CHAPTER ONE

The Argument (and Its Limits) in Brief

> The Assyrian came down like the wolf on the fold,
> And his cohorts were gleaming in purple and gold;
> And the sheen of their spears was like stars on the sea,
> When the blue wave rolls nightly on deep Galilee.
>
> Like the leaves of the forest when Summer is green,
> That host with their banners at sunset were seen:
> Like the leaves of the forest when Autumn hath blown,
> That host on the morrow lay withered and strown.
>
> For the Angel of death spread his wings on the blast,
> And breathed in the face of the foe as he pass'd;
> And the eyes of the sleepers wax'd deadly and chill,
> And their hearts but once heaved, and for ever grew still!
>
> – Lord Byron, "The Destruction of Sennacherib" (1815), verses 1–3

> [The] whole damn war business is about nine hundred and ninety-nine parts diarrhea to one part glory.
>
> – Walt Whitman[1]

In 1727, the British Vice-Admiral Francis Hosier sailed with a naval squadron to the shores of what is now Colombia and Panama. His superiors had instructed him to blockade this coast in hopes of preventing a Spanish treasure fleet laden with South American silver from reaching

[1] Traubel (1906–61, 3:293). Whitman served as a nurse in the American Civil War; Byron died in the Greek War of Independence – of malaria.

Spain. Yellow fever broke out on Hosier's ships while they were cruising off Portobelo, killing almost the entire crew. Hosier soon scraped together another crew from Jamaica and returned to his duty, whereupon yellow fever killed the second crew along with the Vice-Admiral. Some 4,000 sailors died without a shot fired. Fourteen years later, Admiral Edward Vernon brought an amphibious strike force of about 29,000 men to the Colombia coast to besiege the Spanish stronghold of Cartagena. Within a few months 22,000 were dead, almost all from diseases, mainly yellow fever but probably malaria as well. The population of the Spanish colonies remained unaffected, and Spain's grip on its American empire remained firm.

The enormous mortality of these expeditions and many more like them was remarkably one-sided. Yellow fever and malaria attacked some people much more often than others, which had political consequences. Although always evolving, the ecological conditions that prevailed in the Greater Caribbean after the 1640s reliably included these twin killers. Strictly speaking, they did not determine the outcomes of struggles for power, but they governed the probabilities of success and failure in military expeditions and settlement schemes. It is perhaps a rude blow to the *amour propre* of our species to think that lowly mosquitoes and mindless viruses can shape our international affairs. But they can.

The Argument

This book aims to show how quests for wealth and power changed ecologies in the Greater Caribbean, and how ecological changes in turn shaped the fortunes of empire, war, and revolution in the years between 1620 and 1914. By "Greater Caribbean" I mean the Atlantic coastal regions of South, Central, and North America, as well as the Caribbean islands themselves, that in the course of the seventeenth and eighteenth centuries became plantation zones: from Surinam to the Chesapeake. The book provides a perspective that takes into account nature – viruses, plasmodia,[2] mosquitoes, monkeys, swamps – as well as humankind in making political history.

From the sixteenth century forward, the great powers of the Atlantic world – chiefly Spain, France, the Netherlands, and Britain – struggled

[2] Plasmodia are parasites, a variety of protozoa. Certain species of plasmodia cause malaria in humans.

among themselves for control over territories, resources, and peoples in the American continents and the Caribbean islands. Additionally, from the late eighteenth century onward some of the peoples of the Americas sought to achieve political independence from those great powers in a series of revolutions that created the United States, Haiti, and several republics in Spanish America. These were stirring events, the stuff of political history, replete with heroism and drama, providing stages for characters such as George Washington, Toussaint Louverture, and Simon Bolívar. They were also the stuff of ecological history.

