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Infectious Disease and the Demography of the Atlantic Peoples

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I WANT to present a new version of the history of the peoples of the Atlantic basin based on a new reading of the documents and data of their story during the last half millennium. I am not the first to propose such a version¹ (being a member of the second generation to have taken it up), but it is new to most people outside the ranks of Americanists, anthropologists, and a few varieties of historians. This version has only begun to appear in college textbooks, and it is still absent from high school textbooks as far as I know. One of the chief reasons for the slowness of its advance into popular perception is that it focuses not on politics and war, which many still think of as *real* history, but on demography and epidemiology, which many would prefer not to think about at all. It focuses on deadly disease, and on how most of us who are now living in the Americas are doing so because our ancestors were either attracted or dragged across the Atlantic to fill vacancies opened up by disease. This is not a particularly ennobling story, and a lot of people believe history should ennoble or be forgotten.

1492

Let me begin with what some will consider a startling premise. I believe that in 1492, population densities in the areas occupied by the advanced peoples of the Old and New Worlds (Europe, Persia,

¹ This thesis has many parents. The two whom I regard most reverentially are Sherburne F. Cook and Woodrow Wilson Borah.

India, China, Mesoamerica, Peru, etc.) were not very different. For instance, it seems likely that the density of settlement in the central valley of Mexico was not far less than that in the Yangzi Valley. Such areas were more numerous and several of them more extensive in the eastern than in the western hemisphere, but these were, I suggest, roughly similar in density of inhabitants. I grant that the number of people per square kilometer in the American grasslands was lower than in the Old World grasslands because Amerindians had no crop as well adapted to steppe climate as the Old World's wheat, barley, millet, or sorghum, and no domesticated herbivore of size except the llama (and that in only one part of the continent). On the other hand, the population densities in the hot, wet lands of the Americas were, according to our best knowledge about the character and geographical distribution of diseases and crops in pre-Columbian times, probably equal to those of similar lands in southern Asia and greater than those in Africa. Old World peoples did have a great advantage over peoples of the New World in livestock and its meat, milk, fiber, skins, and fertilizing manure. But the great advantage of Amerindians over Eurasians and Africans was in suffering from a smaller number of infectious diseases.²

There is an obvious and undeniable contrast in the duration of occupation between Old World peoples and Amerindians circa 1492. The eastern hemisphere was the original home of *Homo sapiens*, and the western hemisphere, comparatively speaking, a new residence for the species. Eurasians and Africans had all the time they needed and more to produce dense populations, but what about Amerindians, who had only inhabited their continents for as few as eleven thousand years, according to some archeologists? To answer that question, let me dig up and adapt to my purposes an old demographic chestnut. It is a statistical fact that if an Amerindian Adam and an Amerindian Eve had initiated human procreation in the New World only eleven thousand years ago, and if the number of their descendants had increased by only 1%

² For evidence and arguments in favor of a highly controversial hypothesis of very large Amerindian population circa 1492, see, for instance, Henry F. Dobyns, "Estimating Aboriginal American Population: An Appraisal of Techniques with a New Hemispheric Estimate," *Current Anthropology* 7 (1966): 395-416. For evidence and arguments in favor of not so large yet considerable numbers of Amerindians, see William M. Denevan, ed., *The Native Population of the Americas in 1492* (Madison: University of Wisconsin Press, 1976); and the second chapter of Russell Thornton, *American Indian Holocaust and Survival: A Population History since 1492* (Norman: University of Oklahoma Press, 1987).

annually—an easy assumption to accept (at first), considering the amounts of space and food available to them—then the Amerindian population in 1492 would have been a sphere of living flesh thousands of light-years in diameter, expanding at many times the speed of light.³ Ergo, the sharp difference in the durations of human occupation between the Old and New Worlds has no real significance demographically.

