There is strong evidence that a healthy population is crucial, if not required, for the kind of sustainable economic and population growth that Rome experienced throughout its history (World Health Organization 2002). From its formative years, Rome had to prevent its martial population from dying and declining in heaps. Although the population was subject to the caprices of climate, war, and foreign pathogens, the city planners of this era had tremendous foresight with one especially shrewd measure—the Cloaca Maxima, the original great drain of the city. They were aware of waterborne illness and malaria at the time, but in constructing the Cloaca Maxima, these planners guaranteed a healthier Rome and created conditions necessary to support the future growth of a large city.

A Dryer Forum
The Cloaca Maxima’s command over illness depended on its ability to drain water from the valleys. Before the Cloaca Maxima, the Roman Forum and the city itself appeared very different. Archaic homes clung to the sides of Roman hills, perched over the valleys that dotted the landscape (Coarelli 44). The Tiber River would flood at regular intervals every year so that lowlands such as that of the Roman Forum would transform into marshes, and “ditches were dank with waters that flooded back from the river” (Ovid, Fasti 6.451-2). Specifically, the Romans realized that the Forum acted like a bowl because the lowest parts of the basin were far below the annual flood level (Hopkins 6). And although a few tombs and temporary archaic structures stood in the Forum before the drain, stagnant water rendered these areas uninhabitable for long-term use (Grattan 62; Coarelli 44).

A drainage system, supposedly installed by the Tarquin kings, grappled with problems of flooding in the seventh and sixth century BC, and modern archaeology corroborates these approximate dates using masonry analysis (Livy, Ab Urbe Condita 1.54.2; Hopkins 9). First, they constructed a landfill that would raise the level of the Forum approximately three meters to the annual flood level (Hopkins 6). This would temporarily eliminate many of the problems associated with stagnant water. However, the annual flooding and receding of the river eroded the landfill and compromised its structural integrity. Furthermore, the runoff water from the floods would channel into other low-lying areas, effectively creating new marshes.

The construction of the Cloaca Maxima addressed these problems (Coarelli 44). It was an uncovered canal that followed the natural watercourse of the floodwaters through the landfill, ultimately draining into the Tiber. The subsequent repaving of the Forum completed the transformation of the area (Plutarch and Ashby 126; Grattan 62).

The kings built the Cloaca Maxima to reclaim the Forum area, but equally important, albeit unintended, outcomes followed, and among these the reduction of malaria and other mosquito-borne illnesses proved paramount to public health in its earliest years. Among the diseases of ancient Rome, malaria was the greatest determinant of demographic patterns and mortality (Salassius 2). The malarial patient requires only a mosquito and a human host to complete its life cycle, and therefore the success and transmission of the parasite falls almost exclusively on the well-being of the mosquitoes, which thrive in environments with standing water, high temperatures, and low elevations (Centers for Disease Control 2009). These were precisely the conditions that characterized the valleys of Rome before the construction of the Cloaca Maxima (Grattan 62). Thus, the leveling, draining, and paving of the Forum in the sixth century BC removed Natural marshes from standing water from the city center and deprived the mosquito of a breeding ground. Consequently, they were unable to reproduce and spread the disease as effectively (Centers for Disease Control 2009).

Yet even after the construction of the Cloaca Maxima, malaria continued to torment the region incessantly. The Romans did not link mosquitoes to malaria, but they certainly recognized something plague-like about marshy regions of the country (Cassius). In ancient literature, there exists a stark dichotomy between the safer hills and unsafe valleys, a threat they attributed to the air. In fact, malaria literally means “bad air” in Italian. Cassius, writing in the late Republic, believed that “the site which [Romulus] chose is healthful, though in the midst of a pestilential region; for there are hills, which not only enjoy the breeze but at the same time give shade to the valley below” (Cassius, Ab Urbe Condita 2.5.11). Similarly, in Livy’s historians, Cambius associates the health of Rome with its hills: “Not without cause did gods and men select this place for establishing our city—with its healthful hill” (Livy, Ab Urbe Condita 5.53.4). The Romans did not link mosquitoes to malaria, but they certainly recognized something plague-like about marshy regions of the country.

The Romans did not link mosquitoes to malaria, but they certainly recognized something plague-like about marshy regions of the country.
The streets of Rome were constantly wet from the overflow of fountains, aqueducts and other public water basins, and pools of standing water could have formed anywhere.

Even if the Romans constructed their public works perfectly, they would still have extensive areas of flooding due to the annual floods of the Tiber

The Pontine region, presumably related to mosquitoes. The literary sources reflect the anxiety Romans felt about the disease: Rich Roman senators would build summer villas in the mountains—this helped them flee the standing water, climate and elevation that mosquitoes required (Sallust 2013). Play the Younger persuades a friend that his summer villa is safe by invoking the physical geography of its surroundings, which is similar to that which mosquitoes despise. Undoubtedly, the region along the coast of Tuscany is trying and dangerous to the health, but my property lies well back from the sea... in the highest of mountain ranges (Epist. VII.2). On the other hand, the poor plebeians would be relegated to the densely populated valleys during the hot summers. Later generations of wealthy Romans also expressed this idea of ‘quitting the city’ and returning to the countryside in the hills (O’Sullivan et al. 758). The numerous owns extensive villas of popes and cardinals, such as the Villa d’Este and the Palazzo Farnese, demonstrate how routine this practice must have been for the elite.

