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1

A Matter of Degree

A REMARK by the eighteenth-century *philosophe*, Charles-Louis de Secondat, Baron de Montesquieu, has provided me with a name for the conceptual territory I want to explore in this inquiry. In his famous treatise, *The Spirit of the Laws*, which first appeared in French in 1748, Montesquieu declared that the “empire of the climate is the first, the most powerful of all empires.”¹ It was a controversial claim. In the early 1750s, the Sorbonne, a theological college of the University of Paris that, on royal authority, had to approve all religious publications, identified this proposition as one of the passages that called for censure. One problem was that Montesquieu had attributed to climate too great an influence on human affairs when accounting for the manners and mores of nations. Another was his observation that religious belief systems could not be satisfactorily transferred from one climatic regime to another, and therefore that climate had set the bounds of both Christianity and Islam.² Clearly, the climatic empire of which Montesquieu spoke exercised its power over a far-flung realm—much to the annoyance of the religious establishment.

Since Montesquieu’s day, the empire of climate has continued to extend its influence over more and more regions of human life and culture. And in the wake of prevailing concerns over the consequences of rapid climate change, it looks set to maintain its imperial rule into the indefinite future. Across the worlds of technical research, academic scholarship, popular science, and climate journalism, as conventionally understood, a common resort to the elemental power of climate’s agency is plainly on view. And it is for this reason that, in what follows, I routinely pass across the fuzzy borders between these cultural domains, thereby transgressing distinctions between specialist science and pop-science, learned erudition and lay sentiment. Before outlining the itinerary we will follow in our travels through this empire, it will therefore be useful to demonstrate something of the explanatory hold climate retains among

professional historians, science journalists, and popular writers alike, as well as reflect on a couple of conceptual issues that weave their way through the narrative that follows.

History by Degree

When *National Geographic* premiered its television show “Six Degrees Could Change the World,” the columnist Joanne Ostrow contrasted it with Al Gore’s *An Inconvenient Truth*. Under the strapline “*Six Degrees* charts climatic apocalypse in HD television,” she reported that while Gore’s Oscar-winning documentary film felt like a mere lecture, *National Geographic*’s offering was more “like a cool disaster movie, complete with fantastic animation and scary predictions.” At just 2 degrees Celsius warmer, she observed, pine beetles will kill off the forests and “tiny Pacific islands will sink under the ocean”; at 1 degree more, category 6 hurricanes will become “regular occurrences” and thousands of species will disappear; at 4 degrees, “hordes of climate refugees” will flee famine, with the number reaching into the tens of millions at 5 degrees. When 6 degrees are reached, the world resembles “dinosaur time”—the Cretaceous Period.³ Accompanying the original *National Geographic* broadcast was an interactive website inviting visitors to explore the earth’s future at different degrees of global warming.⁴ Enter the site, and a map of the world with what could be called a “disaster dial” along the margin appeared on the screen. In line with the program, viewers were confronted with the same dire warnings. On clicking the dial for 2 degrees warmer, urban Bolivians were seen moving into rural areas in search of water; at 3 degrees, floods appeared in New York City; at 4 degrees, deserts arrived in southern Europe; and point 5 on the dial disclosed worldwide political upheaval, economic disaster, and armed conflict.

This way of foretelling humanity’s destiny has become increasingly commonplace. In point of fact, *National Geographic*’s project was inspired by a 2007 book by the journalist Mark Lynas, *Six Degrees: Our Future on a Hotter Planet*. Drawing heavily on the contributions of climate modelers and repeatedly underscoring the massive significance of critical tipping points, Lynas presented a history of the future degree by degree. He developed what could be described as a calculus of catastrophe as the temperature ratchets up notch by notch in a globally warming world. The book’s eschatological ethos, prefixed by an epigraph from Dante’s *Inferno* on entering the First Circle of Hell, certainly caught the attention of newspaper reviewers: the *Daily Mail* found it—all too ironically—“chilling,” the *Sunday Times* thought it “terrifying,” and the

Financial Times dubbed it an “apocalyptic primer.”⁵ Why? The worldwide catalogue of impending calamity offered no hiding place.

In these storylines, there is a strong sense of historical predestination when certain climate changes come about. Humanity’s future is dictated literally by degree. Prophecy, of course, is a precariously uncertain business, not least on account of the wide range of variables involved. Indeed, none other than Sir John Houghton, former chair of the Intergovernmental Panel on Climate Change, issued a word of caution when giving evidence to the United Kingdom’s House of Lords Select Committee on Economic Affairs on January 18, 2005: “when you put models together which are climate models added to impact models added to economic models, then you have to be very wary indeed of the sort of answers you are getting and how realistic they are.”⁶

