus) fa[brum] / [3]um de balineo im[3] / [3]ne m[
CIL 11, 00709 (p 1239) = D 01394 (p 175)	-	Aemilia / Regio VIII	Bologna / Bononia	Funerary	Yes	Text and Floral Decorations	also praefectus equitum	D(is) M(anibus) v(ivus) f(ecit) / T(ito) Visulanio / Aufidio / Trebio Clementi / T(itus) Visulanius Crescens / praef(ectus) fabr(um) bis... text continues
CIL 11, 00712 (p 1239)	-	Aemilia / Regio VIII	Bologna / Bononia		Yes		also praefectus equitum	[3 D]enticol(us?) Q F C B / [3] prim(us) pil(us)

								praef(ectus) eq(uitum) / [3 II]vir i(ure) d(icundo) / [prim(us)] pil(us)... text continues
MEFR-1988-118 = Questori 00377 = AE 1976, 00207 = AE 1988, +00565	1 - 100	Aemilia / Regio VIII	Bologna / Bononia		Yes	Text	also quaestor	C(aius) Trebius C(ai) f(ilius) Lem(onia) Maxim[us 3] / praef(ectus) fabr(um) q(uaestor) IIIvir Aug(ustalis) IIvir pon[t(ificex) 3] / C(aius) Trebius Maximus... text continues
CIL 11, 00624 (p 1236) = Epigraphica-1983- 151 = Grabalt 0001	31 - 70	Aemilia / Regio VIII	Forli / Forum Livii	Funerary	Yes	Text and Floral Decorations	also praefectus equitum	Dis Manibus / C(aius) Purtisius C(ai) f(ilius) Stel(l)atina {s} III/vir quin(quennalis) pr(aefectus) equi(tum) pr(aefectus) fab(rum) pri(mus) pil(us) leg(ionis) / [
MEFR-1988-118 = Questori 00371 = AE 1980, 00489 = AE 1988, +00565	1 - 100	Aemilia / Regio VIII	Imola / Forum Cornelii		Yes		also quaestor	C(aius) Antistius P(ubli) f(ilius) Po[l(lia)] / Pansa a<e=I>d(ilis) q(uaestor) IIvir / IIIvir Augustal(is) ex d(ecreto) d(ecurionum) / inter primos creatus... text continues
CIL 11, 01217 = CIL 11, *00175	-30 - 30	Aemilia / Regio VIII	Piacenza / Placentia	Funerary	Yes	Text	tribunus	P(ublius) Aufidius L(uci) f(ilius) IIIIvir IIvir / tr(ibunus) milit(um) praef(ectus) fab(rum) sibi et / L(ucio) Aufidio Cn(aei) f(ilio) patri et... text continues
CIL 11, 01219 (p 1252)	-27 - 41	Aemilia / Regio VIII	Piacenza / Placentia		Yes		augur	S(extus) Petronius T(iti) f(ilius) Lupus / Marianus dec(urio) IIIIvir iu(re) d(icundo) / augur praef(ectus) fabr(um) cons(ularis) / bis xystum cu[m... text continues
CIL 11, 01220	-	Aemilia / Regio VIII	Piacenza / Placentia		Yes			P(ublius) Vettius P(ubli) [3 praef(ectus)] / fabr(um) bi[s 3]

								/ Paullino f(ilio) [3] / Amandae [3] / quae quod eg[
CIL 11, 06940 = Epigraphica-1981- 253 = MEFr-1967- 46 = Questori 00384 = AE 1983, 00420 = AE 2010, +00104 = AE 2016, +00019	-50 - 14	Aemilia / Regio VIII	Piacenza / Placentia		Yes	Text	augur quaestor	L(ucius) Caecilius L(uci) f(ilius) / Flaccus pater / q(uaestor) tr(ibunus) aug(ur) curator / aedis Iovis faciund(ae) // Petronia C(ai) f(ilia)... text continues
ERimini 00022 = MEFR-1988-117 = AE 1976, 00200 = AE 1978, 00333 = AE 1988, +00565	31 - 70	Aemilia / Regio VIII	Rimini / Ariminum		Yes	Text	tribunus	M(arcus) Arrecinus M(arci) f(ilius) [3] / Clemens trib(unus) mil(itum) leg(ionis) III Cyren(aicae) / et leg(ionis) XXII praef(ectus) fabr(um) IIvir IIIvir... text continues
CIL 11, 01185 = MantVel p 129	1 - 100	Aemilia / Regio VIII	Velleia Romana / Veleia	Dedication	Yes		pontifex tribunus basilicam	C(aius) [3]s L(uci) f(ilius) Sabinu[s] p[ontif(ex) [II]vir i(ure) [d(icundo)] / p[3] pontif(ex) IIvir t[rib(unus)] milit(um) [leg(ionis) 3] / [3] Cae[3]... text continues
CIL 11, 01186 = MantVel p 132	1 - 100	Aemilia / Regio VIII	Velleia Romana / Veleia	Dedication	Yes		tribunus basilicam	trib(unus) milit(um)]leg(ionis) / [3 pr]aef(ectus) / [fabr(um) patronus ba]sili[cam 3 fe]cit
CIL 11, 01188 = MantVel p 134	1 - 50	Aemilia / Regio VIII	Velleia Romana / Veleia	Dedication			pontifex	] IIvir ter(tium) et pontif(ex) [3] / [3 praef(ectus)] fabr(um) patronus / [3] IIvir [3]III[
CIL 08, 00069 (p 924, 925, 1162) = CIL 11, *00296 = ECortonese 00030 = MEFR-2012-227 = AE 1946, +00234	65 - 65	Africa proconsularis	Akouda / Akkudah / Kalaa- Kebira / Gurza					A(ulo) Licinio N(er=FP>va Siliano co(n)s(ule) / civitas Gurzensis ex Africa / hospi<t=I>ium fecit cum <Q=O>(uinto) Aufus/tio C(ai) f(ilio) Gal(eria) Macrino... text continues
CIL 08, 17408 = ILAlg-01, 00010 = D 05474 = Libyca- 1954-378 = AE 1910, +00126 = AE	-	Africa proconsularis	Annaba / Bone / Hippone, Ruines d' / Hippo Regius					S]alvius L(uci) f(ilius) Quir(ina) Fusc[us] / [pr]aef(ectus) fabr(um) aedil(is) IIvir IIvir quinq(uennalis) / [st]atuum

1938, +00045 = AE 1955, +00146							argenteam ex HS LI(milibus) CCCXXXV /... text continues
CIL 08, 01478 = CIL 08, 15503 = CIL 08, 26519 = IL Afr 00520 = LBIRNA 00029 = Dougga 00024 = ILTun 01496 = Saturne-01, p 212 = AE 1914, 00173 = Aounallah-2016, p 124	43 - 43	Africa proconsularis	Dougga / Thugga		Yes		[[Imp(eratori) Ti(berio) C[]audio Caesari Au[g(usto) Ger]mani[co] patri patriae]] / [[pontific[i] maximo tribunicia pot[es]tate co(n)s(uli) i[t]er(um) co(n)s(uli) desig(nato) III]] / L(ucius)... text continues
CIL 03, 08287e = CIL 03, 12678 = Doclea 00024 = CILGM 00185	101 - 300	Dalmatia	Duklja / Duklje / Rusevine / Doclea			Facsimile of text	T(itus) Flaviu[s] / Verecundu[s] / Thamaria[n(us)] / Iivir i(ure) d(icundo) / praef(ectus) fab(rum) / t(estamento) f(ieri) i(ussit)
AE 1946, 00055	-	Africa proconsularis	Hughrissi	Funerary			Dis Manib(us) sacr(um) / Sex(tus) Rocius M(arci) f(ilius) Ho(ratia) / Bassus aed(ilis) Iivir Iivir quinq(uennalis) fl(a)m(en) / perp(etuus) praef(ectus) fabr(um)... text continues
CIL 08, 00058 = CIL 08, 11114	-	Africa proconsularis	Lamta / Lamtah / Lemta / Dhahret Slama / Soukine / Sokrine, Hr. / Lepcis Minor	Funerary	Yes		M(arco) Aemilio L(uci) f(ilio) Pal(atina) Supero / praef(ecto) fabr(um) flam(ini) divi Aug(usti) perp(etuo) fratri optimo / M(arcus) Aemilius L(uci) f(ilius)... text continues
ILAlg-01, 02194 = AE 1920, 00019	-	Africa proconsularis	M'Daourouch / Mdaourouch / Madauros / Madaurus	Funerary	Yes		Di{i}s Manibus sacr(um) / Ti(berius) Claudius Ti(beri) f(ilius) Quir(ina) Hispanus / trib(unus) mil(itum) leg(ionis) III Aug(ustae) scr(iba) [q(uaestorius)] prae[f(ectus) f]abr(um)... text continues

CIL 09, 01646 = D 06498	31 - 70	Apulia et Calabria / Regio II	Benevento / Beneventum					M(arcus) Gavius / M(arci) fil(ius) Palat(ina) / Sabinus / scriba aed(ilium) / i(iure) d(icundo) praef(ectus) fab(rum) / sibi et /... text continues
Bovino 00298 = AE 1980, 00273	-5 - 30	Apulia et Calabria / Regio II	Bovino / Vibinum					[A(ulus) Allien]us A(uli) [f(ilius)] Ga[l(eria) Laetus] / praef(ectus) fa[brum] / A(ulus) Allienus Pr[imus Aug(ustalis)] / iter(um) quinq(uennalis) [
RAL-1969-38 = Bovino 00192 = Engfer-2017, 00175 = AE 1969/70, 00165	-5 - 30	Apulia et Calabria / Regio II	Bovino / Vibinum					A(ulus) Allienus A(uli) f(ilius) Gal(eria) / Laetus praef(ectus) fabr(um) / A(ulus) Allienus Primus Aug(ustalis) / iter(um) quinq(uennalis) podium s(ua) p(ecunia)... text continues
EAOR-03, 00073 = Engfer-2017, 00167 = AE 1937, 00064 = AE 1938, 00110 = AE 1939, +00171	-27 - 14	Apulia et Calabria / Regio II	Lucera / Luceria	Dedication	Yes		pontifex tribunus amphitheatrum	M(arcus) Vecilius M(arci) f(ilius) L(uci) n(epos) Campus praef(ectus) fabr(um) tr(ibunus) mil(itum) Ilv[ir i(iure)] dic(undo) pontifex / amphitheatrum loco privato suo... text continues
CIL 09, 00223 (p 655)	51 - 120	Apulia et Calabria / Regio II	Oria / Uria	Funerary				L(ucius) Clodius / L(uci) f(ilius) Pius Marian(us) / praef(ectus) fabr(um) / v(ixit) a(nnos) VIII m(enses) VI d(ies) VI / huic... text continues
CIL 13, 00962 = CIL 13, 11045 = EAOR-05, 00073 = ILA-Petr 00027 = CAG-24-02, p 130 = AE 1910, 00123 = AE 1910, 00158	51 - 80	Aquitani(c)a	Perigueux / Vesunna				tribunus amphitheatrum	[T[1]P()] L[3 Petru]cor(iorum) A(ulus) Pomp(eius) Dumnom[otuli f(ilius)] / [3 t]rib(unus) mil(itum) leg(ionis) [3]ae praef(ectus) fabr(um) amphit[heatrum] / [cum] ornament[is omnibu]s... text continues

