

Joel Simon, *Endangered Mexico: An Environment on the Edge* (San Francisco; Sierra Club Books, 1997), 10-26.

I

The Aztecs' religion of imminent ecological doom did not prevent them from constructing a massive infrastructure that transformed the natural habitat and brought remarkable stability to an unstable world. In fact, there was a natural coincidence—since the Aztecs fully expected their capricious gods to send wind or rain or earthquakes or wild animals at any moment, they took measures to protect themselves.

The Aztecs had an enormous advantage. The Valley of Mexico was not Aztlan, but it was still an ecological marvel. Two million years ago, during a period of intense volcanic activity, lava sealed off the valley's natural drainage, and the waters that had formerly flowed south to the sea spread out into a series of five interconnected lakes. The valley's geology fostered a series of microclimates—marshes and dry scrub, subtropical plains and alpine forests, and fresh- and saltwater lakes—which shared a small and clearly defined area.

Within half a century of their arrival in the Valley of Mexico, the Aztecs had given up the life of hunter-gatherers and taken up farming. Since they had settled on an island in the middle of Lake Texcoco, they had to create farmland artificially. They dredged mud from the shallow lake bottom and piled it along the shores, a technique borrowed from other tribes that had already settled in the valley. These artificial fields, called *chinampas* or “floating gardens,” were astonishingly productive, producing 100 million pounds a year of maize alone. Water seeped up through the mud, keeping the soil moist, allowing plants to germinate before the rainy season began and protecting the crop from drought. As the population of Tenochtitlán expanded, the *chinampas* were appropriated for urban settlement while food production was shifted to the southern part of the valley. Tenochtitlán emerged as a city of thousands of small islands divided by canals—the Venice of the New World.

The canals formed the basis of a transportation revolution. A fleet of 200,000 canoes brought the valley's products to the city's doorstep. Squash, chiles, and tomatoes came from the *chinampas* of Xochimilco. Corn, beans, and amaranth, which were grown

along the lakeshore in small irrigated plots and in terraced fields that climbed the mountain slopes, arrived daily in enormous canoes.

Aztec engineers set to work constructing an urban infrastructure that amazed the first European visitors. Despite a large population of perhaps 500,000—as much as ten times the size of the largest Spanish city of the time—Tenochtitlán had an ingenious transportation system that made getting around easy. Each street was half roadway and half canal. Canoes went everywhere in the city, including directly into the emperor's palace. The city was connected to the shore by a series of well-defended causeways. Fresh water, meanwhile, was brought in through an enormous stone aqueduct that spanned the lake. Around 1440, Nezahual-coyotl, poet-king of the neighboring city of Texcoco, was commissioned to construct a ten-mile-long dike, which divided Lake Texcoco and helped alleviate damage from the perennial floods.

In their urban design the Aztecs tried to replicate the paradisiacal realm of the water god, Tlaloc. The streets of the city were lined with flowers, and nearly every house had a rooftop garden. Moctezuma II, the Aztec emperor at the time of the Spanish Conquest, kept an aviary full of quetzals, macaws, ducks, and other rare birds, as well as a zoo with pumas and jaguars. The streets were spotless, there were no beggars, and unlike the European cities of the time, which reeked of sewage, the Aztecs had found a highly effective and efficient way to get rid of human waste. Small outhouses at the end of each street emptied directly into canoes, which were poled each day across the lake to the farmland, where the cargo was used as fertilizer.

The Aztecs' ability to expand their dominion over all of Mesoamerica was based on their good fortune in settling in such an ecologically advantageous location. The interconnected lake system allowed them to use canoes to exploit the diverse products of the ecosystem. This was an enormous breakthrough in a country that had no domesticated animals (the decline of game had been so complete during the era of the big-game hunters seven thousand years earlier that Mesoamerica had been left without any large animals from which to breed domestic livestock).

Given the topography of Mexico (the mountain terrain had prevented the formation of any major navigable rivers in the highlands) and the technology of the time,

no culture outside the valley could hope to generate the same level of production. By the sixteenth century, the Aztec empire extended from the Atlantic to the Pacific.

