

had their revolution. The island exploded when the bourgeois Rights of Man clashed with French colonial intentions. Although the revolutionaries in Paris were willing to extend suffrage to free white Haitians and eventually to free brown ones, they had no intentions of undermining one of France's main sources of revenue by abolishing slavery. So Haiti's black Jacobins freed themselves. The world's first modern war of national liberation was also arguably its first race war. Fighting almost continuously from 1791 to 1804, the ex-slaves seized the island, killing or exiling the free population.

After more than a century of the bitterly harsh slave regime, the freedmen were ready for a vacation. Once they returned to work, they refused to work for plantations; instead they undertook their own land reform, breaking up the large estates into small parcels. The black Jacobins became black peasants. They also refused to grow sugar. Although the individual black peasants no doubt were far better off than they had been while the sugar economy was booming, Haiti no longer played a role of importance in the international economy. Today the island ranks 112 out of 125 countries in per capita exports. The island found itself with little infrastructure, little capital (for sugar's wealth had always been mostly invested in France), and an uneducated peasantry with no political experience. A small mulatto aristocracy arose who exploited the population for their own benefit but brought little development. When their rule wavered, the United States lent a hand (as during the U.S. occupation between 1915 and 1934) to maintain "stability" and keep the peasants quiescent. After 1804 Haiti found nothing to replace sugar as the island's population swelled. Certainly an economy based on exporting baseballs and blood was not likely to be dynamic. Europe's sweet tooth turned a tropical paradise into a miserable, impoverished backwater. The world economy does not only bring progress.

5.2 As Rich as Potosi

Deep in the interior of South America, ten weeks from Lima by mule, stands the 16,000 foot high Cerro Rico peak, which towers over a bleak, frigid, barren landscape. This was the end of the world, but it became the center of the world. It became a magnet for tens of thousands of people who founded the city of Potosi. The world of colonial South America became irreversibly changed and the world economy transformed. This remote summit in this harsh land came to affect millions of people and the course of history because it was a mountain of silver, the richest motherlode ever found.

The Incas had already worked Potosi with their flint picks. They used silver for their temples and jewelry. They were not anxious to share their secret with their Spanish conquerors, but by 1545 the Spanish were aware of the mountain.

At first the Spaniards employed Incan techniques and Indian labor. This was quite successful for about two decades, as long as they could mine the four unbelievably rich veins that lay close to the surface. But the voracious Spanish appetite soon exhausted the easily exploitable veins. Potosi's boom threatened to be very brief.

Spanish technology came to the rescue. Production was revolutionized in the early 1570s under the tutelage of Viceroy Toledo. The discovery of the rich mercury mine at Huancavelica, Peru, in 1565 made feasible the patio method of extracting silver from ore by applying mercury.

But first the ore, with its declining silver content, had to be crushed. Rich merchants and government officials turned miners invested millions of pesos in creating a maze of water works. To ensure water all year around in this dry land, four large reservoirs were built. Thirty dams and tunnels and canals brought the water to the crushing plants to provide hydraulic power.

Equally important, the viceroy solved the labor shortage. Labor was a major problem because Potosi was so far removed from population centers and because Peruvian and Bolivian Indians were not anxious to work for wages. They preferred their subsistence, barter economies. Toledo instituted a labor corvee system inherited from the Incas known as the *mita*. Indian villages were obliged by Spanish authorities to supply a certain number of men for the mines.

State coercion had to be used early on because Indians feared the dangerous mine work. The men worked six or seven days a week deep in the sweltering, dusty tunnels. They sometimes had to carry out fifty-pound loads of ore, climbing up ladders as much as two hundred fifty meters long and then face the frigid air at the mine's mouth. To avoid the labor draft, some villages paid off government officials. If they failed in their efforts and had to provide laborers, funeral services were held in the village before the men's departure. Funereal music was appropriate. A priest newly arrived in Potosí gasped at seeing miners trudge by: "I don't want to see this portrait of hell."

Indians unable to avoid the *mita* trekked to Potosí and remained there a year. As many as fourteen to sixteen thousand Indians were used at a time. Whole families often accompanied married men in order to provide the men's food. By 1650 there were some 40,000 Indians living on the outskirts of Potosí. This was only one-fourth of the city's population, however.