If Rome continued to suffer severe problems with malaria throughout its history, did the Cloaca Maxima actually control disease? Consider another failed city that had no such water drainage infrastructure, Ostia Antica. From the fourth century BC to the first century AD, it is thought as one of Rome’s primary ports. Before long, the port severely silted over, the city plunmented into a precipitous collapse, and most people abandoned Ostia (Stambaugh 268). Malaria may have played a large part in this collapse. While the port was still functional, the salinity of the estuary crowded the mosquito population. As the city gradually moved away from the coast, many lakes replaced the hardwoods and brickwork water replaced seawater (O’Sullivan et al. 758). Mosquitoes wreaked havoc on the region, newly tunic from its hot, humid and desiccated climate. It degenerated so badly that by the eleventh century, the bishop of Ostia requested to leave his appointment due to the inherent danger in living there (Sallust 87). The Cloaca Maxima did not eradicate malaria completely. Along with the other cloacae of the city, it simply moderated disease by removing some of the primary breeding grounds for mosquitoes.

The literary sources reflect the anxiety Romans felt about mosquitoes. The Cloaca Maxima did not eradicate malaria completely. Along with the other cloacae of the city, it simply moderated disease by removing some of the primary breeding grounds for mosquitoes.
The Cloaca Maxima fought communicable diseases by separating stagnant, potable water sources, such as lakes, from fecal matter.

In subsequent centuries following its construction, the Cloaca Maxima took on more functions that affirmed its role as the protector of the city, particularly when engineers integrated a sewer into the drain during the fifth century BC. Although Rome's state-of-the-art water supply and aqueduct system provided a constant flow of fresh water to its citizens and curved exposure to water-borne illnesses, the Cloaca supplemented these aqueducts in disease-control (Statham 139). There are countless diseases that arise whenever fecal matter mixes with the water supply—for example, dysentery, choler and typhoid—and such water-borne illnesses occur in epidemics throughout history (“Water and Sanitation Related Disease Fact Sheet”). As late as 1854, an unclean water supply plagued London with cholera’s epidemic (Cameron 1853). The Cloaca Maxima fought communicable disease by separating stagnant, potable water sources, such as lakes, from fecal matter. As a result, almost no water-borne illnesses and water-related epidemics are discussed in ancient sources, though the second century author Celsus briefly discussed ideas of the intestines with enteric sugars, a symptom of dysentery (Amulree 248). Some scholars believe that other water-related diseases existed in antiquity but that the aqueducts, drainage, and Roman bathing culture relegated them as inconsequential (Amulree 248). Among these, the drainage system would have combated other vector-borne illnesses, besides malaria, that require an intermediate host. The Cloaca supplemented these aqueducts in disease-control (Statham 139). There are countless diseases that arise whenever fecal matter mixes with the water supply—for example, dysentery, choler and typhoid—and such water-borne illnesses occur in epidemics throughout history (“Water and Sanitation Related Disease Fact Sheet”). As late as 1854, an unclean water supply plagued London with cholera’s epidemic (Cameron 1853). The Cloaca Maxima fought communicable disease by separating stagnant, potable water sources, such as lakes, from fecal matter. As a result, almost no water-borne illnesses and water-related epidemics are discussed in ancient sources, though the second century author Celsus briefly discussed ideas of the intestines with enteric sugars, a symptom of dysentery (Amulree 248). Some scholars believe that other water-related diseases existed in antiquity but that the aqueducts, drainage, and Roman bathing culture relegated them as inconsequential (Amulree 248). Among these, the drainage system would have combated other vector-borne illnesses, besides malaria, that require an intermediate host. For transmission. Even though no literary evidence exists for their presence in antiquity, if the modern incidence rate of European diseases such as the West Nile Virus, the dengue fever and the Chikungunya virus are any indication, additional mosquito-related ailments existed (Takken and Koks 2008).

Thus, it was a public health boon in two capacities by both dewatering sewage and stagnant water from the city. Even in its original form when Rome consisted of a manger collection of houses, the Cloaca Maxima was constructed on a scale so large that it served as one of the city’s principle drain wells into Rome’s peak (Furhman 304). At one point, it is estimated that the sewer carried 100,000 pounds of human excrement per day (Cameron 25). Today, the Cloaca connects to the main sewer of Rome, and its continued use led Pliny the Elder to call it “indestructible” and another modern scholar, Lewis Mumford, to call it “the perfect public works project” (Furhman 304).

The Cloaca Maxima, the Great Drain of Rome, successfully fought disease for its entire existence, and though the Roman Empire eventually collapsed, the sewer did not. While it suppressed a wide variety of disease through the sanitation and desiccation of the valleys, its suppression of malaria, the most potent disease of antiquity, had the greatest socio-economic impact and may have even prevented the premature collapse of the City. After all, Ostia Antica and the Pontine Marshes did not survive malaria’s assault. It’s no wonder that the Romans built a temple to Venus Cloacina directly adjacent to the sewer (Claridge 68. Furhman 304). Venus, the goddess of beauty, also endorses health and fertility. Indeed, the city took on a grander and safer disposition after its construction that would foreshadow Rome’s future growth from a deadly marsh into a sprawling metropolis.