CIL 13, 01036 = ILTG 00148 = ILA- Sant 00007 = CAG- 17-02, p 306 = Rosso 00026 = Rosso 00027 = Rosso 00028 = AE 1980, +00626	18 - 19	Aquitani(c)a	Saintes / Mediolanum Santonum	Dedication/Votive		On a monumental arch	pontifex sacerdos and others	Germanico [Caesa]r[i] Ti(beri) Aug(usti) f(ilio) / divi Augusti nep(oti) divi Iuli pronep(oti) auguri / flam(ini) August(ali) co(n)s(uli) II imp(eratori) II... text continues
ZPE-117-112 = AE 1993, 01479 = AE 1997, 01436	-100 - -1	Asia	Ephesus	Funerary	Yes	Text	tribunus	[3 Corne]lius Alexidis f(ilius) Cor(nelia) Menodor(us) / [3] praef(ectus) fabr(um) tr(ibunus) mil(itum) primus ex i(i)s qui in Asia habitant /... text continues
MAHierapolis 00035 = Montana- 02, 00151 = AE 1927, 00095	-	Asia	Iskelekoy / Iskele / Ishkeli		Yes	Text	cohortis	[I(ovi) O(ptimo) M(aximo)] / [pro salute Imp(eratoris) Caes(aris)] / [divi Traiani Parth(ici) fil(ii)] / divi Nervae nepotis / Traiani Hadriani... text continues
CIL 02, 01979 = IRAlmeria 00002 = HEp 1990, 00022 = HEp 1997, 00017 = HEp 1999, 00064 = Navarro-2017, 00023	1 - 200	Baetica (Spain)	Adra / Abdera	Dedication	Yes	Text	flamen basilicam	flamen di]vi Aug(usti) p[raef(ectus) coh(ortis) 3] / [praef(ectus)] fabrum II[vir 3] / [3]lia L(uci) f(ilia) Anulla mater sacerdo[s divae Aug(ustae)]... text continues
CIL 02-05, 00316 = CIL 02, 01614 = AEspA-2013-261 = HEp 1989, 00245 = AE 2013, 00829 = AE 2016, +00014 = HEp 2013, 00183	71 - 130	Baetica (Spain)	Cabra / Igabrum		Yes	Text	Aquam flamen	Aquam / Augustam / P(ublius) Cornelius [3 f(ilius) G]al(eria) Nova[tus(?)] / Baebius Balbus / praefectus fabr(um) / trib(unus) mil(itum) leg(ionis)... text continues
CIL 02-07, 00281 = HEp 1994, 00283	71 - 130	Baetica (Spain)	Cordoba / Corduba		Yes	Text	cohortis	P(ublius) Fabius [3] / C(aius) Clodius E[3] / praef(ectus) fabr(um) bis [3 praef(ectus) coh(ortis)] / VIII voluntari[orum 3] / h(ic)... text continues

CIL 10, 00337 = CIL 12, *00261c = InscrIt-03-01, 00153	-	Bruttium et Lucania / Regio III	Atena Lucana / Atina		Yes		tribunus	Q(uitus) Staius Q(uiti) f(ilius) Pom(ptina) [Gallus] / tr(ibunus) mil(itum) bis IIvir te[r] / Melenceia Sex(ti) f(ilia) Po[silla] / Q(uitus) Staius... text continues
CIL 10, *00073 = InscrIt-03-01, *00015	-	Bruttium et Lucania / Regio III	Buccino / Volcei		Yes		tector	Laetitia sign() / C(aius) Domitius C(ai) f(ilius) Bassus coh(ortis) / III leg(ionis) Italicae praefect(us) / mil(itum) et fabrorum tector
FVSarmiz 00061 = AE 2006, 01163	151 - 230	Dacia	Sarmizegetusa / Sarmizegethusa / Burgort / Varhely				flamen collegii	dec(urio) c[ol]on[ia]e ex [3] / [3]tus C[//] / [flam]en et q(uin)q(uennalis) [col]on[ia]e 3] / [praef]ectus c[ol]l[eg]ii fa[b]ru[m 3]... text continues
CILA-03-01, 00098 = HEp 1995, 00416 = HEp 2009, 00168	-	Hispania citerior	Linares / Cazlona / Castulo			Facsimile of text		Ro]mae et Aug(ustorum) praef(ectus) [3] / [3 c]um staius gentis [3] / [3 II]vir praef(ectus) fabr(um) III [3] / [3... text continues
CIL 03, 08737	51 - 150	Dalmatia	Solin / Salona	Funerary	Yes	Text	augur cohritis aedilis	Q(uitus) Cassius Q(uiti) f(ilius) Tro(mentina) Constans / aed(ilis) IIIvir i(ure) d(icundo) augur praef(ectus) / fabr(um) tr(i)b(unus) milit(um) coh(ortis) IIII vol(untariorum)... text continues
CIL 11, 07304	-	Etruria / Regio VII	Bolsena / Volsinii			Text		] / IIIIv[ir iur(e) dic(undo)] / ter p[raef]ectus fabrum] / ex [visu] / Ap[ollini]
CIL 11, 03617 = D 06578 = MEFR- 1967-45	-10 - 14	Etruria / Regio VII	Cerveteri / Agylla / Caere		Yes		tribunus censor	M(arcus) Manlius C(ai) f(ilius) / Pollio / tr(ibunus) mil(itum) / a populo / praef(ectus) fabr(um) / cens(or) perp(etuus) / [
CIL 11, 03101 = AE 2004, +00553	-	Etruria / Regio VII	Civita Castellana / Falerii		Yes		tribunus scriba	M(arcus) Pon[tius 3]tius / trib(unus) milit(um) leg(ionis) III C[yren(aicae) praef]ectus

								coh(ortis) IIII R]aetor(um) equitatae / praef(ectus) cohor(tis) II It[uracor(um?) 3]r... text continues
CIL 11, 03113 (p 1323)	31 - 68	Etruria / Regio VII	Civita Castellana / Falerii		Yes		Tribunus	] IIIIvir tr(ibunus) militum pr(aefectus) fabr(um) [
CIL 11, 01601 = Campedelli 00122 = Engfer-2017, 00365	37 - 200	Etruria / Regio VII	Firenze / Florentia				augur	] / praef(ectus) fabr(um) aed(ilis) II/vir aug(ur) eq(uo) pub(lico) ex / V decuriis faciundam quae / est inter porticus Lurc[3]... text continues
CIL 11, 01326 = D 01416 = Luni-2014, p 27	117 - 161	Etruria / Regio VII	Luni Mare / Luna		Yes		tribunus augur	C(aius) Lepidius / C(ai) f(ilius) Pal(atina) / Secundus / praef(ectus) fabr(um) pr(aefectus) / coh(ortis) tr(ibunus) milit(um) / promag(ister) XX /... text continues
CIL 11, 01331 (p 1254) = D 00233 = InsBaliares 00069 = Lunensia p 87 = Luni-2014, p 38 = Epigraphica-2016- 56 = AE 2000, +00251 = AE 2000, +00553 = AE 2001, +00958 = AE 2016, +00023	65 - 64	Etruria / Regio VII	Luni Mare / Luna		Yes	Text	flamen tribunus	Divae Poppaeae Augustae / Imp(eratoris) Neronis Caesaris August(i) / L(ucius) Titinius L(uci) f(ilius) Gal(eria) Glaucus Lucretianus flam(en) Romae / et... text continues
CIL 11, 03205 = D 04948 = AE 2003, +00029	-30 - 14	Etruria / Regio VII	Nepi / Nepet / Nepete		Yes	Text	tribunus collegio	Q(uintus) Veturius Q(uinti) f(ilius) Pom(ptina) Pexsus(!) / lupercus Fabianus ex collegio / Virtutis trib(unus) mil(itum) II praefectus / fabrum /... text continues
CIL 11, 01934 = CIL 01, 03364 = ILLRP 00638 = ILLRP-S, 00147 =	-20 - -1	Etruria / Regio VII	Perugia / Perusia			Text	cohortis	C(aius) Atilius A(uli) f(ilius) Glabrio / IIIIvir quinq(uennalis) praefectus fabr(um) / delat(us) a

D 02685 = Letta-2012, p 147 = AnalEpi p 355 = Epigraphica-2011-117 = AE 1979, 00245 = AE 1983, 00393 = AE 1990, +00384 = AE 1991, +00663 = AE 2011, 00365 = AE 2012, +00490 = AE 2012, 00495 = SupIt-30, 00010								co(n)s(ule) praef(ectus) cohors(tis) / I Tyrionum sagittar(ionum)... text continues
CIL 11, 03379	1 - 100	Etruria / Regio VII	Tarquinius / Corneto / Tarquinii	Funerary		Text	funere publico elatus	L(ucius) Papirius / L(uci) f(ilius) Stel(latina) Co/gnitus praef(ectus) / fabr(um) IIIIvir / iur(e) dic(undo) ex / dec(reto) dec(urionum) / funere... text continues
Cippus 00297 = AE 1969/70, 00188 = SECI 00297	-25 - -1	Etruria / Regio VII	Tarquinius / Corneto / Tarquinii	Funerary	Yes	Text	tribunus	[3] Aurelius Sex(ti) f(ilius) / flamen IIIIvir i(ure) d(icundo) / praef(ectus) fabr(um) tr(ibunus) mil(itum) / a popul(o) v(ixit) a(nnos) LX
Engfer-2017, 00385 = AE 2008, 00524 = AE 2011, +00089	35 - 35	Etruria / Regio VII	Tarquinius / Corneto / Tarquinii		Yes	Text	tribunus	[Pro sal(ute) Ti(beri) Caes]aris divi Augusti f(ili) divi Iulii n(epotis) Augusti pont(ificis) / [maximi co(n)s(ulis) V] imp(eratoris) VIII tribunic(ia) potest(ate)... text continues
CIL 11, 03010 (p 1313) = Epigraphica-2007-381	1 - 50	Etruria / Regio VII	Viterbo / Musarna			Text	balineum	C(aius) Cafat[ius 3] / in bali[neum 3] / Sorri[nensibus 3] / C(aius) Gavi[us 3] / praef(ectus) fa[brum 3] / ex... text continues
Tyche-2001-1 = AE 2001, 01918 = AE 2003, +01014 = AE 2007, +01473 = BritRom-01, 0001	45 - 46	Galatia (turkey)	Yalvac / Antiochia Pisidia		Yes		cohortis	Ti(berio) Claudio / Ca<e=I>sari Aug(usto) / Germanico / pont(ifici) max(imo) co(n)s(uli) III / trib(unicia) pot(estate) V

							p(atri) p(atriae) / pro... text continues
CIL 12, 02537a = ILHSavoie 00009 = ILN-05-03, 00760 = CAG-74, p 131	92 - 99	Gallia Narbonensis	Arles / Arelate		Yes		tribunus sacerdos M(arcus) Te[3] / Te[r(etina) 3] prae(fectus) [f]a[brum] / promag(istro) ferr(ariarum) / provinciar(um) / Narbonens(is) Lu[gdun(ensis)] / Aquitanic(ae) Belgi[c(ae)]/ adiutor Cassi... text continues
CIL 12, 02607 (p 831) = ILN-05-03, 00844 = Genava 00087	-	Gallia Narbonensis	Bellerive / Genava		Yes		flamen augur L(ucius) Iul(ius) P(ubli) f(ilius) Vol(tinia) Br[occhus V]al(erius) / Bassus prae(fectus) [fabr(um) bis] trib(unus) mil(itum) / leg(ionis) VIII Aug(ustae) Ivir [iur(e)... text continues
CIL 12, 02458 = ILN-05-03, 00696 = CAG-73, p 132	-	Gallia Narbonensis	Brison-Saint- Innocent			Text	flamen] / [prae(fectus) f]abr(um) flamen [3] / fl[amen] Mart(is) templum c[um] / om[nib]us ornamentis quo[d(?)
CAG-30-02, p 382 = AE 1992, 01217	31 - 70	Gallia Narbonensis	Gaujac / Nemausus			Text	[Ap]oll[ini] / [3] An[t]onius L(uci) f(ilius) Vo[l(tinia)] / Pater[nu]s aedil[is] / prae[f(ectus) f]abrum / IIIvir ad aerar(ium)
CIL 12, 02606 = D 07004 = RISch-01, 00013 = ILN-05-03, 00843 = Genava 00022 = AE 2011, +00682	-	Gallia Narbonensis	Geneve / Genava		Yes	Text	tribunus augur pontifex L(ucius) Iul(ius) P(ubli) f(ilius) Vol(tinia) Brocchus Val(erius) / Bassus prae(fectus) fabr(um) bis trib(unus) / mil(itum) leg(ionis) VIII Aug(ustae) Ivir iur(e)... text continues
CIL 12, 02456 = ILN-05-02, 00530 = CAG-73, p 171	-	Gallia Narbonensis	Gresy-sur-Isere		Yes	Text and geometric design	cohortis tribunis T(itus) Marcius Taurinus / prae(fectus) fabr(um) II / prae(fectus) coh(ortis) III Gal(lorum) / trib(unus) mil(itum) leg(ionis) VI Vict(ricis) / viv<u=O>s... text continues

