CHAPTER 9

William H. McNeill: Epidemiological and Biogeographical Perspectives on Civilization

1 PAINTING ON A BIG CANVAS

With an interlude at *Cornell University* where he took his Ph.D., William H. McNeill spent his academic life at the *University of Chicago*, from whence he obtained his bachelor's and master's degree, before returning to serve as *Robert A. Millikan Distinguished Service Professor Emeritus* in the Department of History. Alan R. H. Baker, our geographical historian featured in Chapter 4, credits McNeill with having revivified *a new world history* in the cast of Oswald Spengler and Arnold Toynbee. Indeed, McNeill (1989) admired Toynbee sufficiently to write his full length biography. In turn, Toynbee admired McNeill, saying of his *The Rise of the West*, that it is "the most lucid presentation of world history in narrative form that I know."

Reading McNeill's account of Athens (1979; pp. 94–148) justifies Toynbee's high opinion. Therein, McNeill contrasts Athenian culture circa 500 BC with that of 400 BC. In that space of time, Athens transitioned from the head of *Delian League*, to subsidiary within the Spartan-led *Peloponnesian League*; from hegemon of the Aegean to subordinate polis; from democracy to oligarchy; and from the collector to the payer of tribute. McNeill's narrative of Athenian decline is especially interesting when read in the context of group and individual selection, as described in *multi-level selection theory*[1] (Keller 1999; Reeve and Keller 1999; Leigh 1999). Athens in the year 500 BC had checks to social stratification naturally arising from the use of the phalanx and trireme; for,

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whether guarding the flank of one's fellow soldier or pulling on an oar for the polis, most men found place and esteem within the social nexus. In turn, the encomiums and emoluments accruing to elites were but little resented because they were thought to have been well-earned. This period of Athenian history was further marked by solidarity, political involvement, public service, a tradition of heroism that was emulated, and a robust set of freedoms that were defended. From this state of affairs, McNeill describes decline toward mutual distrust, disinvestment in public life, cession of political responsibilities to professionals, outsourcing of military duties to mercenaries, and philosophical specialization that was erosive of civic engagement. Reminiscent of Toynbee, McNeill locates Athenian civilizational decline precisely in the midst of cultural efflorescence. The most lasting and valued cultural exports of the Athenian world, Platonic philosophy, Euripidean tragedies, and Gorgian skepticism, for example, were symptomatic of decadence. McNeill seems to be suggesting that the spare, hard, cohesive aggregates, supportive of civilizational growth, are like the stem of a plant from which the flower of complexity, culture, and learning briefly blooms. McNeill's own metaphor is geological:

> Civilizations may be likened to mountain ranges, rising through aeons of geologic time, only to have the forces of erosion slowly but ineluctably nibble them down to the level of their surroundings. Within the far shorter time span of human history, civilizations, too, are liable to erosion as the special constellation of circumstances which provoked their rise[2] passes away, while neighboring peoples lift themselves to new cultural heights by borrowing from or otherwise reacting to the civilized achievement. (McNeill 1963; p. 249)

While McNeill could descend into particulars of individual civilizations, as he did in the case of Athenian culture, "his comparative advantage as a historian lay…in painting on a big canvas" (McNeill 1992; p. xv). Cataloguing historical anecdotes from which he wrought broad generalizations, McNeill was able to proceed from induction to deduction with incredible celerity. Drawing on his stock and trade as a world historian, McNeill demonstrated competence in the areas of specialization for all those authors preceding him in this volume: In his treatment of biogeography, McNeill (1963) reads like Huntington; in his treatment of frontier communities, McNeill (1983) reads like Crosby; in his treatment of agricultural yields, McNeill (1963) reads like Baker; in his treatment of mortality, McNeill (1998) reads like Price; in his treatment of population, McNeill (1990) reads like Malthus; in his treatment of procreation, McNeill (1979) reads like Landers; all while treading comfortably in the wake of Toynbee.

