Marketing Nature: Apothecaries, Medicinal Retailing, and Scientific Culture in Early Modern Venice, 1565-1730

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Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of History in the Graduate School of Duke University

2015
ABSTRACT

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Abstract

This dissertation examines the contributions of apothecary craftsmen and their medicinal retailing practices to emerging cultures of scientific investigation and experimental practice in the Italian port city of Venice between 1565 and 1730. During this important period in Europe’s history, efforts to ground traditional philosophical investigations of nature in a new material culture of empirical and experimental practice elicited significant debate in scholarly communities. Leading the way in advancing the authority of “experience” were Europe’s medical practitioners divided between university-trained physicians and guild-regulated apothecaries and surgeons. In Italy, humanist praise for the practical arts and new techniques of analyzing inherited texts influenced sixteenth-century university physicians to redefine the medical discipline in terms of its practical aims to intervene in nature and achieve useful effects. This led to an important revival in northern Italian universities at Ferrara and Padua of the classical Greek writings on the empirical disciplines of anatomy and pharmacy. In the sixteenth century the university at Padua, under the patronage of the Republic of Venice, was the site of Europe’s first public botanical garden, anatomical theater and clinical demonstrations. The university also hosted important experimental practitioners such as Andreas Vesalius, Galileo Galilei and William Harvey, and remained a leading center of medical investigation attracting an international faculty of students and professors until the eighteenth century. At the same time, the study of Aristotelian natural philosophy in original Greek texts was largely emancipated from the faculty of theology at Padua,
nurturing innovative discourses on experimental method by figures such as Giacomo Zabarella and the anatomist Fabricius Aquapendente.

The unique intellectual climate at Padua has thus attracted significant scholarly attention in the history and philosophy of early modern science. However, the university’s important relationships with the thriving world of artisan guilds and their commercial practices in the nearby city of Venice have not received due attention in historical scholarship. To address this issue, this dissertation focuses upon a unique group of guild-trained medical practitioners in Venice – apothecaries – to trace the circulations of materials, skills, and expertise between Padua and the Venetian marketplace. Drawing on the methods of urban history, medical anthropology, literary studies and intellectual history, I conceptualize Venice as an important “contact zone,” or space of dialogue between scholarly and artisanal modes of investigating and representing nature between the latter sixteenth and early eighteenth centuries. In particular, I focus upon emerging apothecary strategies for retailing nature to public audiences through their medicinal creations, printed books, licensing petitions, and their pharmacy shops. Through these practices, apothecaries not only marketed commercial remedies during a period of growing interest in pharmaceutical matters, but also fashioned their own expertise as learned medical practitioners linking both theory and practice; head and hand; natural philosophy and practiced skill. In 1565 Venice’s apothecaries made their first effort to define their trade as a liberal profession in establishing a College of Apothecaries that lasted until 1804. Already by the turn of the eighteenth century, however, Venice’s apothecaries had adopted the moniker as “Public Professors” and engaged in dialogue with leading professors at Padua for plans to institute a new school of “experimental
medical chemistry” with the prior of the apothecary college proposed as its first public demonstrator. Looking to a wide variety of statements on the urban pharmacy in Venice in published medical books, pharmacopeias, trade manuals, literary works, civic rituals and archival licensing and regulatory decrees, I trace the evolution of the public apothecary trade in Venice, paying particular attention to the pharmacy’s early modern materialization as a site of cultural and intellectual exchanges between the artisan workshop and the university world inhabited by scholars.

My readings of these sources lead to three important conclusions regarding the significance of apothecary retailing to the scientific culture of early modern Italy. First, the urban terrain of artisan practice in a merchant republic must be placed alongside the traditionally studied princely courts and universities as a fertile ground for dialogue between artisans and scholars in the study of nature. Second, apothecary investments in processing and retailing nature during this period made significant contributions to the material culture of early modern science in both mediating a growing pharmacopeia of exotic materials imported from around the globe, and in fashioning workshop models for the first university chemical laboratories instituted at Padua in the eighteenth century. And third, apothecary marketing strategies expressing their own medical expertise over nature’s materials articulated a fusion of textual learning and manual skill that offered some of the earliest profiles of the experimental practitioner that was eventually adopted in the public discourse of the experimental New Sciences by the latter seventeenth century.
Dedication

To my family, Lynn, Dave and Brad.
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List of Abbreviations

ASV – Archivio di Stato di Venezia
BMC – Biblioteca Museo Correr
BNM – Biblioteca Nazionale Marciana
ACR – Accademia dei Concordi di Rovigo
BOBP – Biblioteca dell’Orto Botanico di Padova
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The person most responsible for the particular theme of this dissertation, however, is Valeria Finucci at Duke. Her course on medicine and the body in Renaissance Europe was among the first I took at Duke and immediately inspired me to enter into a world of early modern medicine and science I knew very little about at the time. Her immense kindness and infectious enthusiasm for the history of medicine, literature, and the city of Venice always restored my sense of purpose and commitment to a challenging project. Through my conversations with Valeria I learned to see the history of science and medicine through a much broader frame incorporating art, literature, theater, and
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Introduction

The Public Culture of Pharmacy in Venice

In sixteenth-century Europe one drug stood above all others as a panacea unmatched for its therapeutic capacities: Theriaca Andromachi, or, the Theriac of Andromachus. So named for the first century Roman physician credited with its perfection, Andromachus the Elder, the syrupy theriac concoction was composed of more than sixty botanical substances, including cinnamon, myrrh, cardamom and opium. Most important of all was the inclusion of the macerated flesh of poisonous vipers, said by classical medical authorities to make the drug a powerful antidote to all manner of poisons. The authority of theriac derived, in part, from its obvious expense, but also from the dramatic ceremony of its manufacture that took place each spring in the public squares of cities in Italy and Germany. In the city of Venice, where theriac was strictly regulated by the Venetian Republic, large quantities of vipers were brought in annually for public slaughter by apothecary apprentices and made into trochisci, small preserved tablets, eventually incorporated into the final theriac mixture. In the piazzas outside of the shops licensed to prepare and sell theriac the numerous ingredients were placed on public view in painted majolica jars where they were inspected by fully costumed apothecaries and members of the College of Physicians. Finally, to the accompaniment of music and poetic recitations praising the drug’s virtues, the mixing of the ingredients, performed by shop assistants, began in large bronze mortars lined along the piazzas. The proceedings generally took forty days to produce an acceptable batch of theriac, which was then left to age from anywhere between two and twelve years before it could be consumed. Praised by poets
and humanist physicians in numerous printed treatises, Venetian theriac, or “treacle” as it was known in London, became the standard for all theriacs, and was packaged and exported with the printed seals of the noted Venetian pharmacies that specialized in its very public production.\(^1\)

In many ways the public theater of theriac in Renaissance Italy presents a striking contrast with our contemporary age of corporate pharmaceutical production in which medicinal objects are often designed and manufactured behind the closed doors of highly technical private laboratories. At the same time, however, the ceremonial promotion of this classical panacea also strongly resonates with our present era in which actors, designers, and artists are daily enlisted to promote the immediate effects of various mood stabilizers, diet pills, and oral treatments for sexual dysfunctions.\(^2\) While the tasks of developing and promoting pharmaceuticals are divided today between laboratory pharmacists and public relations professionals, in early modern Europe apothecary

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\(^1\) According to the description of the theriac recipe passed down by the first century physician Galen in his tract *THERIACA AD PISONEM*, the drug was invented by Mithridates IV of Pontus as an antidote against the bites of poisonous animals. Galen relates that after Mithridates was defeated by the Romans, many physicians sought out his antidote known as “Mithridatum”. The most noted was the elaboration of Andromachus the Elder who added poisonous snakes to the mixture and presented a recipe of sixty-four ingredients in poetic form. While various forms of theriac were used throughout the European Middle Ages, the penetration of humanistic studies into medicine in the sixteenth century led to a dramatic revival of debate over theriac’s proper composition and modes of operation. A large body of material now exists on theriac in the classical world and in early modern Europe. I list here only a few notable discussions: Gilbert Watson, *THERIAC AND MITHRIDATUM: A STUDY IN THERAPEUTICS* (London: Wellcome Historical Medical Library, 1966); Giuseppe Olmi, “Farmacopea antica e medicina moderna: La disputa sulla teriaca nel cinquecento Bolognese,” *Physis* (1977); Marianne Stossl, *Lo spettacolo della Triaca: produzione e promozione della “Droga Divina” a Venezia dal Cinque al Settecento* (Venezia: Centro Tedesco di Studi Veneziani, 1983); Paula Findlen, *Possessing Nature: Collecting, Museums, and Scientific Culture in Early Modern Italy* (Stanford University Press, 1996); Vivian Nutton, “Galen on Theriac: Problems of Authenticity,” in *Galen on Pharmacology: Philosophy, History, and Medicine* (Brill Publishing, 1997), 133-153.

\(^2\) There are now many critical studies on the modern pharmaceutical industry but I have found the very best introduction to be the collection of essays contained in: Sergio Sismondo and Jeremy A. Greene, eds., *The pharmaceutical studies reader* (Malden, MA: Wiley Blackwell, 2015). For the concept of “pharmaceuticalization” – meaning the growing assignment of medicinal treatment for all manner of perceived “disorders” – see, John Abraham, “Pharmaceuticalization of society in context: theoretical, empirical and health dimensions,” *Sociology* 44, n. 4 (2010): 603-622.
manufacturers were themselves the promotional retailers of their own therapeutic creations. Unlike their physician counterparts, whose authority derived from their intellectual backgrounds and university degrees, guild-trained apothecaries, like other artists and craftsmen, relied upon their manual creations to stand as witnesses to their knowledge, skill and expertise. Early modern apothecaries thus specialized in the crafting of objects with a highly unique status, bearing signatures as philosophical demonstrations of nature’s principles, as medical instruments for bringing about health, and as commercial commodities that were the lifeblood of thriving local communities increasingly linked together in expanding networks of exchange. In light of the multivalent nature of their medicinal products, the study of early modern apothecaries therefore suggests an important opportunity to explore the connections between scientific cultures and cultures of commercial retailing in the early modern world.


Few early modern locales more readily present themselves to such an investigation than the northern Italian port city of Venice. A uniquely canal-laced city settled in the early Middle Ages and built on the outer marshes of Italy’s Adriatic coast, Venice for centuries stood as the medieval European gateway to the spices of the Indian Ocean brought to Levantine ports in the eastern Mediterranean. From there Venetian merchants carried them back to their well-protected city which flourished as a center of trade and shipping. Though ruled by a narrow oligarchy, Venice nevertheless attracted a steady stream of professionals, tradesmen, and shopkeepers who formed their activities into numerous guild corporations and religious confraternities. Spice dealers, known as “speziali di grosso”, constituted a large commercial sector in the city. In 1258 they joined with medical apothecaries, the “speziali di medicina”, to form a guild corporation that lasted until 1565 when the apothecaries separated from the grocer’s guild to form their own Venetian College of Apothecaries. As an important expression of the Venetian apothecary trade’s independence from the direct authority of local physician’s boards, the


College remained the organizational center of the trade until seven years after the fall of the Republic in 1804.\textsuperscript{8}

Since at least 1297 participation in the public affairs of the Venetian Republic had been restricted to roughly three hundred merchant families whose ranks remained relatively stable and unmarked by violent rebellion until the arrival of Napoleon in 1797.\textsuperscript{9} For many Renaissance observers the Republic’s seemingly harmonious political constitution, which had miraculously resisted the political turmoil of other European states over the centuries, was affirmed in the very architectural space of the city itself; a spreading mass of stone and marble that appeared to float on the waters of the Adriatic. For the sixteenth-century emissary Cornelio Frangipane, the Republic was nothing less than a “recipe of liberty, a temple of religion, a true shelter of peace and tranquility.”\textsuperscript{10} The Venetian physician Prospero Borgarucci, in his \textit{Contemplations on anatomy} (1564), explained to his noble patron the analogies between the human body and the city, and thus the need for princes, like physicians with their patients, to acquire a cognition of anatomy to maintain the prosperity and health of their polities. Yet, in a republic, Borgarucci added, the tonic of princely rule was replaced by the rule of law: “to sustain…and liberate it from men of bad condition they were introduced the Laws: similarly for conserving the body and for liberating it from diseases we have from the

\textsuperscript{8} The standard reference for the history of the Collegio remains Girolamo Dian’s, \textit{Cenni storici sulla farmacia veneta} (Filippi Editore, 1983; originally published, 1901).


heavens, Medicine.”

Two years later, Borgarucci added another work, *The Fabric of the Apothecary* (1566), in which he devoted over 1000 pages to various aspects of the apothecary’s art, as well as a lengthy discussion on the nature and virtues of Venetian theriac. As a perfectly balanced medicine composed of the most prized commodities that linked Venice with the riches of the east, Venetian theriac mirrored the prosperous and stable city-state Republic where it was annually manufactured in full view of the world.

In the second half of the sixteenth century the expansion of apothecary investments in the lucrative theriac market greatly enhanced the prestige of their profession and encouraged more vocal claims for their public roles as important defenders of public health. Through their petitions and publications apothecaries attested to the importance of their profession in providing the urban community with both life-sustaining commerce and knowledgeable expertise in summoning nature’s medicinal powers. Fully half of the thirty-two new statutes proposed at the founding of the Venetian College of Apothecaries concerned the regulation of theriac production. Trade in theriac ultimately offered Venice’s apothecaries not just commercial prosperity, but a chance to reinvent themselves as merchant scholars whose expertise in matters of ‘materia medica’ found sanction through their parochial attachments to Venice and its

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11 Prospero Borgarucci, *Della contemplatione anatomica* (Venice, 1564), 5.

12 Prospero Borgarucci, *La fabrica degli spetiale* (Venice, 1566).


14 *Ordini e capitoli* (n. 36), 5. “the most important and necessary art of the Apothecary, which holds first and principle place since it is dedicated to the service and preservation of human bodies.”

15 See note 7.
ancient civic institutions. By the seventeenth century those respected Venetian pharmacies that were licensed to manufacture theriaca also began to make larger investments in instruments for distilling and the production of chemical remedies. The most famous was the Struzzo (Ostrich) pharmacy founded by the German émigré Georg Melich in the sixteenth century.\textsuperscript{16} Widely respected for his erudition and botanical knowledge among the Veneto community of humanist physicians, Melich was also held in high esteem by Venice’s leading popular distiller of experimental remedies (and fervent critic of the medical establishment), Leonardo Fioravanti.\textsuperscript{17} Melich’s \textit{Advice for the composition of medicines for use in the pharmacy} (Venice, 1575), brought readers directly into his workshop practice and was reprinted several times over the next century.\textsuperscript{18} His seventeenth-century successors, Alberto Stecchini and Antonio de Sgobbis, both added their own published writings on new pharmaceutical materials and techniques undertaken at the Ostrich.\textsuperscript{19} De Sgobbis’ \textit{Universal Farmaceutical Theater} of 1667, reproduced recipes for hundreds of chemical remedies and presented an argument in favor of the mutual accord between the new chemical medicine and the traditional botanical remedies of the Greek physicians. Operating between the professional center

\textsuperscript{16} For a brief introduction to this pharmacy, see: Richard Palmer, “Pharmacy in the Republic of Venice,” in \textit{The medical Renaissance of the sixteenth century}, eds. Andrew Wear and Roger Kenneth French (Cambridge University Press, 1985), 100-117.

\textsuperscript{17} Fiorvanti takes note of Melich as a “huomo dottissimo e nella sua professione e’ unico…gradissimo distillatore” in his, \textit{Specchio di scienze universal} (Venezia, 1564), 63.

\textsuperscript{18} Georg Melich, \textit{Avvertimenti nelle compositioni de’ medicamenti per uso della spetiaria} (Venezia, 1575).

and the unincorporated margins of the medical community, Melich’s pharmacy thus became an important center of pharmaceutical publishing and chemical experimentation linked together by the general pursuit of commerce in the early modern city. Hence, as a result of their late Renaissance investments in the merchandising of classical medical knowledge, some Venetian pharmacies also became important sites of invention and experimentation in the seventeenth-century city. Most importantly, in marketing nature to urban audiences, Venice’s commercial apothecaries eventually came to market themselves as disinterested experimental philosophers with special investments in preserving the public health of the local urban community.

