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40. Frederick S. Hulse, *The Human Species, An Introduction to Physical Anthropology*, 346.
41. J. V. Neel and F. M. Salzano, "A Prospectus for Genetic Studies on the American Indians," 249.
42. A. E. Mourant, Ada Kópec, and Kazimiera Domaniewska-Sobczak, *The ABO Groups, Comprehensive Tables and Maps of World Distribution*, 268-270.
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"THE COLUMBIAN EXCHANGE"

ALFRED W. CROSBY

Conquistador y
Pestilencia | 2

WESTPORT, CT
GREENWOOD PRESS

1972

Why were the Europeans able to conquer America so easily? In our formal histories and in our legends, we always empha-size the ferocity and stubbornness of the resistance of the Aztec, Sioux, Apache, Tupinamba, Araucanian, and so on, but the really amazing thing about their resistance was its ineffectiveness. The Orientals held out against the Europeans much more successfully; they, of course, had the advantage of vast numbers and a technology much more advanced than that of the Indians. The Africans, however, were not "thou-sands of years ahead" of the Indians, except in possessing iron weapons, and yet the great mass of black Africans did not succumb to European conquest until the nineteenth century.

There are many explanations for the Europeans' success in America: the advantage of steel over stone, of cannon and firearms over bows and arrows and slings; the terrorizing effect of horses on foot soldiers who have never seen such beasts before; the lack of unity among the Indians, even within their empires; the prophecies in Indian mythology about the arrival of white gods. All these factors combined

to deal to the Indian a shock such as only H. G. Wells's *War of the Worlds* can suggest to us. Each factor was undoubtedly worth many hundreds of soldiers to Cortés and Pizarro and other great Indian-killers.

For all of that, one might have at least expected the highly organized, militaristic societies of Mexico and the Andean highlands to survive the initial contact with the European societies. Thousands of Indian warriors, even if confused and frightened and wielding only obsidian-studded war clubs, should have been able to repel the first few hundred Spaniards to arrive. And what is the explanation for the fact that Indians were really only a little more successful in defending themselves and their lands after they learned that the invaders were not gods, after they obtained their own horses and guns and developed tactics to deal with the Europeans?

After the Spanish conquest an Indian of Yucatan wrote of his people in the happier days before the advent of the European:

There was then no sickness; they had no aching bones; they had then no high fever; they had then no smallpox; they had then no burning chest; they had then no abdominal pain; they had then no consumption; they had then no headache. At that time the course of humanity was orderly. The foreigners made it otherwise when they arrived here.¹

It would be easy to attribute this statement to the nostalgia that the conquered always feel for the time before the conqueror appeared, but the statement is probably in part true. During the millennia before the European brought together the compass and the three-masted vessel to revolutionize world history, men moved slowly, seldom over long distances and rarely across the great oceans. Men lived in the same continents where their great-grandfathers had lived and seldom caused violent and rapid changes in the delicate balance

between themselves and their environments. Diseases tended to be endemic rather than epidemic. It is true that man did not achieve perfect accommodation with his microscopic parasites. Mutation, ecological changes, and migration brought the Black Death to Europe, and few men lived to the proverbial age of three-score years and ten without knowing epidemic disease. Yet ecological stability did tend to create a crude kind of mutual toleration between human host and parasite. Most Europeans, for instance, survived measles and tuberculosis, and most West Africans survived yellow fever and malaria.

