

THE CLOACA MAXIMA AND THE MONUMENTAL MANIPULATION OF WATER IN ARCHAIC ROME

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Introduction

Scholars generally conceive of the Cloaca Maxima as a massive drain flushing away Rome's unappealing waste. This is primarily due to the historiographic popularity of Imperial Rome, when the Cloaca was, in fact, a sewer. By the time Frontinus assumed the post of *curator aquarum* in 97 AD, its concrete and masonry tunnels channeled Rome's refuse beneath the Fora and around the hills, and stood among extensive drainage networks in the valleys of the Circus Maximus, Campus Martius and Transtiberim (Figs. 1 & 2).¹ Built on seven hundred years of evolving hydraulic engineering and architecture, it was acclaimed in the first century as a work "for which the new magnificence of these days has scarcely been able to produce a match."²

The Cloaca did not, however, always serve the city in this manner. Archaeological and literary evidence suggests that in the sixth century BC, the last three kings of Rome produced a structure that was entirely different from the one historians knew under the Empire. What is more, evidence suggests these kings built it to serve entirely different purposes. The Cloaca began as a monumental, open-air, fresh-water canal (Figs. 3 & 4). This canal guided streams through the newly leveled, paved, open space that would become the Forum Romanum. In this article, I reassess this earliest phase of the Cloaca Maxima when it served a vital role in changing the physical space of central Rome and came to signify the power of the Romans who built it.

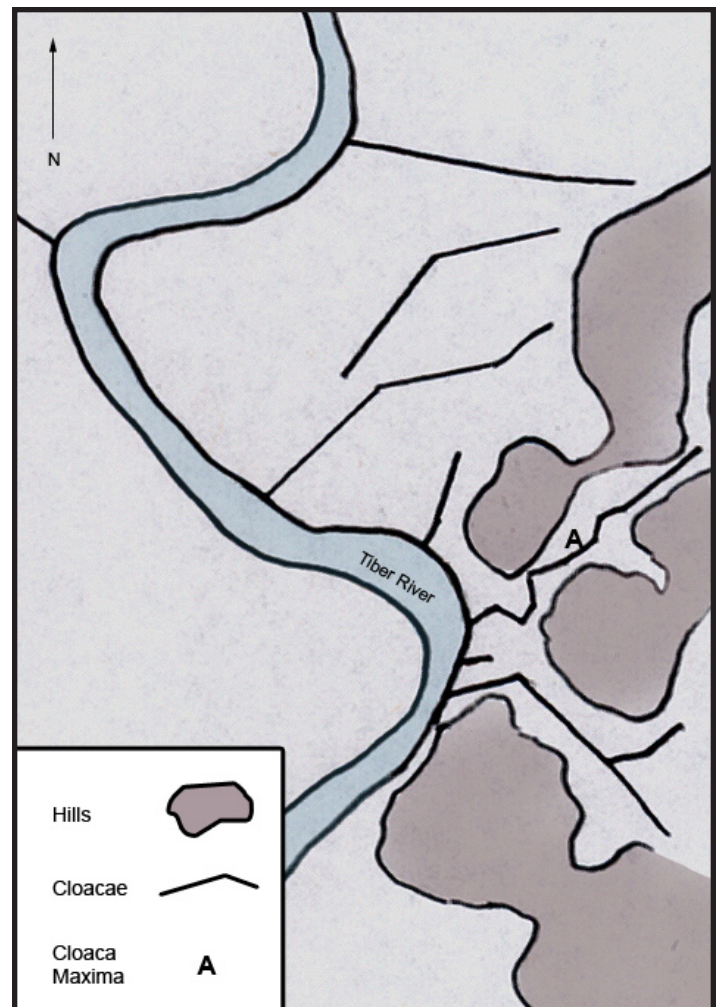


FIG. 1. The cloacae of Rome under the Empire. After C. Moccheggiani Carpano

This paper is the result of my thesis, "Reflections of Expansion: The Cloaca Maxima and Urban Image in Tarquin Rome" (U. Texas, 2004) and research toward my Dissertation, "The Topographical Transformation of Archaic Rome: A New Interpretation of Architecture and Geography in the Early City" (U. Texas, forthcoming). I am deeply indebted to my advisors, Penelope J. E. Davies and John R. Clarke, who are incomparable mentors. I am grateful to Albert Ammerman, Nicola Terrenato, Rabun Taylor, Ingrid Edlund-Berry and Jim Packer for their guidance and support on this project,

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¹ C. Moccheggiani Carpano, "Le Cloache dell'antica Roma," *Roma Sotterranea*, Rome (1984) 166-171.

² Livy I.56.2



FIG. 2. Cloaca Maxima. Interior of Closed Augustan Section. Photograph by John N. N. Hopkins

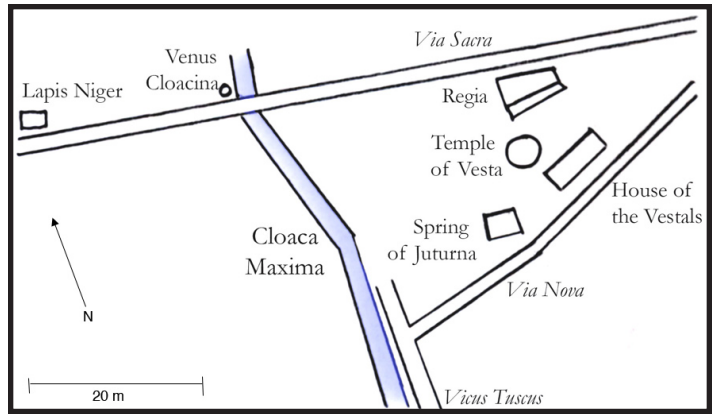


FIG. 4. Plan of area around sixth century Cloaca Maxima. After C. Smith

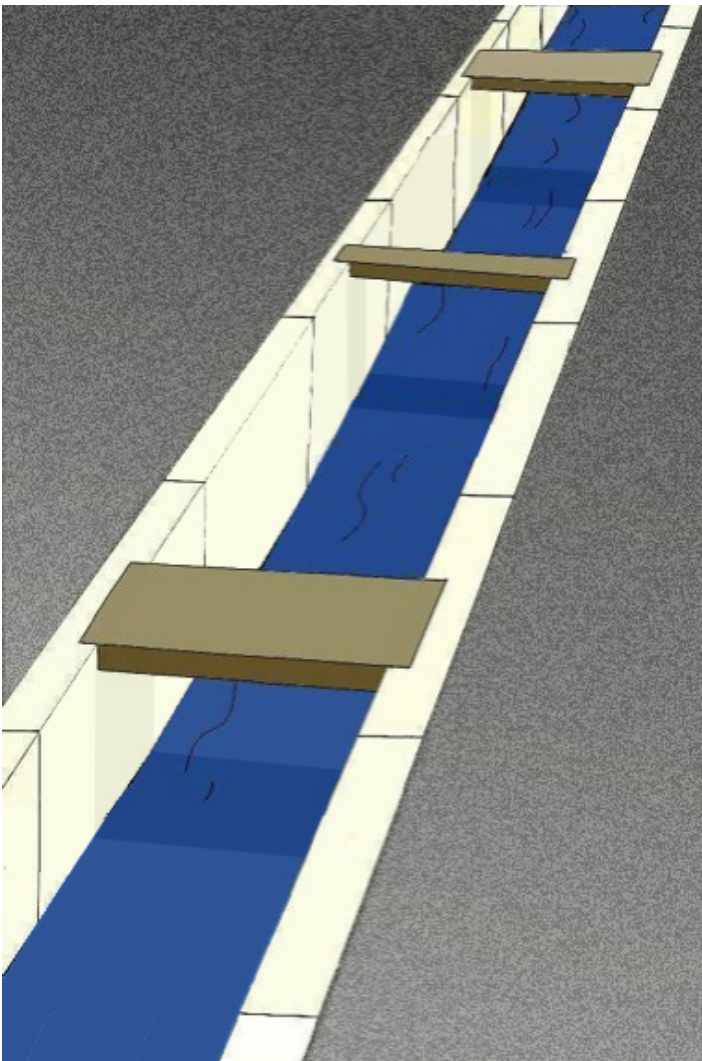


FIG. 3. Reconstruction of the sixth century Cloaca Maxima. John N. N. Hopkins

Setting the stage: The Cloaca Maxima through the centuries

The Cloaca Maxima originally stretched more than 100 meters through the center of the Forum Romanum, between the later Basilicae Aemilia and Julia. Mere decades after completing this monument, Romans added smaller canals to drain nearby areas and began extending the main duct to the Velabrum (Fig. 5).³ In the following centuries, repairs, extensions, additions and renovations changed the architecture and course of the canal. Engineers often made repairs only in broken or severely outdated sections, and so the masonry of the system is a patchwork of Roman building techniques (Fig. 6). Due to the possibility of collapse, Romans only rarely built major structures over cloacae; instead, they built new ducts to circumvent new structures. This accounts for twists through the city and the many sealed shafts in disuse (Figs. 5).⁴ The irregular nature of the ducts and the patchy masonry make it difficult to date a section absolutely or to suggest the original extent of certain sections of the Cloaca. Still, one can in some cases see how changes to the city's architecture necessitated alterations to its drainage system.

