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"Heavy Shadows and Black Night": Disease and Depopulation in Colonial Spanish America

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Abstract. A substantive body of scholarship now recognizes that Native American populations declined precipitously in size following European conquest and colonization. The precise magnitude of demographic collapse continues to spark heated debate, but consensus is emerging where dissent prevailed before. That consensus attributes Indian depopulation in large part to the introduction of Old World disease. Many factors besides imported sickness caused aboriginal demise, but disease proved the most destructive agent of a fatal complex. This paper examines the role disease played in depopulating the Spanish Indies, from first contact to the early seventeenth century. Analysis focuses on five distinct geographical settings: Hispaniola, central Mexico, northwestern Mexico, Guatemala south of the Petén rainforest, and the central Andes. For each of these settings, literature is reviewed that illuminates problems of data, chronology, impact, and identification that have charged discussion of the issues for some time. An attempt is made to situate regional findings in hemispheric context and to appraise the status of the disease factor in quincennial consciousness.

Key Words: Old World disease, Native American depopulation, colonial Spanish America, Hispaniola, Mexico, Guatemala, central Andes.

Little by little heavy shadows and black night enveloped our fathers and grandfathers and us also, oh, my sons! All of us were thus. We were born to die!

Annals of the Cakchiquels (ca. 1559-81)

WHOEVER watched as Columbus came ashore, if any natives did, witnessed the beginning of a conquest that would eventually cause the greatest destruction of lives in history. We will never know precisely how many died, but it is now possible, even in the midst of ongoing controversy about the numbers involved, to distinguish which factor out of a tragic and potent mix proved the most destructive. That factor is disease (N. D. Cook and Lovell 1992). Whether the theater of disaster was the Canadian west or the Chilean south, European intrusion unleashed on Native American peoples abrupt and unprecedented collapse by exposing their immune systems to hitherto unknown forms of sickness.

It was, to be sure, a variable encounter, for some Indian groups fared much better than others in the face of sustained European expansion. Period by period, place by place, no two experiences were exactly alike, for regional and local circumstances differed markedly across the Americas. The Taino of Hispaniola, for example, have disappeared, as have the Beothuk of Newfoundland and the Yahi of California. In sharp contrast, more than twenty distinct Maya cultures endure in Guatemala, albeit under considerable duress. Many factors besides disease must be examined in order to explain pat-

terms of survival or demise (Newson 1985; Lutz and Lovell 1990), but the key to comprehending the scale and rapidity of native depopulation, especially in the years immediately following contact, lies in the role played by Old World disease. Europeans fell sick and died from illness too, just as countless Indians perished by fire and sword or from trauma and exploitation, reasons connected more to ideology and power than to genetics and germs. But disease ranks first, at least in terms of the intellectual discourse that generally prevails, in learned journals if not in the popular imagination, five centuries after conquest was begun.

It was not always so. Until early this century, Spain's American exploits continued to be viewed in the English-language world through the lens of the Black Legend. That view attributes native loss-of-life primarily to demoniacal acts of cruelty, a vision promoted from 1514 on in the works of the Dominican friar Bartolomé de las Casas (1957–61). It befell an American geographer, Carl O. Sauer, to be among the first of modern scholars to call attention to the impact of Old World disease on Native American life (1935), a relationship Las Casas apparently understood but chose not to emphasize. While the Black Legend, as Charles Gibson (1964) aptly observed, also reflects the hideous truth of a Black Reality, its overall portrayal is crude and simplistic, its representations stark and unrefined. Sauer was certainly no apologist for Spanish colonialism, as his views of Columbus and the Columbus legacy clearly attest (1966). He was, if anything, like Las Casas a "defender of the Indians," calling for greater recognition of the worth of their cultures and more sympathetic appreciation of their fate (1939). Three of Sauer's Berkeley associates—Woodrow Borah, Sherburne F. Cook, and Lesley B. Simpson—pursued this interest, revolutionizing not only the way we think about the size of Precolumbian native populations but also the ranking of factors most responsible for post-conquest decline (Denevan, forthcoming). Although the "Berkeley School" of historical demography has its articulate detractors, even they would concede that an impressive body of work has shaped the agenda of current debate.

This paper seeks to illuminate the role disease played in depopulating the Spanish Indies, primarily from first contact to the early seventeenth century. That period is important,

for its temporal span is one in which epidemics that originated as "visiting people" (Greek *epidemos*) eventually became endemic, ones that stayed among or "in people" (Greek *endemos*), for most parts of the empire at any rate. Five vignettes—for Hispaniola, central Mexico, northwestern Mexico, Guatemala south of the Petén rainforest, and the central Andes—illustrate the problems encountered with data, chronology, impact, and identification. A concluding section situates the regional discussions in hemispheric context and appraises the status of the disease factor in quincennial consciousness.

"Who Will Believe This?": Hispaniola, 1493–1518¹

In terms of conquest demography, no single outcome provokes such heated debate, nor such vast disagreement in terms of aboriginal numbers, as Hispaniola, the Caribbean island today shared by Haiti and the Dominican Republic. Hispaniola's notoriety involves (1) the Admiral of the Ocean Sea, Cristóbal Colón, the name by which Columbus (baptized Cristoforo Colombo in his native Genoa) is known in the Spanish-speaking world; (2) the equally controversial figure of Bartolomé de las Casas, who went to Hispaniola in 1502 as a young man in search of fortune, mended his ways at age 40, and thereafter, as a member of the Church, denounced the behavior of fellow Spaniards and campaigned relentlessly to better the native lot; and (3) the first known casualties of the European conquest of America, the Taino or Island Arawaks.²

The range of contact population estimates, given that all scholars manipulate essentially the same sources, is remarkable. At the low end, Verlinden (1968) suggests a mere 60,000, roughly half the figures put forward by Amiama (1959) and Rosenblat (1976). In the middle range, Córdova (1968) reckons 500,000, compatible with the uppermost statistic in a series calculated by Lipschutz (1966); Moya Pons (1971, 1987) advances 375,000–600,000; and Zambardino (1978) and Guerra (1985) favor approximately one million. At the high end, S. F. Cook and Borah (1971, 407) project eight million. Sauer (1966, 65–69), shrewdly noncommittal, refers to an "oft-repeated figure" of 1,100,000, the number that Las Casas was told

by Archbishop Deza of Seville that Columbus had mentioned to him in conversation. Skeptical of the whole business, Henige (1978, 237) concludes that "it is futile to offer any numerical estimates at all on the basis of the evidence now before us." Others press on, evaluating eyewitness testimony for new evidence and insight (Watts 1987, 71-75).

Numbers clearly matter. In the case of Hispaniola, however, whatever estimate one contemplates is but a prelude to extinction. Criticized for promoting his low estimate "in order to defend the enterprises of Columbus," Rosenblat (1976, 45) observes that "it scarcely seems that explaining the extinction of 100,000, instead of 3,000,000, implies a glorification of colonization." Regardless of the numbers involved, Hispaniola and neighboring islands had been reduced by 1519 to what Sauer (1966, 294) described as "a sorry shell." What could have caused such drastic, irreversible depopulation?

Until recently, the disease factor could not be invoked with confidence because most scholars believed that the first major outbreak of Old World sickness was smallpox, which did not appear in Hispaniola until December 1518 (N. D. Cook and Lovell 1992, 221). Sauer (1966, 204) called that outbreak "the first epidemic of record." More categorically, Henige (1986, 19) declares that his perusal of sources revealed "no serious or epidemic incidence of infectious disease in Hispaniola before late 1518." S. F. Cook and Borah (1971, 1:409-10), however, argue for a much earlier introduction of disease than 1518, mindful that the timing of occurrence directly affects the credibility of their estimates. They contend that "from the first voyage on, there was disease among the Spaniards," a circumstance that made it "most unlikely that the sick would have been kept so isolated that the natives would not have picked up any disease of epidemic possibility." Their contention now has the independent support of a seductive piece of analysis by Francisco Guerra (1985), who suggests that there was an outbreak of influenza in Hispaniola, from which considerable numbers died, following the return of Columbus on his second voyage in 1493.

What is striking about the evidence marshalled by Guerra is its unanimity with respect to when and where the disease broke out, its clinical characteristics, and the impact it had

on Spaniards as well as Indians. This last point is important, for Guerra makes it clear that, while natives suffered "infinitely," the invaders were also affected. Of the 1500 men who sailed from Cádiz on September 25, 1493, scarcely 200 were alive a decade later. Among the first to fall sick, in fact, was Columbus, laid low on December 10, one day after the illness appeared in the newly-founded Isabela. The Admiral eventually recovered, but other Spaniards and many more Indians did not.