It is not just climatic futurists, however, who see in climate the fate of human civilization. In recent decades, historians of different stripes have sought to find in climatic circumstances the driving force of humanity’s story. Blockbuster books with deep historical and wide geographical reach have done much to reposition human history more firmly in the context of its diverse natural and climatic environments. *Guns, Germs and Steel* (1997) by the biogeographer and historian Jared Diamond is a case in point. A virtuoso performance taking his readers to well-nigh every corner of the globe, Diamond inserted into his narrative subjects as diverse as the history of plant and animal domestication, the genesis of food production, the evolution of writing, and the impact of pathogens on the fate of human cultures, ever stressing the fundamental role played by climatic geography in choreographing humanity’s global drama. Throughout, he intended external forces to triumph fully over any resort to innate cultural or ethnic essentialism.⁷ Mention too might be made of *The Wealth and Poverty of Nations* (1998) by the economic historian David Landes. Taking nothing less than universal history as his remit, Landes looked to climate and environment as primary agents of historical change as he plotted a global geography of history’s “winners” and “losers.”⁸ Even the titles on the shelf of books produced by the prolific archaeologist-anthropologist Brian Fagan disclose the place he accorded to climate’s influence in the unfolding of human affairs. A sampling: *The Long Summer: How Climate Changed Civilization*, *El Niño and the Fate of Civilizations*, and *The Little Ice Age: How Climate Made History*. And while he conceded that “environmental determinism may be intellectually bankrupt,” he nonetheless declared that “the great warming propelled humanity” across the Behring Strait and into an uninhabited continent. Flips in the North Atlantic

Oscillation, he told his readers, and the advent of El-Niños “caused civilizations to collapse.”⁹

At least in part, what has fostered the resurgence of interest in the role of the weather in sculpting the shape of human history has been the increasing availability of paleoenvironmental data on climate variations over the centuries. The distinguished French historian Emmanuel LeRoy Ladurie, celebrated for his work on the history of peasantry, environmental history, and much else besides, had already recognized well over half a century ago the significance of merging climate records and archival inquiry. When his *Times of Feast, Times of Famine*, the English translation of his work on history and climate, made its appearance in 1971, it revealed just how serious was his engagement with the research of the climate scientists of the time. He was careful, however, to resist facile attributions of climatic causes for historical events. For he found the earlier “climatic interpretation of human history,” of the kind championed by environmental determinists such as Ellsworth Huntington, to be “highly dangerous.”¹⁰ And so he frequently paused to identify the limitations of climate’s explanatory power. Much more recently, the same caution has been voiced by the environmental historian Dagomar Degroot, who warns that “we come no closer to understanding its [climate’s] impact when we view it as a straightforward cause of human events.”¹¹

Over the past few decades, research on dendrochronology, volcanic ash traces, ice sheet sediments, pollen analysis, lacustrine deposits, and the like has mushroomed, generating vast quantities of proxy data about past climatic environments and the changes they have undergone over extended periods of time.¹² Records such as these have encouraged historians to pose new questions about the dynamics of historical explanation and, together with access to a wider range of archival materials, have prompted many to read history more exclusively through the prism of climatology. Of course, large climate-related data sets have huge significance for the historian’s craft. Rich information of this kind can illuminate some of the silences and uncertainties in the archive and address old issues in new ways. Big data’s promises seem endless.¹³ And yet, their very availability can suggest that, as Jo Guldi and David Armitage put it, “we are locked into our history, our path dependent on larger structures that arrived before we did,” thereby opening the door to what they call “reductionist fictions about our past and future merely masquerading as data-supported theories.”¹⁴ For every promise large data sets offer, it seems, there is some peril lurking in the neighborhood. Besides the reductionism that Guldi and Armitage identify, what might be dubbed “data-overdetermination” is another snare.

The very presence of rich data on climate over millennia has the potential to seduce many into giving them a controlling explanatory role that favors causation over correlation, assertion over argument, declaration over documentation. There is nothing necessary about this pitfall, of course, but it does carry a cautionary warning about the lure of epistemic zealotry.

Climate Determinisms and Histories of the Future

These proposals, both historical and futuristic, may be taken as emblematic of a renewed resort to climatic readings of the human story. And they bear witness to two sets of issues that require some attention before providing an outline sketch-map of the way in which I intend to traverse the empire of climate. First, explanatory accounts of both past and future scenarios are frequently intertwined and mutually reinforcing. Historians typically seek to mobilize the results of their inquiries into the influence of climate on earlier societies for contemporary and future purposes. For their part, climate futurists routinely contextualize their prophetic forecasts by reference to historical reconstructions of life in times of climate stress. In one way or another, chronicles of the past and histories of the future merge in claims about the impact of climate and climate change on human society. Second, advocates of a climatic reading of retrospective and prospective history have aroused anxiety among some over what they see as a rejuvenation of a discredited environmental determinism. Despite routine disavowals by proponents of climate-driven history, the charge of determinism, or sometimes reductionism, continues to be made.¹⁵ Apart from anything else, this alerts us to a fluidity in the use of the term “determinism” and to suspect that determinisms come in a variety of different shades.¹⁶

