Epilogue
The Difference That Made Spain, the Difference That Spain Made

William Eamon

Eighteenth-century Enlightenment critics of Spain almost always made pointed reference to Iberia’s “difference,” its “otherness” with respect to the rest of Europe,1 beginning with the French philosophe Montesquieu, who asserted in 1741 that the grip of the Inquisition rendered Spain “incapable of any degree of light or instruction” (II: 56). Montesquieu’s statement would prove to be only a contemptuous prelude to the question the famous French polymath Nicolas Masson de Morvillers polemically asked in 1792: “What do we owe Spain?” European intellectuals rebuked Spain as a backward nation and its people as ignorant, superstitious, and alien to all that modernity stood for. Particularly with regard to science, Masson asserted, Spain had become “the most ignorant nation in Europe.” After all, he asked dismissively: “What can we expect of a country that needs to ask priests for permission to read and think?” In the eyes of many educated Europeans, Spain was different.

The image of Spain as barbaric and despotic took hold throughout Europe in the eighteenth century from Italy to England. Few authors did more to fashion the stereotype than Montesquieu (Iglesias). His Esprit des lois helped to set the fashion of depicting Spain as the land of fanaticism and ignorance. Like many others, Montesquieu attributed Spain’s stagnation to the exaggerated Spanish tradition of honor that valued idleness over labor. Thus in the eighteenth century, the perception of the Spanish state gradually shifted from that of a benevolent Christian monarchy to that of an oriental despotism (Padgen, Spanish Imperialism; Lords of All the World).

In fact, all sorts of things—including Catholicism—were blamed for Spain’s supposed degradation: sloth, climate, bad government, the stars (MacKay 108). According to the construction of Spain that emerged in the eighteenth century, the Spanish people were governed by barbaric institutions, engaged in pagan religious practices, and subjected to bloody tyrants. The contrast with other European nations seemed stark and absolute. Northern European travelers to Spain, such as John Armstrong, an English engineer who was stationed in the island of Minorca in the 1730s and ’40s, reinforced these negative images of Iberia. “There is no

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1 I treat this theme in greater detail in my essay “Nuestros males,” where a more complete bibliography may be found.
degree of superstition into which these people have not been led,” Armstrong reported (Hontanilla 9).

Spanish observers—some indignantly coming to their country’s defense and others joining in the chorus of criticism of Spain’s supposed “backwardness”—also insisted that Spain was different from the rest of Europe. The satirist Juan Pablo Forner took Masson’s article as representative of French libertinism and used his reply to Masson (Oración apologética por la España y su mérito literario, 1786) as a pretext for attacking the philosophes in general (Gies; Herr 123–4). Denouncing the article as typically Anglo-French, Forner pronounced: “We have not had famous dreamers like Descartes and Newton, but we have had the most just legislators and excellent practical philosophers” (qtd. in Herr 224).

Yet the idea that Spain was, by nature and misfortune, exceptional predates the eighteenth-century controversies about the state of Spanish science that came to be known as the “polémica de la ciencia española.” Already in the seventeenth century, and particularly during the reign of Philip III, a group of writers called the arbitristas put a name to Spain’s predicament, as they saw it: declinación, or decline. Their reform proposals, covering all manner of problems from taxation to morality, called for a restauración, or restoration, of a bygone kingdom and, for that matter, bygone days of glory (Elliott, “Self Perception and Decline”). Some argued that the root causes of Spain’s backwardness were sexual depravity and religious hypocrisy; others blamed luxuriant living, overindulgence in food and drink, and the effeminate fashion among men of wearing their hair long. (The cure, of course, was moral reform.) Others sought more “scientific” explanations. Was Spain’s decline an irreversible part of some cosmic, cyclical process, they wondered? Or, applying the model of astrological determinism, was it somehow the result of the movement of the planets? Medical metaphors were abundant: Spain was just sick. Diseases, of course, can be diagnosed, but the cures proposed by the arbitristas were, frankly, not very helpful.

