Disease and Social Diversity

The European Impact on the Health of Non-Europeans

Stephen J. Kunitz

Professor, Department of Community
and Preventive Medicine
University of Rochester
School of Medicine and Dentistry

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Natural History and Local History

> Men that undertake only one district are much more likely to advance natural knowledge than those that grasp at more than they can possibly be acquainted with: every kingdom, every province, should have its own monographer.
>
> GILBERT WHITE

In a volume on the idea of social change and development in Western history, Robert Nisbet devotes considerable attention to the 18th-century idea of natural history:

> The method was to cut through the morass of customs, superstitions, traditions, and prescriptive laws, which to most of the rationalists of the age seemed to be the very stuff of the historic social order, to the underlying forces of the natural order. What was wanted was a conception of man's advancement through the ages in the terms of what was fundamental and natural to man, rather than in terms of ordinary or conventional history.[1]

The idea of nature, he continues, means pristine and "uncorrupted by adventitious circumstances. To get to the nature of anything is to get to its shape and substance before these have been altered by exposure to elements and forces not bound up in its own being."[2]

Nisbet was particularly interested in ideas of development and change as they were used by Western social thinkers. The idea of natural history is a crucial part of the story, for the notion that there is a natural history of civilization, or of particular social institutions, has been central to much Western thought. The same notion of natural history has been applied to the understanding of diseases, in which it has meant very much the same thing as it has in other domains of knowledge. As Nisbet observed:

> Epidemiologists and physicians continue to speak of the natural history of an epidemic or sickness (forgetting oftentimes in the process the presence of sick *people*), just as economists deal with the natural history of the business firm, sociologists with the natural history of revolutions, crowds, crime-cycles, and so on. The distinction between the actual, minutely recorded, history of a thing, and the history that we conceive as flowing from its very nature, when not deflected or otherwise interfered with,

> remains a vital distinction for most of us even though we rarely today make it as explicit as did the philosophers of the eighteenth century (italics in original).[3]

This way of understanding social change and the nature of diseases in populations and individuals has been enormously valuable, for it allows one to generalize and to predict the trajectory of many phenomena. It is, however, only one version of natural history. Another is exemplified by Gilbert White, the 18th-century parson of Selborne, who wrote that he was "laying before the public his idea of *parochial history*" (italics in original). He continued, "If stationary men would pay some attention to the districts on which they reside, and would publish their thoughts respecting the objects that surround them, from such materials might be drawn the most complete county-histories."[4] The tradition of natural history of which White is an inspirational figure is grounded in intimate knowledge of particular places and the relationships among the organisms of which it is constituted. It is not universal history but local history or, as White termed it, parochial history.

In this book I should like to argue for the value of a particularistic approach to the study of diseases in populations. This is not unprecedented. Until the great scientific advances of the late 19th century, especially the bacteriological revolution, physicians were concerned primarily with the characteristics of particular patients and the characteristic diseases of particular places. In his mid-19th-century classic, *Principal Diseases of the Interior Valley of North America*, Daniel Drake wrote:

> There are diseases which occur independently of all known external influences, which affect individuals of all races, and present in all cases substantially the same symptoms and lesions of structure. . . . In reference to all these . . . it may be said, that the observations made in one country are, in the main, equally applicable to every other. The maladies are the common scourge of our race; and the knowledge of their symptoms, lesions, and treatment, the common heritage of our profession.
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> On the other hand, there are diseases which scarcely ever occur but in certain climates, localities, or states of society. . . . Here then is the foundation of local medical history and practice; a basis which does not support the whole nosology, and yet is broad enough for a large superstructure whenever an extended region constitutes the field of enquiry.[5]

The importance of local knowledge was thought to have been made obsolete by the developments of biomedical science, particularly by the germ theory in the late 19th century and by utterances in the social sciences (stemming from the assumptions described by Nisbet) about the stages of economic and social development and modernization. In medicine as in the social sciences—valid and valued professional knowledge has become universal knowledge.[6] I have taken a different position. It is not that I believe it is impossible or undesirable to make broad generalizations about the misfortunes that affect peoples or about the way they attempt to cope with them. Far from it. My belief is, however, that at our present stage of knowledge and in the wake of the recent collapse of many old certainties, it is likely to be more useful to understand in detail the myriad ways

in which different causes of morbidity and mortality in populations are affected by social processes, rather than to strive to build grand theories.

To impose some order on such an immense topic, I have limited my discussion in the following ways: First, I shall consider only the indigenous peoples of the United States, Canada, some large Polynesian islands, and Australia. Second, I shall consider the impact of European contact and social change on the mortality and morbidity of these populations. Third, I shall be selective in the topics I cover and the examples I choose. Fourth, in most chapters I shall use the comparative method to isolate important explanatory variables.[1]

The structure of the book moves from macrosocial international comparisons to microsocial intracultural comparisons. The points I should like to make by organizing my book in this way are several. First, diseases rarely act as independent forces but instead are shaped by the different contexts in which they occur. In this regard I describe the trajectories of population change after European contact to argue that factors other than disease were at least as significant as the introduction of new microorganisms into previously unexposed populations.

