CHAPTER 1

Chivalric Espistemology and Patriotic Narratives
Iberian Colonial Science

Of all the modern European powers, Spain and Portugal have by far the longest colonial record, beginning in the fourteenth century with the settlement of the Canary Islands and ending in the late twentieth century with the protracted processes of decolonization of Angola, Macao, East Timor, and the Spanish Sahara. Yet despite this record, our knowledge of the role of science and technology in the making, spread, and survival of these colonial empires is spotty and limited.[1] Spanish historians, in particular, have shed light on the history of cartography, metallurgy, and natural history in Spanish America in the sixteenth and eighteenth centuries.[2] Beyond these two centuries and this region, however, we know little of Iberian colonial science and technology. Within Spanish America itself, our knowledge of the history of the colonial science of the seventeenth and nineteenth centuries is sketchy and blurry, to say the least. The so-called decline of Spain has made historians of science focus mostly on the sixteenth-century apogee of the empire and its eighteenth-century Bourbon revival, to the detriment of the long seventeenth century, which was allegedly characterized by forms of decadent, baroque scholarship. The nineteenth century, too, has been marginalized, largely owing to the fact that Spain lost most of its colonial territories in the New World in the 1820s.[3] But nineteenth-century Spain continued to be a formidable empire, with far-flung colonies in America, Africa, and the Pacific. Cuba and Puerto Rico remained central to the economy and politics of metropolitan Spain.[4]

The gaps in our knowledge are considerable, even in areas that have attracted substantial attention, as in the case of the history of botany and empire. The collection of plants to secure new monopolies and trade was accomplished by at least four means: metropolitan expeditions, the patriotic impulse of provincial clerical elites within the composite monarchy that was the empire, the private initiative of entrepreneurial settlers and merchants, and coordinated regional, and even continental, campaigns to gather information using the empire's bureaucracies and the vast network of municipal

authorities (the *relaciones geográficas*). Our knowledge of each of these activities and institutions varies considerably.

The scholarship on the botanical expedition in Mexico of the royal physician Francisco Hernández (1517–87), for example, is vast.[5] At a time when Europeans had inherited from Dioscorides, Theophrastus, and Arab naturalists knowledge of no more than 600 species of plants, Hernández put together some fifteen volumes of writings and illustrations of 3,000 new plants. Hernández used the fledgling network of colonial hospitals in Mexico to test the medical properties of hundreds of these plants. With the help of local Nahua intellectuals trained in Latin and classical sources by Franciscan missionaries, Hernández tapped into centuries of Nahua (Aztec) botanical and medical scholarship. Historians have, for example, identified in the extant images of plants assembled by the expedition (the eleven volumes of images put together by Hernández were lost in the great fire of El Escorial in the late seventeenth century) traces of Nahua iconographic (pictographic, hieroglyphic) conventions.[6] Less well explored, however, is the fact that Hernández's written descriptions of plants in Latin are remarkably similar to those offered in the *Libellus de medicinalibus Indorum herbis*, an earlier illustrated herbal by two Nahua intellectuals, Juan Badiano and Martín de la Cruz.[7]

That Badiano and Cruz wrote an herbal in Latin in Mexico City as early as 1552 speaks to the traditions of Nahua botanical knowledge into which the Spaniards tapped, as well as to the rapid processes of global cultural mongrelization and hybridization that the conquest sparked. The cases of Badiano and Cruz's and Hernández's natural histories should teach historians of imperial science to avoid reductive terms such as "European" and "indigenous," both based on reified and dichotomous notions of identity.[8]