2 Epidemiological World History

For all the acknowledged similarities with other world historians like Toynbee,[3] McNeill distinguished himself, not by exhaustively cataloguing societies, but by writing something approaching what might be called *bio-history*, as can be seen in an autobiographical accounting:

> I have emphasized the role of demography in human affairs and tried to show how politics rides on currents of biological ebb and flow. Only by recognizing these levels of human life and the constraints and possibilities they offer to conscious and deliberate management can we expect to become more nearly able to navigate successfully amidst the tumult of our times. (McNeill 1990; p. 70)

Demographic pressures were appreciated as the forerunner to conflict and social change in McNeill's reckoning. Altogether, McNeill is Malthusian. By way of example, he describes Japanese imperialism as motived by domestic population pressures. The Japanese, like the Germans, were looking for *lebensraum*. Further afield, McNeill convincingly traces the assassination of Archduke Ferdinand by Gavrilo Princip to population expansion beginning around 1750; population expansion that advanced in retrained sawtooth fashion before rocketing upward on the contrails of industrialization. The association, not claimed as deterministically causal, but only weakly predisposing after a general fashion, comes in the belligerency between nations, stoked by the dispossessed masses bereft of space and place. As envisioned by McNeill, "global growth of population is the most fundamental and pervasive disturber of human society in modern times." Punctuated population growth can predispose persons to rove in bands, affiliate with dissidents, and defy the social order that has not the room to offer them a place at the Table,[4] as it seems to have done with Princip. McNeill also recognized, at once, the challenge and reward of the Neolithic Revolution. Newfound mastery of ecological constraints purchased agricultural surplus at the price of wearisome fieldwork, “fundamentally at odds with humankind’s propensities as shaped by the hunting experience” (McNeill 1998; p. 59).

Most uniquely, McNeill was epidemiologically astute. He was chief among a very few authors convincing the “historical profession that disease must be taken seriously as a historical force” (McNeill 1992; p. xi). McNeill’s focus on disease as it is differentially present across time, ecologies, and population densities, threaded through several early publications. For instance, in, *The Shape of European History* (1974), malarial mosquitoes migrating from Western Africa are discussed as they affected early Christian Europeans; in *The Great Frontier* (1983), the Black Death is related to the wages of labor; and in *The Global Condition* (1992) there is consideration of how *diseases of civilization* transitioned from epidemic to endemic. McNeill’s epidemiological applications were thereafter collected and expanded upon in his celebrated *Plagues and Peoples.*

One can properly read McNeill as the historian most sensitive to what is referred to as *mortality regimes* by evolutionists. Arising from McNeill’s expertise in both geography and epidemiology, many a passage within Plagues and Peoples show forth an inherent appreciation of mortality regimes as they vary along the *latitudinal diversity gradient*, the drastic ecological changes found along the north-south latitudinal axis (Phillimore 2014):

- “As we have just seen, in sub-Saharan Africa humankind continued to confront biological checks that remained powerfully effective even after human hunting skills had upset the older balances of nature among large-bodied creatures. But when human communities learned to survive and flourish in temperate climes, they faced a simpler biological situation. In general, lower temperatures meant less propitious conditions for life” (McNeill 1998; p. 47).
- “The result is a sharp climatic difference between northern and central China. Among other things, the warmer, moister condition of the South allowed a greater variety of parasites to flourish than could survive in the North. Throughout the Yellow River flood plain, the severe winters killed off parasites that lacked dormant forms capable of resisting prolonged freezing” (McNeill 1998; p. 103).
- “Malaria, although occurring occasionally in the North, is a modern health problem only in the South” (McNeill 1998; p. 105).

As with *latitudinal diversity gradient*, even as McNeill does not use the terminology, he implicitly accounts for both *physical ecology*, abiotic features of landscape and climate, and *community ecology,* the matrix of biological creatures that alternately serve as competitors and resources.

3 Mortality Regime and Ecology

In *Plagues and Peoples,* McNeill (1998; p. 52) condenses into one paragraph, three reasons why the importance of disease diminished for Eurasian migrants, relative to African populations:

> ….it seems probable that outside the tropical zones where humanity had itself evolved, disease organisms were not very important. Parasites that could spread from host to host by direct bodily contact, like lice, or the spirochete of yaws, could survive in temperate climates within small and migratory hunting communities. As long as the infection acted slowly and did not incapacitate the human host too severely or too suddenly, such parasitisms could and probably did travel with hunting communities from humanity's tropical cradlelands throughout the earth. But the array of such infections and infestations was vastly diminished from what had thriven in the tropical luxuriance of humanity's oldest habitat.