Second, preventive and curative interventions have had profound consequences for disease patterns and life expectancy, but this has not always been the case. In the instances I consider, the reasons for failure have been political and institutional, as have the reasons for success. But political institutions are themselves the products of historical forces and are not easily changed simply by an act of what is nowadays called political will.

Third, diseases differ, and different kinds of diseases have their trajectories shaped differently in different populations. In some instances it is useful to think of them as having a natural, in others a social, history.

Fourth, notions of modernization as described by Nisbet have had a great impact on the way that epidemiologists and demographers have written about changing epidemiologic regimes. It is true that many writers besides Nisbet have seriously questioned those linear theories. Nonetheless they are still important, and I argue that they are often misleading when applied to the indigenous peoples I consider in this book. The processes by which such peoples have been "modernized" are variable, as are the health consequences. In some instances it was labor that the Europeans wanted, in others land, and in still others both. Where labor and land were wanted, as in the case of Native Hawaiians, integration into the lowest social class of an emerging capitalist society occurred. When labor was not wanted, but only land, as was the case with most American Indians and Australian Aborigines, isolation on reservations and missions occurred. In these cases it is difficult to claim that integration into the class system has occurred, but rather isolation and encapsulation. And in cases in which labor but not land was wanted, as in Samoa, a typical colonial system developed, with a planter class and indigenous people continuing to live and work in their own villages. In the last two instances certain traditional behaviors persisted because they were a way of adapting to economic marginality. Such behaviors have continuing relevance to some but not all causes of morbidity and mortality.

Fifth, this book is about epistemology as much as it is about epidemiology. I am making an argument for accepting the importance of diversity and local

knowledge in our understanding of diseases in populations. One reader of an early version of this book said that the emphasis on local history and the suggestion that a generalization of conclusions is impossible are a "postmodernist nihilist strategy employed by scholars who feel that their only task is to deconstruct things." That is not my position. Among people writing about health and disease, one sees the same polarization as in other aspects of our culture, between those who believe that scientific knowledge is generalizable and universally accessible and those who believe that truth is local, relative, and socially constructed. My view is that it is possible to know the world and not simply construct it but that the kind of knowledge that is useful depends on the question one wants to answer. I am concerned with diseases in populations, and I contend in this book that diseases in populations are so diverse that attempts at generalizing may often—but not always—be vacuous and go badly astray. There is still a lot of mileage to be gotten out of thinking about diseases in their local or national contexts, even understanding that some processes are universal. Generalizations may be parsimonious. They may also be impoverished.

To create a context for the detailed studies of North America and Oceania, in the remainder of this chapter I sketch briefly the contrasts between the epidemiologic and demographic consequences of European contact in Africa and the Americas and then between those in Latin and English America. The contrast between Africa and the Americas is meant to show, as many before this have done, that their different disease ecologies had a profound impact on the Europeans and on the consequences of European colonization for the native peoples. The contrast between Latin and English America is meant to illustrate that different colonial policies had different consequences as well. Clearly, disease ecology placed tighter or looser constraints on Europeans, but where the constraints were relatively loose, as in the Americas and Oceania, policy differences had quite different epidemiologic and demographic consequences.

In Chapter 2 the focus narrows to Australia, Canada, New Zealand, and the United States, all places where English-speaking liberal democracies were established. I do not deal with the history of the indigenous population decline but, rather, with the consequences for the health of the indigenous peoples of institutional and policy differences in the 20th century. My point is that different forms of federalism have had important implications both for the way that central and state governments deal with indigenous peoples and for their health. These differences have tended to be more observable in regard to infectious than to noninfectious diseases, because the health services that have been created have been better equipped to deal with infectious conditions. In general, where treaties have been signed and where the central government has assumed responsibility for relations with indigenous peoples, their general health and welfare are better than where state governments have assumed responsibility.

One of the difficulties with the analysis in Chapter 2 is that the indigenous peoples of the four nations are themselves very different. Therefore in Chapter 3 I have looked for populations that are similar in social organization and culture but that differ in regard to their historical and contemporary experiences with Europeans. I have chosen several Polynesian populations that have in common

not only their biological inheritance and language but also the fact that they reside on large islands with large, stratified populations. That is, I have tried to control as best I can for genetic background, culture, and social organization while observing the effects on health of different types of European contact.