The burden of evidence rests more heavily on those who state (often on the basis of tradition rather than data) that there were only a few million native Amerindians in 1492 than on those who state (usually after much research and analysis of original sources) that there were tens of millions of people in the New World when Columbus arrived. I doubt that there were any large areas in the New World suitable in soil fertility, climate, flora, and fauna for dense populations that were not already thoroughly occupied in 1492.⁴

AFTER 1492

If the preceding statement is true, then it leads us to a paradox. How could post-Columbian migration from the Old World to the New have been as enormous and swift as it was if the New World were as heavily populated as I claim? Transatlantic migration leaped from zero migrants and zero significance to immense numbers and immense significance in what was, by any standard but that of the recent past, a very short time indeed. The *Völkerwanderung*, the *Drang nach Osten*, the Bantu advance south into Khoisan Africa, the Chinese advance into the Yangzi Valley and beyond—these were driftings that took many centuries; they must be contrasted against rather than compared with the vaultings of the Atlantic since 1492.

The efficiency of the three-masted sailing vessel of Renaissance Europe, then the steamship, and finally the airplane help to explain the size and speed of transatlantic migration, but these astonishing machines only explain how, not why, the post-Columbian millions made the trip. After all, the machines also provided fast transportation to India and China, where fortunes and empires were to be made, but only thousands, not millions, of

³ I dug this chestnut, in a somewhat different form, out of Carlo M. Cipolla, *The Economic History of World Population* (Harmondsworth: Penguin, 1964), pp. 88–89.

⁴ Thornton, *American Indian Holocaust*, pp. 34–37.

migrants embarked from the Atlantic world for Asia. The abruptness and magnitude of the transatlantic transfer of population to the New World were the products of a phenomenon more complicated than innovation in transportation technology.

Today North Americans of all ancestries are apt to think of colonization as the seizure of land and the elimination and displacement of the incumbent population by invaders. But that is not the way conquest has usually worked. It was not, for instance, what William the Conqueror had in mind when he and his Normans took over England in 1066. Land is worthless without laborers, who are as essential to a conquest as the land's flora and fauna. Most of the *conquistadores* and their early successors in America were not trying to propagate an ideology or a religion or their particular subspecies of *Homo sapiens* so much as they were trying to rise economically and socially in the traditional way, through the acquisition of lands with families of laborers to work them.

The first European colonists, Portuguese as well as Spanish, did not want Amerindians to die. They wanted them to be producers, customers, tribute payers, serfs, peasants, peons, and servants. Columbus's original plan for Española (modern-day Haiti and the Dominican Republic) was not that it should become a colony of settlement, but that Europeans should establish trading "factories" there, such as those his fellow Italians had in the Levant and the Portuguese had on the coast of west Africa—small colonies of merchants and their aides organized to carry on trade with and milch the indigenous people. The plans of many of the first Spanish colonists in newly discovered Española were somewhat different, but even more in line with European tradition. They did not want to trade with Amerindians on anything like an equal basis; they wanted to become their lords, supported by the native Americans with gold, food, and labor. The demand of Spanish rebels in Española in 1499, a demand to which Columbus had to acquiesce, was for *encomiendas*, which were defined not as grants of land, but as grants of rights to the labor and tribute of native communities. If Columbus and the sixteenth-century European colonists had been able to do what they had originally planned, there might have been no greater a proportion of Europeans crossing the Atlantic after 1492 than Normans crossing the English Channel after 1066.⁵ But then came the epidemics, which

⁵ Samuel Eliot Morison, trans., *Journals and Other Documents on the Life and Voyages of Christopher Columbus* (New York: Heritage Press, 1963), pp. 199–200;

changed the colonists's plans, all American societies, and Europe—indeed, the entire world.

THE EPIDEMICS

The arrival of large numbers of Europeans and Africans in a given area of the Americas was always followed by a rapid, even catastrophic, decline in the aboriginal population. The invaders' gross mistreatment of the indigenes steepened the decline, but its chief cause was the pathogens the invaders inadvertently brought with them, germs that caused numerous epidemics of an extent and mortality comparable to the fourteenth-century Black Death in Eurasia and North Africa. Scholars and scientists have carefully assembled various lists of diseases that arrived in the Americas with Europeans and Africans. These lists vary somewhat in length and content, being products of what must be speculation, however well informed. Most contain the following maladies: smallpox, measles, diphtheria, trachoma, whooping cough, chicken pox, bubonic plague, malaria, typhoid fever, cholera, yellow fever, dengue fever, scarlet fever, amoebic dysentery, influenza, and certain varieties of tuberculosis.⁶ Whether a disease should be added or subtracted is relatively unimportant. What is important is that there was undeniably an avalanche of disease that decimated all native American peoples, and even obliterated many, such as the Tainos of the Greater Antilles, who were struck by the micro-invaders and the macro-invaders simultaneously.

