PLANET IN CRISIS

PLAGUED

SURVIVING A MODERN PANDEMIC

Albert Bates

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Introduction

In 2014, more than 11,000 people in West Africa died from the Ebola virus. Dr. Susan Murray later wrote in the *New England Journal of Medicine* that even though no Ebola cases had appeared where she was working in rural Ireland, people were frightened. “Having the wrong color skin is enough to earn you the side-eye from your fellow passengers on the bus or train,” she wrote. “Cough once, and you will find them shuffling away from you.”

According to one famous account of the Black Plague, pandemics unfold as social dramas. People ignore clues that something is awry until they are surrounded by illness and death shakes them from complacency. That launches the second act: a demand for explanations, whether superstitious (“this is a bioweapon made in China” or “the gypsies are responsible”) or scientific (“it is a new kind of virus for which we have no cure”). People then either accept or reject these explanations and choose to either cooperate or rebel, and that can make the third act as dramatic and disruptive as the disease itself— a crisis of individual and national character.

Pandemics put pressure on the societies they strike and can widen cracks in social structures that had been ignored. They reveal what really matters and the things that have true value. Would you rather be able to shop in a mall or have your grandparents alive? Blame is a destructive force that can ruin much more than the disease can. From Jews in medieval Europe to meat mongers in Chinese markets, someone is always blamed. Government

authority, people with power and privilege, and minorities and immigrants are all common targets of blame.

Another recurring theme in history is that doctors and public health institutions fail to live up to their reputations. In 1900, health officials in San Francisco strung a rope around Chinatown in an attempt to contain an outbreak of bubonic plague. Only non-Chinese people (and rats and fleas) were allowed to enter or leave. That was the state of the art in public health at that time, but it did not work, and in many ways it made things worse.

Fear can be a dangerous contagion also, but well-reasoned hope can be a powerful antidote. Sometimes adversity can be a gift because it focuses your attention on things that really matter and compels you to exercise your courage. Maybe it can allow you an opportunity to think things through at a deeper level than you had before.

During a turn-of-the-century outbreak of the plague, San Francisco's Chinatown was quarantined with a rope cordon to keep the Chinese residents in. Ship-borne rats were the suspected disease vectors, and a massive rat eradication program was more successful in combating the disease.