The Difference That Made Spain

Spain’s critics, both from within and outside of Spain, as well as her defenders, were, however, right about one thing: Spain was different—though not for the reasons advanced by those on either side of the polemic. The difference that was Spain had nothing to do, of course, with the character of its people or its supposedly degenerative environment, but instead had everything to do with the most obvious fact about its early modern situation: it possessed the largest empire the western world had ever known, an empire that under Hapsburg rule reached from Madrid to Potosí and from Naples to Antwerp, not to mention the distant Philippines—the first empire in world history over which the sun never set. The Spanish Empire even included in its orbit Rome, where tens of thousands of Spaniards settled,

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2 See López Piñero’s Ciencia y técnica 15–27 and Nieto-Galán’s “Images of Science.”
colonizers for a kind of “informal” Spanish imperialism that until recently has received little attention (Dandelet).

During the heyday of the Spanish Empire, the sixteenth century, the Iberians confidently saw themselves as the first “moderns,” surpassing the ancients. Yet it was not just Spaniards who saw themselves this way. The English, always creative borrowers, were among the first to recognize Spain’s superiority and to imitate the scientific institutions created by the Iberians (Cañizares-Esguerra, “Iberian Science” 86). The Italian philosopher Tommaso Campanella thought that Spain was destined to rule the world before the final days: “The monarchy of Spain,” he wrote, “which embraces all nations and encircles the world is that of the Messiah, and thus shows itself to be the heir of the universe” (qtd. in Pagden, Spanish Imperialism 50). Spain was a rising giant that would become the world’s first modern global empire and would produce the first worldwide scientific network (Barrera-Osorio, Experiencing Nature).

Spain’s possession of a vast global empire set it apart from the rest of Europe in a number of important ways, many of which are highlighted in the essays in this volume. Above all, the Spanish were the first Europeans to grapple with what was, from their perspective, the strangeness and novelty of America, its environment, its exotic flora and fauna, and the diversity of its peoples and cultures (Elliott, “Same World, Different Worlds” 195–7). For starters, the Spanish were the first Europeans who had to contend with the question of the humanity of aboriginal cultures (Pagden, The Fall of Natural Man). As José Pardo-Tomás’s careful analysis of the medical content of the Relaciones Geográficas de Indias demonstrates in Chapter 2 of this volume, Spaniards wrestled with the most basic aspects of the character of indigenous peoples (including whether or not the Indians were rational humans or irrational animals).

The Spanish experience in America was entirely unlike that of the English in this regard. Although there were some points of similarity in the ways in which the Spaniards and the English responded to the challenges that confronted them in the New World, with respect to the treatment of the indigenous population, the differences offer a stark contrast (Elliott, “Britain and Spain in America”). “It is a melancholy reflection,” wrote Henry Knox, the American Secretary of War to President Washington, in 1794, “that our modes of population have been more destructive to the Indian natives than the conduct of the conquerors of Mexico and Peru. The evidence is the utter extirpation of nearly all the Indians in most populous parts of the Union. A future historian may mark the causes of this destruction of the human race in sable colors” (qtd. in Elliott, “Britain and Spain in America” 150). To be sure, there was plenty of cruelty on both sides, but simply by demographic measures, a far greater percentage of Indians survived the conquest in the Spanish territories than in the English colonies. The reason was

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3 Elliott estimates that while 56 percent of the original Indian population in Hispanic America survived into the eighteenth century, only 6 percent of Indians in North America survived (“Britain and Spain in America” 150).
that the British lacked the driving impetus to convert the indigenous population that motivated so much of the Spanish enterprise in America. That powerful motivation, evident from the very first generation of friars in the Indies, inspired a remarkable and unprecedented attempt to understand the character and customs of the indigenous peoples of the New World. Millions of non-Europeans, whose very existence was completely unknown only a generation earlier, were suddenly thrust into the European consciousness. In short, as Anthony Pagden has shown, the Spanish experience in America created a new kind of opportunity for systematic ethnographic study and gave rise to the science of comparative ethnology (The Fall of Natural Man).

