

complete Pizarro melted everything into ingots and shipped them to Spain. The conquistadors did not follow through on their part of the deal. Rather than releasing Atawallpa, they garroted him. Then they marched to Qosqo.

Almost at a stroke, just 168 men had dealt a devastating blow to the greatest empire on earth. To be sure, their victory was nowhere near complete: huge, bloody battles still lay ahead. Even after the conquistadors seized Qosqo, the empire regrouped in the hinterlands, where it fought off Spanish forces for another forty years. Yet the scale of Pizarro's triumph at Cajamarca cannot be gainsaid. He had routed a force fifty times larger than his own, won the greatest ransom ever seen, and vanquished a cultural tradition that had lasted five millennia—all without suffering a single casualty.

Charles Mann, 1491

VIRGIN SOIL

I have just pulled a fast one. The Inka history above is as contemporary scholars understand it. They disagree on which social factors to emphasize and on how much weight to assign individual Spanish chronicles, but the outline seems not in serious dispute. The same is not true of my rendering of Pizarro's conquest. I presented what is more or less the account current when Dobyns arrived in Peru. But in his reading he discovered a hole in this version of events—a factor so critical that it drastically changed Dobyns's view of native America.

Why did the Inka lose? The usual answer is that Pizarro had two advantages: steel (swords and armor, rifles and cannons) and horses. The Indians had no steel weapons and no animals to ride (llamas are too small). They also lacked the wheel and the arch. With such inferior technology, Tawantinsuyu had no chance. "What could [the Inka] offer against this armory?" asked John Hemming, the conquest historian. "They were still fighting in the bronze age." The Inka kept fighting after Atawallpa's death. But even though they outnumbered the Europeans by as much as a hundred to one, they always lost. "No amount of heroism or discipline by an Inka army," Hemming wrote, "could match the military superiority of the Spaniards."

But just as guns did not determine the outcome of conflict in New England, steel was not the decisive factor in Peru. True, anthropologists have long marveled that Andean societies did not make steel. Iron is plentiful in the mountains, yet the Inka used metal for almost nothing useful. In the late 1960s, Heather Lechtman, an archaeologist at the MIT Center for Materials Research in Archaeology and Ethnology, suggested to "an eminent scholar of Andean prehistory that we take a serious and careful look at Andean metal-

lurgy." He responded, "But there wasn't any." Lechtman went and looked anyway. She discovered that Inka metallurgy was, in fact, as refined as European metallurgy, but that it had such different goals that academic experts had not even recognized it.

According to Lechtman, Europeans sought to optimize metals' "hardness, strength, toughness, and sharpness." The Inka, by contrast, valued "plasticity, malleability, and toughness." Europeans used metal for tools. Andean societies primarily used it as a token of wealth, power, and community affiliation. European metalworkers tended to create metal objects by pouring molten alloys into shaped molds. Such foundries were not unknown to the Inka, but Andean societies vastly preferred to hammer metal into thin sheets, form the sheets around molds, and solder the results. The results were remarkable by any standard—one delicate bust that Lechtman analyzed was less than an inch tall but made of twenty-two separate gold plates painstakingly joined.

If a piece of jewelry or a building ornament was to proclaim its owner's status, as the Inka desired, it needed to shine. Luminous gold and silver were thus preferable to dull iron. Because pure gold and silver are too soft to hold their shape, Andean metalworkers mixed them with other metals, usually copper. This strengthened the metal but turned it an ugly pinkish-copper color. To create a lustrous gold surface, Inka smiths heated the copper-gold alloy, which increases the rate at which the copper atoms on the surface combine with oxygen atoms in the air—it makes the metal corrode faster. Then they pounded the hot metal with mallets, making the corrosion flake off the outside. By repeating this process many times, they removed the copper atoms from the surface of the metal, creating a veneer of almost pure gold. Ultimately the Inka ended up with strong sheets of metal that glittered in the sun.

Andean cultures did make tools, of course. But rather than making them out of steel, they preferred fiber. The choice is less odd than it may seem. Mechanical engineering depends on two main forces: compression and tension. Both are employed in European technology, but the former is more common—the arch is a classic example of compression. By contrast, tension was the Inka way. "Textiles are held together by tension," William Conklin, a research associate at the Textile Museum in Washington, D.C., told me. "And they exploited that tension with amazing inventiveness and precision."