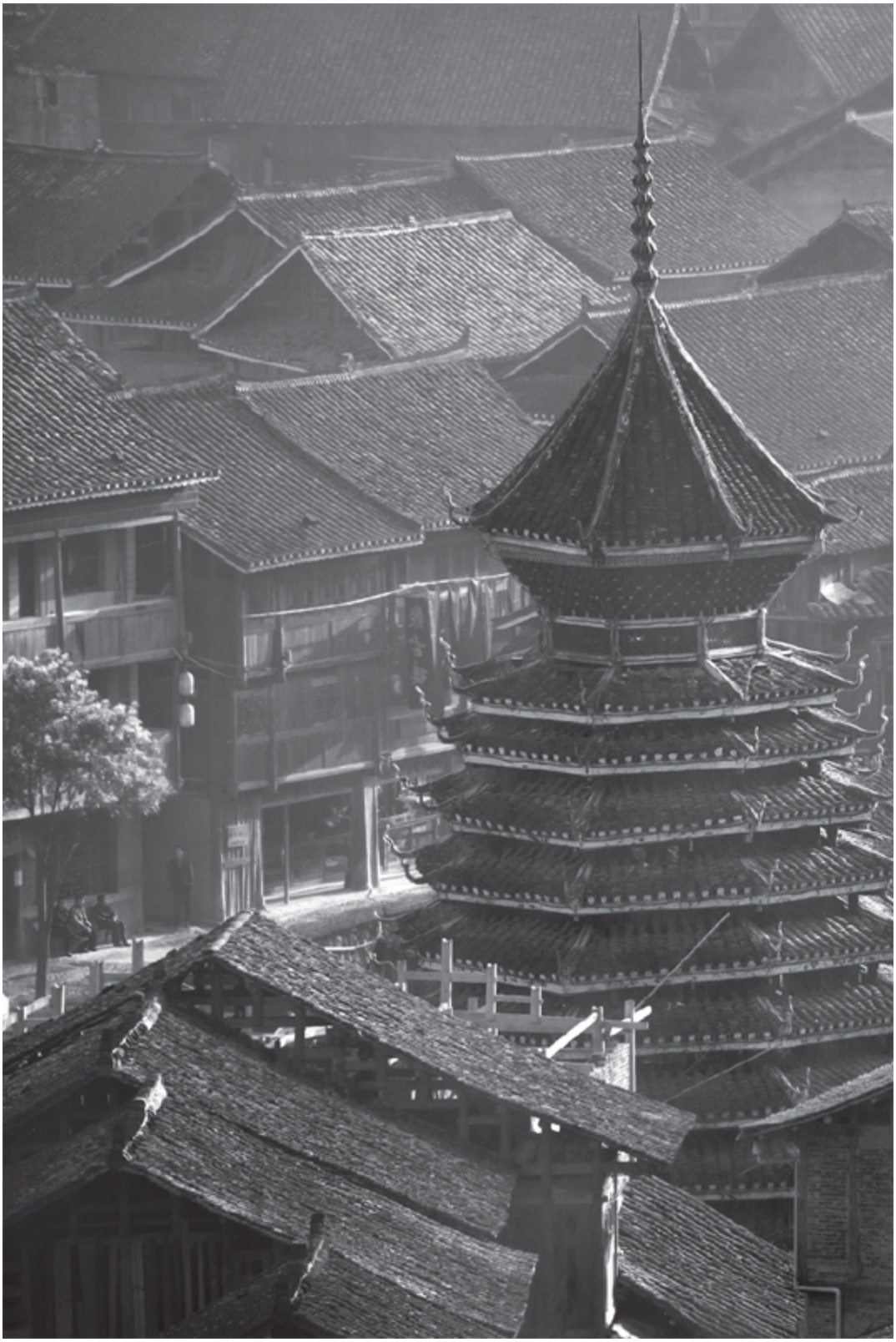
In an odd sort of way, the Covid-19 pandemic of 2020 could not have arrived at a better time. Hundreds of species that had been poised at the edge of extinction were suddenly granted a reprieve. New oil drilling, which threatened to wreck the climate of Earth, stopped. The cutting of forests slowed, and chainsaws fell silent. With fewer commercial flights for business travelers or tourists, skies became blue again over much of the planet. Dolphins leaped at the great bounties of fish left just to them, not netted by the millions and hustled away to restaurants. Wild platypuses returned to the rivers of Australia. Whales sounded and blew their spouts to celebrate the disappearance of the sightseeing ships that had been following them around for years. For the first time since record-keeping began 70 years earlier, the amount of carbon dioxide and other greenhouse gases going into the atmosphere actually bent the curve downward.

And we owe all that to a little round bug with a thorny crown that we called Sudden Acute Respiratory Syndrome Coronavirus #2 (SARS-CoV-2).

Don't get me wrong. The year 2020 was also a sad time, when so many people suffered and died. It is indescribably horrible to lose a parent, child, brother, sister, or friend. But there is another side. The pandemic put human destruction of Earth on pause. It gave everyone some time to think. Maybe it will also give us hope. We can mend more than just the damage caused by the disease. We can mend our ways.

Before the pandemic, we were making more withdrawals than deposits from Mother Nature's great bank. Most fisheries were managed unsustainably. Many farms were managed so badly that there will not be enough soil, freshwater, and seed to carry us through another century. The ocean was being polluted with poisons, plastics, and nuclear waste. The rare-earth elements we use to make wind generators, electric car batteries, computers, and smartphones were being mined out. On top of all that, we were still burning fossil fuels and heating Earth's atmosphere to an intolerable degree. If you don't think some kind of ecological and economic catastrophe must come from all that, you are just whistling past the graveyard.

The little bug made us pause. It allowed us to stop and give all that a think. On the other side of any pandemic, there is a chance to do better.



Chapter 1

Historical and Hysterical Experiences

Because viruses naturally occur in the human body, and come and go from our contact with other humans, animals, insects, and nature generally, it should not be surprising that occasionally we get one that chooses to be nasty. Going back to the beginnings of agriculture, there is evidence that 5,000 years ago, an epidemic struck a small village in northeast China now called Hamin Mangha. That village was not inhabited again for many centuries. The bodies of the dead were stuffed inside a house and the house burned down.