Guerra uses his medical training to discount diagnosis as malaria or yellow fever, opting instead for an almost textbook identification of influenza.³ Diagnosis is based on source descriptions that mention acute infection, extreme contagion, high fevers, prostration, aches and pains, and general malaise. Guerra argues that a virulent strain of influenza developed among humans after people came in contact with pigs carrying swine fever. Eight sows, his sources indicate, had been taken aboard ship during a provisioning call *en route* to the Indies at La Gomera in the Canary Islands between October 5-7, 1493. Swine fever, Guerra notes, was the source of the influenza pandemic that in 1918 resulted in more than ten million deaths. His depiction of Indian depopulation in Hispaniola from around 1506 on (Guerra 1985, 341) is every bit as precipitous as that of S. F. Cook and Borah (1971, 1:401, 407), although his contact estimate is considerably less. From Hispaniola, Guerra argues, influenza would have spread to other islands and eventually the mainland.

One particularly interesting feature of Guerra's analysis is his presentation of data for the Philippine Islands as a comparative frame of reference against which to measure native population dynamics in the West Indies. He first draws attention to geographical similarities (area, climate, latitude) and the common historical denominator of Spanish conquest and colonization. The key difference between the two island groups at contact, Guerra asserts, is that native peoples in the Philippines lived alongside domesticated animals, whereas those in the West Indies did not. This meant that humans in the former archipelago had adjusted biologically to the presence among them of diseases originating in animals, including swine fever. The population of the latter had not. Contact with mainland China ensured that the Philippines were incorporated early on into

the Old World disease pool. Landfall there by Magellan, in 1521, and exposure thereafter not only to Spaniards but also to the assorted paraphernalia of empire, thus had radically different consequences for native ecology from the arrival and reappearance in the West Indies of Columbus (Watts 1987). The founding of Manila in 1571 was not accompanied by the disease and depopulation that followed the founding of Isabela in 1493. From the sixteenth century on, the native population of the Philippines increased steadily, the experience in reverse of the aboriginal peoples of Hispaniola and surrounding islands.

By 1518, then, when smallpox is usually first considered to have entered the American scene, a pestilence that may have been influenza had already gutted the West Indies. Ambitious Spaniards wanted nothing more to do with the ruin they, their actions, and their imported sickness had created. Wealth lay on the mainland to the west, towards which sailed an expedition led by Hernán Cortés. In its wake followed smallpox.

"Not Forever on Earth": Central Mexico, 1518–1605⁴

Spaniards under the leadership of Cortés landed on the Mexican coast at Veracruz on Good Friday, 1519. They soon became aware that they had entered a world organized and settled very differently from the Caribbean islands they had been anxious to leave. We know it today as Mesoamerica, a term used to define a far-flung area embraced by central and southern Mexico, Guatemala, Belize, El Salvador, the westernmost parts of Honduras and Nicaragua, and the Nicoya peninsula of Costa Rica. At the time of the Cortés landfall, Mesoamerica was home to scores of cultures capable of meeting basic human needs and replete with remarkable accomplishments in art and architecture, astronomy, mathematics and the measurement of time, plant domestication, environmental management, written and pictographic communication, and the building of towns and cities. The splendors of Mesoamerica were many, but none was more impressive nor offered as much possibility for enrichment than the Aztec (Mexico) capital of Tenochtitlán, which the Spaniards entered, mortals mistaken for gods, on November 8,

1519 (León-Portilla 1962; 1984). They arrived as guests, watchful and inquisitive, taking measure. Later they were driven out after their motives became apparent; almost two years passed before they and their allies forced the surrender of Tenochtitlán. Of day One Serpent in the year Three House, an Aztec poem laments:

Our spears lie broken in the streets.
We have torn our hair in our grief.
Gone are the roofs of our houses
Their walls red with blood.

Worms crawl across the streets and squares.
The walls are splattered with gore.
Red are the waters lurid as tan bark,
And when we drink the water tastes of brine.

Against the adobe walls
We have pounded our hands in despair,
For our city is no more.
The shields of our warriors were its defense,
But not even they could save it.⁵

Tenochtitlán fell on August 13, 1521, but between the time the Spaniards were first repelled and their final victory, an event occurred that bears directly on the outcome of military confrontation. Just as the Aztecs could not have been defeated without the participation, under Spanish command, of warriors furnished by the city state of Tlaxcala, so also is victory impossible to imagine without the turmoil set loose in Tenochtitlán by an outbreak of smallpox, which worked to the invaders' advantage. Once again, a native text provides mournful commentary:

While the Spaniards were in Tlaxcala, a great plague broke out here in Tenochtitlán. It began to spread during the thirteenth month [September 30–October 19, 1520] and lasted for seventy days, striking everywhere in the city and killing a vast number of our people. Sores erupted on our faces, our breasts, our bellies; we were covered with agonizing sores from head to foot.

The illness was so dreadful that no one could walk or move. The sick were so utterly helpless that they could only lie on their beds like corpses, unable to move their limbs or even their heads. They could not lie face down or roll from one side to the other. If they did move their bodies, they screamed with pain.

A great many died from this plague, and many others died of hunger. They could not get up to search for food, and everyone else was too sick to care for them, so they starved to death in their beds.⁶

Scholars generally agree that the plague so graphically described was, in fact, smallpox,

and that its effects on the Aztecs and other Mesoamerican peoples, whom it lashed under "virgin soil" conditions, was devastating (Borah 1992, 7–10). Disagreement, however, persists as to how many perished and how many were alive to begin with.

Like Hispaniola, the range of contact population estimates is immense. S. F. Cook and Simpson (1948) first volunteered 11 million for central Mexico, a figure Borah and S. F. Cook (1963) later raised to 25.2 million. Rosenblat (1954) reckoned 4.5 million for all of Mexico, an estimate close to that of Sanders's (1972) 5–6 million inhabitants for the Aztec empire. Sanders and archaeologist Barbara Price (1968) favor 12–15 million for all of Mesoamerica. For the Basin of Mexico, Sanders (1976, 149) calculates 1–1.2 million, with roughly one-third to one-quarter that number resident in the "metropolitan area and satellite villages and towns" of Tenochtitlán and 150,000–200,000 in the island city proper, twelve square kilometers in extent. Also for the Basin of Mexico, Whitmore (1991, 477) advances 1.59 million as a figure he believes conforms to the "moderate historical estimates" of Sanders and others. Whitmore (1991, 483) champions an "all-Mexico total" of 16 million, based on a "scaling procedure" that extends his computer simulations for the Basin of Mexico farther afield.⁷ Like Whitmore, Zambardino concerns himself more with methodological procedure than source interpretation, offering a contact figure of 5–10 million for central Mexico, which for him "matches the evidence gathered and presented by Borah and Cook far more accurately than their estimate of 25 million" (Zambardino 1980, 22). Following Sanders, Slicher van Bath (1978) scrutinizes Borah, Cook, and Simpson's conversion of diverse socioeconomic categories into total population and then shaves their count by 15 percent to arrive at 21.4 million for central Mexico.

This region is the unit of analysis most often investigated by the provocative Berkeley trio, two of whom (S. F. Cook and Borah 1971, 1:viii) compute native depopulation there between 1518–1605, in millions, as follows:

1518	25.2
1532	16.8
1548	6.3
1568	2.7
1580	1.9

1595	1.4
1605	1.1

Zambardino (1980) argues that, from a mathematical standpoint, each of these estimates conceals a significant margin of error, having been calculated for an extensive area from data which, for the most part, are indirect, incomplete, and locally specific, a criticism leveled earlier by Sanders (1976). Fully aware that the debate is far from resolved, S. F. Cook and Borah (1979, 3:102) conclude that "the Indian population of central Mexico, under the impact of factors unleashed by the coming of the Europeans, fell by 1620–1625 to a low of approximately 3% of its size at the time the Europeans first landed on the shores of Veracruz." Even if one is inclined not to accept the figures put forward by Cook and Borah, their work has served as a catalyst for much recent work in historical demography, to the advancement of the field as a whole.