But Badiano and Cruz's herbal also speaks to the rich traditions of local, colonial botanical and natural history writing supported by religious orders (Badiano and Cruz were trained by, and wrote for, the Franciscans). Steven J. Harris has explored some of these writings, particularly those produced by Creole (Spanish American) Jesuits. There is no denying that this tradition had a utilitarian, mercantile goal (identifying medicines for infirmaries and hospitals, or, as in the case of the Jesuits, securing worldwide monopolies). By and large, however, local clerics wrote with purposes other than commerce and trade in mind. They sought to create patriotic genealogies for the new American viceroyalties as members of the Spanish composite monarchy. The clergy also turned to the surrounding landscape to secure providential, moral narratives.[9] There was, to be sure, no novelty to this tradition. Members of the local intelligentsia of every kingdom that constituted

the Spanish empire, from Naples, Sicily, and Aragon to Mexico, were heavily invested in developing patriotic surveys of local material and spiritual resources, including not only natural histories but also chorographies and the ubiquitous hagiographies.[10] Thus it would be an error to exaggerate the distinction between European "provinces" and New World "colonies" in the early modern composite monarchy.[11]

In addition to clerics engaged in patriotic and moral campaigns, there were enterprising settlers and merchants who upon arrival set out to identify plants that could be sold in Europe. It is often wrongly assumed that the Iberians either established local clerical botanical traditions or dispatched expeditions to collect botanical information, while the English mostly left systematic botanical work to merchants and other enterprising individuals. The large scale of private botanical initiatives in the Spanish empire is thankfully, however, being clarified by the ongoing archival researches of Antonio Barrera and Paula De Vos. Both Barrera and De Vos have exposed a world of enterprising settlers and merchants who claimed to have New World plants with extraordinary curative powers. De Vos has found shipment after shipment of curiosities in the eighteenth century.[12] Barrera has demonstrated that the surge of claims and counterclaims as to the curative virtues of plants forced the Spanish Crown to create institutions such as the Casa de Contratación to apportion credit, settle disputes, and hand out patents in the sixteenth century. Apothecaries and physicians back in Spain sought to systematize this new knowledge created by settlers and merchants. Nicolás Monardes is well known for his efforts to survey these new drugs, which had been flooding the markets of Seville since the early sixteenth century.[13] Yet despite the efforts of scholars such as Barrera and De Vos, we know very little about this market for botanical goods in the Spanish empire. A history of the trade in plants and dyes, such as sarsaparilla, cochineal, ipecacuanha, guaiacum, cacao, jalap root, vanilla, and the precious febrifuge cinchona, over which Iberians had held very lucrative monopolies since the sixteenth century, has yet to be written.[14]

However, there was yet another mechanism used in the Spanish empire to gather knowledge of colonial botanical resources. Scholars have studied the campaigns known as *relaciones geográficas*, in which thousands of local authorities answered detailed questionnaires sent out by the Crown about the nature of the local resources, in some detail. The answers now fill dozens of volumes in archives on both sides of the Atlantic. Of all the traditions I have described above (the others being expeditions, clerical natural histories, and entrepreneurial settlers), this is perhaps the only one that was

unique to the Spanish empire. The *relaciones* were sweeping, continentwide surveys with pretensions to all-encompassing knowledge, launched by rickety premodern bureaucracies with no standing armies at their disposal. It was the vast network of municipal authorities, both indigenous and Creole, that mobilized resources to reply to the Crown questionnaires, thus leading to remarkable variations.[15]

As this quick overview of Spanish colonial botanical efforts should demonstrate, there are big gaps in our knowledge. To be sure, much remains to be done in other sciences, such as cartography and metallurgy, that, like natural history, were born out of a colonial context.[16] There are also areas wholly unexplored. Let me turn to two in the remainder of this chapter. One is the elucidation of a model of imperial science, popularized by early modern Spain, in which chivalric, gendered values colored the pursuit of knowledge. This model had a wide impact on early modern British and French colonialism as well. The second area is the different aspects specific colonial sciences took on when practiced with imperial or patriotic aims in mind.