A full and proper understanding of these events requires not only an appreciation of the social and economic forces at play – something historians have skillfully offered for a long time – but also an appreciation of ecological contexts and concurrent environmental trends, something historians have only lately tried to do. The geopolitical struggles of the Greater Caribbean were fought out mainly in landscapes undergoing rapid environmental change, replete with deforestation, soil erosion, and the installation of plantation agro-ecosystems based on crops such as sugar and rice. The unstable evolving ecologies of the Greater Caribbean provided ideal incubators for the species of mosquitoes that carry two of humankind's most lethal diseases, yellow fever and malaria. The vector of yellow fever is the female of the species *Aedes aegypti*. Although several *Anopheles* species transmit malaria, in the southern colonies of what would become the United States (where malaria helped turn the fortunes of nations) one species, *Anopheles quadrimaculatus*, communicated the disease.[3] Ecological change resulting from the establishment of a plantation economy improved breeding and feeding conditions for both mosquito species, helping them become key actors in the geopolitical struggles of the early modern Atlantic world, if not, strictly speaking, *dramatis personae*.

The microbes behind yellow fever and malaria were also inadvertent historical actors. Humans often have complicated and contradictory motivations. Microbes do not: they "want" to reproduce. The yellow fever virus and malarial plasmodia produced similar geopolitical effects, and they often afflicted the same people at once, but were different organisms with different impacts. In populations without immunities,

[3] *Aedes aegypti* appears in the specialist literature as *A. aegypti* or as *Ae. aegypti*. *Anopheles quadrimaculatus* appears as *A. quadrimaculatus* or *An. quadrimaculatus*.

yellow fever was much more lethal than malaria. It plagued urban areas, whereas malaria haunted rural ones. Yellow fever conferred full immunity upon survivors, whereas malaria victims built up resistance through repeated bouts. The next chapter will say more about yellow fever and malaria, but this much should suffice to understand their historical roles. This book will have more to say about yellow fever than about malaria because yellow fever more often and more powerfully shaped the history of empires and revolutions in the Greater Caribbean.

Mosquitoes and the diseases they carried wrought havoc in the Greater Caribbean, but not indiscriminate havoc. Some people carried no immunities to either disease and easily succumbed to sickness and death. Others, by virtue of having survived childhood in times and places where yellow fever or malaria were commonplace, enjoyed some resistance to either or both, and as a result as adults were much less likely to fall ill or die. This distinction, which is at the heart of the argument, I will call "differential immunity" or, when it refers only to malaria, "differential resistance." I will explain the complexities of this concept in Chapter 2.

Once yellow fever and malaria became common in the Americas, differential immunity gave both diseases political importance. They made it extremely hazardous for outsiders with unprepared immune systems to come to the Greater Caribbean, which in practice mainly meant people from Europe and North America. The hazard escalated if they came in large groups for reasons addressed in Chapter 2. Large-scale settlement schemes, such as those at Darien and Kourou (Chapter 4) routinely collapsed amid searing epidemics.

Large-scale military expeditions usually met the same fate. Before 1800, the great powers tried to take strategic or wealthy colonies from one another whenever suitable opportunity arose. Spanish possessions were especially favored targets because Spain (after 1580 or so) often appeared weaker than its rivals, and because its assets in the Americas, notably its silver mines, seemed especially worth taking. But by relying heavily on locally recruited men and on fortifications of key strongholds, the Spanish managed to retain their American empire despite frequent predatory missions undertaken by imperial rivals. If they could hold out for two months against an attacking force, they could expect yellow fever and malaria to destroy their foes – provided those foes had been recruited from regions of the world that could not prepare human immune systems for the disease environment of the Greater Caribbean. Yellow fever formed a crucial part of Spanish imperial defense. Without it, Spain

might well have lost much of her American empire in the eighteenth century.

After 1770, the tenor of geopolitics in Atlantic America altered. Imperial rivalries persisted but now revolutionary struggles also reverberated throughout the Atlantic world, complicating the political picture. Populations mainly born and raised in the Americas began to agitate for their freedom from imperial control. Once again, differential immunity ensured that yellow fever and malaria shaped the outcomes of these contests. By and large, revolutionary forces enjoyed far greater immunity to these twin killers than did those sent out to quell revolutions, and they learned to exploit that fact. If they could avoid losing quickly on the battlefield, the revolutionaries could prevail in the long run thanks to the systematically partisan attacks of epidemics. And prevail they did.