This third chapter is devoted to the history of the population since the first intensive European contact in the late 18th century. I argue that the population collapse was especially severe and prolonged on the two largest island groups, New Zealand and Hawaii, because these were places where settlers dispossessed indigenous people from their lands. Tonga and Samoa had quite different histories. But even here one finds a poorly understood anomaly, the Marquesas, where the population decline was especially severe and prolonged and where dispossession was not a significant factor. Most of Chapter 3, however, considers contemporary patterns of mortality and morbidity, which I attempt to explain by invoking a variety of political and economic factors.

Because the analyses in Chapter 2 and 3 are at a macrosocial level, it is difficult to demonstrate the details of the way that government structure and policy influence health. Thus in Chapter 4 I depart from the comparative perspective to consider in greater depth the relationships between policy and the health of Aborigines in Queensland, Australia. I have chosen this population because of all the peoples discussed in this book, the Aborigines (particularly the men) have by far the lowest life expectancy. It is therefore especially important to try to understand why. I contend first that the population decline in the 19th century was not due primarily to diseases acting independently but to the savagery with which the Aborigines were hunted and slaughtered, particularly by pastoralists and miners who were intent on occupying the land and extracting its natural resources. I then show that in the 20th century the very slow improvement in Aboriginal health has been due to the particularly dysfunctional form of federalism applied to the Aboriginal policy that has developed in Australia.

The first four chapters all are concerned with environmental factors, either natural or social, that have influenced the historical and current disease patterns of indigenous peoples. I argue that disease ecology was an important constraint historically and that when it is held roughly constant, one can see more clearly the enormous impact that different colonial and contemporary policies have had. But all these analyses ignore the very real differences among indigenous peoples and the contribution their own cultures make to shaping their disease experience.

Thus in Chapter 5 I looked for a setting in which government policy and services, as well as natural ecology, are the same but where the cultures of the people differ. All my examples are drawn from the Navajo and Hopi Indians who live as neighbors on the Colorado Plateau in the American Southwest. What I wish to demonstrate in this chapter is that people with different cultures and patterns of social organization responded to Anglo-American contact in different ways, with different consequences for their health. Moreover, I wish to show that even now culture continues to make a difference in the incidence, prevalence, and trajectory of certain conditions. It is in this context that I discuss the distinction between the concepts of the natural history of disease and the careers of patients with a disease. I argue that when attempting to explain disease trajecto-

ries, each concept has more or less utility, depending on the characteristics of the condition being considered. The comparison of the same diseases in two populations with access to the same health and welfare system helps make the point.

The discussion in Chapter 5 tends to treat the two societies as homogeneous, whereas in fact, each is rather diverse. Some of that diversity in Hopi society is dealt with there, but it is in Chapter 6 that intratribal variability is considered in greater depth. Several sources of internal differentiation among Navajos (regional, social status, and gender) and their health-related consequences are described. It is in this chapter that I address most directly the issue of "modernization" and health. I make the point that social change does not affect everyone similarly, that the differences are not random in the population, and that different measures of health and disease are useful for understanding the impact of social change among different segments and strata of the population.

I have thus organized the sequence to allow me to describe, first, the difference that disease ecology made to European colonization. Then, by focusing on English and Spanish America, I assume a relatively constant disease ecology and so am able to consider the importance of different colonial policies. Next, by discussing only English-speaking liberal democracies in temperate zones, I am able to focus on the impact of institutional arrangements on indigenous people. Then, by considering two different populations living as neighbors and influenced by the same government policies, I am able to say something about how culture influences health. Finally, by considering differences within the same population, I am able to describe how intracultural variations shape several different health consequences of European contact.

THE OLD WORLD AND THE NEW

For my purposes the Old World includes Eurasia and Africa, and the New World includes the Americas and Oceania. The expansion of Europe had an enormous impact on all non-Europeans, but epidemiologically and demographically it took a somewhat different form in each world. To the degree that European contact with non-Europeans in Asia and Africa had health-related consequences, they were the result primarily of political and economic domination. In the Americas and Oceania, by contrast, contact-induced diseases were as much a prelude to European domination as its aftermath. Here domination was facilitated, and even made possible in certain instances, by devastating pandemics that often decimated and demoralized whole populations and that on occasion spread in advance of the invading Europeans, carried by the natives who fled before them.[7]

These differences are accounted for by the fact that the diseases carried by Europeans, most notably perhaps smallpox and measles, were diseases to which they themselves had been exposed, survived, and become immune. This was true as well for large parts of Eurasia and some areas of Africa.[8] But it was not the case in the New World, where the natives had never been exposed to such diseases and where entire populations were afflicted almost simultaneously, leaving no one to carry on the vital tasks of nursing the sick and producing subsis-

tence. Whether these people were also immunologically more vulnerable because their ancestors had never been exposed to these conditions is a matter of debate. It is plausible but not necessary to explain what happened. In so-called virgin-soil populations exposed for the first time to an acute infectious disease, everyone who is exposed gets sick. In severe diseases such as smallpox and measles, the debility may be such as to make it impossible for people to care for themselves. High deathrates, demoralization, and social collapse ensue. Often the religion of the invaders was thought (by both Europeans and natives) to be more powerful than the religious beliefs and practices of the natives, further increasing the demoralization of the natives and making conquest that much easier.

