

# INTRODUCTION

On September 14, 1775, a notary in Mexico City began an inventory of the pharmacy of apothecary Jacinto de Herrera y Campos, whose goods had been sequestered as part of a criminal investigation (see fig. I.1).<sup>1</sup> The inventory proceeded over several days, during which the notary itemized the medicines, furniture, and equipment in each of the pharmacy's rooms—the main retail shop, workshop, and storage rooms—as well as those that spilled over into a passageway, patio, and stable (see fig. I.2 and appendix 4). Customers entered the pharmacy through embroidered hemp curtains that hung in each of the two doorways that opened onto the street. Here they would face the main counter—complete with inkstand and balances—where the retail transactions took place, behind which mirrored panels reflected the panorama of jars, bottles, boxes, stands, and shelves full of remedies, equipment, and medical books that lined every wall (see fig. I.3).

Much of the stored materials consisted of what were referred to as “simples”—natural substances derived from plants, animals, and minerals with known healing powers. These included resins, gums, roots, flowers, wood, and bark, 94 percent of which were native to Afro-Eurasia; the hooves, claws, blood, bones, and testicles of various animals; and metals, metallic ores, earths, and precious stones stored in the compartments of a lapidary. The Herrera pharmacy also

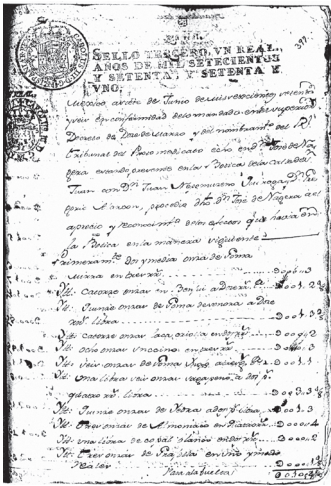


Fig. I.2. Page from the inventory of the Herrera pharmacy. AGN/M Civil, vol. 72, exp. 9, 1774, Autos de Concurso de Acreedores a Bienes de Don Jacinto Herrera Dueño de Botica en esta Ciudad, f. 397r.

held a variety of “compounds,” remedies made up of multiple simples that had been processed and combined. These included sugar- or honey-based electuaries, confections, preserves, syrups, and lambatives; gum-based pills and pastilles or troches; and oil- or wax-based liniments, ointments, and plasters. A third type of remedy, formulated by alchemical means, was also present in the pharmacy in a series of flasks that held spirits, waters, essences, and tinctures made by distilling and repeatedly filtering simples in solution. In addition to these remedies was the equipment needed to process and formulate them, including a brazier, an oven, a mill, a large press, pots and pans, mortars and pestles, stills, water baths, retorts, funnels, sieves, and spatulas. The living quarters above the shop held still more items—medical books and a copper still in Herrera’s bedroom and a collection of herbs in the living room.

In total, the Herrera pharmacy included 251 simples (only 15 of which were native to the Americas), 89 compounds, 75 alchemical medicines, 30 books, and a multitude of equipment. What at first glance appears to be a lengthy and confusing list of items, however, upon further study lends insight into a centuries-old tradition that represents a cornerstone of natural philosophy and medicine in the West. For although officials determined that its medicines were “very poorly worked,” the pharmacy’s contents were in fact fairly typical of apothecary shops in the major cities of New Spain and throughout the Spanish Empire, a product of Spanish medical practices transplanted to the Americas.<sup>2</sup> The simples it contained, the compounds into which they were formulated, and the equipment used to carry out these processes were part of Galenic pharmacy, the tradition that guided early modern pharmaceutical theory and practice in the West from the first centuries of the Common Era well into the nineteenth century.

A study of what the pharmacy contained and why reveals the layers of that tradition and how it developed over time, reflecting a global history of the transmission of materials, knowledge, and techniques over centuries. That the first millennium of this development was largely centered in the Near and Middle East demonstrates the intertwined history and multiple bases of the Western scientific and medical tradition, and the false dichotomy often



Fig. I.3. Interior of an Apothecary shop. Credit: Wellcome Collection. CC BY.

made between “Orient” and “Occident” in the establishment of that tradition. That medieval Arabic authors established key components of this tradition and continued to be widely revered by European medical authors well into the eighteenth century similarly calls into question myopic views of European exceptionalism and the significance of Renaissance humanism in spurring the Scientific Revolution. A study of Galenic pharmacy over the *longue durée* and its long-term implications for Western understanding of the constitution and behavior of matter also reveals the great significance of pharmacy—and of artisanal pursuits more generally—as a cornerstone of ancient, medieval, and early modern epistemologies and philosophies of nature. Indeed, pharmaceutical matters were a major component of writings in natural philosophy and medicine, occupying some of the greatest scholars of the Greek, Arabic, and Latin knowledge traditions.