After successful revolutions between 1775 and 1825 created the United States, Haiti, and several republics in Spanish America, the geopolitical significance of yellow fever and malaria in the American hemisphere abated, mainly because the intensity of conflict subsided and the presence of foreign (and nonimmune) forces became rarer. But it did not disappear entirely. In a scattering of conflicts, especially the insurrections against Spain in late nineteenth-century Cuba, differential immunity still exerted considerable sway. But gradually armies and societies grew more adept at reducing the toll of infectious diseases. By the early twentieth century, when medical researchers had shown that mosquitoes spread both yellow fever and malaria, a new imperial power had arisen, the United States. With efficient mosquito control among its weapons, the U.S. quickly established a small empire of its own in the Caribbean in Puerto Rico, temporarily in Cuba, and most importantly in the case of the Panama Canal. Part of the reason that the U.S. acquired its Caribbean empire when it did was that it could more easily absorb the manpower costs of a tropical empire once its forces learned to keep mosquitoes at bay. In short, this book will argue that those tiny amazons, the female *Aedes aegypti* and *Anopheles quadrimaculatus*, underpinned the geopolitical order in the Americas until the 1770s, after which they undermined it, ushering in a new era of independent states.

The Limits of the Argument

On the first page of his artful polemic, *The Eighteenth Brumaire of Louis Napoleon*, published in 1852, Karl Marx wrote, "Men make their own

history, but they do not make it as they please."[4] He went on to explain that the past powerfully constrains the present, shaping what people think and do, and indeed what they are capable of thinking and doing. While not disputing the wisdom of that lapidary phrase, this book argues that in the Greater Caribbean not only did conditions inherited from the intellectual past constrain human affairs but so did conditions inherited, and evolving, in the ecological realm. People made their own history but they did not make it as they pleased because ecology would not let them.

This book also argues that the reverse was true as well: mosquitoes and viruses made history in the Greater Caribbean but they did so only because soldiers and statesmen, slaves and revolutionaries acted in certain specific ways. Ecology shaped history with unusual force in this context, but that it could do so was a result of both accidents of history and environmental change brought about by human agency. Had the slave trade not brought yellow fever and malaria to the Americas, none of the story offered here would have happened. The disease environment of the Caribbean was a cultural artifact. Had American or Haitian revolutionaries not taken their stands, malaria and yellow fever would have had no chance to undermine empires in the Americas. Had doctors not proven helpless in the face of yellow fever, they might have erased the effects of differential immunity. Humankind and nature make their own history together, but neither can make it as they please.

This, then, is not quite an essay in mosquito determinism, or even environmental determinism, although at times it will seem just that. In trying to highlight what is novel in this argument, I will, as authors often do, underplay other considerations. I will make my case in bold and bald terms, and not repeat endlessly the relevant caveats and qualifications. Passages taken on their own will seem far too deterministic for some readers, with a simplistic sense of cause and effect. Some readers may take offense, finding my interpretations downplay the heroics of Spanish forces at Cartagena in 1741, of insurgent slaves in Haiti, or of George

[4] Consulted at http://www.marxists.org/archive/marx/works/1852/18th-brumaire/index.htm. There are various translations from the original German, the other leading one being: "Men make their own history, but they do not make it under conditions of their own choosing." Translations in this book are mine, unless otherwise indicated. Where I think the original words might be important to some readers, they are provided.

Washington at Yorktown. But, I hope, the book taken as a whole will seem to provide a blended perspective that emphasizes the mutual and reciprocal impacts of geopolitics and ecology. Each guided the other in an ongoing process, a cotillion of co-evolution.