Attributing demographic collapse in the century following conquest primarily to the disease factor, as the "Berkeley School" always has done, leads logically to discussion of particular epidemic episodes. The convergence of opinion that identifies the first major bout of sickness as smallpox—we even know the name of the black slave, Francisco de Eguía, held responsible for transferring infection from ship to shore in 1520—does not extend to the second outbreak (1531–32), nor most subsequent outbreaks between 1538 and the early seventeenth century. This lack of agreement is addressed in the recent work of H. J. Prem (1992), whose analysis of native health and welfare, like that of A. López Austin (1988), evaluates rich Aztec testimony that augments better-known, though not always carefully consulted, Spanish texts. Prem dissects relevant sources with considerable prudence before venturing an opinion as to what possible diseases match the symptoms and characteristics described. Two of his conclusions are of special interest: (1) that the manner in which a disease is presently thought to behave may not correspond to its manifestation in the past; and (2) that only the very earliest epidemics, few in number, involved one specific pathogen, the greater likelihood being that outbreaks of sickness involved what Borah (1992, 7) calls "compound epidemics." Prem suggests that while one principal agent may be singled out, its predomi-

nance does not preclude other forms of sickness. The incidence of measles and typhus at roughly thirty-year intervals is striking in Prem's sequence. He also contends, as do Slicher van Bath (1978) and Whitmore (1991), that depopulation occurred in a series of abrupt, irregular drops, rather than the smooth, gradual progression depicted in the work of S. F. Cook and Borah (1971, 1:80–81).

What did follow an upward, exponential trajectory was the population of introduced livestock. As Indians disappeared, herds of cattle, sheep, and goats became a prominent feature of the rural landscape; Old World animals were roughly nine times more numerous than native inhabitants by the early seventeenth century (Simpson 1952, frontispiece). The ecological consequences of this four-legged invasion continue to be poorly understood and improperly represented (Butzer forthcoming). S. F. Cook (1949) observed that, in some parts of central Mexico, erosion sequences point to ground cover and topsoil having been removed in Precolumbian times, an observation borne out by recent pollen analysis (Brown 1985; González and Montúfar 1980). These studies, however, also indicate that processes of deterioration occurred or were accelerated under Spanish domination, even if Old World livestock offered native communities increased subsistence options and afforded their fields a hitherto unknown source of fertilizer. More informed awareness of regional variation is in order. The "Simpson scenario" of vanishing Indians and multiplying livestock is perhaps nowhere more vividly etched than in the eroded terrain of the Mixteca Alta (S. F. Cook and Borah 1968; Lovell 1975). Disease and depopulation, there as elsewhere, helped fuel a process of environmental degradation that scars the landscape still.

**"A Long Series of Encounters":
Northwestern Mexico, 1519–1653⁸**

That part of Mexico lying beyond the northern perimeter of Mesoamerica, from the Pacific lowlands of Sonora and Sinaloa up through the canyon country of Chihuahua and on towards the open plains cut by the Río Grande, presented yet another cultural arrangement for Spaniards to contemplate. No *conuco* mounds here, the large earthen piles

characteristic of the islands, nor manicured *chinampas*, the "floating gardens" Cortés and his men marveled at in the waters surrounding Tenochtitlán. Favorable pockets did exist, where intensive agriculture was practiced and where towns and villages flourished, but the cultural whole, with important exceptions, lacked the political, social, and technological sophistication found farther south. Population levels at contact, therefore, could not possibly have been comparable to those of central Mexico, but even in this daunting periphery, indications are that human numbers were still impressively large.

A fundamentally different view of the meaning of conquest, and bold advocacy of higher estimates than most scholars hitherto had advanced, begins in the 1930s with the pioneering work of Sauer, for it is in the regional setting of northwestern Mexico that prevailing scholarly attitudes about aboriginal culture and demography were first seriously challenged. In their study of Aztatlán, Sauer and Brand (1932) combine perusal of documentary sources with field observation to assert that, at the time of Spanish intrusion, the area of the Pacific coast under examination supported a population roughly the same size as the one living there in the early twentieth century, which in 1920 was 225,000. They caution at the outset that "statements we present herewith are anything but conclusive," instead asking that "certain discoveries" be treated "in terms of a tentative thesis" (Sauer and Brand 1932, 3). Crucial though the disease factor is, other reasons must be sought to account for native decline in Aztatlán; slave raids, pillage, and wanton destruction, for example, Sauer and Brand (1932, 41) recognize as the acts of "about as hard a gang of killers as Spain let loose anywhere in the New World." Three years later, Sauer (1935, 32) published another monograph in which the same analytical approach was applied to a much more extensive territory, resulting in a similar finding as at Aztatlán:

The record, as interpreted, gives an aboriginal population between Gila and Río Grande de Santiago in excess of half a million, almost three-fourths of the number now living in this part of Mexico. Bit by bit, the theme has obtruded itself that aboriginal rural populations and present ones are much the same. This, I believe, is not a sensational conclusion, but a quite natural one.⁹

What struck the mind of Sauer as "quite nat-

ural" was, in fact, "a sensational conclusion" for others less inclined to look closely at subsistence possibilities and thereby gain some insight into potential carrying capacity, an insight that would then allow the historical record to be read either with justifiable skepticism or with greater credibility. One scholar who must have found Sauer's proposition difficult to accept was the Berkeley anthropologist Alfred Kroeber, who had earlier estimated the contact population of northwestern Mexico at 100,000, less than one-fifth the number calculated tribe by tribe, region by region, by his colleague in geography (Kroeber 1934).

Sauer's influence is apparent in much of the literature on Latin American historical demography, even if the field is not one customarily associated with his expertise (Denevan forthcoming). For northwestern Mexico, two recent contributions help complete the picture. The "north frontier" that forms the third component of Peter Gerhard's monumental New Spain trilogy (1972; 1979; 1982) includes entire colonial jurisdictions (Nueva Galicia, Alta and Baja California) not incorporated by Sauer's spatial orbit, but the former's population estimates indicate the variable extent of Indian decline particularly well. The experience of Nueva Galicia conforms to the demographic trajectory of central Mexico, with a sixteenth-century collapse, a seventeenth-century nadir, and an eighteenth-century recovery. Alta and Baja California, on the other hand, resemble a delayed variant of the West Indies, with aboriginal inhabitants dwindling to extinction. Gerhard (1982, 24) observes that "whereas in central and southern Mexico the native population may have dropped 95 percent in the sixteenth century, on the northern frontier the loss, while drastic, was less pronounced and, as might be expected, occurred later." He also notes (1982, 23) that "native populations here sometimes were fatally infected with European disease before they came under Spanish control," a circumstance that both Sauer (1935) and S. F. Cook (1937) failed to take into consideration.

Gerhard's figures take on added significance for "north frontier" territory today comprised by Sonora, Sinaloa, Durango, and Chihuahua in Mexico, and Arizona, New Mexico, and Texas in the U.S., when viewed alongside the elaborate disease chronology reconstructed by Daniel Reff (1991, 97-179). For different areas

of northwestern Mexico, with some overlap into the southwestern U.S., Reff reconstructs the events surrounding sixteen disease episodes between 1530-1653. He divides his chronology into two periods that fall before and after the arrival of Jesuit fathers in the region in 1591. The coming of the "Black Robes," with their instructions to keep records and write annual reports, means that post-Jesuit epidemics can be pieced together with greater attention to detail than pre-Jesuit epidemics. Unlike Dobyns (1983), Reff (1991, 102) considers that "native exchange networks" were not sufficiently organized to facilitate diffusion into northwestern Mexico of the smallpox epidemic that caused so much destruction elsewhere between 1518-25. He does, however, contend that at least four outbreaks of sickness occurred before Father Gonzalo de Tapia and Father Martín Pérez made their way to Villa San Felipe in 1591. This leads Reff (1991, 15) to conclude that "the Jesuits found only vestiges of once populous and developed cultures" and that the discrepancy between accounts of explorers and missionaries may be ascribed to "significant disease-induced changes" between the time of penetration by the first contingent of Spaniards and arrival on the scene by the second.

Discussion of the demographic consequences of disease outbreaks complements without duplicating Gerhard's treatment of the matter. Reff (1991, 16) estimates that "most native populations were reduced by 30 percent to over 50 percent prior to sustained contact with the Jesuits." In the wake of the order's missionization program, which sought to gather formerly dispersed, mobile groups together in a single, fixed location, "native populations were reduced by upwards of 90 percent." Depopulation is viewed as the result of "a complex set of demographic factors, but particularly an exceedingly high infant mortality rate." While cognizant of the devastating role of disease, Reff acknowledges, like Sauer and Brand, that certain goals and policies pursued by Spain helped accelerate the process of decline. He argues that mining activity in Durango and southern Chihuahua forged "routes of contagion" south to north from about 1546 on and that missionization, by nucleating Indians and thereby increasing the likelihood of greater mortality when disease broke out, in fact killed the very Indians whose souls it was designed

to save. The latter scenario, not surprisingly, resulted in widespread mission abandonment and the terrifying correlation of sickness with foreign presence. A backlash was inevitable. Father Gonzalo de Tapia met his martyr's death (a severed head, a dismembered arm) when Indians who believed that it was he who had infected their communities took revenge during a pastoral visit to Tovoropa on July 11, 1594. After setting the church on fire, they stuck Father Gonzalo's head on a pole and paraded it on a circuit of neighboring settlements.