Migration of man and his maladies is the chief cause of epidemics. And when migration takes place, those creatures who have been longest in isolation suffer most, for their genetic material has been least tempered by the variety of world diseases. Among the major divisions of the species homo sapiens, with the possible exception of the Australian aborigine, the American Indian probably had the dangerous privilege of longest isolation from the rest of mankind. Medical historians guess that few of the first rank killers among the diseases are native to the Americas.²

These killers came to the New World with the explorers and the conquistadors. The fatal diseases of the Old World killed more effectively in the New, and the comparatively benign diseases of the Old World turned killer in the New. There is little exaggeration in the statement of a German missionary in 1699 that "the Indians die so easily that the bare look and smell of a Spaniard causes them to give up the ghost."³

The most spectacular period of mortality among the American Indians occurred during the first hundred years of contact with the Europeans and Africans. Almost all the contemporary historians of the early settlements, from Bartolomé de las Casas to William Bradford of Plymouth Plantation, were awed by the ravages of epidemic disease

among the native populations of America. In Mexico and Peru, where there were more Europeans and Africans—and, therefore, more contact with the Old World—and a more careful chronicle of events kept than in most other areas of America, the record shows something like fourteen epidemics in the former and perhaps as many as seventeen in the latter between 1520 and 1600.⁴

The annals of the early Spanish empire are filled with complaints about the catastrophic decline in the number of native American subjects. When Antonio de Herrera wrote his multivolume history of that empire at the beginning of the seventeenth century, he noted as one of the main differences between the Old and New Worlds the extreme susceptibility of the natives of the latter to diseases, especially smallpox. Indian women, he wrote, were especially quick to succumb to it, but it rarely infected anyone of European birth. The Indians became so enraged by the invulnerability of the Spaniards to epidemic disease that they kneaded infected blood into their masters' bread and secreted corpses in their wells—to little effect.⁵

The victims of disease were probably greatest in number in the heavily populated highlands of New Spain (Mexico) and Peru, but, as a percentage of the resident population, were probably greatest in the hot, wet lowlands. By the 1580s disease, ably assisted by Spanish brutality, had killed off or driven away most of the peoples of the Antilles and the lowlands of New Spain, Peru, and the Caribbean littoral, "the habitation of which coasts is . . . so wasted and condemned, that of thirty parts of the people that inhabit it, there wants twenty-nine; and it is likely the rest of the Indians will in short time decay."⁶

It has often been suggested that the high mortality rates of these post-Columbian epidemics were due more to the brutal treatment of the Indians by the Europeans than to the Indians' lack of resistance to imported maladies. But

the early chroniclers reported that the first epidemics following the arrival of Old World peoples in a given area of the New World were the worst, or at least among the worst. European exploitation had not yet had time to destroy the Indians' health.

The record shows that several generations of Indian contact with Europeans and Africans seemed to lead not to the total destruction of the Indians, but only to a sharp diminution of numbers, which was then followed by renewed population growth among the aborigines.⁷ The relationships between these phenomena are too complex to be explained by any one theory. However, their sequence is perfectly compatible with the theory that the Indians had little or no resistance to many diseases brought from the Old World, and so first died in great numbers upon first contact with immigrants from Europe and Africa; and when those Indians with the weakest resistance to those maladies had died, interbreeding among the hardy survivors and, to some unmeasured extent, with the immigrants, led to the beginning of population recovery.

The record of early post-Columbian medical history of America was never kept carefully and much of it has been erased since, but it does seem to show a greater number of epidemics, characterized by a higher mortality rate, than was typical even in insalubrious Europe of that time. The very first was a pandemic which began in 1519 in the Greater Antilles and swept through Mexico, Central America, and—probably—Peru. It caused "in all likelihood the most severe single loss of aboriginal population that ever occurred," to quote one expert who has examined its history carefully.⁸ It is the best documented of all of the first epidemics. We have no more than snatches of information on the others. Hans Staden, captive to the Tupinamba of Brazil in the early 1550s, was—ironically—saved from death by what may have been an epidemic. He convinced the local chief that

the malady carrying off many of the Indians had been sent by the Christian God to punish them for their intention to eat Staden. In 1552 a respiratory disease killed many natives around Pernambuco. In the same decade epidemic broke out among the famished Frenchmen at Río de Janeiro, spread to the mission Indians there and killed eight hundred of them. In 1558 pleurisy and bloody flux spread along the coast from Río to Espírito Santo. In 1558 and 1560 smallpox arrived in Río de la Plata and swept off thousands of Indians, without touching a single Spaniard. Smallpox came to Brazil in 1562 and 1563 and carried off tens of thousands of Indians, but left the Portuguese unscathed. In some villages no one was left who was healthy enough to tend the sick, "not even someone who could go to the fountain for a gourdfull of water."⁹