To some extent, almost all human history is really a co-evolutionary process involving society and nature. But the degree to which this is true varies greatly from context to context. Sometimes the two scarcely affect one another: The mid-nineteenth century intellectual and theological debates surrounding the question of papal infallibility, for example, probably did not turn on any ecological considerations, nor did their resolution have any discernible ecological effects. But in other times and places, the links between human history and ecological history are robust, sometimes to the point where mosquitoes and viruses infringe on the fortunes of humankind in ways that seem unflattering to our species, making us seem mere playthings in dramas wrought (not directed) by tiny, mindless creatures.[5]

This is difficult to appreciate today – fortunately. We have recently experienced a golden age of health and longevity never before attained in human history. Certainly it has been much more golden for some than others, and lately in some countries the modern trend is now in reverse and life expectancies are in decline. If the AIDS pandemic goes unchecked or is joined by other infections running rampant, it may be that the golden age will come to a close. But for the moment, we must recognize how unusual the last century or so has been for human health, and for our human ability to bend the rest of the biosphere to our will – within limits and not without unintended consequences – and remember that it was not always so.[6]

It is not always easy to remember and to give yellow fever and malaria their due. Mosquitoes and pathogens left no memoirs or manifestos. Before 1900, prevalent understandings of disease and health did not recognize their roles, and no one alive grasped their full significance. So they left scant trace in the archives. Subsequently historians, living in the golden age of health, normally failed to see their significance either. Historians, like other humans, typically prefer explanations for the course of human affairs that emphasize human roles and agency (and do not require forays into the domains of ecology or epidemiology). But

[5] Cloudsley-Thompson (1976) pioneered insect-centric history.
[6] McNeill (2000: 194–211) explores this theme.

the mosquitoes and pathogens were there, flitting around the Greater Caribbean, and in pursuit of their uncomplicated goals they had effects on human affairs that we can see reflected in archives and memoirs.

The Limits of the Novelty of the Argument

Two and a half millennia ago, Thucydides thought that an epidemic surging through his native city of Athens was important enough to warrant careful discussion in his account of the Peloponnesian War (Book II, chapters 47–54). Since that time, observers of events and subsequent historians have often recognized that epidemics can interfere in human affairs, including geopolitics, as Lord Byron's stanzas atop this chapter attest. Contemporaries normally understood these cases as evidence of divine intervention, punishment for transgressions of a people or its leaders. Historians, often skeptical of such interpretations, tended to regard epidemics as random and therefore not worth deep investigation. Although their effects might be important, their causes seemed to lie outside the province of the historian. And, most historians supposed, their effects evened out over time, attacking one combatant force, then another, and in the end carrying no consequences beyond the early deaths of those affected. As a result, it is possible to find histories of the American Revolution or the Napoleonic Wars that make no mention of disease at all, even though diseases killed far more combatants than did combat.[7] For that matter, although he noted that the epidemic in question struck Athens and spared its enemies, Thucydides gave it little weight in his effort to explain the Athenian defeat.

However, in the last half century historians acquainted with epidemiology have demonstrated how crucial disease often was in intersocietal encounters, as in all other aspects of human experience – often, but not always.[8] The reluctance to attribute importance to epidemic disease in affairs of state had some basis as long as historians did not range too far afield. When neighboring populations fought one another, they

[7] In both these wars, the British army suffered about eight times as many deaths from disease as from battle. Smallman-Raynor and Cliff (2004: 34).

[8] Among the pioneers were Alfred Crosby (1972, 1986), Philip Curtin (1968), and William McNeill (1976). Medical authors with an interest in warfare preceded them, notably Prinzing (1916), Zinsser (1935), and Major (1940). The latest general treatment is Smallman-Raynor and Cliff (2004).

often carried roughly the same sets of immunities and susceptibilities, so while typhus and dysentery might carry off thousands, they had no systematically partisan effect and could safely be relegated to the footnotes or even neglected altogether – although that would miss the home truth of Whitman's observation at the outset of this chapter. When Europeans fought against other Europeans, or when Chinese fought against other Chinese, in most cases diseases did not serve as arbiters of prolonged struggles, even if they might destroy an army here and there.