Still the Aztecs believed that the end was near. While the canals, aqueducts, canoes, *chinampas*, and dikes had helped Tenochtitlán achieve a remarkable ecological stability, by the middle of the fifteenth century the city was confronting some serious environmental problems. Drought, flood, frost, and famine became increasingly common. To the Aztecs, then, the most important project of their environmental infrastructure was the enormous pyramid that towered above Tenochtitlán's central plaza. The pyramid offered a way for the Aztecs to petition the gods who controlled the natural forces. When the rains were late or when the lake waters rose quickly, the Aztecs offered human sacrifices to Tlaloc, the god of water.

Each victim, who was usually a prisoner captured in battle, was led up the 114 steps of the great pyramid, where priests bent him back over the sacrificial stone, plunged an obsidian knife into his taut stomach, and then reached under the rib cage to extract the beating heart. The heart was placed in a basin while the body, representing the setting sun, was tumbled down the steps of the pyramid. At the bottom, other priests made quick work of dismembering the body. The arms and legs were cooked with chiles and tomatoes and served at a ceremonial feast, while the torso was fed to the beasts in Moctezuma's zoo. The head was placed on a wooden rack at the base of the pyramid which, according to one of Hernan Cortés's men, contained more than one hundred thousand skulls.

Although the Aztec practice of human sacrifice horrified the Spaniards and helped to justify their toppling of the empire, to the Aztecs it was merely an expression of their belief that the world was constantly threatened with environmental calamity. The Aztecs were extremely devout and extremely apprehensive. Throughout Mesoamerica, human sacrifice was a widely accepted and institutionalized form of showing devotion and subservience to the gods. "[It] was inspired by neither cruelty nor hatred," wrote Jacques Soustelle in his classic *Daily Life of the Aztecs*. "It was their response, and the only response they could conceive of, to the instability of a continually threatened world."

Indeed the Aztec world, their carefully constructed and maintained universe, was doomed. But the source of the danger was unimaginable. In 1502 vague and unsettling

rumors reached Moctezuma about a new race of men who came from the east. Then, in the summer of 1518, some Indians near Tabasco saw a mountain range bobbing off the coast. When they paddled out to explore, they realized that these were ships carrying strange white men with beards. After a bit of barter, the ships sailed up the coast, fighting a brief battle with other Indians near present-day Veracruz, before turning eastward, dipping below the horizon, and sailing back into the oblivion from which they had come.

II

The Spanish galleon returned to Cuba bearing rumors of its own: westward across the sea was a rich land, a new world populated not by naked savages but by wealthy lords who possessed vast treasures of gold and jewels. That was enough information for a small-time lord and big-time adventurer named Hernan Cortés. Within a year, he had cobbled together a small fleet and sailed west from Havana. He had no idea what he would find—all he knew was that he would conquer it.

Nearly five hundred years after Cortés's short voyage, it is hard to fathom how different the New World was from the Old in 1519. They were separated not merely by history and culture but by the vastness of time. Roughly 200 million years ago, Europe, Africa, and North America were part of the same land mass, an enormous supercontinent called Pangaea. By the middle of the Jurassic period, the continents began pulling apart. Africa detached from North America, creating what would become the Gulf of Mexico, and slowly, over the next 50 million years, wiggled loose from South America to form what would become the Atlantic Ocean. This means that although many of earth's life forms have a common origin, the plants and animals of North America evolved for 200 million years in relative isolation. Animals, plants, and humans had all crossed the temporary land bridge that connected the continents across the Bering Strait, but the biological differences between the two worlds were staggering. Almost none of the plants or animals were familiar to Europeans. They had never seen a hummingbird or a rattlesnake or tasted corn, or tomatoes, or chiles. Americans, on the other hand, had never seen a horse or a cow and had never eaten oranges or wheat.