In the technosphere of the Andes, Lechtman explained, "people solved basic engineering problems through the manipulation of fibers," not by creating and joining hard wooden or metal objects. To make boats, Andean cultures wove together reeds rather than cutting up trees into planks and nailing

them together. Although smaller than big European ships, these vessels were not puddle-muddlers; Europeans first encountered Tawantinsuyu in the form of an Inka ship sailing near the equator, three hundred miles from its home port, under a load of fine cotton sails. It had a crew of twenty and was easily the size of a Spanish caravelle. Famously, the Inka used foot-thick cables to make suspension bridges across mountain gorges. Because Europe had no bridges without supports below, they initially terrified Pizarro's men. Later one conquistador reassured his countrymen that they could walk across these Inka inventions "without endangering themselves."

Andean textiles were woven with great precision—elite garments could have a thread count of five hundred per inch—and structured in elaborate layers. Soldiers wore armor made from sculpted, quilted cloth that was almost as effective at shielding the body as European armor and much lighter. After trying it, the conquistadors ditched their steel breastplates and helmets wholesale and dressed like Inka infantry when they fought.

Although Andean troops carried bows, javelins, maces, and clubs, their most fearsome weapon, the sling, was made of cloth. A sling is a woven pouch attached to two strings. The slinger puts a stone or slug in the pouch, picks up the strings by the free ends, spins them around a few times, and releases one of the strings at the proper moment. Expert users could hurl a stone, the Spanish adventurer Alonso Enríquez de Guzmán wrote, "with such force that it will kill a horse. . . . I have seen a stone, thus hurled from a sling, break a sword in two pieces when it was held in a man's hand at a distance of thirty paces." (Experimenting with a five-foot-long, Andean-style sling and an egg-sized rock from my garden, I was able, according to my rough calculation, to throw the stone at more than one hundred miles per hour. My aim was terrible, though.)

In a frightening innovation, the Inka heated stones in campfires until they were red hot, wrapped them in pitch-soaked cotton, and hurled them at their targets. The cotton caught fire in midair. In a sudden onslaught the sky would rain burning missiles. During a counterattack in May 1536 an Inka army used these missiles to burn Spanish-occupied Qosqo to the ground. Unable to step outside, the conquistadors cowered in shelters beneath a relentless, weeks-long barrage of flaming stone. Rather than evacuate, the Spanish, as brave as they were greedy, fought to the end. In a desperate, last-ditch counterattack, the Europeans eked out victory.

More critical than steel to Pizarro's success was the horse. The biggest animal in the Andes during Inka times was the llama, which typically weighs three hundred pounds. Horses, four times as massive, were profoundly, terribly novel. Add to this the shock of observing humans somehow astride their

The conquistadors disparaged steep Inka highways because they had been designed for sure-footed llamas rather than horses. But they were beautifully made—this road, photographed in the 1990s, had lasted more than five hundred years without maintenance.



backs like half-bestial nightmare figures and it is possible to imagine the dismay provoked by Pizarro's cavalry. Not only did Inka infantrymen have to overcome their initial stupefaction, their leaders had to reinvent their military tactics while in the midst of an invasion. Mounted troops were able to move at rates never encountered in Tawantinsuyu. "Even when the Indians had posted pickets," Hemming observed, "the Spanish cavalry could ride past them faster than the sentries could run back to warn of danger." In clash after clash, "the dreaded horses proved invincible." But horses are not *inherently* unbeatable; the Inka simply did not discover quickly enough where they had an advantage: on their roads.

European-style roads, constructed with horses and cars in mind, view flatness as a virtue; to go up a steep hill, they use switchbacks to make the route as horizontal as possible. Inka roads, by contrast, were built for llamas. Llamas prefer the coolness of high altitudes and, unlike horses, readily go up and down steps. As a result, Inka roads eschewed valley bottoms and used long stone stairways to climb up steep hills directly—brutal on horses' hooves, as

the conquistadors often complained. Traversing the foothills to Cajamarca, Francisco Pizarro's younger brother Hernando lamented that the route, a perfectly good Inka highway, was "so bad" that the Spanish "could not use horses on the roads, not even with skill." Instead the conquistadors had to dismount and lead their reluctant animals through the steps. At that point they were vulnerable. Late in the day, Inka soldiers learned to wait above and roll boulders on their foes, killing some of the animals and frightening others into running away. Men left behind could be picked off at leisure. Multiple ambushes cost the lives of many Spanish troops and animals.