The first of these propensities—the futurizing of history—has become increasingly commonplace. Indeed, Lynda Walsh has gone so far as to suggest that scientists, including climate scientists, are frequently called upon to perform the role previously allocated to the prophet and to manufacture rhetorical certainty out of empirical complexity.¹⁷ A couple of the authors mentioned above illustrate, in somewhat different ways, the climatic melding of past, present, and future. As he reached toward the conclusion of *Floods, Famines and Emperors*, for example, Fagan paused to observe: “History tells us that El-Niños have sometimes provided the knockout punch that topples states and great rulers. How infinitely greater these kinds of stresses are in our overpopulated and polluted world! If the scientists are right . . . then the fate of entire

nations could lie in the unrelenting punches” of climatic events.¹⁸ As for humankind’s fragility in the face of a tyrannical climate, he remarked that we moderns “have not erased our vulnerability but merely traded it upscale.”¹⁹ Such comments catch the eye of reviewers and blurb writers who hungrily fasten on contemporary lessons to be drawn from historical inquiries. The dust jacket of *The Great Warming*, for example, used as advertising copy the *Publishers Weekly* remark that “looking backward, Fagan presents a well-documented warning to those who choose to look forward.”²⁰

With an eye to current preoccupations, another prominent historian, Wolfgang Behringer, began his *Cultural History of Climate* by calling attention to how historical investigations can inform contemporary practice. The experience of the Little Ice Age in Europe during the sixteenth and seventeenth centuries, he insisted, “may be regarded as a trial run for *global warming*.” “We shall learn from it,” he continued, “that even minor changes in the climate may result in huge social, political and religious convulsions.” One of the prevailing motifs that wound its way through this narrative was the thought that climatic challenges inspire human creativity. To put it another way, Behringer’s was not a chronicle of despair but rather a hermeneutics of hope. “The world did not collapse” during the Little Ice Age, he noted. “Instead, the crisis provoked a flexible cultural response, and even a lasting improvement in living conditions.”²¹ History, in this vein, is once again staged as a sequence of cautionary parables intended to encourage us to imagine a more creative public conversation by taking the possibilities as seriously as the perils of climate change.

For both advocates and detractors alike, the second concern—the specter of determinism—haunts the landscape of climatic theories of history and society. Diamond, for instance, claimed to be fully aware of the nasty aroma that has long clung to geographical determinism in various guises—an ugly racism, cultural supremacism, and the like. But these, he reckoned, were merely unfortunate contingent accretions to climatic causation; they were not intrinsic to it. Its sense of fatalism, too, has troubled many, but Diamond insisted that necessitarian defeatism was merely a confusion “of an explanation of causes with a justification or acceptance of results.”²² Not everyone has found his self-defense compelling. One critic insisted that Diamond had callously relegated the fate of large numbers of people to their natural environments and at the same time given the public a seemingly “scientific” justification for Eurocentric prejudice—whatever his claims to the contrary.²³ Another charged him with what might be dubbed causal impressionism. “In order to demonstrate the veracity of a cause-and-effect explanation,” Andrew Sluyter

insisted, “every link in the chain—from putative first cause right up to final effect—requires serious attention”—something that was just impossible when the trails of influence are strung out over five centuries. Even more troubling to Sluyter were the “harmful policies” *Guns, Germs and Steel* had the uncanny potential to unleash, and he thus warned his readers in no uncertain terms that Diamond’s “junk science” demanded “vigorous intellectual damage control.”²⁴ Others were convinced that Diamond had factored out of historical explanation the role of “human consciousness, desire, political power” and suchlike “in the distribution of wealth and power.” In the end, they concluded, his cardinal error was conceptual—elevating “limiting factors to the level of causation.”²⁵

Closely connected has been the temptation to succumb to the enticements of what Mike Hulme has labeled epistemological slippage. By this, he means the inclination to transfer “predictive authority from one domain of knowledge to another without appropriate theoretical or analytical justification.” Because scientists make authoritative claims about historical and prospective climates, there is a tendency to imagine the past and future as “climate-shaped” and to gloss over social, cultural, and political atmospherics. And something similar underlies Hulme’s suspicion that a good deal of climatic futurology is erected on what he calls climate reductionism. That is a process in which “climate is first extracted from the matrix of interdependencies that shape human life within the physical world” and then “elevated to the role of dominant predictor variable.” What has so enormously facilitated the “eschatological rhetoric” characteristic of this turn to “climate-driven destiny” is the “hegemony” exerted by predictive natural sciences like climate modeling. In Hulme’s view, the development of computer-based simulation models by a powerful epistemic community of climate scientists “has allowed a form of climate reductionism to dominate contemporary analysis and thinking about the future.”²⁶

If Hulme’s analysis is in the right neighborhood, then it will be wise to pay close attention to Mary Midgley’s remark that if the aim of reductionism is to simplify explanation, a “mere exercise in logical hygiene” as she has it, then we need to be sure that we are not operating with a false economy. For alongside this appeal to epistemic frugality is the ironic, if common, inclination to engage in a gross expansion of the territory over which the explanation is claimed to have jurisdiction. These are the “lush speculative outgrowths” that Midgley regards as “designed to stimulate the imagination” to travel “in unexpected directions rather than to discipline it.”²⁷ In many ways, this chimes with the observation of Philip Smith and Nicolas Howe that “more and more aspects

of planetary ecology and social experience are tethered in one way or another” in the rhetoric of climate change.²⁸