The ritual production of Venetian theriac thus draws together in one cultural practice the historically generative encounters between commercial retailing, science, and urban culture that are the primary subjects that I explore in this dissertation. In directing my attention to the ways Venetian apothecaries created markets for their products, I also aim to trace the emergence of new expressions of medical expertise organized around therapeutic objects during this period. As medical practitioners and commercial retailers, apothecaries were able to navigate continuously between spaces devoted to knowledge production and to the production of commodity value through their manufacture and marketing of medicines.20 By looking to public retailing and marketing as important inducements to experimental practice in early modern medicine, my research links the social and cultural history of urban craft guilds with the history of ideas to make a new

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20 For a general introduction to the apothecary trade in Europe see, Edward Kremers and Georg Urdang, History of Pharmacy (Lippincott, 1951); and the recent essays in Louise Hill Curth, ed., From Physick to Pharmacology: Five Hundred Years of British Drug Retailing (Ashgate Publishing, 2006).
contribution to the study of guild-trained artisans as scientific practitioners in early modern Italy.  

Commerce, Artisan Science, and Cities in Early Modern Europe

One of the most important developments in recent historiography on early modern science has been the attention given to the ways natural philosophers engaged with the material culture of commerce and artisan practice in the sixteenth and seventeenth centuries. Whereas an older generation of scholarship scrutinized the theoretical content of important texts such as Galileo’s Two World Systems (1632), Robert Boyle’s The Skeptical Chymist (1661), or Isaac Newton’s Opticks (1704), recent studies have drawn attention to their extensive interests in alchemical practice, rhetorical self-promotion in seeking patronage, and their engagements with the artisan marketplace for scientific instruments. This shift in focus reflects a new orientation towards the study of science


not merely as a body of concepts, nor of methodological programs, but as a set of
empirical practices for engaging with nature widely dispersed in the society and economy
of early modern culture. As Harold Cook has put it, “one of the more interesting
problems, then, is how some kinds of knowledge about ways of interacting with the
constituents of the world were elevated to the status of learned knowledge…” From this
perspective the study of artisan workshop practices, and the forms of knowledge they
entailed, take on a new significance in the history of science largely overlooked in
previous scholarship.

Over the last two decades Pamela Smith’s insightful publications on this issue
have set a whole new agenda for historians of science interested in teasing out the
relationships between craft knowledge and philosophical reflection; or in Smith’s terms:
between making and knowing. Tracing this hierarchical distinction between theoretical
knowledge and empirical technique in Western culture back to Aristotle, Smith has
proposed the notion of an “artisanal epistemology” long active in the late medieval craft
workshops that was eventually appropriated by scholars in the seventeenth century and

(Cambridge University Press, 1997); Pamela Smith and Paula Findlen, eds. Merchants and Marvels:

Culture of Empirical Knowledge (Ann Arbor: University of Michigan Press, 2014); Ursual Klein, ed.,
Materials and Expertise in Early Modern Europe: Between Market and Laboratory (Chicago: University of
Chicago, 2010).

24 Harold Cook, “Victories for Empiricism, Failures for Theory: Medicine and Science in the Seventeenth
Century,” in The Body as Object and Instrument of Knowledge: Embodied Empiricism in Early Modern

Materials and Expertise in Early Modern Europe: Between Market and Laboratory, ed. Ursula Klein
(Chicago: University of Chicago Press, 2009), 29-50; Ursula Klein, "The Chemical Workshop Tradition
and the Experimental Practice: Discontinuities within Continuities," Science in Context 9, no. 3 (1996):
251-287; Ursula Klein, "The Laboratory Challenge: Some Revisions of the Standard View of Early Modern
projected in the new profile of the experimental philosopher.\textsuperscript{26} At the heart of the artisan outlook was the premise that the body was the only source of certain knowledge about nature. Where words constituted the privileged currency of philosophical demonstration and logical dispute in the universities, artisans sought to demonstrate nature’s principles by imitating its productive capacities with crafted things. The attainment of knowledge in the artisanal mode came not from reading paper books, but from direct encounters with the ‘book of nature’ itself.\textsuperscript{27} Artisanal epistemology thus denotes something quite different from propositional knowledge in that its pathway towards greater theoretical certainty is marked by the active manipulation of matter to produce effects, rather than the philosophical deliberation over existing phenomena to deduce their causes. In the schemas of classical philosophers, certain knowledge of nature was something to be arrived at - not produced - thus Aristotle’s opinion on experimental intervention as a corruption of the course of nature marking its conclusions as less certain than those arrived at by philosophical deduction.\textsuperscript{28}

An important line of investigation in the history of science thus considers how ordinary artisans and craftsmen contributed to the broad cultural critique of Aristotle’s stance on empirical experimentation in seventeenth century natural philosophy. For the sociologist Edgar Zilsel, writing in Vienna before the Second World War, the so-called “Scientific Revolution” of the seventeenth century traced its roots to increasing social


encounters and collaborations between craftsmen and scholars in the early modern centuries. His primary case study focused on the English physician William Gilbert and his critique of Aristotle in his work, On the Magnet. Zilzel therefore offered only the slimmest of evidence to support his far-reaching thesis, which also did not question the traditional identification of science with theoretical reflection. However, Pamela O. Long has recently revived the general tenor of Zilzel’s argument in proposing early modern courts, universities, and cities as key social contact zones between scholars and artisan practitioners. Between 1400 and 1700, she argues, the traditional lines demarking these two groups and their procedures for representing nature became increasingly intertwined so that in fifteenth-century Italy we see workshop-trained artists and goldsmiths, like Alberti and Da Vinci, begin to approximate the status of learned intellectuals. In the princely courts of Renaissance Europe artisan skills were increasingly valued to assist nascent state-builders in the design of fortresses and arms, and to produce works of art and architecture to frame the exercise of public power in the ongoing spectacles of court life. In these settings humanist scholars and craftsmen were drawn into one another’s orbit, leading to new styles in the representation of nature that distorted the lines between nature and artifice. Nature became something to be staged in elite private gardens and in cabinets of curiosity that displayed rare and mysterious natural objects such as fossils, unicorn horns, bezoar stones, whalebones and other such curiosities. Just as the


artisan’s creations invoked pleasure and wonder at the skills they embodied, so too was nature increasingly conceived as a spectacle of invented forms reflecting back on the skillful artistry of their divine ‘Creator’. By the seventeenth century, learned scholars such as Rene Descartes (1596-1650) and Giovanni Borelli (1608-1679) even began to represent nature’s forms as mechanical devices, indicating the extent to which the urban craftsmen’s skills had fully penetrated the conceptual universe of natural philosophers.

Though beginning in the private courts and palazzi of Renaissance patricians, the practice of collecting nature in cabinets and gardens had also emerged by the mid-sixteenth century as a public phenomenon in the universities of Italy. In the 1540’s the universities at Pisa and Padua instituted Europe’s first botanical research gardens for the demonstration of medicinal plants (known as ‘simples’). In 1595 Padua followed up with the first anatomical theater, providing a permanent setting for its annual public dissections conducted over the previous century. These sites materialized the classical and humanist notion of the teatrūm as a philosophical space where nature’s objects were presented as images to the reasoning intellect. By the mid-seventeenth century similar academic nature theaters had spread rapidly across Europe transforming the ways nature

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33 Giovanni Alphonso Borelli, *De motu animalium* (Romae, 1680).


was studied and represented in the early modern period. To assist in the operations of
these medical spaces apothecaries and surgeons – the guild-trained members of the
medical hierarchy – were enlisted to procure botanical specimens and conduct dissections
for learned physicians who then discussed and displayed them to students. The Padua
garden’s first director Luigi Anguillara, for instance, spoke affectionately of “our learned
apothecary Messer Giovanni Guidoni” as a man esteemed “for his great virtue and
competency in his art,” suggesting the close working relationships between guild and
university trained practitioners in the new university theaters.\(^{37}\)

Finally, of the three social arenas where artisan skills and scholarly erudition
potentially collided most frequently, the city has surprisingly received the least
consideration.\(^{38}\) However, it is precisely within these commercial zones that historians
have increasingly gone in search of enterprising alchemists and popular healers who
marketed their inventions to broader audiences.\(^{39}\) As Deborah Harkness has vividly
detailed in *The Jewell House* (2007), her study of “vernacular science” in sixteenth-
century London, the rhetoric of experimental investigation was, in its essence, a distinctly
urban discourse on nature and knowledge. Drawing on a variety of published and archival
sources traditionally overlooked in the history of science, Harkness traces informal
communities of popular investigators of nature, such as the so-called “Lime Street

\(^{37}\) Luigi Anguillara, *Sempici, li quali in piu pareri a diversi nobili* (Venice, 1561), 163.

\(^{38}\) Sven Dierig, Jens Lachmund and Andrew Mendelsohn, “Introduction: Toward an Urban History of

\(^{39}\) Pamela H. Smith, *The Business of Alchemy: Science and Culture in the Holy Roman Empire* (Princeton,
the Scientific Revolution* (Chicago: University of Chicago Press, 2004); Pamela H. Smith and Paula
Findlen, eds., *Merchants & Marvels: Commerce, Science and Art in Early Modern Europe* (New York,
Naturalists” composed of apothecaries, surgeons, alchemists, distillers and other figures who manipulated nature for commercial gain. Many of these figures were immigrants to London who followed opportunities from city to city selling medicines or their technical skills in various crafts. The extraordinary mobility of craft practitioners, popular healers, and distillers is a common thread linking the most important recent works on vernacular science by Harkness, William Eamon and Pamela Smith. In Venice, Eamon has reconstructed the colorful career of the travelling surgeon Leonardo Fioravanti who drew on Venice’s large print industry to publish several books advertising his medicinal “secrets” and entertaining criticisms of the academic medical establishment. His works were widely translated and thus present an interesting example of the ways print served as a communicative medium between artisanal and scholarly ways of knowing in early modern Europe.

In the Dutch and German contexts, Pamela Smith has highlighted the profile of the Swiss apothecary and alchemist Johann Glauber. After moving around the courts of Germany, Glauber settled in Amsterdam where he ran a famous laboratory that even attracted the interest of Robert Boyle. Like Fioravanti before him, Glauber published several treatises promoting his medicinal remedies that also presented his audiences with the public face of a disinterested natural philosopher. In Smith’s rendering, Glauber provides an early example of the new ‘experimental’ profile that many natural philosophers would adopt by the close of the seventeenth century.


The emergence of new experimental practitioners on the edges of urban guild communities and universities was therefore nurtured by a highly mobile labor market and the wide availability of printing services in the sixteenth and seventeenth centuries.\(^{43}\) Yet in this respect well-travelled figures like Fioravanti and Glauber also shared a great deal with their “public” counterparts who claimed membership in local craft guilds. In Italy the apothecary trade was a highly mobile profession with apprentices serving in several cities before opening their own shops in a foreign town.\(^{44}\) Indeed, the most famous apothecary in sixteenth-century Venice, Georg Melich, was a native of Augsburg and had travelled through Greece before apprenticing in Padua and opening his Ostrich pharmacy in Venice.\(^{45}\) Moreover, the self-conscious iconoclast Fioravanti had even gone into business dealings with local pharmacists, selling his remedies in their shops and naming those he most approved of in his vernacular publications.\(^{46}\) In practice then, the line between the official and unincorporated sectors of medicinal manufacturing was quite flexible, and it would be misleading to suggest that one side was inherently more open to experimentation and novelty than the other.\(^{47}\) This point is clear from the records of


\(^{45}\) Georg Melich, *Avvertimenti nelle compositioni de’medicamenti per uso della spetiaria* (Venice, 1575).

\(^{46}\) Fioravanti appears to have been in close contact with the Orso pharmacy of Sabba de Franceschi. See, Eamon, *Secrets of Nature*, 177.

Venice’s medicinal licensing authorities, which contain patent requests for new inventions from an exceptionally diverse cross-section of early modern society, including apothecaries, popular ‘empirics’, learned physicians, surgeons, merchants, and elite patricians. Such petitions were submitted in earnest beginning in the second half of the sixteenth century and continued with fluctuations in volume throughout the early modern period. Conscious experimentation therefore defined the cultural marketplace of medicinal manufacturing in Venice from the unincorporated margins all the way to its institutional centers in the sixteenth and seventeenth centuries. While the activities of university physicians and popular charlatans and empirics have been studied in some detail, we still know little about the guild-regulated center of this marketplace and its significance for important developments in experimental pharmacy in the early modern period. Part of this is due to the traditional conception of guilds as resistant to innovation and concerned only with protecting trade interests. However, recent trends have significantly revised these assumptions, suggesting that the middling sector of the medical community in Venice can perhaps offer a unique position from which to survey and interpret a number of important developments that transformed medical practice in the seventeenth century.

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The Venetian College of Apothecaries and Experimental Culture

Though it is possible to cite several detailed studies on Italian apothecary corporations and their members written over the course of the twentieth century, the vast majority have limited themselves to discussion of guild statutes, training and apprenticeship, and the place of apothecary organizations within the regulatory regimes of urban commerce. More recently, social historians of medicine have developed nuanced portraits of the ways apothecaries delivered health care services and negotiated their status between university trained and popular practitioners in the medical community. Moreover, as it has become clear that medical practitioners were leading promoters of the Renaissance disciplines of empirical anatomy and natural history, historians of science have looked to individual apothecary virtuosi, their museum pharmacies, and private correspondence to understand their emerging expertise as brokers of natural knowledge. In the wealthy city of Verona in the Venetian Republic,

51 Girolamo Dian, Cenni storici sulla farmacia veneta (Venezia: Filippi, 1983, originally published 1901); Gino Meneghini, La farmacia attraverso i secoli e gli speziali di Venezia e Padova (Padova: 1946); Giulio Conci, Pagine di storia della farmacia (Milano: Edizioni Vitoria, 1934); Raffaele Ciasca, L’arte dei medici e speziali nella storia e nel commercio fiorentino dal secolo XII al XV (Firenze: Olschki, 1927); Danilo Tangnini, Degli speziali bresciani (Bresci: Moretto, 1984); Ivana Ait, Tra scienza e mercato: gli speziali a Roma nel tardo medioevo (Roma: Istituto Nazionale di Studi Romani, 1996).


the apothecaries Francesco Calzolari (1522-1609) and Giovanni Pona (1565-1630) enjoyed wide contacts with leading naturalists across Europe as well as the private patronage of local Italian elites, such as the Gonzaga Dukes in Mantua.

However, while these courtier apothecaries have garnered the bulk of recent attention, the members of the Venetian College of Apothecaries who operated shops in Venice’s busy streets remain largely forgotten to posterity.\textsuperscript{54} Formed in 1565 at the behest of seventy-one medical apothecaries in Venice, the College’s original thirty-two statutes display a central concern with the regulation and privileges of the theriac market, as well as the right to sell composed medicines, indicating an important shift in the apothecary’s source of income and public reputation from wholesale to market retailing and shop-keeping. This was an important development as the heightened investment in theriac production significantly enriched the material culture of the Venetian pharmacy and introduced Greek medical botany, filtered through medical humanist writings, into the apothecary’s traditional repertoire of medieval Arabic works on polypharmacy (the preparation of compound drugs). The chief authorities on drug compounds were the ninth century physicians Yahya ibn Sarafyun and Yuhunna ibn Masawaih, known widely in the West as Serapion and Mesue. Rather than displace Arab polypharmacy, however, humanist ambitions to reconstruct the theriac compound also buttressed the traditional authority of Arab polypharmacy for Venetian apothecaries.\textsuperscript{55} Indeed, the pharmacopeias and apothecary trade manuals of the latter sixteenth century reveal a strong commitment

\textsuperscript{54} To date, Girolamo Dian’s \textit{Cenni storici sulla farmacia veneta} (1901), has not been surpassed as the standard reference for the Venetian College of Apothecaries.

to Arab electuaries, syrups, and pills that continued even into the eighteenth century.\textsuperscript{56} In early modern Venice, the leading pharmacies that developed reputations as medicinal distilleries and producers of chemical remedies, such as the Ostrich (Struzzo) pharmacy in the commercial district, were also those that had already established European-wide reputations for the quality of their theriac.\textsuperscript{57} Hence, through their expanded public manufacturing and marketing of theriacs that proceeded under the influence of sixteenth-century humanist reformers, several of Venice’s apothecaries also enlarged their investments in medicinal distilling. In doing so, they also promoted themselves as scholar-craftsmen whose expertise lay not just in identifying substances, but in skillfully rendering their medicinal virtues. Thus combining the botanical knowledge of the Greek physicians with the artful compositions of the Arab authorities, apothecaries in late Renaissance and Baroque Venice presented an alternative image of the experimental physician armed by the early seventeenth century with a repertoire of instruments, techniques and materials that would serve as the foundation for the laboratory medicine eventually introduced to the universities in the eighteenth century.\textsuperscript{58}

Hence, rather than propose a study of the influence of ideas and texts imported from beyond the Alps, including the widely studied “chemical philosophy” of the radical Swiss German reformer Paracelsus (1493-1541), this dissertation instead illustrates how intellectual and cultural currents local to the Italian scene, such as humanist medical


\textsuperscript{57} For the reputation of Venetian theriac in London, see: John P. Griffin, “Venetian treacle and the foundation of medicines regulation,” \textit{British journal of clinical pharmacology} 58, no. 3 (2004): 317-325.

botany and the political culture of regulation in Venice, were adapted by artisan practitioners to reframe their own established practices and public identities. While the works of northern European chemical writers like Paracelsus (1493-1541), Joseph du Chesne (1544-1609), and Herman Boerhaave (1668-1738) were certainly known in Venice, they cannot be deduced as the ultimate causes for why chemical practice gained ground in the Republic. Nor must one look solely to the unincorporated margins of medical practice to trace the social origins of experimental pharmacy in Italy. Instead this study looks outward from the guild-organized commercial center of medicinal retailing in Venice to unravel the dynamics that transformed local practices of observation and experiment into procedures bearing the status of universal knowledge by the close of the seventeenth century.