It is remarkable that two worlds separated by forces so powerful should be reconnected by one so slight. Cortés's fleet of ragtag adventurers not only conquered the

people of the New World; the flora and fauna they brought with them conquered the land. A century after the conquest, the American landscape was utterly transformed. But even more significant from a human standpoint was what this continental isolation had meant in terms of the development of pathogens—the microorganisms that cause disease. The only human diseases in the New World were the ones brought by the migrants who crossed the Bering Strait beginning thirty thousand years ago. The new settlers lived for generations in small groups spread out across a cold climate, not very favorable conditions for the pathogens. By the time the ice age ended and the Bering Strait was resubmerged, relatively few pathogens had colonized the New World. Hepatitis, polio, intestinal parasites, and perhaps syphilis were there. But smallpox, mumps, measles, bubonic plague—the killers of Europe—were unknown.

Europe, meanwhile, had been a veritable petri dish for a host of devastating epidemic illnesses. The difference was precisely its lack of isolation. For thousands of years, European traders had brought back spices from Asia and slaves from Africa, as well as new pathogens. These diseases spread across Europe, which had few natural barriers. By the fifteenth century, Europeans had been exposed to hundreds of terrible epidemics, and the surviving population had developed immunities. Europeans were therefore the perfect vessels in which to transport a host of new diseases to America, Australia, New Zealand, and the Pacific Islands. Smallpox is a good example. It was a widespread and often fatal childhood disease in Europe in the sixteenth century, but those who survived its ravages into adulthood developed a resistance.

When Cortés sailed from Havana in February 1519, he provisioned his fleet of eleven ships with an array of steel weapons. He procured sixteen horses, which were rare in Cuba and more expensive than slaves. But the most important weapon in the Spanish arsenal was not even aboard Cortés's ships. It was brought later by a single African slave who landed on the shore of Veracruz in 1520. The slave was infected with the smallpox virus. He was well enough, however, to march to Tenochtitlán, where he introduced smallpox among the Aztecs.

The nature of epidemic disease was poorly understood until very recently. Both the Spaniards and the Aztecs attributed the terrible plague to divine forces. William Prescott's famous history of the conquest written in 1843 has exactly one mention of

smallpox, and even more recent accounts analyze the victory of the Spaniards over the Aztecs in terms of technological superiority, military strategy, cultural misunderstanding, and Moctezuma's unwillingness to attack the Spanish force immediately. Each of these played a role in the early campaign, but Cortés would not have been able to conquer the Aztecs without the aid of European disease.

In the early stages Spanish armor, cannons, and crossbows allowed Cortés and his forces to defeat the large armies that attacked them soon after they landed at Veracruz. Horses in particular terrified the Indians. They had never seen an animal that big and initially thought that man and horse were a single beast. The Spaniards' easy victories strengthened their belief that they had been sent on a divine mission against the forces of evil. The final proof that the Indians were waiting to be liberated was the fact that many joined their campaign. By promising relief from Aztec tyranny, Cortés fomented a rebellion and recruited Indian allies to his side.

Moctezuma heard of the alliance between the Spaniards and his old enemies and became nervous. Legend has it that Moctezuma at first believed that Cortés was Quetzalcoatl returned from the east as he had once promised. But even if that story were true, Moctezuma also never doubted that his vast armies could defeat the Spaniards. He knew, too, that it would be a costly campaign and so, in the best Aztec tradition, decided to try and cut a deal. Moctezuma offered Cortés an annual gift of gold and jewels, believing the Spaniard would accept, sail away, and let the Aztec emperor return to the business of government. With this proposal on the table, Cortés and his men entered Tenochtitlán as Moctezuma's guests.

The Spaniards immediately betrayed Moctezuma's trust, taking the Aztec emperor captive. Several months later the Aztecs rose up and drove the invaders from Tenochtitlán. But while the Spaniards themselves were driven out, they had left behind a time bomb. Within months, Tenochtitlán was ravaged by smallpox. In the tightly packed city the disease spread with terrible swiftness, striking down commoners and rulers without distinction. In the general carnage of the conquest no one bothered to tabulate who died of smallpox and who died of other causes, but given Tenochtitlán's close quarters and the way that the disease is known to spread in similar environments, it is not inconceivable that it could have killed 50 percent of the population within a few months.