The explanatory powers attributed to climate, of course, come in various shapes and sizes. Sometimes it is the direct influence of climate on human bodies or historical events that advocates have in mind. Sometimes climate’s influence is believed to be indirect, modulated by or operating through a range of other agents. On some occasions, the causal chain is short and immediate; on others, it is long and circuitous. Sometimes climatic explanations are mono-causal; sometimes they operate in conjunction with other mechanisms. Plainly, advocates of climatic causation have adopted different stances—some softer, some harder—on just how climate influences history and society. And indeed there has been long-standing fluidity about what the designation “determinism” actually names. Frequently, those most often dubbed environmental or climatic determinists eschew the label for one reason or another. At the same time, there are those, like Robert Kaplan, who warmly embrace determinism with all its fatalistic overtones. Having found in Europe’s temperate zone “the perfect degree” of environmental challenge to stimulate its denizens “to rise to greater civilizational heights,” he told his readers of their need to engage with geographical determinists who “make liberal humanists profoundly uneasy.” These figures, he went on, “were hardly philosophers: rather, they were geographers, historians and strategists who assumed the map determined nearly everything, leaving relatively little room for human agency.”²⁹ All of this cautions against seeking terminological exactitude in dealing with a suite of concepts that are related more by family resemblance than analytical specificity. In my view, it is a mistake to impose conceptual clarity on ideas that display historical opacity. Rather than operating with a stipulative definition or seeking philosophical precision, we would be better advised to work empirically and endeavor to map the different shapes and forms “climatic determinism” has assumed. That at least is the perspective that will guide us on the journey on which we are about to embark.

Explorations in the Empire of Climate

Exploring the empire of climate is my quest in this book. It is an expansive domain extending both backward and forward in time, as well as in the scope of items that are believed to come under its sway. There is no one correct way to navigate this conceptual space any more than there is one way to arrange books on a shelf or paint a landscape. My approach has been to begin from a

series of contemporary concerns about the influence of climate and climate change on human life and to set these preoccupations in a much wider historical context. Accordingly, I have chosen four arenas where the impact of weather and climate continues to be a source of distress or intrigue: health, mind, wealth, and war. I make no claim to have comprehensively mapped this terrain. Specialists in various fields will no doubt discern silences and absences, born as much of ignorance as of necessity, in my cartography. My aim, however, is to be suggestive rather than exhaustive, indicative rather than all-inclusive. But I hope nonetheless that the four major baselines that structure how I have sought to navigate *The Empire of Climate* will throw light on contemporary anxieties, encourage others to continue exploring this realm, and perhaps even better equip our own society for the climatic challenges that we all face. I am quite persuaded by Hulme's telling observation that the recent "phenomenon of climate-change is not a decisive break from the past, neither it is a unique outcome of modernity." Rather, climate change should be seen, as he puts it, "as the latest stage in the cultural evolution of the idea of climate, an idea which enables humans to live with their weather through a widening and changing range of cultural and material artefacts, practices, rituals and symbols."³⁰

Part I begins with the anticipated effects of contemporary and future climate change on human health. Cardiovascular, neurological, respiratory, and many other disorders are anticipated to sharply rise with climate change, thereby putting unbearable pressure on public health systems. Allusions to the writings of the ancient Greek physician Hippocrates are not uncommon among these assessments, and accordingly, we initially inspect the Hippocratic *On Airs, Waters and Places* and its ongoing legacy.³¹ The modern revitalization of this tradition owes much to the seventeenth-century contributions of Thomas Sydenham, whose Baconian outlook reinforced the role he allocated to climate in a range of seasonal disorders. Other medical authors during the period of the Scientific Revolution bear further witness to the vitality of the Hippocratic inheritance at the time. The development of a burgeoning literature on medical geography during the eighteenth and nineteenth centuries continued this tradition and had the politically potent effect of dividing the world into sickly and salubrious spaces according to climatic regime. The resulting medical cartography encouraged those with particular conditions, and who could afford it, to move temporarily or permanently to sites where the climate was deemed beneficial to their health.³² Such concerns also deeply affected those Europeans who, for one reason or another, spent long periods of time in the tropical world because they were on military duty, were part of

colonial officialdom, engaged in business enterprises, or answered a missionary calling. They and their families, believing themselves to be in danger from the malign influence of a tropical sun, sought refuge away from the “infested” lowlands in hill stations where efforts were made to replicate European sites of domesticity and cultural landscapes.

