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EDITED BY CHRISTOPHER R. BOYER



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Nature as Subject and Citizen in the Mexican Botanical Garden, 1787–1829

Rick A. López

The Mexican Royal Botanical Garden, funded by King Charles III in 1787, was no ordinary royal garden. Typically, eighteenth-century European royal gardens mapped their patron's territorial domination. In Versailles, for instance, land nearest the palace emphasized legibility, rationality, and the centrality of regal authority. As visitors ventured farther afield, they moved into spaces that symbolized the territorial reach of the French king's power. Kew Botanical Garden outside London used its layout, architectural structures, and plants to demonstrate England's dominion over tropical resources encircling the globe. Madrid's Royal Botanical Garden similarly asserted the Spanish king's claim over the products found in his territories around the world.¹ The Mexican garden lacks these standard tropes, which gives the false impression that it ignored the organization of power, space, or knowledge. Yet the Mexican garden did comment on such matters. And the particular ways it did so reveal much about the changing (and contested) understandings of nature first within New Spain and then within the Mexican republic.

The garden was part of the Royal Botanical Expedition to New Spain (1787–93), an undertaking that was to signal Spain's reassertion of its colonial might and of its relevance to the Enlightenment. This ambitious expedition had three main prongs: a massive 56.25 hectare garden in the heart of Mexico City to cultivate, propagate, and study plants with economic or scientific potential; a school that would reform the training of doctors and

pharmacists in New Spain; and a research apparatus that would scour the colony to identify, analyze, and publicize New Spain's botanical riches. These interdependent arms fell under the supervision of the head of the expedition, the Aragonian doctor Martín Sessé y Lacasta.²

Because the Mexican Royal Botanical Garden, unlike most other imperial institutions in New Spain, survived the transition from colony to nation at the turn of the nineteenth century, it offers a revealing point of entry for an analysis of the emergence of Mexico's nationalist ecological imagination(s). Those who have studied the garden or the botanical expedition of which it was a part have tended to focus narrowly on disentangling species identifications, tracing the professionalization of biology and chemistry, or recounting the bureaucratic and personal dramas that unfolded within and around the expedition. This study asks, instead, what the garden can teach us about the evolving relationship between nature and the imagined community during the period when New Spain saw the rise of Creole protonationalism.

The scientists of the expedition claimed to represent the European Enlightenment against rival modes of scientific organization, including those of the Mexican Enlightenment. Sessé and his allies criticized the homegrown Mexican movement as "unscientific" and as inappropriately melding the private sphere (which these agents of the European Enlightenment constructed as feminine, ethnically and locally specific, and immature) with the public sphere (which they constructed as masculine, universal, scientific, and Creole- and European-controlled). The head of the garden, Vicente Cervantes, tellingly, did not care whether Nahuas' and others' ways of naming or using the plants, animals, and natural products of Mexico survived in "plazas or in small gatherings with Indian herbalists and vegetable vendors" so long as they did not intrude upon "places of learning."³ Rather than blot out other modes of knowing, the expedition sought to impose a hierarchical system of knowledge that exalted and masculinized the system developed by the influential Swedish botanist Carolus Linnaeus (1707–78). It also aspired to centralize botanical knowledge in Mexico City to serve the needs of scientific research and medical practice, while restoring some of the Spanish empire's tarnished glory.

This chapter shows how, from their base in Mexico City, members of the expedition codified their views of the natural world as the new "common sense" that guided how Mexican scientists, the state, and economic and political elites interacted with nature during the late colonial and post-independence eras.

Imperial Claims upon Mexican Nature

The story of the Mexican Royal Botanical Garden begins with Spain's imperial expansion across the New World starting in 1492, which coincided with the Renaissance rediscovery of the botanical and medical knowledge of the ancient Greeks. As it became clear that the flora of the Americas surpassed that known to the ancients, King Philip II appointed his court physician (*protomédico*) Francisco Hernández to carry out a detailed botanical study of New Spain. At the start of 1571, Hernández arrived in Mexico, where he remained until 1577. Following the Crown's instructions, he based his observations on interviews with native people rather than on public texts such as those by Fray Bernardino de Sahagún, Martín de la Cruz, or Juan de Cárdenas.

Hernández encountered a society in which Nahuatl healers known as *titici* were alive and well. For six years he learned from these *titici* while practicing medicine at their side in the Hospital of Oaxtepec, where he also benefited from a pre-Conquest botanical garden that remained in use. As the *titici* taught him the names and medicinal uses of plants, native draftsmen known as *tlacuilos* drew these specimens so that Hernández could compile an authoritative account. His guides also led him and his retinue to nearby fields, woods, and deserts, where villagers taught him about local simples (medicinally useful plants). Hernández was careful to point out that he never took the natives' word for anything; he tested all their claims, along with his own hypotheses, on patients in the hospital.⁴

In his letters to the king, Hernández expressed enthusiasm for the many plants in New Spain that were unknown in Europe and had potential economic value, and he bragged about the detailed studies and illustrations he was preparing from his samples.⁵ He also used his time in Mexico to complete his translation of the thirty-seven books of Pliny's *Natural History* into Spanish under the conceit that his work and Pliny's, taken together, would offer the definitive account of global botany.

Hernández characterized the natives as "feeble, timid, and mendacious," as well as lazy and impious, and he criticized the *titici* for their ignorance of the principles of humorism, which led them to rely on the administration of simples, rather than the supposedly more advanced techniques of bleeding, surgical intervention, and the rebalancing of humors.⁶ Despite this, he expressed the highest admiration for the useful knowledge they had accumulated about native plants. "It is a wonder," he wrote, "that among such rude and barbarous people" all the plant names are "adapted . . . with such apt skill and wisdom that hearing the name alone is enough

to indicate the natural properties that can be known or investigated.⁷⁷ Because the Linnaean systems (which did not develop uniformity until the eighteenth century) were proving inadequate even for the plants already known in Europe, he doubted they could accommodate the vast trove of knowledge he was about to introduce. For this reason, upon his return to Spain, he urged integration of the Nahuatl nomenclature system as an ideal language for botanical science.⁸

His work redefined New World nature as a resource that could be studied and exploited through the mechanisms of science and empire, rather than simply the stuff of myth and legend.⁹ Spain already enjoyed a special place within Renaissance science thanks to Muslim scholars who had preserved ancient knowledge that had been lost to medieval Christians. To this, Hernández added Spain's exclusive access to Nahua science, which he filtered through European assumptions and, ultimately, through his own position of authority.

The protomédico expected to receive hard-earned royal laurels. Unfortunately for him, the Spanish Crown had become less interested in learning about its resources than in guarding them against English and French encroachment. His European colleagues, moreover, frowned upon Nahuatl as too strange and savage to serve as a real language of learning.¹⁰ The Crown hid away the vast collection of information and images that Hernández hoped to publish, lest they fall into enemy hands. The bits of his findings that eventually become public emerged in abridged and distorted form.¹¹ Even as Hernández's findings helped shape Enlightenment science on both sides of the Atlantic, his original illustrations and manuscript disappeared into the archives as Spain's imperial power withered.

Enlightened Science, New World Nature, and the Recapturing of Imperial Glory

As England challenged Spain on the global stage during the mid-1700s, Charles III set out to modernize his vast holdings into an overtly extractive empire along the lines of the English, Dutch, and French. To this end, he became an avid patron of botany and cartography, the twin pillars of imperial science. One official revealingly declared that "a dozen naturalists and some chemists scattered in Spain's dominions . . . will offer an incomparably larger utility to the state than a hundred thousand men fighting for the enlargement of the Spanish empire."¹² As Spanish scholars of the time anxiously debated the past, present, and future of the empire, they latched

onto Hernández's work as a point of pride as well as a source of information to exploit for future gain.¹³ A 1671 fire in the royal palace of El Escorial had consumed Hernández's manuscript and illustrations, but only now did the Crown appreciate the magnitude of this loss. As luck would have it, officials located another draft of part of Hernández's manuscript; however, the text was hard to decipher without its accompanying illustrations.