In December 1520, with the smallpox epidemic at its peak, the Spaniards began to lay siege to the Aztec capital. Soon neither food nor water was reaching the population. On August 13, 1521, the Spaniards broke through the last Aztec defenses and marched into the ruined city. “We found the houses full of corpses and some poor Mexicans were still in them who could not move away,” recalled Spanish soldier Bernal Diaz in his account of the conquest. “The city looked as if it had been ploughed up. The roots of every edible greenery had been dug out, boiled and eaten, and they had even cooked the barks of the trees. There was no fresh water to be found; all of it was brackish.”

“The sky was crushed,” recalled an Aztec poet. “The sun did not follow its course.”

III

In the century following the Spanish Conquest, a host of European diseases from measles to chicken pox ravaged the New World. Smallpox raged like a firestorm across a drought-stricken land. Within decades, it had spread from the Great Lakes to the tip of South America, reaching the Incas before the Spanish conquistadors. It devastated the Amerindian population on the eastern seaboard and along the Mississippi River, a population that, because its settlements were made of wood rather than stone, disappeared with hardly a trace. Across the Great Plains, the disease opened up new areas for the buffalo herds, which expanded into once heavily populated areas. The nomadic existence of the Plains Indians who followed the buffalo was an adaptation to an environmental transformation that had taken place only a few centuries earlier.

In Mexico, especially across the urbanized heartland, the diseases were devastating. There is too much debate about the size of the population at the time of the conquest to cite any reliable figure — estimates for Tenochtitlán range from about 60,000 to 1 million, for the valley itself from 1 to 3 million, and for what is present-day Mexico from 6 to 25 million. What is certain is that millions were killed in the epidemic. Data confirm that many individual towns lost 90 percent of their population.

The population collapse also changed the shape of the land itself. Over the course of a century, the Aztecs’ highly regulated system of environmental management, which supported an extremely dense population, gave way to a much more haphazard

exploitation of resources. Essentially, disease opened an ecological niche for the Spaniards to occupy. Actually it was not the Spaniards themselves who moved in — they were not much for farming — but their animals. Pigs were in the vanguard; conquering Spanish expeditions drove herds of swine in front of their advance so that they would be provided with food. Many pigs that escaped the ensuing hunt went feral; within a few generations in the wild they had sprouted tusks and lost their pudgy. The Arkansas razor-backs are their descendants. Pigs flourished along riverbanks and in lowland forests; they also did well across the highlands. A decade after the arrival of the first pigs, the beasts were so numerous that raising them was no longer a profitable enterprise.

Luckily for the Spaniards, cattle took hold in the next decade. Mexico's vast plains extending north to points unknown had not been grazed in ten thousand years, since the New World horse and the mastodon had died out. The cow's-eye view must have been overwhelming; the tufts of thick, tall grass were the bovine equivalent of a Roman banquet. As the herds grew, the price of beef plummeted, until by 1542 meat was so cheap that butcher shops opened in Indian villages. Before the conquest, only warriors who participated in the cannibal feasts ate meat regularly. Herds of cattle were soon traipsing through Indian fields, often before the corn could be harvested. In the Valley of Mexico, Indians built fences, dug trenches, killed invading cows, and burned pasture to ward off the hungry beasts. The marauding cattle could not be contained. They ate the Indians' food and poisoned their water supply, the creeks and springs, with their manure. Soon, whole villages picked up and moved to avoid the ravenous herds. Because unplanted land was considered open pasture, the abandoned plots often fell into Spanish hands.

The cattle not only chased the Indians off; overgrazing in the central highlands led to long-term and even permanent degradation of the land itself. The herds left hillsides bare, and the exposed soil was washed away in the next rain. Cows were often introduced into areas that had been recently deforested for Spanish construction or cleared for grazing or mining; in these areas the soil tended to be even more unstable. Hillside erosion was accelerated by animal-drawn plows, which replaced the Indian digging sticks. Finally, as disease wiped out the Indians, many hillside plots were abandoned; when their stone terraces collapsed, the rains washed away the uncontained top soil. Fifty

years after the conquest, once-cultivated hillsides were pocked gullies of hard yellow earth. Whole areas were permanently lost to production. The prevalence of the phenomenon is suggested by the fact that *tepetate*, the Nahuatl (Aztec) word for exposed hardpan, was quickly incorporated into the New World Spanish vocabulary.

