

The Environmental Fall of the Roman Empire

Abstract: Global environmental history is currently being enriched by troves of new data, and new models of environmental variability and human impact. Earth scientists are rapidly expanding historians' knowledge of the paleoclimate through the recovery and analysis of climate proxies such as ice cores, tree rings, stalagmites, and marine and lake sediments. Further, archaeologists and anthropologists are using novel

uct of its own age. Indeed, every generation looks upon the past through the eyes of the present. It is no surprise or disservice for us to return anew to the Roman past, awakened to the fact that the *environment* can be a protagonist in human history, armed with radically new tools for re-

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At this moment, as new models of environmental change and human impact gather momentum, the watchword is *resilience*: the capacity of human societies to respond to the shocks of nature, to draw on batteries of stored energy to fund the recovery from the lashes of climate change and disease.¹⁰ Resilience is not infinite, however, and to look for it in ancient societies is also to be alert for the signs of persistent stress, and the realization that just beyond the threshold of endurance lies cascading change and systemic reorganization. Resilience asks us to consider the ecological specificity of a social system, in which lie its reserves of strength, as well as its tensions and vulnerabilities. The notion of resilience lets us look anew at Rome in the middle decades of the third century and allows us to see, perhaps, not a society waiting for its “principle of decay,” as Gibbon phrased it, to unfold in course, but one whose depleted stores left it exposed to the unforeseeable strokes of environmental misfortune.

If you could go back in time from the secular games of ad 248 to the very foundation of the city of Rome—nearly ten “ages of man”—you would have found an in-

sea, combined with the crenellated texture of its inland terrains, pack extreme diversity into miniature scale. The region is a patchwork of microclimates.¹² And because of its position at the juncture of the subtropics and mid-latitudes, the Mediterranean zone is crossed by an array of distinct climate processes. The western territories are subject to the influence of Atlantic patterns, in particular North Atlantic pressure gradients, which decide whether the storms carrying all-important rains will pass into the Mediterranean or spin north over the European continent. The controls on the Eastern Mediterranean are even more complicated, still including the sweep of westerlies from the Atlantic, but also hypersensitive to other mechanisms that influence the levels of winter precipitation. And Egypt, the breadbasket of the empire, plugged the Romans into wholly other climate regimes; the life-bringing Nile floods originated in Ethiopian highlands, watered by the Indian Ocean monsoons.

Control of grain production along the Nile's verdant flanks gave the Romans a natural insurance policy to buffer against the vagaries of the Mediterranean climate. And this was only one of many. The Romans had the advantage of building an empire atop countless indigenous risk-management strategies, a stock of peasant knowledge accreted over millennia. Over that ground cover of local wisdom, the engineers of the Roman empire built a machinery of food provision and water management that was political in nature, and monumental in scale. Despite the renown of the aqueduct and the grain dole, what is truly striking is the extent of the imperial food system left to the market. Public granaries provided a margin of protection, and in times of acute crisis, the government inserted itself. But the best insurance policy was the network of roads and sea lanes, along which private merchants moved bulk

goods with ease. The high Roman Empire is notable for the distinct absence of severe food crisis.¹³ Dearth is always relative, but Malthus's "gigantic inevitable famine" seems not to have stalked the Romans, so much as periodic bouts of high prices.

The Roman economy defied the dour logic of Malthusian pessimism, according to which the teeming populations of the empire should have crunched the food supply. The high empire stands as one of the most significant phases of economic "efflorescence" in the centuries before industrialization. In this period, the gains from trade and the diffusion of technological improvements allowed a large-scale society to forestall the real and overarching limits of the land's productivity. The Roman economy achieved growth, even on a per-person basis, straight into the teeth of population expanse. The best evidence comes from the dry sands of middle Egypt: recovered papyri enable fragmentary reconstructions suggesting that, here in a province subjected to heavy fiscal extraction, the wages of the most ordinary laborers (diggers, donkey drivers, dung haulers) increased across the first two centuries of Romanization.¹⁴

Trade and technology let the Romans outrun the Malthusian reaper for no short season. But the success of the imperial economy seems to have had another accomplice: the climate. The "Roman climate optimum" emerges from a range of proxies as a distinct phase of late Holocene climate. In the Mediterranean, it was a period of unusually hospitable alignment: warm, wet, and stable. Levels of total solar irradiance were consistently elevated, and there was a striking absence of signatures of major volcanic eruption. Of the largest twenty-five eruptions in the last two and

stand in affirmation. Heat was matched with moisture in the West; Spain and Italy appear to have been well-watered. The effects in the East were uneven, although the Levant enjoyed a persistent cycle of humidity, for which the most concrete testimony is the evidence of shoreline settlements high above the Dead Sea. And the sacred floods of the Nile River revealed a period of astonishing dependability.¹⁶