To be sure, horses confer an advantage on flat ground. But even on the plains the Inka could have won. Foot soldiers have often drubbed mounted troops. At the battle of Marathon in 490 B.C., the outnumbered, outarmored Athenian infantry destroyed the cavalry of the Persian emperor Darius I. More than six thousand Persians died; the Greeks lost fewer than two hundred men. So dire had the situation initially appeared that before the fight Athens sent a messenger to Sparta, its hated rival, to beg for aid. In the original marathon, the courier ran more than a hundred miles in two days to deliver his message. But by the time the Spartan reinforcements arrived, there was nothing to see but dead Persians.

The Inka losses were not foreordained. Their military was hampered by the cult of personality around its deified generals, which meant both that leaders were not easily replaced when they were killed or captured and that innovation in the lower ranks was not encouraged. And the army never learned to bunch its troops into tight formations, as the Greeks did at Marathon, forming human masses that can literally stand up to cavalry. Nonetheless, by the time of the siege of Qosqo the Inka had developed an effective anti-cavalry tactic: bolas. The Inka bola consisted of three stones tied to lengths of llama tendon. Soldiers threw them, stones a-whirl, at charging horses. The weapons wrapped themselves around the animals' legs and brought them down to be killed by volleys of sling missiles. Had the bolas come in massed, coordinated onslaughts instead of being wielded by individual soldiers as they thought opportune, Pizarro might well have met his match.

If not technology or the horse, what defeated the Inka? As I said, some of the blame should be heaped on the overly centralized Inka command structure, a problem that has plagued armies throughout time. But another, much larger part of the answer was first stated firmly by Henry Dobyns. During his extracurricular reading about Peru, he came across a passage by Pedro Cieza de León, the Spanish traveler who observed three roads between the same two cities. Entranced by the first exhibition of Inka booty in Spain, Cieza de

León had crossed the Atlantic as a teenager and spent fifteen years in Peru, Bolivia, Ecuador, and Colombia, traveling, fighting, and taking notes for what would become a massive, three-volume survey of the region. Only the first part was printed in his lifetime, but by the twentieth century historians had found and published most of the rest. Dobyns learned something from Cieza de León that was not mentioned in Prescott's history, in the Smithsonian's official *Handbook of South American Indians*, or in any of the then-standard descriptions of Tawantinsuyu. According to Cieza de León, Wayna Qhapaq, Atawallpa's father, died when "a great plague of smallpox broke out [in 1524 or 1525], so severe that more than 200,000 died of it, for it spread to all parts of the kingdom."

Smallpox not only killed Wayna Qhapaq, it killed his son and designated heir—and his brother, uncle, and sister-wife. The main generals and much of the officer corps died, wrote the Inka chronicler Santacruz Pachacuti Yamqui Salcamayhua, "all their faces covered with scabs." So did the two regents left in Qosqo by Wayna Qhapaq to administer the empire. After the dying Wayna Qhapaq locked himself away so that nobody could see his pustulous face, Salcamayhua reported, he was visited by a terrifying midnight vision. Surrounding him in his dream were "millions upon millions of men." The Inka asked who they were. "Souls of the lost," the multitude told him. All of them "would die from the pestilence," each and every one.

The story is probably apocryphal, but its import isn't. Smallpox has an incubation period of about twelve days, during which time sufferers, who may not know they are sick, can infect anyone they meet. With its fine roads and great population movements, Tawantinsuyu was perfectly positioned for a major epidemic. Smallpox radiated throughout the empire like ink spreading through tissue paper. Millions of people simultaneously experienced its symptoms: high fever, vomiting, severe pain, oozing blisters everywhere on the body. Unable to number the losses, the Jesuit Martín de Murúa said only that the toll was "infinite thousands."

The smallpox virus is thought to have evolved from a cattle virus that causes cowpox; a now-extinct equine virus responsible for horsepox; or, perhaps most likely, the camelpox virus, which affects camels, as the name suggests. People who survive the disease become immune to it. In Europe, the virus was such a constant presence that most adults were immune. Because the Western Hemisphere had no cows, horses, or camels, smallpox had no chance to evolve there. Indians had never been exposed to it—they were "virgin soil," in epidemiological jargon.