Population decline as a result of epidemics is most likely if the young are selectively affected.[9] If people of all ages are afflicted equally, as is the case in virgin-soil epidemics, then it is likely that—short of annihilation of the entire population—enough young people will remain to reproduce and begin the process of population recovery. But if the young are lost selectively, such a process cannot occur, unless of course they are obtained from elsewhere, by raiding, for example. Among the most lethal New World epidemics were smallpox and measles, acute infectious diseases that evoke lifelong immunity. Thus, after an initial epidemic of, say, smallpox in a virgin-soil population, all the survivors would be immune, but anyone born after the epidemic would be susceptible. Accordingly, if a second epidemic of the same disease struck 20 years later, everyone under 20 would very likely fall sick, and—depending on local circumstances—a high proportion would probably die. The result would be a heavy loss of young people. If the same happened in another 10 or 20 years, the results would be the same. After a while, the population would cease to reproduce itself and would decline. If more than one disease were involved, for example, both smallpox and measles, the decline would be exacerbated.

The same effect could be achieved in other ways, of course. First, mortality might disrupt marriages because of the death of one or both of the spouses. The result would be the premature termination of childbearing, as happened to the Maori after the 1918 influenza pandemic.[10] Second, children might fail to be born because one or both members of the couple are sterile, usually as the result of venereal disease. For example, Rallu calculated that among Marquesan women born between 1860 and 1886, the average number of children born was four, about half what would have been expected. He writes: "Proportions of primary infertile women, due to widespread venereal disease, were very high: 36% in generations 1860–81, whereas it is normally around 5% in populations where all the women get married, like the Marquesan."[11] Notice that women of childbearing age may be fertile but that because of the loss of members from their age cohort might still not be able to bear sufficient children to outnumber the deaths. That is, crude birthrates may be lower than crude deathrates because of infertility, a dearth of women, or both. Knowing only crude birthrates is not sufficient to distinguish between the possibilities. Third, children might be born and fail to survive because of active or passive infanticide or extraordinarily high rates of infant and child mortality due to endemic as well as epidemic diseases. None of

these possibilities is mutually exclusive of the others, but estimating their relative importance in early contact and historic populations is likely to prove virtually impossible.

In addition to sharing many diseases with Europeans, non-European natives of the Old World had some unique diseases of their own to which Europeans had not been exposed. These were the so-called tropical diseases, most of which cannot flourish in temperate climates. Europeans often did poorly when exposed to such disease environments. Since the native populations of Africa and Asia were not being decimated by European diseases and since European settlers and soldiers were often weakened if not killed by the tropical diseases, the same kind of European demographic wave that engulfed the natives of the New World did not overwhelm those of the Old.[12] But this is not to say that European contact was without effect on the health of Asians and Africans. I shall draw my examples from Africa south of the Sahara because, though part of the Old World, its disease pool was not so thoroughly mixed with that of the Europeans as was the Asians' or North Africans' disease pool.

Africa

Africa south of the Sahara is a land in which a large number of chronic infectious diseases—such as typhoid, leprosy, trypanosomiasis (sleeping sickness), and malaria—are endemic and presumably have been so for centuries. Though often lethal (especially sleeping sickness), as often as not their effect is debilitating. It is generally agreed that a rough sort of equilibrium must have developed between the human and microbial populations. The human adaptations were both physiological and sociocultural, though the distinction is not always a clear one. Among physiological adaptations, by far the best known is the sickle cell trait, which enhances resistance to malaria. Among sociocultural adaptations was the tendency for trade to be carried on at the borders of territories.[13]

European colonization, beginning in the 16th century but intensifying enormously in the 19th, upset what must have been at best an unstable equilibrium. Beyond the possible introduction of new diseases,[14] European colonialism's acceleration in the 1880s caused a major disruption by forcing large groups of people to work on plantations in areas distant from their homes, usually under unhealthy and unsanitary conditions.[15] Caldwell argued that the demographic regime of premodern sub-Saharan Africa can be described as "a society where women averaged 5.5–7 live births yielding a birth rate of 42–50 per thousand, and where the expectation of life at birth was 20–30 years yielding a death rate of 38–50 per thousand and an infant mortality rate of 250–375 per thousand live births."[16] Until the 1880s, he continues, the "clearest assault on the demographic balance" was the slave trade.[17] Beginning in the 1880s when the race for colonies intensified, long-distance trade and troop movements became increasingly frequent. Moreover, the shift from subsistence farming to the monocropping of cash crops for sale in the world market led to landlessness, urban migration, and deteriorating nutritional status. Though adequate registration data are not available, the far from unanimous consensus is that the colonial period, beginning in

inflation, international indebtedness, natural disasters, warfare, and less aid from abroad,[24] all of which are causes of infant and child malnutrition.