The significance of disease in warfare changed when armies fought far from home in unfamiliar disease environments, or fought against people with sharply different immunities and susceptibilities to disease. For example, when armies of China's Qing dynasty fought on the inner Asian steppe against Dzungar Mongols in the eighteenth century, the Qing troops enjoyed a systematic edge because they usually carried immunity to smallpox and the Dzungars generally did not.[9] The Dzungars had been too isolated from the large populations of Eurasia through which smallpox circulated to encounter it in childhood (when it is usually a milder disease) and thereby acquire immunity. But almost every Chinese who reached adulthood was immune. Similarly, when Spanish conquistadors fought Amerindians in sixteenth-century Mexico or Peru, their immunities to smallpox, measles, mumps, whooping cough, and influenza gave them a potent advantage over their enemies. These were situations in which populations carrying fuller arrays of immunities to the so-called "crowd diseases" enjoyed persistent systematic advantages over more isolated populations who did not. Such situations were routine in world history before the twentieth century.[10] The key to this phenomenon, the microbial sword of civilization, is that the crowd diseases were maintained as childhood infections by circulating among crowds, often millions, of people. They prevailed where populations were dense and interactive, and immunized survivors; they did not depend on specific environmental conditions.

[9] Perdue (2005: 47–8, 91–2). The Chinese met their match in the southwest, in Yunnan. The Qing dynasty had to scale back its expansionist ambitions in Yunnan because malaria was so lethal to its troops and administrators. As one Chinese diarist put it: "Its people are neither brave nor vigorous, their weapons dull. They fall far short of Chinese troops and preserved themselves only because of rugged terrain and virulent malaria." Cited in Bello (2005: 283).

[10] Crosby (1986); McNeill (1976).

Less routine but common enough were situations in which armies and navies operated far from home in hostile disease environments for which their backgrounds did not and could not prepare them. The most conspicuous cases took place when invasion forces entered regions with local diseases that could not spread around the world because they depended on specific environmental circumstances. Such diseases then served as shields for local populations. Malaria and yellow fever fall into this category because their spread requires mosquitoes, and the mosquitoes require certain conditions (particularly of temperature). Where those conditions held, malaria and yellow fever might reign. Populations living in such zones paid a considerable price, mainly in the form of high childhood mortality to malaria (and much lower to yellow fever). But in the bargain they acquired resistance (as adults) to lethal diseases that would help them against invaders. For example, most African societies between the Sahara and the Cape of Good Hope enjoyed a systematic edge over invading foreigners because of their resistance to malaria and (in some cases) to yellow fever – an edge that modern military medicine reduced by the 1890s, thereby making European colonialism in Africa much more affordable, tempting – and likely.[11]

Yellow fever and malaria in the Greater Caribbean were not swords of civilization like smallpox and measles, scything down hitherto isolated populations. Nor were they in this case shields for indigenous populations in the sense that they were in Africa because in the Americas they were recently imported diseases. Their role in this context was unusual in several respects. First, conditions conspired to create sharply differential immunity and frequent epidemics, so their power to shape events was magnified to extraordinary proportions. Second, unlike the crowd diseases – which played a fairly consistent role in world history – their geopolitical significance shifted sharply in the late eighteenth century as a result of new currents in Atlantic world politics. Third, with the exception of Haiti, yellow fever and malaria – both originally African diseases – mainly shaped political struggles among Europeans and people

[11] Curtin (1998). Even as late as the Second World War, malaria proved an important factor in campaigns in southeast Asia and the South Pacific, despite the best efforts of military doctors in the Japanese, British, and American armies. But in this case it was not systematically partisan, as all of these armies suffered severely from it because their manpower was mainly recruited from zones that did not provide soldiers with experience of and resistance to malaria.