The questions the Spaniards asked during this process were so fundamental as to challenge existing assumptions about the nature of humanity. By studying strange men in alien environments, the Spanish asked questions that were at the same time creative and disturbing: What were the essential characteristics of humanity? What constituted a civilized man, as distinct from a barbarian or an animal? Were the natives, indeed, human or animal? Even if the answers were sometimes inadequate and ill-informed, merely asking them served, in the words of John Elliott, to “widen the boundaries of perception” (“Discovery of America” 43). It was, above all, José de Acosta’s remarkable Historia natural y moral de las Indias that brought the nature of the aboriginal cultures of America to the attention of Europeans. Acosta’s work, which was translated into several different languages, served as a major conduit of information about the Incas and Aztecs in the early modern period. In one sense, Acosta contributed to a process already well underway. Works such as Fernández de Oviedo’s Historia general y natural de las Indias and, above all, Bartolomé de las Casas’s Brevisima relación de la destrucción de las Indias touched off a Europe-wide dispute over the nature of aboriginal cultures. Spanish efforts to come to grips with the humanity of American natives were sometimes problematic, but they nevertheless opened up entire new ways of seeing humanity.

Related to this, the Spaniards were the first to grapple with the demographic catastrophe that afflicted the Americas during the colonial period. As Pardo-Tomás shows in his essay in this volume, Spanish officials made concerted efforts to understand the nature of the epidemics that swept through New Spain. Even more enlightening, however, are the native voices that echo throughout the Relaciones Geográficas de Indias, revealing a population whose health and numbers had declined steeply, whose indigenous healers had been killed off by diseases of unknown origin, a people desperate to understand why, in the words of one: “In the past they lived very healthy and died old, […] and now they are few.” The discourse between natives and oppressors took place in a context that was completely, or almost so, independent of metropolitan debates. The Relaciones reveal a hybrid medical culture unlike anything known in Europe, a culture, as Pardo-Tomás puts it, comprising “the diversified world of lay folk who were the authors and creators of their own medical culture, cultures that only entered the discourse of the experts in an impoverished and schematic form.”
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Then there was the matter of seeing America for the first time: its environment, its exotic flora and fauna, its peculiar environment, climate, and terrain, all so unlike anything that Spaniards had ever experienced. In the immediate wake of the first encounter with America, Europeans too often saw what they wanted or expected to see. It was all too easy to merely assimilate the strangeness of the New World into the familiar (Pagden, *European Encounters with the New World* 17–50). Yet it was not long before the Spaniards realized that inherited preconceptions were inadequate to describe the New World, and that there was a wide divergence between image and reality (Elliott, *The Old World and the New* 21). Sometimes the problem of description reduced voyagers to despair. There was too much diversity, too much to describe. Gonzalo Fernández de Oviedo, who spent a total of 43 years in the Antilles and Central America—and who with some justification imagined himself as the “American Pliny”—was one of the first chroniclers to try. As Oviedo wrote to his patron, Charles V: “there are such great kingdoms and provinces, and such very strange people, of different customs, rites and idolatries, far removed from anything which has been recorded, *ab initio* up to our own time, that the span of a man’s life is hardly sufficient [either] to see it, to begin to comprehend or [even] to conjecture upon it” (qtd. in Myers 146).

The more we learn about the Spanish experience in the New World the more we come to understand the significance of seeing American nature for the first time. A number of scholars, in particular Antonio Barrera-Osorio, have recently argued that the knowledge-generating practices of Iberian institutions, such as the Spanish Casa de Contratación, created a model that was emulated elsewhere in Europe, ultimately transforming natural philosophy from a discipline based upon deductive argument into one that increasingly emphasized the experience of concrete events. The power of this model is exemplified most famously by the research reports by the Fellows of the Royal Society of London, found in countless contributions to the *Philosophical Transactions*. Natural philosophers increasingly used reports of singular events anchored in a specific time and place (including “experiments” modeled on recipes found in books of secrets) as a way of constructing experiential statements. Barrera has convincingly argued in works such as “Empiricism in the Spanish Atlantic World” and *Experiencing Nature* that fact-gathering became an essential component of Spanish imperial practices. The Spanish monarchs knew that to rule Spain’s vast empire, they needed to know what that empire contained and where its sources of wealth came from. That meant taking inventory, which Philip II and his successors did time and again by sending agents such as Francisco Hernández to the New World to collect and codify the things of the Indies.