Virgin-soil death rates for smallpox are hard to establish because for the last century most potential research subjects have been vaccinated. But a

study in the early 1960s of seven thousand unvaccinated smallpox cases in southern India found that the disease killed 43 percent of its victims. Noting the extreme vulnerability of Andean populations—they would not even have known to quarantine victims, as Europeans had—Dobyns hypothesized that the empire's population "may well have been halved during this epidemic." In about three years, that is, as many as one out of two people in Tawantinsuyu died.

The human and social costs are beyond measure. Such overwhelming traumas tear at the bonds that hold cultures together. The epidemic that struck Athens in 430 B.C., Thucydides reported, enveloped the city in "a great degree of lawlessness." The people "became contemptuous of everything, both sacred and profane." They joined ecstatic cults and allowed sick refugees to desecrate the great temples, where they died untended. A thousand years later the Black Death shook Europe to its foundations. Martin Luther's rebellion against Rome was a grandson of the plague, as was modern anti-Semitism. Landowners' fields were emptied by death, forcing them either to work peasants harder or pay more to attract new labor. Both choices led to social unrest: the Jacquerie (France, 1358), the Revolt of Ciompi (Florence, 1378), the Peasants' Revolt (England, 1381), the Catalanian Rebellion (Spain, 1395), and dozens of flare-ups in the German states. Is it necessary to spell out that societies mired in fratricidal chaos are vulnerable to conquest? To borrow a trope from the historian Alfred Crosby, if Genghis Khan had arrived with the Black Death, this book would not be written in a European language.

As for Tawantinsuyu, smallpox wiped out Wayna Qhapaq and his court, which led to civil war as the survivors contested the spoils. The soldiers who died in the battle between Atawallpa and Washkar were as much victims of smallpox as those who died from the virus itself.

The ferocity of the civil war was exacerbated by the epidemic's impact on a peculiarly Andean institution: royal mummies. People in Andean societies viewed themselves as belonging to family lineages. (Europeans did, too, but lineages were more important in the Andes; the pop-cultural comparison might be *The Lord of the Rings*, in which characters introduce themselves as "X, son of Y" or "A, of B's line.") Royal lineages, called *panaqa*, were special. Each new emperor was born in one *panaqa* but created a new one when he took the fringe. To the new *panaqa* belonged the Inka and his wives and children, along with his retainers and advisers. When the Inka died his *panaqa* mummified his body. Because the Inka was believed to be an immortal deity, his mummy was treated, logically enough, as if it were still living. Soon after arriving in Qosqo, Pizarro's companion Miguel de Estete saw a parade of defunct emperors. They were brought out on litters, "seated on their thrones

and surrounded by pages and women with flywhisks in their hands, who ministered to them with as much respect as if they had been alive."

Because the royal mummies were not considered dead, their successors obviously could not inherit their wealth. Each Inka's *panaqa* retained all of his possessions forever, including his palaces, residences, and shrines; all of his remaining clothes, eating utensils, fingernail parings, and hair clippings; and the tribute from the land he had conquered. In consequence, as Pedro Pizarro realized, "the greater part of the people, treasure, expenses, and vices [in Tawantinsuyu] were under the control of the dead." The mummies spoke through female mediums who represented the *panaqa*'s surviving courtiers or their descendants. With almost a dozen immortal emperors jostling for position, high-level Inka society was characterized by ramose political intrigue of a scale that would have delighted the Medici. Emblematically, Wayna Qhapaq could not construct his own villa on Awkaypata—his undead ancestors had used up all the available space. Inka society had a serious mummy problem.

After smallpox wiped out much of the political elite, each *panaqa* tried to move into the vacuum, stoking the passions of the civil war. Different mummies at different times backed different claimants to the Inka throne. After Atawallpa's victory, his *panaqa* took the mummy of Thupa Inka from its palace and burned it outside Qosqo—burned it alive, so to speak. And later Atawallpa instructed his men to seize the gold for his ransom as much as possible from the possessions of another enemy *panaqa*, that of Pachacuti's mummy.