The Spanish authorities did take some steps to protect the Indians' corn supply, which in the first century after the conquest also fed the Spaniards. By the 1530s, most of the large herds had been driven north into the grasslands region now known as the Bajío, which was then occupied by nomadic Indians. There, amidst the lush waving grasses interspersed with cacti, prickly pears, and scrub, the cattle population exploded. By the time a mining strike at Zacatecas in 1546 drew Spanish settlers into the region, herds of twenty thousand animals were not uncommon.

The damage caused by grazing was compounded by the fact that the hillsides around the mining centers were quickly deforested. The mines consumed huge amounts of timber for the construction of shafts and the production of the charcoal used for smelting. In 1543, Indians around Taxco in present-day Guerrero complained that the mines had not left a tree standing. The same was true around the sugar plantations developed in the upland valleys of Veracruz and the interior lowlands of Morelos. Extensive stands of highland tropical forests were cleared to make way for the cane; timber was also needed to power the mills that ground the cane into sugar. The cattle swarmed over the denuded hills, preventing the forest from regenerating. Widespread desertification was the result.

By 1570, as the mining boom continued, the Bajío was turned over to wheat production, and the cattle were driven further north into the sparsely populated grasslands of Coahuila, Durango, and Sinaloa. For twenty years or so, cattle herds doubled every fifteen months; the largest herds had 150,000 animals. Then, suddenly, the cattle started to die off. The rate of reproduction slowed; herds thinned. The Spaniards could not understand what malady had befallen them. They blamed the shrinking herds on packs of wild dogs and Indian nomads. But in fact, the cows were eating the pasture more quickly than it could reproduce. A mere sixty years after the first cow was brought from Cuba, the vast country—from the rugged mountains of the south to the grass-covered northern reaches—was so crowded with cattle that the land had reached its carrying capacity.

Some grazing areas, like the Sinaloa plains where scrub replaced the grasslands, were damaged beyond repair.

If cattle were a blight on the land, sheep were an absolute pestilence. Like cattle, the sheep herds exploded across the landscape, grazing hillsides bare. Sheep crop grass much more closely than cattle; they also graze in steep and rocky terrain, which is especially vulnerable to erosion. In the Mezquital Valley north of the Valley of Mexico sheep “transformed ... a complex and densely populated agricultural mosaic into a sparsely populated mesquite desert.” That’s the conclusion of Elinor G. K. Melville in *Plague of Sheep*.

When the first Spaniards came upon the Mezquital Valley, it was densely populated by Otomi farmers who were under the sway of the Aztec empire. The hillsides were covered with pine-oak forests, and creeks ran clear down from the mountains. The valley floor was heavily irrigated; terraced fields climbed the hillsides. To the Spanish eye, the valley seemed ideal for pastoralism. The Spaniards could not possibly have understood the underlying fragility of a region that appeared so fertile; nor could they have imagined the destructive potential of sheep, animals that after millennia of grazing in Europe had reached an accommodation with the Old World environment.

The first sheep were introduced in the Mezquital Valley in the 1530s and 1540s. By the late 1550s there were 421,200 of them. Fifteen years later there were over 2 million. The growth of herds coincided with the demise of the human population as the waves of plagues wreaked their usual havoc.

Then in the 1580s the sheep suddenly began to die off. The Spanish pastoralists were at a loss to explain it; the animals were not fattening and breeding was slowing. An explanation for this strange phenomenon would have to wait nearly four centuries until scientists came up with a model called “ungulate irruption.” Scientists discovered that when ungulates—sheep, deer, goats, pigs, horses, bison, or any herbivores with hard, horny hooves—are introduced into virgin grasslands the animals reproduce at a frenetic rate until the growing herds have eaten every bit of grass down to the nub. Then the population crashes as the animals die in droves. The decline in the population allows the flora to recover. When the grass returns, the herds grow slowly, rising and falling until they reach an accommodation with the available resources. Scientists who have studied

the cycle by introducing ungulates onto isolated islands have found that the whole process takes only thirty-five to forty years.