THE WORLD'S GREATEST LABOR SHORTAGE

In 1493 Columbus dropped into the laps of Europeans an unprecedented opportunity for conquest, empire, and fortune. Fertile

Samuel Eliot Morison, *Admiral of the Ocean Sea: A Life of Christopher Columbus* (Boston: Little, Brown, 1942), pp. 567–68; James Lockhart and Stuart B. Schwartz, *Early Latin America: A History of Colonial Spanish America and Brazil* (Cambridge: Cambridge University Press, 1983), pp. 68–71, 92–96; Carl Ortwin Sauer, *The Early Spanish Main* (Berkeley: University of California Press, 1969), pp. 101, 200–204.

⁶ For instance, consult Henry F. Dobyns, *Their Numbers Become Thinned: Native American Population Dynamics in Eastern North America* (Knoxville: University of Tennessee Press, 1983), p. 34; Thornton, *American Indian Holocaust*, pp. 39, 44. See also Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986), pp. 195–216.

lands, mines of silver and gold, and myriads of Amerindians to work them were to be had by right of arms. Amerindians, however, did not wear well. The demographic collapse in the highlands of the Aztec and Inca empires is more fully documented than that of other Amerindians for the simple reason that in central Mesoamerica and Peru lived the populations most coveted by those Spanish monarchs and their subjects who were or aspired to become holders of the *encomiendas*. These highland populations fell by ninety percent or so in the first postconquest century, and vast, sparsely staffed *haciendas* sprawled where the *conquistadores* had anticipated manors teeming with native laborers.⁷ The decline in the number of Amerindians of the hot, wet, coastal lowlands is not so fully recorded, although it was even more extreme. In the comparatively cool highlands the chief killers were the diseases that had been circulating in Europe: pustular infections, such as smallpox and measles, and respiratory infections, such as whooping cough and pneumonia. The peoples of the lowlands were afflicted by the same diseases *plus* diseases from the Old World tropics, including malaria, yellow fever, dengue fever, and amoebic dysentery. These swept into oblivion the small number of West Indians who had survived the initial European onslaught and early epidemics of infections such as smallpox, and eliminated most of the inhabitants of the littoral of the Gulf of Mexico and the Caribbean and, in time, the occupants of lowland Brazil and the hot, humid Pacific coasts. The Maya of Yucatán were the greatest exception to the generality that lowland Amerindians melted away after the Old World peoples arrived. The reason for their survival in large numbers might be that their stony and seasonally arid peninsula was a difficult environment for the anopheles mosquito. Be that as it may, survival of Amerindians of the sultry lowlands was the exception, not the rule. Father José de Anchieta wrote from Bahia, Brazil, in the 1560s that the native population had plunged precipitously during the previous twenty years, and that “one never believed that so many people would ever be used up, let alone in such a short time.” A century after Columbus, the historian of the Spanish empire, Antonio de Herrera, wrote that Spain’s lowland Amerindian laborers were “so wasted and condemned, that of thirty parts of the people that

⁷ James Lockhart, “Encomienda and Hacienda,” *Hispanic American Historical Review* 49 (1969): 411–29; Woodrow Borah, *New Spain’s Century of Depression* (Berkeley: University of California Press, 1951).

inhabit it, there wants twenty-nine; and it is likely the rest of the Indians in a short time will decay.”⁸

As their lowland Amerindian subjects died off, Europeans reached out to the Bahamas, Nicaragua, and the backlands of their Brazilian settlements for slaves, but the newly enslaved died off as rapidly as those who were first subjugated.⁹ A century and more later, the English in Carolina tried to make do with Amerindian slaves as local labor and an export commodity but also failed.¹⁰