Methods and Research Outline

While centered upon the members of an early modern guild corporation, this study is not limited to an institutional and social history of Venice’s apothecary tradesmen. Rather, penetrating the rhetoric of apothecary marketing and to draw attention to the cultural interactions between the Venetian marketplace and the University at Padua also requires an openness to several methodological approaches to early modern scientific

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culture. From urban historians I have drawn insights regarding the practice of urban space as a productive resource for articulating authoritative claims. From recent work on the material culture of early modern science, heavily indebted to cultural anthropological approaches to knowledge, I have gained an appreciation for the ways early modern practitioners thought not simply about objects, but with and through them to fashion experimental profiles. And finally, from literary scholarship I have also learned to be attuned to the significant role of humanist rhetoric and poetics in the broader discourse of early modern scientific and medical culture. Informed by these methods of investigations I have striven to construct and arrange the following chapters in a manner

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that conveys both chronological change and thematic depth. Chapter One - “New Worlds/Ancient Texts” - introduces the parallel impact of both print and the commercial importation of exotic plants upon medical discourse in the universities of sixteenth century Italy. Beginning at Ferrara, humanist physicians trained in Greek texts openly critiqued the inherited Latin medical corpus and promoted the study of Greek medical botany as a pathway to the renewal of therapeutics. This led to important reforms in medical education, including the establishment of permanent botanical research gardens for the empirical demonstration of medicinal simples, many of which began arriving through expanded global trade networks. As botanical research became less of a textual endeavor, and more of an empirical practice, humanist physicians at Ferrara and Padua took interest in the practices of apothecary tradesmen with long experience in gathering and manipulating nature’s materials. The sixteenth century in northern Italy was thus a moment of increased dialogue between the university and guild-trained apothecaries that raised the profile of pharmacy as a central terrain of medical discourse on nature.

Chapter Two – “Pharmacy and City” – turns from the universities to the urban space of Venice to consider the evolution of public regulation and retailing in the city between the thirteenth and sixteenth centuries. Drawing on a variety of archival materials from both religious and civic tribunals, this chapter traces the urban pharmacy’s emergence by the latter sixteenth century as a key site of commercial, social, and cultural exchange in the city as Venice’s urban economy supported a growing retail and service sector. These long-term developments provide the necessary context for understanding the important founding of the Venetian College of Apothecaries in 1565.
Chapter Three – “Tricks of the Trade” – then turns to the contents of apothecary trade manuals published during the latter sixteenth century, which begin to develop notions of “reasoned experience” as the essence of apothecary expertise. While contemporary physician renderings of apothecary expertise focused on their experience as botanists, these manuals focus on Arab polypharmacy and the practiced skill cultivated by repeated experience necessary to craft complex medicines. Significantly, the details of this discourse linking head and hand bear striking similarities with the methodological statements on anatomical study later developed at Padua in the works of Fabricius Aquapendente and his pupil, William Harvey. The Paduan anatomist’s understanding of anatomical reasoning as the outgrowth of repeated experience and cultivated skill in dissection thus bears witness to the close proximity of artisans and scholars in the cultural nexus of Padua and Venice. This theme is continued, albeit from a different angle, in Chapter Four – “The Satyr in the Pharmacy” – which focuses on the pharmacy as a site of anatomical dissection and apothecary self-fashioning in the seventeenth century. Through the lens of Antonio Donati’s little known local natural history of Venice, the Trattato de’ semplici (1631), we can see how Venetian apothecaries engaged with the academic community at Padua while also publicly marketing their local pharmacies. Both novel scientific text and marketing instrument, Donati’s natural history provides unique insights into the hybrid culture of the Baroque pharmacy as a space of medical knowledge production and cultural invention demonstrating the apothecary’s skill as a dissector of both nature and culture.

Finally, Chapter Five – “Pharmaceutical Theaters” – concludes with a study of the arrival of chemical remedies on the shelves of Venetian pharmacies during the
seventeenth century. While scholarship on the rise of medical chemistry in Europe has traditionally looked to the influence of Paracelsus’ writings in northern Europe, the same cannot be said for Italy as the Swiss reformer’s books were quickly banned by the Inquisition. However, apothecaries were clearly important promoters of such drugs from the sixteenth-century onward, and by the latter seventeenth century had developed reputations for their well-equipped shop laboratories. To address this development this chapter looks to Venice’s complex licensing regime for proprietary medicines that, I argue, served as the driving engine for these new materials and practices in the marketplace. Looking to both archival and published sources, this chapter aims to enter into these new laboratories and ultimately trace the translation of the material culture developed there to the University of Padua by the early eighteenth century.

In the following chapters then, I aim to demonstrate how apothecary manufacturing and retailing in early modern Venice established them as important mediators of materials, knowledge and practices between communities of erudite scholarship and the vibrant world of vernacular medicine and healthcare. As such they developed practices and rhetorical models of medical expertise that bridged both head and hand, providing early models for the new profile of the experimental natural philosopher in the seventeenth century. As the traditional pharmacopeia of known medicinal substances significantly expanded with the importation of new commodities during the sixteenth and seventeenth centuries, apothecaries incorporated them into known remedies and developed tactile applications to produce knowledge of their medicinal virtues. Hence, in their careful preparations of nature for retail consumption, Venice’s apothecaries also contributed to a culture of experimental investigations that left
a lasting impression on the material culture of medicine and experimental investigations of nature.
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New Worlds/Ancient Texts: Humanism and Medical Botany in Sixteenth-Century Northern Italy

Introduction: A Medicine Cabinet of the World

In 1575 Nicolas Monardes’ Medical History of the Things Brought from our West Indies, the earliest European pharmacopeia of American remedies, appeared for the first time in Italian in the port city of Venice. Initially published in 1565, the Historia medicinal was an instant European success, inspiring its author to append two more books of descriptions and medical advice for the use of exotic plants like tobacco and cocoa in 1571 and 1574. Though Monardes’ third book never appeared in Italian, the translation and publication of the first two books by Annibale Briganti, humanist physician from the southern town of Chieti, was reissued in five more editions in Venice by 1616. In all of them, Monardes’ text was bound together in a single volume with another medicinal catalogue, this time of East Indian remedies, the Conversations on the Simples, Drugs, and Medicinal Materials of India (Lisbon, 1561) compiled by the Portuguese physician Garcia d’Orta. Briganti’s combined Italian volume was given an appropriately lengthy title – Two Books on the History of Simples, Herbs, and other Things brought from the East Indies pertaining to medicine; and two other books on the medicinal things they bring from the West Indies – and packaged with updated illustrations of armadillos and plant specimens by an unknown artist. In his dedicatory

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1 Nicolas Monardes (1493-1588) was a physician in Seville credited with composing the first published pharmacopeia devoted to American remedies. His editorial project describing American materia medica
letter to the Spanish nobleman who presided over his native Chieti, Briganti introduced
Monardes and Garcia D’Orta as “as two divine authors” who had “diligently researched
and examined with their own eyes” nature’s medicinal bounty so that “not only do they
mention those simples already written by ancients, but bring to us infinite new ones
neither seen nor comprehended.” As Briganti observed, the study of medicinal simples
had already witnessed numerous advances in his own time under the guidance of the
Italian humanist physicians Mattioli, Anguillara and Maranta. However, the near
simultaneous appearance of Monardes’ and D’Orta’s tracts on American and Indian
remedies suggested that medicine had indeed finally reached “that peak of perfection”
that could only be achieved through a complete cognition of nature’s medicine cabinet. In
treating Italian readers for the first time to an armchair panorama of a truly global theater of medicinal marvels, Briganti’s editorial project therefore voiced the optimism of humanist physicians regarding the prospects of medicine’s restoration to classical standards.4

Yet, by the time of Briganti’s translation in 1576, many in the humanist medical community were also in agreement that a mere literary acquaintance with newly discovered medicines was not sufficient to properly comprehend their marvelous virtues. This was made abundantly clear in a brief letter to readers appended to the end of the 1589 edition of Briganti’s text.5 In it the Venetian physician Borgarutio Borgarucci informed readers who did not want to make the long and dangerous journey to America or India that “many of the discussed medicines, and infinite others, are at present found in the possession of the most honorable apothecary and singular botanist Francesco Calzolari at the Golden Bell pharmacy in Verona.”6 There, visitors would find in Calzolari’s shop not just medicinal concoctions, but a museum of “diverse minerals, precious stones, the most rare animals, rarely seen birds, unknown fish, diverse kinds of earth, and woods…in sum all that one can see of beauty, rarity, and goodness gathered by

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5 “Borgarutio Borgarucci a Lettori”, 347-352: “Torno dunque a dirvi (humanissimi Lettori) che havete gra commodita di vedere, e conoscere un’infinita di medicamenti, & alter rarita, con poca spesa, e manco fattica, senza andare alla volta dell’Indie, & con assai miglio conditione, che leggendo su I libri.” Borgarucci was a physician in Venice and brother to Prospero Borgarucci who composed his own vernacular tracts on anatomy and pharmacy, *La fabrica degli spetiale* (Venice: 1566). Borgarucci worked primarily as a translator and editor of medical and scientific texts, including the 1582 version of Briganti’s translation and a 1565 edition of a book of secrets falsely attributed to the famed anatomist Gabriele Fallopio, *Secreti diversi e miracolosi*. He also composed a brief tract on the 1576 plague that devastated Venice: *L’afflition di Vinetia: nella quale si ragiona di tutti gli accidenti occorsi in Vinetia, l’Anno 1576 per cagion di Peste* (Florence: 1578).

6 Ibid., 348.
the most learned and revered geniuses of our time who study the subject, as in a universal Theater of all the most exquisite and most singular things in the world.”

Listed in the same description along with preserved specimens of chameleons, birds of paradise, and even a unicorn horn, Borgarucci also described bits and pieces of Egyptian hieroglyphics on stones and “the true papyrus of Egypt written in letters that none comprehend.” Such objects teased the imaginations of Italian humanists who busily collected old parchments for a living, and, following Plato in his _Timaeus_, liked to trace medicine’s mysterious origins to the ruins of ancient Egypt. They also made the tradesman Calzolari, an apothecary without a university education, a respected and revered figure in the Italian community of humanist physicians and naturalists who visited his museum. As a collector of nature’s strangest materializations in his “universal Theater,” Calzolari, in many respects, performed the role of stage manager for the community of scholars who went to his pharmacy to discuss, learn, and most importantly, observe the spectacle of nature on display. Conveniently erasing the barriers of time and distance in his pharmacy museum, Calzolari gained rare entry into an academic medical community that increasingly drew upon the empirical practices of his craft in an effort to reform medicine as a whole in late Renaissance Italy.

This chapter surveys some of those far-reaching humanist reforms in sixteenth-century learned medicine, particularly in the field of medical botany, which inspired the construction of the first permanent university botanical gardens for the purposes of

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7 Ibid., 349.


medicinal instruction in the 1540’s. The story of the “rise of medical humanism” in early sixteenth-century Italy is a familiar theme to students of early modern medicine and has long been cast as a crucial foundation of later developments in medical chemistry and a new experimental outlook in natural philosophy more generally. The term “medical humanism” denotes a critical stance beginning in the latter fifteenth century towards the inherited corpus of Latin medical manuscripts translated from the works of Arab physicians in the High Middle Ages. Pointing out the many errors and inconsistencies in these texts, medical scholars, such as the Ferrara professor Niccolo Leoniceno (1428-1524) and his students Antonio Musa Brasavola (1500-1555) and Giovanni Manardi (1462-1536), instead called for a return to the original Greek language sources of Galen, Dioscorides, Hippocrates and Theophrastus. By the mid sixteenth century their editorial efforts to produce new translations of Greek medical treatises culminated in the founding of new university botanical gardens, as well as the composition of original treatises on anatomy and medical botany. The crowning achievement – and reputed death knell for the medical humanist movement – was the 1543 publication of the Paduan professor

10 The gardens at Padua and Pisa vie for the privilege of being the first university gardens created in Europe. Though plans began earlier at Padua, the Pisa garden was completed in 1545 and Padua in 1546. However, the Pisa garden was soon after moved to another site, giving the Padua garden the right to claim the oldest still standing garden in Europe. Alessandro Minelli, *The Botanical garden at Padua, 1545-1995* (Venice: Marsilio, 1995).


12 The works of these figures are discussed and cited below.
Andreas Vesalius’ *Fabric of the Human Body*, a spectacularly illustrated masterpiece that took issue on numerous points with Galen’s anatomy. Thus purified of Arabic “confusions” and the mistakes of copyists, the newly edited medical texts showcased the Greek physicians as medical practitioners and teachers strongly committed to the empirical disciplines of anatomy, medical botany, and clinical medicine.

Historians have generally stressed the inherent conservatism of the Hellenist physicians in Italy who aimed to restore medicinal teaching and practice to its idealized Greek standards. However, while philological studies and a strong commitment to the authority of the Greek physicians were certainly important features of medical humanism, it is easy to overlook how these strategies fit into the medical humanist’s broader concern to restore medicine’s capacity for innovation and openness to new therapeutic practices. In the newly dusted off figures of Galen, Hippocrates, and Dioscorides the humanist physicians found model practitioners whose rational approach to medicine made it possible to transcend the accreted authority of textual traditions and dogmas by engaging in practical and experimental investigations of nature itself. Through their editorial

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14 For a general discussion of how these new disciplines emerged in the universities of northern Italy, see: Paul F. Grendler, *The Universities of the Italian Renaissance* (Baltimore: Johns Hopkins University Press, 2011).

15 Nutton, “Rise of Medical Humanism”. 
recovery of Greek authors, the medical humanists hoped to present the medical profession with exemplary models of a medical practice capable of change, new learning, and growth. Though famously characterized by Walter Pagel as a necessary, and ultimately short lived movement on the way towards experimental medicine in the seventeenth century, medical humanism more accurately inaugurated a lengthy, and deeply important dialogue between medicine and the study of humane letters that continued throughout the early modern period. In doing so, humanist physicians developed important perspectives on erudition and experience in medical practice that drew the learned profession into closer dialogue with the practices of apothecaries and surgeons, the traditional guild-trained arms of the medical community. As this and later chapters will demonstrate, the efforts of humanist physicians to reform learned medicine opened important avenues for apothecary artisans to make their own claims in print as learned and experienced medical investigators by the second half of the sixteenth century.

In the following discussion I begin first with the important editorial projects of medical humanists at the University of Ferrara between 1490 and 1530. Looking to the writings of Giovanni Manardi and Antonio Musa Brasavola, this section draws attention to their efforts to reframe medicine as an investigative and practical art aimed at bringing about contingent effects in nature. In this way medical botany took on a new importance for these figures, especially Brasavola, who composed several fictional dialogues on

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pharmaceutical themes. I then turn to the medical humanist discussions elicited by the arrival of novel medicinal commodities, particularly the “guaiacum” wood from the Americas.\(^\text{18}\) The guaiacum was the subject of one of the first broadly circulating print advertising campaigns for new medicinal commodities in the sixteenth century. Its appearance was largely responsible for the enduring perception of the New World origins of syphilis in Renaissance Europe.\(^\text{19}\) While physicians mistakenly identified the wood as a species of ebony, a substance well-known to Greek authorities, they also devoted significant discussion to its experienced properties and experimental applications. As a simple botanical remedy, the guaiacum met the medical humanist’s approval as a learned counterpoint to the fashions for Arabic polypharmacy, or compound drugs sold in the marketplaces. However, the humanist fascination with Galen’s theriac remedy, itself composed of more than sixty ingredients, also gave credence to the efficacy of drug compounds. As commerce in botanical substances expanded and classical specimens were recovered, humanist physicians expressed confidence that theriac could be reproduced according to classical recipes.\(^\text{20}\) This project was even cited as justification for the construction of new university gardens where exotic and classical specimens could be cultivated and examined. These new spaces for staging botanical knowledge are addressed in the last section which addresses the impact of medical humanism on the medical curriculum at Padua. As with the enlistment of surgeons in the university’s


annual anatomical demonstrations, the physician rectors of the garden also relied on apothecaries to supply it with rare and exotic specimens. Thus, in developing new philosophical theaters in the sixteenth century, the universities in northern Italy increasingly absorbed the skills and expertise of guild-trained practitioners to provide new training grounds for generations of aspiring physicians.