This kind of empirical information gathering, codification, and utilitarianism was pivotal in the development of European science, because, as Harold Cook

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4 Pagden labels this strategy “the principle of attachment.” See also Ryan, “Assimilating New Worlds.”

5 See, for example, Peter Dear’s *Discipline and Experience* 25.
pointed out, natural history was the empirical science of the early modern period (*Matters of Exchange* 411). Natural history, and particularly botany because of its practical use for *materia medica*, became pivotal sciences in Spain’s pursuit of colonial wealth (De Vos, “An Herbal El Dorado”). It also provided a model for imperial information-gathering that was based on a close relationship between state support, scientific knowledge and practice, and commercial aims. Moreover, there is considerable evidence that many of the practices instituted by the Spanish generated keen interest among other Europeans, particularly the English. Further research is needed to trace the routes of communication between Spain and northern Europe, but one thing is clear: it is hardly an accident that “the so-called Scientific Revolution occurred at the same time as the development of the first global economy” (Cook, *Matters of Exchange* 411).

The Spanish naturalists were made constantly aware of the newness of the New World. At the outset of his *Historia general*, Oviedo lamented: “I am at the very end of my life, and yet I perceive that I am only just at the beginning [of my understanding of] the marrow of these great and innumerable secrets, which remain to be discovered in this second hemisphere and in these parts which were unknown to the ancients” (qtd. in Pagden, *European Encounters* 58). Oviedo’s resigned lament raises the question: who makes the best witness? Who was best qualified to report on the novelties of the New World? Was it the philosopher who comes to nature with preconceived notions? Or was it someone like the “simple, crude fellow” who told Montaigne of the strange customs of the New World Indians? Montaigne seemed to believe the latter. His informant had lived for some time in Brazil, and it was a combination of experience and simplicity that, for Montaigne, made him fit to bear true witness. In order to get reliable reports about things we have not seen for ourselves, wrote Montaigne, “we need a man either very honest, or so simple that he has not the stuff to build up false inventions and give them plausibility” (152).

Spanish chroniclers may not have been as innocent of preconceived notions as the “simple, crude fellow” of Montaigne’s essay. Yet, as Ralph Bauer argues in his essay in this volume, exotic American flora entered the early modern literature of natural history not only decontextualized from their meanings in Native American cultures, but also stripped of the layers of analogies and signatures that had encrusted them for centuries. The European encounter with the New World struck an irreparable blow to the doctrine of signatures. The plants and animals of the New World were entirely new. They had no known similitudes. Anteaters and sloths, tobacco and chocolate, are all missing from the writings of antiquity. As William Ashworth writes: “They come to the Old World naked, without emblematic significance (318). Hence naturalists could not approach the new flora and fauna in the manner of earlier humanists. Instead, they were forced to limit their descriptions to discussions of appearance, habitat, food, and reports gathered from native people.

See also De Vos’s “The Science of Spices.”
In shaking off the “crust of analogies” that had accreted in natural history over centuries, thereby making objects “naked,” the sixteenth-century literature of the discovery and conquest of the New World represents an important step towards a natural history in which nature’s specimens instead become objects of inquiry instead of vehicles of religious and philological meaning. Moreover, there can be little doubt that the experience of New World natural history stimulated the collecting impulse that was so characteristic of Renaissance natural history (Ogilvie 269). Of course, the “curiosities of art and nature” that made up the princely Wunderkammern were not collected for strictly scientific purposes, but instead served as a testament to one’s power, status, and authority. Nevertheless, they were ultimately deployed in the construction of the modern scientific “object” during the Scientific Revolution. Although the origins of objectivity are still not fully understood, it seems clear that seeing the New World for the first time will have a place in that history.