The organization and pursuit of knowledge in chivalric terms, that is, the cosmographer as knight, or the knight as cosmographer, was a hallmark of the Portuguese and Spanish fifteenth- and sixteenth-century colonial expansion. A quick glance at the sixteenth-century Iberian treatises of cosmography so much admired by the English shows that the Iberians saw knowledge gathering as an expansion of chivalric virtues.[17] This model made a profound impression on Elizabethan proponents of English colonial expansion, such as Sir Walter Raleigh and the community of mathematicians, cosmographers, and alchemists who gathered around him, including Thomas Harriot, John Dee, and Lawrence Kemys. It was the learned Kemys who, in his account of his second trip to Guyana in 1596 to recover samples of gold, insisted that the Orinoco should be named the "Raleana" just as the Amazon had been named the "Orellana" after its Spanish discoverer, Francisco de Orellana. This chivalric model also had lasting influence on Captain John Smith and the colonization of Virginia. Smith liked to present himself as a knight cosmographer, wielder of both the sword and the compass. In a map of his *Advertisements for the unexperienced planters of New-England* (London, 1631), Smith appears as a fully armored knight, standing right next to a globe.

These images resemble those of Amerigo Vespucci and Fernão de Magalhães (Ferdinand Magellan) that the Flemish artist Jan van der Straet (1523–1605) (aka Johannes Stradanus) bequeathed to posterity in his *Americae retectio* (ca. 1589) (fig. 1.1). The third engraving (bottom left) has Vespucci

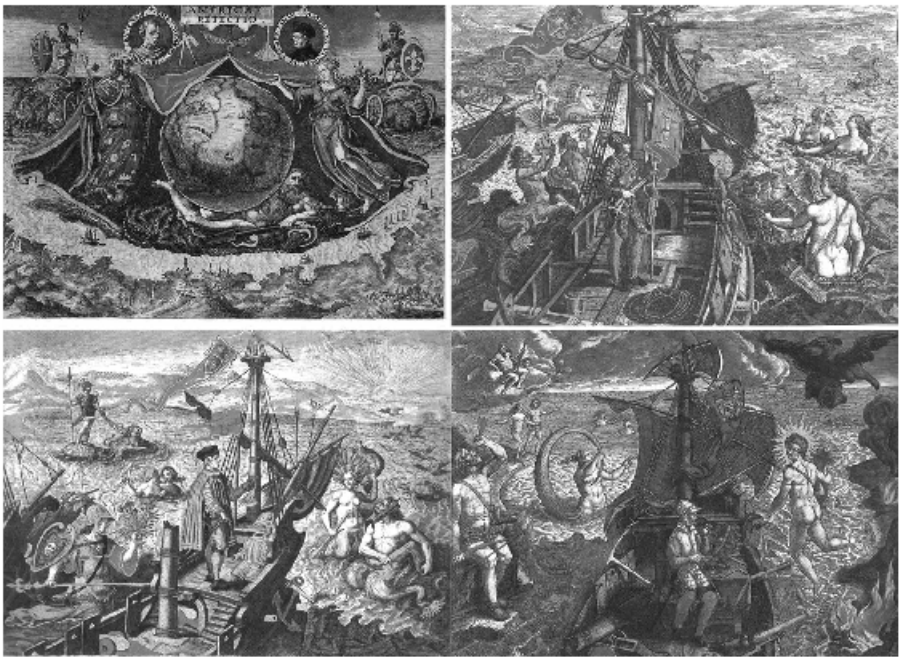

FIG. 1.1. Three heroes cross the ocean, guided by Providence. Drawing by Johannes Stradanus (Jan van der Straet), engraved by Adrainus Collaert and printed by Ioannes Galle in *Americae retectio* (ca. 1589). From Theodore de Bry et al., *Americae pars quarta* (Frankfurt a/M, 1594). The originals (inverted) are reproduced in Straet, *New Discoveries* (1953).

making astronomical observations with a quadrant. Next to him is a banner bearing the cross, a reminder that Vespucci first described the constellation of the Southern Cross. A broken mast reminds the viewer that the knight-cosmographer has survived a tempest. The final image (bottom right) portrays Magellan crossing the straits (represented here by a Patagonian giant swallowing an arrow, to the right, and the Land of Fire, to the left). Magellan is depicted as a knight clad in full armor who charts the heavens by means of an armillary sphere, a lodestone, and a compass, led by Apollo, the sun god, carrying a lyre, and aided by Aeolus, god of the winds. This gendered, epic, and markedly aggressive notion of the role of knowledge in the expansion of empire is one of many traditions inherited by northern Europe from sixteenth-century Portuguese and Spanish colonialism.

