

Foreword

Plagues: An Inevitable Consequence of Civilization

We humans, particularly in America, persevere on diseases of individuals: heart disease, breast cancer, prostate cancer, *etc.* All of us have had family members and friends who have died from these afflictions. But these diseases, as devastating as they can be when they involve family and friends, take away only individuals. Infectious diseases – plagues – can take out civilizations. Yet, ironically, plagues are an inevitable consequence of civilization. The word civilization is derived from the Latin *civitas*, meaning city, and it is this characteristic of civilization that marks the process whereby humans came to live close together in significant numbers. Since plagues require enough vulnerable people collected in one location for the germ to spread and cause its attendant devastation, civilization has provided the substrate of vulnerable people needed to nourish a contagion.

The first well-described plague was the Plague of Athens. Although Greek cities in the 5th century BCE did not ordinarily provide the crowding needed for a plague to sustain itself, at the start of the Peloponnesian War the infantry of Sparta was able to force the citizens and allies of the naval power, Athens, into close quarters, resulting in the first of humanity's "great mortalities". Its ravages were essentially confined to Athens and the adjacent other most populous towns. It killed between 80 000 and 100 000 people, including Pericles, and was described in vivid detail by Thucydides, who had the disease himself but recovered.¹ Recent scholarly work with DNA points to typhoid as the likely cause.²

While large enough collections of humans to sustain plagues were not common in the 5th century BCE, for the past 2000 years, civilization has provided many cities with sufficient crowding to sustain many plagues, and the list of these recurrent contagions that have changed history is not a short one. To name two, the Plague of Justinian³ was a bubonic plague that so devastated the “civilized” resurgent Roman Empire and the “civilized” Persian Empire, that in the next century the relatively unaffected “uncivilized” Arabs were able to dominate that part of the world under the banner of Islam; in the New World discovered in 1492, there were between 50 million and 125 million Indians, but the “plagues” of the Old World, particularly measles and smallpox, killed 90% of the Native Americans, permitting the Europeans to occupy and totally control the Americas.⁴ It is extremely unlikely that the eruption of Islam out of the Arabian Peninsula in the 6th century would have been possible without the Justinianic Plague first decimating the Roman and Persian Empires, and it is certain the takeover of the Americas by Europeans in the 15th, 16th, and 17th centuries would not have been possible without European disease “plagues” with their “great mortalities” first paving the way.

Many of man's most virulent sources of infection, including those causing plagues, have as a common denominator that originally they were infections of the animals with which man lived in close contact; many of the animals were domesticated like cattle, but man has lived cheek by jowl with rats that have never been domesticated. However, the infective agents of these animals often mutated enough to make the “jump” from host animal to man. The plagues of the Black Death are caused by *Yersinia pestis*, a disease of rats transmitted by the rats' fleas, but when there is an insufficient supply of rats the fleas go to “plan B”, jump to man, and *Yersinia pestis* carried by the fleas then infects man. Tuberculosis made the jump from cattle. Malaria jumped from birds. Pertussis – whooping cough – jumped from pigs and/or dogs.⁵

And then there are the viruses. Measles is probably a mutated variant of rinderpest which infects cattle. Smallpox, a descriptive term that distinguished it from the larger poxes of syphilis, likely jumped from cowpox in cattle. Flu makes its annual mutation to jump from birds, and also perhaps pigs. Ebola likely originated in primates and bats, as did the human immunodeficiency virus. Today's version of this recurrent zoonotic transmission theme is the coronavirus which normally inhabits a number of animals, particularly bats, but has shown ready adaptability in jumping from other animals to man and then demonstrating its plague capability in being transmissible from human to human. This large family of viruses first showed its truly malignant potential with severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002, then with Middle East respiratory syndrome in 2012. The viral structure of the coronavirus makes mutation relatively easy, and this decade's version, SARS-CoV-2, is causing our current coronavirus disease 2019 pandemic.

It is human nature, almost a visceral need, to concoct conspiracy theories and to blame others when plagues hit. Even in Athens there was a conspiracy theory that someone was poisoning the water supply. Conspiracy theories in Christian Western Europe usually accused Jews of poisoning the water, and Jews were also often scapegoated as being the cause of God's displeasure in sending the current plague; and such anti-Semitic conspiracy fervour did, through the centuries, result in the murder, dare we say sacrifice, of thousands of Jews. Today's coronavirus also has the traditional conspiracy theory that God has sent this plague, although at least this time I haven't seen these fundamentalists blaming the Jews. And this time, the usual poisoning-the-water conspiracy theory has been replaced by an up-to-date conspiracy theory that blames fifth-generation wireless transmissions, convincing some that those transmission towers must be burned down. Today's conspiracy theory, trying to blame China for America's being hit by this pandemic has no basis in fact, as genomic evidence gives no credence to this politically driven idea that the virus was hatched in a laboratory in China.

But surely we can blame someone for our plague problems. The Native Americans would certainly "blame" the Europeans for infecting them with their diseases. But as the world got "smaller", as exploration proceeded, it was the inevitable consequence of living on the same planet. It was going to happen; it was only a matter of when. When a new influenza virus first emerged in Kansas, causing the "Great Influenza" during and after World War I, it spread throughout the world killing millions;⁶ and when a novel coronavirus first emerged in China 100 years later, it too spread throughout the world. Trying to throw "blame" on either Kansas and America or Wuhan and China where these mutated viruses emerged only indicates a total lack of understanding of the process. The never-ending mutations of viruses in all of the world's animals means that it is also inevitable that events such as the coronavirus pandemic now being experienced are inevitable. No conspiracy theory is needed to explain that this is the "nature of things", and the only people who should appropriately be "blamed" are those who fail to understand this fact but who fail to make plans prospectively to manage plagues as well as possible.

The exact details of each plague, such as the mortality rate, will change, and how readily human-to-human transmission occurs will determine how bad each infectious event will be. But the interconnectivity of our world today on land, air, and sea also means that John Donne's phrase, "no man is an island entire of itself; every man is...a part of the main"; applies not only to individuals, but to each and every country on our planet. Understanding that we humans are all in this together should focus our attention on this fact; only by working cooperatively with all of the world's countries involved can the damage from these worldwide plagues be minimized.

It is worthwhile to paraphrase the narrator Rieux's thoughts from the end of Albert Camus' Nobel Prize awarded book *The Plague*:⁷ in times of pestilence we learn that there are more things to admire in men than to despise.

But we understand that plagues never die or disappear for good; they may lie dormant, but will come again for the bane of men; perhaps this bane may also serve to enlighten men as to what really matters in life, but when that inevitable contagion comes the rats will again rouse up and good people will die in previously happy cities.

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References

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