In the area of the Imperial and Roman fora, canals and their vaults exhibit archaic, mid-republican, Julian, Augustan, early Flavian and Domitianic masonries. Opus reticulatum and Anio Tufo in the area of the Tor dei Conti and Via Madonna dei Monti, represent the Augustan (Agrippan) masonries *par*

³ Sandro Picozzi, "L'esplorazione della Cloaca Massima," *Capitolium* 50 (1975): 4, 5, H. Bauer, "Die Cloaca Maxima in Rom," *Mitteilungen* 43 (1989): 49-51, "Recent Excavations in Rome," *Classical Review* 15 (1901): 136-13, C. Moccheggiani Carpano, "Le Cloache" 164-169

⁴ Bauer, "Die Cloaca Maxima," and Bauer, "Cloaca, Cloaca Maxima" in Steinby, Ed., *LTUR* (Roma, 1993-): 288-289; Contra Louise A. Holland Janus and the Bridge (American Academy in Rome, 1961): 348.

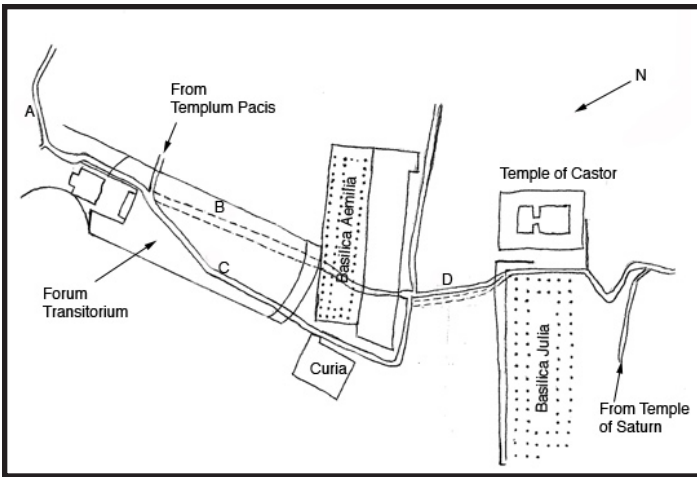


FIG. 5. Plan of Cloaca Maxima in the late Empire. A) Augustan Track B) Closed Augustan Track C) Manhole in Domitianic Track D) Archaic Track. After H. Bauer



FIG. 7. Cloaca Maxima. Augustan Track. Domitianic closure wall at corner of Temple of Minerva. Photograph by John N. N. Hopkins



FIG. 6. Cloaca Maxima. Juncture between early-republican, late-republican and archaic tracks, with repairs. Photograph by John N. N. Hopkins

excellence (Figs. 2 and 5-A).⁵ This Augustan track, which ran along the eastern edge of the Forum Transitorium, underneath the Basilica Aemilia and connected to the archaic track in the Forum Romanum, was sealed off under Domitian's reign (figs. 5-B and 7).⁶ While building the Forum Transitorium, Domitian had a new track installed; its Peperino walls, later capped with opus latericium in bipedales and a cement vault, begin at the corner of the Temple of Minerva; it then crosses the Forum Transitorium and meets a mid-republican track on the northwest side of the Basilica Aemilia (Figs. 5-C, 8 and 9).⁷

⁵ Bauer, "Die Cloaca Maxima," 49-51, Bauer, "Cloaca, Cloaca Maxima," 288-9, C. Moccheggiani Carpano, "Le Cloache" 169-173

⁶ Bauer, "Die Cloaca Maxima" 48

⁷ Bauer, "Die Cloaca Maxima" 48-9.

The mid-republican track was likely installed when the Basilica Aemilia (or its forerunner) was built over the area of an earlier Cloaca.⁸ For structural safety, builders redirected the canal around the northwest side of the building. From here until it reaches the Basilica Julia, the Cloaca's masonry vacillates between archaic, mid-republican and early imperial stone and concrete walls and vaults.⁹

As the city and its population grew, the need for a large drainage system and sanitation network became important for hygiene and to keep streets and buildings as free from floodwaters as possible.¹⁰ In the area of the Campus Martius, two mid-republican cloacae ran from the area of the later Pantheon to the Porticus Octavia and the Tiber and from the north slope of the Capitoline to the Tiber; an imperial track ran from the Pincian hill to the Tiber, draining the area of the northern Campus (Fig. 1).¹¹ The Cloaca Maxima spread through the city's center in the Republic and Empire; new shafts drained each of the imperial fora, the area around the Carcer, Temples of Saturn and Castor, and a large duct running alongside the Via Sacra fed into the main channel in front of the Basilica Aemilia (Fig. 5).¹² To the south, the Cloaca Circi

⁸ Bauer, "Cloaca, Cloaca Maxima," 288.

⁹ For details on this section of the Cloaca, see below, "The Cloaca Maxima in the sixth century: design and implementation"

¹⁰ C. Moccheggiani Carpano, "Le Cloache" 165

¹¹ C. Moccheggiani Carpano, "Le Cloache" 169-70, Bauer, "Die Cloaca Maxima" 46-7

¹² Bauer, "Die Cloaca Maxima" 49-50, C. Moccheggiani Carpano, "Le Cloache" 171-173



FIG. 8. Cloaca Maxima. Track under Forum Transitorium. Photograph by John N. N. Hopkins



FIG. 9. Cloaca Maxima. Juncture of Flavian and Republican tracks. Photograph by John N. N. Hopkins

Maximi originally drained the area of the Circus Maximus, but later connected to drainage systems for the Coliseum and perhaps the area of the Baths of Caracalla.¹³

Setting the stage: The political, economic and military history of early Rome in brief

Livy, Dionysius of Halicarnassus and Cicero all agree that seven kings ruled Rome between ca. 753 and ca. 509 BC.¹⁴ Dionysius further testifies that Tarquinius Priscus, the fifth of these kings, began his reign in “the second year of the forty-first Olympiad,” or 614 BC; Servius Tullius followed in 576, and Tarquinius Superbus, the last king, ascended the throne in 532.¹⁵ These authors were writing more than five hundred years after the period they discuss and with conspicuous political motives; this leads some scholars to override their testimony and place the start of Priscus’ reign later than 575.¹⁶ Still, Ceramic finds at the Forum Boarium, Capitoline Temple and on the north slope of the Palatine corroborate literary

¹³ C. Moccheggiani Carpano, 174-5, cf. R. Lanciani *Ruins and Excavations of Ancient Rome*, (New York, 1897) 30-31

¹⁴ Dion. II.2.1-4, IV.41.1; Livy I.7.3-7 Cicero gives a foundation date of 751, *De Re Publica* 2.10.17

¹⁵ Dion. III.46.2, IV.41.1

¹⁶ On the authors’ biases, see E. Gabba, *Dionysius and the History of Archaic Rome* (Berkeley, 1991), R.M. Ogilvie, *A commentary on Livy, books 1-5* (Oxford, 1965), John North and J.G.F. Powell, *Cicero’s Republic* (London, 2001). On later chronologies, see T.J. Cornell, *The Beginnings of Rome* (London, 1995): 121-127; cf. Einar Gjerstad, *Early Rome* (Lund, 1953-73)

¹⁷ A. Mura Sommella, “La decorazione del tempio arcaico,” *PdP* 32 (1977) 62-128, G. Colonna in *La Naissance de Rome* (Paris 1977), S. B. Downey, *Architectural Terracottas from the Regia* (Ann Arbor 1995), Alberto Danti,

chronology for construction in these areas. Masonry styles that Romans employed at these sites and at the Regia reflect one another and demonstrate the very burst in architecture that Livy and Dionysius witness under Priscus, Servius and Superbus.¹⁷ Archaeologists including Dunia Filippi, Anna Mura Sommella and A. J. Ammerman continue to uncover material evidence that compellingly corroborates Dionysius and other ancient authors’ timeline; these archaeologists’ conclusions guide me to adopt the literary chronology in this article.¹⁸

By the start of Priscus’ reign in 614, votive deposits, grave goods and remnants of public and private architecture suggest that the polity of Rome had a social hierarchy,

“L’indagine Archeologica nell’area del Tempio di Giove Capitolino,” *BullCom* 102 (2001): 331-338, A. Mura Sommella, “Le recenti scoperte sul Campidoglio e la fondazione del tempio di Giove Capitolino” in Antonio Maria Colini, ed. *Archeologo a Roma. L’opera e l’eredità, Atti del Convegno di Studi, RendPonAc*, 70, 1997-98 (2000): 68-72. A. Carandini, *Palatino, Velia e Sacra Via: Paesaggi Urbani Attraverso il Tempo* (Rome, 2004).