Galenic pharmacy’s engagement with pharmaceutical traditions indigenous to the Americas, moreover, shows both its long-term continuity, brought wholesale to the urban centers of the Spanish Empire, and its malleability, as it blended with local and domestic healing in rural areas. This flexibility was also apparent in the development of a parallel tradition of alchemical pharmacy with which it united in the later seventeenth century, leading to further

transformation of this ancient tradition until it gave way to the modern chemical age. Studying this history, in short, gives new perspective and insight into the development of Western science and medicine—its varied origins, its engagement with and inclusion of multiple knowledge traditions, the ways in which these traditions moved and circulated in relation to imperialism, and its long-term continuities as well as its dramatic transformations.

Galenic pharmacy was named after, and largely founded upon, the teachings of Galen (ca. 130–ca. 210 CE), a physician from Pergamon in the Roman Empire whose medical system came to dominate Western medicine for almost two millennia.<sup>3</sup> Galenic medicine taught that the human body was composed of four humors, which were themselves the product of a combination of four fundamental elements—earth, air, fire, and water—that made up all terrestrial matter. Each of these elements in what is called the “four-element theory” was in turn associated with a combination of qualities—hot, cold, wet, or dry—that were also imbued within all earthly matter (depending on its elemental composition), including the humors. The particular combination of elements and qualities within matter was called its “mixture,” later translated as “complexion” or “temperament.” In a healthy body, the humors and the elemental, or “primary,” qualities that made up its complexion were in balance, referred to as *krasis*; illness resulted when one or more of the humors, as manifested in their qualities, grew out of balance, a state of *dyskrasis*. Galen proposed various ways to correct imbalances, one of which was the use of medicines, or drug therapeutics, and the theory and practice of pharmacy constituted a major line of inquiry in his voluminous writings. In his writings, Galen argued that drugs, like all other matter, had their own complexions, and the application of a drug of opposite qualities to the diseased body would restore balance and thus health. Those drugs were said to cure by “altering” the body’s complexion; other drugs, called purgatives, cured by purging the overabundant humor. In this way, Galenic pharmacy was tied to fundamental issues in natural philosophy concerning the composition and nature of matter and its behavior, and thus was central to some of the most important philosophical debates of the ancient, medieval, and early modern periods.

Galenic medicine—its theory, epistemological basis, pathology, physiology, and anatomy—is well known and studied extensively, but Galenic pharmacy, though widely recognized, is little understood. Like Galenic medicine, Galenic pharmacy constituted a long tradition that developed out of the ancient Mediterranean and constituted the basis for pharmaceutical theory and practice in the West.<sup>4</sup> Indeed, Galenic pharmacy—though not labeled as such until much later—constituted a recognizable and coherent tradition with

a relatively consistent set of materials, ideas, and techniques from the time of Galen. Despite its relative stability over the *longue durée*, however, it was also a dynamic tradition that moved throughout the Mediterranean through a series of highly important translation enterprises, from the Greek medical tradition of the Roman Empire in which it first developed to the Arabic tradition of the Islamic Empires in the medieval period to the Latin and later vernacular traditions of medieval and early modern Europe. In the sixteenth century, Galenic pharmacy was once again in transit, brought to Mexico—evident in the contents of the Herrera pharmacy—under the Spanish Empire; and in the seventeenth, it merged with alchemical pharmacy.

Yet, despite their importance over time, Galenic pharmacy and “Galenicals,” the medicines prepared by its means, are in modern times often derided for their simplicity and backwardness, representing the antithesis of modern, evidence-based, allopathic medicine and considered the product of a primitive, prescientific era.<sup>5</sup> In a similar vein, Galenic pharmacy is contrasted with the “chemical medicines” and processes that joined it in the seventeenth century and that would eventually overtake it. Such attitudes not only belie the same progressivist, celebratory narratives that dominate much of the history of medicine but are both a cause and a symptom of a general lack of understanding of this longstanding and fundamental tradition in the history of Western medicine, a tradition that has received remarkably little attention from historians.<sup>6</sup> Whatever the perceived value of its remedies in the modern era, Galenic pharmacy comprised a set of highly complex practices and concepts, and an understanding of the material world that shared much in common with—and indeed helped lay the foundations for—modern chemical pharmacy. Many of its compounds, moreover, are still formulated in compounding pharmacies today, and many of its simples still serve as ingredients in homeopathic, herbal, and over-the-counter remedies. Without proper understanding of this tradition, the history of pharmacy and its significant place in the Western medical tradition remains incomplete.