So significant was this latter enterprise to the imperial powers that I devote chapter 3 to the invention and reinvention of the tropical world as a medical *and* a moral domain. Concerns about the direct influence of the sun’s rays on European constitutions stimulated a brisk trade in handbooks of tropical medicine designed to offer prophylactic advice to imperial travelers on how to remain well in the low latitudes. Often the recommendations turned sermonic, with advice being offered on moral hygiene in its widest sense. Whether or not Europeans could acclimatize to these conditions deeply divided medical and political opinion for on its resolution the very nature of empire crucially depended. Along the way, local people and places often, but not always, found themselves represented as diseased and dangerous and dissolute. To meet these challenges, a whole range of strategies—textile, sartorial, architectural, medicinal, behavioral, symbolic—were put in place to protect Europeans from climatic evils. All of these came under the influence of the empire’s potent climate.³³

In this connection, Amitav Ghosh is doubtless entirely correct to remind us, in *The Great Derangement*, that to look at the current “climate crisis through the prism of empire is to recognize . . . that the continent of Asia is conceptually critical to every aspect of global warming: its causes, its philosophical and historical implications, and the possibility of a global response to it.”³⁴ But it is equally vital to recall that the peoples of Asia, Africa, and other parts of “the empire” were often on the receiving end of climate’s conceptual condemnation long before the recent threats of climate change were registered. For the denunciation of tropical climates went hand in hand with the denigration of tropical peoples—medically, morally, and mentally. At the same time, indigenous peoples were sometimes thought to be superior to white colonizers in coping with tropical conditions, and this served to provide a naturalistic apologia for labor exploitation and, in some cases, to build a political system on the philosophy of sun and slavery. By the same token, the trope of tropical vulnerability among Europeans provided critics, some African and Asian, with the opportunity to present medical and other scientific evidence aimed to discourage aspiring colonial settlers and to cast serious doubts on long-term imperial success. Either way, traces of tropicality persisted well into the twentieth century, particularly among those with a passion to racialize climatology.

The final section of part I further follows this residual legacy by dwelling on the development of the science of biometeorology and the mobilization of its neo-Hippocratic health philosophy for eugenic ends by some of its pioneers. Here medical practitioners, enamored of finding causal connections between weather and well-being, and frequently engaging in tropical disparagement, found a comfortable home. The expression of these sentiments took many forms. Some sought to Darwinize the entire enterprise by translating their obsession with meteorology and medicine into a lexicon of fitness for environment, struggle for survival, and natural selection. Huge amounts of medical-meteorological data, reaching into thousands of pages, were accumulated by enthusiasts like William F. Petersen, who, during the 1930s and 1940s, sought to link the passing of cyclonic weather systems with seasonal patterns in the occurrence of vascular disease, gallbladder disorders, tuberculosis, coronary thrombosis, thyroid disease, and many more. Some found in this bioclimatic synthesis grounds for tightening American regulations on immigration to ensure that the eugenic health of the population was not compromised by the influx of foreigners from so-called inferior climatic regimes. Those zones were home to the lowest rungs of human potential and were reported to be deficient in vital energy. Others dwelt on the climatic circumstances that pertained during early human evolution and marshaled their findings to insist that there were climatic optima—temperature in particular—for reproduction and birth, as indeed for physical well-being, intellectual development, and mental stability. Convictions of this sort found their way into eugenic catechisms designed to instruct prospective parents on doing the best thing for their offspring. The idea of an optimal season for conception, the causes of differential birth rates within a population, and calls to further advance eugenic selection fed into these recommendations. There were implications too for a host of dysgenic anxieties about criminality, idiocy, and insanity that were thought to correlate with birth month. More recently, in the context of unprecedented anthropogenic climate change, popular writings keeping this picture before the minds of the general public demonstrate the lingering resonances of these earlier biometeorological preoccupations.

Part II takes as its center of gravity the influence of weather and climate on the human mind. In the first of the two chapters comprising this section, attention falls on the early evolution of the human species and its cognitive powers. The current enthusiasm for identifying climate as a critical causal factor in the emergence of the human brain can be traced back to at least the early twentieth century, when Darwinian natural scientists identified changes

in climate as the fundamental driver of evolutionary development. To communicate the patterns of vertebrate geography that ensued, a number of students of historical zoogeography resorted to the visual rhetoric of cartography to convey the evolutionary story they espoused. The focus here is initially on a set of writers who turned to a north polar projection of the globe in order to visualize the chronicle of human development. This projection, by relegating hot climates to the fringes of the map and by giving optical dominance to northern climes, facilitated a narrative that gave pride of place to what they described as “Caucasian” and “Mongolian” races while relegating “Negroes” and “Australians” to the edge of global space and to the margins of human significance. Climate-inspired cartography in this register, frequently expressed in the anthropometric language of head form and cephalic index, fed an evolutionary imagination structured by a racialized hermeneutic of human history.

While expressing dissatisfaction with this racial rendering of human evolution, recent students of paleoanthropology have nonetheless frequently resorted to climate change as the major evolutionary forcing-agent in the emergence of large-brained hominids. Different explanations for causally connecting climate change and human evolution have been put forward. Some have linked their bioclimatic model of head-form evolution with crucial behavioral changes in the anthropoid move from tree-dwelling to grassland habitation. Others have dwelt on the development of flexible cognitive capacities that successful hominids evolved to meet the challenges of rapid climate changes. Those who developed a “brain for all seasons,” as it has been styled, enjoyed selective advantage in the Darwinian struggle for life. Yet others turned to the connections between head form and thermoregulation in search of an explanation for human brain development and have not been slow to link their tale of early human evolution with latter-day challenges arising from global warming. While contemporary paleoanthropologists routinely distance themselves from what are widely regarded as the excesses of climatic determinism, there are those who continue to wonder if these more recent accounts of climate, crania, and cognition have successfully jettisoned the racial resonances of their early twentieth-century predecessors. At the same time, others, noting that climate causation chimes with present anxieties over global warming, have pondered whether the research agenda of paleoanthropology has been steered as much by contemporary concerns about rampant climate change as by the environmental record of humanity’s deep past.