In summary, the health of Africans worsened and then has improved only slowly since the time of intense colonization by Europeans in the 19th century. Much is accounted for by the nature of Africa's disease ecology, but it seems safe to say that the spread of epidemics and the presumed deterioration of life expectancy followed on the heels of the Europeans' assertion of social and political control.

The Americas

This situation was reversed in the New World, where social, political, and economic domination by Europeans followed on the heels of epidemics. Here the epidemiologic and demographic consequences of European contact were even more catastrophic for the indigenous populations than they were for the indigenous Africans.[25]

The New World encountered by Spanish, Portuguese, English, French, and other explorers and colonists was highly diverse, both ecologically and culturally. It encompassed arctic, temperate, and tropical climates; small bands of hunter-gatherers and large complex empires based on irrigation and agriculture; low-lying river basins and high mountain ranges. I shall consider some of the consequences of that diversity in subsequent chapters. Here I shall point to the similarities. For no matter where they lived, no matter how sophisticated their cultures, no matter how complex their social organization and technology, the overwhelming fact is that demographic decline, if not complete collapse, was the fate of virtually all indigenous groups in the Americas.

Acute infectious diseases introduced by Europeans, most notably smallpox, measles, and perhaps influenza, played an important role in this decline.[26] Indigenous Americans had evidently not been exposed to these diseases previously, perhaps because the animal hosts in which they first evolved and from which they spread to humans were not present in the Western Hemisphere[27] or perhaps because even large aboriginal populations were too isolated to sustain such diseases.[28] These diseases were followed by others, some transmitted directly by the Europeans (such as typhus and diphtheria), others by African slaves (such as malaria, yellow fever, and hookworm).

Other factors were important as well, however.[29] For example, some authorities believe that tuberculosis had existed in the precontact indigenous population but became a major killer only when the hardships and stress of European contact and domination made themselves felt.[30] Other causes of depopulation were famine induced by the destruction and/or confiscation of crops by the invaders, forced labor in mines and on plantations, warfare, the absence of marriage partners (both a cause and a consequence of depopulation), and epidemic-induced panic, social disorganization, and demoralization. The question about which there has been much debate is the degree to which diseases acted independently of these other factors. I shall leave that aside for now and return to it in Chapters 3 and 4. There I shall argue that disease was not a deus ex machina but

that the kind of contact that occurred was of great significance. Essentially, when displacement from land—often accompanied by warfare—occurred, the results were especially catastrophic.

Though the fact of demographic decline is widely acknowledged, its magnitude and timing have been a fruitful source of disagreement and debate.[31] There are a variety of ways of estimating the aboriginal population.[32] They result in very different figures for the 1490s, the time of the first significant European contact, from a low of 8.4 million to a high of 112 million.[33] The higher the initial figure the greater the magnitude of subsequent loss to the nadir. Indeed, some authorities believe that the loss of population across the entire Western Hemisphere was over 90 percent. Others argue that the depopulation was much smaller, conceivably even less than 50 percent.

The writers who believe the numbers at contact were very high contend that disease was the major cause of decline and that much of the collapse occurred in the 16th century before face-to-face contact between most Indians and Europeans but as a result of the diffusion of epidemics. Low counters have tended to minimize the impact of disease. The debate is significant because the high counters argue that the social organization before the collapse was very different from what it was afterward, and thus ethnographic and historical reconstructions of precontact populations must necessarily be wrong.

The available evidence suggests that disease was in fact important, as I have argued, but that inferences about the size of the population at contact are extremely uncertain. The high counts are based on backward projections from population nadirs and assume ratios of population at contact that were at least 20 times greater than the nadir populations. Such inferences assume a natural history of epidemics that was everywhere the same. In the case of the Navajo and Hopi Indians (described in Chapter 5) and the Polynesians (described in Chapter 3), this does not seem to have been so. Nor does it seem to have been true on the Northern Plains,[34] among the Iroquois of central New York State, or among the Pueblos along the Rio Grande.[35] Indeed, in regard to the Indians north of the great civilizations of Mexico, the decline to nadir seems to have ranged from a high of 95 percent among the California Indians to a low of 53 and 56 percent in the Arctic and sub-Arctic, respectively.[36]

The point of this comparison between Africa and the Americas is that disease ecology had profound consequences for both the invading Europeans and the indigenous peoples. It shaped the way the Europeans were able to colonize Africa and the New World, and it influenced the epidemiologic and demographic responses of the indigenous peoples they encountered. At the same time, the policies pursued by Europeans colonizers and settlers also had far-reaching epidemiologic and demographic consequences.