Finally, there was the matter of what may be called the “everyday Atlantic” (Elliott, “Illusion and Disillusionment” 133). In other words, if you were a Spaniard living in the sixteenth century, it would have been impossible to ignore the presence of the empire, in one guise or another, in almost every aspect of everyday culture. It is likely that you would have known someone who had gone to the Indies, or had returned from there. By the end of the sixteenth century, travel to New Spain was relatively common and affordable, even for average Spaniards. In growing numbers, Spaniards had the option of emigration. More than 2,500 Castilians took passage for the Indies each year in the sixteenth century, and at least 4,000 per year in the first half of the seventeenth century. The Jesuit chronicler José de Acosta reported that exit was as easy “as for a laborer to travel from his village to the town” (qtd. in Elliott, Spain, Europe, and the Wider World 133). One could buy passage to the Indies for a mere 20 ducats, about a month’s pay for a skilled worker in Madrid. The passage was neither easy nor undertaken without trepidation, as the letters analyzed by Mauricio Sánchez-Menchero in this volume suggest. Yet, as Hernán Sanchez assured his brother Diego Ramos in 1569: “[I]t has been many days since one of the fleets has suffered an accident; because the route has been heavily traveled, and there are many skilled pilots” (qtd. in Elliott, Spain, Europe, and the Wider World 133).

Moreover, New World products, from tobacco and chocolate to maize, cochineal, and sassafras, were everywhere in sight. Visitors to the ports of Lisbon or Seville would have been made immediately aware—by sight, sound, and smell—of a strange new world of goods arriving from distant parts of the world. The first European dyers to work with cochineal, the exotic red dyestuff from Mexico, were almost certainly Spanish, although soon Spain’s monopoly on the dye was broken by the Italians (Greenfield 72–3). Pharmacies, too, which stocked everything from guaiac wood to bezoars, put exotic plants and animals on display for the public, like natural history museums.

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7 In addition, see De Vos’s “The Rare, the Singular, and the Extraordinary.”
The everyday Atlantic was also evident in popular literature and culture. The empire and the New World turn up frequently, almost as characters, in the popular literature of the period. In Francisco Santos’s novel, Las Tarascas de Madrid, tasting chocolate is represented as one of the urban lusts to which women, in particular, were supposedly most susceptible. Even on the theatrical stage, arguably the most popular literary form of Golden Age Spain, the empire asserted its presence—for instance, in the dramatization of syphilis or the French Pox, which was widely regarded as being a gift of the New World to the Old.

Imperial priorities were also behind the search for local medicines in New Spain. Keeping planters alive in the colonies was an urgent concern for the Spanish Monarchy. In a recent study, José Pardo-Tomáš has examined in detail the creole physician Juan de Cárdenas’s appropriation of the books of secrets, a largely European genre, for the purposes of promoting local medicines and native medical knowledge in Mexico. Cárdenas not only presented his creole readers with a rational scientific knowledge (in contrast to the purely empirical knowledge traditions of native practitioners), but also vigorously defended local medicines and native practices. Similarly, the Spanish encomendero Antonio de Villasante learned about the virtues of native plants in Hispaniola from his Christianized Taino wife, Catalina de Ayahibex (a cacica). One of Villasante’s discoveries was a native balsam, for which he received a monopoly from the Crown (Barrera-Osorio, “Local Herbs, Global Medicines”). Of course, Europeans tended to think of the New World medicinal plants predominantly within a Galenic explanatory model of disease and therapy—perhaps confirming the notion that, in Guenter Risse’s words, “travelers never leave home, but merely extend the limits of their world by taking their concerns and apparatus for interpreting the world along with them” (32). Nevertheless, a new creole scientific culture was being constructed within the Spanish Empire from materials on both sides of the Atlantic. Moreover, as Antonio Barrera-Osorio has argued, the empirical practices first put into play in the Spanish empire eventually became institutionalized both in the Spanish context and in the wider European scene (Experiencing Nature).

The principal problem with our current historiography of the Scientific Revolution, insofar as it regards the Spanish experience at all, is that it has been framed largely within the domain of intellectual history, thus keeping it safely within the comfort zone of the Anglo-French axis. A case in point is the most recent attempt at a broad synthesis or master narrative of the Scientific Revolution, Stephen Gaukroger’s erudite work The Emergence of a Scientific Culture: Science and the Shaping of Modernity, 1210–1685 (2006). In a book ostensibly about “the shaping of modernity,” Gaukroger, surprisingly, does not include so much as a mention of some of the most obvious aspects of modernity, such as globalization, colonialism, and the expansion of the European system to