The barren, remote mountain gave birth to the largest city in the Americas, indeed, one of the largest cities in the world. By 1600 there may have been as many as 160,000 people living in Potosí, making it as large as Amsterdam, London, or Seville. Said one amazed observer in the 1570s: "New people arrive hour by hour, attracted by the smell of silver."

But no more than about 15 percent of Potosí's vast population came to work the mines. The rest came to mine the miners. There were hundreds of carpenters, hat makers, tailors, weavers, cooks. Government treasury officials who ran the mint kept a stern eye on activities. Numerous sumptuous churches sprang up as Dominicans, Franciscans, and Jesuits competed to save souls. This was not another sprawling, dusty frontier boom town. Built on an orderly Spanish grid pattern, Potosí's stone buildings in the town center lined at least thirty regular blocks.

But it certainly had its share of saloons, gambling dens, and, by one count, 120 prostitutes. With some 30,000 transients, violence and gang warfare were common. An exasperated judge complained in 1585 that Potosí was a den of thieves with "the most perverse sort of people the world has created."

All of these people had come to this distant place because for over a century it was the economic heart of South America and one of the most dynamic places in the Spanish world. With the most silver, Potosí also had the highest prices on earth. This made it a magnet for merchants because the city's inhospitable surroundings demanded that all food and goods be imported.

The poorly paid Indian population could not afford much. But they purchased lots of potatoes, corn beer (*chicha*), and coca leaves. So much *chicha* was drunk on festival days that "small rivulets of urine" ran through

Potosí's streets. Coca under the Incas had been restricted to the aristocracy. But under the Spanish it became more "democratic" as thousands of workers chewed it to deaden hunger and energize themselves. It came from Cuzco, 600 miles away. Pack trains of 500 llamas regularly entered Potosí to bring these goods. The mining center required a total of 100,000 llamas to attend to its transportation needs. (One can imagine the fragrance.)

The Hispanicized population had far greater wants, turning Potosí into the center of a complex international trade network. Wine came from Chile and Argentina as did mules, cattle, and wheat; cloth arrived from Ecuador. Brazil provided African slaves. Potosí's millionaires also craved French hats and silks, Flemish tapestries, mirrors, and lace, German swords, and Venetian glass. These arrived not only on the legal Spanish fleets via Seville and Panama but also through smugglers who circumvented the mercantilist routes. *Peruleros*, Lima merchants who bought directly in Spain and avoided the expensive fleets and royal taxes, joined French, Dutch, and Portuguese traders who landed goods in Argentina's Río de la Plata and then carted them overland. At least a quarter of Potosí's silver exited through these illegal routes.

Potosí also reached across the Pacific. Peruvian merchants sent silver to Acapulco, Mexico, partly in trade for Mexican cacao and cochineal, but mainly for Asian goods. From Acapulco the Manila Galleons shipped Cerro Rico's treasure to the Spanish-owned Philippines, which was an emporium for Chinese porcelain and silks, Indian and Persian carpets, perfume from Malacca, cloves from Java, cinnamon from Ceylon, and pepper from India. Anything available in Seville, London, or Amsterdam could also be bought in Potosí—at a much higher price. But when one owns a silver mountain, price, distance, and difficulties shrink in importance. Potosí brought the world to it. Potosí's wealth was legendary. "To be as rich as Potosí" was the ultimate dream.

Then the silver gave out. After more than a century of prosperity, declining quality of ore and increased problems with production forced mines to close down. By 1800 the thriving metropolis, once the equal of any of Europe's leading cities, had become little more than a ghost town. And the world, which had once strained to serve its greatest delicacies and luxuries to the distant miners, forgot about Potosí.

