Over the course of the past few decades, there has been sustained reflection about environmental risks, disasters, and vulnerability. Some commentators have remarked that humanity finds itself in a challenging new epoch called the “technocene,” characterized by complex technologies with accompanying hazards that can potentially harm human societies and their living environments on historically unprecedented scales. The dystopian threats of the technocene have precipitated a host of crucial questions. Just how safe is humanity in a world of toxic chemicals and industrial installations with destructive potential? To what extent is it feasible to contain chemical, nuclear, and other pollutants? Is it at all possible to prevent runaway disasters in highly complex industrial technoscapes?

Historically, such questions have been addressed from the vantage points of specific intellectual and ideological traditions. There have been religious perspectives ranging from fatalism to providence; cultural views that span denial of harm to extreme fear; and
political doctrines that span caution and precaution, on one end of the spectrum, and a Panglossian risk-taking attitude, on the other. However, recognizing that risk, disaster, and vulnerability associated with industries such as chemical and nuclear are novel, historically unprecedented, and anthropogenic in origin, scholars and thought leaders have responded with a wide range of new ideas, explanatory frameworks, and calls to action. These include traditional risk analysis, variants of the precautionary principle, industrial sociology, and environmental justice. There have also been many studies of the role of bureaucracies and technocracies, and of the passions, interests, and economic and political entanglements between corporate and governmental entities.

In the last few decades, entirely new research traditions have consequently been formulated, adding nuance and, in many cases, reframing questions. Among these are vulnerability theory in anthropology and geography; the sociology of illness and the environment in public health research; organizational theory applied to understanding the ideology of disasters; a multifaceted inquiry called Science and Technology Studies (STS); and a field called development studies which, among other things, explores the trade-offs and collateral damage related to industrial progress. There have also been vigorous debates about the relationship between the technocene and politics; reflexivity in civic thought and political discourse; science, technology, and democracy; the role of the media; and big data and the manipulation of thought. Underlying all these concerns are questions about the politics and political economies of risk acceptance and propagation; the role of economic systems; and human rights and accountability.

POINTS OF DEPARTURE

These intellectual adventures have, however, tended to be enmeshed in disciplinary genres, and as in the classic fable of the blind person
and the elephant, most scholarly communities are captivated by one or another feature or theme. In the process, they have often ignored the synergies and complexities that can be explored through broader transdisciplinary conversations, leaving room for creative osmosis. Moreover, their jargon renders them inaccessible to a general audience, thereby shutting the public out of an important debate about the choices that face them. The purpose of this book is to address these gaps. By elucidating and synthesizing disparate literatures and points of view, it enables scholars and citizens not versed in the extant literature on risk, disaster, and vulnerability to understand the social and theoretical import of these works, and their implications for global and planetary ideologies, institutions, and arrangements.

The sources for this book include documents produced by governmental regulatory agencies, nonprofit advocacy organizations, investigative journalists, and the works of academics from a wide variety of disciplines and institutions, including the physical and biological sciences, engineering, public policy, and the social sciences. I have also read many philosophical works that engage, critique, and reflect on some of these works, and on the wider human condition in the technocene. Moreover, I have, during the past decade and a half, discussed some of the central ideas with scholars and practitioners in these fields. The book you are reading now therefore aims to serve as an intellectual witness to some of the big ideas and debates, an attempt to organize historically disparate literatures in a dialogue of ideas, render technical discussions in simple language, and therefore enable ordinary citizens to understand and reflect on what might otherwise seem esoteric concepts.

I draw on three broad types of genres of research and practice, each speaking to one theoretical term in the title of this essay. The first of these stems from a simply phrased question—how safe is safe enough? This question springs from the recognition that industrial toxins in the environment have, in one form or another, wreaked havoc on the lives and livelihoods of people all over the world. For example, air and water pollution have had significant public health
consequences. There have been dramatic instances when sections of rivers have literally caught fire. Many pollutants bioaccumulate, with traces of chemical toxins found far away from where particular polluting industries are physically located. For example, freshwater lakes have seen aquatic ecosystems devastated due to pollution from distant sources, and traces of toxic chemicals have been found in mountains, rivers, oceans, and even in the ice at the poles. The traditions of research and analysis that have addressed the problem of toxins and pollution have sought answers to the question of the human and environmental health implications of the increased presence of chemical toxins in the environment. More recently, uncomfortable questions about the distributive effects of environmental risks, and especially the question of the relationship between pollution, poverty, and social justice have also been raised, giving birth to a new field that calls itself environmental justice.

The second research tradition addressed in this book is concerned with the idea that technology can go out of control and adversely damage human communities, societies, and even nation states. The concept picked up steam in the aftermath of the Bhopal and Chernobyl disasters. Although iconic, Bhopal, Chernobyl, and more recently Fukushima are only a few lowlights of a sequence of industrial disasters the world over. Some are relatively small in scale, killing a few people and maiming others, but others, such as disasters at chemical plants in Flixborough, United Kingdom, and Seveso, Italy, to take but a couple of examples, have had significant impacts. There have also been planetary consequences due to the release of toxic chemicals, as evidenced by phenomena such as acid rain.