By the 1590s the sheep herds in the Mezquital Valley had been reduced by half. The cycle had come to an end. After three decades of being picked over by millions of sheep, the Mezquital Valley was too degraded to recover. Springs dried up and the torrential summer rains eroded the exposed hillsides. By the beginning of the seventeenth century the hillsides showed extensive sheet erosion and deep gullies. The topsoil was carried away, leaving only *tepetate*.

One final ingredient transformed the American environment once disease and grazing animals had done their damage — weeds. A new era of biological competition ensued in the degraded environment as New World and Old World plants competed for the same ecological niche. A great many New World food crops made it to Europe and beyond — corn, potatoes, and tomatoes are three important examples. But European weeds won the battle in the New World. Most arrived accidentally, in animal dung or stuck to clothing. By 1600, entire meadows were largely devoid of New World plants. Dandelions, nettles, a host of grasses, and European clover annihilated their New World rivals. Thousands of plant species were wiped out within the first century after the conquest.

Why did European weeds have an advantage over the New World varieties? Biohistorian Alfred Crosby calls weeds “the Red Cross of the plant world”; their evolutionary niche is to recolonize land that has been destroyed in floods, fires, and other natural disasters. Their specialization, however, is also their vulnerability. Once the emergency is over, weeds generally give way as the original ecosystem reestablishes itself.

These hardy plants did so well in the New World precisely because it was suffering an ecological calamity of historic proportions. The population crash meant that plowed fields were never planted, and European weeds quickly rooted in the exposed soil. An overgrazed and eroded hillside is a propitious environment for a weed. The weeds wiped out hundreds of native plants, but they also stabilized eroding hills — essentially cauterizing an open wound. In the Mezquital Valley, for example, grazing sheep had so damaged the environment that the original ecosystem could not regenerate.

Forests of pine and oak and native grasses gave way to European weeds and drought-tolerant plants like maguey, yucca, thorn scrub, and mesquite. The Spaniards began to disparage the once-fertile valley as a blasted badlands marginally suitable as sheep pasture.

This unprecedented ecological transformation was utterly lost on contemporaries. The Spaniards were unequipped to notice or understand what was going on. It happened with such rapidity that they had no reference point. Even if they had noticed, they would not have been concerned that familiar weeds were thriving in the new land. The Indians must have been aware of the process, but in most cases we are not privy to their observations. All we know for sure is that if Moctezuma had returned in 1600 he would not have recognized the place.

IV

Before the Spanish Conquest, the Aztec religion stressed man's vulnerability and frailty against the forces of nature. The Spaniards, on the other hand, believed just the opposite: that nature had been created by God to serve man. In the Garden of Eden, sixteenth-century theologians argued, nature was so abundant that Adam and Eve lived a life of leisure, plucking the bountiful fruit that God had provided. Once they were expelled, God provided them with the raw materials but stipulated that they would have to work to bring forth the fruits of the earth. "Be fruitful and multiply and replenish the earth and subdue it," he had commanded. "Have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth."

To transform the environment and put it at the service of man was therefore to do God's will. It was impossible to live a Christian life in the wilderness—forests, deserts, and jungle were the refuge of the devil. This thesis was proven time and again, whenever Spanish Christians fell into Indians' hands. Gonzalo Guerrero, a Spanish soldier who had been shipwrecked in the Yucatan in 1504, pierced his ears and lower lip, tattooed his body, and became a pagan. When Cortés landed in the Yucatan in 1519, Guerrero led the Indians in an attack on the Spanish invaders. During the Cabeza de Vaca expedition, a shipwrecked crew had sunk to the abominable depths of cannibalism. Even today, few

Mexicans venture into the woods unless they have some business there—corralling a stray cow, hauling firewood, growing drugs, fighting a guerrilla war.