¹⁸ Essential works include: T. J. Cornell, *The Beginnings*, T.P. Wiseman, *Remus: A Roman Myth* (Cambridge, 1995), A. Carandini, ed., *Roma: Romolo, Remo e la fondazione della città* (Milano, 2000), A. Carandini, *Palatino, Velia e Sacra Via: Paesaggi Urbani Attraverso il Tempo* (Rome, 2004), G. Forsythe, *A Critical History of Early Rome: from Prehistory to the First Punic War* (Berkeley, 2005), G. Dumèzil, *Archaic Roman Religion*, 2 Volumes (Chicago, 1970), Gjerstad, *Early Rome*, A. Alföldi, *Early Rome and the Latins* (Ann Arbor, 1965), A. Momigliano and A. Schiavone, eds., *Storia di Roma I: Roma in Italia* (Turin, 1988). G. Pasquali, “La Grande Roma dei Tarquini,” *La Nuova Antologia*, 16 (August, 1936): 405-16, K.A. Raafaub, ed., *Social Struggles in Archaic Rome: New Perspectives on the Conflict of the Orders* (Berkeley, 1986), David and Francesca Ridgway, Eds., *Italy Before the Romans: The Iron Age, Orientalizing and Etruscan Periods* (New York, 1979), R. Ross Holloway, *The Archaeology of Early Rome and Latium* (London, 1994), C.J. Smith, *Early Rome and Latium: Economy and Society, c. 1000-500 B.C.* (Oxford, 1995).



FIG. 10. Map of Italy

economic ties to its neighbors and military defenses that kept its boundaries secure.¹⁹ Yet, to the immediate north, the Etruscan alliance was expanding much faster than Rome, reaching beyond the Italic peninsula. More than a century of trade enterprises with powers from Carthage to Assyria had made the alliance a powerful player in Mediterranean economics (Fig. 10).²⁰ To the south, Magna Graecia was also growing rapidly, supplying much of the Mediterranean with grain and fostering inter-regional trade in its cities. The two powers were strengthening their grip on the Italian mainland, settling the area just beyond the north bank of the Tiber and establishing a foothold in Campania, south of Latium. With their expansion

¹⁹ On social stratification, see: R. Holloway, *Archaeology*: 114-120, Cornell, *The Beginnings*: 81. On early sixth century Roman trade, see Gjerstad, "Cultural History of Early Rome:" 34-35, M. Pallottino: 199-201, Colonna, in Ridgway and Ridgway, eds., *Italy Before the Romans*: 224-233, Cornell, *The Beginnings*: 81-97

²⁰ See Alessandro Naso, "La Penisola Italica e l'Anatolia, XII - V Secolo A.C." in *Der Kosmos der Artemis von Ephesos* (Wien, 2001): 169-183, "Etruscan and Italic artefacts from the Aegean," in *Ancient Italy in its Mediterranean Setting* (London, 2000): 193-207, "Materiali Etruschi e Italici nell'Oriente Mediterraneo," in *Magna Grecia e Oriente Mediterraneo Prima dell'età Ellenistica: atti del trentanovesimo* Convegno di studi sulla Magna Grecia: Taranto, 1-5 Ottobre (1999): 165-185, Michel Gras, *Trafics tyrrhéniens archaïques* (Rome, 1985): 583-701, Marina Martelli, "Serigni Etruschi Tardo-arcaici dall'Acropoli di Atene e dall'Illiria," *Prospettiva* 52-56 (1989): 21-22

encroaching on Roman territory, Priscus could either allow Etruria and Magna Graecia to absorb central Italy, or he could lead Rome to meet their advance. Tim Cornell argues that Priscus and subsequently Servius and Superbus seized upon the commercial prosperity of the seventh-century Mediterranean in order to solidify Rome's hold on central Italy.²¹

Livy and Dionysius evidence this drive to strengthen Rome's presence in central Italy. They relate that Priscus sacked and annexed seven of Rome's Latin neighbors, taking "cartloads of plunder." Gold jewelry and bronze statuary from cities Rome conquered demonstrate the very kind of plunder he may have seized.²² Priscus also gained control of territories as far as Caere and the south Etruscan countryside (Fig. 10).²³ After again subduing Veii, Servius enacted sweeping civic reforms, laying a strong political foundation for Rome.²⁴ For his part, Superbus secured a treaty with Etruscans, sought hegemony over Latium and opened a port near Circeii to complement an existing Roman port at Ostia (Fig. 10).²⁵ Amber and ivory statues near the Forum Boarium, as well as terracotta sculpture and bronze votives from the Vicus Tuscus and Lapis Niger, form only a sample of the archaeological evidence for economic growth at Rome under the late kings. A sharp increase in Corinthian and Attic ceramics and other foreign objects further demonstrates Rome's growing contact with nations beyond the Italic peninsula in the late regal period.²⁶

Polybius witnesses this increasing inter-cultural interaction in his discussion of a treaty Rome forged with Carthage, one of the great empires and seafaring powers of the seventh- and sixth-century Mediterranean.²⁷ The language and date of the treaty suggests that the two states entered

²¹ Cornell, *The Beginnings*: 121-127; see also Penelope J. E. Davies, "Exploring the International Arena: The Tarquins' Aspirations for the Temple of Jupiter Optimus Maximus" AIAC, Boston 2003.

²² Mauro Cristofani, et al., *La Grande Roma dei Tarquini* (Rome, 1990): 21, 53, 56-57, 62-63, 260-261

²³ Dion. III.48-66; Livy I.35-39

²⁴ Dion. IV.1.1-IV.40.1, Livy 1.40.1-1.48.1

²⁵ Dion. IV.44-58, Livy I.49-57

²⁶ J.C. Meyer, "Roman History in the Light of the Import of Attic Vases to Rome and South Etruria in the 6th and 5th Centuries B.C.," *Analecta Romana Instituti Danici*. 9 (1980): 47-68. Cf. Colonna in Ridgway and Ridgway, eds., *Italy Before the Romans*: 224-233.

²⁷ Poly. VI Frag. 11 a.; Cf. Cornell, *The Beginnings*: 210-214. Meyer states that one of the weak points in the supposed treaty with Carthage is that Ostia is not mentioned as a city. Yet, he demonstrates that this can be easily refuted as "possibly an early Ostia was not mentioned in the treaty, because a trading stronghold at the mouth of the Tiber was not considered a city, like others." Meyer, "Roman History," 65.

the agreement after Carthage recognized and became more heavily involved with Rome's overseas trade. Discovered in the 1960s with text in both Phoenician and Etruscan, the Pyrgian tablets further substantiate claims of extensive contact between central Italy and Carthage.²⁸ The treaty suggests that by the late-sixth century, powerful Mediterranean states began to recognize Rome's commercial achievements.

In light of this archaeological and literary evidence, it is clear that the last three kings of Rome achieved a level of economic and political prosperity that Romans had not previously experienced. Though not as powerful as Carthage, the Etruscan alliance or burgeoning Greek powers, Rome under the late kings demonstrated its military strength to opposing polities in central Italy and exhibited its financial prosperity to powers as far as North Africa.

Setting the stage: topographical and architectural manipulation under the late kings

While advancing the military and economic power of Rome, the late kings began to change the city's image. A full examination of how the late kings altered Rome's topography is beyond the scope of this article, but a brief consideration is essential to understanding the urban context of the Cloaca.

Before Priscus came to power, Rome had few large-scale buildings, and navigating the city was difficult at best. The early kings and inhabitants of Rome had defined a city on the east bank of the Tiber River; nestled among the hills, the settlement overlooked a valley that later became the Forum Romanum, Velabrum and Forum Boarium (fig. 1). The lowest point of this basin stood at just under six meters above sea level (m.a.s.l.).²⁹ With streams and runoff from the hills crossing it and the Tiber flooding yearly to almost nine m.a.s.l., the valley

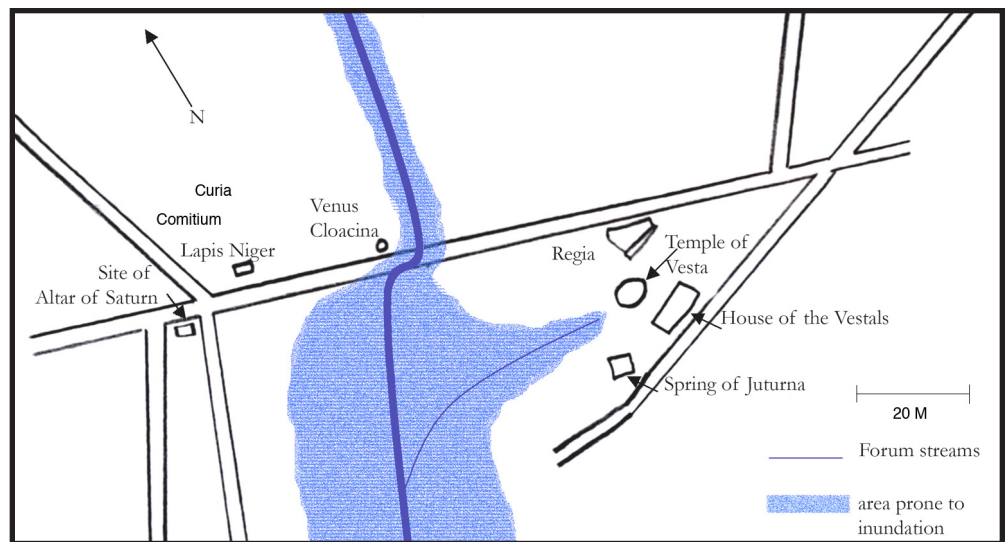


FIG. 11. Plan of the central valley of Rome before late kings' intervention. After C. Smith and A. Ammerman

was seasonally inundated, unsuitable for construction and often only traversable by boat.³⁰ Traffic, communal gathering and permanent architecture was therefore confined to the hills.