The purpose of this book is to trace the origins and development of the main components of this tradition over time, leading to the particular collection of materials found in the Herrera pharmacy and the ideas and practices associated with them.<sup>7</sup> Each chapter identifies one aspect of this tradition—the simples, compounds, alchemical medicines, and equipment for processing them—and identifies key steps that took place through a series of stages over time to account for the materials and practices found in (and beyond) this Mexico City pharmacy. A study of these key steps over centuries reveals the significance of pharmacy to the Western scientific and medical traditions.

## The Stages of Development in Galenic Pharmacy

Galenic pharmacy consisted of a set of ideas and practices that began with ancient Greek teachings and developed in layers or stages over the centuries, in which key components of the early modern tradition would come into view. At the same time, a recognizable set of materials, techniques, and underlying theories forming the basis of the tradition was in place early on, stemming from a series of core ancient texts including the Hippocratic Corpus (5th/4th centuries BCE), Dioscorides's *De materia medica* (1st century CE), and especially works by Galen (2nd century CE), a prolific author and namesake of the tradition. Greek medical thought conceived of medicines as *pharmaka* that were instilled with “powers,” or *dunameis* (*dunamis* or *δύναμις* in the singular), that made them act in a certain way—the actions of drugs referred to today as pharmacodynamics.<sup>8</sup> In the first stage of the tradition, Galen codified and systematized these ideas in his writings. For Galen, the *pharmaka*, which he labeled “simples” to differentiate them from compounds, gained their powers from the qualities associated with their complexion. As such, each simple could be categorized according to its dominant element or elements, displaying the actions—heating, cooling, moistening, or drying—associated with those elements. These ideas, put forth in several works but particularly in *On the Mixtures and Powers of Simples*, provided the theoretical basis for subsequent understanding of the powers (later translated as the “virtues”) of simples.

While Galen dominated theoretical understanding of pharmacodynamics, Dioscorides (ca. 40–90 CE) had greater influence in later understanding of the actual substances in use, the collection of medicinal materials of the Galenic tradition referred to as its *materia medica*. In a treatise by that name, Dioscorides provided exhaustive descriptions of more than a thousand plant, animal, and mineral simples from an extended Indo-Mediterranean area, notably ordered according to their *dunameis*.<sup>9</sup> Although other simples were added to this collection over the centuries, Dioscorides's work continued to provide the basis for Galenic *materia medica* through the nineteenth century CE. Together, then, Galen and Dioscorides provided the theoretical and practical basis for knowledge and understanding of simples. Galen also wrote two major works on compound remedies, *Compound Remedies according to Place* and *Compound Remedies according to Kinds*.

In the second stage of the development of Galenic pharmacy, Galen's work was redacted and codified by a series of Byzantine encyclopedists, including Paul of Aegina (ca. 625–690 CE), who helped to spread his teachings throughout the Mediterranean, and beginning with Islamic conquests and especially

through a major translation effort in Baghdad under the Abassids (750–1258 CE), Arabic authors assimilated and built upon these works and translated Dioscorides as well. They added new simples, mainly aromatics from East and Southeast Asia, to the materia medica and compiled recipes for compounds into a new genre of pharmaceutical writing, the formulary, or *aqrabadhin* (Latinized to *grabadin*). Although Galen had written about compound remedies, his works on them were largely unorganized compilations of medical recipes from earlier authorities. The medieval Arabic formularies, which accompanied the gradual professionalization of pharmacy as a separate medical field, were organized systematically by type of compound with clearly delineated chapters, consistent recipes, and instructions for their formulation. Arabic physician-philosophers, including al-Kindī (ca. 801–873 CE), Rhazes/al-Rāzī (854–925 CE), Ibn Sīnā/Avicenna (ca. 980–1037), and Ibn Rushd/ Averroes (1126–1198), also grappled with some of the issues regarding pharmacodynamics that Galen had left unresolved: how to explain the ways in which qualities and powers of simples mixed in compound remedies, and how to explain the powers of substances like purgatives and some poisons, whose actions did not appear to result from their complexions. Ibn Sīnā in particular argued that these actions resulted, at least in part, from an external, celestial source, an organizing principle he termed the “specific form.” In this way, Ibn Sīnā opened the possibility of an alternate, hidden, or “occult,” source of power in pharmacodynamics that did not derive from the complexion. Such concerns were an indication of the significance of pharmaceutical matters to medieval natural philosophy and medicine, to the extent that three of Ibn Sīnā’s five books in the *Canons of Medicine* deal with pharmaceutical matters and cosmological, theological, and philosophical issues directly related to them.