The Latin word for city—*civitas*—is the root of the word “civilization,” and for the Spaniards the equation was literal. Cortés barely mentioned the Mexican landscape, but he was enthralled by Tenochti-tlan. He marveled at its wide streets, its flowering gardens, its sense of order. “The Indians,” Cortés declared, “live almost as we do in Spain.”

In the first century of the colonial era the Spanish vision of nature triumphed. Land was so abundant that the Indians could have their plots of land and their villages as long as they surrendered part of their labor. Because a city was the ultimate example of man’s dominion over nature, the Spaniards sought to Christianize the Mexican landscape by urbanizing it. The friars gathered the Indians in villages, while Cortés built his imperial capital on the ruins of Tenochtitlán.

By the early part of seventeenth century, some semblance of ecological equilibrium had been restored. As the surviving Indians developed immunities, the plagues became less frequent and less devastating. By 1650 the Indian population began its slow recovery. Grazing animals as well had reached an accommodation with their new environment. The cattle herds stabilized between 1570 and 1590; sheep a bit later. Throughout most of the highlands, European plants had completed their colonization. The collapse of the Indian population, combined with the opening of the northern frontier to cattle ranching, transformed a country that was living at the limits of its environmental capacity into one in which the natural resources seemed vast and inexhaustible. This temporary abundance meant that the trauma of environmental upheaval and demographic collapse was not reflected in the social order. Just the opposite—the colonial era was one of the most stable periods in Mexican history. But the underlying conditions that produced the stability were fleeting.

One of the Crown’s goals in Mexico—now christened New Spain— was to avoid the kind of reckless exploitation that had destroyed the Indies. The key was to create two separate societies—the Republic of Indians and the Republic of Spaniards. In 1542 laws were established to protect the Indian communities from slavery, servitude, and plunder.

Spanish society in the sixteenth century was highly legalistic and the conquest precipitated a half-century-long debate among theologians and lawyers: who were the Indians and what responsibility did the Spaniards have toward them? The first argument, invoked by backers of the slave trade, cited Aristotle's theory of "natural slavery." Indians, it was argued, lived no differently from the beasts—they survived, as does a monkey or a deer, from what nature offered them. The inability to transform nature—to grow crops and build cities—was a sign that the Indians were not fully developed human beings.

But the discovery of the Aztecs' great cities and later those of the Incas raised new questions about this conclusion. A new theory emerged that was to find its champion in Chiapas Bishop Bartolome de Las Casas, who argued that the Indians were spiritual children, whose deficiencies were the result not of any innate qualities but of their hostile environment. They needed to be separated from nature, put into towns, and evangelized. Inspired by the enthusiasm with which the Indians accepted the gospel, the friars spread across the New World at a rate that rivaled the spread of cattle.

Throughout the century, Indians were gathered into towns built in a grid pattern, with a central plaza dominated by a church and town hall. According to royal decree, each Indian was to cultivate sixty fathoms and own six hens and a rooster; royal "chicken officials" made the rounds to ensure that Indians were keeping the proper number of poultry. At the behest of the friars, many farmers abandoned their terraced plots for land in the valleys, turning the hillsides over to the sheep. Domestic animals allowed the Indians to diversify their economy, introducing meat, milk, and wool production. But their grazing of unstable hillsides accelerated erosion and desertification. Abandoned farmland was confiscated for grazing by both Spaniards and Indian leaders, dubbed *principals* or *caciques* by the Spaniards. Nature and the friars conspired to wipe out indigenous systems of land use.

In the Spanish realm of Mexico—the *Republica de Espanoles*—an entirely different perception of the new land took hold. While the Indian universe was the village, the Spaniards were rubbing their eyes and trying to take in the vast new horizon. They perceived Mexico almost as if they were seeing it from an airplane—the new land was endless, almost unknowable. The conquerors who wandered for years through the

country had not found its limits. Resources—from timber to silver to pasture—were enormous in a land where they had never been exploited. The Spanish settlers saw no reason to manage an environment that was this bountiful; the Indians were silly and sentimental to grow corn in little mountain plots while vast plains were left uncultivated in the north. Spanish colonists cobbled together royal grazing permits called *estancias* into enormous estates, which would evolve into the eighteenth-century haciendas.