European conquerors faced the greatest labor shortage of all time. With Amerindians dying so precipitously, who was to do the work of reshaping the Americas in accordance with the schemes of imperial governments and the demands of the European and the world market? Who, for example, was going to do the brute labor of making Jamaica into a giant sugar plantation and Maryland into a giant tobacco plantation? The new masters of the American lowlands tried to persuade Europeans to volunteer for work that would make a mule balk and to live in environments with tropical diseases that killed Europeans about as fast as the diseases had Amerindians.¹¹ Convicts were conscripted, and some unfortunates were simply kidnapped, but there were never enough laborers. White laborers rattled around like peas in the bucket-sized vacancy.

EPIDEMICS AND SLAVES

Epidemics often produce labor shortages, which strengthen the hand of the yeoman in his negotiations with the squire, and also encourage slavery as a way to refill the ranks of laborers. In the sixth century, Justinian’s plague swept through the Mediterranean basin, creating a servant shortage that made it profitable to

⁸ Denevan, ed., *Native Population of the Americas in 1492*, pp. 35–41, 120, 176; Stuart B. Schwartz, “Indian Labor and New World Plantations,” *American Historical Review* 83 (1978): 58; Alfred W. Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport: Greenwood Press, 1972), p. 38.

⁹ David R. Radell, “The Indian Slave Trade and Population of Nicaragua during the Sixteenth Century” in *Native Population of the Americas in 1492*, ed. Denevan, pp. 73–75; Lockhart and Schwartz, *Early Latin America*, pp. 197–200; Schwartz, “Indian Labor,” pp. 43–83.

¹⁰ Charles H. Hudson, *The Southeastern Indians* (Knoxville: University of Tennessee Press, 1976), pp. 435, 437–38.

¹¹ See, for instance, chapter ten of Kenneth F. Kiple, *The Caribbean Slave: A Biographical History* (Cambridge: Cambridge University Press, 1984).

reach beyond the epidemic's farthest ravages to obtain slaves from northern and especially eastern Europe to supply the Christian and Muslim slave markets. "Slav" is the root for words meaning slave in all western European languages and also the root for *sakaliba*, which is Arabic for both slave and eunuch. The return of plague in the fourteenth century stimulated the slave trade between southern Europe and the Black Sea, and also black Africa. Mediterranean Europe wanted slaves for domestics, artisans, sexual partners, and, in Portugal, for field hands. By 1551 slaves made up 10% of the population of Lisbon; there were more slaves in the countryside.¹²

The influx of slaves into western Europe, however, amounted to no more aliens than the resident populations could and did assimilate socially and genetically within a few generations.¹³ Population expansion in fifteenth- and sixteenth-century Europe made up for much of the plague losses and presumably would have eventually reduced to naught the Europeans' demand for slaves. Europe's African slaves would have been lost in the footnotes of history books, as were the Tartar and Circassian slaves from an earlier time. But then Europe reached out for the Americas where its touch quite literally killed.

The history of transatlantic migration divides into two periods. Until the end of the eighteenth century, most migrants were African and slave, about ten million, as compared with perhaps as few as two million European migrants in the same period.¹⁴ After 1800 most migrants (by an enormous margin) were European and free. The first migration was appallingly coercive and brutal; the second was less so but scarcely humane. Mass movements across the face of the earth are not accomplished without human suffering. The horror of the near extinction of native Americans was

¹² J. -N. Biraben and Jacques LeGoff, "The Plague in the Early Middle Ages" in *Biology of Man in History: Selections from the Annales, Economies, Societies, Civilisations*, ed. Robert Forster and Orest Ranum (Baltimore: Johns Hopkins University Press, 1975), pp. 48-80; William D. Phillips, Jr., *Slavery from Roman Times to the Early Transatlantic Trade* (Minneapolis: University of Minnesota Press, 1985), pp. 47, 57, 69, 105-106; William H. McNeill, *Plagues and Peoples* (Garden City: Doubleday, 1976), pp. 77-148; Robert S. Gottfried, *The Black Death: Natural and Human Disaster in Medieval Europe* (New York: Free Press, 1983); Lockhart and Schwartz, *Early Latin America*, pp. 27-28.