1.2 Humanism, Philosophy and the Art of Medicine at Ferrara, 1490-1530

An issue of great significance to the medical humanists at Ferrara consisted in the need to establish methods for distinguishing natural phenomena already known to ancient writers from those that were genuine novelties. As new substances continued to enter European markets and attract the attention of learned physicians, universities developed new collection sites in public botanical gardens where professors demonstrated the forms and properties of nature’s healing remedies. The two earliest public investments in these spaces took place at Pisa and Padua. While the University of Pisa under the Medici Dukes claims the title of Europe’s first university garden built in 1545, it was soon after moved to a new site, thus making the Padua garden, constructed in 1546 under the direction of the Venetian Republic, Europe’s oldest continuously standing public botanical garden.21 The founding of these new medical theaters in Italy affirmed the significant impact of humanistic studies upon the medical profession over the previous half century. In 1492-93, just as Columbus was encountering a wealth of unknown botanical species in the Caribbean, the Venetian humanist Ermolao Barbaro (1454-1493) published his Corrections of Pliny, claiming to have amended more than 5,000 textual

errors, mostly related to botanical terminology, in the first century Roman writer Pliny the Elder’s *Natural History* (c. 77 A.D.). Pliny’s *Natural History* was perhaps the most highly regarded scientific text inherited from classical Rome, thus Barbaro was careful not to offend other humanists by questioning Pliny’s authority. Instead, Barbaro argued that the wealth of errors in the multivolume work were the result of scribal mistakes in copying the text throughout the centuries. The existing manuscripts in circulation were thus corrupted and required careful editing to restore Pliny’s true meanings.

Indeed, the timing of Barbaro’s criticisms came at an important moment shortly after the arrival of the printing press in Europe and the production of several printed editions of Pliny’s esteemed work. These new editions circulated widely to new audiences, including men of practical means like Christopher Columbus who kept a 1489 Venetian edition in his personal library. Most importantly, the press placed the editors of classical texts on public record in ways that differed greatly from the previous medieval practice of employing anonymous copyists. In the opening years of print, humanist editors placed their scholarly reputations on the line in producing new printed editions of Pliny and other writers. While some humanists faced ridicule, Barbaro’s publications on medical botany earned widespread praise from his scholarly peers. To

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23 The important impact of print upon the reading of Pliny is discussed by Charles G. Nauert, “Humanists, Scientists, and Pliny: Changing Approaches to a Classical Author,” *The American Historical Review* 84, n. 1 (Feb., 1979): 72-85. The first printed edition of Pliny’s work was issued in Venice by Joanes Spira in 1469. Thirteen more editions were produced by 1492.

24 The 1489 edition was produced by Bartholomaeus de Zanis. For Columbus’ postils on this text, see: Miles H. Davidson, *Columbus Then and Now: A Life Reexamined* (Tulsa: University of Oklahoma Press, 1997), 92-96.
assist in his editorial labors Barbaro even claimed to end his daily library routine with a half hour of direct observation in his private garden to compare the descriptions of Pliny and Dioscorides with his own cultivated specimens. It is unclear how much this practice actually informed Barbaro’s corrections of the Plinian manuscripts, but his claims draw attention to the growing fashion among Venetian patricians during this period for private garden collections to adorn their urban residences. By the mid-sixteenth century these patrician practices would become public spaces at Padua where Barbaro, like most Venetian elites, had received his education.

However, while Italian humanists attributed the errors found in classical texts to medieval copyists, physician scholars well-grounded in the philological techniques of the humanists also launched an important series of attacks on the authority of Pliny’s medical claims. In the same year as Barbaro’s Corrections in 1492, the professor of medicine at the University of Ferrara, Niccolo Leoniceno, published On the Many Errors of Pliny and other Physicians on Medicine. Unlike Barbaro, the physician Leoniceno directed his attack at Pliny’s Latin translations of plant names from the botanical works of the Greek physicians Dioscorides and Theophrastus. Leoniceno’s critique of Pliny’s command of Greek terms earned him stern rebukes from leading humanists, including Pandolfo Collenucco who voiced his displeasure in his Defense of Pliny against the Accusations of Nicolo Leoniceno. The Florentine humanist Poliziano addressed

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25 For an interesting biographical account of this important humanist and botanist, see: Edward Lee Greene, Landmarks in Botanical History, Part Two, ed. Frank N. Egerton (Washington D.C.: Smithsonian Institute, 1983), 553-569.

26 Julia Mary Cartwright Ady, Italian Gardens of the Renaissance: And Other Studies (Scribner, 1914).

27 Niccolo Leoniceno, De Plinii et aliorum in medicina erroribus (Ferrara, 1492).

28 Pandolfo Collenucio, Defensio Pliniana adversus Nicolai Leoniceni accusationem (Ferrara, 1493).
Leoniceno publicly, telling him that his critique of Pliny should not “have been undertaken at all, or it should have been assailed by a stronger arm than you thus far seem to have raised against it.” However, as the proud connoisseur of the largest collection of Greek language medical manuscripts in Europe, the elderly Leoniceno was in a prime position to raise serious objections to Pliny’s authority at the turn of the sixteenth century. These texts had begun to flood into northern Italy with the exodus of Greek scholars following the fall of Constantinople in 1453. Armed with these resources, Leoniceno began with the errors in botanical names found in Pliny, but quickly turned to the larger corpus of the Greek physician Galen, whose works had for centuries comprised the backbone of medical knowledge bestowed on the West through the commentaries of the Arab physician Avicenna. With Galen’s original Greek treatises, however, Leoniceno and his students at Ferrara initiated far-reaching reforms that questioned medicine’s traditional relationships with natural philosophy. Through their extensive philological labors the Greek physicians of antiquity re-emerged, not merely as philosophers composing syllogisms to explain symptoms and causes, but as active practitioners of a contingent art tasked with bringing about the ‘effects’ of health in the human body. As a result, Galen’s writings on the more empirical branches of medicine – anatomy and medical botany – garnered greater interest and criticism as the sixteenth century wore on.

29 Quoted in Greene, Landmarks, 536.


31 Nancy Siraisi, Avicenna in Renaissance Italy: the Canon and medical teaching in Italian universities after 1500 (Princeton University Press, 2014).
The rapid rise to prominence of medical botany and anatomy in Italian universities during the first half of the sixteenth century is generally acknowledged to have significantly raised the epistemological profile of “experience” in scholarly communities. Fueling this renewed interest in medical topics largely overlooked in medieval curriculums was the application of humanist textual criticism to the inherited Latin corpus of medical treatises. In the intervening centuries since their original compositions in Greek, Arab physicians had translated and produced extensive commentaries on the numerous treatises of Galen, Hippocrates, Dioscorides and Theophrastus. These Arab texts later formed the basis of new Latin translations during the great transmission of medical and scientific texts to the West in the eleventh and twelfth centuries. In medieval universities the commentaries on Galen by the Arab physician Avicenna, known as the *Canon of Medicine*, remained the standard medical text memorized by university medical students. Towards the close of the fifteenth century, however, Italian physicians in northern Italy, beneficiaries of recently acquired Greek manuscripts from Constantinople, took note of extensive errors and mistranslations from the Greek in the Latin medical corpus. For Leoniceno this required a strict return to the original Greek sources that could serve as the basis for the reform of medical education and practice. Most troubling of all to Leoniceno was that Galen himself, the


leading Greek medical authority, had been thoroughly misunderstood as an Aristotelian natural philosopher in the tradition of medieval commentaries. What was needed, the medical humanists insisted, was not Galen the philosopher, but Galen the medical practitioner.

Once again it was the learned Leoniceno who proposed to significantly revise tradition. In 1508 he published in Venice the first Latin translation of Galen’s *Ars medica* accompanied by his own commentary explaining the text. In doing so, Leoniceno inserted himself into a long tradition of competing interpretations of Galen’s prologue on method beginning with the Egyptian physician ‘Ali ibn Ridwan (d. 1061) whose opinions were primarily known in Italy through the commentaries of the fourteenth-century Paduan physician Pietro A’bano. In brief, the crux of the issue concerned the extent to which Galen had understood “method” as pertaining to the organization of a body of knowledge (like medicine) for instructional purposes, or as a method for approaching particular problems within a discipline (something closer to the notion of a ‘scientific method’). For Leoniceno, earlier commentators (particularly the Arab physicians), in their efforts to promote medicine as a true “science,” had mistaken Galen’s discussion on method for a philosophical treatise on logical demonstration. Instead, Leoniceno severed Galen’s traditional link with Aristotle by stressing his strong Platonism. More importantly, Leoniceno argued that Galen’s mysterious prologue on method was in fact

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an extended discussion on how a *conceived* end might be achieved and brought about. To support his interpretation of Galen’s prologue as a treatise on didactic method, Leoniceno drew attention to passages in Aristotle’s *Metaphysics* in which the philosopher compared the conceived ends of physicians and carpenters: health for a physician, a house for the carpenter. Thus like geometers, physicians begin with mentally conceived ends, though with the distinct difference, as William F. Edwards has put it, “that the geometer reasons back till he comes to something known, while the physician reasons back till he comes to something he can produce himself.” Following upon Leoniceno’s corrections of Avicenna’s translation, it thus became clear that Galen was discussing medicine in terms of an operational art to bring about health, and not as an explanatory science of existing effects.

In severing Galen from the medieval tradition of Aristotelian commentaries on the *Ars medica*, Leoniceno exerted significant influence on future generations of physicians who increasingly focused on Galen’s practical therapeutics, anatomical investigations, and herbal pharmacy in newly printed editions. First among them was Leoniceno’s student at Ferrara, Giovanni Manardi, who later served for a brief period as the royal doctor at the Hungarian court from 1513 to 1518 before settling back at the University of Ferrara. Like his teacher, Manardi was also well versed in the reading of Greek manuscripts which he regularly incorporated into his university lectures. His opinions on a vast selection of medical topics are largely preserved in a collection of letters and medical treatises published over twenty years and read throughout sixteenth-century Europe known as the *Epistulae*. Manardi’s governing concern was to continue

Leoniceno’s humanist project of purging the classical medical texts of terminological confusions that had accumulated over the centuries. This sometimes involved extended polemics against the medieval Arab physicians whose commentaries were translated into the Latin medical corpus during the twelfth century. For Manardi, the Canon was a treacherous text for its resemblance to “a dense fog,” as were the compiled writings on pharmacy originally composed by the medieval Baghdad physician, Ibn Masawaih (c. 777-857), known in the West as Johannes Mesue. For Manardi, the only true path for the aspiring physician lay directly through the teachings of the Greek Galen, read and understood without the mediating influence of his accumulated translators and commentators.\(^{40}\)

Manardi remains a significant figure for his many contributions to contemporary debates over medicine’s relationship to natural philosophy. Unlike many of his medieval forbearers and contemporaries, Manardi refused to see medicine as anything other than an art, though one with a uniquely important mission that placed it well above all other mechanical trades:

\(\ldots\) it is impossible for any of the arts to be a science because, in addition to possessing a habitus that is productive and aimed toward external operation, the intentions that lead to their goals are reached in a contingent way. Moreover, if one affirms that there are many aspects in medicine that are not directed toward operation and can therefore be shown by demonstration, I will absolutely admit that there are such real demonstrations. However, precisely because they are demonstrations, they no longer belong to medicine – that is, to an art – but instead become part of natural philosophy.\(^{41}\)

\(^{40}\) For Manardi’s biography see, Nutton, “Medical Humanism” (1997); and Edward Lee Greene, Landmarks of Botanical History, Part Two (Stanford UP, 1983, originally published 1909), 584-598. Giovanni Manardi, Medicinales epistolae (Ferrara, 1529). Manardi appears to have even garnered the admiration of Paracelsus himself, the era’s most aggressive critic of academic physicians and Greek Hellenism in the profession. Paracelsus possibly spent a brief period in Ferrara after he took his degree in Vienna in 1512.

\(^{41}\) Translation of Manardi’s commentaries on Galen’s Ars Parva quoted from Daniela Mugnai Carrara, “Epistemological Problems in Giovanni Manardi’s Commentary on Galen’s Ars Parva,” in Natural Particulars: Nature and the Disciplines in Renaissance Europe, ed. Anthony Grafton (MIT Press, 1999), 263.
Though numerous “ignorant lawyers” had for generations sought to diminish medicine by aligning it with the mechanical trades, Manardi saw no shame in labeling medicine an art, since:

The term “art” designates something so noble that even the imperial dignity, than which there is nothing greater on earth, is defined, according to Quintillian, with the name of art. Nor does the name of art abrogate the dignity of medicine though it shares the name with humbler arts. Indeed the name of man does not take dignity away from kings even though they share it with commoners. Furthermore art represents something noble because those who possess an art are always considered superior to those who lack it. We say not only is medicine an art, it is the noblest of arts, which Galen himself…holds as superior even to rhetoric.\footnote{Ibid., 264. G. Manardi, \textit{In primum artis parvae Galeni librum commentaria} (Basel, 1536), 43-44: “Nec velim vitio mihi verti, quasi de medicina pessime merito, quoniam eam in atrium numero repono; quo legluleii infingere nobis solent; quasi vile sit artes profiteri vocarique, quod ipsi de dignantur, magistros. Nomen enim artem adeo nobilem signat, ut imperatorial quoque dignitas, qua nulla alicuius in terries maior fuit, Quintilliano teste, artis nomine censeatur. Nec dignitatem artis nomen abrogare medicinae, quia sit vilioribus communis; sicuti nec hominis nomen regibus, quia sit illis cum plebucula commune. Alioqui de se nobile quid ars repraesentat, cum qui arte pollut, ea carentibus semper paeponant. Non solum autem artem dicimus meidicnam, sed atrium nobilissimam.”}

In Manardi’s scheme medicine therefore had no need to aspire to natural philosophy which specialized in demonstrating causes. Instead, medicine was devoted to actively producing human health, the noblest effect in nature. Stressing the physician’s broadly comprehensive learning as well as his productive capabilities, Manardi thus evaded the image of the philosophically pretentious physician that had elicited Petrarch’s biting criticism of the medical profession two centuries earlier. Most importantly, the learned and experienced physician was now expected to actively lead with new investigations of nature since it had become apparent, to Manardi at least, that his predecessors “wrote as an oracle and therefore added nothing to the arts. This failure, especially in the field of medicine, was a great sin and did much damage.”\footnote{Ibid., 264.}
For Leoniceno’s student, Antonio Musa Brasavola, no subject held greater promise for achieving Manardi’s vision for medicine than medical botany. A Ferrarese patrician and medical graduate of the university there in 1521, Brasavola absorbed much from Leoniceno and Manardi, and published several original Latin tracts on botanical and pharmaceutical topics. Unlike previous generations, however, Brasavola’s publications reflected the growing importance of botanical prospecting and the inspection of apothecary shops to identify plant specimens found in classical sources. His works, moreover, were often composed as dialogues between himself (the scholarly voice) and those already well-seasoned in tracking through the fields and valleys of northern Italy for medicinal simples: herbalists and apothecaries. This is the format followed in his most famous work, *An examination of all medicinal simples* (1536), which describes a chance meeting in the field between himself and an old apothecary he called *Senex*. Accompanying Senex is his illiterate assistant, *Herbarius*, who periodically intercedes in the dialogue between the physician and the apothecary. As the dialogue unfolds Brasavola takes several opportunities to demonstrate to the old apothecary the many errors in botanical nomenclature found in the guidebook he carries with him, known as the “Pandette” – a medicinal compendium compiled in the fourteenth century by the

44 Along with the *Examen omnium simplicium* cited below, Brasavola also composed other dialogues on various medicines: *Examen omnium Syruporum* (Venice, 1538); *Examen omnium catapotiorum vel pilularum, quarum apud pharmacopolas usus est* (Basel, 1543); *Examen omnium loc, idest linctuum, suffuf, idest pulverum, aquaram, decoctionum, oleorum, quorum apud Ferrarienses pharmacopolas usus est* (Venice, 1553).