The boom fueled by a massive and reckless consumption of vast and unexploited resources lasted until the middle of the seventeenth century. By then livestock, having devoured ten millennia worth of grass in less than a century, were in decline, while most of the easily prospected mines had been picked clean. New World agricultural exports—sugar, cotton, cochineal, indigo, and cacao—bottomed out as Spain entered a prolonged recession. Writing about the Valley of Mexico, historian Charles Gibson noted: “The colonial population, while it fell and rose sharply, always did so within the environment’s declining potential. “The same can be said for the colony as a whole. Ironically, however, it was Mexico’s economic stagnation that partly accounted for the social peace. The lack of markets had turned agricultural production inward, emphasizing self-sufficiency. Most peasants had some land to farm, either in a village or on a large estate.

But the social peace collapsed with the beginning of a second mining boom in the eighteenth century. New techniques made it possible to extract silver from the previously discarded ore. Mine owners sank their profits into refurbishing the decrepit haciendas. Many of the estates were retooled, switching over from cattle ranching to wheat cultivation in order to meet the demand in Mexico’s growing cities. As the haciendas expanded wheat production, they pushed their cattle onto the marginal land that had been farmed by villages and tenant farmers—land that the friars and the Crown had promised the Indians in perpetuity. Even in the north, land was no longer so plentiful that it could simply be occupied without conflict. The demographic recovery of the Indian population meant that it had become a zero-sum game—when the haciendas took land they stepped on the villagers’ toes, and vice versa.

The colonial era had left a legacy of two competing and even contradictory land ethics. Within the confines of the *Republica de Indios*, and at a time when land was abundant, the Crown had instituted a series of laws to protect Indian land holdings from

Spanish encroachment. While it was never realized, the colonial ideal, articulated by the friars and the Crown, was that a small piece of land—enough to grow a subsistence crop of corn and beans—was the right of every Indian. The state had a responsibility to provide it.

That ideal clashed with the Spanish settlers' concept of private property. Under Spanish law, land and all other natural resources belonged to the sovereign, who granted titles that were theoretically revocable. The estate owners, or *hacendados*, saw their land as inviolable private property, which, like capital itself, could be used at the absolute discretion of its owner. The growth of mining and cattle ranching and the decline of the Indian population had fostered the development of a parallel economy that was centered around the large estates and tied to international markets.

These two competing land ethics have been a source of constant and still unresolved conflict. Both ideals—land as private property and land as a birth right—have roots in the colonial era and in Spanish law. But they had been applied within the two separate realms of colonial society—the former to Spaniards, and the latter to Indians. By the late eighteenth century Indian villagers, mestizo ranchers, small farmers, and agricultural laborers, despite their different cultures, languages, and circumstances, often found themselves with the same grievance: their land was being usurped.

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During three centuries of uneasy peace, the struggle over land simmered just below the surface. Then in 1808 the heat got turned up—Spain fell to Napoleon, leaving the colonies on their own. As muted grievances suddenly boiled over, land hunger swept the new nation. The environmental cost of the colonial policy was thus paid in the first century of independence.

The cause of the social unrest was not merely that two societies began fighting over an increasingly scarce resource. The problem was also that a third and unrecognized society had been created. Throughout the colonial era, Spanish officials had tried to get the Indians and the Spaniards to mate with their own kind. They did not try too hard, however, and by the eighteenth century all they could do was acknowledge that miscegenation was a fact of life and develop an elaborate legalistic nomenclature to

describe the progeny of every possible coupling. The child of a Spaniard and Indian was officially a *mestizo*; the child of a Spanish woman and a black was a *mulatto*; a Spaniard and a *mulatta* produced a *morisco*; and so on. No one paid the slightest bit of attention to such classifications. By the time independence rolled around, anyone who was not white or Indian went by a single name—*mestizo*. But to whom did these bastard children owe their allegiance—their Spanish fathers or their Indian mothers?