McNeill's excerpt leaves us with much to unpack. First, there is the raw effect of migration; literally the release that came of leaving. Upper Paleolithic migrants to Eurasia, in leaving *humanity's oldest habitat,* benefited from *ecological opportunity,* wherein exquisitely evolved parasitic life cycles were disrupted by the abrupt movement of human hosts to harsh northern ecologies. Without reference to the term, McNeill (1998; p. 47) elsewhere marks the concept, as when he wrote of the "initial absence or near-absence of organisms capable of living parasitically on or inside human bodies." Second, release from parasite pressure did not come simply from moving; it came from moving north (Hertler 2015). Even while fleas, ticks, lice, and other *endo-parasites* fared better because they sheltered in the homeostatically controlled tropics of the human body, sources of new infections were curtailed by cold, as were mosquitoes, flies, and many other disease vectors. Third, the concept of *density dependence* explains differences in disease prevalence and lethality between tropical Africa as compared with temperate Eurasia. Relative to this last point, African zoonotic diseases can remain unchecked in their virulence for centuries, as they have the luxury of killing their hosts outright without ending the homeostatic conditions necessary to their existence. Tsetse flies, black flies, sand flies, and mosquitoes can simply travel from one host to another without relying on a cough or sneeze in close quarters. These zoonotic diseases are then more lethal precisely because they are effectively *density independent*. In contrast, classic Eurasian diseases are *density dependent* and so only arise with sufficient population and routinely evolve toward non-lethal virulence as a necessary precondition for successful propagation and persistence. Given a seasonally cold external environment, pathogens who kill only a moderate fraction of their hosts risk thinning the herd sufficiently to render reaching the next host improbable.

Anyone studying the history of early modern and late modern Europe may well balk at any description of populations being sheltered from disease. After all, plague, smallpox, yellow fever, tuberculosis, and dysentery might be thought equally potent analogues to the zoonoses of the south. In reality, the period of potent disease pressure was short lived. Only in the last few millennia of the 50,000 post-migration years of human evolution within Eurasia, was there anything like epidemic disease; and even then was it sporadically suffered within newly emerging metropolitan communities. Only since trade was established between populations, sufficiently dense and densely aggregated, was epidemic infection supported. McNeill himself said as much in noting that epidemic disease exerted extreme pressures on cities like Lisbon and London bringing back *fevers and fluxes* from foreign shores, even while Western Europe "as a whole was scarcely affected" (McNeill 1998; pp. 129–130). Daniel Defoe's *Journal of the Plague Year* is not accidentally set in a large port city, as these epidemic diseases required a "community of between 40,000 and 300,000 persons in order to survive" (McNeill 1976, p. 63). In the same source, on the same page, McNeill goes on to state that, "clearly, such a disease could exist on a permanent basis only among 'civilized' societies, where human populations are comparatively dense and communication nets far-flung." Again, only with density, was pathogenic island hopping from one *98.6* degree outpost to another made possible. Even as the great epidemic diseases rocked European and Asian populations, their effects were broad and diffuse, not clearly dysgenic, and also transitioned from being epidemic to being endemic over the course of two centuries (McNeill 1992). Thereafter, vaccines implemented in the late 1700s began to create herd immunity for diseases like smallpox.

Though biogeographical differences in the incidence and prevalence of disease were recognized as consequential by McNeill, it is not clear that their evolutionary significance was appreciated. Once diseases were less common and less lethal, it became possible for human populations to evolve toward a slower life history; an evolutionary strategy that was predicated on life being *probabilistically* longer and surer. The reduction in mortal disease allowed every future-oriented investment to take on new value: Altruistic acts were more likely to be reciprocated; conscientious agricultural improvements became practicable; parental investment was less likely squandered, as was enculturation, learning, resource creation, and capital accrual.

We would be remiss if we did not mention the following: Northerly migration into cold latitudes made *sLH*-selected, future-oriented behaviors, not only viable, but necessary. The seasonal cold that attenuated disease burden concomitantly augmented climatic threats. Cold can kill hosts as well as parasites. Therefore, those same future-oriented behaviors listed above became necessary as well as practicable, as did other conscientious and future-oriented actions representative of the *sLH*-selected behavioral repertoire. The coming cold is an apt example of *intrinsic* mortality, as discussed in Chapter 5, because it can be predicted, and correspondingly controlled. Methods of control include food growing, gathering, preserving and storage, preparing of skins and shelters, and collecting cordwood and faggots for future fires.

4 Evidence of the Latitudinal Diversity and Consequent Effects on Human Life History

Herein, we have provided a narrative, explanatory of life history variation across populations. Some of the connections and finer details presented are wrought of long experience with life history evolutionary literature. Inevitably, there is some measure of extrapolation in the application. Even so, the central tenets of the foregoing section of this chapter can be pointedly supported with citations; indeed, some have already been so supported in previous chapters. Most notably, chapter two, relating to Huntington's writings, provides evidence of broad population differences in mean life history as documented by the work of J. P. Rushton. Also, in Chapter 5, referencing Richard Price, we have already established the relevance of mortality regime.