Washkar's *panaqa* kept the civil war going even after his death (or, rather, nondeath). While Atawallpa was imprisoned, Washkar's *panaqa* sent one of his younger brothers, Thupa Wallpa, to Cajamarca. In a surreptitious meeting with Pizarro, Thupa Wallpa proclaimed that he was Washkar's legitimate heir. Pizarro hid him in his own quarters. Soon afterward, the lord of Cajamarca, who had backed Washkar in the civil war, told the Spanish that Atawallpa's army was on the move, tens of thousands strong. Its generals planned to attack Pizarro, he said, and free the emperor. Atawallpa denied the charge, truthfully. Pizarro nonetheless ordered him to be bound. Some of the Spaniards most sympathetic to Atawallpa asked to investigate. Soon after they left, two Inka ran to Pizarro, claiming that they had just fled from the invading army. Pizarro hurriedly convoked a military tribunal, which quickly sentenced the Inka to execution—the theory apparently being that the approaching army would not attack if its leader were dead. Too late the Spanish expedition came back to report that no Inka army was on the move. Thupa Wallpa emerged from hiding and was awarded the fringe as the new Inka.

The execution, according to John Rowe, the Berkeley archaeologist, was the result of a conspiracy among Pizarro, Thupa Wallpa, and the lord of Cajamarca. By ridding himself of Atawallpa and taking on Thupa Wallpa, Rowe argued, Pizarro "had exchanged an unwilling hostage for a friend and ally." In fact, Thupa Wallpa openly swore allegiance to Spain. To him, the oath was a small price to pay; by siding with Pizarro, Washkar's *panaqa*, "which had lost everything, had a chance again." Apparently the new Inka hoped to return with Pizarro to Qosqo, where he might be able to seize the wheel of state. After that, perhaps, he could wipe out the Spaniards.

On the way to Qosqo, Pizarro met his first important resistance near the river town of Hatun Xauxa, which had been overrun by Atawallpa's army during the civil war. The same force had returned there to battle the Spanish. But the Inka army's plan to burn down the town and prevent the invaders from crossing the river was foiled by the native Xauxa and Wanka populace, which had long resented the empire. Not only did they fight the Inka, they followed the old adage about the enemy of my enemy being my friend and actually furnished supplies to Pizarro.

After the battle Thupa Wallpa suddenly died—so suddenly that many Spaniards believed he had been poisoned. The leading suspect was Challcochima, one of Atawallpa's generals, whom Pizarro had captured at Cajamarca and brought along on his expedition to Qosqo. Challcochima may not have murdered Thupa Wallpa, but he certainly used the death to try to persuade Pizarro that the next Inka should be one of Atawallpa's sons, not anyone associated with Washkar. Meanwhile, Washkar's *panaqa* sent out yet another brother, Manqo Inka. He promised that if he were chosen to succeed Thupa Wallpa he would swear the same oath of allegiance to Spain. In return, he asked Pizarro to kill Challcochima. Pizarro agreed and the Spaniards publicly burned Challcochima to death in the main plaza of the next town they came to. Then they rode toward Qosqo.

To Dobyns, the moral of this story was clear. The Inka, he wrote in his 1963 article, were not defeated by steel and horses but by disease and factionalism. In this he was echoing conclusions drawn centuries before by Pedro Pizarro. Had Wayna Qhapaq "been alive when we Spaniards entered this land," the conquistador remarked, "it would have been impossible for us to win it. . . . And likewise, had the land not been divided by the [smallpox-induced civil] wars, we would not have been able to enter or win the land."

Pizarro's words, Dobyns realized, applied beyond Tawantinsuyu. He had studied demographic records in both Peru and southern Arizona. In both, as in New England, epidemic disease arrived *before* the first successful colonists. When the Europeans actually arrived, the battered, fragmented cultures



Although Andean societies have been buffeted by disease and economic exploitation since the arrival of Europeans, indigenous tradition remained strong enough that this *chicha* seller in Cuzco, photographed by Martín Chambi in 1921, might have seemed unremarkable in the days of the Inka.

could not unite to resist the incursion. Instead one party, believing that it was about to lose the struggle for dominance, allied with the invaders to improve its position. The alliance was often successful, in that the party gained the desired advantage. But its success was usually temporary and the culture as a whole always lost.

Between the sixteenth and eighteenth centuries, this pattern occurred again and again in the Americas. It was a kind of master narrative of post-contact history. In fact, Europeans routinely lost when they could not take

advantage of disease and political fragmentation. Conquistadors tried to take Florida half a dozen times between 1510 and 1560—and failed each time. In 1532 King João III of Portugal divided the coast of Brazil into fourteen provinces and dispatched colonists to each one. By 1550 only two settlements survived. The French were barely able to sustain trading posts in the St. Lawrence and didn't even try to plant their flag in pre-epidemic New England. European microorganisms were slow to penetrate the Yucatán Peninsula, where most of the Maya polities were too small to readily play off against each other. In consequence, Spain never fully subdued the Maya. The Zapatista rebellion that convulsed southern Mexico in the 1990s was merely the most recent battle in an episodic colonial war that began in the sixteenth century.