After failing to find copies of more than a handful of the destroyed illustrations in Europe, Casimiro Gómez Ortega, head of the Royal Botanical Garden in Madrid, contracted three intellectuals in New Spain to comb the Mexican archives. His first two agents were the prominent Creole protonationalists José Antonio Alzate y Ramírez (1738–99) and José Ignacio Bartolache (1739–90). I will leave aside for now these well-studied figures in the history of the Mexican Enlightenment to focus on Gómez's third agent, who became the central figure in the Royal Botanical Expedition: Martín Sessé y Lacasta (1751–1808). Possessed of medical training, an inclination for scientific research, and a taste for adventure, Sessé had served in Gibraltar and Cuba, where he conducted clinical trials to combat the epidemics that were debilitating the imperial army. In 1785, while trying to collect on a 1,000-peso debt he had extended to the Crown, he moved to Mexico City, where he took over a lucrative private medical practice and worked at research hospitals while serving as a physician for the Holy See.¹⁴ The trio failed to find a copy of the manuscript in Mexico, but Sessé convinced Gómez Ortega that he could turn this setback into an opportunity.

Gómez Ortega, from his position as head of the Royal Botanical Garden in Madrid, was a towering figure in European science who fiercely advocated for the Linnaean system in botany and its chemistry counterpart, the Lavoisierian system. When Sessé in 1785 proposed a new expedition to build upon what remained of Hernández's manuscripts, Gómez Ortega embraced the idea. The two men won the backing of the New Spanish viceroy and the intendant of the Indies, and then presented their plan directly to the Crown, which agreed in 1787 to offer royal backing and, of equal importance, the support of the royal treasury.

The initial justification for the expedition was to re-create Hernández's lost illustrations and to fact-check and round out his text.¹⁵ But Gómez Ortega and Sessé were hatching larger plans. Sessé from the start proposed that the expedition establish a botanical garden and a school of botany in Mexico City. As he envisioned it, the expedition, the garden, and the school would work in tandem to conduct original research, reform the medical-training-and-licensing establishment in New Spain, and free the colony and the mother country from reliance on medicinal imports from imperial rivals.¹⁶

Sessé and Gómez Ortega shared a desire to impose a top-down structure in which the metropolis was to serve as the hub for the imposition of scientific uniformity across the empire. Recently launched colonial expeditions, such as those by Hipólito Ruiz to Peru and Chile (1777–88), José Celestino Mútis to Nueva Granada (1783–1808), and Juan de Cuéllar to the Philippines (1786–97), had unfolded in the absence of any central coordination and without any plan about what to do with the information that was gathered. To lend order to these expeditions, Gómez Ortega created the Royal Office of Botany (*Oficina Botánica*). The most pressing task of the new royal institution, however, was to design from the ground up the Royal Botanical Expedition to New Spain, which was to use the latest scientific theories and methods to rationalize the Crown's exploitation of New World nature while ensuring Spain's future as a pillar of Enlightenment science and as an empire to be reckoned with.¹⁷

By the middle of 1787, Sessé and Gómez Ortega had recruited much of their expeditionary team, most importantly the Spaniard Vicente Cervantes (1755–1829) as *catedrático* (chaired professor or director) of the garden and the botany school. Cervantes was born in 1755 in Extremadura. He had shown intellectual talent as a youth, but his family could not afford university, so he entered an apprenticeship in a Madrid drug dispensary. At the end of each workday he studied botany in the company of friends who attended university. Though an autodidact, Cervantes successfully petitioned to take the certification exam, which he passed brilliantly. This attracted the attention of Gómez Ortega, who helped him win a professorship in the Royal School of Botany and a position as botanist to the General Hospital of Madrid.¹⁸ Gómez Ortega then appointed his rising protégé to assist Sessé in the creation of a Mexican garden and school following the model of the Madrid garden and school. Cervantes arrived in Mexico in 1787 to begin his collaboration with Sessé.

Though they drew inspiration from Hernández's earlier work, Sessé and Cervantes intentionally departed in crucial ways from their sixteenth-century predecessor. Hernández had relied openly upon native knowledge and even applauded the Nahua nomenclature system. The new expedition sought to steer clear of such tendencies. Moreover, whereas Hernández had been instructed by the Crown not to interfere with local licensing or medical practices, Sessé won a royal mandate to intervene precisely in these matters.¹⁹ Sessé thought of himself and his team of nine as living in a new scientific era that would build upon past knowledge while constructing a framework for new knowledge that would render that past superfluous. Sessé noted that "no sooner was America discovered and incorporated into

the vast territory of the Crown of Castile than Phillip II sent to this continent his illustrious physician Dr. don Francisco Hernández to identify, discover, and collect its medicinal products," which, he claimed, the Crown immediately recognized as more valuable even than precious metals. "Hernández," he argued, "did his best to fulfill the good intentions of the monarch, but the lack of scientific principles, which were not known until 200 years after his death, made it such that his descriptions, despite being no worse than those of the wisest Greeks and Romans who preceded him, and superior to those of almost any other botanist since Pliny, turned out to be so incomplete and defective" that they could offer no real guidance to the present. He credited the sixteenth-century physician for having extracted, tested, and refined indigenous knowledge, and admits that Hernández's native informants "certainly knew more useful plants than those described by Dioscorides." Had Hernández's finding been fully exploited in Europe in the 1500s, they would have added greatly "to the riches of the old continent."²⁰ But that did not happen, and in Sessé's time it was too late. Enlightenment science, in Sessé's view, provided such powerful tools that there no longer was any need to mine native knowledge; any effort in that direction would bring science up to date with the sixteenth century, but it had little use, he argued, in his own era at the turn of the nineteenth century.²¹

As to Hernández's respect for Nahua science and Alzate's argument that Nahua nomenclature and locally based experts had the advantage of growing out of prolonged experience in the New World and its flora, Cervantes, after several years in Mexico, countered that the expedition's research in the garden and its clinical trials in the hospitals provided more than enough experience and a sufficiently "long period of observation." Because of this, he considered that the Royal Expedition to New Spain would surpass the work of Hernández, the Nahua system, and local expertise; its modern theory and scientific methods, moreover, would set it apart from *all* the recent expeditions that had been carried out by Spain, which he claimed emphasized taxonomy and description at the expense of experimentation and research.²²

Sessé and Cervantes also set themselves against what they viewed as the backward practices of the Creole medical establishment. In this conflict, the expedition benefited from the weight of the Crown. At the start of the expedition, the two men requested the conversion of several busy general hospitals into research facilities, with fewer beds. When the Mexican medical board balked, the Crown overruled it to grant Sessé the control he sought.²³ This was but the start of a tempestuous power struggle between the expedition on one side and university professors and local scientific society members, intellectuals, and officials on the other.

Lest we accept Sessé and Cervantes's claim (which has been taken for granted by their later biographers) that they were stamping out the backwardness of mestizo and Creole doctors and of Nahua herbalists in favor of science and rationality, we should keep in mind that the methods they described as cutting edge were firmly rooted in humoric theory and other medical assumptions that, today, we might view as less advanced than those of the herbalists they disdained. While they engaged in medical and scientific arguments, therefore, we must not lose sight of the degree to which these were embedded within larger issues of power and authority.

The privileging of metropolitan structures of knowledge was clear in the methods employed by Sessé and his Creole acolyte José Mariano Mociño (the latter a product of the expedition's school and Sessé's eventual successor, who would become a leading scientific figure in Spain). Rather than seek out native guides, as Hernández had done, Sessé and Mociño drew on native knowledge indirectly, through European texts that filtered and reordered that knowledge. They combined this indirect knowledge with their own direct scanning of the ground. Methodically, they gathered specimens that they then examined, drew, and compared to the published record. They conducted clinical trials, identified "unknown" plants, and assigned Latinate names, following the Linnaean system, to everything they found. Their method subjected the flora, land, and people of New Spain to a structure of knowledge that subordinated the colony to the metropolis, while claiming the fruits of that knowledge and the territory of New Spain in the name of European science mediated through the Spanish empire.