Modest wattle-and-daub huts lay on the Palatine, Capitoline and perhaps on other hills.³¹ A Temple of Jupiter Feretrius stood on the Capitoline, but no archaic remains survive to indicate its size.³² The most extensive construction lay at the feet of the Capitoline, Esquiline and Palatine hills, around the part of the central valley that would become the Forum Romanum (Fig. 11). At the north end of this valley, at the base of the Capitoline, stood an altar of indeterminate form to Saturn; just east of this altar, a modestly articulated comitium and curia rested between the slopes of the Capitoline and Quirinal, and a small temple to Venus may have existed at the base of the Esquiline.³³ To the East a house and shrine of the Vestal Virgins lay at the bottom of the Palatine alongside a spring dedicated to the goddess Juturna.³⁴ An early wattle-and-daub version of the Regia, perhaps the seat of the kings,

²⁸ Cornell, *The Beginnings*: 212

²⁹ A.J. Ammerman, "On the origins of the Forum Romanum," *AJA* 94 (1990): 634-5, A.J. Ammerman and D. Filippi. "Dal Tevere al Argelito," *BullCom* 105 (2004): 7-28.

³⁰ Ammerman, "On the origins," 634-8. Ammerman, A.J. and D. Filippi. "Dal Tevere al Argelito," *BullCom* 105 (2004): 7-28.

³¹ See Gjerstad, *Early Rome III*: 48. Forsythe, *A Critical History*: 82-5, Cf. Carandini, *Palatino and Palatium e Sacra Via I. BollArch.* 34. Rome, 1995.

³² Dion. II.34.4

³³ Smith, *Early Rome*: 150-184, Holloway, *The Archaeology*: 51-90, A.J. Ammerman, "The Comitium in Rome from the Beginning," *AJA* 100 (1996): 121-136

³⁴ Smith, *Early Rome*: 150-184, Holloway, *The Archaeology*: 51-90

stood along the Via Sacra, just north of the Temple of Vesta.³⁵ There is currently no archaeological evidence to suggest monumental scale or extensive sculptural programs for any of these structures.

In sum, before the late kings, Rome's urban topography was defined by hills, dotted with domestic architecture and a cluster of small public buildings overlooking a central, annually flooded basin.

Through monumental construction projects, Priscus, Servius and Superbus redefined Rome's geographic and architectural landscape (Fig. 12). In addition to adding raised seating to the Circus Maximus,³⁶ Priscus and Superbus built the Temple of Jupiter Optimus Maximus, whose 54 x 74 m cappellaccio podium would remain the largest of any known temple in Rome until the high Empire.³⁷ According to Livy and Dionysius, Priscus also situated "magnificent porticoes and shops about the Forum,"³⁸ and Frank Brown's excavations demonstrate that at the opposite end of the Forum, the kings reconstructed the Regia several times. They outfitted one of these reconstructions with a monumental foundation of cappellaccio blocks that are comparable in size and shape to those used in the Capitoline Temple.³⁹ Servius erected temples near the Forum Boarium and Tiber with extensive sculptural decoration as well as a Temple of Diana on the Aventine.⁴⁰ By the end of Superbus' reign, these monuments on the Aventine and in the Forum Boarium greeted visitors entering Rome from the Tiber.⁴¹ New infrastructure, including the Vicus Tuscus, led people from the river past the newly articulated Circus into the city center, and monumental temples and civic buildings surrounded the central valley.⁴² Janet Delaine argues that monumental structures have the power "to reshape the face of the earth, and thus to create a new landmark to rival those of

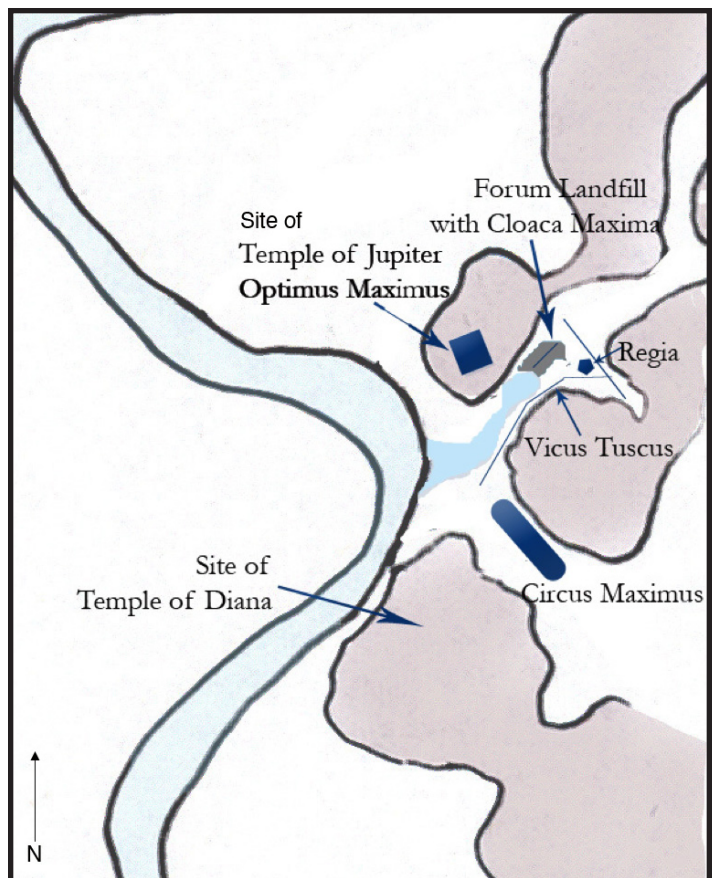


FIG. 12. Plan of Rome with late kings' construction marked

nature."⁴³ The late kings put a monumental stamp on Rome, rivaling the natural environment of the city with architecture of monumental proportions, enduring tectonics and extensive sculptural ornamentation.

A major part and perhaps the focus of this monumental intervention was Priscus' and Superbus' successful attempt to exploit the unused area of the central valley that later became the Forum Romanum. Ammerman proposes that in the late

³⁵Frank Brown, "New soundings in the Regia. The Evidence for the Early Republic," in *Les Origines de la République Romaine* (Vandoeuvres-Geneve, 1967) and "La Protostoria della Regia," *RendPontAc* 47 (1974-5): 15-36, Downey, *ibid.* Cf. Filippi, D. "La Domus Regia," in *Workshop di Archeologia Classica* 1 (2004): 101-121, "Dal Palatino al Foro Orientale: Le Mura e il Santuario di Vesta." in *Workshop di Archeologia Classica* 1 (2004): 89-100.

³⁶ Livy I.35.8-9; cf. Dion. III.68.1-4

³⁷ Dion. III.69.1-2, IV.44.1; Livy I. 38.7, I.55.1-9; cf. A. Mura Sommella, "Notizie Preliminare sulle Scoperte e sulle Indagini Archeologiche nel Versante Orientale del Capitolium," *BullComm* 102 (2001): 264, Alberto Danti, "L'indagine Archeologica nell'area del Tempio di Giove Capitolino," *BullComm* 102 (2001): 331-338; A. Mura Sommella, "Le Recenti Scoperte sul Campidoglio e la fondazione del tempio di Giove Capitolino" in *Antonio Maria Colini, Archeologo a Roma*, 70, 1997-98 (2000): 57-79, Davies, "Exploring the International Arena." Cf. J. Stamper, *The Architecture of Roman Temples: The Republic to the Middle Empire* (Cambridge, 2005): chs. 1-3.

³⁸ Dion. II.67.3

³⁹ Frank Brown, "New soundings" and "La Protostoria," 15-36, Downey, *ibid.*, Filippi. 103-121.

⁴⁰ For the temples in the Forum Boarium, see F. Coarelli, *Il Foro Boario*, (Rome, 1988): 301-28 and A. Mura Sommella, "L'area sacra di S. Omobono. La decorazione architettonica del tempio arcaico" *La parola del passato* 32 (1977): 62-128, 312; for Diana on the Aventine, see Livy, I.44.2-3, Dion. IV.25.4-5

⁴¹ On traffic entering Rome from the Tiber, see Gretchen Meyers, *Etrusco-Italic Monumental Architecture from the Iron Age to the Archaic Period: An Examination of Approach and Access*. Diss. The University of Texas at Austin, 2003.

⁴² on the Vicus Tuscus, see Smith, *Early Rome*: 171-172

⁴³ Janet Delaine, "The Temple of Hadrian at Cyzicus and Roman Attitudes to Exceptional Construction" *BSR* 70 (2002): 210.



FIG. 13. Plan of the central valley of Rome and landfill without canal system. After A. Carandini

seventh century, Priscus had builders dump as much as 20,000 m³ of soil, tuff fragments and debris in five successive layers into this basin; the process took place over a long span of time, with several attempts at gravel pavement and probably several attempts at drainage.⁴⁴ This undertaking had the dramatic effect of raising the level of the basin to nine m.a.s.l. and so, above the annual flood-level of the Tiber in flood. Stretching 120 m from the base of the Capitoline to the Palatine, the new stable area was by the late-sixth century an open flat space paved in grey gravel and was safe to walk and build upon. Yet, as Ammerman describes it, this massive project would *not* have provided the same visually impressive, monumental stamp on

⁴⁴ These layers correspond to Gjerstad's five lowest strata in the Forum, 23-28. See Ammerman, "On the Origins," 641-645. Cf. Ammerman, and Filippi: 7-28 and D. Filippi, "Il Velabro e le origini del foro," in *Workshop di Archeologia Classica 2* (2005): 93-109.