Salerno physician Matteo Silvatico (d. 1342).\textsuperscript{47} In place of this text, long cherished by apothecaries, Brasavola recites descriptions from the Greek herbalist Dioscorides’ \textit{Materia medica}. Slowly the apothecary comes to recognize the errors in his guidebook, yet at that point Brasavola takes the opportunity to position pharmacists at the head of the classroom to potentially give instruction to ignorant physicians. This is illustrated in their discussion on a plant known as Agrimonium:

\textbf{SENEX:} Agrimonium comes next to hand.

\textbf{BRASAVOLUS:} This corrupt alteration of the name is in use here and there. It ought to be written Argemone. We already have demonstrated that what the herb vendors deal in under the name \textit{argemone} is the real \textit{Eupatorium}. The true Argemone, however, is not yet known to me. Nevertheless, I hope that the time may come when I shall be able to show what that and certain other plants really are; but let us dismiss for the present and until someone shall give ocular demonstration that he has found it.

\textbf{SENEX:} Meanwhile, what is to be done if some physician comes and orders \textit{argemone}?

\textbf{BRASAVOLUS:} I should inform him that there is no such herb.

\textbf{SENEX:} And he might happen to exclaim: are you to instruct me? That is to say, may the sow teach Minerva?

\textbf{BRASAVOLUS:} I should again, and in gentle speech, advise him that he would perhaps do well to find the truth of the matter.

\textbf{SENEX:} Then he might raise his voice to another pitch, rail at me awhile vociferously, and finally desert my shop forever.

\textbf{BRASAVOLUS:} A miserable set, ignorant, well aware of their ignorance, yet obstinately persisting in it, they scorn the very idea of being taught anything, willing to grow old in their folly rather than learn from others, or even to make any endeavor to find out the truth for themselves. If I were a pharmacist, and anything like that happened, I would turn my back on such men, telling them to find some other shop and there order what they had come to me for, because to sell one thing for another is illicit business.

\textsuperscript{47} A physician from Mantua, Silvatico resided at Salerno where he was an important member of the influential school of medicine there. He was the compiler of the \textit{Pandectae Medicinae} around 1313, a botanical guide containing over 720 entries that achieved considerable authority in late medieval Europe. The “Pandette” as it was known in the vernacular, built upon the earlier work of Simon of Genoa who had compiled the botanical knowledge of Greek and Arab physicians. Despite Brasavola’s fictional account of the apothecary Senex’s realization that the Pandette is of little value, living apothecaries who enjoyed the esteem of humanist physicians continued to cite its authority throughout the sixteenth century. In Georg Melich’s \textit{Avvertimenti} (1575) it is cited several times to identify difficult substances.
SENEX: That is what I am resolved to do for the future, and to have in view the salvation of my soul, instead of the small gain that would accrue to me from some listless and ignorant physician who, once, or at most twice a year might give me an order.\textsuperscript{48}

The implication from this fictional scene was clear: if an apothecary shopkeeper could grasp and accept the teachings of the original Dioscorides, then so too should physicians in the academic community be open to new learning. Though certainly critical of the state of the apothecary trade in his time, Brasavola’s Latin dialogue was nevertheless composed for an audience of learned physicians and reserves some of its harshest criticisms for their stubborn adherence to mistaken authorities.\textsuperscript{49} It is ultimately unclear how much field study Brasavola actually conducted, yet his other dialogues on various aspects of the apothecary’s art, such as the making of electuaries, syrups, and tablets, suggest that he was well acquainted with the local shops in Ferrara.\textsuperscript{50} In these dialogues the elderly Senex continues to play his part as the foil for the humanist physician Brasavola to extoll on the lessons of Greek authorities. Yet the very choice of the apothecary’s medicinal craft as a topic worthy of Latin dialogues was itself a novelty. Brasavola’s dialogues were among the earliest works to convey the medical humanist message of reform by directly examining the practices and materials of contemporary pharmacy.\textsuperscript{51}

\textsuperscript{48} For this passage I have relied on the translation of Edward Greene in his \textit{Landmarks of Botanical History} (orig. published 1909; Stanford, 1983), 664-673.

\textsuperscript{49} As for the Arabic authorities Avicenna and Mesue, Brasavola responds to Senex’s query about them with the following: “I answer you in the words of Pliny: ‘No book is so bad but that some part of it will be found useful.’ I advise all candidates in medicine that, having mastered the Greek physicians, they read the Arabians, from which I have no doubt they may learn something worth knowing. And so, I not only do not second, I openly disapprove the movement of those who would abolish the Arabians. I would rather see them corrected where they are wrong.”

\textsuperscript{50} See note 44 above.

\textsuperscript{51} There is some debate on the originality of Brasavola’s dialogue on simples since another writer, Euricius Cordus (1486-1435), had published his own botanical dialogue, \textit{Botanologicon}, in 1534 – two years before
apothecary herbalist as a chance occurrence - rather than a coordinated gathering in the field - Brasavola’s dialogue maintained the proper social distance between the university-court physician and the dealers of drugs in the marketplace. What was important for his learned readers to extract from these Latin dialogues was the message that medicine, without the proper foundations in careful textual studies of Greek physicians, was an art as hopelessly lost as the barely literate apothecary Senex misidentifying plants out in the fields. To remedy this situation, Brasavola implied, physicians needed to become proactive pharmacists themselves, engaging more directly with Nature’s anatomy through the deployment of their own senses to confirm textual descriptions and, most importantly, to know the difference between plants already described by classical authors and those genuine novelties that had begun to arrive from the other side of the Atlantic. For the medical humanists at Ferrara, the sudden appearance of a new venereal contagion around 1500 opened up important discussions on the worth of a new medicinal commodity imported from the Caribbean known as guaiacum, or “holy wood”.

1.3 Confronting Novelties: Syphilis and the Guaiacum Cure

One of the enduring mysterious in the history of Renaissance medicine concerns the nature of the widely reported venereal contagion that swept across Italy beginning in the last decade of the fifteenth century. The first reports of a deadly and highly
contagious skin affliction appeared in 1495 in Naples during the siege of the city by Charles VIII’s invading French army. The earliest known account comes from the Venetian surgeon Marcello Cumano who noted the initial appearance of topical ulcerations on the genitals followed by painful pustules on the face and body accompanied by extreme joint pain. By 1498 the condition had already acquired a name, the “French Disease”, in the important account of Tommaso di Silvestro. In the early age of print the so-called mal francese generated extensive commentaries and descriptions that afford medical historians with some of the earliest examples of an increasingly important mode of writing: the medical case study. In these early accounts the disease was not always associated with venereal contagion, with some writers suggesting that the skin lesions and cartilage damage indicated a particularly virulent form of leprosy. The name “syphilis” did not actually appear until 1530, when the Veneto physician Girolamo Fracastoro composed a Latin verse poem describing the disease’s origins in the New World through the exploits of its main character, “Syphilo”.  

53 Even then, the contagion was not fully identified with syphilis until the eighteenth century when European naturalists began to situate American nature (and by extension colonial society) within natural historical schemes that privileged the mature progression of European civilization.  

54 At this juncture, particularly in the works of the French naturalists, the

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Renaissance Studies, 2005); Claudia Stein, Negotiating the French Pox in Early modern Germany (Ashgate, 2009).

53 Girolamo Fracastoro, Syphilis, sive morbo gallico (Verona, 1530). For more on Fracastoro, who has been considered an early theorist of germ contagion, see Vivian Nutton, “The reception of Fracastoro’s theory of contagion: the seed that fell among the thorns?” Osiris, 2nd ser., 6 (1990): 196-234.

American origins theory of modern syphilis took on a new life in medical debates and publications that continue to this day.  

The most recent approaches to the history of medicine, however, have put aside the tendency for retrospective diagnoses of Renaissance epidemics to instead explore the broader cultural framing of health and illness during this period. An extensive literature now exists detailing the moral, religious, and medical disputes that the French disease elicited in sixteenth-century Europe and it is not my intention to review them all here. Instead, the following discussion considers the opinions of the medical humanists regarding the new guaiacum wood cure and their reasons for accepting it within medicinal therapeutics. While the Latin medical establishment traditionally dismissed the specific remedies of empirics, the humanist reformers readily embraced new botanical simples such as American guaiacum and sarsaparilla. For the most part these physicians categorized American remedies as new species of plants already known to classical authorities. In the case of guaiacum wood, the tree was often identified mistakenly as a different species of ebony for their similar color and hardness. Such views preserved the authority of classical authors while opening space for empirical evaluations and experimentations with new substances. It is clear from the notes of Manardi, Brasavola and the Venetian physician Nicolo Massa (1485-1569) that the new commodities

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57 Pietro Andrea Mattioli, Discorsi di M. Pietro Andrea Matthioli nei sei libri di Pedacio Dioscoride Anazarbeo della materi medicinale (Venice, 1563), 132.
significantly raised the profile of pharmaceutical matters and the authority of experience in learned medical discourse during the 1520’s and 30’s.\textsuperscript{58}

In Renaissance Italy, the identification of the contagion with the newly encountered continent was not immediate and did not pick up steam until rumors emerged around fifteen years after the disease’s appearance of a new miracle treatment in Spain recently imported from the Caribbean.\textsuperscript{59} To investigate the truth of the guaiacum cure the Hapsburg court in Germany sent an early delegation of physicians to Spain that included the Emperor’s physician Nicolaus Pol. In 1516 Pol delivered a report that circulated in manuscript but was not published until 1535, \textit{On the cure of the French disease by the guaiacum wood}.\textsuperscript{60} According to Pol, who likely gathered information from Spanish and Portuguese recipes, the guaiac wood made into a powder and dissolved into a decoction had been successfully used on three thousand infected Spanish soldiers. Other German treatises soon followed, however, it was a 1519 publication by the German aristocrat Ulrich von Hutten: \textit{Of the guaiacum medicine and the French disease}, that finally advertised the guaiacum cure to a broad European audience. A long time sufferer of the disfiguring disease, Hutten was nevertheless an enthusiastic advocate of the guaiac cure which he used to point out the philosophical pretensions and ineffectiveness of

\textsuperscript{58} Niccolo Massa, discussed below, was a celebrated Venetian physician who published frequently and conducted important anatomical dissections that he described in his \textit{Anatomiae libri introductorius} (Venice, 1536). He is significant here for his equally influential tract of the French Disease and the guaiacum cure: \textit{Liber de morbo gallico} (Venice, 1532).

\textsuperscript{59} Munger, “Guaiacum” (1943).

\textsuperscript{60} Early medical writings on the contagion were quickly published in Venice in collected volumes. Pol’s tract was included in the 1535 publication, \textit{Liber de morbo gallico, in quo diversi celeberrimi in tali materia scribentes, medicine continetur auctores videlicet} (Venice, 1535).
learned medicine.\textsuperscript{61} In place of logical syllogisms, useless aphorisms, and ineffective compound drugs offered by physicians and apothecaries, Hutten presented the guaiacum cure – which he called “holy wood” - as a pure and unrefined gift from God for an ailing mankind. In taking aim at the establishment fixation on Greek rational medicine and Italianate fashions, Hutten’s treatise has thus been studied as an important source on reformed religious currents in German culture before the full onset of the Reformation.\textsuperscript{62}

At the core of those complaints, famously voiced in Martin Luther’s attack on Papal corruption in 1517, was the Church practice of selling indulgences that involved the wealthy German Fugger family and its extensive financier interests. Incidentally, it was the Fuggers who had obtained a full monopoly on the importation of the guaiacum wood into Europe two years before Hutten’s popular text. In his opening letter Hutten even expressed his gratitude to the Fuggers who surely were not disappointed to see his treatise translated into several European vernaculars.\textsuperscript{63}

In Italy, where the French Disease first appeared, the guaiacum wood was widely discussed by humanist physicians almost immediately after its arrival.\textsuperscript{64} While the elderly Leoniceno had much to say about the new disease in his 1497 treatise on the subject (he concluded that Hippocrates had already described it without giving it a name), he appears to have had little to say about the guaiac cure. This is fitting considering Leoniceno’s reputation as a bookish physician who spent a great deal more time perusing manuscripts.


\textsuperscript{62} Hajo Halborn, \textit{Ulrich von Hutten and the German Reformation} (Harper & Row, 1965).

\textsuperscript{63} The English translation of Hutten’s treatise was made by Thomas Paynel in 1533 and published as, \textit{De morbo gallico: Of the wood called Guaiacum}.

\textsuperscript{64} Arrizabalaga, \textit{The Great Pox}, 20-32.
than in practicing medicine. The same cannot be said, however, for his students Manardi and Brasavola, both of whom took issue with their teacher’s opinions on the disease and offered substantial commentary on new remedies imported from both the Americas and Asia. Another important commentator was the Venetian physician Nicolo Massa who composed an influential text on the French Disease and American remedies first published in 1527. For all of these authors the identity and medicinal values of the guaiac wood were intimately connected to their understandings of the venereal contagion itself. Though presenting slightly inflected opinions on the matter, they departed from Leoniceno in moving closer towards a notion of the disease as a “whole substance” entity that attacked particular parts of the body’s interior, rather than a disease acting solely through manifest lesions and skin deformations.65 This was an important shift from the Galenic canon, which understood diseases as humoral imbalances exhibited in manifest symptoms. The notion of the French disease as a whole substance entity already informed the more dangerous mercury treatment administered orally and said to expunge the morbid substance through mercurial salivations. The use of mercury infused ointments for serious skin afflictions was by then an ancient tradition, and given that many commentators, including Manardi, viewed the new disease as a species of leprosy it is not terribly surprising that sufferers turned to this radical treatment to ease their pain in the absence of other remedies.66

65 Ibid., 252-272.

66 “A Night with Venus, and a lifetime with Mercury” was a popular saying among those who contracted the contagion. On the mercury cure and earlier traditions of mercury treatments, see: The Great Pox, 139-142. For the history of mercury in the alchemical tradition see the selections provided in Stanton J. Linden, ed., The Alchemy Reader: From Hermes Trismagistus to Isaac Newton (Cambridge: Cambridge University Press, 2003).
In openly rejecting this course of treatment, famously advocated by the radical Swiss physician Paracelsus (1493-1541), the Italian medical humanists concurred with Ulrich von Hutten in praising the use of homeopathic and gentler botanical purgatives to treat patients. Unlike the layman Hutten, however, the medical Hellenist Brasavola exerted considerable energy developing elaborate indexes detailing the disease’s manifold symptoms and multiple composite subspecies. In this way Brasavola argued that the disease had changed over the three decades since its appearance in Italy and thus exhibited its own historical biography of mutation and decay. With respect to the guaiacum, the wood’s dark color and density suggested to both Brasavola and Manardi a close affiliation with the ebony tree well known to classical authors. Though acknowledging the guaiacum’s novelty they nevertheless catalogued the American remedy as an extended species of plant familiar to Mediterranean commerce. Manardi further claimed that based on his own observations of arriving specimens from America

67 Philip von Hohenheim, better known as Paracelsus, was a Swiss German medical reformer whose writings were severely critical of the Galenic medical establishment and the metaphysics of Aristotle. Drawing on the alchemical tradition that had remained active in the circulating manuscripts of the medieval monks Raimond Lull and Arnaud of Villanova, Paracelsus developed an elaborate chemical philosophy that was based in a radical empiricism. He has long stood at the center of studies on early modern alchemy and chemistry. See, Allen Debus, The Chemical Philosophy, cited. More recently, his writings have been studied by Pamela Smith for their articulation of an “artisanal epistemology”. See, Pamela Smith, The Body of the Artisan (2004). The question of Paracelsus’ influence in Catholic Europe remains unsettled as his works were quickly placed on the Roman Index of Books and therefore publications were censured. However, manuscripts and books clearly circulated in Italian medical circles. See, Antonio Clericuzio, “Chemical Medicine and Paracelsianism in Italy, 1550-1650,” in The Practice of Reform in Health, Medicine, and Science, 1500-2000, eds. Charles Webster, Margaret Pelling, Scott Mandelbrote (Ashgate, 2005), 59-74. Clericuzio points out that apothecaries and distillers in Italy also introduced Paracelsus’s remedies in their own practice. In Catholic Europe new chemical practices could spread rapidly without necessarily being familiar with or even accepting of Paracelsus’ philosophical principles. Galenism was sufficiently flexible to incorporate traditions of chemical distilling and the traditional rendering of ‘Galenists vs. Paracelsians’ misses the many gradations and hybrid physiological models proposed by learned physicians in the seventeenth century. I address Paracelsian doctrines more directly in chapters four and five of this dissertation.

there were in fact three different species of the guaiacum wood. Suffice it to say that the early movement of botanical commodities across vast oceans during this period resisted serious quality controls and left open considerable opportunities for the marketing of all manner of substances as something other than what they were. Nevertheless, the writings of these medical reformers showcase the humanist penchant for detailed classification and the composition of encyclopedic indexes in their confrontations with novel diseases and their cures. In the early sixteenth century new diseases and medicines thus brought nature’s particular manifestations to the forefront of academic medical discussion in important new ways. To know the disease and its cures meant compiling an increasingly sophisticated paper trail of empirical descriptions, case studies, and natural histories.69

The composition of descriptive natural histories of the ‘mal francese’ and its American cures was not limited to university physicians however. For those who practiced in Italy’s busy urban communities, publishing tracts on these matters also offered an important way to cultivate a public reputation and drum up clients in a competitive marketplace. Among the first to see the value of this strategy was the Venetian physician Nicolo Massa (c. 1480-1569), an unjustly overlooked figure in Renaissance medicine whose publications on anatomy and the French Disease present interesting points of comparison with the university physicians so far discussed in this chapter.70 Tracing his family roots to Genoese merchants who had settled in Venice

69 Jon Arrizabalaga, “Medical Responses to the ‘French Disease’ in Europe at the turn of the Sixteenth Century,” in Sins of the Flesh: Responding to Sexual Disease in Early Modern Europe, ed. Kevin Patrick Siena (Toronto: Center for Reformation and Renaissance Studies), 33-55.