Between 1787 and 1803 they traversed four thousand miles, collecting seeds, live plants, and dried herbarium samples. They produced thousands of field botanical illustrations, reorganized medical education and practice in New Spain, and created Mexico's first Enlightenment-influenced botanical garden as well as its first natural history museum. By implanting its institutions and approaches within the colony and training the next generation of Mexican doctors, scientists, and pharmacists, the expedition helped change how nature was viewed within New Spain and how it was understood in relation to the imagined community. Previous efforts, such as those by Hernández, Bernardino de Sahagún, or Juan de Cárdenas, had confined themselves to the immediate environs of the Valley of Mexico. By venturing across the breadth and width of New Spain, this expedition was the first effort to define New Spain not by the political structures that held it together, by the peoples it ruled over, or even by terrain and property lines but by the plants and animals that lived in and wandered about or spread their seed across its soils.

Ironically, even as the expedition subordinated the colony to the metropolis, it also nurtured possibilities for conceiving of New Spain as a distinct imagined community rooted in nature (or natural resources) and centered in Mexico City. The expedition collected, named, illustrated, and otherwise claimed plants as abstract, floating specimens, the knowledge of which was mediated by centralized "scientific" authorities in Madrid and other European centers. The expedition's scientists rarely noted the specific site of collection, nor did they comment on the plant's range or habitat. All that they conveyed, generally, was that the plants were from the Crown's colony of New Spain. By abstracting plants out of their local places and out of webs of local knowledge they reconfigured space and knowledge as beholden to, controlled, and defined by centralized imperial agents in the Royal Botanical Garden of Mexico and, through it, the Madrid garden and the European scientific network of which it was part.

Space, Science, and Nature in the Royal Botanical Garden of Mexico

Much of the material collected or produced by the expedition, such as living and dried plants, seeds, and botanical illustrations, was exported to Madrid to serve the needs of the metropolis and perhaps later to be re-exported to the colonies as part of imperial projects of "improvement."²⁴ However, the expedition did leave the colony a legacy in the form of the Mexican Royal Botanical Garden and the Royal School of Botany, both officially headed by Sessé but in practice managed by Vicente Cervantes.²⁵

After two years of planning, the expedition inaugurated the garden on May 1, 1788, with an audience that included the regent of the Audiencia, a representative of the viceroy, attendees from the university, and members of Mexico's scientific societies, along with other distinguished persons of the capital. After an orchestral performance, Sessé delivered a lecture on innovations in the study of botany and medicine. Then followed a fireworks display by the most renowned pyrotechnician in the colony, Joaquín Gavilán. This incorporated explosions in the form of recently discovered Mexican plants and, reportedly, even a male papaya tree shooting flares of pollen to fertilize two nearby female papayas.²⁶ The attention to flower structures and pollination emphasized the primacy of the Linnaean system, which categorized plants based on their reproductive features. It also spoke to the ambition of the expedition to spread, like the male plant, its pollen of scientific knowledge so as to fertilize the feminized colonies so that they,

through the rationalized exploitation of their natural resources, could nourish the empire.

During the event, the rector of the university was required to affirm the investiture of Sessé and Cervantes as his equals. This eradicated jurisdictional claims by members of the university who had tried to exert supervision over the expedition, and it publicly affirmed the expedition's right to have a say in local practices. The event coincided with royal orders that all medical students had to take courses in the botanical school and that the head of the garden was in charge of administering the medical licensing examination. The next day saw the inaugural class session in botany.²⁷ The first group of students (which included José Mariano Mociño, who, as the star pupil, later ascended to leadership of the expedition) comprised young doctors eager to learn European science and, above all, to understand the practices and theories that had developed around the illustrious Linnaeus.

The garden's inauguration marked an important triumph for Sessé. He had initially petitioned to locate the garden and its botanical school near the viceregal palace and university, the centers of learning and political power in the heart of Mexico City. When his request for this venue got stuck in bureaucratic red tape, he began to worry that plans for the garden would grind to a halt unless he found an expedient alternative. He turned to a zone known as the Potrero de Atlampa (Atlampa Pasture), halfway between the central square (the Zócalo) and Chapultepec, at the edge of which a prominent architect named don Ignacio Castera offered to rent one of his homes. The large 56.25 hectare plot beside the new Salto del Agua fountain was located within easy access to the Royal Indian Hospital (Hospital Real de los Indios), which, Sessé suggested, might prove useful for clinical trials. Mexico City finalized the transfer of the proposed garden lot to the Crown in 1788 in time for the garden's official inauguration. The land was poor, but that did not worry Sessé. Only later did he learn that he had overestimated the ability of science to bend the site to its will.

In the meantime, he had to figure out how to make scientific research profitable. The Crown agreed to cover all of the expedition's salary and travel expenses but expected the garden and the school, like other royal institutions, to devise ways to become self-sustaining. Sessé felt confident that his efforts would benefit the Spanish empire in countless ways over the long term, but he had to figure out how to make scientific research profitable in the short term. Barring the discovery and rapid development of a wonder drug equal to Peru's cinchona (used to treat malaria), Sessé had to look for sources outside of science. The problem was that most forms of rent, from lottery to other fees and taxes that Sessé was able to imagine,

including even licensing fees for pharmacists, already were claimed by other agencies. Among these other claimants was the Mexican medical licensing board (*protomedicato*), which Sessé already was at odds with and did not wish to antagonize further. He even pursued a plan to build a bull-fighting ring to fund the garden, until he found himself unable to get the start-up capital and then discovered, in any case, that the receipts would generate inadequate revenue. He secured patronage from among the New Spanish elite, but this was not enough to cover more than a fraction of his expenses.²⁸

Though royal institutions were expected to become self-sustaining, Sessé convinced the Crown to support the garden while he continued his search for a secure form of funding. No one predicted at that time that the garden and school would remain permanent dependencies of the state treasury. While the scientists waited in vain for more funding, Cervantes set up a provisional garden of twenty thousand square yards surrounded by a picket fence in the patio of the school's temporary quarters, rented from don Ignacio Castera. They planted seeds imported from Europe and Nueva Granada (modern-day Colombia, Ecuador, Panama, and Venezuela) and, soon after, transplanted specimens that the botanists had begun to gather from the New Spanish countryside.²⁹

Anxious about finances, the Crown demanded a detailed estimate of what the garden would cost to run during that first year. Officials were shocked by the price tag and grew more so in August 1789 when Sessé presented plans for the permanent school and garden. The first set of site plans and elevations, now filed in the Archive of the Indies in Seville, was ambitious. It called for the construction of a grand new structure complete with a teaching hall, an herbarium, a natural history museum (*gabinete*), living quarters for Cervantes and the staff, and a research library open to the public, plus an enclosed teaching garden with colonnades and an elaborate irrigation system. Beyond this edifice lay the massive main garden, which was to be encircled by an irrigation ditch and a masonry wall and accessed by a bridge leading into the main gate. The grounds were to be divided into thirty-four beds, each almost as large as a city block. The recently refurbished Chapultepec aqueduct on the south end of the garden was to provide water, channeled through the canal around the perimeter and then into a grid of pipes that extended along paths throughout the garden. Water from the aqueduct was to be supplemented in the dry season by a large pond in the southwestern corner of the garden, and individual beds also would enjoy their own water reserves held in fountains. This was an expensive proposal. With no clear source of income other than royal funding,

which the Crown was loath to guarantee, Sessé and Cervantes had to figure out ways to scale back their plans.³⁰

These financial and bureaucratic difficulties, however, faded in the face of a more pressing dilemma. It turned out that seasonal flooding and poor drainage not only prevented students from attending class or working on their experiments but also rendered the entire Potrero de Atlampa unsuitable for gardening. The expedition and garden were supposed to organize the study and exploitation of natural resources while affirming man's domination over the natural world. They presupposed that modern science offered all the tools necessary to eliminate the peculiarity of place as a problem, and to discipline nature so that it would conform to Enlightenment schemes of abstract rationality. Nature presented unanticipated resistance.