CIL 12, 02493 = ILHSavoie 00069 = ILN-05-03, 00721 = CAG-74, p 263	-	Gallia Narbonensis	Marigny-Saint- Marcel			Text	balineum aquarum	C(aius) Sennius C(ai) f(ilius) Vol(tinia) Sabinus pr[ae]f(ectus) fabr(um) / balineum campum porticus aq[uae] iusque / earum aquarum tubo ducendarum [ita... text continues
CIL 12, 02494 = ILHSavoie 00070 = D 05768 = ILN-05- 03, 00722 = CAG- 74, p 263	-	Gallia Narbonensis	Marigny-Saint- Marcel			Text	balineum aquarum	C(aius) Sennius C(ai) [f(ilius) Vol(tinia) Sabinus] praef(ectus) fabr(um) / balineum ca[mpum porticus] aquas iusque / earum aquarum [tubo ducendar]um ita... text continues
ILHSavoie 00071 = ILN-05-03, 00723 = CAG-74, p 264	-	Gallia Narbonensis	Marigny-Saint- Marcel			Text	aquas	C(aius) Sennius C(ai) f(ilius) Vol(tinia) Sabinus praef(ectus) fabr(um) [3] / [3 a]quas plu[res(?)
CIL 12, 04371 = CIL 12, 04372 = CAG-11-01, p 199 = ZPE-49-142 = AE 1982, 00694	1 - 50	Gallia Narbonensis	Narbonne / Narbo		Yes	Text	augur tribunus	] / [duum]vir quinquenna[li]s duomvir / [iteru]m praefectus pro duoviro augur / [tribunu]s militum primipilus(!) praefectus [fabr]um / [ex c]o< =N>legio... text continues
CIL 12, 04373 = CAG-11-01, p 206 = CAG-11-01, p 280	-	Gallia Narbonensis	Narbonne / Narbo					praefect]us fabrum [//]s praef(ectus) fa[brum // p]raef(ectus) [
AE 1961, 00167	-	Gallia Narbonensis	Rognes / Aquae Sextiae		Yes		tribunus	D(ecimus) Domitius L(uci) f(ilius) Vol(tinia) Celer / tr(ibunus) mil(itum) praef(ectus) fabrum viv<u=O>s fecit // L(ucius) Domitius L(uci) f(ilius) Vol(tinia) Magu[s]... text continues
AE 1961, 00167a = AE 1969/70, 00340a	-	Gallia Narbonensis	Rognes / Aquae Sextiae		Yes		tribunus	D(ecimus) Domitius L(uci) f(ilius) Vol(tinia) Celer / tr(ibunus) mil(itum)

								praef(ectus) fabr(um) viv<u=O>s fecit
ILHSavoie 00098 = ILN-05-03, 00786 = ILGN 00348 = CAG-74, p 328 = AE 1904, 00141 = AE 2009, +00838	-	Gallia Narbonensis	Seyssel / Condate				Text	August[o Vintio(?) sacr(um?)] / C(aius) Marius D(ecimi) [f(ilius) Volt(inia) 3] / I(vir) i(ure) [d(icundo) praef(ectus)] / fabrum III [3 IIIvir]... text continues
CIL 12, 01375 = ILGN 00208 = ICalvet 00071 = CAG-84-01, p 238	-	Gallia Narbonensis	Vaison-la- Romaine / Vasio				Text and Floral Decorations	[Q(uintus) Domit]ius T(iti) f(ilius) / [Volt(inia)] Rufus / [praef(ectus)] fabr(um) praef(ectus) / [Va]siens(ium) II aed(ilis) Voc(ontiorum) / [p]roscænium marmorib(us) /... text continues
ILGN 00269 = ILN- 05-01, 00086 = AE 1897, 00026 = AE 1997, 01058 = AE 2004, +00888 = CAG-38-03, p 24	-30 - 14	Gallia Narbonensis	Vienne / Vienna				Text	] Asia[ti]cus / [3 praef(ectus) fa]br(um) I[IIIvi]r(?) / [3 de] sua [pec]un(ia) / [dedit(?) 3]INFI[
CIL 13, 06816 (4, p 108) = CSIR-D-02- 05, 00059 = CSIR- D-02-08, p 12	4 - 14	Germania superior	Mainz / Mogontiacum		Yes		Text columns and floral border	tribunus praefectus equitum Cn(aeus) Petronius / Cn(aei) f(ilius) Pom(ptina) / Asellio / trib(unus) militum / praef(ectus) equit(um) / praef(ectus) fabrum / Ti(beri) Caesaris
CIL 13, 05418a = CAG-25/90, p 352	-	Germania superior	Mandeure / Epamanduodurum				Text	]L[3] / [prae]f(ectus) fabr[um] 3] / [3]NAME[3] / [3]VER[
AE 1980, 00201a	1 - 100	Latium et Campania / Regio I	Fondi / Fundi				Facsimile of text	]mus M[3] / [3 pr]aef(ectus) fabr(um) [3] / [3]us ae[
IRSegobriga-03, 00043 = HEp 1990, 00384 = HEp 2000, 00225 = HEp 2011, 00363 = AE 2011, 00581	1 - 100	Hispania citerior	Saelices / Cabeza del Griego / Segobriga	Dedication	Yes		Text	theatrum tribunus and other titles [M(anius?) Octavius M(ani) f(ilius)] Gal(eria) Nova[tus] adlec[t(us) inter pra]eto[rios leg(atus)] legion(is) [3] Cl(audiae) [proco(n)s(ul) 3]e Flavia [3 flaminica] conv[entus

								Carthag(inensis)]... text continues
CIL 10, 05394	23 - 30	Latium et Campania / Regio I	Aquino / Aquinum		Yes		tribunus	[Q(uintus)] Decius Q(uinti) f(ilius) M(arci) [n(epos) Saturninus pontif(ex) minor Romae tubicen] / sacror(um) pub(licorum) p(opuli) R(omani) Qu[irit(ium) praef(ectus) fabr(um) co(n)s(ulis)]... text continues
CIL 10, 05399 = Atina 00197 = Questori 00063	42 - 200	Latium et Campania / Regio I	Aquino / Aquinum		Yes		tribunus	V(ivus) f(ecit) / C(aio) Avidio C(ai) f(ilio) / Clementi aedil(i) / Ilviro nepoti / suo et sibi / L(ucius) Fufidius... text continues
CIL 10, *00474 = Epigraphica-1960-23 = Questori 00126 = AE 1980, 00218 = AE 2014, +00009	1 - 100	Latium et Campania / Regio I	Capua / Casilinum		Yes		tribunus potifex aedilis	L(ucius) Campanius L(uci) f(ilius) / Flaccus / tr(ibunus) mil(itum) leg(ionis) XV Ilvir pont(ifex) / q(uaestor) II aed(ilis) praef(ectus) fabr(um) et... text continues
CIL 10, 03830 = CECasapulla 00015	102 - 116	Latium et Campania / Regio I	Capua / Casilinum	Votive		Text		[In honorem divi Vespasiani et] divi Titi / [divi Vespasiani] f(ili) / Imp(eratoris) Nervae Caes[aris] / Traiani Aug(usti) G[erm(anici)] /... text continues
CIL 10, 05188	54 - 65	Latium et Campania / Regio I	Cassino / Casinum					M(arcus) Obultronius Cultellus praef(ectus) fabr(um) / divi Claudii iussu Caesaris dedicavit
NSA-1976-324 = MNR-01-02, p 323 = AE 1977, 00181	41 - 54	Latium et Campania / Regio I	Fidene / Borgata Fidene / Fidenae	Funerary		Text and floral decorations		C(aius) Sallustius / C(ai) f(ilius) Ser(gia) / Hostianus / praef(ectus) fabr(um) / vixit ann(os) XXVI / C(aius) Sallustius / Primus... text continues
EE-09, 00897 = InscrIt-04-01, 00049 = D 09010 =	121 - 160	Latium et Campania / Regio I	Tivoli / Tibur		Yes	Facsimile of text	sacris faciundis	P(ublius) Fulcinus / Vergilius Marcellus / praef(ectus) fabrum trib(unus) / mil(itum)

TermeDiocleziano-02, p 115 = AE 1894, 00158								leg(ionis) VII Gem(inae) Felicis / praef(ectus) equitum alae /... text continues
Bovillae p 201 = Engfer-2017, 00013 = AE 1979, 00117	-100 - -1	Latium et Campania / Regio I	Marino / Castrimoenium				Text	prae]f(ectus) fab(rum) p(ecunia) s(ua) [3] / [3 ex decre]to XXXvi[rum]
CIL 14, 02468 = CIL 09, *00373	31 - 70	Latium et Campania / Regio I	Marino / Castrimoenium				flamen	L(ucius) Cornelius A(uli) f(ilius) Fal(erna) / Pupillus / praefectus fabr(um) / flamen quinquen(nalis) / patronus Castrimoen(i)e(n)sium / ex testamento /... text continues
CIL 14, 03955 = D 02740 = EE-09, p 486 = BritRom-10, 00013	101 - 170	Latium et Campania / Regio I	Mentana / Nomentum		Yes		Text	flamen lots of different places named Gn(aeus!) Munatius M(arci) f(ilius) Pal(atina) / Aurelius Bassus / proc(urator) Aug(usti) / praef(ectus) fabr(um) praef(ectus) coh(ortis) III / sagittariorum praef(ectus)... text continues
CIL 10, 04736 = Engfer-2017, 00122	1 - 50	Latium et Campania / Regio I	Mondragone / Sinuessa		Yes			M(arcus) Cacius C(ai) f(ilius) Cerna / Ilvir trib(unus) mil(itum) praef(ectus) / fabr(um) / natali suo cenam / publice populo Sinues(sanorum)... text continues
LMentana-01, 00047 = AE 1976, 00138 = AE 2002, +00563	-	Latium et Campania / Regio I	Montecelio / Ficulea					scribae librario A(ulus) Popillius A(uli) f(ilius) Vel(ina) Rufus / praef(ectus) fabr(um) et / A(ulo) Popillio Heleno scrib(ae) libr(ario) / quaerere cessavit nu<m=N>quam... text continues
MEFR-2002-808	-	Latium et Campania / Regio I	Ostia Antica					]et Pro[3] / [3] L(ucius?) Antoni[us 3] / [3]ass pr(aefectus) fabr[um 3] / [3]us Mar/[
NSA-1953-256 = ELOstia p 218 =	69 - 96	Latium et Campania / Regio I	Ostia Antica	Funerary	Yes		Text	collegii tribunus M(arcus) Acilius [M(arci) f(ilius) P]riscus / d(ecreto) d(ecurionum) d(ecurio)

Questori 00002 = AE 1955, 00169								adle[ctus] quaest(or) / aer(arii) suffra[gio de]curion(um) / Iivir aedil(is) II(vir) [quinq]uennal(is)... text continues
CIL 14, 03021 = ASI Germanicum 00097 = AE 1997, +00264	101 - 200	Latium et Campania / Regio I	Palestrina / Praeneste			Text	aedilis	pra]ef(ectus) fabrum [3] / [3 a]ed(ilis) IIIIIvir [Aug(ustalis) 3] / [3]darium [
CIL 10, 00797 (p 967) = D 05004 (p 184) = PompIn 00006 = Getules 00007 = AE 2000, +00243 = AE 2012, +00340	47 - 54	Latium et Campania / Regio I	Pompei		Yes	Text	augur pontifex libris Sibyllinis	Sp(urius) Turranius L(uci) f(ilius) Sp(uri) n(e)pos L(uci) pron(e)pos Fab(ia) / Proculus Gellianus praef(ectus) fabr(um) II pra<e=I>f(ectus) curatorum alvei / Tiberis... text continues
CIL 10, 00851 (p 967) = D 06363d = MEFR-1967-38 = AE 2000, +00296	63 - 70	Latium et Campania / Regio I	Pompei		Yes	Text	pontifex tribunus	M(arcus) Lucretius Decid(ianus) / Rufus Iivir III quinq(uennalis) / pontif(ex) trib(unus) mil(itum) / a populo praef(ectus) fab(rum) / M(arcus) Decidius... text continues
D 06363a = MEFR-1967-38 = AE 1898, 00143	-20 - - 11	Latium et Campania / Regio I	Pompei		Yes	Text	tribunus	M(arcus) Lucretius L(uci) f(ilius) Dec(idianus) Rufus / Iivir iter(um) quinq(uennalis) / trib(unus) milit(um) a populo / praefect(us) fabr(um)
NSA-1910-390 = PompIn 00063 = AE 1911, 00071	1 - 30	Latium et Campania / Regio I	Pompei	Funerary		Text		N(umerius) Herennius N(umeri) f(ilius) Men(enia) / Celsus d(uum)v(ir) i(ure) d(icundo) iter(um) praef(ectus) / fabr(um) / Aesquilliae C(ai) f(iliae) Pollae /... text continues
CIL 10, 01685 (p 1009) = CIL 11, *00095,3 = D 01397 = EAOR-08, 00002 = Questori 00118	97 - 110	Latium et Campania / Regio I	Pozzuoli / Puteoli	Funerary	Yes		augur put on a gladiator games	L(ucius) Bovius L(uci) f(ilius) L(uci) n(e)pos Fal(erna) Celer / Iivir q(uaestor) augur / praef(ectus) fabr(um) trib(unus) milit(um) leg(ionis)