70 For Massa’s publications on anatomy and the morbo gallico, see note 58 above. For discussions of Massa’s biography and medical ideas, see Richard Palmer, “Nicolo Massa, his family and fortune,” Medical history 25, no. 4 (1981): 385-410; Cynthia Klestinec, Theaters of Anatomy: students, teachers, and traditions of dissection in Renaissance Venice (Baltimore: Johns Hopkins University Press, 2011), 30-35;
around 1400, Massa took a degree in surgery from the Venetian College of Physicians in 1515 and a further degree in arts and medicine from the College in 1521. While the Venetian College possessed the authority to license degrees, it was not a teaching institution with a curriculum or body of students. It is possible that Massa may have studied for a time at Padua and like other practitioners of his time decided to pay the lower fees of the Venetian College to obtain his public license. What is clear is the generally practical tenor of his medical publications that give voice to the concerns of a practicing urban physician whose reputation depended to a large degree on the therapeutic success of his treatments. In taking an interest in anatomy and medical botany Massa therefore showed little concern in establishing philosophical grounds for their status as new disciplines.

After obtaining early positions as the physician at the Scuola di San Giorgio and the convent of the Sepulcher, Massa published his first Latin treatise in 1527, the *Book on the French Disease*. For Massa the disease was a new contagion in his time conveyed primarily, but not exclusively, by sexual intercourse. His detailed descriptions of case studies reveal extensive experience with the disease and its symptoms. His understanding of the disease generally fits well within humoral medicine, explaining it in terms of an excess of cold phlegm originating in the liver. However, in making his case, Massa refers

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71 Paul F. Grendler has referred to the Venetian College of Physicians as a “paper university”: Grendler, *Universities of the Italian Renaissance*, 140-141, 179.

72 O’Malley, *Andreas Vesalius*, 121-123.

73 Massa’s original Latin text of 1527 was reprinted in the vernacular in 1566 in Venice as, *Il libro del mal francese, composto dall’eccell. Medico & Filosofo M. Nicolo Massa Venetiano*.
to his own observations made while conducting morbid anatomies on disease victims. From these dissections he insists that the essence of the disease is “material” and thus cannot be effectively treated by means of regimen and diet therapy.\textsuperscript{74} It is here that he finds justification for devoting several chapters to the history, characteristics, and mode of administering the new guaiacum cure. In chapter eight Massa takes issue with those who, following Galen, contended that dietary abstinence was more responsible for cleansing the bodies of sufferers than any medicinal specific like guaiacum. While agreeing with the Galenic notion of dietary abstinence as a way to “purge equally the entire body”, Massa cites the Arab authority Averroes in adding that diet “however, does not purge all of the humors of the body…as every humor evacuates itself by its own way and by its own medicines.”\textsuperscript{75} This did not mean that careful regimen restrictions were not important to Massa, who provided detailed instructions on the kinds of foods and habits patients should adopt while undergoing the guaiacum treatment, but that his own experience had taught him that relying on regimen therapies alone often made the condition worse in patients. As a trained surgeon Massa therefore took for granted the idea that the “the physician means to help nature” in the restoration of sick bodies back to health. In the cases of difficult sores and lesions that were “not obedient to remedies” the doctor is obliged to intervene and “modify them with instruments” such as scalpels and rubbing tools.\textsuperscript{76} Massa’s treatise on the French disease thus presented a portrait of the practicing physician steeped in the writings of ancient authorities, yet open to a wide

\textsuperscript{74} Ibid., 58. “che essendo l’infirmita material, e per repletione, conviene venire a purgation…”

\textsuperscript{75} Ibid., 103. “Dove e’ da sapere, che quantonque la dieta ugualmente purge tutto il corpo, non pero purge tutti gli humori del corpo, come bene al loco allegato dichiara.”

\textsuperscript{76} Ibid., 105.
spectrum of experimental interventions to treat particular cases: “for in great and exceedingly difficult diseases it is permissible to try everything provided that one proceeds reasonably…for I am not of the opinion that nothing can be added to the discoveries of the learned, which would be madness, as if to hold that those who have not been cured by mild medicines may not be cured by stronger or very potent ones, even if they are not universally known.”

This approach to empirical investigation also appears to have informed Massa’s more widely discussed writings on anatomy. In his Introductory Book on Anatomy, published without illustrations in 1536, Massa guides readers through the practical procedures of dissection most conducive to revealing the various organs and structures of the body. Drawing on autopsies conducted at the hospitals of St. Paul and St. John in Venice, Massa’s text made important contributions to the study of human anatomy, including his experimental injections of the kidneys to disprove Galen’s conclusion that the kidneys acted as filters straining urine from the blood. He also offered important descriptions of the internal structure of the liver. Scholars have suggested that Massa’s book was an important influence upon Andreas Vesalius whose, On the Fabric of the Human Body, published in Padua in 1543, stands as one of the most important achievements of Renaissance medicine. Though Vesalius does not credit him, it is hard to imagine that he was not familiar with Massa’s practical text and its teachings. Nevertheless, it is Vesalius who is generally credited with staging the new critical

77 Ibid., 193. This is the translation of the passage provided by Palmer, “Nicolo Massa,” 393.

78 Nicolo Massa, Liber introductorius anathomiae (Venice, 1536).
empiricism most effectively through his famed public demonstrations at Padua. While Massa’s practical guide to dissection treated anatomy as an adjunct to medicine, Vesalius presented a spectacular visual argument for its status as an independent discipline in the 1540’s. After an initial period of editing and translating the texts of Greek authorities on anatomy and medical botany between 1490 and 1530, northern Italian universities increased their investments in theaters of public demonstration that quickly multiplied throughout Europe and transformed the nature of medical education in the early modern period.

1.4 Staging Knowledge: The University Nature Theaters

Following the early activities of the medical humanists at Ferrara, the University of Padua, under the direction of the Republic of Venice since 1405, emerged as a receptive home for new generations of humanist physicians fully inspired by the achievements of Leoniceno, Manardi and Brasavola. In the field of anatomy Padua was already a leading center of learning with human dissections performed there as early as the 1430’s. The professor of surgery Leonardo Buffi, reported several dissections in his commentaries on Avicenna and in his treatise “On Antidotes” (1430). By the latter fifteenth century dissections were an established tradition at Padua with Mondino de’


Liuzzi’s *Anatomia* (1316) serving as the primary instructional text. In the annual demonstrations three professors took part with one reading the text of Mondino, a second who explained the text against the dissected body, and a third professor of surgery who carried out the incisions. Two of the most important contributors to the study of anatomy during this period were Alessandro Benedetti (c. 1450-1513) and Gabriele Zerbi (1435-1505). Benedetti’s *Anatomice sive historia corporis humani* (1502) achieved wide fame and first described the norms for the construction of temporary anatomical theaters modeled on classical theaters “such as can be seen at Rome and Verona.”

Both Benedetti and Zerbi took considerable interest in the Hellenist fashions then emerging in academic circles. In the space of the classical “teatrum” Benedetti saw a philosophical terrain where the attention of spectators were directed less to the dissected corpse, than to the words of the demonstrating orator.

This emerging tradition was not without critics, however. In his 1536 anatomical treatise Nicolo Massa warned readers that they “should not expect from me a kind of stage of preparation or a seat, where the crowd of spectators may watch you dissecting or demonstrating. Do not expect any such ridiculous thing. I shall display myself in my writings as an ignorant man and not a philosopher.”

As Cynthia Klestinec has observed, Massa’s disdain for the new anatomical performances echoed Petrarch’s famous criticism of physicians as performers accomplished in the rhetorical arts of deceiving their patients. The contrast between Massa and the consummate anatomical showman Vesalius thus

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82 Klestinec, 28.


could not have been greater. Whereas Massa’s small libretto lacked any illustrations, Vesalius’ *Fabrica* presented stylized figures in seven volumes with a large frontispiece image depicting the Flemish anatomist demonstrating an anatomized female corpse at the very center of a crowd of onlookers in the Padua theater. Vesalius, however, justified his public demonstrations as useful opportunities for students to gain experience in the techniques of dissection and perhaps even to touch the dissected corpses themselves. In doing so he fortified the public space of the theater as a pedagogical tool that no doubt enhanced his prestige among the students who attended his demonstrations.85

Student demand for more practical medical instruction was also an important impulse for the formation of the public ‘Orto Botanico’ at Padua in 1546. In 1533 Padua established the first university lectureship in Italy for the teaching of medicinal simples. The position was given to the professor of practical medicine, Francesco Buonafede (1474-1558) who was tasked with teaching from Dioscorides’ *Materia medica* and Galen’s *De simplicium medicamentorum*. However, it soon became clear that instruction in the subject suffered from a lack of practical demonstrations of living plant specimens. In 1543 Buonafede, at the behest of several of his students, therefore petitioned the Venetian directors of the university to construct a public garden where students could directly handle and examine plant specimens.86 In November 1543 student leaders submitted their own petition citing the achievements of ancient and contemporary writers in the field of natural history and arguing that the university’s reputation would be greatly

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85 Klestinec, *Theaters of anatomy*, 32-34.

enhanced with a physic garden. In this endeavor, Buonafede also received enthusiastic support from Giovan Battista Da Monte, professor of theoretical medicine and great admirer of the Ferrara medical humanists. Da Monte was perhaps the most respected physician in Italy for his introduction of clinical medicine at Padua through bedside lectures to students at the Hospital of San Francesco.\(^\text{87}\) With his support funding for the garden was quickly approved with construction completed in the summer of 1546.

Another important inducement for the garden’s founding appears to have been the medical humanist fascination with the classical theriac remedy, the recipe for which was passed down in Galen’s treatise, Theriaca ad Pisonem. According to the contemporary writer Marco Guazzo, it was Buonafede’s readings of Galen’s tract on theriac that urged him to join with other faculty in proposing a permanent garden to the university’s Venetian directors:

> …the Excellent Doctor Francesco Buonafede, after reading the exposition of Galen on the Theriac of Andramaco, physician to Nero, knew the great difficulty in acquiring the cognition of such a drug. Therefore, he sought to communicate his thoughts to the Excellent Giovan Battista Montano, chair of medical theory: and thus the Riformatori were petitioned if it would please them to make known to the Venetian Senate the great utility that would result to posterity and to the present age…to found in Padua a space to make use of a medicinal garden.\(^\text{88}\)

For humanist physicians like Buonafede then, the possibility of recreating the “true” theriac represented the gold standard of pharmacy and the renewal of medicinal therapeutics in their own time. The new garden theater thus had a larger purpose beyond the teaching of medicinal simples: it also provided a tool for recuperating the botanical ingredients of an ancient panacea. In this way the Padua garden provided the humanist

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\(^{87}\) Giuseppe Corvetto, *Di Giambatista da Monte e della medicina italiana nel secolo XVI* (Antonelli, 1839).

medical community with a laboratory collection site for a variety of specimens imported from around the Mediterranean, as well as a public stage for materializing the medical knowledge of classical authorities. Most importantly, the garden served to ornament the political authority of the Republic of Venice and its maritime empire in an era when new global trade routes threatened to displace it from the center of long-distance commerce in Europe.

Finally, in the garden’s founding document, the physicians noted the public benefit of an instructional space to rectify “the infinite errors and frauds committed in apothecary shops where medicines are composed with false and stale stuff to the damage of men’s lives.”89 By improving education in the study of medicinal simples physicians hoped to arm practitioners with the skills to identify the errors of retailers who read only in the vernacular and thus remained ignorant of Greek medical botany. The third rector of the Padua garden, Giacomo Cortuso, claimed particular success in his campaign to eradicate the use of the “doronicum” plant from the pharmacies of Italy. For Cortuso, the doronicum found in the shops was none other than “aconitum”, or poisonous leopard’s bane described by Dioscorides. After testing the plant on several animals Cortuso confirmed his identification, which was widely celebrated as an important victory for the medical humanist’s approach to botany. Here was an example of how textual studies could serve empirical investigations and lead to important reforms in the interests of public health.90

89 Translated by Laughran, “Professionalization of the Apothecary”, 103.

However, though touted as philosophical spaces untainted by the interests of the marketplace, the new botanical theaters and their physician rectors were also reliant upon the skills of guild-trained apothecaries to obtain, cultivate, and examine specimens. The sixteenth-century evidence is admittedly scarce, yet passages from the writings of noted botanists are nevertheless revealing of important collaborations. In his only publication, *Opinions on Simples* (Venice, 1561), the first rector of the Padua garden, Luigi Anguillara, compiled his letters to various leading naturalists and physicians advertising his knowledge of numerous plants. Passages from these letters indicate that Anguillara and his botanist circle maintained close contacts with at least a pair of Veneto apothecaries. In his letter to a physician in Chieti, Anguillara informed him that “I have found, my Excellent Sir, in Venice your most expert apothecary Messer Donato Lanuto, by the Farra of S. Martino, my dearest friend and brother, who has given me an assurance by your hand saying that you desire to know my opinions on the Absinth and other plants.”

In another letter addressed to Annibale Briganti (translator of Monardes and D’Orta discussed at the beginning of this chapter), Anguillara remarks that “Our learned apothecary Messer Giovanni Guidoni (not to say only yours for I also love him for his great virtue and competency in his art no less than you make in yours) the other day requested of me that I should write down some things about the plants of Dioscorides, Galen, Theophrastus…and Pliny since he affirms to me that you would like to know my

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91 Luigi Anguillara, *Semplici, li quali in più pareri a diversi nobili nominii scritti* (Venice, 1561), 163. “Ho trovato, Eccellentissimo Signor mio, in Vinegia il vostro peritissimo special messer Donato Lanuto dalla Farra di S. Martino mio carissimo amico, & fratello, il quali mi ha dato una polizza di vostra mano, ove dite che desiderate sapere il mio parere sopra gli Absinthi, & altri piante, pregandomi con grande instanza a compiacervi.”
We have little further information on the two apothecaries other than a brief, yet revealing mention in Briganti’s *Two books on the things brought from the Indies* in 1576. In chapter XI of Garcia D’Orta’s Indian pharmacopoeia, Briganti inserted his relation of an incident in Naples in 1562 involving the protomedico’s decision to ban the use of the stems of an imported Persian plant known as *manna*. Disagreeing with the judgment, Briganti sought out more information from the apothecaries Guidoni and Lanuto on the origins of the plant widely used in local pharmacies: “apothecaries most judicious and very accurate, who were always with me.” From them he learned that there was only one species of *manna* and that it originated in the Piedmont area of Italy. Whatever the truth of the matter, Briganti felt compelled “to write a long discourse in Latin to offer proof” of his discovery. However, after sending his manuscript to the physician Don Antonio Altomare for proofreading, Altomare published it under his own name “without offering a minimum sign of gratitude that I with hardship had written, and with so much sweat had labored.” While Briganti unfortunately learned about the limits of academic collegiality the hard way, his lively anecdote reveals the important place of apothecaries as expert mediators in the intellectual networks of physician naturalists that apparently stretched from the Padua garden to the Kingdom of Naples in sixteenth-century Italy.