As the rest of the expedition forged ahead with fieldwork, clinical trials of simples, training a new generation of Mexican doctors and pharmacists, and assembling an herbarium, the garden continued to suffer from flooding. Extended periods of submersion suffocated plant roots and rotted seeds that had been acquired at great expense from Spain, other parts of Latin America, and the far reaches of New Spain. It was with good reason that the common name for Atlampa was "El Sapo," an allusion to the frogs that enjoyed its soggy conditions. The flooding problem was compounded by the lack of the sandy loam that every gardener cherishes. Instead, the ground was heavy clay that remained so soggy after the water receded that people could not walk on it without their feet getting sucked under, much less till or plant it. When it finally dried, it turned hard as stone, until it flooded again.³¹

Confident that modern science must triumph over nature and frustrated at the loss of the seeds and plants, Cervantes desperately commissioned raised beds filled with hundreds of canoe loads of manure and high-quality soil from San Agustín de las Cuevas. When the raised beds failed to solve the problem, he commissioned two thousand flowerpots that he elevated atop racks, but these would not accommodate the trees that Sessé had begun sending to the garden from the countryside. In the meantime, Cervantes hired plowmen to prepare the large lot that he still hoped might serve as the main garden.³²

Try as he might, Cervantes and the site planner, Miguel Constanzó, could not bend the land to their will. Cervantes had expected to use the garden to propagate plants plucked from all across New Spain, whose ecological zones range from temperate forest to desert, from coastal to alpine, and from rainforest to chaparral. However, nothing but the hardiest of cultivars (which generally were useless for the expedition) could survive these

conditions. Cervantes and Sessé at last accepted failure and resolved that the only solution was to abandon the Potrero de Atlampa for higher ground.³³

During their search for a better location, Cervantes and Sessé eyed the site of Moctezuma's pre-Conquest garden on Chapultepec Hill. In 1784 the Viceroyalty of New Spain had begun construction of a sprawling structure on the old Aztec site. That building, today known as Chapultepec Castle, sat incomplete in 1790, with the government unable to finish it or find a private buyer. Sessé argued that the grounds surrounding the abandoned facility would serve as an ideal garden. The structure could be finished to fill the needs of the garden and the school, and the many levels of elevation and microclimates of Chapultepec would be ideal for cultivating the wide variety of plants gathered by the botanists during their fieldwork. The request fell on deaf ears.³⁴

Imperial Science over Mexican Nature

By 1790 the expedition had begun to earn a place within Mexico City society. Its members had initiated reform of the study and licensing of pharmacy, medicine, and surgery and already had identified hundreds of medicinally useful plants that needed to be further studied and propagated in the garden. But the garden stalled, stuck in the mud of Atlampa.³⁵ Thanks to clay pots, it had managed to grow many plants, some of which had even been transferred to Spain, but it had not yet managed to come into full physical form.

At last, in 1791, Cervantes and Sessé won an alternative space, not in the unfinished castle atop Chapultepec but in the even more highly prized viceregal palace on the Zócalo. Though the space was a fraction of the size of the Atlampa site and lacked the climatic advantages of Chapultepec, its location within the royal residence eliminated the overhead that would come from constructing or refurbishing and then maintaining a separate building, and the existing arcade could be converted into a greenhouse and into a series of teaching laboratories for medicine, surgery, and pharmacy. The patio could hold only one thousand species, but these would be sufficient for the school's needs, provided that they were supplemented with plants collected daily from the countryside and by shuttling plants and students back and forth between the viceregal palace and Chapultepec (which Sessé continued to propose as a site for extensive beds). The downtown location, moreover, allowed ready access to housing for staff and to teaching hospitals for Cervantes and the students. It also afforded public

prominence and an opportunity to edify the subjects of Spain's Enlightened absolutism.

By bringing the garden into the center of colonial authority in New Spain, the expedition, the viceroy, and the Crown expected that the union of absolutist politics and Enlightenment science could overcome the obstacles set forth by nature so that they could get on with the business of reorganizing space, knowledge, and power. As it turns out, the new site did not solve their problems. The structures could be remodeled to meet the school's teaching and research needs, but the land presented a more daunting challenge.³⁶

The soil was an accumulation of clay mixed with rubble from old Aztec temples. Scarred by his battle against Atlampa, Cervantes insisted to the viceroy that altering the height of the beds or refilling them with better soil would not be enough: the entire site had to be excavated to a depth of one meter so that the clay and rubble could be discarded and replaced with fertile, well-draining soil from Tlalpan.³⁷

The garden, like the broader expedition of which it was part, sought to erase the indigenous foundations upon which it was built. By harnessing Enlightenment science to imperial power, Cervantes literally and metaphorically sought to replace the historical accumulation with fertile soil amenable to the appropriation, reorganization, and propagation of Mexican nature. This massive earthmoving was accomplished by Indian laborers working under the supervision of head gardener Jacinto López—who, like Cervantes, had trained at the Royal Botanical Garden in Madrid, where he then worked for fourteen years before coming to Mexico. They removed the clay and rubble with canoes floating in the Aztec canals that still served at that time as Mexico City's roads.³⁸

The earthmoving project was not as visually striking or awe-inspiring as the terraces of Versailles or the massive glass greenhouses of Kew or Madrid, but it was no less an achievement. It called for hundreds of canoe loads of good-quality soil; production of large quantities of locally manufactured bricks, tiles, lime, and tools; and a massive procurement of native labor.³⁹ Whereas the garden of Versailles made the visitor acutely aware of the engineering feats that made possible the transformation of the land, the Mexican garden minimized outward evidence of the effort. The power to eliminate this evidence while making invisible the indigenous knowledge from which it derived was, in fact, central to the garden's Enlightenment mission.

Cervantes and Sessé traded visual awe for a studied admiration for the ability of men of science, backed by the Crown and New Spanish supporters, to make the land look pretty much as it did before but to have it be

“better” than it was before. That, after all, was what they hoped to do with New Spain: keep it looking as it did, growing what it grew, and producing what it produced, but to do so “better,” under scientific supervision, and for the benefit of the empire. And they hoped to do so in a central location where they could concentrate products from the vast, diverse spaces of New Spain into one centralized hub, whose organization appeared as though it were subject only to the abstract rule of Enlightenment rationality.

The Imagined Community of Plants

Unlike European gardens, the Mexican Royal Botanical Garden did not re-create the dominated territory in cartographic miniature. Nonetheless, it did demonstrate the capacity of centralized scientific authority to know, control, and reorganize the natural resources within its dominion. It then put this capacity on display at the doorstep of the viceroy, thereby affirming the Crown's prerogative, and capacity, to use Enlightenment rationality to claim and exploit the resources of its domain.

Shortly after moving to the viceregal palace, the expedition finally gained the right to claim part of Chapultepec Hill for garden beds. In practice, the two parts of the garden, one in the downtown viceregal palace and the other atop Chapultepec Hill, worked in tandem. As Sessé explained, the beds in Chapultepec grew “the plants from across the diverse climes of this America” while the viceregal site offered students and teachers a space for research and pedagogy, and to the public it offered “the Capital its most beautiful spectacle, visible from its principal square.”⁴⁰

Sessé also insisted that the Mexican Royal Botanical Garden in the viceregal palace serve as a public and pedagogical space, which “gente decente” could enter; others would be able to admire its collection from beyond a short barrier. More broadly, the garden was to model how to bring the urbanity idealized by Hispanic culture together with the rural space that constituted most of New Spain. Order could be imposed upon the unruly city by importing nature from the countryside, but only after that nature had been domesticated and rationally regimented by Enlightenment science and centralizing political absolutism. By bringing nature into the city in an organized manner, therefore, the garden could serve as a model for how to organize space within the city, as well as a model for how to tend nature beyond the city, treating the expanse of New Spain as a massive garden that could be subjected to top-down regimentation.