In the third stage of development, Arabic advances in pharmacy, pharmacology, and pharmacodynamics were in turn brought to medieval Europe in the twelfth and thirteenth centuries through translation centers in Toledo and Salerno. There, Scholastic authors associated with medieval universities and their schools of medicine and theology (in Montpellier, Paris, and Bologna, especially) continued to debate and develop solutions to the ambiguities in Greek and Arabic natural philosophy related to the inherent powers of terrestrial matter and their relation to the celestial realm. Their work in turn resulted in the emergence of another foundational figure in the history of Western pharmacy, a pseudonymic author who went by the name of a ninth-century physician and medical author of the Islamic world, Yūḥannā ibn Māsawayh (ca. 777–857 CE), anglicized to John Mesue.<sup>10</sup> Unlike Galen, whose contribution to Galenic pharmacy is unquestioned, Mesue (“pseudo-Mesue” or “Mesue the

Younger,” as he was referred to) remains almost wholly unknown among modern scholars, although he was viewed by early modern apothecaries as a luminary, a “prince of medicine” to whom they owed much of the foundation of their work.<sup>11</sup> Mesue served as a conduit for Arabic pharmacy in the Latin West, writing three pharmaceutical treatises that went on to unprecedented fame and set the foundations for the very definition of the apothecary’s art, standardizing the formulary, and providing a more mechanical, corpuscular concept of pharmacodynamics that was to guide both theory and practice in the pharmacy from then on.

Mesue focused on purgative simples, arguing that their medicinal powers derived from two sources—the “elemental virtue” deriving from its complexion (following Galen), and the “celestial virtue” that was instilled (following Ibn Sinā and subsequent Scholastics) by astral influence. For Mesue, the celestial virtue was stronger than and overrode the elemental virtue; it was specific to each simple; and it could be manipulated in various ways to ensure optimum effects. One way to do this was through “election”—selecting the best possible simple and harvesting it at the place and time in which its virtue was strongest (or, for a dangerously strong virtue, when it was weakest). Another way to manipulate the virtue was through “correction”—isolating, manipulating, strengthening, or weakening the virtue through one of four different types of pharmaceutical processing—cooking, infusing, washing, or grinding. In this way, Mesue proposed an alternative to traditional Galenic concepts of pharmacodynamics in which a simple’s powers derived from a fixed complexion, introducing instead a quasi-mechanical concept of powers that could be manipulated.<sup>12</sup> Such a focus, which provided the basis for pharmaceutical practice from then on, led to an emphasis on technique rather than qualities or degrees.

In addition to his arguments regarding pharmacodynamics, Mesue also embraced the advances made in medieval Arabic formularies and produced a *grabadin* that would eventually standardize categories of compound medicines in the Latin West. With Mesue’s work, medieval and early modern pharmacy reached its full fruition. In the Spanish tradition—clearly following Mesue—Galenic pharmacy came to be defined as “the art of preparing simples and mixing compounds well” or “the art or science that teaches how to choose and prepare simples or natural bodies and from those to make compounds.”<sup>13</sup> It was thus associated with three main tasks: choosing optimum simples, processing these simples in order to prepare them for inclusion in a compound remedy, and formulating these compound remedies.

At the same time, Galenic pharmacy continued to evolve. With European



overseas expansion and the establishment of the Spanish Empire, Galenic pharmacy entered its fourth stage of development when it was transported to the Americas. Apothecaries trained in the Galenic tradition arrived in the Americas with the first Spanish settlements and went on to establish pharmacies, import and transplant simples, and dispatch medicines in the colonial cities of the Viceroyalties of New Spain and Peru. Colonial officials put legislation in place regulating pharmaceutical practice, instituting licensing requirements and regular pharmacy inspections to ensure that each pharmacy carried the requisite Galenic remedies and that they were in good condition—fresh and not spoiled. Thus the tradition of Galenic pharmacy stayed largely intact, as evident in the Herrera shop of Mexico City, but its contact with New World materia medica led to the addition of another wave of Mesoamerican “simples” to the traditional materia medica.