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92 Ibid., 133. “Il nostro dotto special messer Giovanni Guidoni (per non dir solamente vostro, amandolo io per le sue gran virtu & sofficienza nell’arte sua non meno, che facciate voi) l’altro giorno mi prego, ch’io ponesi in carta quello, che a me pareva di alcune piante di Dioscoride, di Galeno, di Theofrasto, di Crateva, di Archigene, & di Plinio, affermandomi, che voi desideravate saperne il parer mio.”

93 A. Briganti, *Due libri dell’historia dei semplici aromati et altre cose che vengono portate dall’Indie Orientale pertinenti all’uso della Medicina* (Venice, 1582), 50-52. The narrative is under the heading “Annotatione di Carlo Clusio” but is actually the one instance in which Briganti makes his own interjection into his translation of Monardes and Garcia d’Orta’s books.
In late Renaissance Italy between roughly 1490 and 1560 the culture of university trained physicians thus experienced significant reforms in education, intellectual outlook, and practice that enhanced the authority of the senses and empirical investigations into the material substances of nature. While it is certainly true that important medical investigations into botany, anatomy, and healing springs had already preceded Leoniceno’s fateful attack on Pliny in the 1490’s, the arrival of the printing press initiated important shifts in the ways academic physicians engaged with the classical inheritance and indeed with the very nature of texts.\textsuperscript{94} Absorbing the humanist’s approach to texts as historical fabrications in themselves, the physician scholars scrutinized them carefully for their accumulated corruptions and applied rigorous philological tools to try to extract the original meanings and intentions of their Greek authors. The press not only exposed the discrepancies in the available manuscripts, it also offered opportunities for scholars to brandish their skills and cultivate fame before a wider European audience of intellectuals and dignitaries. At the same time the discovery of new trade routes and the general expansion of overseas commerce made it possible for some humanists to also consider the limits of classical medical knowledge and thus ponder the possibilities for medical advances in their own time. In the universities and cities of northern Italy the humanist physicians balked at occult explanations for new diseases and developed detailed observations of discrete symptoms which they compared with other case studies.\textsuperscript{95} The


\textsuperscript{95} Nancy Siraisi, \textit{Medicine and the Italian Universities, 1250-1600} (Leiden: Brill 2001); Gianna Pomata and Nancy Siraisi, eds., \textit{Historia: Empiricism and Erudition in Early Modern Europe} (Cambridge: MIT Press, 2005).
venereal contagion, like its American wonder cure, possessed a discrete anatomy as a naturally occurring disease entity that Brasavola suggested could even be analyzed over time.

Thus sandwiched between the fifteenth-century arrival of Greek manuscripts after the fall of Constantinople, and new remedies (and possibly diseases) from an unknown continent across the Atlantic, physicians in sixteenth-century Italy began to historicize their own art in new ways, seeing the long medieval period that preceded them as an era in which physicians had neglected practical therapeutics in favor of logic and philosophical dispute.\(^96\) Hence, medical botany held out a particular promise for optimistic humanists in restoring the physician to his full anatomy bridging both head and hand. Moreover, while disfiguring diseases (and growing religious strife) appeared to spell catastrophe for mankind in the early sixteenth century, the appearance of a new “holy wood” shortly after also seemed to confirm belief in a divinely ordered creation where every affliction had its healing counterpart in nature. The sixteenth century in northern Italy was thus a period of optimism for the renewal of therapeutics through the direct study of nature’s healing substances that had the consequence of turning the pharmacy into a space of contested authority with the medical community of physicians, guild practitioners, and “irregular” practitioners. In the following chapter I turn to this theme to address the evolution of the public pharmacy and the urban regulatory regime in the city of Venice.

TWO

Pharmacy and City: Retailing and Regulating Medicines in Venice

2.1 Introduction: The Urban Stage of Medical Authority

It truly amazes me when I see the composition of Theriac, which as I consider it, is made of so many materials, the one a contrary to the other, as if it was made by a swindler or an ignorant fool. I am not denying that Theriac might be a miraculous medicine, but I say that it would be much improved by taking away all of those materials that they put into it which more often are noxious…thus Theriac would be much more perfect if they did not add the dried tablets of *squilla* which is a poisonous and evil onion…the opium which is a mortal poison, as everyone knows, as well as the addition of vipers, which are more poisonous than all the others…¹

Thus, in his widely read *Mirror of Universal Science*, published in Venice in 1564, the prolific author and peddler of medicinal secrets, Leonardo Fioravanti, offered his opinions regarding the composition of the most famous remedy of his day: the *Theriac of Andramocus*. For Fioravanti, the theriac concoction was less a universal panacea than a holdover from the days before the printing press when physicians could easily “dangle carrots in front of the people.” However, much had changed “since this blessed Press has come to light, books are multiplying of such variety that now anyone can study…and so

¹ Leonardo Fioravanti, *Dello specchio di scientia universal* (Venice, 1583), f. 40r.-41r. For more on this fascinating figure, see: William Eamon, *The Professor of Secrets: Mystery, Medicine and Alchemy in Renaissance Italy* (National Geographic Books, 2010).
the kittens have opened their eyes.” As a result, the apothecaries who made the drug were “held in no more esteem and reputation today than they were before, so that today every house has become a pharmacy…and it is my firm opinion that little by little the science of medicine will end up in the whorehouse, and we unfortunate doctors in the hospital, because everyone today is a Physician…But blessed the world would be if the Physicians strained themselves to learn how to medicate without the Apothecaries and to recognize all of their operations from God, and not from other earthly men.”

Though he fashioned himself a physician in many of his public writings, Leonardo Fioravanti’s actual credentials on this point were never exactly clear wherever he landed in his extensive journeys around the Italian peninsula. In Bologna and in Venice he ran into trouble with local physician’s boards that demanded to see his degrees. In all likelihood, Fioravanti had received his training as a surgeon, and if he did attend university courses, records do not survive to prove it. As an irrepressible critic of all academic pretensions in the field of medicine, it is thus not surprising that Fioravanti took aim at the drug which most embodied the fawning adherence of physicians and apothecaries to humanist legends and ancient texts. Moreover, as a popular healer who certainly knew a thing or two about pharmaceutical self-promotion in the Venetian marketplace, Fioravanti was perhaps in a position of authority when he implied that the established physicians and apothecaries who praised theria in print and ceremony were the biggest quacks of them all.

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2 Ibid., 41v. “ma di poi che questa benedetta Stampa é venuta in luce, i libri sono multiplicati di sorte tale, che ogni uno puo studiare; & massime che la maggiore parte si stampano in lingua nostra maternal: & cosi I gattisini hanno aperti gli occhi, perche ciascuno puo vedere, 7 intendere il fatto suo, in modo che noi altri Medici non possiamo piu cacciar carotte alle genti…”

3 Ibid., 41r.
Fioravanti’s amusing critique of official medicine and its ritual trappings in
Venice draws our attention to the entwined themes of public marketing and public
regulation in the city that are the subjects of this second chapter. Indeed, while numerous
scholars have called attention to the promotional aims of the theriac ceremonies in
Venice, Andrea Mozzato has more recently suggested that the investments in the drug’s
ritual festivities should also be seen as a form of public regulation to prevent the
unsupervised production of a highly addictive narcotic therapy. Though composed of
more than sixty ingredients, one substance at the heart of all theriac recipes – the opium
plant – stands out as an herb capable of producing powerful alterations in the body. That
this substance was understood by early modern apothecaries to be a key measuring stick
of the drug’s worth is evident from their discussions of theriac’s virtues. Georg Melich,
the German owner of the Ostrich pharmacy in Venice, refers to “the virtue of opium, and
of other things” in his discussion of theriac’s shelf-life, tellingly neglecting to name any
other particular ingredients present in the concoction. He also prescribes other opium
based concoctions to induce sleep and to improve the spirits of patients suffering from
melancholia. Medical practitioners clearly understood the drug’s effects, even if the
pharmacology was uncertain, and were likely also aware of the deadly effects of
overconsumption. It thus does not seem unwarranted to see the presence of opium in the
theriac remedy as an important explanation for both the drug’s high commercial value,
and its presence at the center of Venice’s efforts to regulate the production and sale of


\[5\] Georg Melich, Avvertimenti nelle composizioni de’ medicamenti per uso della speziaria (Venice, 1605), 7. Melich’s important text will be discussed in greater detail below.
medicines since the twelfth century. In a world where the vocabulary of spectacle made up for the shortened reach of public power compared with the modern state’s technologies of enforcement, it is not surprising that the theriac-opium concoction became the object of careful ritual framing designed to promote a commercial remedy while informing audiences of its restriction to a small group of state-licensed experts.

In late Renaissance Venice, those experts were primarily the city’s apothecaries organized in their Noble College of Apothecaries established in 1565. Most of the College’s leading members were operators of pharmacies known as triacanti, shops licensed by the Public Health Office to manufacture and sell Venetian theriac. While theriac had been the subject of regulation since the late middle ages, the second half of the sixteenth century witnessed a veritable boom in the industry that developed in tandem with a complex public licensing regime involving multiple civic authorities. These developments were not restricted to the dynamics between physicians and apothecaries, however, and must be understood as part of a broader development in which the urban space of Venice rapidly became a stage for a variety of medicinal retailers from all social levels to engage in the growing commercialization of health.6 As Fioravanti noted, every house seemed to have “become a pharmacy [and] everyone today is a Physician.”

Indeed, thinking about the city as a stage for medical theater also entails a consideration of the city as a kind of contact zone: an arena in which rhetorical

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instruments of authority circulated between often competing groups claiming expertise over pharmaceutical matters. While the founding of the Venetian College of Apothecaries in 1565 announced their claims to public authority in this area, the professional profiles and retailing tactics they developed were cultivated responses to a web of institutional interests and rehearsed forms of expertise. Understanding the Venetian apothecary’s long evolution from medieval spice dealer and public grocer to learned medical practitioner and craftsmen-scholar thus demands an assessment of the urban pharmacy as the apothecary’s identifying instrument of commercial practice and medical authority. In what follows I examine the pharmacy’s presence in a wide variety of archival statements including the regulatory prescriptions and licensing records of civic authorities, judicial proceedings, testaments, and guild minutes to trace its emergence as a key site of Venetian civic, religious, commercial and medical culture by the turn of the seventeenth century. In doing so, I build on the general outline of the previous chapter, and establish a historical and material grounding for the themes addressed in the chapters to follow. By the conclusion of this chapter I aim to have demonstrated that, behind the foundation of the College of Apothecaries in 1565, lay the pharmacy’s long transition from merchant magazine (apotheke) to dynamic retail shop (spezieria) hosting diverse segments of Venetian society and serving as an important site of cultural exchange in the city.

2.2 Medicinal Regulations in Medieval and Renaissance Venice

7 The notion of contact zones as arenas of cultural dialogue and appropriation between elite and subject groups derives from the field of post-colonial studies and Mary Louise Pratt’s Imperial Eyes: Travel Writing and Transculturalization (Routledge, 1992). I have found it a useful here to think about the development of the pharmacy as a space practiced by both elite and popular practitioners in Venice.
From its early settlement in the seventh century the city of Venice had remained a contested Italian possession of the Byzantine emperors in Constantinople. In the ninth century, under the leadership of a series of active Doges, the city began to develop its famed orientation towards maritime commerce and quickly dominated the Adriatic with its galley fleet. In the eleventh and twelfth centuries Venetian participation in the various Christian Crusades to Jerusalem increased its negotiating leverage within the Byzantine Empire, ultimately leading to Venice’s orchestration of the Crusader sack of Constantinople in 1204. In 1380, Venice’s long competition with the Genoese also came to an end at the Battle of Chioggia, in which the Venetians defeated their rivals and asserted their commercial dominance in the eastern Mediterranean until the latter sixteenth century.\(^8\)

Venice’s considerable wealth thus ultimately derived from its medieval control of the Levantine spice trade, which connected the prized traffic of the Indian Ocean to Mediterranean waters. The city’s bustling market at the Rialto for centuries served as Europe’s most important transit point supplying pepper, myrrh, incense, cardamom, cinnamon, nutmeg, balsam and various resins to the rest of Europe.\(^9\) By the thirteenth-century the city’s powerful merchant families increasingly asserted their control over the political institutions of the Republic. In 1297 these families finally closed ranks, forbidding entry of any new families into the Great Council which supplied members of the Venetian Senate. This system of popular exclusion remained relatively intact until the

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\(^8\) The best general introduction to Venice’s maritime republic remains Frederic C. Lane’s *Venice, a maritime republic* (Baltimore: Johns Hopkins University, 1973).

fall of the Republic in 1797, a fact that generations of historians have explored from several angles to decipher Venice’s famed stability expressed in its Republican mythography and civic pageantry as *La Serenissima*, the “Most Serene Republic”.\textsuperscript{10} While no single factor can account for Venice’s political stability as most of its neighbors experienced constant upheaval, one important factor was the Republic’s tolerant fostering of urban guilds and trades so that the city remained a constant magnet for immigrant laborers and fortune seekers.\textsuperscript{11} Unlike its most famous cultural rival, Florence, merchant guilds never took shape in Venice since the merchant class’ domination of state organs rendered them unnecessary. Thus while Florence developed strong distinctions between merchant dominated “Greater” guilds and artisan “Lesser” guilds, thereby limiting entry and expansion of guild trades, Venice never developed such rigid hierarchies and rarely restricted the splintering of guild organizations. As a result, the city hosted more guilds – and their associated religious confraternities - than most other Italian cities by the sixteenth century.\textsuperscript{12}

Another reason for the Republic’s tolerant approach to guild communities was the city’s continual need to resupply its population with foreign laborers. For though the city was certainly a center of resplendent wealth, its position on the salt marshes of the Venetian lagoon and its reliance on long-distance commerce also made it a notorious


graveyard for victims of plague and malaria.\footnote{13} Hence, well before other European cities, Venice actively developed a sophisticated system of inspection boards and public health regulations to minimize the effects of recurrent plagues that devastated the city after the Black Death of 1348. Well aware of the threat that the city’s maritime lifeblood also posed to its very existence, authorities developed rigid rules of inspecting and quarantining imported goods – including spices – for a period of time before they were placed on the market. During times of plague temporary health boards were called to action to enact curfews, quarantine urban areas, and pursue other actions to attenuate the spread of contagion. By 1486 the city went a step further in instituting Italy’s first permanent public health office (\textit{Provvveditori alla Sanita}), establishing an institution that would quickly expand its jurisdictional power into many other areas of Venetian urban life, including the activities of guildsmen provisionally under the authority of the Old Justice (\textit{Giustizia Vecchia}), one of Venice’s most ancient civic tribunals.\footnote{14} For Venice’s apothecaries, both institutions would play important roles in shaping the practices of their trade.

Founded in 1173, the five person magistracy of the \textit{Vecchia} was charged with the administration of marketplace justice, adjudicating disputes among tradesmen and enforcing quality controls for consumable items, and eventually, manufactured goods. In time the growing workload led to specialized courts for the butchers (\textit{Beccarie}) and


bakers and grain traders (Biave), while a New Justice (Giustizia Nuova) was established in 1261 to oversee wine traders and taverns. With this change the original court took on the name of the Giustizia Vecchia, and issued some of the first regulations over the apothecary trade. Only three years prior, in 1258, the city’s medical apothecaries (speziali di medicina) joined the grocers (speziali di grosso) to draw up statutes for a new guild. Though joined in the same guild, the apothecaries formed a colonello, or autonomous subgroup with their own rules under the umbrella of the grocer’s corporation. In the same year the physicians also drew up their own corporate statutes that would soon after serve as the foundation for the Venetian College of Physicians.\footnote{The late medieval medical statutes of the apothecaries and physicians have been published in their original latin in: Ugo Stefanuti, Documentazioni cronologiche per la storia della medicina, chirurgia e farmacia in Venezia: dal 1258 al 1332 (Padova: Antenore, 1961). An Italian translation is available in Renato Vecchiato, Gli speziali a Venezia (Ordine del Farmacisti della Provincia di Venezia, 2013), 28-31. Both the 1258 and 1565 statutes of the apothecary trade are published in: Capitulare de specialibus (sec. XIII-XIV). Ordini e capitol del collegio de gli spetiali della inclinita cittá di Venzia l’anno della redention nostr MDLXV (Accademia italiana di storia della farmacia, 1984). For my own discussion that follows I have relied primarily on this latter published source. Archival copies of the original 1565 statutes are located in the Archivio di stato di Venezia (henceforth ASV), Giustizia Vecchia, busta 211; and the Biblioteca Museo Correr (henceforth BMC), Mariegola 209, vol I.} In drawing up these articles the physicians and apothecaries joined the rest of Venice’s craft guilds and trades in submitting to the Republic’s decree that all of the arts form corporate bodies to be recognized under the law. This was a general development throughout late medieval Italy and reflected the growing sophistication of urban economies during this period.\footnote{Stephen R. Epstein, “Town and country: economy and institutions in late medieval Italy,” Economic History Review (46, no. 3 (1993): 453-477.}

The sixteen articles of the physicians repeatedly visit the issue of conspiratorial associations made with apothecaries to inflate prices, suggesting that this was a common practice. Physicians were not to receive salaries from apothecaries nor were they permitted to manufacture drugs of any kind and sell them on the market. However, statute...
twelve also made it clear that “no apothecary may medicate or give anyone any medicines or potions without the advice of a physician nor may he examine any urine.”