The English were as efficient disease carriers as the Latins. In 1585 Sir Francis Drake led a large expedition against Spain's overseas possessions. His men picked up some highly contagious fever—probably typhus—in the Cape Verde Islands and brought it along with them to the Caribbean and Florida. The malady spread to the Indians in the environs of St. Augustine and, "The wilde people . . . died verie fast and said amongst themselves, it was the Inglishe God that made them die so faste."¹⁰

In 1587 the English founded a colony at Roanoke Island, a few hundred miles north of St. Augustine. The colonists' diagnoses of their immediate and fatal effect on many of the Indians was similar in medical philosophy to that expressed by the Florida Indians. Thomas Hariot wrote that there was no Indian village where hostility, open or hidden, had been shown,

but that within a few dayes after our departure from everies such townes, that people began to die very fast, and many in short space; in some townes about twentie, in some fourtie, in some sixtie, & in one sixe score, which in trueth was very manie

in respect to their numbers. . . . The disease also was so strange that they neither knew what it was, nor how to cure it; the like by report of the oldest men in the countrey never happened before, time out of mind.¹¹

The natives of what is now the Atlantic coast of Canada had contact with Europeans—fishermen and fur traders—from very early in the sixteenth century, long before the English attempted colonization at Roanoke or any other place in America. Depopulation was already apparent among their tribes by the time of French settlement. The Jesuit *Relations* contain a report dated 1616 from which the following paragraph is extracted. The Indians, it states,

are astonished and often complain that, since the French mingle with and carry on trade with them, they are dying fast and the population is thinning out. For they assert that, before this association and intercourse, all their countries were very populous and they tell how one by one the different coasts, according as they have begun to traffic with us, have been more reduced by disease.¹²

These Indians looked south enviously to New England, where tribes were not diminishing. The turn of these Armouchiquois, as the Canadian Indians called them, came in the same year that the above report was written. In 1616 and 1617 a pestilence swept through New England, clearing the woods, in the words of Cotton Mather, "of those pernicious creatures, to make room for better growth." Whatever the sickness was, Europeans were immune to it. The handful of whites who passed the winter of 1616–1617 with the Indians of coastal Maine "lay in the cabins with those people that died, [but] not one of them ever felt their heads to ache, while they stayed there." The Massachusetts tribe was nearly completely exterminated, depopulating the area of Plymouth Bay at just about the same time that the Pilgrims were deciding to come to America. The same epidemic

also swept the environs of Boston Bay. A European who lived in that area in 1622 wrote that the Indians had

died on heapes, as they lay in their houses; and the living, that were able to shift for themselves, would runne away and let them dy, and let there Carkases ly above the ground without burial. . . . And the bones and skulls upon the severall places of their habitations made such a spectacle after my coming into those partes, that, as I travailed in the Forrest nere the Massachussetis, it seemed to me a new found Golgotha.²⁰

There is no need to continue this lugubrious catalog. The records of every European people who have had prolonged contact with the native peoples of America are full of references to the devastating impact of Old World diseases. The Russians, the last to come, had the same experience as the Spanish, Portuguese, English, and French; and thousands of Aleuts, Eskimos, and Tlingits were thrust into their graves by the maladies which the promyshlenniki—as innocent of intent as the conquistadores—brought to the New World with them.²¹

It would take a work of many volumes to give the full history of Old World diseases and New World peoples. We will limit ourselves to a detailed study of the first recorded American epidemic, an epidemic whose influence on the history of America is as unquestionable and as spectacular as that of the Black Death on the history of the Old World.