Reff's work is a creative example of what can be gained by diligent and persistent application, particularly *not* accepting what other scholars say about a source but instead consulting that source first-hand in order to judge, interpret, accept or reject information for oneself. Reff's thorough combing of the history written in the mid-seventeenth century by the Jesuit father Andrés Pérez de Ribas is a case in point, for it "abounds with references to disease" that previous researchers apparently missed. Reff (1991, 281-82) also makes the point that "fundamental acceptance of European techno-economic superiority" frustrates accurate representation of aboriginal patterns of land and life. His stricture applies with equal force to interpretations of the contact situation in Guatemala.

"Great Was the Stench of the Dead": Guatemala, 1519-1632¹⁰

In Guatemala, more than in any other Latin American country of comparable territorial extent, physical and cultural diversity lend themselves to a regional investigative approach, an approach governed by awareness of place-to-place variation even over short distances. This reality is reflected in all sorts of intellectual enterprises, in anthropology and linguistics, in archaeology and human ecology, but espe-

cially in historical geography (Lovell 1990, 1992b). Gaps in our knowledge abound. For Guatemala, however, a mosaic can be assembled that addresses, region by region, the combination of factors responsible for catastrophic depopulation in the century or so following conquest.

Of the five sets of figures recorded in Table 1, those suggested by Denevan (1976) and by Lovell, Lutz, and Swezey (1984) pertain to all or a sizeable portion of the present-day republic of Guatemala. The calculation of Sanders and Murdy (1982) refers to highland Guatemala only, while Zamora's (1983) covers both highland and lowland areas in the western half of the country. The spatial compass of Solano (1974) is never clearly defined, but his figures relate to most of Guatemala lying south of the Petén lowlands. Differences in the size of territory appraised, therefore, must be borne in mind when comparisons are made. Zamora's contact estimate of 315,000, for example, at first glance appears to be in agreement with Solano's tally of 300,000. When, however, the spatial bases of reckoning are taken into account, Zamora's figure more closely coincides with the 500,000-800,000 advanced by Sanders and Murdy, and in fact is not entirely out of line with the 2 million favored by Denevan or by Lovell, Lutz, and Swezey.

Solano's statistics are more difficult to reconcile. Even his low contact estimate, when viewed in relation to figures put forward for 1550 and 1575, indicates a "massive collapse" (1974, 61). For the last quarter of the sixteenth century, however, Solano champions a population increase that conflicts with abundant contemporary testimony (Lovell 1992a). In a field of study where emotions are known to run high, Solano (1974, 61) claims that the "Berkeley School" is driven by "a secret passion," the goal of which is "to blame Spanish actions as the direct cause" of drastic native depopulation.

Table 1. Native Population Size in Sixteenth-Century Guatemala

Year	Denevan (1976)	Lovell, Lutz, and Swezey (1984)	Sanders and Murdy (1982)	Zamora (1983)	Solano (1974)
ca. 1520	2,000,000	2,000,000	500-800,000	315,000	300,000
ca. 1550		427,850		121,000	157,000
ca. 1575				75,000	148,000
ca. 1600				64,000	195,000

Table 2. Contact Estimates and Native Depopulation by Region for Guatemala, 1520–75

Region	1520	1525	1550	1575
Northwest	260,000	150,000	73,000	47,000
Verapaz	208,000		52,000	
Northeast	17,500			524
Southwest	33,000		8,250	
Totonicapán	105,000	75,000		13,250
Center-South (Quiché)	823,000			
Center-South (Cakchiquel)	250,000			
East Central (Pocoman)	58,000			14,500
East Central (Chortí)	120,000			
Atitlán (Tzutuhil)	72,000	48,000	5,600	5,300
Southeast (Pipil)	100,000			

Source: Lovell and Lutz (forthcoming).

If Solano's *hispanidad* tirade and indeterminate or variable units of analysis confuse the issue, less misleading is the regional picture that emerges in Table 2. Lacunae are many, but for the seven regions for which two or more estimates between 1520–75 are available, some comparative observations can be made. In crude, relative terms, the Northwest appears to have experienced lower population losses than did Verapaz, the Northeast, the Southwest, Totonicapán, and Atitlán. Depopulation seems most pronounced in the Northeast and in Atitlán, the former a lowland region, the latter made up of lands along the southern shores of Lake Atitlán as well as large tracts of the Pacific piedmont lying at intermediate altitudes below the lake. The Atitlán region witnessed the full force of Spanish military conquest and intense economic exploitation thereafter, including enslavement of local populations, the imposition of tribute demands, and involvement in the boom days of cacao (Bergmann 1969; Orellana 1984). The remote Northeast, on the other hand, was spared almost all direct contact with the conquest regime, save for having to contend with the Cortés expedition that passed through the region en route to Honduras in the mid-1520s (Kramer 1990). Two more different physical regions, two more dissimilar colonial encounters, are hard to imagine in the Guatemalan context, yet both shared a fate of early, accelerated, and ruinous decline.

How Indians fared in the Northwest, in the rugged terrain of the Sierra de los Cuchu-

matanes, may be related to the region's mountain isolation and limited economic potential holding the invaders somewhat at bay, but even here there are important exceptions that caution against indiscriminate generalization (Kramer, Lovell, and Lutz 1991). The regional profiles in Table 2 reflect all sorts of deficiencies, but they constitute, demographically, the least hazardous way of either deriving an aggregate contact figure or gaining some idea of what happened in what regions during what periods of time.

Regarding disease, documentary evidence reveals eight outbreaks between 1519–20 and 1632 which, in all likelihood, constitute widespread or pandemic occurrences. Another 25 recorded episodes relate to more local, epidemic flare-ups (Lovell 1992a). As in central Mexico, it is often impossible to determine what specific bouts of sickness might have been, because ambiguous, contradictory, or inadequate descriptions defy accurate diagnosis. This is certainly the case with the first great disease outbreak, recorded in the *Annals of the Cakchiquels* as having arrived in Guatemala sometime between August 1519 and October 1520, four or five years before the wars of conquest waged by Pedro de Alvarado. A well-known passage (Recinos and Goetz 1953, 115–16) runs:

It happened that during the twenty-fifth year the plague began, oh, my sons! First they became ill of a cough. They suffered from nosebleeds and illness of the bladder. It was truly terrible, the number of dead there were in that period. The prince

Vakaki Ahmak died then. Little by little heavy shadows and black night enveloped our fathers and grandfathers and us also, oh, my sons!

It was in truth terrible, the number of dead among the people. The people could not in any way control the sickness.

Great was the stench of the dead. After our fathers and grandfathers succumbed, half of the people fled to the fields. The dogs and the vultures devoured the bodies. The mortality was terrible. Your grandfathers died, and with them died the son of the king and his brothers and kinsmen. So it was that we became orphans, oh, my sons! So we became when we were young. All of us were thus. We were born to die!¹¹

While we must be grateful that such a poignant and graphic account has survived, difficulties abound, for opinion is divided as to what particular disease or diseases the above passage could have referred to. Dozens of scholars have scrutinized the Cakchiquel description. The balance of commentary favors smallpox, but not unanimously so, for alternative designations suggest influenza, measles, pulmonary plague, and exanthematic typhus. What seems worthy of observation is that medical doctors who to analyze the Cakchiquel text are more inclined to diagnose measles than smallpox (Lovell 1992a).

Identification, then, is problematical. Decidedly not, however, is clear reference to high mortality, social disruption, fear, and panic that this sickness brought to the Cakchiquel Maya. The source also distinguishes between a time (August 1519–October 1520) when "the plague raged" and a period thereafter (October 1520 to March 1521) when "the plague spread" (Recinos and Goetz 1953, 115; Lovell 1992a, 60–68; Wright 1992, 54–66). In terms of origin and chronology, Prem (1992) correlates the Guatemalan outbreak with the smallpox that struck central Mexico in 1520 and 1521, but this connection fails to account for a possible appearance of the disease in 1519. The problem disappears, however, if the source of infection is sought in the Yucatán, where smallpox may have made an even earlier American landfall than the commonly accepted date of 1518 (N. D. Cook and Lovell 1992, 218–19). Even if the Cakchiquel were the sole diligent recorders of the sickness in Guatemala, its entry into a "virgin soil" environment must also have affected the neighboring Tzutuhil, Quiché, and Mam. MacLeod (1973, 40–41) refers to the disease outbreaks that preceded Alvarado's intrusion as "the shock troops of the conquest."

The advance guard that cut down the Maya had a similar role to play in the campaign launched by Francisco Pizarro to conquer the Incas of Peru.