⁴⁵ V. J. Zipparro and H. Hasen, *Davis' Handbook of Applied Hydraulics*, 4th ed., (New York, 1993): 6.6.

parts of the landfill and erode its layers (Fig. 13).⁴⁵ Conversely, until the level of the basin was raised to nine m.a.s.l., a drainage canal would rest below the flood level of the Tiber. During seasonal inundation, it would be submerged in floodwater and unable to maintain the forum streams it was built to control. When floodwaters receded, these streams would create new paths and again erode the basin. Once the landfill was complete, however, a permanent canal would serve as a vital element of the project, guiding the stream water safely through the new open space.⁴⁶

Dionysius and Livy state that Priscus "began digging

⁴⁶ A makeshift canal, probably made of wood, would have served to guide the stream through the landfill until the final layer was laid, but would not have held up as a permanent device.

⁴⁷ Dion. III.67.5

⁴⁸ Livy I.38.6

the city's urban environment as the Capitoline temple or the kings' other projects must have done. Once complete, the landfill would blend in with the earth around it; evidence of the labor and material that went into the project would disappear, obscuring the audacity of the enterprise.

I believe the synergy of the Cloaca and landfill is essential to understanding the engineering feat and visual significance of a project that was intended to change Rome's urban space in a monumental fashion.

The Cloaca Maxima in the sixth century: design and implementation

Those who conceived the landfill needed to control the flow of the stream (or streams) that ran through the area; as each layer of the fill was deposited, a free-flowing—and at times swift-moving—stream would break through weaker

the Cloaca,⁴⁷ “in order to drain the city about the Forum.”⁴⁸ Both authors maintain that this plan was only completed in the late sixth century when Superbus “finished the drainage canals.”⁴⁹ In separate studies Heinrich Bauer, Sandro Picozzi and Claudio Moccheggiani Carpano concluded that the masonry technique of the Cloaca’s earliest walls dates to the late sixth century, corroborating the literary tradition (Fig. 14).⁵⁰ Moreover, they also agree that the earliest vaulting dates after the start of the second century B.C., substantiating a late-third-century account in Plautus’ *Curculio* calling it ‘*canalem*’ and suggesting that it was previously left open to the sky.⁵¹ Remains of the sixth-century canal stretch 101 meters through the center of the Forum, between the later Basilicae Aemilia and Julia (Fig. 5-D). It is over one-meter wide and its floor is 1.25 meters below the tops of its walls.⁵² The sides are walled in roughly 1.25-meter-square by .3-meter-deep blocks of cappellaccio tuff.⁵³ Probably quarried from the Palatine and Capitoline Hills, this cappellaccio is the same tuff used in the late-sixth-century foundations of the Capitoline Temple and Regia. It is also cut in blocks of roughly the same size and shape as those in the Regia and was mounted using the same construction technique.⁵⁴ This comparandum strengthens a late-sixth-century date for the Cloaca and further unifies the visual interplay of these monuments within the city.

Excavation and transportation of the tuff for the Cloaca must have been a huge task; placing these massive blocks and keeping them situated in the new landfill would have created further obstacles. Moccheggiani Carpano and Picozzi may have found how Romans made this possible. Just under the third-century vaulting, at the tops of the original walls, they found that “the [cappellaccio] blocks have several deep squared incisions like niches, which directly oppose one another.”⁵⁵ Moccheggiani Carpano argues that these niches held wooden



FIG. 14. Cloaca Maxima. Archaic track with later vaulting. Photograph by John N. N. Hopkins

braces that kept the stone facing of the canal from falling in. In some cases, the width of the incisions is sufficient to allow for wide planks of wood; Picozzi suggests that these planks functioned as braces and as bridges that Romans used to cross the canal.⁵⁶ The suggestion finds support in evidence from other extant Roman canalized water systems. Wooden planks still hold up the stone sides of a Roman canal in Swarenacker, Germany, and stone bridges cut into the walls of the Euripus in the Campus Martius may have served as braces.⁵⁷ A dual function for the beams in the Cloaca as supports and bridges would be essential for anyone wishing to cross from one side of the Forum to another.

The image of the archaic Cloaca becomes that of an open-air canal recessed into the ground with bridges crossing over (Fig. 3). It remains to be demonstrated that the tops of the Cloaca’s walls are indeed flush with the pavement of the archaic

⁴⁹ Dion. IV.44.1, cf. Livy I.56.3

⁵⁰ Sandro Picozzi, “L’Esplorazione della Cloaca Massima,” *Capitolium* 50 (1975): 4, H. Bauer, “Die Cloaca Maxima in Rom,” *Mitteilungen* 43 (1989): 49, 51, C. Moccheggiani Carpano, “Le Cloache,” 166-171.

⁵¹ Plautus, *Curc.*, 475-6: *in foro infimo boni homines atque dites ambulat / in medio propter canalem, ibi ostentatores meri* (in the lower forum, walk the good, wealthy men; in the middle, near the canal, there [one finds] the utterly boastful ones. Trans. J.N.N. Hopkins). See also P. Reimers, “Opus Omnium Dictu Maximum” *Opuscula Romana* 17 (1989): 137-141, for an etymology and definition of *canalis*.

⁵² For all dimensions listed above, see Bauer, “Die Cloaca Maxima,” 49, 51, Picozzi, “L’Esplorazione,” 4, 5, “Recent Excavations in Rome,” *Classical Review* 15 (1901): 136-137.

⁵³ Bauer, “Die Cloaca Mazima,” 49

⁵⁴ For the Regia, see Frank Brown, “New soundings.”

⁵⁵ Picozzi, “L’Esplorazione:” 5: “I blocchi presentano delle profonde incisioni squadrate simili a nicchie, perfettamente corrispondenti sui due lati del condotto,” my translation.

⁵⁶ Picozzi, “L’Esplorazione:” 5

⁵⁷ On Swarenacker, see T. Hodge, *Roman Aqueducts and Water Supply*, (London, 1992): 339. On the Euripus, see C. Brunn, *The Water Supply of Ancient Rome: A Study of Roman Imperial Administration*, (Helsinki, 1991): 121.



FIG. 15 Forum Transitorium. Modern Entrance to Cloaca Maxima. Photograph by John N. N. Hopkins

Forum and thus that the Cloaca and Forum landfill are truly synchronal projects. Imperial pavements above the archaic Cloaca prevent its excavation, and so its exact relation to the pavement of the Forum cannot be certain. Still, measurements of the Cloaca's altitude compared with the gradient of its pavement and drops in its floors suggest a close relationship in the elevations of the two finished projects.

In the 1990s a modern entrance to the Cloaca Maxima was installed on a platform in the Forum Transitorium, directly above a Flavian stretch of the Cloaca (Figs. 5-C and 15). The platform measures .74 m above the Domitianic pavement of the Forum Transitorium, itself 14.78-14.88 m.a.s.l.⁵⁸ Thus, the entrance to the Cloaca is roughly 15.6 m.a.s.l. The Flavian pavement of the Cloaca Maxima measures 5.06 meters below this entrance, or approximately 10.5 m.a.s.l. (Fig. 16). H. Bauer's analysis of the Cloaca from the Fora to the Tiber found an average gradient of .69%.⁵⁹ If one applies this average to the 160 meters of the Cloaca between the Flavian stretch under the modern entrance and the start of the archaic track of the Cloaca below the Forum Romanum, in front of the Basilica Aemilia, the resulting drop in altitude is 1.10 meters. The altitude of the Cloaca's archaic floor would therefore be roughly 9.4 m.a.s.l. Midway along the northwest side of the Basilica Aemilia, however, a Flavian section joins a Republican track, resulting



FIG. 16. Cloaca Maxima. View from Forum Transitorium entrance to floor of Canal. Photograph by John N. N. Hopkins

in a significant drop in the floor of the Cloaca (Figs. 5 and 9). At the juncture of these two phases, the floor splits between a Republican pavement on the left and a modern walkway on the right (Fig. 9). The modern walkway immediately rises to .34 meters above the Flavian pavement. Over less than 3 meters length, the Republican floor drops 1.31 meters and maintains this level. In front of the Basilica Aemilia this section ends in a Y-junction, joining the Augustan track to one's left, the track along the Via Sacra ahead and the archaic track to one's right (Fig. 6). At this point, the modern walkway ends and one stands on a precipice overlooking a slow-moving stream of water. The pavement under this stream corresponds to the floor of the archaic Cloaca; it rests 1.66 meters lower than the modern walkway, 1.32 meters lower than the Flavian pavement and .1 meters lower than the Republican floor. This additional drop brings the altitude of the floor of the archaic stretch of the Cloaca to roughly 8.1 m.a.s.l. Ammerman has demonstrated that the surface of the paved Forum had a variable elevation between nine and ten m.a.s.l., or one to two meters above the floor of the archaic Cloaca.⁶⁰ At 1.25 meters high, the tops of the Cloaca's walls are within the range of altitudes for the first archaic pavement, and so the top of the Cloaca would seem to align with the paved Forum (Fig. 3).