We know that the most deadly of the early epidemics in America were those of the eruptive fevers—smallpox, measles, typhus, and so on. The first to arrive and the deadliest, said contemporaries, was smallpox. Even today, however, smallpox is occasionally misdiagnosed as influenza, pneumonia, measles, scarlet fever, syphilis, or chicken pox.²² Four hundred years ago such mistakes were even more com-

mon, and writers of the accounts upon which we must base our examination of the early history of smallpox in America did not have any special interest in accurate diagnosis. The early historians were much more likely to cast their eyes skyward and comment on the sinfulness that had called down such epidemics as obvious evidence of God's wrath than to describe in any detail the diseases involved. It should also be noted that conditions which facilitate the spread of one disease will usually encourage the spread of others, and that "very rarely is there a pure epidemic of a single malady." Pneumonia and pleurisy, for instance, often follow after smallpox, smothering those whom it has weakened.²³

Furthermore, although the Spanish word *viruelas*, which appears again and again in the chronicles of the sixteenth century, is almost invariably translated as "smallpox," it specifically means not the disease but the pimpled, pustuled appearance which is the most obvious symptom of the disease. Thus the generation of the conquistadores may have used "viruelas" to refer to measles, chicken pox, or typhus. One must remember that people of the sixteenth century were not statistically minded, so their estimates of the numbers killed by epidemic disease may be a more accurate measurement of their emotions than of the numbers who really died.

When the sixteenth-century Spaniard pointed and said "viruelas," what he meant and what he saw was usually smallpox. On occasion he was perfectly capable of distinguishing among diseases: for instance, he called the epidemic of 1531 in Central America *sarampión*—measles—and not viruelas.²⁴ We may proceed on the assumption that smallpox was the most important disease of the first pandemic in the recorded history of the Americas.

Smallpox has been so successfully controlled by vaccination and quarantine in the industrialized nations of the twentieth century that few North Americans or Europeans have

ever seen it. But it is an old companion of humanity, and for most of the last millennium it was one of the commonest diseases in Europe. It was long thought, with reason, to be one of the most infectious maladies. Smallpox is usually communicated through the air by means of droplets or dust particles; its virus enters the new host through the respiratory tract. There are many cases of hospital visitors who have contracted the disease simply by breathing the air of a room in which someone lies ill with the disease.¹⁸

Because it is extremely communicable, before the eighteenth century it was usually thought of as a necessary evil of childhood, such as measles is today. Sometimes the only large group untouched by it was also that which had been relatively unexposed to it—the young. Yet even among Spanish children of the sixteenth century, smallpox was so common that Ruy Díaz de Isla, a medical writer, recorded that he had once seen a man of twenty years sick with the disease, “and he had never had it before.”¹⁹

Where smallpox has been endemic, it has been a steady, dependable killer, taking every year from 3 to 10 percent of those who die. Where it has struck isolated groups, the death rate has been awesome. Analysis of figures for some twenty outbreaks shows that the case mortality among an unvaccinated population is about 30 percent. Presumably, in people who have had no contact whatever with smallpox, the disease will infect nearly every single individual it touches. When in 1707 smallpox first appeared in Iceland, in two years 18,000 out of the island's 50,000 inhabitants died of it.²⁰

The first people of the New World to meet the white and black races and their diseases were Arawaks of the Greater Antilles and the Bahamas. On the very first day of landfall in 1492 Columbus noted that they “are very unskilled with arms . . . [and] could all be subjected and made to do all that one wished.”²¹ These Arawaks lived long enough to pro-

vide the Spaniards with their first generation of slaves in America and Old World diseases with their first beachhead in the New World.