¹³ Ruth Pike, "Sevillian Society in the Sixteenth Century: Slaves and Freedmen," *Hispanic American Historical Review* 47 (1967): 344-59.

¹⁴ Philip D. Curtin, *The Atlantic Slave Trade: A Census* (Madison: University of Wisconsin Press, 1969), p. 87; William H. McNeill, *The Great Frontier: Freedom and Hierarchy in Modern Times* (Princeton: Princeton University Press, 1983), pp. 18-19.

echoed in the agony of Africans enslaved to replace them, and faintly in the anxieties of the uprooted Europeans who followed.

European demand for tropical crops such as sugar was the economic force that drove the Atlantic migration in the first period. The Christian effort to seize the Holy Land from the Muslims had failed several centuries before Columbus, but the Crusades did introduce western Europeans to sugar, the cultivation of which spread throughout the Mediterranean from the Levant to Granada, and then to Madeira, the Canaries, and São Tomé in the near Atlantic. Madeira and São Tomé were uninhabited when Europeans landed, and imported disease and brutal invaders quickly destroyed the aborigines of the Canaries. From Europe the new masters of these islands brought convicts, Jewish children, and recent converts to Christianity from Islam, but there were never enough laborers to work the plantations.¹⁵ The solution to the labor problem lay in the Berber and later in the black African. Before depopulation in the Americas raised the question of where laborers were to be found to cut the cane, chop the cotton, and pick the coffee beans, the plantation masters of the islands of the eastern Atlantic had the answer.¹⁶

AFRICA'S MILLIONS

The greatest transoceanic migration and probably the greatest long-distance migration by water or land before the nineteenth century was that of African slaves crossing the Atlantic to the New World. Between the first decade of the 1500s, when the Spanish monarchy authorized the shipment of slaves directly from Africa to the Antilles, and 1870, when the last American market for slaves locked its gates, ten million Africans arrived alive in American ports, most of them to work in plantations raising cash crops for the European market: sugar, tobacco, rice, indigo, cotton, and coffee. Ninety percent went to fill the vacuum left in the hot, wet tropics by the now-extinct aboriginal populations. Brazil alone took 38% of the slaves, the Caribbean Islands 40%. Saint Domin-

¹⁵ Crosby, *Ecological Imperialism*, pp. 73, 92-99; Baily W. Diffie and George D. Winius, *Foundations of the Portuguese Empire, 1415-1580* (Minneapolis: University of Minnesota Press, 1977), p. 147; G. Y. Scammell, *The World Encompassed: The First European Empires, c. 800-1650* (Berkeley: University of California Press, 1981), p. 246.

¹⁶ The subject of the plantations and slavery is vast and intimidating. A good place to start is Philip D. Curtin, *The Rise and Fall of the Plantation Complex* (Cambridge: Cambridge University Press, 1990).

gue (the French name for Española) received twice as many African slaves as the thirteen colonies and later the United States.¹⁷

The classic plantation lands from Brazil through the Guianas and around the West Indies never established self-sustaining slave populations in colonial times, and could not have maintained their exports of cash crops to Europe without continually importing workers from Africa. The birth rate of their black populations fell far short of their death rate. There are many explanations for this: overwork, inadequate diet, the preponderance of males over females (plantation masters found it more practical to replace dying workers than to encourage the birth of American-born replacements), and disease. The pathogens and parasites that had eliminated the native Americans from most of the lowlands also shortened the lives of those who came to replace them. Africans were, genetically and by childhood exposure, more resistant to malaria, yellow fever, and many of the various tropical parasites than were the whites, but Africans were by no means immune to all strains of invasive species. Although the disease environments of torrid America were more like those of west Africa than of Europe, they were not identical. In America the Africans were also subject to infections brought overseas by their European masters.¹⁸ In hot, wet America, disease eliminated Amerindians, kept Europeans to a small number, and killed many Africans, stimulating the need for slaves down to the time of José Martí.¹⁹

EUROPE'S MILLIONS

The greatest century of the transatlantic slave trade in terms of absolute numbers was the eighteenth, when six million crossed from Africa. In the next century, slavery was abolished in one after another of the transatlantic empires and finally in the United States and Brazil; after the arrival of two million more Africans, the trade finally came to an end.²⁰ The change was not a comfortable one for the plantation elite. Former slaves tended to avoid work on the old plantations: "They turn out to work when

¹⁷ Curtin, *Atlantic Slave Trade*, pp. 89, 92.