These measurements demonstrate a close connection

⁵⁸ Chiara Morselli and Edoardo Tortorici, *Curia, Forum Iulium and Forum Transitorium* (Roma 1989): 237-250, fig. 220 and Tav. I

⁵⁹ Bauer, 65, 67. Cf. Hodge: 216-219 for average gradients of aqueducts. This is not the place to discuss why the Cloaca's gradient is so high; one possibility is the need in later periods to flush more than water through the system, and thus a desire to create a swift current. Bauer's findings indicate that most tracks with higher gradients are late republican and imperial.

⁶⁰ Ammerman, "On the Origins" 641.

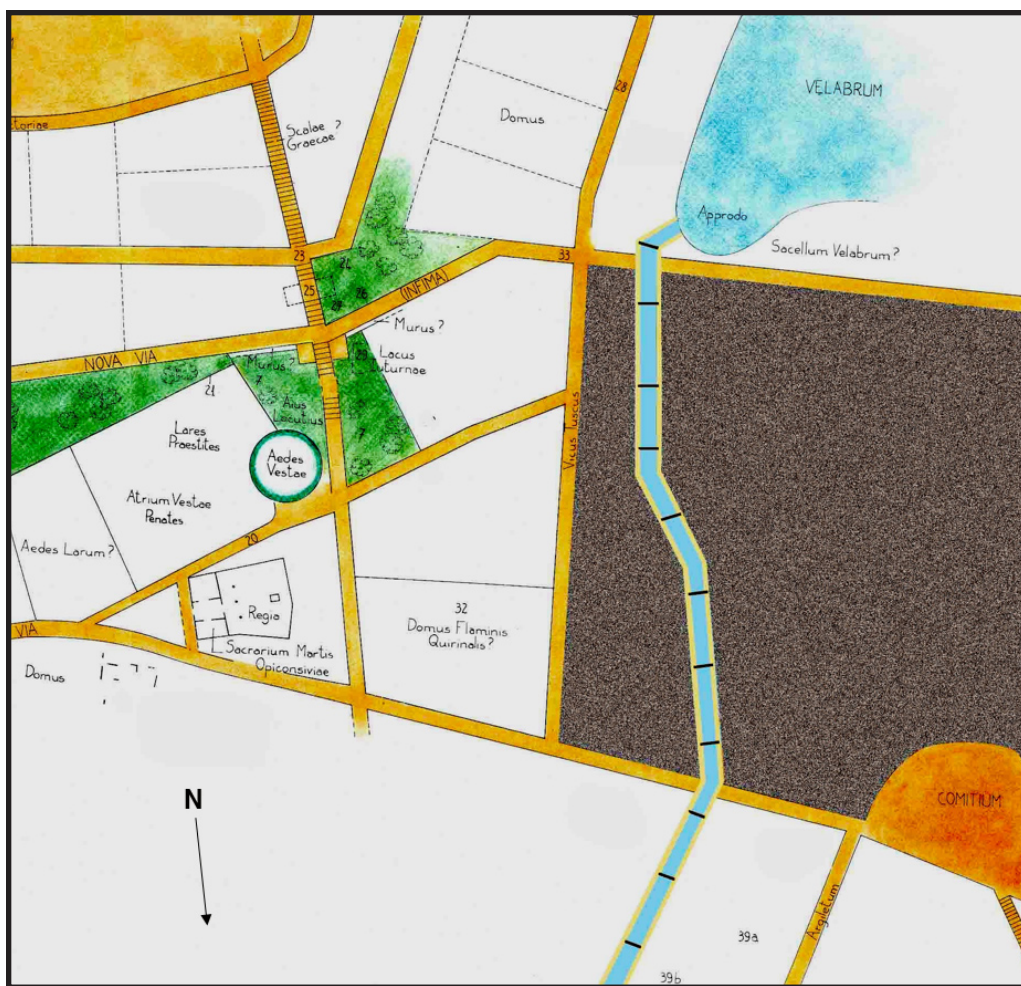


Fig. 17. Central valley of Rome with completed landfill and Cloaca Maxima. After A. Carandini

between the Cloaca and Forum landfill. Once the two projects were complete, the view of the area between the Palatine and Capitoline was changed irrevocably. Instead of a deep, marshy basin, there now stood two massive, one-hundred-meter-long stone walls channeling a stream through a flat, open, paved space (Fig. 17).

The Cloaca Maxima in the sixth century: the significance of a masonry canal

Building the Cloaca was no simple operation; Livy, Pliny and Cassius Hemina describe a scene of construction so grueling that laborers attempted escape and even committed

⁶¹ Pliny, NH 36.107; Cassius Hemina fr. 15P

⁶² J. Ortalli, "Bonifiche e regolamentazioni idriche nella pianura emiliana tra l'età del ferro e la tarda antichità," in *Interventi di Bonifica Agraria nell'Italia Romana*, (Roma, 1995): 61-69; cf. Ortalli, "Nuovi Dati sul Popolamento di età celtica nel territorio bolognese," in *Etudes Celtiques XXVII* (1990): 7-41, "Bologna, Via della Donzsa: Svincolo Arcoveggio Resti di Inseidamento Rurale," in *Pianura Bolognese* (1994): 291-296, V. Manzelli,

suicide. So many people began revolting that Superbus instituted crucifixion at the site to deter more people from mutinying.⁶¹ The strenuous nature of the project lay in positioning and stabilizing the massive tufo blocks. Had there been a precedent to which the kings and their workers could look, this may have proved less daunting a task, but in the Italic peninsula, there seems to have been no predecessor to a stone lined canal of this size. Other, less demanding hydraulic techniques were in use near Rome at the time; yet the kings chose a new, complex masonry technique for the Cloaca. It remains to determine why they chose such a radically different and perhaps unnecessarily difficult engineering for their canal.

In the seventh and sixth centuries BC, canals as large as 3.1 m wide and 2.5 m deep existed in Bologna, Casalecchio

di Reno, Magreta, rural Modena in Etruria, and Metaponto in Magna Graecia. These V- and U-shaped courses were dug into the ground and lined with clay and gravel.⁶² The lining served two functions. First, it held back the earth on either side of the canals, some of which were three times the size of the Cloaca. Second, clay acted as a barrier to keep water from seeping into the ground. Romans were in contact with people in these territories and could have modeled the Cloaca on these canals.⁶³ None required masonry, let alone massive heavy stone like that used in the Cloaca. Their construction, therefore, did not present the same engineering difficulties that the Cloaca's did and would have provided a much easier means of draining the newly leveled space in Rome.⁶⁴ One must question why

"Le regolarizzazioni Agrarie in Crimea e Nel Territorio di Metaponto," in *Interventi di bonifica agraria nell'Italia romana*. (Roma, 1995): 229-240.

⁶³ John Cherry & Colin Renfrew, eds., *Peer Polity Interaction and Socio-political Change* (New York, 1986): 2-6

⁶⁴ V. J. Zipparro *et al.*, *Davis' Handbook of Applied Hydraulics*, 4th ed. (New York, 1993): 6.6