Their struggles with the soil in Atlampa and then on the Zócalo had forced the viceroy and the members of the expedition to accept certain limitations regarding the power of modern science to obliterate the importance of place, space, and soil. The Crown, however, would have none of it. In 1792, after Sessé and Cervantes had relocated the garden from Atlampa to the hills of Chapultepec and the downtown viceregal palace, the king's minister fired off an irate missive excoriating the members of the expedition for failing to bend the Potrero de Atlampa to their will and impugning the abilities and integrity of Sessé, Cervantes, and even Constanzó. He ordered them to move the garden back to the Potrero de Atlampa and make it work.

Sessé responded with an extended review of the Chapultepec site, examining its woods, ditches, and slopes and its ready access to water, with which to naturalize plants from such diverse climes as deserts, forests, marshes, and alpine regions, as well as those imported from Africa and Europe. All this would be impossible in Atlampa but could be accomplished in Chapultepec, he explained, while avoiding the high cost of irrigation. To make his case as forcefully as possible he reminded the minister that only by cultivating this wide variety of species could the garden find ways to propagate and exploit the medical and commercial potential of New Spanish plants for the benefit of the empire.⁴¹ In the end, Sessé prevailed through a deft combination of argument, obstinacy, and mobilization of alliances in Madrid and Mexico City.

The layout of the garden, first in Atlampa and then in the viceregal palace and Chapultepec, suggests a union of symbolism and practicality even as Sessé and Cervantes learned to adapt their methods to the limitations of nature. This was designed to be a working garden, every aspect of whose design speaks to the practice of science and to the study, centralization, organization, and transfer of New Spain's natural products. Because of this, the garden's plan resembled a nursery except that, rather than growing seedlings to be transferred elsewhere for maturation, as does a nursery, it propagated frames of understanding so as to nurture *new knowledge*. The frames of understanding, meantime, were to be imported from the metropolis into New Spain by way of the garden and the school so that they might take root and prosper in colonized soil. These new frames of understanding were to be used in pursuit of new knowledge that then could be transplanted from New Spain to the metropolis, where it might be cultivated to full maturity through its incorporation into European science.

The garden reduced New Spain to a collection of individual plants that could be moved, sorted, and otherwise traded, observed, or manipulated

in isolation from their local places of origin. Yet it also bestowed two commonalities upon the plants that moved through its beds. First, they all possessed potential economic and scientific value that could serve both the colony centered in Mexico City and the empire based in Madrid. Second, except for the handful of plants explicitly treated as imports, they all came from somewhere within the territory claimed by New Spain. Consistent with this, as it collected the plants for the garden from across the colony, the expedition did not concern itself with their potential value to local people. Nor did it record the exact location where they were collected or concern itself about the range of particular plants. All that mattered was that they had potential economic and scientific value, and that they came from New Spain.

From Empire to Republic

Whereas the garden initially had been thrust upon the colony by the Crown, it ceased to be viewed as an imperial imposition by the end of the century. Many of the scientists and doctors trained within its walls (it trained between ten and seventy-eight per term) had risen to positions of authority within the colony by the time of the independence wars (1810–21). Creole patriots, rather than rejecting the garden along with other imperial institutions, incorporated it into their own modernizing vision for Mexico. This support was evident in 1800 when the new viceroy tried to cut the Crown's costs by forcing Cervantes and López back to Spain on the grounds that they already had exceeded their original six-year contract.⁴² A decade earlier, such a plan might have won the consent of the Mexican establishment, but by 1800 Cervantes had become sufficiently embedded within local society that locals backed him, rather than the viceroy, and he was allowed to stay provisionally and, after 1803, permanently.

Sessé returned to Madrid in 1803 to present the expedition's findings but made clear that he, too, planned to return to Mexico to serve as the permanent director of the garden, with Cervantes as the *catedrático* of the school and López as the head gardener. The commitment to Mexico on the part of Cervantes and Sessé likely owes as much to personal circumstances as to a dedication to the garden and the school. Cervantes's lucrative pharmaceutical business and his work as an esteemed researcher and physician at the San Andrés teaching hospital afforded him wealth and prestige that would have been difficult to reproduce in or transfer to Spain. He also had a family in Mexico. Sessé, similarly, benefited economically

from a lucrative medical practice in New Spain and had married into a Mexican family. His wife, María Guadalupe Morales, and two children, Alexandro and Martina, along with his wife's sister Josefa Morales, joined him on his return to Spain, and they all anticipated a return to Mexico. As it turned out, Sessé died in Spain before he could present his findings. His Creole protégé José Mariano Mociño succeeded him as head of the expedition while winning fame in Europe as a professor and then vice president of Spain's prestigious Royal Academy of Medicine in Madrid and director of the Royal Museum of Natural History (Real Gabinete de Historia Natural).⁴³

The garden and school in Mexico, meanwhile, entered into a productive routine. Now that the Linnaean methodology was firmly established in the colony, Cervantes could comfortably delegate intellectual reproduction to his Creole protégés, whom he invited back to the school to help teach the next generation of Mexican scientists and doctors. Together they cured the sick and expounded upon the virtues of the rubber tree, the *árbol de las manitas* (hand tree), and the many other plants described and illustrated by the expedition and at that time under cultivation in the garden.⁴⁴

When the celebrated German naturalist Alexander von Humboldt visited in 1803, he was appalled at Mexico's social inequalities but stood in admiration of the scientific accomplishment of this colonial capital. "No city of the new continent, without even excepting those of the United States," he wrote, "can display such great and solid scientific establishments as the capital of Mexico." He pointed particularly to the School of Mines, the Mexican Royal Botanical Garden, and the Academy of Painting and Sculpture. He praised Cervantes, Sessé, and Mociño, along with the Creole botanical illustrator Atanasio Echeverría, "whose works will bear a comparison with the most perfect productions of the kind in Europe." Humboldt estimated that, on account of their efforts, the "new philosophies" of botany and chemistry were embraced more in Mexico than in much of Spain.⁴⁵

The uprising that Miguel Hidalgo announced with his September 1810 *Grito de Dolores*, along with Napoleon's invasion of the Iberian peninsula, growing Creole discontent with the Bourbon reforms, and the development of a grassroots popular movement, set off the chain of events that culminated in Mexican independence. More irksome to Cervantes than the general impact of the war and the occasional mistreatment that his workers and students suffered during their collecting expeditions was the callous treatment he and the garden received from Spanish government officials and the troops that commandeered his space, dismantled many of the garden's structures, destroyed the irrigation system and beds, and uncaringly trampled to death the plants that had been acquired with such difficulty.⁴⁶

To these setbacks was added the death of López in 1813 during a wartime epidemic and the Spanish government's reluctance to authorize a replacement. With no head gardener, the laborers had little supervision and the garden lost hundreds more "interesting plants that were vital to the lessons" in botany, medicine, and surgery.⁴⁷

Cervantes's relationship with the Spanish forces deteriorated further when a military official named Velasco tried to strip him and the garden of their functions. Velasco readily admitted that Spanish troops had severely damaged the garden and destroyed its "choice plants." But rather than make amends, he argued that on account of this damage and of the garden's inability even to "provide the medicinal herbs most frequently necessary for the public," it no longer merited the rank of "botanical garden" and was not worth its expense. Moreover, given the need to mobilize against the rebels, the government could no longer afford the luxury of scientific research. By his estimation, the students who daily drained resources through their studies at the garden and its school would better serve the empire by joining the army and fighting in the front lines. He proposed that Cervantes, who already had exceeded his initial six-year commission, should be replaced by a certain Diego Martín, who could fill his role at 16 percent of Cervantes's current salary.⁴⁸

Outraged, Cervantes retorted that even Napoleon, during his aggression against Spain, had seen fit to continue to fund science and learning, yet the Spanish Crown was proving unwilling to do so. He refuted Velasco's presumption that the garden was nothing more than a source for medicinal herbs. It was not some dispensary but a center of scientific learning and research. Though its collections had suffered at the hands of the Spanish troops, it still contained seven hundred species that, together with two hundred to three hundred plants brought in routinely from the countryside by assistants, enabled the sixteen to twenty students to conduct botanical and chemical research while studying medicine, pharmacy, and surgery, thus providing a benefit to society that he insisted was no less valuable than service in the battlefield. Cervantes personally chafed at Velasco's suggestion that his role as catedrático of the school and garden could be filled by Diego Martín, whom Cervantes insisted was but a poor, illiterate Indian who knew only enough to grow chiles, tomatoes, garlic, and onions on his chinampa. Cervantes convinced the *fiscal* to reject Velasco's proposal but, in exchange, accepted further cuts to his already strained budget.⁴⁹

In 1817 the garden began to show signs of recovery. Students and workers resumed their collecting and research expeditions, and Cervantes even managed to coordinate a complicated exchange of live plants with agents

in Havana, Cuba. The following year, he finally secured a successor for López. The new head gardener was the Italian Juan Lazari, who previously had headed the private garden of don Manuel Tolsá, the recently deceased head of Mexico City's famous institute for art, the Academy of San Carlos, where the expedition's botanical illustrators had studied.