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8 See Enrique Garcia Santo-Tomas’s article in this volume.
9 See, in particular, Slater’s Todos son hojas.
distant parts of the world. Neither the words “exploration” nor “discovery” merit inclusion in the book’s index, where alchemy gets fewer pages of notice than the Italian philosopher Francesco Patrizi. Medicine gets short shrift, despite the volumes of work coming out in recent years by scholars such as Harold Cook, who has sharply challenged existing interpretations of the Scientific Revolution and argued forcefully for the need to include medicine in our interpretation of it—or, alternatively, to dispense with the concept entirely. To be fair, Gaukroger devotes a sentence to José de Acosta’s “pioneering work of New World natural history,” but the opportunity to engage seriously with the far-reaching consequences of that work, or the work of Francisco Hernández, Nicolás Monardes (neither of whom are mentioned in Gaukroger’s 500-page monograph), and countless others, is completely lost. Gaukroger does engage with natural history, but in an oddly detached and cerebral way, and only insofar as it leads to Baconian inductivism (359–67).

It is clear where Gaukroger’s priorities lie when it comes to understanding the Scientific Revolution, and they do not include understanding science and medicine as having global significance, but only as local developments within the sphere of European philosophy. To Gaukroger, the problem of “science and the shaping of modernity” is, essentially, a problem simply of intellectual history. No wonder that Spain gets short shrift in this kind of historiography. Fundamentally, insofar as it includes Spain, the current historiography of science and medicine is Eurocentric in the most obvious and puérile sense, which is that, in general, it neglects the broader context of the Spanish experience. As the essays in this volume suggest time and again, to interpret early modern Spain without including its vast colonial empire seems, at best, strangely surreal, or, at worst, doggedly perverse.

Fortunately, this situation is changing, and changing rapidly. As a result of recent studies such as those in this volume, we are a long way from a situation in which, in 1961, a historian as distinguished as John H. Elliott could ask: “Why was it that science and technology failed to take root in Spain, at a time when they were beginning to arouse considerable interest elsewhere in Europe?” (Spain and Its World 234). Such a comment is all the more surprising coming from a historian who has, perhaps, contributed more to interpreting imperial Spain than anyone else. That Elliott should have gotten things so wrong with regard to science only underscores the underlying, fundamental problem with the current historiography of early modern Spanish science and medicine. It is not that “science and technology failed to take root in Spain”; it is rather that science, technology, and medicine were deployed for very different purposes in Spain than they were in the rest of Europe. Those purposes had everything to do with the relations between colony and metropolis.
The Difference That Spain Made

Scholarship on early modern Spanish science and medicine has a long history. However, it has been only within the last decade or so that historians of science and medicine outside of Spain have begun to take Spain and its empire seriously and to include them in the larger picture of the Scientific Revolution. What, then, was the difference that Spain made? Or, to rephrase the question in Masson’s derogatory words: “What do we owe Spain?”

One could plausibly argue that we owe the modern idea of scientific discovery to the early modern Iberian experience. Prior to the Renaissance, discovery—in the sense of the discovery of new phenomena—was not a priority in natural philosophy. Instead, natural philosophy was conducted as a sort of hermeneutics—“natural philosophy without nature,” as John Murdoch aptly characterized it (Murdoch 171). However, it was not very long before a new generation of intellectuals began thinking of science as a search for new and unknown facts, or of causes concealed beneath nature’s outer appearances. This conception of science rested, in turn, upon a redefinition of what constitutes scientific knowledge. In medieval natural philosophy, factual knowledge (or knowledge of individual, isolated events) did not qualify as science unless it could be demonstrated that such facts occurred by logical necessity. Medieval natural philosophers “had not dwelt upon phenomena and objects that did not fit within existing theories” (Daston 465). Facts were tucked snugly, and invisibly, under the blanket of scientia.