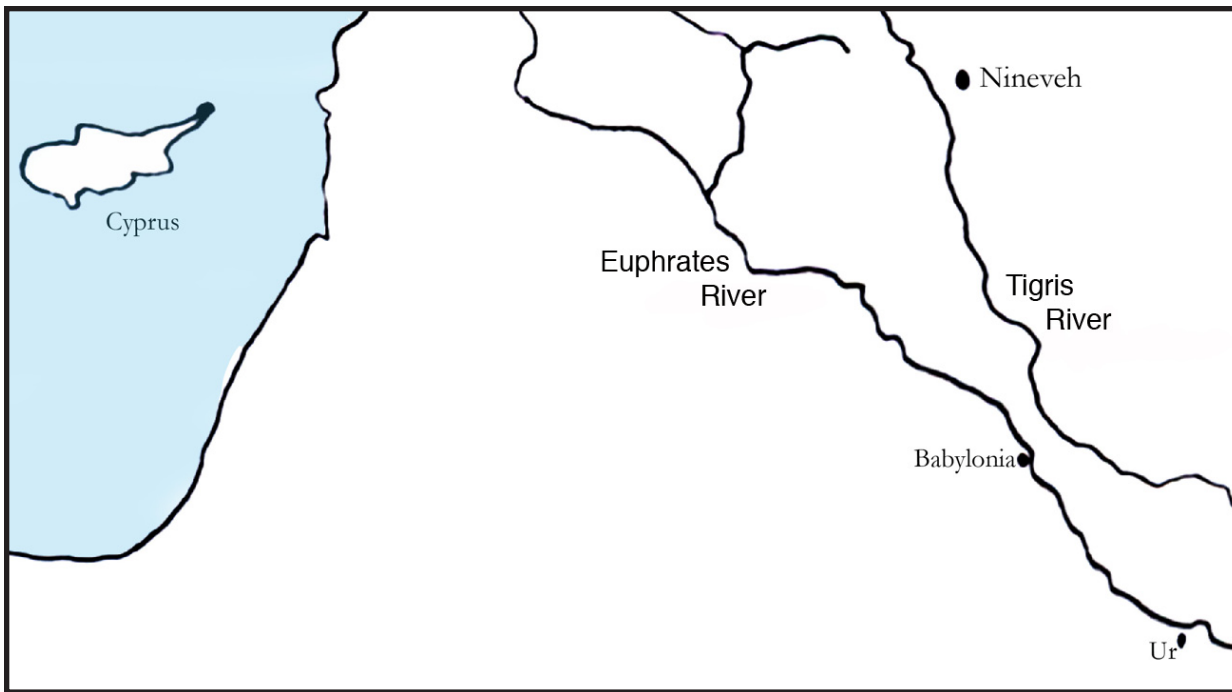


FIG. 18. Map of Near East. After G. Markoe

Romans used such challenging engineering in the Cloaca if it was unnecessary. Comparanda from contemporaneous civilizations further afield may offer some explanation. In 690, Sennacherib, king of Assyria, constructed a fifty-mile-long aqueduct to bring water from the Gomel River to his new palace in Nineveh (Fig. 18).⁶⁵ Like the Cloaca, the aqueduct was walled in monumental stone blocks. Sennacherib also constructed a six-mile-long, walled canal along the banks of the Euphrates and a snaking system of subterranean aqueducts and canals throughout his palace (Fig. 19).⁶⁶ Had he wished only to move water, he could have constructed simple drainage and irrigation systems. Assyrians had previously dug canals directly into the ground and covered them with blocks, leaving them unadorned; the only previous monumentalized hydraulic structures were cisterns.⁶⁷ Realizing the life-preserving significance of the water he brought to Nineveh, Sennacherib chose not to build the traditional modest device, but rather, to monumentalize the entire length of his canal.⁶⁸ What is more, to emphasize his

command over nature, he inserted stone markers throughout its masonry that declared, “I [Sennacherib] caused a canal to be dug to the meadows of Nineveh. Over deep-cut ravines I spanned a bridge of white stone blocks. Those waters I caused to pass over upon it.”⁶⁹ Consequently, Sennacherib’s system conducted essential water to his new city *and* proclaimed his capability to overcome the forces of nature.

At Rome, as at Nineveh, the demanding masonry technique was not only unnecessary, it challenged nearby traditions of hydraulic engineering. I suggest that the kings of Rome monumentalized their great canal for the same reason that Sennacherib monumentalized his: to serve as yet another means of asserting Rome’s power through monumental construction. Alongside the Capitoline temple and the Regia, it served as a testament to Romans’ ability to overpower nature. The Cloaca functioned not only to drain the newly leveled area between the Palatine and Capitoline, *but also* to demonstrate the power of those who built it. Without any monument to accompany it, the massive landfill project would have disappeared into the rest of the city. The Cloaca served as the only object that contemporary and future Romans could look to as a symbol of the labor and material that went into stabilizing the new Forum. It was the *architectural signifier* of

⁶⁵ R. J. Garde, “Irrigation in Ancient Mesopotamia,” *ICID Bull.*, July (1978): 14

⁶⁶ A. H. Layard, *Discoveries in the Ruins of Nineveh and Babylonia*. Vol. 1 (London 1853): 162-168.

⁶⁷ J.K. Finch, “Master Builders of Mesopotamia,” *CEng.* 27 (1957): 50-53 and R. J. Garde: 14

⁶⁸ Hopkins, John N. N. “Adaptation or Innovation?: The Distinct Hydraulic Architecture of Rome’s Cloaca Maxima” in *Proceedings of the 4th Annual IWHA Conference*

⁶⁹ Inscription from Cuneiform block of Sennacherib’s Aqueduct: R. J. Garde, “Irrigation,” 15

BIBLIOGRAPHY

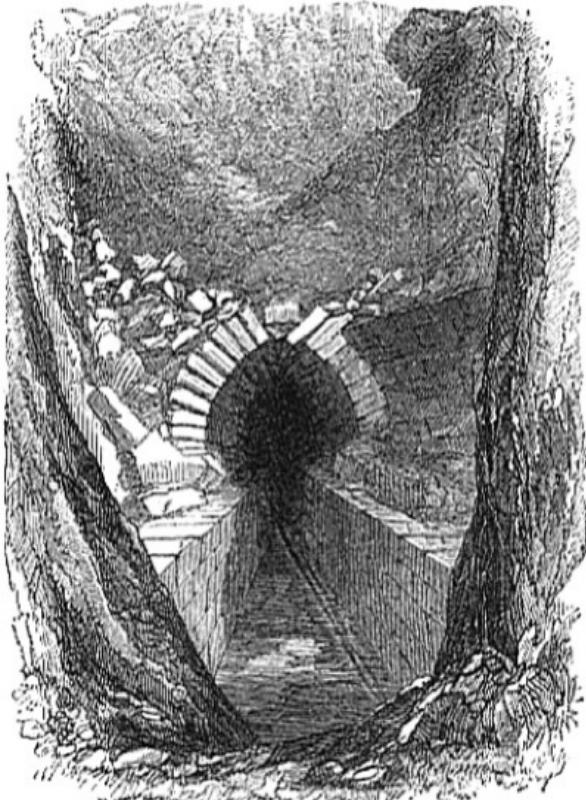


FIG. 19. Reconstruction of Canal under Sennacherib's Palace. A. H. Layard, *Discoveries in the Ruins of Nineveh and Babylonia*. Vol. 1 (London, 1853)

the landfill project, and as such, it not only provided Rome's city center with stability and accessibility, it also advertised the enormous manipulation of nature that the late kings effected.

When one considers Rome's regal period, it is imperative that one *not* consider the Cloaca's later use as a sewer, but rather its place within the history and topography of early Rome. The kings were solidifying Rome's economic and military hold on central Italy while constructing a new physical urban environment to match the state's growing power. In this context, the canal itself dramatically altered Rome's physical space and presented locals and foreigners with a monument to Rome's achievements. Stretching under the shadow of the massive Temple of Jupiter Optimus Maximus, the Cloaca Maxima served a vital role in providing Romans with a new city center all the while proclaiming the power of those who made it possible.

- Ammerman, A.J. "The Comitium in Rome from the Beginning." *AJA* 100 (1996): 121-136.
- . "Dawn of the Eternal City," *The Sciences* 29, 4 (1989): 28.
- . "Environmental Archaeology in the Velabrum, Rome. Interim Report." *JRA* 11 (1998): 213-223.
- . "Morfologia ed ambiente dell'area del Foro Romano," *Archeologia Laziale*, 10 Roma 1990. 13-16.
- . "On the origins of the Forum Romanum." *AJA* 94 (1990): 627-645.
- Ammerman, A.J. and D. Filippi. "Dal Tevere al Argiletto" *BullCom* 105 (2004): 7-28.
- Ampolo, C. "L'abitato del Palatino." In *Civiltà del Lazio Primitivo, Palazzo delle Esposizioni*. Roma 1976: 143-45.
- . "Le origini de Roma e la 'cite antique'," *MEFRA* 92 (1980): 567-76.
- . "Sulla formazione della città di Roma. Una risposta a Guidi," *Opus* 2 (1983): 425-30.
- . "La nascita della cita," In *Storia di Roma I. Roma in Italia*. Turin 1988. 153-80.
- . "Il paesaggio politico della città arcaica in Grecia ed in Italia. Per uno studio comparato del centro e delle tribù." *Opus* 6-8 (1987-89): 71-85.
- Bartoli, A. "I Pozzi dell'Area Sacra di Vesta," *MonAnt*, 45 (1959).
- Bauer, H. "Die Cloaca Maxima in Rom." In *Mitteilungen - Leichtweiss-Institut für Wasserbau der Technischen Universität Braunschweig*. Braunschweig 43 (1989): 45-67.
- . "Cloaca, Cloaca Maxima." In E. M. Steinby, *Lexicon Topographicum Urbis Romae*. Roma, 1993-.
- Bergamini, Margherita. *Gli Etruschi maestri di idraulica*. Perugia 1991.
- Blakeway, Alan. *JRS* 25 (1935): 130-137.
- Brown, Frank. "La Protostoria della Regia," *RendPontAc* 47 (1974-5): 15-36.
- . "New soundings in the Regia. The Evidence for the Early Republic." In *Les Origines de la République Romaine*. Vandoeuvres-Geneve 1967, pp. 47-64.
- Bruun, Christer. *The Water Supply of Ancient Rome: A Study of Roman Imperial Administration*. Helsinki 1991.
- Carafa, P. *Il Comizio di Roma dale Origini all'età regia*. *BullCom Serie Monografica* 5, Roma 1998.