By June 1821, just months before the August 1821 conclusion of the conflict, Cervantes, who by this time had managed to set the garden on the road to recovery, already had ceased referring to the garden as the Royal Botanical Garden, preferring to call it simply the Botanical Garden. The documents do not reveal whether this was because Cervantes pragmatically responded to a shift in the political tide or whether it was because the royal forces had alienated him with their disregard for his scientific endeavors (or, more conjecturally, that his treatment by Spanish forces was the result of sympathies Cervantes may have had for the rebels). Whatever may have prompted the subtle name change, Cervantes had tilted in favor of local society and perhaps even the republic.⁵⁰

When Mexico gained independence in 1821, the new government expelled most agents of the Spanish Crown, including Vicente Cervantes's colleague Fausto de Elhuyar, head of the Mexican School of Mines. Cervantes, by contrast, was invited to stay. He escaped the general anti-Spanish sentiments of the independence era because of his services to the common good of Mexicans. Moreover, despite the economic and political crises it faced, the postindependence government continued to fund his scientific and educational work almost until his death on July 26, 1829, and to support the garden until the middle of the century.⁵¹ The new state, with its ambition to assert dominion over the territory previously defined as New Spain, seems to have recognized the utility of the garden for claiming and ordering natural resources from across the new republic and placing these resources at the real and symbolic disposal of central authorities.

During Spanish imperial rule, the garden had devoted its energies to gathering in Mexico City knowledge and natural resources from across New Spain, claiming plants through the authority of the central government, and studying these in pursuit of "pure science." This trend became more pronounced after Sessé's and Mociño's departure in 1803 and continued under the independent republic.

The garden suffered the postindependence economic downturn along with other state institutions but soon found a champion in Lucas Alamán (1792–1853), the conservative Mexican politician, scientist, and former student of Cervantes.⁵² Together, Cervantes and Alamán drafted plans to reestablish the declining garden on firmer footings and to combine it with a

museum of Mexican antiquities and natural history. They aspired to create an institution that would "rival or surpass establishments of [their] kind in Europe." After the fall of Agustín de Iturbide's brief Mexican empire (May 1822–March 1823), they won state approval to move the garden to the cemetery of the Hospital de los Indios (two blocks south of the modern-day Palacio de Bellas Artes) and even began the removal of the buried bodies and demolition of the chapels and walls as well as work on an irrigation system, quarters for workers, paths for public viewing, and amendment of the soil.

One of their most intriguing objectives was to compile an encyclopedic collection of seeds from all Mexican plants. This move from the imperial practice of sampling New Spanish plants for medicinal and imperial uses to the nationalist goal of assembling a comprehensive collection of native plants, however unattainable, points to a new way of bestowing Mexican citizenship upon the natural world. It meant claiming all of nature, rather than select products, as a national resource, and it used plants to define the extension of the imagined community and as validation of the new state's territorial claims.

Plans to move the garden's operations from the presidential palace to the hospital stalled, and the goal of creating a microcosm of Mexico's native plants never got past the planning stage. Nevertheless, initiatives continued to emanate from the cadre Cervantes had trained. By 1831, the combined botanical garden and museum of antiquities and natural history, along with its school of botany, was under the charge of Cervantes's successor and former student, Miguel Bustamante, a native of Guanajuato. A congressional decree of that year ordered Bustamante and the heads of Mexico City's other scientific organizations to form themselves into a council to promote scientific development and advise the government.⁵³ This council persisted, working through the Colegio de Minería, at least into the 1850s, when the combined botanical garden and museum of natural history and antiquities was headed by the botanists and zoologist Pío Bustamante, whose father, Benigno Bustamante y Septién of Querétaro, had been a student of Cervantes.

Through its continued patronage of the garden and the school, the independent government defined itself in terms of its commitment to science and rationality as it laid the foundations for a new order. The garden that had been created to serve the needs of empire now offered its services to the new elite, who used it to assert dominion over the spaces and resources claimed by the state. To the end of his days, Cervantes continued to emphasize the study of plants and nature as "pure" botanical science and never

made any mention of agriculture or the other practical uses beyond medicine.⁵⁴ As such, the garden, from the time of its founding until the mid-nineteenth century, served abstract principles related to empire and then nationhood rather than providing technical services for the new economic elite to engage in export-led monocrop agriculture, as happened in other Latin American countries.

No doubt to Cervantes's postmortem chagrin, the survival of the gardens after midcentury in the presidential palace and on Chapultepec Hill came to rest upon their conversion into pleasure grounds for the rulers of the state and as symbols, rather than tools, of scientific modernity. Under Emperor Maximilian during the French Intervention (1864–67), the space on Chapultepec Hill completed its transition into a pleasure garden, and it continued as such under the rule of Porfirio Díaz (1876–80, 1884–1911). The main garden in the presidential palace remained in operation until the 1940s but never regained its scientific purpose or stature. In the 1880s the Department of Development revived the scientific objectives of the defunct botanical garden. Not content merely to pick up where the garden had left off, the Department of Development placed its resources, including its acceleration of research and plant exchanges, at the disposal of private enterprise, applied agricultural science, and forest management.

Conclusions: Imperial Science and the Nation's Nature

The turmoil in Spain unleashed by Napoleon's invasion contributed to the death of Mociño. In cruel irony, the expedition's botanical illustrations met the same fate as had Hernández's when, after Mociño's unanticipated death, they became lost. The expedition's manuscripts, meantime, sank into relative obscurity until they were recovered in the 1880s by the Mexican government under Porfirio Díaz. Though the Mexican government lacked Sessé's and Mociño's images, it brought their text to light in a celebrated 1887 publication.⁵⁵ Díaz's advisors, known as *científicos* on account of their exuberant faith in the transformative power of science and political order, embraced a nationalist push for top-down modernity. Similar to the way Spanish officials of the eighteenth century had looked to Hernández's sixteenth-century manuscripts as they sought to modernize the empire and claim a space for Spain within the Enlightenment, Porfirian reformers of the nineteenth century looked to the eighteenth-century Royal Botanical Expedition as a guide

for their effort to modernize and claim a place for Mexico within the global economic, industrial, and scientific revolutions of their own day.

During this era when modernity was being imported from the United States and Europe and nationalists became anxious about foreigners' claims to Mexico's natural resources, the Porfirian government's celebration of Sessé's and Mociño's manuscripts established patrimonial claims to the diverse products of nature that occurred on Mexican soil. The state was particularly interested in those plants whose economic value might be unlocked and exploited through science and top-down management and those that, following the precedent set by Alamán's use of the expedition, could be exploited as nativist symbols.

Part of the appeal of the expedition went beyond the information found in its texts. To Porfirian *científicos*, much of the expedition's appeal came from the manner in which it had used science to enshrine hierarchies of knowledge, of social rank, and of unequal access to the products of nature. In this regard, the *científicos* also found a use for the expedition's practice of rendering these resources "alien" to the very people who were most intimately familiar with them by renaming plants and removing them from their local cultural contexts, devaluing alternative ways of knowing nature, and challenging local communities' claims to what elites now declared as "national" resources.