¹⁸ Kiple, *Caribbean Slave*, pp. 104-19, 172.

¹⁹ Philip D. Curtin, *Death by Migration: Europe's Encounter with the Tropical World in the Nineteenth Century* (Cambridge: Cambridge University Press, 1989); Crosby, *Ecological Imperialism*, pp. 140-41.

²⁰ Curtin, *Atlantic Slave Trade*, p. 268.

they like," one white Jamaican complained, "do what they choose, take what days they like—in fact, do as they think proper." To replace them in the West Indies, a few Europeans, a greater number of Chinese, and hundreds of thousands of East Indians were brought in as contract laborers. Many East Indians returned home after a few years, but the descendants of those who remained today comprise half of Guyana's population and well over a third of Trinidad's, representing the most ethnically distinctive addition to the New World's tropical population since the first waves of Europeans and Africans.²¹

The last two million black slaves and the East Indian influx were ripples in comparison with the wave of Europeans that rolled across the Atlantic in the nineteenth and early twentieth centuries, veered away from the tropics, and broke on the shores of the American temperate zones: Canada, the United States, southern Brazil, Argentina, and Uruguay. The Europeans swept far inland, where the number and morale of Amerindians had been drastically reduced by two centuries and more of European and African-American pressure and imported disease.

Europeans, in contrast with Amerindians, had the advantage of long contact with many of the world's chief infectious diseases, which had thereby become endemic rather than epidemic, that is, something more in the nature of an incubus than a lightning bolt. In addition, public health and prophylactic techniques were at long last having some positive effects, and diet was improving in quantity and quality, enabling Europeans to survive all infections in greater numbers than ever before. Demographically, their story in the late eighteenth and nineteenth centuries was opposite that of Amerindians: Europeans were experiencing a population explosion.

In the seventeenth and early eighteenth century, western Europe's population had staggered along, its mortality rates, especially for children, always high and in some years extremely

²¹ David Lowenthal, *West Indian Societies* (London: Oxford University Press, 1972), pp. 57–58, 62; Orlando Patterson, "Migration in Caribbean Societies: Socio-economic and Symbolic Resource," in *Human Migration, Patterns and Policies*, eds. William H. McNeill and Ruth S. Adams (Bloomington: Indiana University Press, 1978), pp. 110–11; David Watts, *The West Indies: Patterns of Development, Culture and Environmental Change since 1492* (Cambridge: Cambridge University Press, 1987), pp. 472–81; Brinley Thomas, "Migration: Economic Aspects," in *International Encyclopedia of the Social Sciences*, ed. David L. Sills (New York: MacMillan and Free Press, 1968) 10:294; Curtin, *Rise and Fall of the Plantation Complex*, pp. 175–77.

high. Births barely exceeded deaths even in the best of times. War killed soldiers and peasants indiscriminately. Hunger accompanied war and killed on its own behalf.²² Worse than famine and war on average and amplified by both in its effects was disease, particularly bubonic plague, the chief arbiter of demography during the *ancien régime*.

For four hundred years, from the mid-fourteenth to the first years of the eighteenth century, plague epidemics in western Europe never ceased for long, if at all. In eastern Europe they continued for another century. The plague commonly killed 60 to 80% of those it infected. There was no known cure, and no one understood its etiology. In the second half of the seventeenth century, it began to retreat. London's last plague epidemic took place during 1665 and 1666, and the disease made its last sweep through the south of France in 1720. The retreat was a truly blessed mystery. Diseases can spontaneously lose their virulence and communicability, and it is possible that subtle changes in western European architecture and general behavior and in the use of quarantine and *cordon sanitaire* might have been effective in battling the disease.²³