Chapter 6 follows another route into the realms of mind and meteorology by charting something of the different ways the human psyche has been reported

to be responsive to the dictates of atmospheric conditions. The impact of climate change on individual and community mental health has become a subject of much contemporary concern, whether on account of extreme weather, oppressively high temperatures, or the experience of flooding, drought, and hurricanes. Early roots of the impulse to find in the weather the source of psychological dispositions and disorders, however, are to be found in the ethnographic components of the Hippocratic *On Airs, Waters and Places*. The modern revitalization of this tradition owed much to the physiological theory of mind advanced by Montesquieu in the eighteenth century, which allowed him to associate national character with the earth's climatic zones. Later writers continued to find causal relations between temperature and temperament, and they expanded the meteorological forces that shaped local psychologies to include the effects of wind on regional psyche. As these and other neo-Hippocratics saw it, climate reached into the deepest recesses of the human soul. Moods, morals, and mind-sets were all believed to be subject to the imperatives of the weather.

One particular dimension of mental life that attracted growing attention during the eighteenth century and well beyond was the association between meteorology and melancholy. Whether portrayed as nervous exhaustion, neurasthenia, depression, or just low spirits, numerous writers fastened on the climate as a major determinant of this mental health syndrome. This condition, frequently discussed in the context of the effect of hot weather on European constitutions, was typically taken as a colonial ailment par excellence. But the underlying premise was often expanded into a general climate theory of psychic constitution. The correlation between mind, metabolism, and month of the year prompted a number of writers to identify seasonal patterns in instances of suicide, prevalence of crime, periodic mood swings, and the performance of schoolchildren. One of the more conspicuous conditions to emerge from this tradition of inquiry was seasonal affective disorder, for which a number of different, if related, modes of climatic influence have been identified. Closely associated is a rapidly expanding body of research on the causal influence of high temperatures on aggression, violence, and anger among individuals and communities inhabiting particular climatic regimes. These findings, however, have been contested as other researchers relate higher temperatures to more positive mood swings. Either way, thermic theories of temperament encouraged some to construct global climatic geographies of crime, cognition, and mental constitution. The possibilities afforded by this branch of psychological research for future-casting in the context of rapid climate change have proven to be extensive.

Some of the themes that wend their way through these first two parts of *The Empire of Climate* continue to manifest themselves in the chapters on wealth that constitute part III of my account. The first of these, chapter 7, introduces the theme of “weather, wealth, and zonal economics” by drawing attention to a spate of recent online publications pondering the influence of climate on national economies. These journalistic reports, while sometimes contested, glean support for their claims in the writings of economists, one a Nobel laureate, who find distance from the equator—a surrogate for climate zone—to be a major determinant of the wealth of nations. The direct reference in some of this work to the earlier zonal history of civilization by the fourteenth-century Islamic scholar Ibn Khaldūn and later Montesquieu prompts a reexamination of their thinking on zonal wealth and the physiology of economic performance. In their writings, and in those of a number of other political thinkers, travelers, and philosophers, economics was all-of-a-piece with a climatic philosophy of civilization. Such naturalistic theories of economy and culture were often constructed on the physiology of the human body and its responses to climatic forces. Increasingly, industrial progress, intellectual accomplishment, aesthetic sensibility, legislative structures, and technological achievements were brought within climate’s sphere of influence.

The impact of Montesquieu’s zonal geo-philosophy was both deep and lasting. It was picked up by Immanuel Kant in his reflections on the different human races, by David Hume in his essay on national character, and by Johann Gottfried Herder, who, though rather more ambiguous, nonetheless insisted that local geography irresistibly impressed itself on human cultures. In the writings of European geographers like Alexander von Humboldt and Friedrich Ratzel, this zonal portrayal of civilization and the wealth of nations continued to flourish. Moreover, Realpolitik of the most practical kind flowed from the zonal *mentalité*, not least in debates about the naturalization of slavery and the problems of colonial labor and wealth generation in tropical empires.³⁵

My second cut at the bonding of weather and wealth, chapter 8, continues the theme of what I call the “sun, soil, and slavery” nexus. The diffusion across the Atlantic of the zonal geopolitical model of the world’s wealth, notably by the Swiss geologist and geographer Arnold Guyot, further reinforced in the United States a long-standing resort to a climatic apologia for the slave labor that powered the plantation agriculture of the Old South. Even while voicing support for abolition, Guyot nonetheless typecast the temperate zone as fitting its inhabitants to legislate, the hot zone to labor—one to govern, the other to grind. There had, of course, already been moves to justify American slavery

on climatic grounds. Thomas Jefferson, for example, had earlier connected climate, African physiology, and slave labor. At much greater length, and with yet more extreme language, nineteenth-century racial supremacists like John Van Evrie opposed any thought of emancipation, juxtaposing the mind of the white races to the muscle of the black. Climate had apparently dictated the racial distribution of brain and brawn. During the final decades of the nineteenth century and on into the twentieth, prominent American intellectuals enamored of racial science found scientific support for interpreting the wealth of the South's plantation economy as the consequence of its temperature and topography. Here the moral ecology of the weather-and-wealth school of economic geography appears in its darkest light.