To understand the different ways in which science was deployed in the Spanish empire, we should not assume that the sprawling "empire" Spain created in the early modern period resembled that built by England in the nineteenth and twentieth centuries. From the beginning, the colonies Spain acquired in the New World were considered by the settlers to be "kingdoms," part of the larger composite monarchy that was Spain.[18] This status of "kingdoms" was not merely symbolic or misleadingly rhetorical. Spanish America developed as a typical ancien régime society, in which corporate privileges and social estates took on an added racial dimension (i.e., Amerindians as peasants; blacks as slaves). Until the eighteenth century, the Creole elites of these colonial viceroyalties enjoyed considerable autonomy and thus developed strong local identities and patriotic narratives. Thus it was typical that for every "imperial" version of a science that arrived in America a local, "colonial" version emerged. I have discussed astronomy and astrology in the seventeenth century elsewhere. Whereas European scholars developed a largely negative view of the effect that the stars of the Southern Hemisphere had on the New World's peoples, fauna, and flora, Creole intellectuals in Spanish America begged to differ. The latter not only challenged European estimates of the size and number of the newly discovered stars and constellations but also developed patriotic and providential alternative astrological readings.[19] I want here to describe briefly the case of eighteenth-century botany.

Having been soundly defeated by the British in the Seven Years' War (1756–63), the Spanish Bourbons sought to introduce aggressive economic, administrative, and cultural reforms in every corner of their far-flung empire. Determined to transform the Spanish viceroyalties into colonies, the Spanish Bourbons turned to the new sciences. The Spanish empire had long been losing territories in the New World, along with status and prestige, to other European powers. Some Spanish intellectuals maintained that the loss of territories began with losses in the struggle over naming, surveying, and remembering.[20] The writing of histories of "discovery" and colonization and the launching of cartographic and botanical expeditions therefore became priorities, and some twenty-five such expeditions visited the New World. Naturalists sought to benefit the economy by identifying new products (dyes, spices, woods, gums, pharmaceuticals) or alternatives to already profitable staples from Asia. Spanish botanical expeditions to the Andes, for example, put a premium on finding species of cloves and cinnamon to challenge the British and Dutch monopolies in the East Indies.[21]

These plans to grow cloves, cinnamon, and other spices in the New World to break the Dutch and British monopolies came to nought, but the

cultural transformation the Bourbon botanists brought about was profound. Botany became new cultural capital in the form of providential idioms and discourses highlighting the untapped economic potential of each viceroyalty. Projects designed to turn local societies into subordinate appendages of a new, revitalized modern empire unwittingly offered ideological tools that allowed those communities to think of themselves, literally, as middle kingdoms. Like their counterparts in contemporary Qing China, Creole intellectuals came to think of their local polities as the center(s) of the world. Spanish American naturalists came to represent each *patria* as a microcosm wondrously poised to become a trade emporium.[22] Mauricio Nieto Olarte has argued in his book *Remedios para el imperio* (2000) that Creole traditions of botany in every respect resembled the colonial model introduced in the eighteenth century by metropolitan naturalists. My interpretation differs from that of Nieto Olarte in that I argue that the mercantilist, pragmatic, imperial goals of metropolitan expeditions were transformed in the Spanish American viceroyalties into utopian patriotic accounts of the landscape and nature. Once the imperial science of Linnaean botany arrived in the "tropics," it took on a life of its own, and it was eventually deployed by local patriot-naturalists to undermine the very goals that Linnaean natural history had set out to accomplish in Spanish America, namely, to revamp and strengthen the empire.

Studies of Iberian traditions of colonial science have been largely limited to the history of early modern Spanish America. We know relatively little of other centuries and regions of the world (to say nothing of the Portuguese side of the story). Notwithstanding these limitations, or rather scholarly challenges, it should be clear, however, that any understanding of European traditions of colonial science needs to come to grips with long-term patterns that first emerged in the tumultuous multicultural world of the early modern Iberian empires.