Galenic pharmacy was also transformed in the final stage of its development by its union with a separate tradition of alchemical pharmacy in the late seventeenth century. This tradition had been developing in Europe since the late medieval period, influenced by the Arabic alchemical tradition that sought to transmute base metals to gold by applying catalysts—labeled “elixirs”—that would promote perfect balance within them. Latin scholars applied these ideas to medicine, arguing that remedies crafted through alchemical means could bring similar balance to the human body to prolong life and preserve youth. Based upon these ideas, a series of medieval and early modern texts included recipes for an expanding set of alchemical remedies. By the early seventeenth century, a full alchemical formulary of waters, spirits, essences, extracts, tinctures, and salts had developed, and by the end of the century had joined with the Galenic tradition in a series of “chemico-Galenic” texts. This “chemico-Galenic compromise” lasted through the eighteenth and into the nineteenth century, but in the end chemical isolation of alkaloids and the eventual rise of the chemical manufacture of synthetic drugs overtook the Galenic tradition and led to its eventual obsolescence in Western allopathic medicine.

This book is thus a survey of key components in the development of Galenic pharmacy as it reached the early modern period: the history of its ancient origins, the development of major concepts and addition of new components through the medieval and early modern periods, and its ultimate demise as a result of its own dynamism. In this way, I aim to identify key moments in the shared tradition in its earlier stages, consulting the works of Hippocrates, Dioscorides, Galen, Paul of Aegina, Ibn Sīnā, and pseudo-Mesue (among others) who had widespread influence throughout the medieval Mediterranean and the Latin West.<sup>14</sup> However, for the early modern period, when the vernacular

traditions of pharmaceutical writing largely began, the book addresses the specific context of Mexico and the Spanish Empire. For this period, I refer to published and archival sources linked to that context—the Spanish pharmaceutical textual tradition, and archival documents from colonial Mexico, especially Mexico City, to see how Galenic pharmacy was practiced in daily life.

The pharmacy texts I consulted were mainly published in Spain, and include early modern pharmacopoeias (both traditional Galenic and chemico-Galenic), procedural texts explicating processing techniques, pedagogical texts designed to train apothecaries, and commentaries and translations of Dioscorides and Mesue.<sup>15</sup> Unlike the Latin and Arabic works of earlier periods, almost all of which were authored by physicians, the early modern texts were increasingly authored by apothecaries. I also use a series of Spanish and Nahua texts that were initiated largely at the behest of the Spanish Crown to inventory Nahua materia medica.<sup>16</sup> Finally, medieval and early modern Latin and vernacular alchemical texts provide the basis for tracing the development of alchemical pharmacy and its influence on Galenism. Archival documents include inventories of Mexican pharmacies conducted for the preparation of wills, pharmacy inspections, lawsuits, and criminal trials over the course of the eighteenth century, and prescription lists from four different cases spanning the late sixteenth to late seventeenth centuries totaling several thousand medicines. I have compiled six appendices detailing the different data derived from these sources and—because this study covers a long period and a relatively unfamiliar area of history—a timeline of key events, authors, and works. Appendices 1 through 4 are included in this book; appendices 5 and 6 are available for download at [upittpress.org/books/9780822946496](http://upittpress.org/books/9780822946496).

### **Pharmacy in History: Approaches and Historiography**

It may seem counterintuitive to approach what is a largely Mediterranean, and later an early modern European, tradition from the vantage point of Mexico. But what may at first seem disjointed is, if considered more carefully from a historical perspective, eminently logical. The Galenic pharmaceutical tradition encompassed a wide swath of the world for many centuries—to the point that pharmacies in Mamluk Cairo had much in common with those of sixteenth-century Seville, seventeenth-century London, and eighteenth-century Mexico City: they were part of the same tradition—one that developed and evolved, but whose core basis remained easily recognizable and largely intact. Second, as stated above, this tradition was brought to Mexico City by the colonial establishment in which apothecaries trained and licensed in Galenic pharmacy began arriving with the first Spanish settlements in the Caribbean

and mainland, bringing with them familiar substances, books, and practices.<sup>17</sup> When Galenic pharmacy was transported to the colonial cities of the Spanish Empire, it also stayed largely intact.