Not all epidemics come from viruses. Typhus, an infection caused by a *Salmonella* bacteria, has been with us since at least 430 BCE when it killed a quarter of the Athenian troops fighting Sparta in the Peloponnesian War and then returned home to kill a quarter of the population of Athens in four years. Fortunately for the victorious Spartans, the sheer virulence of the bacteria prevented its wider spread. It killed off its Athenian hosts at a rate faster than they could spread it, and so it stayed in that one place and eventually died out.

R(0) REPRODUCTION RATIO

In pandemic jargon, the **reproduction ratio** (the average number of vulnerable people infected by each diseased person) is called R(0), R0, or R0, pronounced “Ar-naught.” Reproduction numbers above zero mean more people are infected by each infected person, so the disease is expanding, and R(0) numbers below zero mean the disease is shrinking.

When Covid-19 was studied in Wuhan, China, in January 2020, its R(0) was reported to be between 2.0 and 2.6. The doubling time of infected patients was approximately every five days. Later studies suggested Covid might have an R(0) as high as 6.6. By comparison, the R(0) of Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-1) was 1.88 in Beijing, 1.70 in Hong Kong, and 0.95 worldwide. The disease expanded in China but quickly ended in the rest of the world. The R(0) of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) was from 0.47 to 0.91, so it never spread very far. Covid-19 is not the most infectious disease we know of—measles, mumps, and chickenpox all have an R(0) of greater than 10—but it is higher than most colds and flu, the Spanish flu of 1918, Ebola, and HIV/AIDS.

Reproductive ratio is different from **case fatality rate (CFR)**, which tells us how many of those infected by the virus will die. For SARS from 2002 to 2003, the fatality rate was 9.6 percent. MERS in 2012 had a case fatality rate of 38 percent. Ebola hemorrhagic fever can have a 90 percent case fatality rate if untreated. Covid-19 came with a case fatality rate of 4–5 percent (Germany, China) to 10–14 percent (Spain, Italy). For the world as a whole at this writing (mid-July 2020), Covid’s CFR is 4.2 percent—with 14.7 million confirmed cases and more than 600,000 deaths. Researchers say that deaths among confirmed cases are higher than deaths among infections overall because so many mild or asymptomatic cases are missed. Studies that estimate unseen infections put the global CFR for Covid-19 at 0.3–1.5 percent.