The retreat of plague left Europeans with only war, hunger, and a raft of other infections to deal with, such as smallpox, measles, tuberculosis, and various dysenteric infections. None of them were singly as deadly as the bubonic scourge, but they were quite enough in their sum to cause, with the help of chronic malnutrition, an extremely high mortality rate. Armies, bit by bit, became professional, murdered fewer civilians, and lived off their own provisions rather than what they ravaged from an impoverished peasantry. The problems of crop failures and peacetime food shortages were harder to solve, but they were solved, and healthier populations resulted. Improved transportation sped the transfer of food from areas of surplus to areas of hunger and turned epidemic diseases into endemic diseases, thus softening their impact on society. When endemic diseases kill, they usually

²² Michael W. Flinn, *The European Demographic System, 1500-1820* (Baltimore: Johns Hopkins University Press, 1981), pp. 47-55; Thomas McKeown, "Food, Infection, and Population," in *Hunger and History: The Impact of Changing Food Production and Consumption Patterns on Society*, eds. Robert I. Rotberg and Theodore K. Rabb (Cambridge: Cambridge University Press, 1983), pp. 29-50; E. A. Wrigley and R. S. Schofield, *The Population History of England, 1541-1871* (Cambridge, Mass.: Harvard University Press, 1981), pp. 207-15, 244.

²³ Flinn, *European Demographic System*, pp. 59-61.

carry off the most expendable and easily replaced members of society, that is, immunologically inexperienced children.²⁴

The improvements in agricultural techniques that historians have collectively entitled “the agricultural revolution” were also significant, although not decisive in initially sparking the population explosion. Populations were already increasing before that revolution had proceeded far enough to make much difference in the availability of food supplies. In the beginning, the key factor might have been the cultivation of Amerindian crops in Europe, especially maize and white potatoes, which produced more food per hectare than any traditional European crop. By the eighteenth century, maize was well on its way to becoming the staple of millions of the poorer peasants in a band of territory from northern Portugal to the Black Sea, and the potato was launched as the basic food of the Irish and impoverished farmers and urban lower classes of northern Europe. All of this occurred before the agricultural revolution, before the rise of the sanitationist movement, and certainly before medical science and the practices of variolation and vaccination had much influence on mortality rates.²⁵

Europe’s population was about eighty million when Columbus sailed. In the period circa 1800, when the United States and the nations of Latin America won their independence and the transatlantic slave trade entered its final decline, the population of Europe was about 180 million. In the same three centuries, the inhabitants of the British Isles—the English, Welsh, Scots, and Irish—the most migratory of all Europeans, leaped from five to sixteen million.²⁶ Europe and the British Isles were ready to export people. In fact, they had to. But where?

They went to Australia, New Zealand, southern Brazil, Uruguay, Argentina, Canada, and, above all, to the United States. Aboriginal populations, ravaged by unfamiliar diseases, epidemic and newly endemic, were plunging in all these areas, probably

²⁴ McNeill, *Plagues and Peoples*, pp. 225–26; Emmanuel Le Roy Ladurie, “A Concept: The Unification of the Globe by Disease,” in *The Mind and Method of the Historian*, trans. Siân and Ben Reynolds (Chicago: University of Chicago Press, 1981), pp. 28–83.

²⁵ William Langer, “American Foods and Europe’s Population Growth,” *Journal of Social History* 8 (1975): 51–66; Gretel H. Peltó and Perti J. Peltó, “Diet and Delocalization: Dietary Changes since 1750,” in *Hunger and History*, ed. Rotberg and Rabb, pp. 314–16. The classic work on this subject is Thomas McKeown, *The Modern Rise of Population* (New York: Academic Press, 1976).