"Scattering until They Vanished": The Central Andes, 1524–1635¹²

In terms of aboriginal achievements, comparisons are inevitably made between Mesoamerica and Tawantinsuyu, the latter the name bestowed by the Incas on their Andean empire stretching from southern Colombia through Ecuador, Peru, and Bolivia to northern Chile and northwestern Argentina (Murra 1984). These two vast realms were the ones that attracted Spaniards most, for their resources were varied and abundant. Twentieth-century scholarship has tended to exhibit the same spatial bias, but not quite in equal measure. One reason we know more about Mexico and Guatemala than we do about the Andes is because the Aztecs, Mayas, and other Mesoamerican peoples had developed a strong written tradition by the time of the conquest, which enabled them to record their version of events soon after subjugation. The absence of a similar tradition among the Incas (they kept track of things, as best they could, by means of a knotted string called the *quipu*) meant that much early information was lost, or was put down on paper many years later, with inevitable gaps or lack of detail. This is particularly apparent when it comes to documenting the swath cut by disease, for few native texts exist to illuminate the principal Spanish sources.

The evidence at hand indicates that, as in the case of Guatemala, sickness preceded the physical presence of Spaniards by several years, diffusing ahead of them to weaken military opposition. An outbreak of what could have been hemorrhagic smallpox, whereby a strain of smallpox infects the blood, causing a rash on the skin similar to that produced by measles, entered the Ecuadorian Andes in 1524 (N. D. Cook 1981, 62; Newson 1992, 88–91). There it resulted in heavy mortality. Among its victims was the Inca ruler Huayna Capac, who was then in Quito to consolidate Inca power over northern territories recently brought to heel. The epidemic also claimed the life of Huayna Capac's designated heir, igniting a disastrous civil war between the brothers

Atahualpa and Huascar, rival contenders for the Inca throne (Dobyns 1963, 496). By the time Pizarro followed up his coastal reconnaissance of the late 1520s with a full-fledged campaign in the 1530s, the chaos that sickness and internal dislocations had brought to Tawantinsuyu facilitated Spanish victory, a fact the invaders themselves openly acknowledged (Wright 1992, 72–75).

There is some disagreement as to the origins of smallpox before it reached the Andes. Most scholars consider passage from Central America as the most probable route. Borah (1992, 15), however, suggests a source of contagion among Europeans in the Río de la Plata basin, pointing out that the disease in the mountains was reported to have spread from south to north. Newson (1992, 91) resolves the difficulty by arguing that Inca troops stationed in the north near Túmbez may have fallen sick and carried smallpox south to Cuzco, from where it radiated back towards its source of origin. Newson also contends that other diseases could have struck the Incas before Pizarro's arrival; measles and plague are the most likely candidates, Central America the most probable source.

Andean epidemic history has been examined in seminal contributions by Polo (1913), Lastres (1951), and Dobyns (1963), all three of whose work is synthesized by N. D. Cook (1981, 60–61). After the first outbreak of smallpox, more than twenty different disease episodes took place between 1530–1635, six of them of pandemic dimension. The cumulative effect of these outbreaks, as in central Mexico, was to decrease native population by the early seventeenth century to a fraction of its contact size.

While we lack for Tawantinsuyu the plethora of local studies available for Mesoamerica, we are fortunate to have one comprehensive treatment of Indian depopulation that compensates in quality for the dearth of regional monographs. N. D. Cook (1981) uses the term "demographic collapse" to describe the fate of "Indian Peru" between 1520–1620. In Cook's study, six different methods are either employed or assessed to estimate the size of "Peru's preconquest population." An ecological or carrying capacity model produces a figure of 6.5 million. Archaeological data, reflecting the poorly developed status of the field compared to Mexico, are considered too inadequate for any kind of calculation beyond

those that are site-specific. Even at this level of analysis, however, problems abound: excavation at Chan Chan, Cook notes, yields a range of resident occupants from 25,000–200,000. Depopulation ratio models, believed by Cook to be unreliable because of problems of statistical sampling, generate 6 million (Rowe 1946), 10 million (Wachtel 1977), 12 million (Smith 1970), and 37.5 million (Dobyns 1966), all of which are estimates for the central Andes (Ecuador, Peru, Bolivia). Models of political and social structure, an "idealized concept" with "little basis in fact," give a range of 16–32 million (Means 1931, 1932). Census projection models, described as "one of the most promising avenues of approach," deliver a minimum population of 3.9 million and a maximum population of 14.2 million. Cook's enthusiasm for this procedure, however, does not extend to its manipulation by Shea (1976), whose estimate of 2–2.9 million for the central Andes is dismissed on the grounds of insufficient data and the erroneous supposition "that the rate of decline prior to 1581 paralleled the rate following that date" (N. D. Cook 1981, 95, 108–10).

Methodologically, perhaps the most novel of Cook's six different strategies is his deployment of disease mortality models, whereby death rates known to have occurred during certain epidemics are applied, with appropriate modification, outbreak by outbreak to the Peruvian disease chronology. Working from a "calculated base" of 671,505 in 1620, the "maximal population" in 1520 is estimated at 8,090,421 and the "minimal population" at 3,243,985. Cook's reasoning is episode-specific: 30–50 percent mortality during the first outbreak of smallpox; 25–30 percent mortality during the first outbreak of measles; and 30–60 percent mortality when smallpox and measles appear together, as they did in the murderous epidemic of 1585–91, along with mumps, influenza, and typhus. The model overlooks many key variables—differential immunity, age-specific mortality, physiological adaptation—but it does offer a reasonable basis for calculation, provided, of course, that disease identification has been established with some degree of confidence (N. D. Cook 1981, 59–74).

After dealing, point by point, with the strengths and weaknesses of all six procedures, Cook then steps back from the preponderance of numbers to suggest a specific range (4–15 million) and a specific estimate (9 million) for

the population of Peru on the eve of Spanish conquest. These figures are advocated "after careful weighing of the evidence, rather than being purely an act of faith" (1981, 114). The estimate of 9 million people alive in 1520 contrasts sharply with the estimate of 600,000 alive about a century later. An overall decline of 93 percent "almost completely wiped out" Indians living along the coast. Those who continued to live in the mountains, despite "disease and outright exploitation," in subsequent centuries recovered demographically to give the Andes of Peru its unmistakable, enduring native complexion.

Besides his pioneering work at the national level of analysis, which inspired Alchon (1991) toward similar goals in Ecuador, N. D. Cook (1982) has published a population history of the Colca valley that serves as a concrete example of the kind of regional investigation urgently needed throughout the Andes. In the opposite direction, Cook is reported as favoring a contact estimate for the entire Inca empire of fourteen million, which means he reckons that some five million people lived under Inca rule in Colombia, Ecuador, Bolivia, Argentina, and Chile (Roberts 1989).

These lands, too, experienced precipitous decline in the size of their native populations because of the onslaught of disease. Nowhere, perhaps, are the consequences of demographic collapse in the Andes more tragically described, nor the upheavals caused by Spanish rule more graphically documented, than in the 1,200-page "Letter to a King" composed and illustrated between 1585-1615 by the remarkable Waman Puma (Adorno 1986). Philip III, far from the scene of human neglect and ecological disaster, is told (Waman Puma 1980, 858, 885):

The Indians are the natural owners of this realm, just as the Spaniards are the natural owners of Spain . . . [Here] the Inca is king, and so no Spaniard nor any priest has the right to intrude, because the Inca was [both] owner and lawful sovereign.

Consider these poor Indians and their labors . . . that in each town they constructed irrigation canals from rivers or springs, from lakes or reservoirs. In bygone days these were built with so much effort, by hand, and with the greatest skill in the world that it seems every Indian [who lived] raised up a stone. All this was sufficient for the great many people who then were alive.

And so throughout the kingdom all lands produced food, whether crops were planted in the

yungas, or hot lands, or in desert [oases], or in the rugged mountains of this realm. And the Inca kings commanded that no one should damage or remove one stone, and that no livestock should enter the aforementioned canals.

But now this law no longer applies. And so all the fields are destroyed because of a shortage of water. On account of this the Indians lose their lands, and Your Majesty his royal share, and Holy Mother Church her tithes. For nowadays the Spaniards let loose their animals, their mule trains or their cows, their goats and sheep, and they cause great damage. And they take the water and destroy the irrigation canals so much so that no amount of money could repair them. And the little amount of water that remains, that also is taken from the poor Indians. And so the Indians abandon their towns.¹³

Waman Puma's disclosures triggered no practical response. His voice was silenced and his knowledge lost until early this century, when the manuscript copy of *El primer nueva crónica y buen gobierno* was discovered in the Royal Library in Copenhagen. What Waman Puma has to say has as much relevance to the contemporary situation in Peru as it did four centuries ago.