							III Cyr(enaicae)... text continues
CIL 10, 05581 = RECapua 00271 = Ascesa p 25 = AE 2011, +00195	-30 - 30	Latium et Campania / Regio I	San Giovanni Incarico / Falvaterra / Fabrateria Nova		Yes	Text	augur tribunus M(arcus) Trebellius C(ai) f(ilius) Sextan[us] / IIvir IIvir quinq(uennalis) tr(ibunus) mil(itum) prae(fectus) fab(rum) / aug(ur) sibi et / C(aio) Trebellio... text continues
CIL 10, 05583 = Questori 00062	1 - 50	Latium et Campania / Regio I	San Giovanni Incarico / Falvaterra / Fabrateria Nova		Yes	Text	praefectus equitum tribunus [3 Cu]rtilius(?) C(ai) f(ilius) A<e=I>m(ilia) / [pr]im(us) pil(us) leg(ionis) VI praef(ectus) c(o)hortis / [3] tr(ibunus) mil(itum) praef(ectus) equit(um) praef(ectus) /... text continues
CIL 09, 06525 = Allifae 00040 = AE 1990, 00223b	1 - 30	Latium et Campania / Regio I	Sant'Angelo d'Alife / Allifae		Yes	Text	praefectus equitum tribunus curator aquae Flavoniae L(uci) f(iliae) Pollae / Cordus uxori / M(arcus) Granius M(arci) [f(ilius) M(arci)] n(epos) Cordu[s] trib(unus) m]il(itum) / [praef(ectus) eq(uitum)... text continues
CIL 10, 06309 (p 1015) = CIL 11, *00250,2b = Engfer-2017, 00127	42 - 69	Latium et Campania / Regio I	Terracina / Tarracina			Text	preafectus equitum [Ti(berio) C]aesari divi Aug(usti) f(ilio) Augusto divae Augus[tae] / [3] M(arcus) Iunius C(ai) f(ilius) Gal(eria) Proculus praef(ectus) equit(um) divi Aug(usti)... text continues
CIL 14, 04239 = EE-09, p 471 = InscrIt-04-01, 00105 = D 01013 = AE 2007, +00107	151 - 175	Latium et Campania / Regio I	Tivoli / Tibur		Yes	Text	tribunus Herenniae M(arci) f(iliae) / Helvidiae Aemilianae / L(uci) Claudi Proculi / Corneliani co(n)s(ulis) / reginae suae h(onoris) c(ausa) posuit /... text continues
CIL 03, 00646 (p 989) = Philippi 00046 = CIPh-02-01, 00048	1 - 100	Macedonia	Philippoi / Krinides / Philippi		Yes	Facsimile of text	tribunus [3] Burreno Ti(beri) f(ilio) Vol(tinia) Firmo praef(ecto) fabru[m] / ann(or)um XX mens(ium) IIII [et 3 Fi]rminae

								ann(orum) [3] / [3]... text continues
CIL 10, 06555 = D 03697 (p 181) = EAOR-04, 00038	61 - 150	Latium et Campania / Regio I	Velletri / Velitrac		Yes		tribunus curator lus	M(arcus) Ofasius / Firmus Marus / Cornelius Mari f(ilius) / Clu(stumina) Cossinus / praefectus fabrum / tribunus militum / leg(ionis)... text continues
CIL 10, 04872 = D 02021 = Venafrum 00035	14 - 37	Latium et Campania / Regio I	Venafro / Venafrum		Yes	Text	cohortis	L(ucius) Ovinius L(uci) f(ilius) Ter(etina) Rufus / prim(us) ordo cohortium praet(orianum) / divi Augusti prim(us) pil(us) leg(ionis) XIII Gem(inae) / ... text continues
CIL 10, 05795 = Epigraphica-1962-89 = AE 1964, +00107	1 - 200	Latium et Campania / Regio I	Veroli / Verulae			Text		] Gracchus [3] / [3] praef(ectus) fabr(um) [
CIL 05, 07605 = AlbaPomp 00014 = Grabalt 00242 = Questori 00387	51 - 200	Liguria / Regio IX	Alba / Alba Pompeia	Funerary		Text and Floral Decorations	flamen	V(ivus) f(ecit) / C(aius) Cornelius / C(ai) f(ilius) Cam(ilia) / Germanus aed(ilis) / q(uaestor) IIvir praef(ectus) fabr(um) / iudex ex... text continues
Pais 00970	101 - 200	Liguria / Regio IX	Asti / Hasta					V]olt(inia) / [3 praef(ectus)] fabr(um) / [3 iu]ssit / [3]ucim / [
CIL 05, 07370	1 - 100	Liguria / Regio IX	Tortona / Dertona		Yes		augur tribunus	]lis[3] / [3]anus [3] / [trib(unus)] milit(um) praef(ectus) fabrum [proc(urator)] / [Aug(usti)] et pro legat(o) IIvir II augu[r] / [por]ticus... text continues
CIL 05, 07373 = AE 2004, +00344	101 - 200	Liguria / Regio IX	Tortona / Dertona	Funerary			flamens	C(aio) Mario Iuliano eq(uiti) flam(ini) Dert(onae) qui vix(it) a(nnos) XXIII m(enses) VII / C(aius) Marius Aelianus iudex inter selec(tos) ex... text continues

CAG-69-02, p 548 = AE 1980, 00639 = AE 2000, 00948	54 - 68	Lugdunensis	Lyon / Lugdunum				quaestor	[Pro salute Ne]ro[nis Claudi divi Claudi f(ili) Germanici Caes(aris) n(epotis) Ti(beri) Caesaris Aug(usti) pron(epotis) divi Aug(usti) abn(epotis) Caesaris Aug(usti) Germanici]... text continues
CIL 02, 02479 = CIL 02, 05617 = EE-08-02, 00004 = IRCPacen 00189 = Aquaeflaviae-1997, 00376 = Epigraphica-2002- 72 = HEp 1997, 01202 = HEp 2002, 00668 = AE 2002, +00662 = AE 2011, +00469 = Epigraphica-2018- 184 = AE 2016, +00658	1 - 50	Lusitania	Alcacer do Sal / Salacia		Yes	Text	tribunus	[L(ucius) Cornelius L(uci) f(ilius) Boc]chus pr(aefectus) Caesarum bis / [flam(en) provinc(iae) pon]t(ificus) perp(etuus) flamen perp(etuus) / [I]vir aedilis(?) II pr(aefectus)... text continues
CIL 02, 00052 = IRCPacen 00233	-	Lusitania	Beja / Pax Iulia					C(aius) Iulius C(ai) f(ilius) [3] / I]vir bis prae[f(ectus) fabr(um?) 3] / utriq[ue] sen[atus]
CIL 02, 00056 = IRCPacen 00234	-	Lusitania	Beja / Pax Iulia				praefectus equitum	prae[f(ectus)] equit(um) prae[f(ectus)] / fabr(um) [
ERAEmerita 00108	-	Lusitania	Merida / Emerita			Text	flamen	[3] M(arci) f(ilius) Ser(gia) Modestus / [3] flamen divi Aug(usti) / [3 I]vir prae[f(ectus) fabr(um)] / [proc(urator) p]rovinc(iae) Lusitan(iae) / ... text continues
ERAEmerita 00486 = HEp 2002, 00014	-	Lusitania	Merida / Emerita				pontifex	] M(arci) f(ilius) Pap(iria) [3] / [3 II]vir prae[f(ectus) fabr(um?)] / [pon]tife[x]
ZPE-47-106 = CILCaceres-03, 01014 = Gerion- 2002-425 = HEp	71 - 100	Lusitania	Oliva de Plasencia / Caparra / Capera			Text	magistratus	Aug(ustae) Trebar[unae] / M(arcus) Fidius Fidi f(ilius) Quir(ina) / mag(istratus) III I]vir II prae[f(ectus) fa]br(um)

2002, 00093 = AE 1967, 00197 = AE 1987, 00616j = AE 2002, 00705 = AE 2010, +00058 = CAUN-2017-186 = Navarro-2017, 00267,3								
MEFR-1990-239	-	Mauretania Caesariensis	Chellah / Sala		Yes	Facsimile of text	tribunus	C(aius) Ho[sidius Cn(aei) f(ilius)] Cla[ud(ia) Severus praef(ectus) fabr(um) praef(ects) coh(ortis)] / I Bo[spor(anorum)] pra[ef(ectus) coh(ortis) IIII Raet(orum) trib(unus) mil(itum) leg(ionis)... text continues
Philippi 00385a = CIPh-02-01, 00050 = AE 2005, 01402	1 - 200	Macedonia	Philippoi / Krinides / Philippi	Funerary		Text	quaestor	Sertoria L(uci) f(ilia) Optata annor(um) XXVII h(ic) s(ita) e(st) / M(anius) Cassius M(ani) f(ilius) Vol(tina) Valens praef(ectus) fab(rum) / a... text continues
IAM-S, 00861 = LBIRNA 00102 = AE 1991, 01750 = AE 2013, +00110	101 - 150	Mauretania Caesariensis	Chellah / Sala		Yes		tribunus	C(aius) Ho[sidius Cn(aei) f(ilius)] Cla[ud(ia) Severus praef(ectus) fabr(um) praef(ectus) coh(ortis)] / I Bo[spor(anorum)] pra[ef(ectus) coh(ortis) IIII Raet(orum) trib(unus) mil(itum) leg(ionis)... text continues
CIL 06, 09416 = CIL 06, 32930 = AIIRoma-07, 00009 = AE 1993, 00122	171 - 200	Roma	Roma	Funerary	Yes	Facsimile of text	tribunus	[D(is) M(anibus)] / [Claudiae Antoninae] coniugi / [dulcissimae et sibi] fecit / [Ti(berius)] Claudiu[s Quir(ina) Au]relianus / Ptolem[aeus praef(ectus)] fabrum... text continues

CIL 03, 08261 = IMS-03-02, 00023 = ILJug-03, 01288 = D 02733 = Questori 00302 = AE 2011, +01112	1 - 100	Moesia superior (Balkins)	Ravna / Kulina / Timacum Minus		Yes	Text	augur tribunus	L(ucius) Vecilius C(ai) f(ilius) Lemon(ia) / Modestus / equo pub(lico) de quinq(ue) / dec(uriis) sevir aed(ilis) duovir / iure dic(undo)... text continues
IMS-06, 00064 = AE 1964, 00273 = ILJug-02, 00537	101 - 200	Moesia superior (Balkins)	Skopje / Scupi	Funerary		Text	potifex	pr]/aef(ectus) fabr(um) quaes(tor) / Iivir pontif(ex) / q(uin)q(uennalis) qui vixit ann(os) / LIIII m(enses) VIII d(ies) XXIII / [
CIL 08, 07986 (p 1879) = ILAlg-02- 01, 00036 = D 06862 = LBIRNA 00059 = Louvre 00113	-	Numidia	Skikda / Ras Skikda / Philippeville / Rusicade				flamen rostra	C(aius) Caecilius Q(uinti) f(ilius) Gal(eria) Gallus hab(ens) / equum pub(licum) aed(ilis) hab(ens) iur(is) dic(tionem) q(uaestoris) pro / praet(ore) praef(ectus) pro... text continues
CIL 03, 03438 (p 1691) = D 07254 = TitAq-01, 00126	201 - 250	Pannonia inferior	Budapest / Aquincum			Text and limited decoration	collegii	I(ovi) O(ptimo) M(aximo) pro salute / [// Cl(audius) Pompeius / Faustus dec(urio) / col(oniae) Aq(uincensium) aedil(icius) / Iiviral(is) praef(ectus)... text continues
CIL 03, 10475 = TitAq-01, 00388	201 - 250	Pannonia inferior	Budapest / Aquincum			Text	collegii	] / Cl(audius) Pompeiu/s Faustus d(ec(urio) col(oniae) Aq(uincensium) ae/dilicius Iiviral(is) / praef(ectus) coll(egii) fabr(um) / v(otum) s(olvit) l(ibens) m(erito)
CSIR-Oe-01-03, 01152 = Hild 00034 = MaCarnuntum 00033 = CSIR-Oe- Carn-S-01, 00268 = AEA 1985/92, +00059 = AEA 1985/92, +00071 = IDRE-02, 00258 = AEA 2010, +00006	219 - 219	Pannonia superior	Bad Deutsch- Altenburg / Carnuntum		Yes	Text and standing figure	tribunus collegio	Genium / pro sal(ute) Imp(eratoris) [[[[Caes(aris) M(arci) Aur(eli)]]]] / [[[Antonini P(ii) F(elicis) Augusti]]] / [A]lf(ius) M(arci) f(ilius) Faustinianus / [d]ec(urio)... text continues