Oviedo, one of the earliest historians of the Americas, estimated that a million Indians lived on Santo Domingo when the Europeans arrived to plant their first permanent colony in the New World. “Of all those,” Oviedo wrote, “and of all those born afterwards, there are not now believed to be at the present time in this year of 1548 five hundred persons, children and adults, who are natives and are the progeny or lineage of those first.”²²

The destruction of the Arawaks has been largely blamed on the Spanish cruelty, not only by the later Protestant historians of the “Black Legend” school but also by such contemporary Spanish writers as Oviedo and Bartolomé de Las Casas. Without doubt the early Spaniards brutally exploited the Indians. But it was obviously not in order to kill them off, for the early colonists had to deal with a chronic labor shortage and needed the Indians. Disease would seem to be a more logical explanation for the disappearance of the Arawaks, because they, like other Indians, had little immunity to Old World diseases. At the same time, one may concede that the effects of Spanish exploitation undoubtedly weakened their resistance to disease.

Yet it is interesting to note that there is no record of any massive smallpox epidemic among the Indians of the Antilles for a quarter of a century after the first voyage of Columbus. Indians apparently suffered a steady decline in numbers, which was probably due to extreme overwork, other diseases, and a general lack of will to live after their whole culture had been shattered by alien invasion.²³ How can the absence of smallpox be explained, if the American Indian was so susceptible and if ships carrying Europeans and Africans from the pestilential Old World were constantly arriving in Santo Domingo? The answer lies in the nature of the disease. It

is a deadly malady, but it lasts only a brief time in each patient. After an incubation period of twelve days or so, the patient suffers from high fever and vomiting followed three or four days later by the characteristic skin eruptions. For those who do not die, these pustules dry up in a week or ten days and form scabs which soon fall off, leaving the disfiguring pocks that give the disease its name. The whole process takes a month or less, and after that time the patient is either dead or immune, at least for a period of years. Also there is no nonhuman carrier of smallpox, such as the flea of typhus or the mosquito of malaria; it must pass from man to man. Nor are there any long-term human carriers of smallpox, as, for instance, with typhoid and syphilis. It is not an over-simplification to say that one either has smallpox and can transmit it, or one has not and cannot transmit it.

Except for children, most Europeans and their slaves had had smallpox and were at least partially immune, and few but adults sailed from Europe to America in the first decades after discovery. The voyage was one of several weeks, so that, even if an immigrant or sailor contracted smallpox on the day of embarkation, he would most likely be dead or rid of its virus before he arrived in Santo Domingo. Moist heat and strong sunlight, characteristic of a tropical sea voyage, are particularly deadly to the smallpox virus. The lack of any rapid means of crossing the Atlantic in the sixteenth century delayed the delivery of the Old World's worst gift to the New.

It was delayed; that was all. An especially fast passage from Spain to the New World; the presence on a vessel of several nonimmune persons who could transmit the disease from one to the other until arrival in the Indies; the presence of smallpox scabs, in which the virus can live for weeks, accidentally packed into a bale of textiles—by any of these means smallpox could have been brought to Spanish America.²⁴

In December 1518 or January 1519 a disease identified as smallpox appeared among the Indians of Santo Domingo, brought, said Las Casas, from Castile. It touched few Spaniards, and none of them died, but it devastated the Indians. The Spaniards reported that it killed one-third to one-half of the Indians. Las Casas, never one to understate the appalling, said that it left no more than one thousand alive "of that immensity of people that was on this island and which we have seen with our own eyes."²⁵

Undoubtedly one must question these statistics, but they are not too far out of line with mortality rates in other smallpox epidemics, and with C. W. Dixon's judgment that populations untouched by smallpox for generations tend to resist the disease less successfully than those populations in at least occasional contact with it. Furthermore, Santo Domingo's epidemic was not an atypically pure epidemic. Smallpox seems to have been accompanied by respiratory ailments (*romadizo*), possibly measles, and other Indian-killers. Starvation probably also took a toll, because of the lack of hands to work the fields. Although no twentieth-century epidemiologist or demographer would find these sixteenth-century statistics completely satisfactory, they probably are crudely accurate.²⁶

In a matter of days after smallpox appeared in Santo Domingo, it appeared in Puerto Rico. Before long, the Arawaks were dying a hideous and unfamiliar death throughout the islands of the Greater Antilles.²⁷ Crushed by a quarter-century of exploitation, they now performed their last function on earth: to act as a reserve of pestilence in the New World from which the conquistador drew invisible biological allies for his assault on the mainland.