ENVIRONMENT + TECHNOLOGY

A Silver Refinery at Potosí, Bolivia, 1700

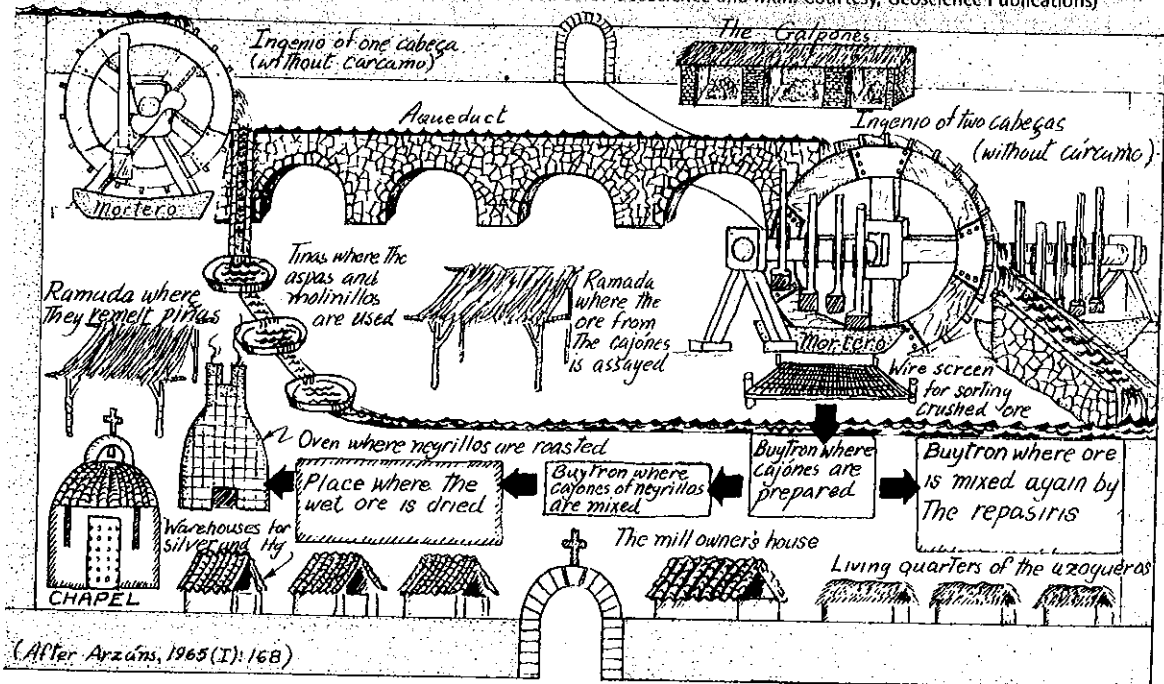
The silver refineries of Spanish America were among the largest and most heavily capitalized industrial enterprises in the Western Hemisphere during the colonial period. By the middle of the seventeenth century the mines of Potosí, Bolivia, had attracted a population of more than 120,000.

The accompanying illustration shows a typical refinery (ingenio). Aqueducts carried water from large reservoirs on nearby mountainsides to the refineries. The water wheel shown on the right drove two sets of vertical stamps that crushed ore. Each iron-shod stamp was about the size and weight of a telephone pole. Crushed ore was sorted, dried,

and mixed with mercury and other catalysts to extract silver. The amalgam was then separated by a combination of washing and heating. The end result was a nearly pure ingot of silver that was later assayed and taxed at the mint.

Silver production carried a high environmental cost. Forests were cut to provide fuel and the timbers needed to shore up mine shafts and construct stamping mills and other machinery. Unwanted base metals produced in the refining process poisoned the soil. In addition, the need for tens of thousands of horses, mules, and oxen to drive machinery and transport material led to overgrazing and widespread erosion.

A Bolivian Silver Refinery, 1700 The silver refineries of Spanish America were among the largest industrial establishments in the Western Hemisphere. (From *In Quest of Mineral Wealth: Aboriginal and Colonial Mining and Metallurgy in Spanish America*, edited by Alan K. Craig and Robert C. West, 1994, Vol. 33 of *Geoscience and Man*, Courtesy, Geoscience Publications)



the silver ore (see Environment and Technology: The Silver Refinery at Potosí, Bolivia, 1700). Silver yields and profits increased with the use of mercury amalgamation, but this process, too, had severe environmental costs. Mercury was a poison, and its use contaminated the environment and sickened the Amerindian work force.

From the time of Columbus, indigenous populations had been compelled to provide labor for European settlers in the Americas. Until the 1540s in Spanish colonies, Amerindian peoples were divided among the settlers and were forced to provide them with labor or with textiles, food, or other goods. This form of forced