= AEA 2011/12, +00022 = AEA 2011/12, +00033 = AEA 2011/12, +00034 = AEA 2011/12, +00043 = AE 1966, 00286 = AE 1968, 00422 = AE 1983, 00766 = AE 1992, 01431 = AEA 2016/17, +00003 = AEA 2016/17, +00076								
AIJ 00173 = RINMS 00036 = ILJug-01, 00316f = AE 1938, 00173 = AE 1939, +00261 = AE 1992, 00687	-27 - 14	Pannonia superior	Ljubljana / Labacum / Laibach / Emona		Yes	Text	tribunus praefectus equitum	T(itus) Iunius D(ecimi) f(ilius) / Ani(ensi) Montanus / tr(ibunus) mili(tum) VI praef(ectus) / equit(um) VI praef(ectus) / fabr(um) II pro... text continues
CIL 03, 10770	71 - 230	Pannonia superior	Ljubljana / Labacum / Laibach / Emona					L(ucius) Curtius [3] / IIIIvir [3] / [praef(ectus)] fab[r(um) 3]/an() Aug(ustalis?) [
AE 1986, 00568	151 - 250	Pannonia superior	Ptuj / Poetovio			Text and figures		Nutricibus Aug(ustis) sacr(um) T(itus) Cassius / Verinus dec(urio) col(oniae) Poet(ovionensium) praef(ectus) fabr(um) praef(ectus) / pro IIvir(is) et Donnia Maximilla con(iux)... text continues
AIJ 00288	101 - 150	Pannonia superior	Ptuj / Poetovio			Text	quaestor potifex	Libero et Liberae / sacrum / L(ucius) Valerius Verus / dec(urio) col(oniae) Poet(ovionensis) / praef(ectus) fabr(um) quaest(or) / aedil(is) pontif(ex)... text continues
CIL 03, 04028 = AIJ 00280 = Kritzinger 00048 = AE 1950,	101 - 150	Pannonia superior	Ptuj / Poetovio			Text		I(ovi) O(ptimo) [M(aximo) D(epulsori)] / C(aius) Val[erius 3] / Scri[bonianus] / dec(urio) [c(oloniae) U(lpiae)

+00145 = AE 1966, 00296							T(raianae) P(oetovionensium)] / [6] / eq(uo)... text continues
CIL 03, 04038 (p 1746) = D 07120 = AIJ 00287 = AEA 2005, +00068 = AE 1998, 01045	201 - 230	Pannonia superior	Ptuj / Poetovio			Text	augur collegio C(aius) Val(erius) Tettius Fuscus dec(urio) / c(oloniae) U(lpiae) T(raianae) P(oetovionensis) q(uaestor) aedil(is) praef(ectus) fabr(um) / Ilvir i(ure) d(icundo) augur /... text continues
CIL 03, 04111	-	Pannonia superior	Ptuj / Poetovio				quaestor I(ovi) O(ptimo) M(aximo) Dep(ulsatori) / C(aius) Tiberin(ius) / Faventinus / dec(urio) col(oniae) Poet(ovionis) / pr(a)ef(ectus) fabrum / qu(a)estor pr(a)ef(ectus) /... text continues
RIU-S, 00003 = LapSav 00041 = AE 1990, 00803 = AE 1995, 01240 = AE 2000, 01190 = AE 2011, 00964 = IseumSav 00002	101 - 150	Pannonia superior	Szombathely / Stein am Anger / Savaria			Text	flamen collegii [I(ovi) O(ptimo) M(aximo) Depu]lsori p[ro salute] / [Savarie]nsium po[rticum cum] / [exed]ra quam L(ucius) O[3] / [3]lianus de[c(urio) c(oloniae) Cl(audiae)... text continues
ILJug-03, 03113	207 - 207	Pannonia superior	Topusko / Ad Fines			Text	collegii] / Cresce(n)s praef(ectus) coll(egii) fabr(orum) / d(onum) d(edit) / Apro et Maximo co(n)s(ulibus)
RIU-01, 00139 = LapSav 00206 = AE 1965, 00294	101 - 200	Pannonia superior	Torony / Savaria			Text	collegiorum
CIL 03, 04557 (p 1793) = AEA 1985/92, +00120 = AEA 2005, +00020 = AEA 2005, +00048 = AEA 2007, +00066 = AEA 2010, +00006	171 - 230	Pannonia superior	Wien / Vindobona				collegii Deor(um) Prosp(eritati) G(aius!) Ma/rc(ius) Marcian(us) dec(urio) mun(icipii) / Vind(obonensium) [q]uaes[t(or)] / aedil(is) Ilvir i(ure) [d(icundo)] /

= AE 1966, +00282 = AE 2003, +00004 = AEA 2016/17, +00036								praef(ectus) co[ll(egii)] / fabrum... text continues	
CIL 09, 05191 = CIL 01, 01911 (p 1052) = ILLRP 00549 = AE 1991, 00609 = AE 2000, 00468 = AE 2003, +00582	-50 - 30	Picenum / Regio V	Ascoli Piceno / Asculum Picenum					Text	T(itus) Satanus T(iti) f(ilius) / Sabinus / duovir quinto / et duovir / C(aius) A() P() praef(ectus) fab(rum)
CIL 09, 05195 = CIL 01, 01912 (p 1052) = AE 2000, 00478 = AE 2011, 00332	-50 - -1	Picenum / Regio V	Ascoli Piceno / Asculum Picenum					Text	curator agrorum]nus duovir / [ite]r(um?) cur(ator) agr(orum) / [3 praefect]us fabrum
CIL 09, 05845 (p 689) = D 03775 = Euergetismo-Aux, 00009 = Auximum 00039 = Osimo 00073 = Engfer- 2017, 00282 = AE 2003, +00029	1 - 100	Picenum / Regio V	Osimo / Auximum			Yes		Text	tribunus]lus tr(ibunus) mil(itum) bis praef(ectus) fabr(um) pr(actor) / [legavit colonis(?) Auximatibu]s HS L(milia) et fundum Hermedianum / [et praedia duo(?)]... text continues
CIL 09, 05567	1 - 30	Picenum / Regio V	Tolentino / Tolentinum					Text	L(ucius) Quinctius L(uci) f(ilius) Vel(ina) / Babilianus praef(ectus) / [f]abr(um) bis iudex dec(uria) prima / Quinctia L(uci) l(iberta) Iconium /... text continues
CIL 03, 00321 (p 976) = CIL 03, 06983 = D 05883 = Marek-A, 00001c	45 - 45	Pontus et Bithynia	Amasra / Sesamos / Amastris						sacerdos Pro Pace A[ug(usti) i]n honorem Ti(beri) Claudi / Germanic[i Au]g(usti) divi Aug(usti) perpetuus sacer/dos G(aius!) Iulius [Aquila pr]aef(ectus) fabr(um) bis... text continues
CAG-10, p 141 = BCAR-1949/50-32 = AE 1953, 00056	31 - 150	Roma	Roma					Text	sacerdos T(itus) Iulius T(iti) Iuli f(ilius) Vol(tinia) / Lentinus hic s(itus) est v(ixit) a(mnos)

								XVIII / praefect(us) fabrum ex civitate /... text continues
CIL 06, 00135 (p 3003, 3755, 4118) = D 03254	1 - 50	Roma	Roma					P(ublius) Valerius Bassus / praefectus fabrum / et Caecilia Pro<c=G>ne / Dianae Valerianae / d(onum) d(ederunt)
CIL 06, 01837	-	Roma	Roma	Funerary			scriba aedilium	D(is) M(anibus) / C(aius) Apidius / Proculus / scriba aed(ilium) curul(ium) / praef(ectus) fabrum et / Cassia Prisca / uxor... text continues
CIL 06, 01841	-	Roma	Roma				scribae aedilium curulium	T(itus) Culciscius T(iti) f(ilius) Vol(tinia) / praef(ectus) fabr(um) scrib(ae) aed(ilium) cur(ulium)
CIL 06, 03510 (p 3400)	-	Roma	Roma					Q(uintus) Cascellius Q(uinti) f(ilius) Vol(tinia) / Labeo / praefect(us) fabrum / arbitratu / Neroniae C(ai) f(iliae) Nerullae / uxoris /... text continues
CIL 06, 03530 (p 3400, 3530, 3846) = D 01314	-27 - 14	Roma	Roma		Yes	Text	tribunus sevir centuriarum equitum	C(aius) Pompeius C(ai) f(ilius) Ter(etina) / Proculus / trib(unus) mil(itum) leg(ionis) XVIII / praefectus fabrum / sevir centur(iarum) equit(um) /... text continues
CIL 06, 03532	54 - 68	Roma	Roma	Funerary	Yes	Text		Ti(berius) Quaestorius Ti(beri) f(ilius) Col(lina) Secundus / pr(a)ef(ectus) fabr(um) II sibi et / Claudiae Anthemidi contubernali / optimae vix(it) ann(os)... text continues
CIL 06, 03539 (p 3846) = D 02730 = BritRom-02, 00009	67 - 100	Roma	Roma		Yes	Text and decorative columns and	tribunus	M(arcus) Stlaccius C(ai) f(ilius) Col(lina) / Coranus / praef(ectus) fabrum equo / publico ex quinque / decuriis

						other decoration		praef(ectus) coh(ortis) V... text continues
CIL 06, 09101	-	Roma	Roma					Philargyrus praefectus fabrum Aug(usti) ex te[s]tamento
Sensi-01, p 70 = AE 1988, 00502	1 - 100	Umbria / Regio VI	Spello / Hispellum		Yes	Facsimile of text	tribunus	[3]tuneius T(iti) f(ilius) / [3]stia IIvir i(ure) d(icundo) / tr(ibunus) mil(itum) pr(aefectus) fa/[b(rum)
CIL 06, 29704	-	Roma	Roma					C(aius) Gavius / C(ai) f(ilius) L(uci) n(e)pos Ste(latina) / Flaccus / triumvir i(ure) d(icundo) bis / quinq(uennalis) te[r(tium)] / praef(ectus)... text continues
CIL 06, 32932 = BCAR-1999-170	1 - 50	Roma	Roma		Yes	Text	tribunus praefectus equitum	V(ivit) M(arcus) Lucilius M(arci) f(ilius) Sca(ptia) Paetus / trib(unus) milit(um) praef(ectus) fabr(um) praef(ectus) equit(um) / Lucilia M(arci) f(ilia) Polla soror
CIL 06, 32935	-40 -- 31	Roma	Roma		Yes	Text	tribunus	] f(ilius) Pap(iria) / [3]s / [p(rae)p(ositus?) leg(ionis) 3 Mac]edonica / [trib(unus) leg(ionis) VI Ge]mellae / [praef(ectus)] fabr(um) / [
CIL 06, 32936	-25 - 40	Roma	Roma		Yes	Text and Floral Decorations	tribunus	] f(ilius) Pap(iria) / [3]ae / [trib(unus) mil(itum) a p]opulo / [praef(ectus) fab]r(um)
CIL 06, 40910 = CIL 01, 02961 = AE 1971, 00061 = AE 2000, +00251 = AE 2003, +00019	-65 -- 20	Roma	Roma			Text	architectus	L(ucius) Cornelius L(uci) f(ilius) Vot(uria) / Q(uinti) Catuli co(n)s(ulis) praef(ectus) fabr(um) / censoris architectus
Gordon 00112 = NSA-1912-379 = MNR-01-02, p 46 = AE 1913, 00194	31 - 70	Roma	Roma		Yes	Text decoration	tribunus	Nymphodoto Aug(usti) lib(erto) / tabulario / Statoria Nephele coniugi optim[o] / et III Ti(beri) Iuli Iulianus