These findings may challenge assumptions and expectations that often inhere in colonial histories of science and medicine. Readers of these histories, consciously or not, expect to learn what was “different”—to find out how European practices, ideas, and norms altered when transported to colonial or non-European regimes. With these assumptions, Herrera’s pharmacy in Mexico City is valuable only for what it reveals about colonial medical regulation, licensing and inspection requirements, or its adoption of indigenous medicines—its place, in other words, within the Spanish imperial system and its adaptation to the particulars of the Mexican colonial context. It is not an example from which to learn about Galenic pharmacy more generally, despite the fact that this tradition undergirded and provided the rationale for the vast majority of the medicines, books, utensils, and equipment in Mexican pharmacies. For that, apothecary shops in Paris, Florence, Venice, or London are more suitable—and for which the question of how these apothecary shops were “different” seems nonsensical.

We must ask ourselves why we make these assumptions—where they come from and what they reveal about the state of the field in the history of science and medicine. Through these assumptions, the European experience is posited as normative, the colonial as derivative, peripheral, “exotic”—valuable only as a supplement to a story already known, and one original to Europe. Indeed, these expectations and assumptions have met with pointed critique among colonial historians of science and medicine in the last few decades, who argue for “multiple metropolises” and “centers of calculation” in the creation of natural knowledge, and emphasize the creativity and dynamism of indigenous knowledge traditions outside of Europe.<sup>18</sup> As valuable as they are, however, these contributions in some ways serve to extend and prolong binaries when, in truth, knowledge production and dissemination is a fundamentally fluid enterprise that often defies political and temporal boundaries.

Additionally, in the case of the Spanish Empire, its colonial cities were themselves highly urbanized metropolitan centers dominated by Spanish inhabitants and Hispanized customs. Mexico City, in particular, was a very wealthy metropolis with its own printing press, university, and a centuries-long tradition of Galenic pharmacy that differed very little from the Galenic pharmacy practiced in Spain. By 1646 the Crown had established a medical board there to govern licensing and practice in the viceroyalty, and by the eighteenth century there were 105 pharmacies in the cities of New Spain—34 in Mexico City,

11 in Puebla, 5 in Querétaro, 5 in Veracruz, 4 in Guadalajara, 4 in Guanajuato, and 4 in Valladolid, with the rest spread throughout the cities of Celaya, Acapulco, Antequera, Zacatecas, and Toluca. These were few in relation to the total population, an indication that Galenic pharmacy was for urban, Hispanized, and largely Spanish inhabitants, and was only one among an array of medical choices—indigenous and imposed—being practiced.<sup>19</sup> Yet the presence of these pharmacies, however few, is an indication of the powerful hold of the Galenic medical system in the Spanish imperial regime, and of its legal division of the colonial population into “two republics,” the “Republic of Spaniards” and the “Republic of Indians.” The two republics were subject to different laws, different courts, and different taxation, and were supposed to live separately. In this system, Spaniards were to live in the colonial cities, apart from the native populations; the latter, by contrast, were to continue living in traditional communities. In practice, there was no such neat separation between the populations; nevertheless, urban areas tended to be dominated by Hispanized customs and practices—hence the continuity of Galenic pharmacy in and beyond Mexico City.

The finding that apothecary shops of Mexico City serve as excellent windows into Galenic pharmacy, furthermore, makes more sense when placed within a recent trend toward more global considerations in the history of science—a “global turn” that has been the subject of several journal fora in recent years aiming to transcend what has been viewed as the increasing parochialism of the field and the narrowing of research topics over the past century.<sup>20</sup> These critiques point out that despite the aims and wishes of the field’s founders, historians of science too often focus on narrowly defined topic areas, staying firmly within accepted periodizations, and informed by the boundaries of modern nation-states and accepted binaries of center/periphery, Western/non-Western, European/non-European, and colonial/metropolitan. Those arguing for more global consideration in the history of science have asserted that, like world historians who transcend traditional boundaries and trace ideas and themes as they run their historical course, historians of science should also trace ideas, objects, and practices “in transit” through shifting political bounds and shaped by evolving contexts. The focus ought to be on transmission and interaction, circulation and zones of trade, “knowledge in motion.” In addition to geographical breadth, we also need far more crossing of traditional chronological boundaries. The significance of Galenic pharmacy to the Scientific Revolution, for example, is visible only with the benefit of a centuries-long view that takes into account Greek, Arabic, and Latin contributions. The obvious challenges posed by such long-term studies, moreover, could certainly be overcome with

more communication between medievalists and early modernists, and with more collaboration among Arabic and Latin scholars.