"How Many Tears?": The Disease Factor in Perspective¹⁴

The above ports of call were not all made in person by Columbus, but all of them did change dramatically because of what happened after he first landed on an island in the Bahamas 500 years ago. A handful of case studies cannot possibly do justice to every aspect of a complex theme, but they do serve to impart some sense of how disease and depopulation affected the native experience in colonial Spanish America. What bigger picture emerges from these regional vignettes?

The related issue of contact population size and post-conquest demographic collapse continues to engage the interest of hundreds of scholars. Their collective endeavors, for the entire Americas, are systematically treated in the volume of essays edited by Denevan (1976), now updated and revised (1992). Intense debate and marked difference of opinion surface throughout this collection. The reader cannot help but observe that controversy is generated not so much by the numbers themselves as by the divergent views of history that any particular choice of numbers represents. In 1976, Denevan averaged out the figures at his dis-

posal to arrive at a New World population in 1492 of 57.3 million, which he now adjusts to 53.9 million to incorporate the research findings of the past fifteen years. Denevan's hemispheric estimates are notably higher than the 8.4 million of Kroeber (1939), the 13.4 million of Rosenblat (1954), and the 15.5 million of Steward (1949). On the other hand, Denevan's reckoning falls far below that of Borah (1976), who mentions upwards of 100 million, and the 90–113 million favored by Dobyns (1966). His estimates most approximate the 37–48.5 million of Sapper (1924) and the 40–50 million of Spinden (1928). In general, a trend towards acceptance of higher rather than lower contact estimates is apparent, with growing acknowledgement that Native American populations a century or so after European intrusion were roughly one-tenth or less their contact size. The disease factor is crucial in any attempt to explain the massive fall in Indian numbers (N. D. Cook and Lovell 1992).

Progress has been made, but much remains to be done. It would be a mistake, for instance, to think that balanced recognition of the role disease played in depopulating the Spanish Indies is shared by all. This is manifestly not the case, nor is it likely to be. The disease issue is distorted or dodged by all sorts of people for all sorts of reasons, many of them governed more by ideological conviction than by ignorance or lack of interest. In a study of the plague of 1629 in Muzo, a mining community in Colombia, Friede (1967, 341) declares that "when there were epidemics in Spanish America, these were neither general nor of identical consequences throughout the regions affected." We may concede Friede the latter point, but he seems unusually blinkered on the former, perhaps influenced too much by the data for the area he happens to know best. For him, however, there exist "numberless documents which definitely attribute the decrease of the Indian population to excessive work, malnutrition, flight, segregation of the sexes, ill-treatment, cruelty, conscription for expeditions, enslavement [and the labor draft known as] the *mita*" (Friede 1967, 339). Sempat Assadourian (1985) is of a similar disposition. The mindset is perhaps best exemplified by the Peruvian writer Mario Vargas Llosa (1990), who manages to address "questions of conquest" in an extended essay in *Harper's* without once demonstrating awareness that the transfer of

disease had a marked influence on how events unfolded.

At the same time as some intellectuals conveniently ignore or marginalize the disease question, others embrace it far too wholeheartedly. The trait is particularly evident among some Spanish scholars, whose near-exclusive focus on epidemiology and biological inequality serves to deny that which cannot be denied: barbarous heavy-handedness on the part of the conqueror, from which Indians suffered dreadfully and against which individuals like Las Casas fought and lobbied nobly. Thus we may concur with Zamora (1985, 131) that disease must be considered "the fundamental cause" but express reservation at its being designated the "almost single" cause of native disappearance. Similar proclivity to oversimplify the matter may also be found in Guerra (1986, 58), who states with more than a shrug of resignation that "the American Indian was victimized by sickness, not by Spaniards." Historical autopsy should not be performed that surgically, least of all on the countless many who died a conquered death after October 12, 1492.

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Notes

1. Las Casas (1957–61, 2:106) states of the island of Hispaniola: "From the year 1494, when their great misfortune began, until the year 1508, which is to say fourteen years, there perished upwards of three million souls, from warfare, from being shipped off as slaves, from work in the mines, and from other labors." It did not serve the Dominican's purpose to mention disease, for the cause he then served called for him to highlight, to the lasting consternation of his fellow Spaniards, the undeniable atrocities referred to. The

good bishop, his gaze wandering far forward, then asked: "Who, among those born in the centuries to come, will believe this? Even to me, who is writing it down, who saw it, and who knows most of it, it now seems to me that it was not possible."

2. Sauer (1966, 37) states that the name Taino, currently in fashion, is "a term introduced in the present century and taken casually from the name for a single social class." He preferred the designation "Island Arawaks" for the native inhabitants of the Greater Antilles (Cuba, Hispaniola, Puerto Rico, and Jamaica), the first New World people to be called, erroneously but enduringly, "Indians." For more on nomenclature, see Berkhofer (1978) and Alcides Reissner (1983).
3. Malaria and yellow fever are usually considered to have arrived in the New World much later than 1493 (Borah 1992, 18–19; N. D. Cook and Lovell 1992, 227–29; Newson 1992, 101–02). The timing of their arrival, however, is still open to debate.
4. Not surprisingly, most Spanish accounts of the conquest of Mexico ring brazenly triumphant, none more so than the soldier's tale narrated by Bernal Díaz del Castillo (1970). The voices of the vanquished, in turn, are brittle and hushed, choked with doom. León-Portilla (1984, 33) quotes a fatalistic Aztec meditation:

"Truly do we live on earth?
Not forever on earth; only a little while here.
Although it be jade, it will be broken.
Although it be gold, it is crushed.
Although it be *quetzal* feather, it is torn asunder.
Not forever on earth; only a little while here."

León-Portilla (1959; 1962) and Anderson and Dibble (1978) explore the Aztec point of view in a series of compelling vignettes.

5. León-Portilla (1959, 154) renders these lines in Spanish, translated from Nahuatl by Angel María Garibay. My English approximation differs from that of Lysander Kemp (León-Portilla 1962, 137–38) and is closer, in texture and voice, to that of Gyles and Sayer (1980, 79).
6. This passage from León-Portilla (1962, 92–93) is translated from Spanish to English by Lysander Kemp. It may also be consulted, in a more literal translation, in Anderson and Dibble (1978, 64). Prem (1992, 24–27) discusses other native texts that describe this outbreak of disease.
7. The computer simulations of Whitmore (1991) indicate that "the large depopulations noted for the sixteenth-century Basin were indeed *possible*, given reasonable assumptions as to cause." This outcome "contradicts those critics who assert that such depopulations were unlikely or even impossible." The latter comment is aimed especially at historical demographers whose work deals exclusively with Europe and whose data for crisis situations indicate less extreme rates of depopulation than the American scenario examined by Whitmore.
8. The descriptive subtitle comes from the account by Long (1987) of the "marvellous adventure" of Alvar Núñez Cabeza de Vaca. Washed ashore more likely near the present site of Galveston in

November 1528, following an ill-fated expedition to Florida, Cabeza de Vaca, two fellow Spaniards, and a Moorish slave trekked some 6,000 miles across Texas, New Mexico, Arizona, and northwestern Mexico before reaching Mexico City in July 1536. Cabeza de Vaca's mystical wanderings were recently the subject of a film by the Mexican director Nicolás Echevarría.

9. One section of Sauer's monograph is devoted exclusively to "European Epidemic Diseases." Reff (1991, 9) is of the opinion that, while Sauer may have been aware of the disease factor, he did not feature it prominently enough.
10. The descriptive subtitle comes from the *Annals of the Cakchiquels*, as translated by Recinos and Goetz (1953, 155).
11. See Lovell (1992a) for further discussion.
12. Writing in the early seventeenth century, the native chronicler Santa Cruz Pachacuti (1968, 311) tells us:

"And so, when it came time to eat, there arrived an envoy dressed in a black cloak, who kissed the Inca with great reverence, handing him a *putti*, a small box closed with a key, and the Inca commanded the messenger to open it, but the messenger begged pardon, saying that the Creator had ordained that only the Inca open it. The Inca, seeing the truth of this, opened the little box, and from it flew forth [things] which resembled butterflies or bits of confetti, scattering until they vanished. This was the plague of *sarampión*, and within two days General Mihacnacayna died, along with a good many other captains, their faces covered in scabs. And when the Inca had witnessed this, he ordered that a house of stone be constructed, and afterwards hid himself in it, and there he died."

N. D. Cook (1981, 254) and Wright (1992, 73) note the parallel with the story of Pandora's box, but whether borrowed or embellished, Pachacuti's account imparts a powerful feeling of impending loss, of catastrophe about to happen.