SPANISH AND ENGLISH AMERICA

Numerous observers have commented on the differences between the Spanish and English colonization of the New World. According to McAlister,[37] one

formulation has it that "whereas the English came to America to settle and till the soil, the Spaniards came only to plunder." But, he continues, there was far more to Spanish policy than that, for although plunder was indeed intended and occurred, the concern was also to create a "Christian republic where men lived in polity and justice *according to their rank and station* and made the land bear fruit" (italics added). I have emphasized "rank and station" because race—Indianness—became in Spanish America a measure of both and the lowest of each. For the Spanish the availability of Indian labor—first for work in the mines and ultimately for work on the haciendas—was crucial.

Patterns of land tenure and social stratification that developed in the colonial period persisted in the 19th century even as the demand for Latin American exports resulted in economic growth.

> The colonial period was thus responsible for establishing the pattern of large landholdings and an exploited peasant or slave underclass throughout much of Latin America. The availability and reliability of commercial opportunities clearly had much to do with the location and characteristics of the productive systems that emerged. During this period, economic and demographic changes had direct consequences for the use of land, labor, and capital in the region. Underlying these changes, however, was a striking uniformity in the unequal distribution of land and the dependent position of labor, whether in areas dominated by domestic production or in those dominated by export production. In the nineteenth century, commercial expansion changed the nature of many agricultural enterprises in the region. Export markets came to dominate production, foreign money flowed into the sector, and export profits stimulated national economies. If anything, however, these changes further cemented the nature of landholding and rural power relations that had developed in the colonial period.[38]

Indeed, the concentration of landholding increased right into the present century. The economic collapse of the 1930s worked a significant change, however, because the national governments in Latin America began to assume a more central role in the organization of the economy. It was then that social welfare programs began to be introduced and government-led drives for industrial development first emerged.[39] The development ideology that gave intellectual legitimacy to the governments' plans included "import substitution," a major role for government planning and direction, and a central place for agricultural modernization "to support and finance industrial development."[40]

The modernization of agriculture required investment in infrastructure - tractors, new seeds, fertilizers, and so on -and the "efficient" use of land, which was generally understood to mean the consolidation of already large haciendas, plantations, and ranches; the dispossession of many small landholders; the exacerbation of rural insecurity and landlessness for the majority of peasants; and rapid urbanization.

It began to be clear in the 1960s that these policies were having some untoward consequences in regard to rural unrest, most impressively in the success of the Cuban revolution in 1959. As a result of that revolution, "95 percent of landholdings over 67 hectares in size were expropriated from private owners . . . and were turned into state farms and cooperatives."[41] Several other countries also

engaged in land redistribution as a result of revolution, but most of the redistribution was carried out from above by national governments. No doubt the fear of revolution and the encouragement of the Kennedy administration played an important role, but it was also thought that only land redistribution would counteract the inefficiencies of the existing pattern and result in true capitalist farming.

Land reform was clearly unpopular among the vested interests, however, and the result was that it was halted, often by military takeovers of national governments, as in Chile in 1973. Thus in the 1970s, a "nondistributional approach to rural poverty" was attempted, with the encouragement of the World Bank under its then president, Robert McNamara.

> Generally, programs were designed with three components: (1) direct inputs to improve production (usually given the largest portion of program funds); (2) infrastructure to encourage and support increased production; and (3) social infrastructure such as health and educational facilities and peasant organizations (usually given the smallest portion of program funds). The approach largely avoided the issue of redistribution of land, indicating that goods and services could be provided that would enable the peasant to produce more at a greater profit; these could be applied without altering the structure of landholding and would still have a significant impact on the standard of living in rural areas.[42]

This brief sketch has ignored substantial differences within Latin America. For example, not all of Mexico and South and Central America was occupied by extensive indigenous agricultural societies, and where mobile hunting–gathering tribes were found, domination was much more difficult—even impossible—to impose. In vast areas of tropical forest in northern Brazil, no European settlements were established. In some tropical areas, slaves from Africa were introduced, primarily into the Caribbean islands and along the northeast and northern Pacific coasts of South America.[43] Grassland areas in what became Argentina, Uruguay, and southern Brazil had no extensive indigenous agriculture and hence did not attract early Spanish settlement. As Oveido, a Spanish chronicler, commented, "The Indies are worth nothing without the Indians." Indeed, it was these areas that attracted the greatest amount of European immigration during the late 19th century.[44]

