

Resource Depletion, Despotism and the End of Empires, Part II

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In the first part of this series, I examined the idea of complex societies' dependence on external inputs of energy in order to maintain themselves. In this second part, I shall examine how the Roman Empire responded to the various crises which afflicted it from the late second century onward. In addition, I shall draw attention to some of the parallels between our ancestors' reactions to crisis and our own today. More specifically, I shall highlight the diminishing returns of increased complexity leading to eventual breakdown.

It should be noted first that the decline and fall of the Roman empire was not a simple case of rise to prominence and subsequent collapse. Rather, the path which Rome followed from its apogee in the second century can best be described as a four-stage process: 1) initial response to crisis (ca.160-235); 2) deepening crisis (ca.235-285); 3) further response to crisis (Diocletian and Constantine's reforms: ca. 285-360); and 4) final disintegration. Part II of this series will focus on the first stage: Rome's initial response to crisis while the good times were still rolling.

In the first two-thirds of the second century C.E., the Roman Empire achieved both its greatest territorial extent and its longest period of relative peace and prosperity. Speaking in the broadest of terms, these circumstances were made possible by a confluence of three main factors:

1. Rome's leadership, while always protecting the vested interests of the elite, were genuinely dedicated public servants and, in most instances, remarkably competent. This was in no small part due to the selective adoption of successors for their character and competence rather than blind loyalty or blood relations (even though the latter did sometimes play a part).
2. There were relatively few crises during this time, and those which did occur (e.g., the Jewish Revolts of 132-5) remained localized. As a result, it was possible to rulers to draw in resources from elsewhere in order to address and resolve threats to stability.
3. The many conquests of Trajan helped ensure that extra resources would be available, at least for a while. This effect would have been felt both in the initial bonanza of booty and in subsequent generations of home-grown slaves resulting from war captives.

The combination of these factors created a positive feedback loop of peace and prosperity where 1) allowed for the impact of 2) to remain relatively small and localized, while 3) allowed for 1) to happen. In the absence of external pressures, this system might have maintained itself indefinitely.

The real world, however, has a way of pushing and pulling at stable situations. Thus, in the aftermath of the turmoil which befell the Roman Empire during the reign of Marcus

Aurelius (plagues, war against the Germans and the Parthians), all three factors which had contributed to the stability of the previous era came undone in the course of less than two generations. During this time, several unsettling trends became manifest. First, the method of imperial succession which had placed competent men at the top for close to a century broke down through an accident of fate when Marcus Aurelius became the first emperor to have a biological son, Commodus, ascend to the throne since Vespasian's son Titus. Subsequent rulers, with the possible and temporary exception of Septimius Severus, could no longer rely on the positive feedback loop described above to keep things running smoothly. Second, the military's relationship with the state was turned upside down: rather than military forces being tools of the state, the state became a tool for those in a position to wield military power. This was especially transparent in the auction of the imperial throne to Didius Julianus in 193 as well as in the increasingly generous terms granted in soldiers' employment contracts. Third, increasing amounts of power were accumulated in the emperor's hands, especially with regard to the emperor being the final appeals judge for the entire empire. In order to cope with these accreted duties, an increasingly large and complex bureaucracy was progressively created under the supervision of distinguished Roman lawyers. Fourth, an increase in external and internal unrest also led to the fiscal necessity of collecting more taxes. As a result, Roman citizenship was granted to all free persons living in the empire in 212, which made all of them eligible for taxation.

These four factors combined to create a self-reinforcing negative feedback loop where each of the factors reinforced the others. Add to this the external invasions from the North and the East and the result is a full-blown, half-century-long emergency (ca. 235-285) which caused populations to flee from urban centers, while those who remained did so apprehensively, behind fortified walls. Additional investments in complexity (i.e., in bureaucracy and the military) yielded diminishing returns: Septimius Severus successfully bought the loyalty of his soldiers, but this was done only by sapping the fiscal foundations of the state. Subsequent leaders then had to compensate by imposing broader taxation, which had to be administered by an increasingly large bureaucracy which also needed to be paid, *et cetera*. Despite these measures, the state was still not in a position to cover its expenses; emperors resorted to devaluing the empire's currency in order to cover the shortfall, resulting in widespread financial crisis and, for the first time in several centuries, a retreat of coinage in favour of barter as a means of exchange.

In sum, once the empire stopped expanding (i.e., its main source of additional resources, both material and human, dried up), the appearance of external pressures (plague & war during the reign of Marcus Aurelius) caused a domino effect of self-reinforcing trends that only helped to sink the ship of state further.

The lessons to draw from this are manifold. Most broadly and obviously, when the conditions necessary for the maintenance of a stable situation change, it can take less than two generations for a seemingly invincible, self-confident, prosperous and peaceful (if you were lucky enough to be an upper-class Roman) civilization to be thrown into a practically worst-case scenario of disorder, chaos and financial ruin. Increasing investments in complexity yield diminishing returns: our society, whose main source of

energy is non-renewable fossil fuels (as discussed in Part I of this series), must be wary of relying on increasing investments in complexity (e.g., more technology, more gadgets, more specialization etc.) to prepare for the day when we can no longer get our hands on an ever-increasing supply of said fuels. The problem with complexity, whether it is described in terms of the variety of material goods and tools available or in terms of the specialization of labour away from primary agricultural production, is that it is predicated upon a supply of energy, rather than the other way around. In other words, you need energy to make technology and specialization possible. More technology does not make more energy: it only consumes more, hence the diminishing returns.

A military response to an impending energy shortage can only serve to further deplete not only energy supplies, but also other resources (both human and material) which are just as crucial to the maintenance of a civilized society. To respond to a fiscal crisis (i.e., excessive debt) by devaluing currency while attempting to stave off other crises yielded financial ruin for the Romans. The United States is currently borrowing over 2 billion dollars every day; the U.S. dollar has lost a quarter of its value against most major currencies in the past year...

It is increasingly apparent, especially since the devastation caused by hurricanes this season, that it may not be possible to carry on increasing the world's supply of fossil fuels. At the beginning of the era of petroleum, one needed to invest one unit of energy to extract 50 units of fossil fuel energy. This ratio is now down to (at best) 1:10 in the Middle East and is as little as 1:1.6 for Alberta's tar sands. At some point, there may be lots of oil, gas & coal in the ground, but it will require more energy to extract than those fuels would provide. This will spell the end of the petroleum age.

Humans have extracted all of the easily obtainable oil, just as the Romans conquered the richest and most profitable lands bordering on their domain before aiming at the less prosperous ones until the diminishing returns of conquest and maintenance of established order made it too costly to expand further. The Romans' territory more or less consistently expanded for at least seven centuries; the first commercial oil well was drilled in 1859 and supplies have consistently grown (along with demand) since then. It is increasingly apparent from the rapidly declining rate of discovery of oil fields that this expansion is unlikely to continue beyond the next few years. If this is indeed the case – doubters have had an increasingly hard case to argue in recent months – then we would be wise to study the nitty-gritty of how the Romans coped with their version of resource shortage which led to the crises of the third century. I shall delve deeper into these questions in the next issue of Labyrinth. Stay tuned...

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