In the Renaissance, scientific inquiry was increasingly conceived as the discovery of new things rather than as attempts to demonstrate the known, as had been characteristic of Scholastic natural philosophy (Eamon, Science as a Hunt). Indeed, the themes of newness and novelty appear repeatedly in the scientific literature of the early modern period. During this period, the Ne plus ultra (“Do not go beyond”) inscribed on the ancient Pillars of Hercules became a favorite device to illustrate the tyranny of ancient philosophy over creative thought. The growing awareness that reverence for antiquity hampered progress aroused a sense of the importance of new discoveries and of the value of novelty for its own sake. Oviedo articulated the idea explicitly and repeatedly. The very newness of the New World meant that no ancient models, not even Pliny, could serve as a guide. Comparing his eyewitness reports to Pliny’s bookish accounts, Oviedo wrote: “I have not culled them from two hundred thousand volumes I might have read, as Pliny wrote […]. I, however, compiled what I here write from two hundred

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10 Some of the most important works have been produced by José María López Piñero and his students, including Victor Navarro Brotòns, José Pardo-Tomáés, Marialuz López Terrada, and many others.

11 One of the earliest studies of early modern Spanish science from a non-Spanish historian was David Goodman’s pioneering Power and Penury, although in that work Goodman focused mainly on Spain under Philip II and not on Spain and the Scientific Revolution.

12 See also Rossi, “The Aristotelians and the ‘Modems.’”
thousand hardships, privations and dangers in the more than twenty-two years that I have personally witnessed and experienced these things” (qtd. in Myers 150).

Certainly the most important event contributing to Europe’s heightened consciousness of novelty was the discovery of the New World. News of the discovery, which revealed regions completely unknown to the ancients, raised Europe’s awareness of the sheer immenseness of the world. The explorers brought back specimens of exotic plants and animals, hair-raising tales of adventure, and accounts of completely new peoples and cultures. Above all, the new geographical discoveries demonstrated that ancient philosophy and science were not eternal verities. The relations of the voyagers to America seemed to confirm, in the words of the Spanish historian Francisco López de Gómara, that “experience is contrary to philosophy.”

The New World itself became a metaphor for the ignorance of the ancients. As Thomas Browne put it, ancient philosophy was so fraught with error that the “untraveled parts of Truth,” what Browne called “the America” of truth, still awaited discovery (5). In the mid-seventeenth century, the English virtuoso Joseph Glanvill still envisioned the opening up of an “América of secrets and an unknown Peru of nature” (178). Like the New World, nature stood before investigators as uncharted territory.13

These considerations lend new perspectives on our thinking about the origins of the Scientific Revolution and, in particular, the role of medicine within it. Where and when did the Scientific Revolution begin? Jorge Cañizares-Esguerra and Antonio Barrera-Osorio have both argued persuasively that the roots of the Scientific Revolution are, in fact, Iberian (Cañizares-Esguerra, “Colonial Iberian Roots”; Barrera-Osorio, Experiencing Nature). Harold Cook and others have convincingly argued that during the first period of globalization, “a worldwide natural science rooted in descriptive natural history developed for the first time” (“Global Economies and Local Knowledge” 101). Historians who have looked closely at the patterns of knowledge acquisition germane to the early modern global economy—including several of the contributors to this volume—have noted that the most important means for acquiring new information involved contact with other people on the global stage. As the essays in this volume demonstrate, that is precisely the pattern we see with regard to the medical cultures of the early modern Spanish Empire.

The personal interactions that are documented in many of the essays in this volume are examples—which could be multiplied many times over—of the exchanges that took place within the “trading zones” that brought together “experts” (Spanish physicians and local healers, naturalists, and native informants, etc.) from different disciplines or fields of activity.14 Pamela O. Long defines

13 On these themes, see my essay “Science as a Hunt.”
14 The term (and its usage here) is from Pamela O. Long (borrowing from Peter Galison) in Artisan/Practitioners 94–126. Long does not, however, consider the concept of trading zones in relation to colonial interchanges such as those examined in the essays in this volume.
such trading zones as “arenas in which the learned taught the skilled, and the skilled taught the learned, and in which the knowledge involved in each arena was valued by both kinds of ‘traders’” (Artisan/Practitioners 95). Long gives examples of several kinds of trading zones, such as arsenals, princely courts, and print shops. Yet arenas of knowledge exchange among the learned and skilled were also located in the distant reaches of the Spanish empire, where metropolitan and colonial expertise intermingled, and in the institutions created by the Spanish monarchy that were designed to process empirical information, such as the Casa de Contratación.15