Climate, then, stood in alliance with commerce and technical progress, as the Roman efflorescence defied or deferred the paradoxical laws of premodern development. People crowded the basin. If there is a sign, though, that quietly points us toward a qualification of this optimistic picture, it is the Romans' short stature. Biological well-being remained as—or more—elusive than ever for the inhabitants of the imperial Mediterranean; life expectancy was low, even by ancient standards. The inadvertent consequence of more people was a more insalubrious environment.¹⁷ In Rome, the dog days of summer brought on an awful tide of gastroenteric illnesses, with an autumn surge of malaria following on its heels. Malthus, we might say, was right for the wrong reasons. The poor health of the Romans was unmediated by food shortage or low wages. In a scenario not unlike the “antebellum paradox,” when American stature suffered a setback in the mid-nineteenth century *despite* the arc of development, urban density and imperial connectivity in the Roman Empire were as conducive for microbial ecology as human prosperity. Thanks to their imperial ecology, the Romans were rich, but sick.

Wealth offered no escape from the brutal facts of life and death. The wife of the emperor Marcus Aurelius bore him at least fourteen children—six girls and eight boys—yet only one of the girls and one of the boys verifiably outlived both of their par-

ents. In the letters of Marcus, we catch glimpses of the fevers and diarrheas that laid low so many little scions of the imperial line. Yet the reign of Marcus was the apex of what Gibbon, with justification, called “the period in the history of the world, during which the condition of the human race was most happy and prosperous.”¹⁸ Today we might look back on the happiest age and see not a lurking principle of decay waiting to unwind, but a society in which cumulative ecological pressure was entailed by the very terms of development. Such a perspective prepares us for what happened next: in the middle of the ad 160s, a pestilence arose in the immediate wake of an eastern military campaign. The Romans believed the soldiers who impiously sacked the city of Seleucia on the Tigris had unlocked a deadly vapor. In reality, the unfamiliar pathogen was probably introduced into the virgin populations of the Mediterranean via Rome's bustling Red Sea trade. It was smallpox.¹⁹

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himself succumbed, probably, to the disease.

In a cruel coincidence, the pacific regime of the Roman climate optimum ended almost simultaneously with the advent of the great mortality. A massive volcanic eruption in ad 169 spelled the inevitable end of an unusually stable chapter of climate history. The climate of the next centuries would be disorganized and indecisive, before a sharp and unmistakable descent into what is starting to be known as the “late antique little ice age.” While the Roman Empire was never quite the same after the appearance of the smallpox pandemic, the reality is that the empire did persist, and in recognizable form. A new dynasty of Libyan and Syrian heritage held sway for nearly half a century. If they failed ever to please the Roman Senate entirely, there is no disguising the basic success of their restorative enterprise. Roman citizenship was made universal, and

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where. It is far better supported than the Antonine Plague, despite appearing at the worst-documented moment in imperial history. Pagans and Christians, from both East and West, independently and unanimously insisted on the plague's devastation. While the crisis summoned forth the full range of our witnesses' rhetorical virtuosity, it also inspired some crucially detailed reportage, from Cyprian's excit

The endnotes

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¹ Edward Gibbon, *The History of the Decline and Fall of the Roman Empire*, vol. 1 (London: Penguin Classics, 1976), 177.

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- ²⁰ [Author], *Plagues and Peoples*, 1. (New York, NY: [Publisher], 1976).
- ²¹ *Ubique domus, ubique populus, ubique respublica, ubique vita.*, [Author] *De Anima* 30.3.
- ²² [Author], 42.3048, [Author] [Title], ([Publisher], 1974). [URL]
- ²³ [Author], *Économie antique: prix et formation des prix dans les économies antiques*, 2, [Publisher], 1997), 194.
- ²⁴ [Author] *Historia Ecclesiastica* 7.21.
- ²⁵ [Author], [Title], [Journal of Roman Archaeology] 28 (2015): 223–260.
- ²⁶ [Author], 236.
- ²⁷ [Author], [Title], *The Journal of Roman Studies* 62 (1972): 134–152.
- ²⁸ [Author], *The New Empire of Diocletian and Constantine* ([Publisher], 1982).