The policy in English America was different: "The British, unlike their rivals, the French and the Spaniards, never developed an overall eighteenth-century colonial policy that gave the Indian a place and a future in the structure of the empire."[45] Indians were widely viewed as savages to be dominated and eliminated, and the epidemics that decimated the Indians were widely considered to be evidence of God's favor. As savages, Indians were supposed inevitably to give way to a higher civilization.[46] It was only in the late 19th century—not coincidentally at the same time that Anglo-Americans began to worry about the preservation of their natural environment and to create national parks—that concern about the survival of American Indians began to be expressed and for that expression to find its way very slowly into policy. But by then the Indians in the eastern half of the country had been largely exterminated, and their remnants

placed on small, fragmented reservations overseen by state governments. In the West, however, sizable Indian populations still survived, and their treaties were made with the federal government. They were placed on reservations that as the 20th century wore on, and particularly after the 1930s, were increasingly well protected legally and well served medically, though their natural resources were generally extracted by, and in the interests of, others.

What, then, were the consequences for the Indians' health of these different colonial policies? Of course, all of Latin America is far more diverse than the United States and Canada; demographic responses to contact differed widely from one place to another within Latin America;[47] and data on the Indians' health status are harder to find there than in North America. In general, however, the effect of the contrasting policies has been that the health of North American Indians has improved far more rapidly than has that of Indians in Latin America. In Latin America throughout the 19th century, and in some countries into the present century as well, mortality from both endemic and epidemic diseases was very high. As late as the 1920s and 1930s, for example, studies in Guatemala and the Yucatán Peninsula found that infant mortality had reached extraordinary levels, that malnutrition was common, that enteric diseases were caused by a bewildering assortment of microorganisms, and that malaria was epidemic.[48] This was an area of dense Indian settlement, much of it in free villages that had escaped land enclosures.[49] Population growth and presumably the local system of social stratification had resulted in the division of property into dwarf holdings and necessitated labor migration—often to lowland coffee plantations—to supplement local subsistence agriculture. This situation is not unique to highland Guatemala. Oscar Lewis pointed out that Mexican history is often conceived of as a conflict between haciendas and free villages, that even in free villages there was a high proportion of landless peasants, and that even those with land often had holdings so small that they needed to find other sources of income as well.[50] It is this constellation of landlessness, labor migration, and rural poverty that is associated with high mortality throughout much of Latin America. In general, rural mortality is higher than urban mortality in all countries for which data have been published,[51] the reverse of the 19th-century North American and North European patterns, and a number of studies suggest that involvement in agricultural wage labor is associated with higher rates of morbidity and mortality than is the relatively greater dependence on subsistence farming.[52]

Moreover, data from Bolivia, Ecuador, and Guatemala in the 1970s show that the probability of death at various ages is greater for Indians than non-Indians, even when urban- rural residence and educational attainment of the mother (in the case of infant and child mortality) are statistically controlled.[53] Infant and child mortality in a rural Zapotec Indian community in Mexico was substantially higher, though falling, in the period between 1945 and 1970 than was infant and child mortality in all of Mexico and was similar to rates reported from highland Maya Indian communities.[54] Moreover, adult heights showed no increase over those of the previous century, indicating no improvement in nutritional status.[55] And studies of body composition and growth of Cakchiquel Indian children in Guatemala demonstrate no improvement in nutritional status over a period of two

decades and suggest reduced nutritional reserves when compared with those of non-Indian children.[56] These data reveal a continuing pattern of death in infancy and childhood due to endemic infectious diseases and malnutrition. On the other hand, there is some evidence that Indian mortality is dropping in some areas and is converging with non-Indian mortality rates.[57]

The situation evolved somewhat differently in the United States. Compared with all U.S. races, Indians have twice the unemployment rate, half the per capita income, and less than half the proportion of college graduates. On the other hand, life expectancy and causes of death have been changing dramatically. I shall discuss this issue in more detail in the next chapter. Suffice it to say here that for both sexes the rate of improvement in life expectancy since the 1940s has been more than twice as rapid for Indians as for whites but that Indian life expectancy still lags by about 3 years for each sex.[58] At ages below 44, Indians die at greater rates than does the rest of the population. Between 45 and 64, the rates are the same. At 65 and above, Indians die at lower rates. This pattern is the result of differences in the relative importance of various causes of death among Indians and non-Indians. Among Indians over the past 30 to 40 years, infectious diseases have declined in significance; cancer and cardiovascular diseases are not as significant as they are among non-Indians; and violence and substance abuse have remained higher among Indians and account for most of the difference in life expectancy at birth.[59]

The colonial policies of Spain and England have had a great impact both on the subsequent economic development of Latin America and the United States and on policies regarding the treatment of Indians. The Spanish policy was to incorporate Indians as the lowest social stratum of the polity. In combination with the generally low level of economic development characteristic of most Latin American countries, the result has been a persistent pattern of high infant mortality and deaths from endemic infectious diseases. In the United States, on the other hand, the great wealth of the country, the special status that Indians ultimately achieved, and the provision of services on reservations have not resulted in dramatically improved economic conditions but have resulted in the control of infectious diseases and malnutrition and the emergence of noninfectious diseases and violence as the most important causes of reduced life expectancy.