²⁶ Colin McEvedy and Richard Jones, *Atlas of World Population History* (Harmondsworth: Penguin, 1978), pp. 18, 49.

none more steeply than in North America. In 1800 there were probably no more than six hundred thousand Amerindians in the United States, down from an estimated five million in 1492; the European and African-American population of the United States was more than five million and climbing. In terms of absolute numbers, there were probably as many people in the area of the United States as there had been three hundred years before, but much had changed. Early Europeans had exposed the natives of North America to a score of new infections to which they had not had time to adapt, immunologically or through medical or public health practices. (For example, while the statistics of the 1800 census were being compiled, epidemics were devastating Amerindians in the interior of North America, reducing the Omaha by two-thirds.)²⁷ Europeans had, in their many centuries of experience with these diseases, adapted to them in one way or another. They had also mastered systems of agriculture and animal husbandry that enabled them to live in North America in numbers several times over the maximum pre-Columbian population.

Many thousands of Europeans emigrated to North America in the first decades of the nineteenth century, but another generation or so passed before they began to leave Europe en masse. It took another epidemic (if that word can be extended to the spread of disease among plants) to give the signal for the exodus of Europeans by the millions. In the mid-1840s, an American fungus (*Phytophthora infestans*) began to spread rapidly through the potato fields of northern Europe, hitting Ireland hardest. In a five-year period, more than a million Irish died of hunger and of jackal diseases, such as typhus and cholera, and hundreds of thousands fled across the Irish Sea and the Atlantic, primarily to the United States.²⁸ Other Europeans—Germans, Scandinavians, and, by the end of the century, southern Europeans, Ashkenazim, and Slavs—followed the Irish, although not faced with so direct a threat of death. Between 1820 and 1930, about fifty-five to sixty million people left Europe for the lands across the oceans and Siberia. That figure amounts to about one-fifth of Europe's entire population in 1820. Over half of them went to the United States, swamping the vestigial native population with a Caucasian tidal wave and reduc-

²⁷ Thornton, *American Indian Holocaust*, pp. 90, 94; E. Wayne Stearn and Allen E. Stearn, *The Effect of Smallpox on the Destiny of the Amerindian* (Boston: Bruce Humphries, 1945), pp. 73-76.

²⁸ Redcliffe N. Salaman, *The History of the Social Influence of the Potato*, rev. ed. (Cambridge: Cambridge University Press, 1985), pp. 289-316.

ing the proportion of African-Americans in the total population from 19% in 1800 to 12% at the end of the century.²⁹

By 1900 the population of the Americas had risen to 145 million, a total equal to that accorded by the most extravagant of the demographic historians to Amerindians in 1492. The great majority of those 145 million were Old World immigrants or their descendants.³⁰

AN INTERIM ASSESSMENT

Columbus and his blue-water emulators initiated a transoceanic revolution of unprecedented magnitude and significance by carrying Old World microlife across the ocean. The migrant pathogens and parasites obliterated millions of Amerindians, broke the morale of the survivors, and rendered vacant large parts of the New World, or at least reduced the population of the original inhabitants to such small numbers that the invaders could claim that the land was going unused—an offense to God! As a result, some Europeans set aside their ambitions for conquest to become lords of the manor, importing millions of Africans and transforming themselves into masters of plantations.

Europeans who remained at home benefited from improvements, technological and administrative, in their transportation system. Food moved rapidly from areas of surplus to areas of want, as did infections. The former process almost eliminated absolute starvation, and the latter homogenized the disease environment, ameliorating epidemics that had dictated Europe's demography since the coming of the Black Death. In increasing numbers, Europeans turned to the immensely productive Amerindian crops for sustenance. The resulting surplus of people then diffused to areas of lesser population density on the other side of the oceans, almost as if in obedience to laws of physical chemistry.

²⁹ McEvedy and Jones, *Atlas of World Population History*, p. 46; Huw R. Jones, *A Population Geography* (New York: Harper and Row, 1981), p. 254; William Woodruff, *Impact of Western Man: A Study of Europe's Role in the World Economy, 1750-1960* (New York: St. Martin's Press, 1967), pp. 106-8; Peter M. Bergman, *The Chronological History of the Negro in America* (New York: New American Library, 1969), pp. 82, 327.

³⁰ Thornton, *American Indian Holocaust*, p. 23; Henry Dobyns, "Reassessing New World Populations at the Time of Contact," unpublished paper delivered 18 April 1988, Institute for Early Contact Studies, University of Florida, Gainesville, Florida.