Weather and wealth, of course, could be causally conjoined in other ways too. The exceptionally popular mid-nineteenth-century English historian Henry Thomas Buckle is a case in point. Buckle's understanding of wealth and civilization was erected foursquare on his philosophy of food. A positivist ethos and more than a smattering of determinism pervaded his *History of Civilization in England*. The Comtean philosophy of social physics supported Buckle's conviction that history obeyed fixed laws, and chief among the forces of nature that governed human actions was the influence of climate on food production and supply. The different dietary habits of populations in hot and cold climatic zones prompted him to find in the chemistry of food ingestion the roots of national temperaments, the foundation of social institutions, and the chief cornerstone of economic life.

The physiological economics that writers like these frequently espoused had implications for the management of imperial empires across the world. Frequently, the argument was made that because the climate had rendered impossible any responsible self-governance of hot regions, the temperate world must take up the task of overseeing the tropics' rich natural resources. Whether on account of inherent inability, climate-induced lethargy, or because of what were seen as long-standing inclinations toward despotism, European powers debated how best to advance their colonial aspirations in the face of these obstacles and the vulnerability of white bodies in tropical heat. From political judgments of this ilk emerged the idea of tropical trusteeship, by which the resources of the tropical regions could be administered—and exploited—from afar. This mode of governance was naturalized in talk of the difficulties of white acclimatization, the medical tyranny of the climate, and the imperatives of evolutionary progress. Ideas of this stripe, far from gathering dust on the shelves of academia or in the book rooms of gentlemen's dining clubs, were

adopted by a whole suite of British imperial officialdom who fastened on them to support their advocacy of colonial stewardship.

Under the title “Climate, Capital, Civilization,” the final chapter of part III extends the narrative of weather and wealth into the twentieth century and beyond. Here we find a perpetuation of the zonal theory of economic performance; the elaboration of hypotheses about the links between temperature, energy, and worker efficiency; and the continuing interest in tracing the rise and fall of civilizations to the vicissitudes of climate. Besides these, supporters of a climatic explanation of national wealth generation have embarked on projects to demonstrate the response of the market to changing weather conditions, to identify the relationship between economic cycles and cyclical patterns of rainfall, and to rehabilitate physiological economics by placing it on the more secure empirical footing of the human body’s thermoregulatory system. The prognosticated effects of these processes, as climate change increasingly grips the human species, continue to catch the eye of popular science journalists and contributors to a wide range of social media platforms.

We pause first at what I call the atmospherics of employment. Here we inspect efforts to measure worker efficiency and intellectual prowess at different daily and seasonal degrees of temperature. This endeavor furnished not only industrial data but also, in aggregate, a global map of human efficiency, worker productivity, and climatic energy that reinforced long-standing stereotypes. It had the advantage too of fitting snugly with the taken-for-granted assumption that attributed wealth and civilization to the influence of the climate. At the same time, the cognate idea of climatic comfort zones was mobilized, not least in Australia, in efforts to inform government economic strategy and, more controversially, immigration policy. It was a short step to dividing the world into a climatically determined hierarchy of spaces appropriate for white colonial settlement. An impressive visual rhetoric of econographs, homoclims, and climographs accompanied the aspiration to wrest citizenship from the sphere of the humanities and transfer it into the realm of the natural sciences. Advocates of these moves could also call upon efforts to naturalize economics by examining the influence of meteorology on the stock market. During the early decades of the twentieth century, efforts to correlate rainfall cycles with financial crises, trade patterns, and the general price index were advanced to make sense of market fluctuations. Some of these endeavors caught the eye of ecologists interested in biological cycles, investment managers, and writers of climatology textbooks. More recently, and with a seemingly broad readership, numerous books have appeared resurrecting, if not transforming, the old idea

that the fate of civilization is to be found in the climate. Here too, past, present, and future merge in projects to use archaeological inquiries about ancient civilizations as morality tales for the Anthropocene future. All of these, in one way or another, can be seen as a continuation of Montesquieu's vision of climate as the greatest of all empires. So, too, can the return to what has been called physioeconomics, an approach to macroeconomics that attributes growth and stagnation to the effects of temperature on the body's success or failure to maintain homeostasis in the different climate zones.