All of this was important, the stuff of historians' arguments and doctoral dissertations, but Dobyns was thinking of something else. If Pizarro had been amazed by the size of Tawantinsuyu *after* the terrible epidemic and war, how many people had been living there to begin with? Beyond that, what was the population of the Western Hemisphere in 1491?

AN ARITHMETICAL PROGRESSION

Wayna Qhapaq died in the *first* smallpox epidemic. The virus struck Tawantinsuyu again in 1533, 1535, 1558, and 1565. Each time the consequences were beyond the imagination of our fortunate age. "They died by scores and hundreds," recalled one eyewitness to the 1565 outbreak. "Villages were depopulated. Corpses were scattered over the fields or piled up in the houses or huts. . . . The fields were uncultivated; the herds were untended [and] the price of food rose to such an extent that many persons found it beyond their reach. They escaped the foul disease, but only to be wasted by famine." In addition, Tawantinsuyu was invaded by other European pestilences, to which the Indians were equally susceptible. Typhus (probably) in 1546, influenza in 1558 (together with smallpox), diphtheria in 1614, measles in 1618—all flensed the remains of Inka culture. Taken as a whole, Dobyns thought, the epidemics must have killed nine out of ten of the inhabitants of Tawantinsuyu.

Dobyns was not the first to arrive at this horrific conclusion. But he was the first to put it together with the fact that smallpox visited before anyone in South America had even *seen* Europeans. The most likely source of the virus, Dobyns realized, was the Caribbean. Smallpox was recorded to have appeared on the island of Hispaniola in November or December 1518. It

killed a third of the native population before jumping to Puerto Rico and Cuba. Spaniards, exposed in childhood to the virus, were mostly immune. During Hernán Cortés's conquest of Mexico, an expedition led by Pánfilo de Narváez landed on April 23, 1520, near what is today the city of Veracruz. According to several Spanish accounts, the force included an African slave named Francisco Eguía or Baguía who had smallpox. Other reports say that the carriers were Cuban Indians whom Narváez had brought as auxiliaries. In any case, *someone* brought the virus—and infected a hemisphere.

The disease raced to Tenochtitlán, leading city of the Mexica (Aztecs), where it laid waste to the metropolis and then the rest of the empire. From there, Dobyns discovered, colonial accounts show smallpox hopscotching through Central America to Panama. At that point it was only a few hundred miles from the Inka frontier. The virus seemingly crossed the gap, with catastrophic consequences.

Then Dobyns went further. When microbes arrived in the Western Hemisphere, he argued, they must have swept from the coastlines first visited by Europeans to inland areas populated by Indians who had never seen a white person. Colonial writers knew that disease tilled the virgin soil of the Americas countless times in the sixteenth century. But what they did not, could not, know is that the epidemics shot out like ghastly arrows from the limited areas they saw to every corner of the hemisphere, wreaking destruction in places that never appeared in the European historical record. The first whites to explore many parts of the Americas therefore would have encountered places that were *already* depopulated.

As a result, Dobyns said, all colonial population estimates were too low. Many of them, put together just after epidemics, would have represented population nadirs, not approximations of precontact numbers. From a few incidents in which before and after totals are known with relative certainty, Dobyns calculated that in the first 130 years of contact about 95 percent of the people in the Americas died. To estimate native numbers before Columbus, one thus had to multiply census figures from those times by a factor of twenty or more. The results obtained by this procedure were, by historical standards, stunningly high.

Historians had long wondered how many Indians lived in the Americas before contact. "Debated since Columbus attempted a partial census at Hispaniola in 1496," Denevan, the Beni geographer, has written, "it remains one of the great inquiries of history." Early researchers' figures were, to put it mildly, informally ascertained. "Most of them weren't even ballpark calculations," Denevan told me. "No ballpark was involved." Only in 1928 did the first careful estimate of the indigenous population appear. James Mooney, a

distinguished ethnographer at the Smithsonian Institution, combed through colonial writings and government documents to conclude that in 1491 North America had 1.15 million inhabitants. Alfred L. Kroeber, the renowned Berkeley anthropologist, built upon Mooney's work in the 1930s. Kroeber cut back the tally still further, to 900,000—a population density of less than one person for every six square miles. Just 8.4 million Indians, Kroeber suggested, had lived in the entire hemisphere.