Going further, we provide evidence on three points: (1) migration curtailed disease-induced mortality; (2) disease-induced mortality remained high at lower latitudes, and most extreme within tropical

Africa; and (3) sustained disease-induced mortality is highly extrinsic and therefore selects for mating effort against parental effort, and more generally for fast life histories.

Relative to our first point of evidence, the work of Phillips et al. (2010) establishes the general trend for migration's ability to disrupt host-parasite associations. More than this, Bordes et al. (2010; p. 92) dilate upon multiple reasons for declining disease prevalence amidst cold northerly latitudes: (1) the increase in parasite mortality, (2) the decrease in parasite transmission "in various major parasite taxa such as helminths, intestinal protozoans, some viruses, and bacteria," (3) the declining commonality among invertebrates that serve as necessary intermediate hosts, (4) the decline in vector viability, and (5) the decline in species richness among hosts, which functions to restrict the range of reservoirs within which parasites can shelter. Finally, Bar-Yosef and Belfer-Cohen (2001) report survival rates soaring for those humans crossing out of "the disease-plagued belts of Africa." At the same time, these authors contrast southerly zoonoses with *measles*, *mumps*, *rubella*, *influenza*, and other density-dependent diseases commonly affecting Eurasian populations, which are "self-limiting in isolated populations below a certain threshold size."

Relative to our second point of evidence, we now present a tabular compilation of parasite distribution as extracted from Wertheim et al.'s (2012) *Atlas of Human Infectious Diseases*:

#	*Parasite*	*Distribution*	*Geographic regions*	*Prevalence*
1.	Amebiasis	Equatorial	Endemic in Mexico, India, South Africa, some Central and South American countries, and Asian Pacific countries	Not reported
2.	Anisakidosis	Cosmopolitan	Increasingly common in Western European countries and the USA due to the increasing popularity of eating raw fish	Not reported
3.	Babesiosis	Temperate	Temperate climates often containing white-tail deer populations	Not reported
4.	Capillariasis	Equatorial	Philippines, Laos, and Thailand	Not reported

(continued)

#	*Parasite*	*Distribution*	*Geographic regions*	*Prevalence*
5.	Clonorchiasis	Equatorial	Principally Southern China	35 million
6.	Cysticercosis	Cosmopolitan	Endemic full life cycle principally within equatorial areas	Not reported
7.	Diphyllobothriasis	Temperate	USA, Northern Europe and similar climates	Not reported
8.	Dracunculiasis	Equatorial	Sub-Saharan Africa, South Sudan particularly and Southern Asia	Not reported
9.	Echinococcosis	Temperate	North China, and Alaska and similar regions	Not reported
10.	Eosinophilic Meningitis	Equatorial	Largely South China, Africa, and Caribbean	Not reported
11.	Fascioliasis	Equatorial	South China, Thailand	10 million
12.	Filariasis	Equatorial	Sub-Saharan Africa and Southeast Asia	120 million
13.	Hookworm	Equatorial	Sub-Saharan Africa Southeast Asia	740 million
14.	Leishmaniasis, Cutaneous	Equatorial	South America, Bolivia, Peru, Brazil	Not reported
15.	Leishmaniasis, Cutaneous and Mucosal	Cosmopolitan/ equatorial	Stretches to Spain and Italy in northern limits, though present in Middle East and parts of sub-Saharan Africa	1.5 million yearly
16.	Leishmaniasis, Visceral	Cosmopolitan/ equatorial	Most common in Mediterranean in the old world and the Amazonian region in the new	500,000 annually
17.	Loiasis	Equatorial	Principally sub-Saharan Africa, concentrated in tropical rainforests	12–13 million
18.	Malaria, *Plasmodium falciparum*	Equatorial	Concentrated in sub-Saharan Africa, though with distribution pervasive across equatorial regions	500 million in Africa
19.	Malaria, *Plasmodium knowlesi*	Equatorial	Southern Asia	Not reported

(continued)