The Porfirian revival of interest in Mexico's native flora, and in the systematic transfer of control over this flora to elites, was derailed by the Revolution of 1910. Nationalist botany was picked up again in the 1930s, but this time with populist objectives as botanists, searching for new natural resources to exploit for the good of the public, rummaged through the expedition's surviving herbarium samples.⁵⁶ In 1981 the Hunt Institute in Pittsburgh quietly placed a winning bid on two thousand botanical illustrations from Barcelona that turned out to be the long-lost illustrations from the Sessé and Mociño Royal Botanical Expedition to New Spain. Since that time there has been a renaissance of international interest in Mexican botany, a reshuffling of scientific names, and discovery of many new plants, along with growing tensions among peasants, nationalists, and transnational pharmaceutical and agricultural companies. This has raised the stakes in relation to the question of whether Mexico can lay intellectual claim to its botanical resources. Across this multilayered history, there has been a consistent view of Mexican nature as a massive working garden that elites have sought to control and exploit but upon which competing levels of society, and now transnational corporations, each continue to assert their own claims.

Notes

1. Chandra Mukerji, *Territorial Ambitions and the Gardens of Versailles* (New York: Cambridge University Press, 1997); Richard Drayton, *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World* (New Haven, Conn.: Yale University Press, 2000); F. J. Puerto Sarmiento and A. González Bueno, "Política científica y expediciones botánicas en el program colonial español ilustrado," in *Mundialización de la ciencia y cultura nacional*, ed. A. Lafuente, A. Elena, and M. L. Ortega, 331–39 (Madrid: Doce Calles, 1993); and Keith Thomas, *Man and the Natural World: Changing Attitudes in England, 1500–1800* (New York: Oxford University Press, 1983).
2. In my forthcoming book I discuss the rich literature on science in Spain and the New World, and about the botanical expedition in particular. Because of space limitations, this chapter narrowly limits citations to the most relevant texts.
3. Cervantes, quoted in Roberto Moreno, ed., *Linneo en México: Las controversias sobre el sistema binario sexual, 1788–1798* (Mexico City: UNAM, 1989), xiii.
4. King Philip II, Instructions to Dr. Francisco Hernández, 11 January 1570, in *The Mexican Treasury: The Writings of Dr. Francisco Hernández*, ed. Simon Varey, trans. Rafael Chabrán, Cynthia L. Chamberlin, and Simon Varey (Stanford: Stanford University Press, 2000) (hereafter *MT*), 46–47; Jesús Bustamante, "The Natural History of New Spain," in *MT*, 34–36. Hernández drew on them for his separate study of the antiquities of New Spain; see *MT*, 65.
5. Francisco Hernández to King Philip II, November/December 1571; and Hernández to King Philip II, 30 April 1572, in *MT*, 48–50.
6. Hernández, "The Antiquities of New Spain," in *MT*, 72 and 77.
7. Hernández, *Antigüedades de la Nueva España*, quoted in Bustamante, "Natural History," 36.
8. Xavier Lozoya, *Plantas y luces en México: La expedición científica a Nueva España (1787–1803)* (Barcelona: Serbal, 1984), 11–12; Bernardo Ortíz Montellano, *Aztec Medicine, Health, and Nutrition* (New Brunswick, N.J.: Rutgers University Press, 1990), 25–26; Rafael Chabrán and Simon Varey, "The Hernández Texts," in *MT*, 3.
9. Though James Scott locates the transition from "nature" to "natural resources" within Europe, evidence from Mexico suggests that the demystification and atomization of the parts of nature, and the resulting reduction of it from a whole into a collection of economically exploitable parts, advanced more rapidly in the colonies. James Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, Conn.: Yale University Press, 1998), 13.
10. Londa Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World* (Cambridge, Mass.: Harvard University Press, 2004), 195–223.
11. The most important was the work of the Italian Nardo Antonio Recchi, which appeared in 1615 in Mexico and subsequently in 1651 in Rome. In Europe, leading works that drew upon Hernández's work, usually indirectly through Recchi, included Fabio Colonna's *Minus cognitarum stirpium* (1616), Johannes Faber of Bamberg's *Animalia Mexicana descriptionibus scholisque exposita* (1628), Robert Lovell's *Pambotanologia* (1659), Henry Stubb's *The Indian Nectar* (1662), John Ray's *Historia plantarum* (1686), Hans Sloane's *Natural History of Jamaica* (1701–25), and James Newton's *Enchyridion* (1752, written c. 1689). In Mexico, other drafts of Hernández's work—drafts that no longer exist—were reproduced in all or in part in such works as Gregorio

- López's *El tesoro de medicinas* (written in the 1580s and published in 1727), Juan Barrios, *Verdadera medicina, cirugía, y astrología* (published in 1607), and Francisco Ximénez's *Quatro Libros: De la naturaleza, y virtudes de las plantas, y animales* (published in 1615). See Chabrán and Varey, "Hernández Texts," in *MT*, xvii–xix and 6–9; and David Freedberg, "The Doctor's Dilemmas," in *The Eye of the Lynx* (Chicago: University of Chicago Press, 2002), 275–304.
12. Quoted in Schiebinger, *Plants and Empire*, 7–8.
 13. Bustamante, "Natural History," 26.
 14. Numerous studies have traced out the early details of his personal and professional life. See, for example, José Maldonado Polo, "La Expedición Botánica a Nueva España, 1786–1803: El Jardín Botánico y la Cátedra de Botánica," *Historia Mexicana* 50, no. 1 (July–September 2000): 5–56, esp. 13–15; and Harold William Rickett, "The Royal Botanical Expedition to New Spain (1788–1820) as described in documents at the AGN (Mexico)," *Chronica Botanica* (Waltham, Mass.: Chronica Botanica Company, 1947), 2:6.
 15. 23 November 1787, folio 323, vol. 138, Reales Cédulas, Archivo General de la Nación, Mexico City (hereafter AGN). My thanks to Rachel Meketon and Chris Wisniewski for their help managing the documents.
 16. Sessé, "Expediente sobre los efectos de las plantas medicinales en los enfermos de Hospital San Andres," Mexico, 1800, WMS.Amer.44, Microfilm #F2634, Wellcome Library, London (hereafter WL).
 17. Antonio González Bueno, "Scientific Knowledge and Power in the Illustrated Spain: Toward the Commercial Supremacy through the Medicinal Botany," *Antilia* 1, no. 2 (1995), <http://www.ucm.es/info/antilia/revista/vol1-en/arten1-2.htm>; and R. Rodríguez Nozal, "La Oficina Botánica (1788–1835): Una institución dedicada al estudio de la flora americana," *Asclepio* 47, no. 2 (1995): 169–83.
 18. José García Ramos, "Elogio histórico del farmacéutico Don Vicente Cervantes, Catedrático que fue de la Botánica," *Boletín de la Sociedad de Geografía y Estadística de la República Mexicana*, 2nd series, vol. 1 (1869): 753–65; and Rickett, "Royal Botanical Expedition," 7.
 19. King Philip II, Instructions to Dr. Francisco Hernández, 11 January 1570, in *MT*, 46–47.
 20. Sessé, "Experiencias clinicas y terapeuticas de la Real Expedicion Botanica a la Nueva-España," Mexico, 1802, WMS.Amer.43, Microfilm #F2633, WL. Also see Sessé to Gómez Ortega, draft of a letter, 3 July 1785, V, 1, 1, 3; and "Relación de plantas enviadas al Real Jardín Botánico de Madrid," 1788–1791, V, 2, 6, 2, Archivo Histórico del Real Jardín Botánico, Madrid, Spain (hereafter RJB).
 21. Sessé, "Experiencias clinicas."
 22. *Ibid.* For documents related to the debates over the value of the Nahuatl system, see Moreno, *Linneo en México*. On Alzate and the protonationalist debate over Creole expertise, see Moreno, *Linneo en México*; and Jorge Cañizares-Esguerra, "Postcolonialism *avante la lettre?* Travelers and Clerics in Eighteenth-Century Colonial Spanish America," in *After Spanish Rule: Postcolonial Predicaments of the Americas*, ed. Mark Thumer and Andrés Guerrero, 89–110 (Durham, N.C.: Duke University Press, 2003).
 23. Sessé, "Experiencias clinicas."
 24. On improvement as a justification for European imperialism, see Drayton, *Nature's Government*.