Two chapters on climate and conflict constitute part IV—the final section—of my analysis. Chapter 10 begins by drawing attention to a spate of popular publications tracing the outbreak of hostilities, both present and prophesied, to the effects of global warming. While analysts of these climate wars tend to dwell on climate *change* as a dominant catalyst for internecine and international war, the impulse to find in atmospheric conditions the cause of warfare has a much deeper history. The humoral theories of temperament adopted by the ancient Hippocratics meant that some peoples were believed to be more prone to warlike behavior than others who were portrayed as possessing a gentler disposition. Proposals of this sort continued to attract supporters and flourished in the wake of Montesquieu, who remarked that while cold climates induced bravery, the inhabitants of warmer climes were fearful. The geography of human temperament that such portrayals delivered was explained by reference to climate and the workings of the cardiovascular system.

One conspicuous application of this neo-Hippocratic philosophy to civil conflict appeared in John William Draper's mid-nineteenth-century *History of the American Civil War*. Draper attributed the commercial and cultural differences between the northern and southern states to the agency of climate acting on human physiology. To him, cold climates promoted abolition; hot climates resisted it. Later writers, too, regarding slavery as a product of the differing climatic and physiographic geographies of these zones, found in climate and landscape the prime movers of the Civil War. In doing so, they easily managed to bypass any talk of moral accountability or recrimination on either side. Yet more recently, paleoenvironmental research on the Little Ice Age during the sixteenth to nineteenth centuries has encouraged many writers to find in the harsh climatic conditions of the time the genesis of social unrest, the incitement to insurrection, the outbreak of hostilities, and the advent of civil strife. That case has been prosecuted with different degrees of determinative intensity and has certainly attracted its fair share of critics. But, even if in different ways, that idea has gripped the imagination of many who harbor deep concerns

about the intensification of bloodshed that climate change is expected to trigger in the years to come.

Finally, chapter 11 pursues this line of thinking into the late twentieth and twenty-first centuries by examining something of how climate change has become a matter of national security concern. A proliferating literature has appeared over the past couple of decades arguing for a strong causal relationship between global climate change and civil conflict. Some of these are synthetic overviews making generalized correlations between weather and war, some have focused on the effects of El Niño, others present data covering several centuries, and still others focus on conflict in particular venues—China, Darfur, Kenya, South Africa. In pursuit of support for the weather-and-warfare thesis, advocates have frequently resorted to historical episodes for illustration and corroboration, though sometimes with rather contradictory results. The inferences drawn from paleoenvironmental data from thirteenth-century Mongolia during the time of Genghis Khan (Chinggis Khaan) are a case in point. Numerous news outlets reported in 2014 that a temporary period of warm, wet conditions, ascertained from tree-ring records, had spurred the rise of the Mongol empire. By contrast, early twentieth-century explanations for the success of Genghis Khan laid emphasis on what at the time were believed to be increasingly arid conditions in Central Asia. Somewhere along the lines, the need to attend to counterfactuals would seem to have been overlooked.

Nevertheless, the corpus of work on climate and conflict has resulted in calls for climate change to be located at the heart of national security agendas, and a range of Pentagon-orientated reports on the subject have appeared under the auspices of military personnel. Needless to say, critics have not altogether welcomed these developments. Many have challenged the wisdom of espousing the neo-Malthusian struggle for resources that frequently underlies the climate-and-conflict thesis, not least on account of its fatalist sense of naturalistic inevitability.³⁶ Alex de Waal, human rights activist and research professor at Tufts University, for example, expresses concern at the simplistic harnessing of climate change as the cause of the Darfur crisis. Climate change may indeed be a factor in the outbreak of conflict, he concedes, but adds that “social institutions can handle these conflicts and settle them in a non-violent manner—it is mismanagement and militarization that cause war and massacre.”³⁷

I have taken health, mind, wealth, and war as the cardinal points of the map I have constructed of the empire of climate. Others will survey this territory

differently using different coordinates and foregrounding different landscape features. Besides, there is no doubt many subregions have escaped my cartographic endeavors. All of this is simply because there are multiple routes across any piece of terrain and different horizonscapes to catch the eye. It will be obvious too from what follows that the streams of thought and pathways of influence that I identify crisscrossed in complex and sometimes unexpected ways, converging and diverging across medical, mental, monetary, and military landscapes. Some figures will appear in several different sections of the book on different, but related, themes. This is because medical climatology, for example, intersected in key ways with judgments about weather and wealth. Ideas about the influence of climate on the human psyche were swept into theories about market performance, stock prices, and economic cycles. The impact of climate on the human body was mobilized to justify racial hierarchy, slave labor, and imperial supervision. Those interested in the environmental origins of war sometimes relied on a latitudinal geography of temperament and emotion, sometimes on the different labor systems the climate supposedly fostered, and sometimes on a Malthusian struggle for diminishing resources. Proposals causally linking climatic conditions with the evolution of the human brain can be found constructing racial hierarchies, judging colonial success or failure, and dwelling on the climatic determination of the human psyche. These intersecting streams of thought demonstrate something of the manifold tributaries and rivulets that zigzag their way across the empire of climate. But by focusing on health, mind, wealth, and war, my aim has been to excavate a history of the present. I do not mean this in the presentist sense of Whiggish history; my intention is rather to underscore the ongoing fusion of past, present, and future horizons so as to expose the multifarious, contradictory, and contested ways in which the story of climate and humanity has been, and continues to be, told.

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