The Winds of Change:
Climate, Weather, and the Destruction of Civilization
By Eugene Linden

Preface

I've been writing about nature and the environment since the early 1970s. I've watched as some environmental catastrophes have materialized, while with others it has been "Never mind." Lake Erie did not die as some predicted when I was a college student, and, as skeptics of global warming point out constantly, we have not begun a plunge into a new ice age, which was the prediction of some climatologists in the 1970s. On the other hand, even decades of insistent warnings could not prepare Americans for the actual horrors that Hurricane Katrina unleashed in August 2005. Turbo-charged by complacency, folly, and incompetence, Katrina destroyed a great city, transforming New Orleans into a septic stew of floating bodies, roaming gangs, disease, and toxic slime. The storm launched a wave of refugees not seen in the United States since the Dust Bowl, and the damage inflicted on crucial energy and transport infrastructure sent ripples throughout the economy.

If there is a message to take away from a look back at past predictions of potential calamity, it is that the risks of erring on the side of caution tend to be fewer than the costs of dismissing predicted threats out of hand. Alarms about Lake Erie mobilized people and governments to take action, and in proving doomsayers wrong, the cleanup also created billions of dollars in value as the lake area became a draw for real estate and recreation. While in the United States officials took action to clean up the air and water beginning in the 1970s, elsewhere in the world environmental threats such as deforestation and extinction are more critical today than they were thirty years ago.

Perhaps the most revealing aspect of this look backward to the early 1970s, however, is the threats that were not there, but which have since risen to prominence. Most prominent would be the possibility of climate change. In the late 1970s, climate specialists first started worrying about the possibility (and indeed a report submitted to President Jimmy Carter in 1979 was right on the money about noticeable changes in climate by the year 2000 if nothing was done to check emissions of greenhouse gases), but with the Iranian hostage crisis and stagflation dominating public concerns, the warning got little notice. The possibility that humans might be altering climate (performing a global experiment with us in the test tube, as some scientists put it) only became an issue in 1988, when Washington sweltered during an abnormal heat wave at the same time that Senator Timothy Wirth held hearings on the issue.

Assignments have taken me to both polar regions and out into the Gulf Stream in attempts to keep pace with the science of this unfolding story. Since 1988, public concerns about climate change have waxed and waned with the weather, but in the United States at least, climate change has not been a pressing issue for the public despite periodic alarms raised by scientists. I have more to say about this in Chapter 18, but at least part of the problem is that, for all practical purposes, the threat is unprecedented. In this respect, our attitudes toward climate change are a little like American attitudes toward terrorism before September 11, 2001, or the attitude toward tsunamis of a tourist visiting Phuket, Thailand, before December 26, 2004.

With regard to climate, it's hard to imagine that we puny humans could affect something so all-encompassing as climate itself; it's hard to imagine what it would mean if climate started changing everywhere on earth; and today even those Americans who view climate change as a threat see it as an event that lies far off in the future.

After all, Americans suffer extremes of weather all the time without any long-term disruption of the economy. If climate change brings more extreme weather, the economy will absorb that too. Similar attitudes and such confidence might well have characterized the Akkadian priests in 2200 b.c., the rulers of the Old Kingdom in Egypt at that same time, the Mayan elite in a.d. 900, the Anasazi in the American Southwest, the Norse settlers in Greenland before a.d. 1350, and many other societies and civilizations which would discover that climate, as oceanographer Wallace Broecker puts it, "is an angry beast."

We humans have a difficult time estimating risk. We spend disproportionate energy worrying about statistically insignificant risks -- e.g., being attacked by sharks -- and yet are blasé about the risks of getting behind the wheel of a car. We are probably at our worst when estimating the risk of something, such as global climate change, that has not yet happened, or happened long ago.

For present-day Americans, the threat of climate change may be abstract because it is unprecedented, but the impact of climate change on other civilizations is not without precedent. And so perhaps the best way to understand the risks might be to look back at the ways in which climate change has affected successful civilizations in the past. This is an undertaking that has become possible only in the last decade (although visionary climate historians like H. H. Lamb began writing about the impact of climate on history in the 1960s), since prior to the 1990s, the picture of past climate was spotty, and in many cases the resolution too crude to link particular historical events with weather at a given time.

Until very recently, climate has been viewed as static. It was only in the mid nineteenth century that scientists discovered the wrenching changes of the ice ages, but even after that, the prevailing attitude was that the present 10,000-year warm period that gave rise to civilization was monotonously stable. So long as climate was viewed as predictable and stable, there was no pressing need to consider it a factor in the fate of civilizations. (It was the discovery that the warm periods between glacial eras tend to last 10,000 years that in part prompted fears of a new ice age in the mid-1970s.) A scientific paper published in 1997 entitled "Holocene Climate Less Stable Than Previously Thought" shows that the notion that our present climatic era has been boring and predictable persisted until very recently.

Nor have historians and archaeologists greeted climate historians with open arms. Those reconstructing the fate of ancient civilization already have to deal with a full plate of competing factors that could bring down a civilization without any deus ex machina like climate. An archaeologist who has been studying a matrix of trade relations, warfare, internal strife, and political intrigue is not going to drop everything when a paleoclimatologist says, "The weather did it."

In certain cases, however, the evidence is pretty compelling, not just in linking weather to a particular event, but also specific ways in which a changing climate may have undermined the legitimacy of rulers. In some cases, climate change fostered the spread of disease; in others, climate change might have set in motion a chain of events that led to migration and warfare. In one well-documented case, the cold

alone made life untenable. The interplay of climate, politics and economies is complex, but there is evidence from the past that helps us sort this out.

I offer evidence that we disregard the role of climate in history at our peril. I've structured the book along the lines of a case. The opening section presents the prosecution's argument that climate change has either killed off or at least been an accomplice in the fall of several civilizations. It quickly runs through the various victims (and a notable evolutionary beneficiary), and also details the weapons and methods of this civilization killer.

The first chapter of Part Two explores how environmental factors, including climate, have fallen in and out of favor as forces affecting history. Subsequent chapters in this section offer a brief description of the gears of our climate system and then look into the forensics of climate history, describing and assessing the various proxies that paleoclimatologists use to reconstruct past weather. The section also suggests some big unanswered questions about past climate and how climate works, questions that have a bearing on our assessment of the present threat of climate change.

Part Three revisits the cases introduced in the opening section; it presents dissenting opinions and digs deeper into the implications of the proxy evidence. Part Four looks at El Niño as a force in history. Although that familiar event is not nearly as disruptive as other climate events of the more distant past, this regular cycle has had huge impacts on humanity at different times. Some historians argue that a series of El Niños in the late nineteenth century killed more people than the two world wars of the twentieth century combined. Moreover, there is a detailed record of El Niño's role in various historical events that reveals both the resiliency of the modern market economy as well as new vulnerabilities to changing climate.

In Part Five, we return to the present. The first chapter looks in detail at the peculiarities of the climate-change story as it has unfolded since the threat first surfaced. In the next chapter, I join a research expedition in the Gulf Stream to check the health of one of the vital organs of the global climate system. The final section draws on what happened in the past and what is happening in the present to develop a scenario of what we may face in the future.

We have an advantage over past civilizations that were blindsided by climate change. We can learn from their misfortunes.