13. I have followed the translation by Wright (1992, 192) closely but not exactly.
14. Writing of the conquest of Guatemala, Las Casas (1957–61: 5, 153) asked: "How many tears were shed, how many groans were uttered, how many people were left to face life on their own?" There is a bust of Las Casas, seldom noticed, in the park beside La Merced church in Antigua, Guatemala. His haunted question hangs in the air each time I walk past.

References

- Adorno, R.** 1986. *Guaman Poma: Writing and resistance in colonial Peru*. Austin: University of Texas Press.
- Alcides Reissner, R.** 1983. *El indio en los diccionarios*. México: Instituto Nacional Indigenista.
- Alchon, S. A.** 1991. *Native society and disease in*

- colonial Ecuador*. Cambridge: Cambridge University Press.
- Amiama, M. A.** 1959. La población de Santo Domingo. *Clio* 11:116-34.
- Anderson, A. J. O., and Dibble, C. E.,** trans. 1978. *The war of conquest: How it was waged here in Mexico. The Aztec's own story as given to Fr. Bernardino de Sahagún*. Salt Lake City: University of Utah Press.
- Bergmann, J. F.** 1969. The distribution of cacao cultivation in pre-Columbian America. *Annals of the Association of American Geographers* 59:85-96.
- Berkhofer, R. F.** 1978. *The White Man's Indian: Images of the American Indian from Columbus to the present*. New York: Alfred Knopf.
- Borah, W.** Introduction. 1992. In "Secret judgments of God": *Old world disease in colonial Spanish America*, ed. N. D. Cook and W. G. Lovell, pp. 3-19. Norman: University of Oklahoma Press.
- , and **Cook, S. F.** 1963. *The aboriginal population of central Mexico on the eve of the Spanish conquest*. Ibero-Americana 45. Berkeley: University of California Press.
- Brown, R. B.** 1985. A summary of late Quaternary pollen records from Mexico west of the isthmus of Tehuantepec. In *Pollen records of late Quaternary North American sediments*, ed. V. W. Bryant and R. G. Holloway, 71-93. Dallas, TX: American Association of Stratigraphic Palynologists Foundation.
- Butzer, K. W.** Forthcoming. Ethno-agriculture and cultural ecology in Mexico: Historical vistas and modern implications. In *Geographic research on Latin America 1990*, ed. T. Martinson.
- Casas, B. de las.** 1957-61. *Obras escogidas de Fray Bartolomé de las Casas*, ed. Juan Pérez de Tudela. 5 vols. Madrid: Ediciones Atlas.
- Cook, N. D.** 1981. *Demographic collapse: Indian Peru, 1520-1620*. Cambridge: Cambridge University Press.
- . 1982. *The people of the Colca valley: A population study*. Boulder, Co: Westview Press.
- , and **Lovell, W. G., eds.** 1992. "Secret judgments of God": *Old World disease in colonial Spanish America*. Norman: University of Oklahoma Press.
- Cook, S. F.** 1937. *The extent and significance of disease among the Indians of Baja California, 1697-1773*. Ibero-Americana 12. Berkeley: University of California Press.
- . 1949. *Soil erosion and population in central Mexico*. Ibero-Americana 34. Berkeley: University of California Press.
- , and **Borah, W.** 1968. *The population of the Mixteca Alta*. Ibero-Americana 50. Berkeley: University of California Press.
- , and ———. 1971, 1974, 1979. *Essays in population history*. 3 vols. Berkeley: University of California Press.
- , and **Simpson, L. B.** 1948. *The population of central Mexico in the sixteenth century*. Ibero-Americana 31. Berkeley: University of California Press.
- Córdova, E.** 1968. La encomienda y la desaparición de los indios en las Antillas mayores. *Caribbean Studies* 8:23-49.
- Denevan, W. M., ed.** 1976, 1992. *The native population of the Americas in 1492*. Madison: University of Wisconsin Press.
- . Forthcoming. Carl Sauer and native American population size. In *The legacy of intellect: Carl O. Sauer and the Berkeley School of Geography*, ed. M. S. Kenzer. Dordrecht, the Netherlands: Kluwer Academic Publishers.
- Díaz del Castillo, B.** 1970. *Historia verdadera de la conquista de Nueva España*. México: Editorial Porrúa.
- Dobyns, H. F.** 1963. An outline of Andean epidemic history to 1720. *Bulletin of the History of Medicine* 37:493-515.
- . 1966. Estimating aboriginal American populations: An appraisal of techniques with a new hemispheric estimate. *Current Anthropology* 7:395-449.
- . 1983. *Their number become thinned: Native American population dynamics in eastern North America*. Knoxville: University of Tennessee Press.
- Friede, J.** 1967. Demographic changes in the mining community of Muzo after the plague of 1629. *Hispanic American Historical Review* 47:338-43.
- Gerhard, P.** 1972. *A guide to the historical geography of New Spain*. Cambridge: Cambridge University Press.
- . 1979. *The southeast frontier of New Spain*. Princeton, NJ: Princeton University Press.
- . 1982. *The north frontier of New Spain*. Princeton, NJ: Princeton University Press.
- Gibson, C.** 1964. *The Aztecs under Spanish rule: A history of the Indians of the Valley of Mexico, 1519-1810*. Stanford, CA: Stanford University Press.
- González Quintero, L. and Montúfar López, A.** 1980. Interpretación paleoecológica del contenido pólinico de un núcleo cercano a Tula, Hidalgo. In *III Coloquio sobre Paleobotánica y Palinología*, ed. F. Sánchez, pp. 185-94. Colección Científica (Prehistoria) 86. Mexico City: Instituto Nacional de Antropología e Historia.
- Guerra, F.** 1985. La epidemia americana de influenza en 1493. *Revista de Indias* 45:325-47.
- . 1986. El efecto demográfico de las epidemias tras el descubrimiento de América. *Revista de Indias* 46:41-58.
- Gyles, A. B., and Sayer, C.** 1980. *Of gods and men:*

- The heritage of ancient Mexico*. New York: Harper and Row.
- Henige, D.** 1978. On the contact population of Hispaniola: History as higher mathematics. *Hispanic American Historical Review* 58:217-37.
- . 1986. When did smallpox reach the New World (and why does it matter?) In *Africans in bondage: Studies in slavery and the slave trade*, ed. P. E. Lovejoy, pp. 11-26. Madison: University of Wisconsin Press.
- Kramer, W.** 1990. The politics of *encomienda* distribution in early Spanish Guatemala, 1524-1544. Ph.D. dissertation, University of Warwick, England.
- ; **Lovell, W. G.**; and **Lutz, C. H.** 1991. Fire in the mountains: Juan de Espinar and the Indians of Huehuetenango, 1525-1560. In *Columbian consequences*, vol. 3, ed. D. H. Thomas, pp. 263-82. Washington: Smithsonian Institution.
- Kroeber, A.** 1934. Native American population. *American Anthropologist* 36:1-25.
- . 1939. *Cultural and natural areas of native North America*. University of California Publications in American Archaeology and Ethnology 38. Berkeley: University of California Press.
- Lastres, J. B.** 1951. *Historia de la medicina peruana*. 3 vols. Lima: San Marcos.
- León-Portilla, M., ed.** 1959. *Visión de los vencidos: Relaciones indígenas de la Conquista*. Mexico: Universidad Nacional Autónoma de México.
- . 1962. *The broken spears: The Aztec account of the conquest of Mexico*. Boston: Beacon Press.
- . 1984. Mesoamerica before 1519. In *The Cambridge history of Latin America*, vol. 1, ed. L. Bethell, pp. 3-36. Cambridge: Cambridge University Press.
- Lipschutz, A.** 1966. La despoblación de los indios después de la conquista. *América Indígena* 26:229-47.
- Long, H.** 1987. *The marvellous adventure of Cabeza de Vaca*. London: Picador Classics.
- López Austin, A.** 1988. *The human body and ideology: Concepts of the ancient Nahuas*. 2 vols. Trans. T. Ortiz de Montellano and B. Ortiz de Montellano. Salt Lake City: University of Utah Press.
- Lovell, W. G.** 1975. Culture and landscape in the Mixteca Alta, Mexico, 1500-1600. M.A. thesis, University of Alberta, Edmonton, Canada.
- . 1990. *Conquista y cambio cultural: La sierra de los Cuchumatanes de Guatemala, 1500-1821*. Antigua, Guatemala and South Woodstock, VT: Centro de Investigaciones Regionales de Mesoamérica and Plumssock Mesoamerican Studies.
- . 1992a. Disease and depopulation in early colonial Guatemala. In *"Secret judgments of God": Old World disease in colonial Spanish America*, ed. N. D. Cook and W. G. Lovell, pp. 49-83. Norman: University of Oklahoma Press.
- . 1992b. *Conquest and survival in colonial Guatemala: A historical geography of the Cuchumatán highlands, 1500-1821*, rev. 2nd ed. Kingston and Montreal: McGill-Queen's University Press.
- , and **Lutz, C. H.** Forthcoming. The historical demography of colonial Central America. In *Geographic research on Latin America 1990* ed. T. Martinson.
- ; ———; and **Swezey, W. R.** 1984. The Indian population of southern Guatemala, 1549-1551: An analysis of López de Cerrato's *Tasaciones de tributos*. *The Americas* 40:459-77.
- Lutz, C. H., and Lovell, W. G.** 1990. Core and periphery in colonial Guatemala. In *Guatemalan Indians and the state, 1540-1988*, ed. C. A. Smith, pp.35-51. Austin: University of Texas Press.
- MacLeod, M. J.** 1973. *Spanish Central America: A socioeconomic history, 1520-1720*. Berkeley: University of California Press.
- Means, P. A.** 1931. *Ancient civilizations of the Andes*. New York: Charles Scribner's Sons.
- . 1932. *Fall of the Inca empire and the Spanish rule in Peru, 1530-1720*. New York: Charles Scribner's Sons.
- Moya Pons, F.** 1971. *La Española en el siglo XVI, 1493-1522*. Santo Domingo: Universidad Católica Madre y Maestra.
- . 1987. *Después de Colón: Trabajo, sociedad y política en la economía del oro*. Madrid: Alianza Editorial.
- Murra, J.** 1984. Andean societies before 1532. In *The Cambridge history of Latin America*, vol. 1, ed. L. Bethell, pp. 59-90. Cambridge: Cambridge University Press.
- Newson, L. A.** 1985. Indian population patterns in colonial Spanish America. *Latin American Research Review* 20:41-74.
- . 1992. Old World epidemics in early colonial Ecuador. In *"Secret judgments of God": Old World disease in colonial Spanish America*, ed. N. D. Cook and W. G. Lovell, pp. 84-112. Norman: University of Oklahoma Press.
- Orellana, S. L.** 1984. *The Tzutujil Mayas: Continuity and change, 1250-1630*. Norman: University of Oklahoma Press.
- Polo, J. T.** 1913. Apuntes sobre las epidemias del Perú. *Revista Histórica* 5:50-109.
- Prem, H. J.** 1992. Disease outbreaks in central Mexico during the sixteenth century. In *"Secret judgments of God": Old World disease in colonial Spanish America*, ed. N. D. Cook and W. G. Lovell, pp. 20-48. Norman: University of Oklahoma Press.
- Recinos, A., and Goetz, D., eds. and trans.** 1953.