Movement in this direction, at least with regard to geography, has taken place within Atlantic world historiography and its recent attention to science and empire, tracing the transit of ideas and commodities through networks over oceans and continents.<sup>21</sup> The same is true for examinations of the early modern global drugs trade, medical consumerism, and the expanding medical marketplace, all of which bodes well for the future of the discipline.<sup>22</sup> But the new models provided by these emerging fields did not explain what I was seeing in the archival documents pertaining to pharmacies of Mexico's colonial cities. As I sought to understand the contents of the pharmacies in Mexico City, Puebla, Querétaro, Guadalajara, or Celaya, I was inevitably led not only across the Atlantic to Spain but far back in time and on a path that crisscrossed the Mediterranean and wove together the shared and evolving knowledge traditions of Rome, Alexandria, Damascus, Baghdad, Cairo, and Córdoba; Salerno, Toledo, Bologna, Padua, and Montpellier; and Florence, Salamanca, Madrid, Paris, and London. The Spanish Galenic tradition, I found, was the heir to a long and rich tradition that had built up over centuries of Greek, Arabic, and Latin learning. It was always "in transit" and though stable and long-lasting, it was not static and did not stay contained within the bounds of a particular region, culture, state, or empire. In fact, it traveled widely over long distances; it was transcribed and translated through multiple languages, interpreted and built upon through different lenses; it spread over land and sea and survived the fall of multiple empires from the Greeks to the Romans to the Byzantines to the Arabs and then to the Spanish and the Nahua, with each stage adding something of value. This tradition lasted a very long time and necessitated a deep look into the past, its long-term significance not visible unless one was willing to move through wide stretches of time and space.

When I began to conduct what I assumed would be basic background research into this Galenic pharmaceutical tradition, moreover, I found no adequate synthetic treatment of it, and a lack of basic understanding of many of its key concepts, texts, authors, materials, and practices. Mesue, for example, was largely unknown and his great impact on pharmacy largely undocumented in the secondary literature. The concept of the medicinal virtue in early modern medicine—so important for explaining the shift to an emphasis on pharmaceutical technique—had yet to be defined or problematized, along with its connection to the ancient concept of *dunamis*. Furthermore, despite a recent and much-needed turn to material culture and artisanal influence on the development of science, the substances and workshop practices used in formulating

Galenic medicines have been left largely unexplored.<sup>23</sup> Similarly, discussions of chemical medicines have made little mention of the medicines themselves, how they were formulated, or their connection to the medieval tradition of medical alchemy. And recent valuable studies of the rich recipe literature in early modern Europe have yet to substantively address what were perhaps the most ubiquitous recipe collections of all, the medieval and early modern formularies.<sup>24</sup> Finally, the overarching influence of Arabic pharmacy on medieval and early modern Europe continues to be obfuscated under the label of “Galenic” pharmacy, papered over by references even in the most recent scholarship to “rediscoveries,” “reintroductions,” and “purified translations” of ancient Greek scholarship that constituted only a part of the overall tradition, while ignoring centuries of development and advancement by cultures and empires now characterized as an Orientalized “East”—despite the fact that they built much of the foundations of this Western tradition.<sup>25</sup> Such statements reveal problematic understandings of the significance and effectiveness of Renaissance humanism, which is assumed to have ushered in a new era of natural philosophy based upon direct translations of ancient Greek works. In my research, the Arabic translations and commentaries of those works, as well as the Latin translations and commentaries of the Arabic works, continued to be of paramount importance in Galenic pharmacy, held in the highest esteem throughout the early modern period.

Despite the importance of this early tradition, furthermore, historical scholarship on pharmacy has largely focused on the modern period, the nineteenth century and beyond, when pharmacy grew increasingly tied to chemical manufacture. Galenic pharmacy remains little understood and often derided, and still lacks synthetic treatment upon which historians can build.<sup>26</sup> Whereas the Galenic medical tradition and its long-term hold over the Western medical tradition is widely understood, Galen’s treatment of pharmacy, pharmacology, and pharmacodynamics has come to the attention of scholars only recently, and there are no modern editions of Galen’s main pharmacological texts.<sup>27</sup> Nevertheless, there are major contributions in the literature that lend critical knowledge and information about the topic. Owsei Temkin’s *Galenism: Rise and Decline of a Medical Philosophy* (1973) provides an important model for the study of Galen’s influence over time, and other historians of ancient medicine have produced scholarship of the utmost importance for understanding early materia medica and conceptions of pharmacy and pharmacodynamics. Scholarship on medieval and early modern pharmacy has also been fundamental to my understanding, including works on medieval Arabic and European pharmacy, and on the transmission of Galen’s corpus and of Arabic pharmaceutical

learning to the Latin West. Studies on individual or regional pharmacy in early modern France, England, Italy, Spain, and Spanish America finally, have provided very useful comparisons, although they often constitute one case study or focus on regulations, licensing, and professional status—the very things that differed according to time and place—rather than examining the larger shared tradition of Galenic pharmacy.