25. 23 November 1787, folio 323, vol. 138, Reales Cédulas, AGN; Juan Carlos Arias Divito, *Las expediciones científicas españolas durante el siglo XVIII* (Madrid: Ediciones Cultura Hispánica, 1968), 67; Letter, 26 April 1788, in *ibid.*, 72.
26. Ricardo Ramírez, introduction to *Flora Mexicana*, 2nd ed., by Martín Sessé y Lacasta and Joseph Mariano Mociño (Mexico City: Secretaría de Fomento, 1894), v; Rickett, "Royal Botanical Expedition," 5; and Ramos, "Elogio histórico," 758–59.
27. Ramírez, introduction to *Flora Mexicana*, v; and Patricia Aceves, "La difusión de la química de Lavoisier en el real Jardín Botánico de México y en el Real Seminario de Minería (1788–1810)," *Quiipu* 7, no. 1 (January–February 1990): 5–35.
28. Rickett, "Royal Botanical Expedition," 9–10.
29. *Ibid.*, 9–11; and Arias Divito, *Las expediciones*, 90–91.
30. Annotated site plan, "Mexico City—Botanical Garden," p. 1, microfilmed documents, William L. Clements Library, University of Michigan (hereafter WCL), "Plano del edificio del Jardín Botánico que se proyectaba hacer en México," "Plano del Terreno destinado para Jardín Botánico," "Fachada principal que mira á oriente y corte que mira al mediodía á lo largo del edificio sobre la línea a.b.," and "Plano, elevación y perfil de una casa para habitación del Catedrático de Botánica, que debe construirse en el terreno destinado para el jardín botánico de esta Capital de Nueva España," MP-MEXICO, 416, 417, 418, and 419, Archivo General de las Indias, Seville, Spain (hereafter AGI); D. Ignacio Castera, "Plano iconográfico de la ciudad de México," 1794, G414.M6 1794.A3, Vault, Geography and Map Division, Library of Congress, Washington, D.C.; Rickett, "Royal Botanical Expedition," 9–12; Arias Divito, *Las expediciones*, 93–96.
31. The loss of these plants and seeds was a major blow and would take five years and much effort and cost to replace. On the effort that went into acquiring the seeds, see Sessé to Gómez Ortega, 26 April 1786 and 28 October 1787, V, 1, 1, 7 and 12, RJB.
32. Rickett, "Royal Botanical Expedition," 13–14.
33. *Ibid.*, 13–16.
34. Folders 69–70, vol. 464, Historia, AGN; Rickett, "Royal Botanical Expedition," 16.
35. Sessé to Pedro Acuña y Malvar, Ministro de Gracia y Justicia, 9 January 1794, V, 1, 4, 30, RJB.
36. Ramos, "Elogio histórico," 761; Rickett, "Royal Botanical Expedition," 16; Vicente Cervantes to Viceroy Revillagigedo, 1 October 1791, pp. 1–8, folder 8, vol. 464, Historia, AGN.
37. Vicente Cervantes to Viceroy Revillagigedo, 1 October 1791, pp. 1–8, folder 8, vol. 464, Historia, AGN.
38. *Ibid.*; Bonilla to Viceroy Revillagigedo, 28 January and 25 February 1791, pp. 1–2, folder III, vol. 464, Historia, AGN; illegible name to Viceroy Revillagigedo, 31 December 1790, p. 3, folder III, vol. 464, Historia, AGN; Rickett, "Royal Botanical Expedition," 16 and 58; illegible name to Viceroy Félix Berenguer de Marquina, 6 April 1801, folder III, vol. 464, Historia, AGN; Sessé to Viceroy Félix Berenguer de Marquina, folder III, vol. 464, Historia, AGN; and illegible name to Viceroy Félix Berenguer de Marquina, 16 January 1803, folder III, vol. 464, Historia, AGN.
39. Mascarós to Viceroy Revillagigedo, 2 October 1791, folder 8, vol. 464, Historia, AGN.
40. Sessé quoted in Rickett, "Royal Botanical Expedition," 19.
41. *Ibid.*, 18.

42. *Ibid.*, 59.
43. *Ibid.*, 66; "María Guadalupe Morales," Arribadas, 441, N.305, AGI; Miguel A. Puig-Samper and Sandra Rebok, "El reconocimiento oficial de Alexander von Humboldt en España," *Humboldt im Netz: International Review for Humboldtian Studies* 5, no. 8 (2004): 1–13.
44. Ramos, "Elogio histórico," 761.
45. Alexander von Humboldt, *Political Essay on the Kingdom of New Spain*, trans. John Black (London: Longman, Hurst, Rees, Orme, and Brown, 1811), 1:134–217.
46. Cervantes to Viceroy Francisco Javier Venegas de Saavedra, 2 April 1811, folder 8, vol. 462, Historia, AGN; Rickett, "Royal Botanical Expedition," 57 and 67.
47. Cervantes quoted in Rickett, "Royal Botanical Expedition," 67.
48. Velasco quoted and translated in *ibid.*, 68.
49. *Ibid.*
50. Various, April 1818–July 1818, folder 17, vol. 466, Historia, AGN; Rickett, "Royal Botanical Expedition," 69; and Cervantes to unknown, 14 June 1821; Cervantes to unknown, 16 June 1821; Secretary of the Viceroy, 1821; Jose Maldonado to unknown, 21 June 1820; Mariano Lopes to unknown, 18 September 1820; and various, folders 31–32, vol. 466, Historia, AGN.
51. Ramos, "Elogio histórico," 753–76; "Expedición al Virreinato de Nueva España, Tras las huellas de F. Hernández," *Historia del botánico, Real Jardín Botánico*, http://www.rjb.csic.es/historia_nuevaespana.php.
52. Lucas Alamán, "Épocas de los principales sucesos de mi vida," 28 August 1843, series I, box 1, exp. 236, p. 5, Lucas Alamán Papers, 1598–1853, Benson Latin American Collection, University of Texas Libraries, University of Texas at Austin; William Bullock, *Six Months Residence and Travels in Mexico; Containing Remarks on the Present State of New Spain* (London: Murray, 1825), 183–86.
53. Lizardi, report, caja 10, exp. 2, 1821; Cervantes to exmo. Señor, 27 August 1823, caja 49, exp. 16/1, 1823; correspondence of Lucas Alamán, various, 1823–29; congressional decree, 21 November 1831, caja 411, exp. 1; all from Gobernación "sin sección," AGN, Mexico City. Thanks to Eric Van Young for directing me to the correspondence of Lucas Alamán. On Bustamante, see caja 118, exp. 6–9, 1829, Gobernación "sin sección," AGN, Mexico City; and Nicolás León, *Botánico-México: Catálogo, biográfico y crítico de autores y escritos referentes a vegetales de México y sus aplicaciones desde la conquista hasta el presente* (Mexico City: Secretaría de Fomento, 1895), 78. On the location of the Hospital de los Indios (Naturales), see Andrés Romero-Huesca and Julio Ramírez Bolla, "La atención médica en el Hospital Real de Naturales," *Cirugía y cirujanos* 7, no. 6 (November–December 2003): 496–505, esp. 497.
54. Rickett, "Royal Botanical Expedition," 61.
55. Martín Sessé y Lacasta and Joseph Mariano Mociño, *Plantae Novae Hispaniae* (Mexico City: Escalante, 1887); and Martín Sessé y Lacasta and Joseph Mariano Mociño, *Flora Mexicana* (Mexico City: I Escalante, 1887).
56. In this regard, it is similar to the shift that McCook has identified between late nineteenth-century practice and that of the populist 1930s in the Spanish Caribbean. Stuart McCook, *States of Nature: Science, Agriculture, and Environment in the Spanish Caribbean, 1760–1940* (Austin: University of Texas Press, 2002).