#	*Parasite*	*Distribution*	*Geographic regions*	*Prevalence*
20.	Malaria, *Plasmodium ovale*	Equatorial	Principally sub-Saharan Africa, though with distribution throughout old world equatorial environments	Not reported
21.	Malaria, *Plasmodium vivax*	Equatorial	Large areas of sub-Saharan Africa, India, Southeast Asia and northern South America	132–391 million cases yearly
22.	Onchocerciasis	Equatorial	Some cases in South and Central America, though concentrated in sub-Saharan Africa	37 million almost exclusively in Africa
23.	Opisthorchiasis	Cosmopolitan/ equatorial	Many cases in Southern Asia, but about one-third of cases found between Northern China and Europe	Approximately 15 million
24.	Paragonimiasis	Cosmopolitan	Africa to Canada	20 million in China alone
25.	Schistosomiasis, Africa	Equatorial	Principally sub-Saharan Africa; secondarily eastern South America	207 million worldwide, 80% in Africa
26.	Schistosomiasis, Asia	Equatorial	Southern Asia	1 million
27.	Strongyloidiasis	Equatorial	Sporadic cases in North America and Europe, but endemic and hyper-endemic only to areas in sub-Saharan Africa and South America	Not reported
28.	Trypanosomiasis, African	Equatorial	Sub-Saharan Africa	50,000–70,000 yearly
29.	Trypanosomiasis, American	Equatorial	Central and South America	7.6 million

In view of the third column, contemplate the ubiquity of equatorially distributed parasites. With that distribution in mind, we turn to our third point of evidence. The disease burden documented above imposes a highly potent form of extrinsic mortality. Consider that even when these parasitic infections are predictable, they are rarely controllable. Some of the waterborne pathogens could potentially be avoided or boiled; some are contracted through unshod feet treading upon contaminated soil and so can be thwarted by a simple pair of shoes; still others can be minimized by the *behavioral immune system*.[5] The behavioral immune system might also be particularly important in curtailing STDs and other diseases contracted through human association. These controls, to the extent that they are implemented, lamentably only nip at the margins. Despite any and all efforts, *the under-5 mortality rate per 1000 live births*, while it may be as low as six in industrialized countries, climbs to 150 for West and Central Africa. Or more simply, consider that *9 out of every 10 childhood deaths from malaria* occur in Africa (Wertheim et al. 2012). No doubt privy to such data, Quinlan (2007) states, parental effort, if it is to evolve, must effectually restrict child mortality. Extrinsic mortality imposed by pathogen and parasite pressure is precisely that which renders intensive parental care ineffectual and even maladaptive (Quinlan 2007; Chisholm 1999). As Quinlan (2007) notes, “it is difficult to imagine” how “parental care could affect exposure to vector-borne pathogens like malaria.” Vector-borne disease effectively increases the so-called *saturation point*; the point beyond which increased parental effort may not evolve (Quinlan 2007). “At high pathogen levels,” Quinlan concludes, “survival may be more a matter of chance than child care.” Under such conditions, mating effort rises relative to parental effort (Figueredo et al. 2005; Ellis et al. 2009; Klug et al. 2012), with the now familiar complex of life history traits following in the *fLH*-selected direction.[6]

NOTES

1. For an extended description of Multi-Level Selection Theory, see *Levels of Selection* (Keller 1999). Briefly, multi-level selection theory is predicated on the “fact that the gene can reside in both individual organisms and groups of organisms,” such that:

> In classical Darwinian Theory, the individual remains a level of aggregation upon which evolution operates, but it transitions from the only level of selection, to one of several levels of selection. All other levels of selection are groups of various sizes. More specifically, families, bands, tribes, regions, states, nations and ethnic populations are candidate groups that comprise the remaining levels of selection. (Woodley of Menie et al. 2017)

Consider also that McNeill's work more generally lends itself to a group selectionist interpretation, as when he writes, "some populations flourished and expanded at the expense of others that either lost their corporate identities after being engulfed by an expanding neighbor or were biologically extinguished" (McNeill 1990; p. 50).

2. When Toynbee spoke of "soul and life-blood and marrow and pith and essence and epitome" we invoked the concept of *biological capital*. Here, in McNeill, we have an equally vague usage: "erosion as the special constellation of circumstances which provoked their rise." Akin to Toynbee, we read "special constellation of circumstances" as waning selective pressures, especially group selective pressures.
3. Recalling Toynbee, McNeill describes how the threat of catastrophic confiscation of life and property at the hands of nomadic raiders induced early agriculturalists to pay rent and taxes to specialists in arms and ruling elites (McNeill 1998; p. 72).
4. Recall here Malthus's analogy using a banquet to suggest that charity compounds the very problem it aims to ameliorate.
5. The *behavioral immune system* refers to behaviors and habits undertaken to avoid contracting disease in the first place; examples include washing hands, avoiding feces, and shunning contact with strangers.
6. It should be noted that any such variance, like all life history variance within species, is moderate. Parental effort reduces mortality in every human population, even as its efficacy with respect to mortality prevention has caused modest evolutionary differences at the level of broad continental populations.

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