Recent publications in the history of science and medicine as well have pointed to new areas of research and methodology that relate to the history of pharmacy. Works on regimen and dietetics reveal the fine line between food and medicine in Galenic pharmacy and awareness that drug therapeutics was only one part of the disease-fighting repertoire.<sup>28</sup> Scholarship on artisans and material culture have shed light on the importance of workshop practices to the scientific and medical enterprise; and new research on recipes, books of secrets, and domestic medicine serve to tie together themes of artisanal and household labor and highlight the important role of the domestic sphere in healing and medicine.<sup>29</sup> Finally, a recent issue of *Bulletin of the History of Medicine* on the testing of drugs in medieval and early modern Europe also indicates growing interest in the field of pharmacy and drugs.<sup>30</sup> This work provides new and promising directions for the field, but without an overall understanding of Galenic pharmacy—its materia medica, its understanding of pharmacodynamics, its methods of processing materials, and its array of compound medicines—they remain without a larger narrative in which to place the findings and tie them together.<sup>31</sup>

Given this lack of overarching narrative, in pursuing my study of colonial Mexican pharmacy, I made the conscious decision to delve further into the ancient and medieval Mediterranean roots of the Galenic tradition I found there, because without a basic concept of that narrative there was little I could say about the contents of those pharmacies beyond the most superficial treatment. Studying an apothecary shop in eighteenth-century Mexico City, in other words, required an understanding of the long history of Galenic pharmacy in order to make sense of what lay inside it and why. I found it highly problematic to allow modern boundaries and borders—geographic, temporal, and disciplinary—to impose limits on the study of a centuries-old tradition that followed a different trajectory. In fact, such an undertaking proved to be absolutely necessary if I were to say anything meaningful about those contents.

Taking on a such a broad genealogical project, however, also means that many of the particulars have yet to be worked out or examined in sufficient detail. This is especially true regarding Arabic contributions to pharmacy, an area that, as indicated above, deserves far more scrutiny and inclusion within

the history of science and medicine. In addition, the translation of *dunamis* as “virtue” in the early modern medical literature (and its other iterations as “faculty,” “potency,” “property,” “force,” “potentiality”) requires further investigation. We also need additional study of purgatives, that group of medicines that worked according to a hidden or occult “celestial virtue.” Promising recent work on poisons has pointed the way, but more is needed.<sup>32</sup> Additionally, it would be valuable to trace the histories of individual categories of compounds and the specific remedies within each category, and to note the evolution of ancient and medieval workshop practices in their formulation and classification. And while this study aims to highlight the shared tradition of Galenic pharmacy, it remains to be seen how much of that core remained consistent from region to region in the late medieval and early modern periods, how much it varied, and what those variations were. Further study, in other words, will hopefully fill out the larger narrative of the basic thread laid out here.

This book, then, traces the history of Galenic pharmacy through the six stages outlined above. Each of the chapters identifies key moments in the reshaping and transformation of this tradition that move roughly chronologically, but the chapters themselves are not arranged by time period. Rather, each chapter focuses on a central question regarding the contents of the Herrera pharmacy in Mexico City and traces their development through the various stages. Chapters 1, 2, and 3 delve, respectively, into the centuries-long evolution that led to the kinds of simples, the equipment for processing those simples, and the compounds found in the Herrera pharmacy. Each chapter traces the history of those components and the theories as to how and why they worked, and ends with a discussion of materials, practices, and ideas as they entered the early modern period. Chapters 4 and 5 then look into the ways that Galenic pharmacy continued to develop when confronted with two alternate pharmaceutical traditions: that of the Nahuas of central Mexico, and that of the European alchemists who shared many of Mesue’s ideas about the powers of medicines but differed as to the methods by which to manipulate them. Chapter 4 examines the simples of American origin itemized in the Herrera pharmacy, while chapter 5 explains the presence of alchemical medicines and apparatus that appeared there, the product of another very long alchemical tradition that merged with Galenic pharmacy and would eventually overtake it.