							praef(ectus) / fabrum trib(unus)... text continues
Kayser 00001 = AE 1964, 00255 = AE 1980, 00046 = AE 1987, 00103 = AE 1991, +00063 = AE 1994, 01815	-30 -- 29	Roma	Roma			Text	Iussu Imp(eratoris) Caesaris divi f(ili) / C(aius) Cornelius Cn(aci) f(ilius) Gallus / praef(ectus) fabr(um) Caesaris divi f(ili) / forum Iulium... text continues
CIL 09, 03307 (p 1511) = D 05599 = MEFR-1967-37 = Engfer-2017, 00261	-30 - 14	Samnium / Regio IV	Castelvecchio Subequo / Superaequum			Yes	tribunus T(itus) Pompullius L(uci) f(ilius) Lappa / IIvir quinq(uennalis) trib(unus) mili(tum) a populo / praef(ectus) fabr(um) ex testamento atrium / auctionarium... text continues
CIL 09, 07387 = SupIt-05-S, 00007 = D 09007 = MEFR-1967-48 = AE 1902, 00189 = AE 1912, 00219 = AE 1977, +00241 = AE 2001, +01551	-5 - 14	Samnium / Regio IV	Castelvecchio Subequo / Superaequum			Yes	Text tribunus praefectus equitum Q(uintus) Octavius L(uci) f(ilius) C(ai) n(epos) T(iti) pron(epos) Ser(gia) / Sagitta / IIvir quinq(uennalis) III praef(ectus) fab(rum) prae(fectus) equi(tum) /... text continues
AE 1964, 00022 = AE 2001, +00908	-	Samnium / Regio IV	Monteleone Sabino / Trebula Mutuesca				augur] Qui(rina) Rufus / [prae]f(ectus) fabr(um) mag(ister) / [iuvent]utis aedilis / [VIII]vir it[er]um q(uin)q(uennalis) augur [// Crito[nia 3] /... text continues
CIL 09, 04889	-	Samnium / Regio IV	Monteleone Sabino / Trebula Mutuesca				magister]s P(ubli) f(ilius) Ser(gia) Rufus mag(ister) iu(v)ent(utis) bis / [quin]q(uennalis) VIIIvir bis praef(ectus) fabrum ter
CIL 09, 04890	-	Samnium / Regio IV	Monteleone Sabino / Trebula Mutuesca				qu[inquennalis] / [octov]ir ter / [3] bis / [praef(ectus)] fabrum / [
CIL 09, 06944 = Questori 00239 = AE 1893, 00050 = AE 1990, 00229	101 - 150	Samnium / Regio IV	Montenerodomo / Iuvanum				praefectus equitum M(arco) Aufatio M(arci) f(ilio) / Arn(ensi) Firmo / Novio Probo / aedili IIIIviro i(ure) d(icundo) / quaestori

							quinq(uennali) II /... text continues
CIL 09, 04968 = D 05543 = Engfer-2017, 00231	54 - 68	Samnium / Regio IV	Passo Corese / Cures Sabini		Yes		tribunus L(ucius) Tuccius P(ubli) f(ilius) Col(lina) Maxim[us] / trib(unus) mil(itum) leg(ionis) XV Apollina[r]is / praef(ectus) fabr(um) IIIIvir praef(ectus) / Neronis Caesaris... text continues
CIL 09, 03669	-27 - 41	Samnium / Regio IV	San Benedetto dei Marsi / Marruvium				L(ucius) Octavius N(umeri) f(ilius) Ser(gia) Balbus / praef(ectus) fabr(um) praef(ectus) castror(um) prim(us) pil(us) / IIvir
CIL 09, 06603 = Questori 00223 = AE 1959, 00284	1 - 50	Samnium / Regio IV	Sepino / Saepinum		Yes	Text	tribunus V(ivus) P(ublius) Numisius P(ubli) f(ilius) Vol(tinia) Ligus p(ater) / tr(ibunus) mil(itum) leg(ionis) III Aug(ustae) praef(ectus) fabrum XV(annos) / aed(ilis) IIvir... text continues
CIL 10, 06976 = IGLMessina 00060a = D 01434	101 - 300	Sicilia	Messina / Messana		Yes		tribunus praefectus vehiculorum L(ucius) Baebius L(uci) f(ilius) / Gal(eria) Iuncinus / praef(ectus) fabr(um) praef(ectus) / coh(ortis) IIII Raetorum / trib(unus) milit(um) leg(ionis) XXII... text continues
AE 2007, 01611	101 - 200	Syria	Beirut / Bayrut / Beyrouth / Bdedoun / Berytus	Funerary			P(ublius) Licinius / Fronto Fab(ia) Mammaianus / hon(oratus) ornam(entis) decurion(alibus) / [// Licinia / Q(uinti) f(ilia) Posilla / Prisca... text continues
CIL 03, 06687 = CIL 05, *00136 = Pais 00475 = D 02683 = Freis 00005 = AE 2006, +01579	-	Syria	Beirut / Bayrut / Beyrouth / Bdedoun / Berytus		Yes	Text	pontifex Q(uintus) Aemilius Q(uinti) f(ilius) / Pal(atina) Secundus [in] / castris divi Aug(usti) [sub] / P(ublio) Sulpi[c]io Quirinio le[g(ato) Aug(usti)] /... text continues

CIL 05, 05267 (p 1083) = IRCómo-Po, 00008 = D 02721 = AE 2006, +00114 = AE 2009, +01761 = AE 2015, +01742	112 - 112	Transpadana / Regio XI	Como / Comum		Yes	Text	tribunus flamen	L(ucius) Calpurnius L(uci) f(ilius) Ouf(entina) / Fabatus / VVir IIIVir i(ure) d(icundo) praef(ectus) fabr(um) / trib(unus) iterum leg(ionis) XXI Rapac(is)... text continues
Pais 00745 = IRCómo-Po, 00006 = AE 1983, 00443b = AE 2010, +00057	77 - 79	Transpadana / Regio XI	Como / Comum			Text	pontifex	[Caeci]liae f(iliae) suae nomin[e] L(ucius) Ca[e]/[ciliu]s C(ai) f(ilius) Ouf(entina) Secundus praef[ect(us)] / [fabr]u(m) a co(n)s(ule) IIIVir i(ure) d(icundo) pontif(ex) tem/[plum]... text continues
CIL 05, 05651	1 - 200	Transpadana / Regio XI	Montelupo Albese			Text		]ius / [3]e factum / [3] Ouf(entina) Seni / [praef(ectus)] fabr(um) / [3 leg]avit municipib(us) / [ad annona]m levand(am) /... text continues
CIL 05, 06431 = D 06743 = AE 2013, +00588	55 - 100	Transpadana / Regio XI	Pavia / Ticinum				flamen augur pontifex	Sex(tus) Sextilius Sex(ti) f(ilius) Papiria Fuscus / flamen Romae et divi Claudii / IIIVir i(ure) d(icundo) pontifex augur salius grat(uitus)... text continues
CIL 05, 05239 = D 06727	81 - 125	Transpadana / Regio XI	Santa Maria Rezzonico		Yes		tribunus flamen pontifex	[L(ucius)] Minicius L(uci) f(ilius) Ouf(entina) Exoratus / flam(en) divi Titi Aug(usti) Vespasiani consensu decurion(um) tr(ibunus) mil(itum) IIIVir a(edilicia) p(otestate) IIvir... text continues
CIL 05, 06969	48 - 49	Transpadana / Regio XI	Torino / Augusta Taurinorum		Yes			[Ti(berio) C]laudio Drusi f(ilio) Caesari A[u]gusto G[ermanico] pont(ifici) max(imo)] / [t]ribunic(ia) potest(ate) VIII imper(ator)

								[X]VI consu[li IIII p(atri) p(atriae)] /... text continues
CIL 11, 05220a = ZPE-211-252	14 - 54	Umbria / Regio VI	Foligno / Fulginiae		Yes	Text	pontifex	L(ucius) Varenus L(uci) f(ilius) / Lucullus IIIIvir i(ure) d(icundo) / tr(ibunus) milit(um) / praef(ectus) fabr(um) quinq(uennalis) ite(rum) / pontif(ex)
CIL 11, 05220b	-	Umbria / Regio VI	Foligno / Fulginiae		Yes		tribunus	] / tr(ibunus) milit(um) praef(ectus) / fabr(um) quinq(uennalis) ite(rum) / pontif(ex) [
Fano-01, 00007 = AnalEpi p 254 = Engfer-2017, 00322 = AE 1983, 00380 = AE 1999, +00602	131 - 170	Umbria / Regio VI	Lucrezia / Pisaurum		Yes	Text	architectus	[C(aius) Cupp]ienus C(ai) f(ilius) Pol(lia) / [Terminalis] praef(ectus) coh(ortis) III Bracarum [in Syr(ia) Pal]aes(tina) praef(ectus) fab(rum) archit(ectus) / signum m[armor(eum)]... text continues
CIL 14, 03581 (p 495) = CIL 11, 04081 = InscrIt-04-01, 00039 = Questori 00287 = Engfer-2017, 00129 = AE 1968, 00162	101 - 200	Umbria / Regio VI	Otricoli / Otriculum					Fortunae Augustae / Sex(tus) Aufidianus Sex(ti) f(ilius) Arn(ensi) / Celer praef(ectus) fabrum / IIIIvir aedilis IIII/vir iur(e) dic(undo) IIIIvir quinq(uennalis)... text continues
CIL 11, 06352 = Pisaurum 00063 = MEFR-1967-46	14 - 31	Umbria / Regio VI	Pesaro / Pisaurum		Yes	Text	tribunus	Po]llio / [trib(unus) mil(itum) a p]opulo / [praef(ectus) fab]r(um) duovir / [au]gur
CIL 11, 04572 = Acquasparta 00003 = AE 2005, +00465 = AE 2010, +00104	51 - 100	Umbria / Regio VI	San Gemini / Carsulae			Text	praefectus equitum pontefex	C(aius) Furius C(ai) f(ilius) Clu(stumina) Tiro / scr(iba) q(uaestorius) IIIIvir quinq(uennalis) tert(ium) pontif(ex) / C(aius) Furius C(ai) f(ilius) Clu(stumina) Tiro... text continues
IICarsulae 00002 = AE 2000, 00529	-15 - 20	Umbria / Regio VI	San Gemini / Carsulae			Text		] IIIIvir q[ui]nquennalis 3] / prae]fectus fabrum(?)

CIL 05, 04920 = InscrIt-10-05, 01145 = MEFR-2012-227 = AE 1941, +00072 = AE 1942/43, 00034	27 - 27	Venetia et Histria / Regio X	Ponte Zanano / Trumplini			Facsimile of text		M(arco) Crasso Frugi / L(ucio) Pisone co(n)s(ulibus) / senatus populusque Thimili/gensis hospitium fecerunt cum / C(aio) Silio C(ai) f(ilio) Fab(ia)... text continues
CIL 05, 08279 = InscrAqu-02, 02862	1 - 70	Venetia et Histria / Regio X	Aquileia					T(ito) Paccio M(arci) f(ilio) / Minucia L(uci) f(iliae) / T(itus) Paccius T(iti) f(ilius) Prisc[us] / IIIvir praef(ectus) fabr(um) / fecit... text continues
InscrAqu-02, 02863	1 - 100	Venetia et Histria / Regio X	Aquileia			Text		praefec]t(us) fabr(um) [3] / [3 cu]ltusque [
RSH 00222 = NSA- 1965-45 = Questori 00417	1 - 50	Venetia et Histria / Regio X	Balena / Verona			Text	quaestor	[3 A]rtorius / Q(uinti) f(ilius) Pob(lilia) / [Hi]strianus / [III]vir i(ure) d(icundo) q(uaestor) aer(arii) / [iteru]m praef(ectus) fabr(um) / [statua]m... text continues
CIL 05, 04212 = InscrIt-10-05, 00018 = D 06714 = Questori 00428	101 - 200	Venetia et Histria / Regio X	Brescia / Brixia			Text	quaestor	Genio / [col]oniae Civicae Aug(ustae) / Brixiae / [Q(uintus?) Ga]rgennius(?) Q(uinti) f(ilius) Fab(ia) / Sagitta / [VI]vir Aug(ustalis) decurio / ... text continues
CIL 05, 04326 = InscrIt-10-05, 00113	-	Venetia et Histria / Regio X	Brescia / Brixia		Yes	Facsimile of text	tribunus	M(arcus) Cl[odius] M(arci) f(ilius) Fab(ia) Ma 3] / aed(ilicia) p(otestate) [praef(ectus) coh(ortis) Cantabrorum] / trib(unus) mil(itum) [leg(ionis) IIII Scythicae praef(ectus)... text continues
CIL 05, 04374 = CIL 11, *00129a = InscrIt-10-05, 00164 = AN-1992-93 = AE	-	Venetia et Histria / Regio X	Brescia / Brixia			Text	augur	P(ublius) Papirius P(ubli) f(ilius) Pastor / augur IIvir praef(ectus) fabr(um) / praef(ectus) Neronis Caesaris