The decline of mortality from epidemic diseases in Latin America and from epidemic and endemic infectious diseases in North America has enabled the growth of the Indian population. I have already said that there is much disagreement surrounding estimates of the number of Indians living in the Americas at the time of first contact. It is equally difficult to arrive at a figure for the present Indian population, since "Indian" is as much a social as a biological designation.[60] Keeping in mind the difficulties of estimation and enumeration, it is still useful to suggest what the magnitude of change may have been from the 1490s to the present. Somewhat conservative estimates for the early period are as follows: North America, 4.4 million; Central America, 21.4 million; and South America, 20 million.[61] Estimates for the 1960s and 1970s are North America, 1.5 million to 2.0 million;[62] Central America, 5.0 million; and South America, 10 million.[63]

It is generally agreed that the low point of the Latin American Indian popula-

tion occurred in the 17th and 18th centuries.[64] The population then began to increase as a result of the decline of epidemics, especially in the 19th century. Improvements in medical care and public health seem not to have played much of a role until well into the 20th century.[65] The low point of the North American Indian population occurred around the turn of the present century.[66] By the late 20th century there had been substantial recovery all across the Western Hemisphere, though some tribes had become extinct and the cultures of the surviving tribes had been irrevocably changed. Thus the population history of Latin America is to a very large degree the history of the indigenous population. In the population history of English America, the indigenous people are only a small part of the story, both because the numbers and complexity of the indigenous societies in Latin America were orders of magnitude greater than in English America and because the colonial policies of the invading nations differed immensely.

CONCLUSION

In this chapter I argued that disease ecology had very different consequences for the colonial experience in Africa and the Americas and that only by holding roughly constant the disease ecology does the impact of differing colonial policies become readily observable. Indeed, throughout the Western Hemisphere and Oceania—where the preexisting disease regimes did not place as severe constraints on Europeans as they did in sub-Saharan Africa—the health consequences of differing colonial policies are particularly visible. It is to some of those patterns that I turn in the following chapters.

NOTES

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the late 19th century, saw a deterioration of the health situation in southern Africa.

One of the most interesting and significant consequences of this period was the creation in Central Africa of a region of high infertility. For my purposes in this book, it is significant because it shows that the same diseases may have quite different consequences depending on the culture of the people afflicted. In this instance, as the Caldwells found, a striking feature of the pattern of sterility is its ethnic specificity. "The evidence is far from complete," they write, "but almost all that does exist points in the same direction; where sterility exists, the society does not attempt so strongly to prevent premarital sexual relations. Such societies also seem to be marked by higher marital instability, but, of course, the break-up of marriages may be the result of sterility as well as the cause of it."[18] They continue:

> The picture is then one of new diseases (or new strains of disease) entering an area previously largely isolated. The diseases were venereal in the sense that they were transmitted by sexual relations and they had their most devastating effect where there was a certain freedom in sexual relations. They entered the country just at a time when European colonization was causing substantial movements of population, particularly of men without women.[19]

They concluded that in a population where the average age at first marriage is 16, primary sterility occurred as a result of gonorrheal infections contracted at age 10 or 12.[20] Thus the impact of colonial rule in Africa was observed in patterns of both mortality and fertility, and they differed among populations depending on location, culture, and type of contact.

Paradoxically, during the postcolonial era, attempts at economic development have often had the untoward effect of worsening the health situation in ways not unlike those of the colonial era. For example, damming rivers in Ghana has expanded the zone of river blindness (onchocerciasis). Road construction in Liberia; migrant labor from Upper Volta, Mali, and Niger to southern Ghana; and settlement relocation from high plateaus to lowland agricultural areas in northern Nigeria all have been implicated in the dissemination of sleeping sickness.[21] The construction of irrigation systems has resulted in the spread of schistosomiasis and malaria. Diamond and gold mining in South Africa have caused the spread of venereal disease and tuberculosis, as well as the disruption of families.[22] AIDS is only the latest, and surely not the last, in a long list of epidemiologic disasters that have resulted from the disruption of African life since the intrusion of Europeans.

Even though disease control programs have helped improve health in some regions and one major killer—smallpox—has been eradicated, life expectancy has increased only modestly since World War II, and infant and child mortality remain high. Indeed, close to half of all deaths occur among children under the age of 5 years, the vast majority from infectious and parasitic diseases and diseases of the respiratory system, followed by diseases of the digestive system.[23] A number of reasons have been proposed, including impoverishment,