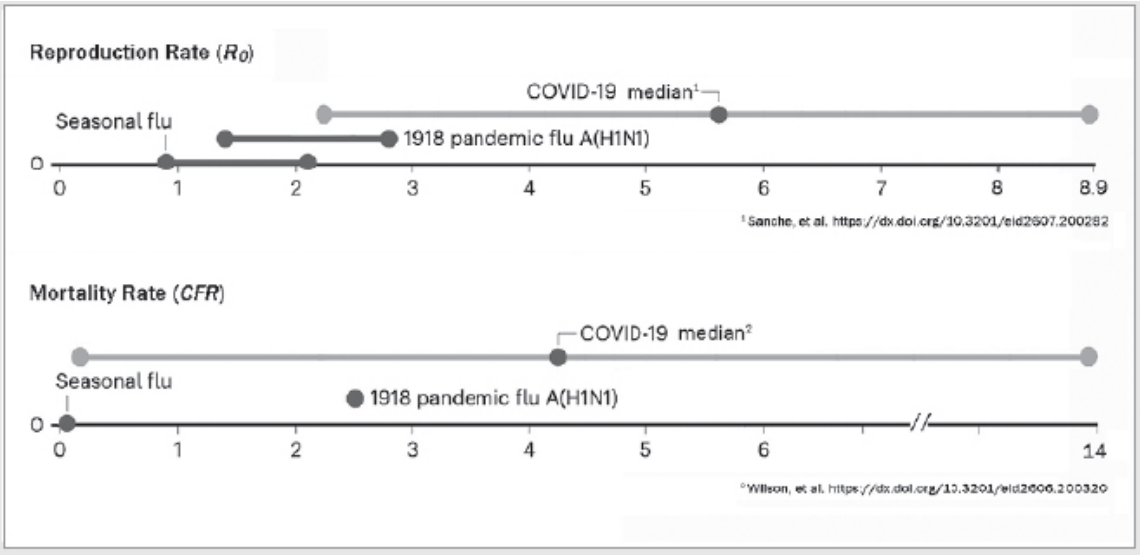
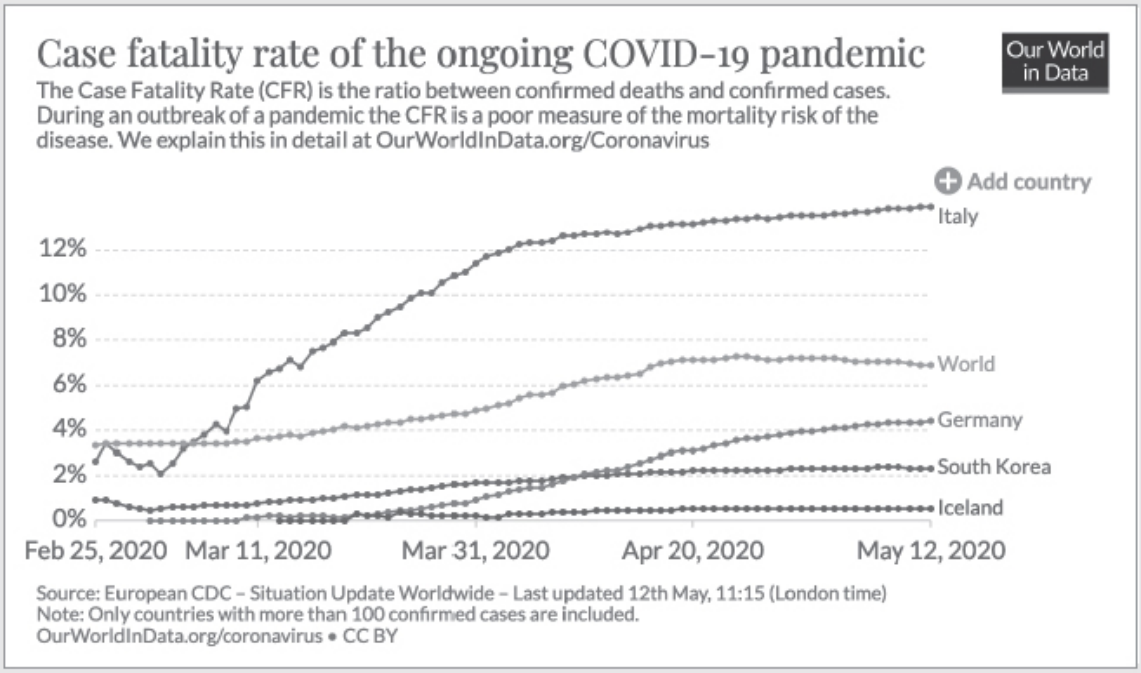


Chart comparing the reproduction rate and mortality of the seasonal flu virus with the Spanish flu and Covid-19.



As an epidemic spreads through the population, the number of people left to infect goes down. The growth rate of an epidemic in progress is described by its **effective reproductive number**, or **Re**. Once that value falls below 1, the epidemic will stop spreading.

Smallpox, Plague, Spanish Flu, and AIDS

At the start of the first millennium, the Antonine Plague was brought to the Italian peninsula by Roman soldiers returning from the Near East. It killed a quarter of those infected, up to five million in all. A second outbreak a century later killed 5,000 people per day in Rome. The plague, later confirmed as **smallpox**, laid the groundwork for the unraveling of the empire. Rome's fighting force was cut in half, offensive military campaigns were postponed, and Germanic tribes edged closer to the capital.

From 541 to 750 CE, the world was struck by a global pandemic— the **bubonic plague**. Before it was done, the plague would cut Europe's population in half. Scientists have concluded that the bacteria *Yersinia pestis* originated in China over 2,600 years ago, but at that time it caused only mild stomach discomfort. It reached Egypt in a much more virulent form in 541 CE, traveled around the Mediterranean with sailors and merchants, and arrived at Constantinople the following spring, killing 10,000 people a day, eventually decimating 40 percent of the city's inhabitants. That outbreak of the plague went on to eliminate one-quarter to one-half of the human population throughout the known world. Then it disappeared.

Eight centuries later, it suddenly reappeared. This time it was called the **Black Death**. The total number of deaths from CE 1331 to 1353 is estimated at 75 million, up to half the people in many urban areas. Gypsies, Jews, foreign travelers, and lepers were hunted down and killed. In actuality, the bacteria were spread by fleas that lived on rats.

The plague returned to England every two to five years until 1480. European outbreaks continued off and on until the eighteenth century, more than 100 in all. The Great Plague of London of 1665–66 was the last major outbreak in England, killing approximately 100,000 people and 20 percent of Londoners. But the Black Death was not done with the rest of the world.