1992, 00744 = AE 2000, +00251								/ Ilvir quinq(uennalis) sibi et /... text continues
Pais 00682 = Pais 01269 = InscrIt-10-05, 00046	-	Venetia et Histria / Regio X	Brescia / Brixia				Text	M(arcus) Quinc[tius?] / Fab(ia) Runco / praef(ectus) fabr(um) in[tr(uitum)] / et aedem Me[rcuri] / HS CL(milibus) res(tituenda) [cur(avit?)] / II(vir?)
IRConcor 00036 = Epigrafia-02, p 890 = AE 1995, 00586 = AE 2008, 00568	101 - 200	Venetia et Histria / Regio X	Concordia Sagittaria / Iulia Concordia / Concordia				collegii	[3] Cicrius [3] Cla(udia) S]ev[erus 3] aed(ilis) II[vir i(ure) d(icundo)] / p[r]aef(ectus) coll(egii) fab[r(um) et cent(onariorum) lu]do[s cum ve]nat(ione?) ex... text continues
CIL 05, 02509	-	Venetia et Histria / Regio X	Este / Ateste					praefectus?] fabrum C[3] / [3]tiii Priscia [
InscrIt-10-05, 00737	-	Venetia et Histria / Regio X	Nave / Brixia		Yes		Text	tribunus pontifex M(arcus) Clodius M(arci) f(ilius) Fab(ia) Ma[3] / aed(ilicia) pot(estate) praef(ectus) coh(ortis) Cantabr(orum) / [tr]ib(unus) mil(itum) leg(ionis) IIII Scythicae praef(ectus) vex[ill(ationis)]... text continues
CIL 05, 02791	-	Venetia et Histria / Regio X	Padova / Patavium		Yes		Text	tribunus Fortunae sacrum / P(ublius) Opsidius P(ubli) f(ilius) Rufus IIIIvir / tr(ibunus) mil(itum) leg(ionis) IIII Scythicae / praef(ectus) fabr(um)
CIL 05, 02828	-	Venetia et Histria / Regio X	Padova / Patavium		Yes		tribunus	M(anius) Allenius M(ani) f(ilius) Fab(ia) / Crassus Caesonius / tr(ibunus) mil(itum) praef(ectus) fabr(um) / IIIIvir
CIL 05, 02836	-	Venetia et Histria / Regio X	Padova / Patavium				Text	augur Sex(tus) Pompeius Sex(ti) f(ilius) / praef(ectus) i(ure) d(icundo) praef(ectus) fabr(um) bis / augur sibi et /

								Tulliae Sex(ti) f(iliae) Severae... text continues
SupIt-28, 00003 = AE 2016, 00455	-	Venetia et Histria / Regio X	Padova / Patavium		Yes		tribunus	F(ortunae) D(omesticae?) / P(ublius) Opsidius / Rufus / tr(ibunus) mil(itum) / leg(ionis) IIII / Scythicae / [praef(ectus) f]abrum(?)] / aed(ilis) IIvir quinq(uennalis) / praef(ectus) fabrum sibi et / Pereliae Gratae uxori / testamento fieri iussit
AE 2010, 00525	1 - 100	Venetia et Histria / Regio X	Peroj / Pola				Text	L(ucius) Menacius L(uci) f(ilius) Vel(ina) / Priscus / equo pub(lico) praef(ectus) fabrum aed(ilis) / IIvir IIvir quinq(uennalis) trib(unus) mil(itum) /... text continues
CIL 05, 00047 = InscrIt-10-01, 00070 = D 05755	1 - 100	Venetia et Histria / Regio X	Pula / Pola		Yes	Text	tribunus flamen	[M(arcus) 3]ius M(arci) f(ilius) Vel(ina) [3] / [IIvi]r IIvir quin[q(uennalis)] / [patronus c]oloniae pr[ae]f(ectus) / [fabr(um?)] f(ecit) sibi et [3]... text continues
InscrIt-10-01, 00568	-	Venetia et Histria / Regio X	Pula / Pola				Text	M(arcus) Surinus M(arci) f(ilius) Marcellus / [IIIIII]vir aed(ilis) praef(ectus) i(ure) d(icundo) IIvir pont(ifex) praef(ectus) fabr(um) quinq(uennalis) d(ecurionum) d(ecreto) / M(arcus)... text continues
CIL 05, 00544 = InscrIt-10-04, 00061	1 - 50	Venetia et Histria / Regio X	Trieste / Tergeste				pontifex	donis donato] / ob bellum Parth(icum) [torquibus] / armillis phaleris co[r]ona [3] / L(ucius) Varius Papirius Papirianus pa[te]r / IIvir... text continues
CIL 05, 00546 = InscrIt-10-04, 00055 = Tergeste p 41 = RSH 00037	117 - 138	Venetia et Histria / Regio X	Trieste / Tergeste				Text	

CIL 05, 00667 = InscrIt-10-04, 00192 = SupIt-10-T, 00010 = AE 1978, 00354	1 - 25	Venetia et Histria / Regio X	Trieste / Tergeste				Text	[3 Ap]piu[s 3 f(ilius) Pup(inia)] / [Cal]pur[nianus] / [prae]fect(us) [i(ure) d(icundo) IIvir] / [pont(ifex) p]raef[ect(us) fabr(um)]
CIL 05, 03427	-	Venetia et Histria / Regio X	Verona				flamen augur	T(itus) Sornius L(uci) [f(ilius)] Dex[t]er IIIvir aed(ilicia) [p]o[t(estate) 3] / augur flam(en) Romae [e]t Aug(usti) pra[ef(ectus) fabr(um)]
CIL 05, 03450 = AE 2005, 00622	-	Venetia et Histria / Regio X	Verona				pontifex	ponti]f(ex) IIIvir i(ure) d(icundo) / [praefectus f]abr(um) III[vir

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Publication	Date	Province	Place	Type	Military	Photo on Clauss/Slaby	Other Terms	Text
OBuNjem 00022 = AE 1979, 00643	253 - 259	Africa proconsularis	Abu Nujaym / Chol / Bu Njem / Bou-Ngem / Gholaia / Golas		Yes		librarius balneus	VIII Ka(lenda)s Ian(uarias) n(umerus) LVII / in his librarius I / optio I / [[proculcator I]] / |(equites) VIII /... text continues
OBuNjem 00027	253 - 259	Africa proconsularis	Abu Nujaym / Chol / Bu Njem / Bou-Ngem / Gholaia / Golas		Yes		librarius	] n(umerus) LVII / [ex his] librarius I / [proculc]ator I / [(equites)] [[I]] / VIII / [quintan]ari(i) XXII /... text continues
OBuNjem 00029	253 - 259	Africa proconsularis	Abu Nujaym / Chol / Bu Njem / Bou-Ngem / Gholaia / Golas		Yes		aquam balnei	] / p[roculcator 3] / op[tio I] / str[uctor 3] / ad aq[uam balnei 3] / ex castri[s 3] /... text continues
IRT 00281	101 - 300	Africa proconsularis	Al-Khums / Khoms / Homs / Lebdah / Lebida / Labdah / Wadi Zennad / Wadi az Zannad / Leptis				Text	] / Genio col(oniae) Lepc(is) / Mag(nae) / Ulp[ius] Rogatus / Pao structor / d(onum) d(edit)

			Magna / Lepcis Magna / Neapolis				
ILAlg-01, 00127 = AE 1900, 00054	-	Africa proconsularis	Annaba / Bone / Hippone, Ruines d' / Hippo Regius				Salvis / Silvis / fel(iciter) Suc(c)es/sus structo(r) / ser(vus) f(ecit)
CIL 08, 05267 = CIL 08, 17448 = ILAlg-01, 00101	-	Africa proconsularis	Bel Amar	Funerary			Felix s[t]ruc/tor ser(vus) vix(it) / annis XX fec(it) / ei[u]s uxor [3] / H[
CIL 08, 23833 = D 09395 = ILPBardo 00319 = LBIRNA 00062	-	Africa proconsularis	Djebel Mansour / Gebel Mansour / Jabal Mansur / Kharrouba / Ech Charoub / Gales	Dedication			Templu(m) Mercurio f(ecit) civitas Gale(n)sis sufetes Aris et Manius Celeris f(ilius) scripsit Satur Celeris f(ilius) structores C(aium) Manium et G(aium!)... text continues
CIL 08, 23834 = ILTun 00634 = ILPBardo 00320 = Afrique p 175 = AE 1905, 00034	-	Africa proconsularis	Djebel Mansour / Gebel Mansour / Jabal Mansur / Kharrouba / Ech Charoub / Gales	Funerary		Text and image of a person	Quarta Nyptanis f(ilia) G/ale(n)sis ux {s}or Celeris / Mantis f(ilii) sacerdos magn(a) / conditiv[u](m) s(ua) p(ecunia) f(ecit) curatorib/us Saturu {m} Rogatu Bruti/one... text continues
IL Afr 00462	-	Africa proconsularis	Hammam Darradji / Hammam Derradji / Bulla Regia	Funerary			[Dis Manibus] / sacrum / Cn(aeus) Iulius Sa/turus Forti/cianus struc/[to]r cum suis / [3]FV[
LBIRNA 00972 = AE 1975, 00886 = AE 1987, 01056 = AE 2012, +01908	-	Africa proconsularis	Sidi Amar				Hercules(!) Ge/nium Sabu/rianensium / Dhamak sace/rdos fecit / [et d]edicavit s(umptu) s(uo) // Primosus / structori / vita(?) qui(?) /... text continues
ILPBardo 00411 = ILTun 01281 = LBIRNA 00104 = AE 1933, 00058	132 - 132	Africa proconsularis	Zawiyat Madyan / Vallis			Text	C(aio) Iunio Serio / Augurino / M(arco) Trebio Ser/giano co(n)s(ulibus) / C(aius) C(a)elius Satur/ninus structor / ab Avitnis votum /... text continues
CIL 13, 01034 = ILA-Sant 00003 = CAG-17-02, p 331	-	Aquitani(c)a	Saintes / Mediolanum Santonum				[M]e[r]curio / Augu[sto] / lapida[rii] / stru(c)t[ores]

CIL 13, 11031 = CAG-47, p 302 = AE 1912, 0027	-	Aquitani(c)a	Sos / Elusa / Elusates					] Tutelae / Adehio et Capito / Ad[e]i Harbelesteg(is) / structores / v(otum) s(olverunt) l(ibentes) m(erito)
CIL 03, p 2328,60ccc	-	Asia	Milas / Mylasa				lapidario	] Ita[3] / Lusopinae numero viginit quin(que) [3] / sequentes numero quadraginta |(denariis) [3] / u<v=B>ae duracinae seu bumastae p(ondo)... text continues
Vindolanda 00001 = Vindolanda 00155 (p 3, 155)	-	Britannia	Chesterholm / Vindolanda	Military letter	Yes	Tablet	balneum plumbum valetudinar furnaces lutum tectors	VIII K(alendas) Maias in offici(i)s h(omines) CCCXXXIII / ex eis sutores XII / s[tr]uctores ad balneum XVIII / [a]d plumbum... text continues
Vindolanda 00156 (p 3, 156) = Gummerus-04, 00465 = Gummerus- 05, 00024 = AE 1994, 01131 = AE 1999, +00971 = BritRom-04, 00017	-	Britannia	Chesterholm / Vindolanda	Military letter	Yes	Tablet		Nonis Martii[s] / missi ad hospitium Marco medico / faciendum structores n(umero) XXX / [a]d lapidem flammandum n(umero) XVIII / ... text continues
CIL 12, 04511 (p 847) = CAG-11-01, p 216	-	Gallia Narbonensis	Narbonne / Narbo	Funerary				V(ivit) L(ucius) Autroni[us] L(uci) l(ibertus) / Rufus struct[or] / v(ivit) Gemina A(uli) l(iberta) / Amoena
CIL 13, 05209 = RISch-02, 00158	-	Germania superior	Windisch / Vindonissa		Yes	Text decoration perhaps tools		[M(arco?) I]ulio M(arci) f(ilio) / [Qui]r(ina) Maxim(o) / [A]ugusto / [Ne]meto mil(iti) / [leg(ionis)] XI C(laudiae) P(iae) F(idelis) / [sti]p(endiorum)... text continues
CIL 06, 08639 (p 3461) = CIL 10, 06637 = InscrIt-13- 01, 00032 = GLISwedish 00149	47 - 69	Latium et Campania / Regio	Anzio / Antium				Text	currus honorem roles; tpoiarius]s Acratus numm(is) / [3]rus teglarius numm(is) / [3]ros structor numm(is) / [3]s Metrodas numm(is) / [A(ulo)

