Contents

List of Illustrations xvii

Introduction 1

This is not a history of our perplexing postmodern plague, nor a general history of pandemics. This is a general history of catastrophe—of all kinds of disasters, from the geological to the geopolitical, from the biological to the technological. For how else are we to see our disaster—or any disaster—in a proper perspective?

Chapter 1
THE MEANING OF DEATH 19

Though life expectancy has hugely improved in the modern era, death remains inevitable and is, in absolute terms, more common than ever. Yet we have become estranged from death. Ultimately, not only are we as individuals doomed, but so is the human race itself. All the world religions and a number of secular ideologies have sought to make this eschaton seem more imminent (as well as immanent) than it really is. What we have to fear is a big disaster, not doomsday. Of the big disasters in human history, the biggest have been pandemics and wars.

Chapter 2
CYCLES AND TRAGEDIES 43

Catastrophe is innately unpredictable because most disasters (from earthquakes to wars) are not normally distributed, but randomly or according to power laws. Cyclical theories of history cannot get around that. Disasters are more like tragedies: those who try to predict them are unlikely to be heeded. In addition to predicting more disasters than actually happen, Cassandras

are up against a bewildering array of cognitive biases. In the end, faced with uncertainty, most people just decide to ignore the possibility that they as individuals will be victims of catastrophe. "The bells of hell go ting-a-ling-a-ling for you but not for me," a ditty sung by British soldiers in World War I, is humanity's signature tune.

Chapter 3
GRAY RHINOS, BLACK SWANS, AND DRAGON KINGS 69

Disasters are often foreseen (gray rhinos), yet even some predicted disasters can appear completely unexpected when they strike (black swans). A few have consequences beyond excess mortality that set them apart (dragon kings). Disasters are not either "natural" or "man-made." Decisions to locate settlements near potential disaster zones—by a volcano, on a fault line, next to a river subject to severe flooding—are what make most natural disasters in some respects man-made. In terms of loss of life, more big disasters happen in Asia than elsewhere. The great American disaster has been, by Asian standards, not all that disastrous.

Chapter 4
NETWORLD 105

The decisive determinant of the scale of a disaster is whether or not there is contagion. Social network structure is therefore as important as the innate properties of a pathogen or anything else (such as an idea) that can be virally spread. People worked out the efficacy of quarantines, social distancing, and other measures now referred to as "non-pharmaceutical interventions" long before they properly understood the true nature of the diseases they sought to counter, from smallpox to bubonic plague. The essence of such measures is to modify network structures to make it less of a small world. Such modifications can be spontaneous behavioral adaptations, but they usually need to be hierarchically mandated.

Chapter 5
THE SCIENCE DELUSION 141

The nineteenth century was a time of major advances, especially in bacteriology. But we should not succumb to a Whig interpretation of medical history. Empire forced the pace of research into infectious diseases, but it also forced the pace of the globalization of the world economy, creating new opportunities for diseases, not all of which submitted to vaccination or therapy. The 1918 influenza was a grim revelation of the limits of science. Break-

throughs in our understanding of risks can be offset by increased network integration and fragility.

Chapter 6
THE PSYCHOLOGY OF POLITICAL INCOMPETENCE 175

We tend to attribute too much of the responsibility for political disasters, as well as military ones, to incompetent leaders. It was a pleasing argument of the Indian economist Amartya Sen that famines were caused by unaccountable governments and avoidable market failures, not food shortages per se, and that democracy was the best cure for famines. That theory may well explain some of the worst famines in the century and a half from the 1840s to the 1990s. But why should Sen's law apply only to famines? Why not to the most man-made of disasters, wars? It is a paradox that the transition from empires to more or less democratic nation-states was attended by so much death and destruction.

Chapter 7
FROM THE BOOGIE WOOGIE FLU TO EBOLA IN TOWN 213

In 1957, the rational response to a new and deadly strain of flu seemed to be a combination of pursuing natural herd immunity and selective vaccination. There were no lockdowns and no school closures, despite the fact that the Asian flu in 1957 was about as dangerous as COVID-19 in 2020. The success of Eisenhower's response reflected not only the nimbleness of the federal government of those days but also the Cold War context of much-improved international cooperation on issues of public health. Yet the successes of the 1950s, '60s, and '70s were deceptive. HIV/AIDS revealed the weaknesses of both national and international agencies. So, in their different ways, did SARS, MERS, and Ebola.

Chapter 8
THE FRACTAL GEOMETRY OF DISASTER 251

Accidents will happen, from the *Titanic* to *Challenger* to Chernobyl. Small disasters are like microcosms of big ones, but because they are less complex, we can understand them more easily. The common feature of all disasters, whether sinking ships or exploding nuclear reactors, is the combination of operator error and managerial error. Often the point of failure in a disaster is not at the top (the "blunt end") or at the point of contact (the "sharp end") but within middle management—a favorite theme of the physicist Richard Feynman and an insight with general applicability.

Chapter 9
THE PLAGUES 285

Like so many past pandemics, COVID-19 originated in China. But the varied impact of the disease on the rest of the world's countries confounded expectations. Far from being well prepared for a pandemic, the United States and the United Kingdom fared badly. It was countries such as Taiwan and South Korea that had learned the right lessons from SARS and MERS. It was tempting to blame Anglo-American travails on the incompetence of populist leaders. However, something more profound had gone wrong. The public health bureaucracy in each case had failed. And the role of the internet platforms in disseminating fake news about COVID-19 led to poor and sometimes downright harmful adaptations in public behavior.

Chapter 10
THE ECONOMIC CONSEQUENCES OF THE PLAGUE 319

The shift from complacency to panic in mid-March 2020 led to economically crushing lockdowns in many countries. Were they the right solutions to the problem posed by COVID-19? The answer is probably not, but that did not make it smart for the United States to attempt a return to normality that summer (the dumb reopening) without adequate testing and tracing. The predictable result was a second, smaller wave and a "tortoise-shaped" recovery. Less predictable was the near-revolutionary political eruption over the issue of racism, which bore striking resemblances to mass movements precipitated by previous pandemics.

Chapter 11
THE THREE-BODY PROBLEM 345

The COVID-19 crisis is widely regarded as dooming the United States to decline relative to China. This is probably wrong. The empires of our time—the United States, China, and the European Union—all made a mess of the pandemic in their different ways. But it is hard to see why the countries that handled it well would be eager to join Xi Jinping's imperial panopticon. In a number of respects, the crisis has shown the persistence of American power: in financial terms, in the race for a vaccine, and in the technological competition. Rumors of American doom are once again exaggerated. Perhaps because of this exaggeration, the risk of not just cold but hot war is rising.

Conclusion
FUTURE SHOCKS 379

We have no way of knowing what the next disaster will be. Our modest goal should be to make our societies and political systems more resilient—and ideally antifragile—than they currently are. That requires a better understanding of network structure and of bureaucratic dysfunction than we currently possess. Those who would acquiesce in a new totalitarianism of ubiquitous surveillance in the name of public safety have failed to appreciate that some of the worst disasters described in this book were caused by totalitarian regimes.

Afterword 397

Acknowledgments 413

Notes 415

Index 475