In a series of classic articles published in the 1940s, Edgar Zilsel argued that the empirical and experimental values that emerged in the early modern period were born from the union of academic learning and the practical activities of artisans. Zilsel linked the convergence of these previously alienated traditions to the collapse of the social barriers that had kept craftsmen and intellectuals apart. The breakdown of the barriers between artisans and men of learning, he argued, was a consequence of the rise of capitalism and the decline of craft guilds. The expansion of industry and commerce during the Renaissance opened up new opportunities for “superior craftsmen” to ascend from the ranks of guildsmen into the emergent middle class, and thereby to rub elbows with humanists. Such individuals, Zilsel claimed, “were the real pioneers of empirical observation, experimentation, and causal research” (551).

Zilsel focused on the interaction of artisans and humanists as the crucial interchanges that gave rise to the emerging empirical values of the early modern period. Building on Zilsel’s insights, other historians have suggested that just as critical were the interchanges that occurred within medicine and natural history. In an article published in 1993, Harold J. Cook made reference to the seventeenth-century Dutch naturalist Jan Swammerdam as an example illustrating the point.16 Swammerdam was the son of an apothecary whose shop bordered the Amsterdam dockyards, where ships from around the world unloaded their wares. Thus from an early age Swammerdam became interested in “things,” collecting them in a natural history cabinet that grew to an impressive size, including more than 1,200 dried and mounted insects. Such curiosity about nature was not uncommon, especially among physicians, who, for reasons pertaining to both the art and science of medicine, took a keen interest in natural history. For their art—the cure of disease—they needed to know about the medicinal uses of plants, animals, and minerals that they used in their practice; for their science—the knowledge of health and disease—physicians shifted their focus from philosophical debate to investigations of nature (H. Cook, “Physicians and Natural History” 91). Physicians, leaders among those

15 See, for example, the chapters by Angélica Morales Sarabia, José Pardo-Tomás, Ralph Bauer, and Mauricio Sánchez-Menchero in Part I of this volume; as well as Pardo-Tomás’s “Natural Knowledge and Medical Remedies.”

16 Cook was one of the first historians to make this argument in a convincing way (“The Cutting Edge of a Revolution?”)
who pursued knowledge of natural things, took an active role in the promotion of natural history and were critical participants in the development of the new philosophy of the early modern period. In the long run, to borrow a term from Gaukroger, natural history facilitated a kind of “focusing” on the particular rather than upon the underlying physical structure of things, thus facilitating a new kind of natural-philosophical approach that increasingly emphasized experimentation (356). The methodology advanced by Francis Bacon, who himself was an avid reader of Spanish colonial literature, exemplifies the new approach.

Virtually all of the interchanges and new interests that historians have regarded as critical to the development of early modern natural philosophy were visible in the Spanish Atlantic empire: the coming together of scholars and craftsmen, the renewed interest in natural history, the emphasis on collecting, and the development of institutions to organize empirical knowledge. Added to these was something perhaps uniquely Spanish or, at any rate, uniquely Iberian. As is evident from even the most cursory reading of a work like José de Acosta’s *Historia natural y moral de las Indias*, Spaniards were obliged by imperial mandate to convert the natives to Christianity, to document and understand native practices and beliefs, to account for the origins of the inhabitants of the New World, and to explain how they got there. Thus Acosta’s work was a “natural and moral history” because it took into account the local and cultural. Medical practice, too, had to be moral because, as the essays in this volume illustrate, medicine in the Spanish empire was always the result of negotiations at the local level. Local practices and beliefs about the body and about sickness and health intersected and interacted with ideas and practices on the global stage.

Early modern Spaniards—both those who made the crossing and those who remained at home—were the first Europeans to construct, in their own imperfect and uncertain way, hybrid medical cultures that were cut loose from the strictures of academic medicine. They did so because they had to: there was no other choice.

17 Spanish works on natural history and New World medicine circulated widely, both on the European continent and in England. For a variety of reasons, however, they had particular appeal in England. As early as 1577, the English merchant John Frampton translated Monardes’s work on natural history and published it under the title *Joyfull Newes out of the New Founde Worlde* (London, 1577). Acosta’s natural history appeared in an English translation by Edward Grimstone in 1604.