= SIGLUps 00022 = Epigraphica-2003- 98 = AE 1997, +00102 = AE 2002, 00309 = AE 2003, +00298 = Solin- 2019b, 00092								Vitellio L(ucio)] Vipstano... text continues
ICUR-01, 03662 = Epigraphica-2003- 90 = AE 1998, 00193 = AE 1998, 00347 = AE 2003, 00299 = Solin- 2019b, 00085	301 - 400	Latium et Campania / Regio	Anzio / Antium	Funerary				D(is) M(anibus) / Max {x} ima dece/ssit in pa<c=S>(e) dul/cissima <v=B>ix {x}i[t] / ann<o=U>s [VI] et / mense {n}s VII / d(iem) I spo(n)sata... text continues
Bovillae p 361 = AE 1979, 00129	31 - 70	Latium et Campania / Regio	Marino / Castrimoenium					P(ublius) Maneilius |(mulieris) l(ibertus) / Pamphilus / P(ublius) Maneilius P(ubli) l(ibertus) Memno / P(ublius) Maneilius P(ubli) l(ibertus) Sabbio / P(ublius)... text continues
CIL 14, 00288	-	Latium et Campania / Regio	Ostia Antica				women? More investigation	]asi l(iberto) Leonti / [3 Augus]tali / [3 fe]cit ex sua pecunia / [3]us P(ubli) Aemili Leontis / [3 A]emilio... text continues
CIL 10, 00868 (p 967) = AE 2011, +00196	-	Latium et Campania / Regio	Pompei					Diogenes structor
CIL 10, 01959	151 - 250	Latium et Campania / Regio	Pozzuoli / Puteoli	Funerary				D(is) M(anibus) / M(arcus) Perpernius / Zmaragdus / Martiali ma/gistro suo stru/ctori b(ene) m(erenti)
CIL 10, 00708	1 - 70	Latium et Campania / Regio	Sorrento / Surrentum					Frontoni / Aug(usti) ser(vo) / structor(i)
SIPSurrentum 00022 = AE 1929, 00154	1 - 70	Latium et Campania / Regio	Sorrento / Surrentum	Funerary				Blastus Aug(usti) / struct(or) fecit / Marciae ver(nae) / suae v(ixit) a(nnos) VI

CIL 14, 02656 = EE-09, p 413	-	Latium et Campania / Regio	Tusculum	Funery				]sosimo / [3] structori / [3]logus de suo / [3] posuit con(iugi) / [3] v(ixit) a(nnos) XVII
BCTH-1896-213 = Hygiae p 174 = AE 2010, 01842	259 - 259	Mauretania Caesariensis	Beni Fouda / Sillegue / Novaricia					P(osita) K(alendis) Iuni(i)s / Bona(e) / de{e}a(e) / Aug(ustae) / Dona/tus st/ructo/r votu/m s(olvit) l(ibens) a(nimo) / a(nno) p(rovinciae) CC/XX
CIL 08, 09426	-	Mauretania Caesariensis	Cherchell / Cherchel / Scherschel / Caesarea	Funerary				Coentus s(t)ructor ad / r<e=O>posit(o)riu(m) vixit a(nnos) XXXXV / h(ic) s(itus) e(st) Rosa uxor fecit ob / meritis eius
TitAq-02, 00834 = AE	101 - 300	Pannonia inferior	Budapest / Aquincum			Text		]stru[ctor(?) 3] / [3 con]iugi [
CIL 03, 13389 = RIU-03, 00838 = Grbic 00168	101 - 150	Pannonia superior	Dunabogdany / Cirpi	Funerary			magister structorum heierarchy?	Teutio / Verco[m]/bogionis / f(ilius) / magis(ter) / structo/rum / <E=A>ravisc<us=O> / h(ic) s(itus) e(st)
CSIR-Oe-01-03, 00318 = Hild 00224 = Legio-XV-Apo 00113 = MaCarnuntum 00200 = AEA 2003, +00002 = AEA 2005, +00004 = AEA 2006, +00003 = AEA 2006, +00007 = AEA 2006, +00023 = AEA 2013/14, +00035 = AE 1954, 00119 = AEA 2016/17, +00056	94 - 150	Pannonia superior	Petronell- Carnuntum / Carnuntum	Funerary	Yes	Text and image of a person		L(ucius) Plotidius L(uci) f(ilius) / Lemonia Vitalis do/mo Bononia / miles leg(ionis) XV Apoll(inaris) / ann(orum) L stip(endiorum) XXIII h(ic)... text continues

CIL 03, 11304 = AEA 2005, +00062 = AEA 2006, +00015 = AEA 2016/17, +00074	1 - 100	Pannonia superior	Wiener Neustadt / Scarbantia	Funerary	Yes	Text		Reuso / Druti f(ilius) / ann(orum) L / structor / fuit / h(ic) s(itus) e(st) / Utto filius / posuit
CIL 06, 06354 (p 3851) = D 07623	1 - 50	Roma	Roma				faber parietarius	T(itus) Statilius Nicep(h)or / faber struct(or) parietar(ius)
CIL 06, 00444 = D 07280	-	Roma	Roma				collegium	Laribus Augusti[s] / collegium struc[torum]
CIL 06, 04034	-75 - 50	Roma	Roma			Text		Parthenio / struct(ori) // [6] / [6] / con(iux)
CIL 06, 06353	1 - 50	Roma	Roma	Funerary		Text		Alexander / structor
CIL 06, 08795 (p 3891) = D 01809 = AE 1980, 00043	101 - 200	Roma	Roma	Funerary				D(is) M(anibus) / Alcimo Caes(aris) / n(ostri) ser(vo) structori / Ingen(u)s Caes(aris) / n(ostri) ser(vus) a cura / amicorum / ... text continues
CIL 06, 08911	-	Roma	Roma					]apaes Iuliae Aug(ustae) / structor(i) Pollian(o) / Calamus conser(vus) oll(am) dat
CIL 06, 09046 = ILMN-01, 00121	14 - 37	Roma	Roma			Text		Chio Aug(usti) / Iubatiano / struct(ori)
CIL 06, 09047 (p 3891) = D 01810	-	Roma	Roma	Funerary				Ti(berio) Cl(audio) Augustor(um) l(iberto) et / structori Domnioni / Antonia Asia fratri / carissimo bene merenti / vix(it) an(nos) XXIII... text continues
CIL 06, 09048 (p 3464)	-	Roma	Roma					]lio Aug(usti) l(iberto) / [3]o structori / [3 F]jeliculae / [
CIL 06, 09102 = ILMN-01, 00124 = Pittori 00006 = ZPE-136-279 = AE 2001, 00197	-30 - 50	Roma	Roma			Text	faber	Libertorum et famil[[iae 3]] // d(ecurio) Fe[3] l(ibertus) / d(ecurio) [3]ochus l(ibertus) / [d(ecurio) 3]icius l(ibertus) / [d(ecurio) 3]us l(ibertus)... text continues

CIL 06, 09903	1 - 100	Roma	Roma	Funerary			D(is) M(anibus) / Aureliae Prepusae [3]/simae et rariss[imae 3]/per opta<v=B>it Pr[3] / T(itus) Aurelius Te[3] / structor M[3] / [fe]cit... text continues
CIL 06, 09904 = ILMN-01, 00149	1 - 100	Roma	Roma	Funerary		Text	Blandus / structor
CIL 06, 09905 (p 3471)	51 - 150	Roma	Roma	Funerary			Dis Manibus Ti(berius) Claudius Onesimus structor fecit / Iuliae Potitae coniugi / suae et Claudiae Onesime / filiae suae vix(it)... text continues
CIL 06, 09906 (p 3471)	-	Roma	Roma	Funerary			Cn(aeus) Cornelius / Anthus / structor / vix {s}it annos LIII // Cornelia / Stacte Graeca / vixit an(nos) LI
CIL 06, 09907 = ILCV 00665	1 - 50	Roma	Roma	Funerary		Text	Timotheus structor / Laudica Asiatica
CIL 06, 09908 = Louvre 00281	-	Roma	Roma	Funerary			Xustus l(ibertus) Rui[3] / Gemini structo[r] / et Diogenes Alexandri / filius hic siti sunt / Lysimachus Q(uinti) Corneli /... text continues
CIL 06, 09909	-	Roma	Roma	Funerary			]ria Chrysis / [3] ann(os) XXIIIX / [3]lus Porciae M(arci) f(iliae) / [3 str]uctor fecit
CIL 06, 09910 (p 3896) = D 07624	-	Roma	Roma	Funerary		parietarius	C(aius) Iulius Salvius / structor parietarius / Iuliae Heuresi / coniugi sanctissimae / Iuliae Restitutae f(iliae) / C(aio) Iulio Statuto... text continues
CIL 06, 33235 = LMentana-01, 00056	101 - 200	Roma	Roma	Funerary		Text	nostris D(is) M(anibus) / Severae / vixit annis XV / fecit Pithanus / Caes(aris) n(ostri) structo(r) / coniugi b(ene) m(erenti)

CIL 06, 33470 = D 09033 = Gordon 00155 = TermeDiocleziano- 02, p 155 = TermeDiocleziano- 01, p 519 = AE 1899, 00152 = AE 1899, +00162 = AE 1899, +00208 = AE 1903, +00006	83 - 96	Roma	Roma	Funerary		Text		Di{i}s Manibus / Epaphrodito / structori a c<u=Y>bo / Imp(eratoris) Caesaris / Domitiani Aug(usti) / Germanici / Syntrophus / co<I=N>lega... text continues
CIL 06, 33795	101 - 300	Roma	Roma			Text	collegium	Collegium / Caesaris n(ostr) C[3] / decuriarum [3] / Hecaton l(ibertus) struc[tor] / Argynnus emp(ticius) [3] / Antiochus l(ibertus) a... text continues
CIL 06, 39523 (p 4073) = NSA-1914- 378,05 = Diutius 00037b	1 - 50	Roma	Roma			Text	magistri opere structorio et textorio	L(uci) Atei Sp(uri) f(ili) / Col(lina) Felicis / mag(istri) opere structorio et text(orio) / monument<a=I> faciund(um) curavit
CIL 06, 39571 (p 4076) = NSA-1914- 388,28 = RAL- 1974-399	1 - 30	Roma	Roma			Text	magister operis structor et tectorum	T(itus) Edusius T(iti) l(ibertus) Mantaeus / magister idemque / curavit operis structor(um) / et tectorum
CIL 06, 39573 (p 4076) = NSA-1914- 392,63	1 - 30	Roma	Roma	Funerary		Text	magister opere structorio et tectorio	Q(uintus) Pupius C(ai) f(ilius) Vel(ina) mag(ister) / opere structorio et / tectorio / monumentum faciend(um) / curavit
CIL 09, 04479	-	Samnium / Regio IV	Preturo / Grottoni / Amiternum					P(ublius) Lucretius P(ubli) l(ibertus) / Structor
CIL 11, 06367 = Pisaurum 00078	201 - 230	Umbria / Regio VI	Pesaro / Pisaurum				magistri vici	[T(itus) Aninius T(iti) f(ilius) Niger] / C(aius) Fir[mi]dus L(uci) f(ilius) ves[t]iarius / P(ublius) Blerra C(ai) f(ilius) lanarius / C(aius) Anne[i]us... text continues

CIL 11, 04753 (p 1374)	-	Umbria / Regio VI	Umbria / Regio VI					Vinisius / C(ai) Massili / Saturnini / structor
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