Recognizing that his continent-wide estimate did not account for regional variation, Kroeber encouraged future scholars to seek out and analyze "sharply localized documentary evidence." As he knew, some of his Berkeley colleagues were already making those analyses. Geographer Carl Sauer published the first modern estimate of northwest Mexico's pre-Columbian population in 1935. Meanwhile, physiologist Sherburne F. Cook investigated the consequences of disease in the same area. Cook joined forces with Woodrow W. Borah, a Berkeley historian, in the mid-1950s. In a series of publications that stretched to the 1970s, the two men combed through colonial financial, census, and land records. Their results made Kroeber uneasy. When Columbus landed, Cook and Borah concluded, the central Mexican plateau alone had a population of 25.2 million. By contrast, Spain and Portugal together had fewer than ten million inhabitants. Central Mexico, they said, was the most densely populated place on earth, with more than twice as many people per square mile than China or India.

"Historians and anthropologists did not, however, seem to be paying much attention" to Cook and Borah, Dobyns wrote. Years later, his work, coupled with that of Denevan, Crosby, and William H. McNeill, finally made them take notice. Based on their work and his own, Dobyns argued that the Indian population in 1491 was between 90 and 112 million people. Another way of saying this is that when Columbus sailed more people lived in the Americas than in Europe.

According to a 1999 estimate from the United Nations, the earth's population in the beginning of the sixteenth century was about 500 million. If Dobyns was right, disease claimed the lives of 80 to 100 million Indians by the first third of the seventeenth century. All these numbers are at best rough approximations, but their implications are clear: the epidemics killed about one out of every five people on earth. According to W. George Lovell, a geographer at Queen's University in Ontario, it was "the greatest destruction of lives in human history."

Dobyns published his conclusions in the journal *Current Anthropology* in 1966. They spawned rebuttals, conferences, even entire books. (Denevan assembled one: *The Native Population of the Americas in 1492*.) "I always felt

guilty about the impact of my *Current Anthropology* article," Dobyns told me, "because I thought and still think that Cook and Borah and Sauer had all said this in print earlier, but people weren't listening. I'm still puzzled by the reaction, to tell you the truth. Maybe it was the time—people were prepared to listen in the 1960s."

Listen—and attack. Dobyns's population projections were quickly seen by some as politically motivated—self-flagellation by guilty white liberals or, worse, a push to inflate the toll of imperialism from the hate-America crowd. "No question about it, some people want those higher numbers," Shepard Krech III, an anthropologist at Brown, told me. These people, he said, were thrilled when Dobyns revisited the subject in a 1983 book, *Their Number Become Thinned*, and revised his estimates upward.

Perhaps the most vehement critic was David Henige, an African studies and Near East bibliographer at the University of Wisconsin, whose book, *Numbers from Nowhere*, published in 1998, is a landmark in the literature of demographic vilification. "Suspect in 1966, it is no less suspect nowadays," Henige charged of Dobyns's work. "If anything, it is worse." Henige stumbled across a seminar on Indian demography taught by Denevan in 1976. An "epiphanic moment" occurred when he read that Cook and Borah had "uncovered" the existence of eight million people in Hispaniola. Can you just *invent* millions of people? he wondered. "We can make of the historical record that there was depopulation and movement of people from internecine warfare and diseases," he said to me. "But as for how much, who knows? When we start putting numbers to something like that—applying large figures like 95 percent—we're saying things we shouldn't say. The number implies a level of knowledge that's impossible."

Indian activists reject this logic. "You always hear white people trying to minimize the size of the aboriginal populations their ancestors personally displaced," according to Lenore Stiffarm, an ethnologist at the University of Saskatchewan. Dismissing the impact of disease, in her view, is simply a way to reduce the original population of the Americas. "Oh, there used to be a few people there, and disease killed some of them, so by the time we got here they were almost all gone." The smaller the numbers of Indians, she said, the easier it is to regard the continent as empty, and hence up for grabs. "It's perfectly acceptable to move into unoccupied land," Stiffarm told me. "And land with only a few 'savages' is the next best thing."

When Henige wrote *Numbers from Nowhere*, the fight about pre-Columbian population had already consumed forests' worth of trees—his bibliography is ninety pages long. Four decades after Dobyns's article appeared, his colleagues "are still struggling to get out of the crater that