- The Annals of the Cakchiquels*. Norman: University of Oklahoma Press.
- Reff, D. T.** 1991. *Disease, depopulation, and culture change in northwestern New Spain, 1518–1764*. Salt Lake City: University of Utah Press.
- Roberts, L.** 1989. Disease and death in the New World. *Science* 246:1245–47.
- Rosenblat, A.** 1954. *La población indígena y el mestizaje en América*, 2 vols. Buenos Aires: Editorial Nova.
- . 1976. The population of Hispaniola at the time of Columbus. In *The native population of the Americas in 1492*, ed. W. M. Denevan, pp. 43–66. Madison: University of Wisconsin Press.
- Rowe, J. H.** 1946. Inca culture at the time of the Spanish conquest. In *Handbook of South American Indians*, vol. 2, ed. J. H. Steward, pp. 183–330. Bulletin 143. Washington: Bureau of American Ethnology.
- Sanders, W. T.** 1972. Population, agricultural history, and societal evolution in Mesoamerica. In *Population growth: Anthropological implications*, ed. B. Spooner, pp. 101–53. Cambridge: MIT Press.
- . 1976. The population of the central Mexican symbiotic region, the Basin of Mexico, and the Teotihuacán Valley in the sixteenth century. In *The native population of the Americas in 1492*, ed. W. M. Denevan, pp. 85–150. Madison: University of Wisconsin Press.
- , and **Murdy, C.** 1982. Population and agricultural adaptation in the humid highlands of Guatemala. In *The historical demography of highland Guatemala*, ed. R. M. Carmack, C. H. Lutz, and J. D. Early, pp. 23–34. Institute for Mesoamerican Studies, Publication 6. Albany: State University of New York.
- , and **Price, B.** 1968. *Mesoamerica: The evolution of a civilization*. New York: Random House.
- Santa Cruz Pachacuti, J. de.** 1968. *Relación de antigüedades deste reyno del Perú*. In *Crónicas peruanas de interés indígena*, ed. F. Esteve Barba. Madrid: Editorial Atlas.
- Sapper, K.** 1924. Die Zahl und die Völksdichte der indianischen Bevölkerung in Amerika vor der Conquista und in der Gegenwart. *Proceedings of the Twenty-First International Congress of Americanists*. 1:95–104.
- Sauer, C. O.** 1935. *Aboriginal population of northwestern Mexico*. Ibero-Americana 10. Berkeley: University of California Press.
- . 1939. *Man and nature: America before the days of the White Man*. New York: Charles Scribner's Sons.
- . 1966. *The early Spanish Main*. Berkeley: University of California Press.
- , and **Brand, D.** 1932. *Aztatlán: Prehistoric Mexican frontier on the Pacific coast*. Ibero-Americana 1. Berkeley: University of California Press.
- Sempat Assadourian, C.** 1985. La crisis demográfica del siglo XVI y la transición del Tawantinsuyu al sistema mercantil colonial. In *Población y mano de obra en América Latina*, ed. N. Sánchez Albornóz, pp. 69–93. Madrid: Alianza Editorial.
- Shea, D. E.** 1976. A defense of small population estimates for the central Andes in 1520. In *The native population of the Americas in 1492*, ed. W. M. Denevan, pp. 157–80. Madison: University of Wisconsin Press.
- Simpson, L. B.** 1952. *Exploitation of land in central Mexico in the sixteenth century*. Ibero-Americana 36. Berkeley: University of California Press.
- Slicher van Bath, B. H.** 1978. The calculation of the population of New Spain, especially for the period before 1570. *Boletín de Estudios Latinoamericanos y del Caribe* 24:67–95.
- Smith, C. T.** 1970. Depopulation of the central Andes in the 16th century. *Current Anthropology* 11:453–64.
- Solano, F. de.** 1974. *Los mayas del siglo XVIII*. Madrid: Ediciones Cultura Hispánica.
- Spinden, H. J.** 1928. The population of ancient America. *Geographical Review* 18:641–60.
- Steward, J. H.** 1949. The native population of South America. In *Handbook of South American Indians*, vol. 5, ed. J. H. Steward, pp. 655–68. Washington: Bureau of Indian Ethnology.
- Vargas Llosa, M.** 1990. Questions of conquest. *Harper's* 281:45–53.
- Verlinden, C.** 1968. *Le repartimento de Rodrigo de Albuquerque á Española en 1514: Aux origines d'une importante institution économique-sociale de l'empire colonial espagnol*. In *Mélanges offerts á G. Jacquemyns*, pp. 633–46. Brussels: Université Libre de Bruxelles.
- Wachtel, N.** 1977. *Vision of the vanquished: The Spanish conquest of Peru through Indian eyes, 1530–1570*. Hassocks, Sussex: Harvester Press.
- Waman Puma [Guaman Poma de Ayala], F.** 1980. *El primer nueva crónica y buen gobierno*, ed. and trans. J. Murra, R. Adorno, and J. L. Urioste. Mexico City: Siglo XXI.
- Watts, D.** 1987. *The West Indies: Patterns of development, culture and environmental change since 1492*. Cambridge: Cambridge University Press.
- Whitmore, T. M.** 1991. A simulation of the sixteenth-century population collapse in the Basin of Mexico. *Annals of the Association of American Geographers* 81:464–87.
- Wright, R.** 1992. *Stolen continents: The Americas through Indian eyes since 1492*. Boston: Houghton Mifflin Company.
- Zambardino, R. A.** 1978. Critique of David Henige's "On the contact population of Hispan-

iola": History as higher mathematics. *Hispanic American Historical Review* 58:700-08.

———. 1980. Mexico's population in the sixteenth century: Demographic anomaly or mathematical illusion? *Journal of Interdisciplinary History* 11:1-27.

Zamora, E. 1983. Conquista y crisis demográfica: La población indígena del occidente de Guatemala en el siglo XVI. *Mesoamérica* 6:291-338.

———. 1985. *Los mayas de las tierras altas en el siglo XVI: Tradición y cambio en Guatemala*. Sevilla: Diputación Provincial de Sevilla.