- . *Officine Ceramiche di Età Regia. La Produzione di Ceramica in Impasto a Roma dalla fine dellVII all fine del VI sec. a.C.* Roma 1995.
- . “La ‘Grande Roma dei Tarquini’ e la Città Romuleo-Numana.” In *BullCom* 97 (1996): 7-34.
- . “La Cronologia dei contesti. L’età orientalizzante e arcaica,” in A. Carandini, *La Nascita di Roma. Dèi, Lari, Eroi e Uomini all’Alba di una Civiltà.* Torino 1997. 599-601.
- Carandini, A. “Pendici settentrionale del Palatino,” *BullCom* 91 (1986): 429-38.
- . “Palatino, pendici settentrionali. Compagne di scavo 1985-1988,” *Bolletino di Archeologia* 2 (1990): 159-65
- , et alii. “Roma, Pendici settentrionali del Palatino. Lo Scavo delle Mura.” *BollArch.* 16-18 (1992): 111-113.
- . “Le Mura del Palatino. Nuova Fonte sulla Roma di età Regia.” *BollArch* 16-18 (1992) 1-18.
- . *Palatium e Sacra Via I.* *BollArch.* 34. Rome 1995.
- . *Roma: Romolo, Remo e la Fondazione della Città.* Milan 2000
- . *Palatino, Velia e Sacra Via: Paesaggi Urbani Attraverso il Tempo.* Rome 2004.
- Cherry, John & Colin Renfrew, eds. *Peer Polity Interaction and Socio-political Change.* New York 1986.
- Coarelli, Filippo. *Il Foro Romano.* Roma 1983.
- . *Il Foro Boario.* Rome 1988.
- Colonna, G. in *La Naissance de Rome.* Paris 1977.
- Cornell, T.J. *The Beginnings of Rome.* New York 1995.
- . “The Formation of the Historical Tradition of Rome.” In I.S. Moxno et al. *Past Perspectives: Studies in Greek and Roman Historical Writing.* Cambridge 1986. 67-86.
- . “The Value of the Literary Tradition Concerning Early Rome.” In K. Rafflaub, ed. *Social Struggles in Archaic Rome.* Berkeley 1986. 52-76.
- . “City-States in Latium.” In Hansen, Mogens Herman, ed. *Comparative Study of Thirty City-State Cultures. An Investigation Conducted by the Copenhagen Polis Centre.* Copenhagen 2000. 209-228.
- Cristofani, Mauro. *La grande Roma dei Tarquini : Roma, Palazzo delle Esposizioni, 12 giugno-30 settembre 1990.* Rome 1990.
- Danti, Alberto. “L’indagine Archeologica nell’area del Tempio di Giove Capitolino.” *BullCom* 102 (2001): 331-338
- Davies, Penelope J. E. “Exploring the International Arena: The Tarquins’ Aspirations for the Temple of Jupiter Optimus Maximus” AIAC, Boston 2003.
- Delaine Janet, “The Temple of Hadrian at Cyzicus and Roman Attitudes to Exceptional Construction” *BSR* 70 (2002): 205-230
- De Martino, Francesco. *Diritto e società nell’antica Roma.* Rome 1979.
- Dionysius of Hallicarnassus. *The Roman Antiquities.* Vols. I-III, translated by Earnest Cary. Cambridge 1990.
- Downey, S. B. *Architectural Terracottas from the Regia.* Ann Arbor 1995.
- Filippi, D. “La Domus Regia” in *Workshop di Archeologia Classica,* vol. 1 (2004): 101-121,
- . “Dal Palatino al Foro Orientale: Le Mura e il Santuario di Vesta.” in *Workshop di Archeologia Classica,* vol. 1 (2004): 89-100.
- . “Il Velabro e le origini del foro” in *Workshop di Archeologia Classica,* vol. 2 (2005): 93-109.
- Finch, J.K. “Master Builders of Mesopotamia.” *Civil Engineering,* 27 (1957): 50-53.
- Forsythe, G. *A Critical History of Early Rome.* Berkeley 2005.
- Gabba, E. *Dionysius and the History of Archaic Rome.* Berkeley 1991.
- Garbrecht, Gunther. *Hydraulics and Hydraulic Research: a Historical Review.* Boston 1987.
- . “Hydraulic Engineering Prior to 600 B.C.” *Journal of the Hydraulics Division.* New York, American Society of Civil Engineers 94 (1968): 612-618.
- Garde, R. J. “Irrigation in Ancient Mesopotamia.” *ICIDBull,* July 1978.
- Gjerstad, Einar. *Early Rome.* IV Vols. Lund 1953-73.
- . “Cultural History of Early Rome, Summary of Archaeological Evidence.” *AA* 36 (1965): 1-41.
- Glinster, F. “Women and Power in Archaic Rome.” In T.J. Cornell and Kathryn Lomas, eds. *Gender and ethnicity in ancient Italy.* London 1997.
- Hodge, A. Trevor. *Roman Aqueducts and Water Supply.* London 1992.
- Holloway, R. Ross. *The Archaeology of Early Rome and Latium.* New York 1994.
- Hopkins, John N. N. “Adaptation or Innovation?: The Distinct Hydraulic Architecture of Rome’s Cloaca Maxima” in *Proceedings of the 4th Annual International Water History Conference.* Paris, 2005.
- Lanciani, R. *The Ruins and Excavations of Ancient Rome.* New York 1897.
- Layard, A.H. *Discoveries in the Ruins of Nineveh and Babylonia.* Vol. 1 London 1853.

- Livy. *Ab Urbe Condita*. Vols. I-II, translated by B. O. Foster. Cambridge 2002.
- Luckenbill, D.D. *Ancient Records of Assyria and Babylonia*. Vol. 2. New York 1968.
- . *The Annals of Sennacherib*. Chicago 1924.
- Manzelli, V. “Le regolarizzazioni Agrarie in Crimea e Nel Territorio di Metaponto.” In *Interventi di bonifica agraria nell’Italia romana*. Roma 1995. 229-240.
- Meyer, J.C. Pre-Republican Rome. An Analysis of the Cultural and Chronological Relations 1000-500 BC. *AnalRom* suppl. 11, 1983.
- . “Roman History in the Light of the Import of Attic Vases to Rome and South Etruria in the 6th and 5th Centuries BC.” *AnalRom* 9 (1980): 47-68.
- Moccheggiani Carpano, C. “Le cloache dell’antica Roma.” In *Roma Sotterranea*. Rome 1984. 164-178.
- & R. Sorbello. “Le inondazioni del Tevere nell’antichità.” In *Tevere: Un Antica Via per il Mediterraneo*. Rome 1986.
- Momigliano, A and A. Schiavone, Eds. *Storia di Roma I: Roma in Italia*. Turin 1988.
- Mura Sommella, A. “L’area sacra di S. Omobono. La decorazione architettonica del tempio arcaico” *La parola del passato* 32 (1977): 62-128, 312.
- . “*Inter Duos Lucos*: Problematiche relative alla Localizzazione dell’Asylum.” In *Etrusca et Italica, Scritti in Ricordo di Massimo Pallottino*, II, Pisa-Roma 1997.
- . “Notizie Preliminare sulle Scoperte e sulle Indagini Archeologiche nel Versante Orientale del Capitolium,” *BullComm* 102 (2001). 262-64
- . “Le Recenti Scoperte sul Campidoglio e la fondazione del tempio di Giove Capitolino” in Antonio Maria Colini, *Archeologo a Roma*, 70, 1997-98 (2000): 57-79.
- Narducci, Pietro. *Sulla fognatura della città di Roma; descrizione tecnica*. Roma 1889.
- Ogilvie, R.M. *A commentary on Livy, books 1-5*. Oxford 1965
- d’Ossat, G. De Angelis, “Storia geologica della regione dei Fori Romani sino all’insediamento dei primitive.” *StRom* 2 (1954): 625-48.
- . *Geologia del colle Palatino in Roma*. Rome 1956.
- Pallottino, Massimo. *Origini e storia primitive di Roma*. Milano 1993.
- Palmer, R.E.A. *The Archaic Community of the Romans*. Cambridge 1970.
- Pasquali, G. “La Grande Roma dei Tarquini.” *La Nuova Antologia*, 16 August 1936: 405-16.
- Picozzi, Sandro. “L’esplorazione della Cloaca Massima.” *Capitolium* 50 (1975): 2-9.
- Platner, Samuel Ball. *A Topographical Dictionary of Ancient Rome*. London 1929.
- Purcell, Nicholas. “Rome and the Management of Water: Environment, culture and power.” In Shipley, Graham and John Salmon, eds. *Human Landscapes in Classical Antiquity: Environment and Culture*. New York 1996.
- Ridgway, David and Francesca, eds. *Italy Before the Romans: The Iron Age, Orientalizing and Etruscan Periods*. New York 1979.
- Rossetto, P.C. “Circo Massimo.” In M. Agostinelli, et al., *Roma Archeologia nel Centro*. Rome 1985.
- Reimers, P. “Opus Omnium Dictu Maximum” *Opuscula Romana* 17 (1989): 137-141
- . “Roman Sewers and Sewage Networks—Neglected Areas of Study.” In *MunusRom*. Stockholm 1991, 111-116.
- Rossetto, P.C. and P Brandizzi Bittucci, “Circo Massimo,” *BullCom* 91 (1986): 542-48.
- . “Circo Massimo: primi risultati delle indagini geognostiche,” *QuadArchEtr* 11 (1985): 127-34.
- Ryberg, I. Scott. *An Archaeological Record of Rome from the Seventh to the Second Century B.C.* London 1940.
- Smith, C.J. *Early Rome and Latium: Economy and Society, c. 1000-500 BC*. Oxford 1995.
- Steinby, Eva Margareta. *LTUR*. 6 vols. Rome 1993.
- Thomsen, R. *King Servius Tullius*. Copenhagen 1980.
- Vendittelli, L. “Il Pozzo Arcaico di Vesta.” In *La grande Roma dei Tarquini : Roma, Palazzo delle Esposizioni, 12 giugno-30 settembre 1990*. Rome 1990.
- Wiseman, T.P. “The God of the Lupercal.” *JRS* 79 (1995): 1-22.
- . “The She-Wolf Mirror, an Interpretation.” *BSR* 61 (1993): 1-6.