The third thread of this book seeks to map and understand the social, cultural, economic, and political vulnerabilities associated with the chemical industry, and more broadly, high-risk technological systems. It raises the question of who is most vulnerable and why. It seeks to understand the political economies that define vulnerabilities, and specifically, the roles played by chemical and fossil fuel corporations and their enablers, and the media and public rela-
tions industries. Moreover, looking into the future, these genres of research ask a crucial series of questions relating to the adequacy of expertise and infrastructure to mitigate deleterious impacts when and where they occur. They also compel us to ponder the policy, public, and civic discourses about the meaning of progress, development, and the teleology of the general good, and consider the implications of the technocene for democracy, rights, and accountability.

The Structure of the Book

The purpose of this book is to explicate the humanistic import of the literatures on risk, disaster, and vulnerability for an audience consisting of people who are not experts in these domains. Its best methodological anchor is therefore the academic subfield called environmental humanities. This emerging genre encompasses literature, intellectual history, philosophy, and history, among others. Like many scholars in this field, I have found the work of Raymond Williams to be very useful. Williams suggested that the world of thought can be understood by interrogating its prominent words and exploring their interlocking, contrarian, contradictory, and contested meanings.

Accordingly, I have organized the book as a series of short essays, each exploring one keyword that coalesces families of terms occurring in the underlying literatures. Keywords, in this analysis and methodology, serve literally as narrow keys. Such devices, as many generations of humanistic scholars have learned to appreciate, can open wide doors, helping frame, discuss, explicate, and analyze the stakes in the various debates and literatures described. In this book, I use this tool to explicate the big picture, the humanistic import, if you will, of the critical discourses about the origins, causes, and impacts of environmental risks, industrial disasters, and the vulnerabilities to human societies around the world owing to such events.

The first of three main parts, entitled “Risk,” addresses the social,
cultural, psychological, and political impacts of synthetic toxins in the environment. It explores debates about how industrial pollution can be regulated and prevented, sketching the arc from a belief that risks can be contained within safe thresholds to one that holds that there are no thresholds for true safety and that the only course is precaution. The second part, “Disaster,” addresses technological complexity, human organizational capacity, and catastrophic events. Here, the big debate is over the extent to which disasters are inevitable, and whether some novel cultural arrangements within institutions might prevent the worst possible outcomes even in highly risky contexts. The third part, “Vulnerability,” examines how environmental risks and disasters create a range of vulnerabilities for the human order. These include situations such as chemical spills and gas leaks, which, in addition to damaging their proximate physical environment, have consequences for entire industries, supply chains, jobs, and complete verticals of the global industrial and financial system. They also include forms of vulnerability that exacerbate the economy, as happens when exposures to toxins in the environment differentially impact the ability to live and work, often mapping on to preexisting factors of social stratification, such as race, gender, class, ethnicity, and nationality. These insights offer new challenges for negotiating the future and pose ethical dilemmas of a kind that humanity has not encountered before, especially in the arena of acceptable collateral damage and tradeoffs. Finally, a brief concluding chapter, entitled “Looking Ahead,” sketches some emerging approaches to understanding risk, disaster, and vulnerability.

In writing this book, I have deliberately chosen not to discuss two critical events that loom large in the public consciousness—the COVID-19 pandemic and climate change. The reason is that these topics of planetary import require a different kind of treatment, anchored around global geopolitics. The topical domain for this book is therefore deliberately constrained to address more conventional issues surrounding risk, disaster, and vulnerability, leaving a discussion of planetary-scale risks for later. The length of the book,
likewise, is deliberately chosen to enable a wider audience, ranging from undergraduate classes to professionals with little time at their disposal, who might not have the capacity to read a larger work.

Two final methodological points are worth making. First, in keeping with my humanistic goals, I have chosen to privilege storytelling and narrative to describe the central concepts of any discipline or genre. My goal here is to delve into many relevant subfields and bring them in conversation with others, rather than writing from the vantage point of any given discipline, however important or influential they have been. This book is also not about the actual techniques of risk analysis or disaster management. Rather, it is a humanistic exercise in inter- and transdisciplinary synthesis, attempting to extract philosophical insights from otherwise technical discussions. I have chosen, for the bulk of the book, to focus on what is regarded by scholars in risk and disaster studies as canonical. It is these literatures that inform the narratives in the three substantive chapters. In recent times, important works have explored relevant topics such as reflexivity, democracy, infrastructures, justice, and human rights. I dedicate chapter 5 to exploring these frontiers.

Second, this book eschews footnotes in favor of bibliographic essays. My goal in these essays is to describe the sources and literatures that form the basis of this book, offer explanations about important assumptions, and provide definitions of some central concepts. By describing my sources, and in many cases, providing exegetical genealogies, I hope to provide systematic guides to further reading. One final comment is worth making. This book engages with publications in academic, public policy, and legal realms primarily from the United States, and to a lesser degree from the United Kingdom and Europe and other contexts where publications are in English and other languages in which I am proficient. Unfortunately, this does mean that many important regulatory and philosophical traditions that are inaccessible to me are not considered or analyzed in this work.