Smallpox seems to have traveled quickly from the Antilles to Yucatán. Bishop Diego de Landa, the chief sixteenth-century Spanish informant on the people of Yucatán, recorded that sometime late in the second decade of that century "a

pestilence seized them, characterized by great pustules, which rotted their bodies with a great stench, so that the limbs fell to pieces in four or five days." The *Book of Chilam Balam of Chumayel*, written in the Mayan language with European script after the Spanish settlement of Yucatán, also records that some time in the second decade "was when the eruption of pustules occurred. It was smallpox." It has been speculated that the malady came with Spaniards shipwrecked on the Yucatán coast in 1511 or with the soldiers and sailors of Hernández de Córdoba's expedition which coasted along Yucatán in 1517. Both these explanations seem unlikely, because smallpox had not appeared in the Greater Antilles, the likeliest source of any smallpox epidemic on the continent, until the end of 1518 or the beginning of 1519. Be that as it may, there is evidence that the Santo Domingan epidemic could have spread to the continent before Cortés's invasion of Mexico. Therefore, the epidemic raging there at that time may have come in two ways—north and west from Yucatán and directly from Cuba to central Mexico, brought by Cortés's troops.²⁸

The melodrama of Cortés and the conquest of Mexico needs no retelling. After occupying Tenochtitlán and defeating the army of his rival, Narváez, he and his troops had to fight their way out of the city to sanctuary in Tlaxcala. Even as the Spanish withdrew, an ally more formidable than Tlaxcala appeared. Years later Francisco de Aguilar, a former follower of Cortés who had become a Dominican friar, recalled the terrible retreat of the *Noche Triste*. "When the Christians were exhausted from war, God saw fit to send the Indians smallpox, and there was a great pestilence in the city. . . ."²⁹

With the men of Narváez had come a black man suffering from smallpox, "and he infected the household in Cempoala where he was quartered; and it spread from one Indian to another, and they, being so numerous and eating and sleep-

ing together, quickly infected the whole country." The Mexicans had never seen smallpox before and did not have even the European's meager knowledge of how to deal with it. The old soldier-chronicler, Bernal Díaz del Castillo, called the Negro "a very black dose [for Mexico] for it was because of him that the whole country was stricken, with a great many deaths."³⁰

Probably, several diseases were at work. Shortly after the retreat from Tenochtitlán Bernal Díaz, immune to smallpox like most of the Spaniards, "was very sick with fever and was vomiting blood." The Aztec sources mention the racking cough of those who had smallpox, which suggests a respiratory complication such as pneumonia or a streptococcal infection, both common among smallpox victims. Great numbers of the Cakchiquel people of Guatemala were felled by a devastating epidemic in 1520 and 1521, having as its most prominent symptom fearsome nosebleeds. Whatever this disease was, it may have been present in central Mexico along with smallpox.³¹

The triumphant Aztecs had not expected the Spaniards to return after their expulsion from Tenochtitlán. The sixty days during which the epidemic lasted in the city, however, gave Cortés and his troops a desperately needed respite to reorganize and prepare a counterattack. When the epidemic subsided, the siege of the Aztec capital began. Had there been no epidemic, the Aztecs, their war-making potential unimpaired and their warriors fired with victory, could have pursued the Spaniards, and Cortés might have ended his life spread-eagled beneath the obsidian blade of a priest of Huitzilopochtli. Clearly the epidemic sapped the endurance of Tenochtitlán. As it was, the siege went on for seventy-five days, until the deaths within the city from combat, starvation, and disease—probably not smallpox now—numbered many thousands. When the city fell "the streets, squares, houses, and courts were filled with bodies, so that it was almost im-