The distinctions were clear: to maintain price and quality controls over medicines physicians were not to make business associations with apothecaries, while apothecaries were forbidden from practicing medicine, which involved making diagnoses and advising therapies. As for the apothecaries’ statutes, the clear theme that emerges from twenty-seven registered between 1258 and 1330 is the establishment of a system of inspections and controls accountable to the Giustizia Vecchia. The wording of statute four suggests that the apothecaries were elected to serve as inspectors of their fellow guildsmen: “If I am elected inspector, I will not refuse the nomination and when I will be required by an apothecary or by fabricators of medicines to check his productions I will do it in the briefest time possible with integrity and without discrimination.”

The following two rules add that in return for their services inspectors will be given two denari and a spoonful of rose sugar and nuts for every labbra of material inspected. By the sixteenth century this practice was no longer in use as the courts employed their own force of fanti (policemen) to carry out inspections of shops. Indeed, an appended statute in 1321 repealed the requirement to reimburse inspectors suggesting that the apothecaries had already ceased electing from their own ranks. In 1325 it was added that no apothecary would be permitted to engage in any aspect of their art without a license issued from the

17 R. Vecchiato, Gli speziali, 20. “Se sarò eletto ispettore o Giustiziere non rifiuterò la nomina e quando sarò richiesto da qualche Speziale o comunque fabbricante di medicinali di controllare la sua produzione, lo farò nel più breve tempo possibile, con lealtà e senza intenti discriminatori.”

18 Ibid., 22. “…per volontà quasi unanime degli Speziali non si debba più pagare agli ispettori due danari per libbra di confetto o di triaca, e che I detti ispettori nulla debbano prendere per tale loro funzione, secondo la prassi ormai consolidate di non effettuare più alcun pagamento per il controllo del confetto e della triaca.”
court. Also, all shop assistants who carried out the tasks of grinding and mixing spices had to present themselves and be publically registered.

These last additions reflect the overriding concern for marketplace fraud and the use of falsified ingredients and dishonest measurements. Indeed, this is the central issue touched on in the very first statute, which invokes members to make their products “in perfect good faith, without any fraudulent intent.”\(^{19}\) This also included the command to “never make, give, nor teach any poisonous or abortive medicines.” In 1323 it was ordered that “no apothecary in the city of Venice, nor any other person male or female will sell or make realgar (arsenic bisulfide)” under penalty of a 50 lire fine. The efforts to reduce opportunities for dishonest practices extended especially to more complex compounds, syrups and electuaries. Statute two forbids the “confection of any medicinal remedy worth more than ten soldi without having first been authorized by one of the inspectors designated by the Giustizieri, unless specifically ordered by a physician or his patient.”\(^{20}\) Such medicines also had to indicate their specific ingredients before they could be sold. All of these proscriptions, finally, extended to the production of theriac, which could not be fabricated without the presence of at least three physicians appointed by the magistrates.

We can gain a sense of the growing importance of theriac to civic authorities in Venice from a 1297 decree of the Great Council (Maggiore Consiglio) stating that “medicines, syrups and theriae” were to be produced in “two or three stations or more on

\(^{19}\) “Giuro sui santi Vangeli di Dio che tutti I medicinali, sciroppi, unguenti o impiatri ed in genere rimedi medicinali che faccio o faro saranno efficacy e legali, confezionati con elementi collaudati, in perfetta buona fede, sen’alcun intent fraudolento…”

\(^{20}\) “Non confezionerò né faro mai confezionare alcun rimedio meidicinale del valore superior a dieci soldi…”

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behalf of the Commune”.21 The manufacturers and sellers were to be paid by the Republic and chosen by the Giustizia Vecchia, which would inspect the ingredients and final preparations. They were also to keep the pharmacies open at all times to serve the infirm. The first two public triacanti, as they came to be known, were the Golden Head at San Bartolomeo and the Cross at San Salvador. In 1437 the Giustizia limited the production of medicines containing more than fifty ingredients to these two pharmacies. Relying on the account books of the late fifteenth-century apothecary Agostino Altucci at the San Salvador pharmacy, Mozzato has painted a detailed portrait of the commercial activities that took place there.22 Altucci’s ledgers reveal his purchases for large quantities of the ingredients used to compose theriac: balsams, viper flesh, saffron, gums, and the expensive costo plant. However, Altucci also appears to have spent a good deal of his energies investing in a wide array of merchant activities that had little to do with medicine. His family contacts stretched across the ports of the eastern Mediterranean and thus he was able to import not only the various resins and sugars used to make medicines, but also trade in silks, fabrics, pigments and glass. With respect to theriac, the apothecary was clearly more invested in bulk wholesaling than smaller volume retailing (vendere al dettaglio), which seems to have only been a minor concern across the board. Aside from the theriac remedy, moreover, there were very few composed medicines in Altucci’s pharmacy compared with an abundance of simplicia - botanicals and spices.23

21 Roberto Berveglieri, Tutela e brevettazione in campo medico e farmaceutico nella Serenissima Repubblica (Mantova: Tecnologos, 2007), 100. The archival location cited by Berveglieri is ASV, Maggior Consiglio, Liber pilosus, c. 69v.


23 Mozzato, “Oppio, triaca e altre specie;” 175-76.
Committed to the composition of theriac that enabled wider commercial investments in the eastern Mediterranean trade, Altucci’s operation thus reflects an urban economy oriented towards maritime commerce and wholesale transactions described in a wealth of historical literature on the medieval and Renaissance Republic. While these activities continued throughout the sixteenth century, Venice’s urban economy also witnessed significant growth in several manufacturing sectors that included silk, glass, soap, turpentine, and pharmaceuticals. Supported by the significant demographic growth of the sixteenth century, the urban economy also nurtured an increasingly diverse service sector of commercial retailers and print shops. As Richard Mackenney has argued in his study of guild communities in Venice, Venice’s apothecary community exemplifies the sixteenth-century growth of small business enterprise in the city and the efforts of certain tradesmen to adapt to Venice’s shrinking share in the Levant trade by investing more in smaller volume retailing.\footnote{Mackenney reports that “Santo Locatelli at the Egg had lost his substance in a shipwreck which may have cost him 1500 ducats and he also stood surety for 300 ducats on Andrea di Franco, who had gone bankrupt…It is striking that respectable incomes could be generated from relatively slender capital} A preserved galley role of 1569 (all guilds were required to supply names to service the galleys) lists eighty-five apothecaries with only seven apparently invested in wholesale. There are also five women apothecaries named who are not among the forty described as “poor”. Many, however, clearly made significant incomes in shops spread out between forty-one different parishes in the city.\footnote{The economic expansion of the sixteenth century took place intandem with an estimated rise in Europe’s population during this period from 85 million inhabitants in 1500 to 110 million by 1600, see: R. Mols, “Population in Europe, 1500-1700,” in The Fontana Economic History of Europe, vol 2: The 16th and 17th Centuries, ed. Carlo Cipolla (London, 1974), 38-39. Richard Mackenney states for this period in Venice that “it is extremely difficult to define the difference between the commercial and industrial sectors, not just because the former was much more important, but because of the close association of manufacture and marketing in the guild system.” See Mackenney’s chapter on Venetian guild adaptations to sixteenth-century enterprise, “Guildsmen and Enterprise” in Tradesmen and traders, 78-127. For more on the adaptations of Veentian industries in the sixteenth and seventeenth centuries see: Richard C. Rapp, Industry and Economic Decline in Seventeenth-century Venice (Cambridge: Harvard University Press, 1976).} By the end
of the sixteenth century, Venice’s most observant urban ethnographer, Tommaso Garzoni, humorously celebrated the new economy in his *Universal Piazza of all the world’s professions* (1585), which ranged across the board from physicians, apothecaries, and notaries, to prostitutes, street sweepers, tavern owners, and medical charlatans. In the pages of Garzoni’s encyclopedia, the exercise of a profession was not merely a matter of corporate affiliation, but also of public performance. Among the Venetian apothecaries Garzoni noted by name as men of “much learning and science” in medicinal matters were Georg Melich at the Ostrich, Nicolo at the Pine Cone, Galeazzo at the Coral, Oratio Zattabella at the Saint Jerome, and Giovan Giacomo at the Phoenix. All of these figures were leading founders of the College of Apothecaries established in 1565.

At the same time, the sixteenth century was also a period of intense religious divisions in Europe pitting the authority of Roman Catholic doctrine against reformers critical of its clerical monopoly on Biblical interpretation, empty ritual discourse, and perceived immersion in worldly avarice. For men like Martin Luther and John Calvin, grace was not bestowed by Popes or good works, but by God alone through the confession of faith practiced daily in the direct study of biblical texts. While reformers a century earlier had expressed similar ideas, the sixteenth-century Reformation primarily gained steam through the medium of the press, which appeared in Germany by the late fifteenth century. Within a short period of time Venice became one of Europe’s leading

resources.” *Tradesmen and Traders*, 88-9. Three other apothecaries were given lucrative contracts to supply the galley surgeons with medicines.


27 Ibid., 663.

centers of print, with German immigrants carrying their skills southward to set up 
shops. In Venice, printers and booksellers were important players in the new retail and 
service economy, and appear early on to have lent their services to popular ciarlatini and 
mountebanks who issued recipes and performed broadsides in the marketplaces of the 
city. In this atmosphere of popular print, retailing, and religious tension, Venetian 
authorities expressed increasing concern with the contagious spread of dangerous ideas 
and practices in the city, issuing numerous decrees through both the Public Health Office 
and the Holy Office of the Inquisition. Indeed, cultural historians have long noted the 
ease with which Catholic clerics likened heretical ideas to infectious plagues and poisons 
upon the body since the middle ages. Hence, Pope Innocent III decried the “plague of 
heretical depravity” in thirteenth-century Provence, while the Cardinal Jacopo Sadoleto 
in 1545 described Venice as having been “poisoned by this Lutheran plague.”30 In the 
following section, we will see how civic authorities in sixteenth-century Venice, in their 
efforts to address the threats to public health posed by unregulated remedies and religious 
heresy in the city, focused their attentions upon the urban pharmacy through two 
important institutions: the Public Health Office and the Holy Office of the Inquisition.

2.3 Inquisitors and Health Inspectors in the Pharmacy

Well after the devastation of the Black Death, in 1347-48, Venice continued to 
deal with recurrent outbreaks of plague into the seventeenth century. Indeed, despite its 

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29 Peter Burke, “Early modern Venice as a center of information and communication” in Venice 
Reconsidered: The History and Civilization of an Italian City-State, 1297-1797 (Baltimore: Johns Hopkins 

30 Quoted from Thomas Fudge, Trial of Jan Hus: Medieval Heresy and Criminal Procedure (New York: 
Oxford University Press, 2013), 64.
traditional portrayal as a period of cultural flowering and commercial growth, the Renaissance in Venice witnessed a particularly damaging string of plagues. Between 1361 and 1528, the city endured twenty-two outbreaks, with eleven taking place between 1478 and 1528.\textsuperscript{31} In response to this situation, civic authorities decided to institute a permanent public health office, the \textit{Provveditori alla Sanità} in 1485, entrusting three patrician magistrates with broad authority to draw funds from the Salt Office (\textit{Provveditori al Sal}) and enact whatever health measures they deemed appropriate. They were also given the authority to impose criminal sentences and ban subjects permanently from the city who refused commands to enter the island reserved for quarantine, the \textit{lazzaretto vecchio}.\textsuperscript{32} Established by the Senate in 1423, the Lazzaretto hosted the earliest permanent plague hospital and was a required stop where those exhibiting plague symptoms upon entry in the city were to remain for forty days. Most did not survive the sojourn and recent excavations have uncovered numerous mass graves testifying to the gruesome conditions on the island. Later in the century, another quarantine island, the Lazzaretto Nuovo, was established as a required stop for all ships and their passengers entering the lagoon. Massive storehouses and dormitories were constructed for entrants – healthy and sick - to wait out the forty day period before they could enter the city.\textsuperscript{33} In 1488 the Health Office also declared that all goods unloaded from arriving ships not registered in the books of the port inspectors (\textit{Dogana da Mar}) would be declared

\textsuperscript{31} Brian Pullan, \textit{Crisis and Change in the Venetian Economy in the Sixteenth and Seventeenth Centuries}, orig. published 1968 (Routledge, 2006), 151

\textsuperscript{32} ASV, \textit{Provveditori alla sanitá}, Capitolare I, c.1, 7 jan 1485.

\textsuperscript{33} For published documents on the early regulation of the lazzaretto vecchio, see: Brian S. Pulla, ed. \textit{Venice: A Documentary History} (Toronto: University of Toronto Press, 2001), 114-122.
contraband. The jurisdiction of the Health Office thus extended beyond passengers possibly bearing disease, to material goods that could potentially transmit plague through physical contact. As a result, its regulatory decrees very soon addressed a wide spectrum of retailers of linens, foodstuffs, wine and medicines in the city.

The first rule regarding apothecaries came in 1511, with the decree that no pharmacy would be permitted to keep “rotten, fetid, or rancid medicines”. In 1528 the office further required the apothecaries to nominate a list of names to serve as “soprastanti alle specierie” – overseers of the pharmacies – to enter shops and examine their contents. The magistrates would then select two names to serve with a third inspector named by the Giustizia Vecchia. However, it is not until a decade later that we begin to see a proactive crackdown on medicinal retailers including apothecaries and itinerant healers. Between August and November of 1539, the minute books of the Health Office record nine cases of shop owners condemned for abuses. Interestingly, several of the condemnations concern a composed remedy known as diagalanga, an electuary made from the ginger root Cyperus galanga. In the recipe of the ninth-century Arab pharmacist known as Mesue (discussed in the following chapter), the root was mixed with sugar to make a solid lozenge and used as an antacid to treat various stomach ailments. However, the Health Office’s sudden concern for remedies made with this substance strongly points to the impact of medical humanist botanical disputes upon the Venetian marketplace. According to the Ferrara professors Leoniceno and Brasavola, the root

34 ASV, Provveditori alla sanità, Capitolare I, b. 2, c.41, 7 nov 1511.
35 See, Berveglieri, Tutela e brevettazione, 104-106.
named *galanga* in the pharmacies had been misidentified, and was in fact the true *Acoro* plant described by Dioscorides. Giovanni Manardi disagreed, claiming that the true *Acoro* was in fact another plant commonly used in pharmacies, the *Calamo Aromatico*. That the issue arose in the first place can be traced to the absence of anything known as *galanga* in the texts of ancient authors, thus sparking speculation regarding its “true” nature. Ultimately, Manardi’s view that the *calamo* was the true *acoro* won over many writers, including the esteemed botanist Carolius Clusius by the end of the century. The *galanga*, however, remained an essential substance in the pharmacy, and was described by the Venetian apothecary Georg Melich in 1575 as a useful substitute for the *calamo* in the composition of theriax. The *diagalanga* electuary, moreover, appears across Europe in medical texts and even on the popular stage in England, where the sixteenth-century playwright John Heywood references the drug in his comedy, *The Foure PP*.37

Despite the survival of the *diagalanga* in the pharmacy, the debates raised by learned physicians in the field of botany continued to affect the Venetian marketplace throughout the 1540’s, a decade that witnessed the flourishing of medical humanism at Padua and the founding of the botanical garden there. In 1540 the Health Office issued a declaration pertaining to all medicinal retailers in the city, requiring that all participants in the sale of medicinal simples and composed remedies must obtain a license from the *Provveditori*.38 In 1547, shortly after the opening of the Padua garden, the Health Office joined with the College of Physicians to launch its most aggressive campaign of reform directed at medicinal retailers in the city. Declaring that “owners of pharmacies who did


not have cognition of medicines must hold in them an approved master,” the magistrates now required that all apothecaries must appear before one magistrate, two physicians, and the three apothecary overseers to be approved by at least four votes to practice in the city.\textsuperscript{39} The two physicians were to examine the number and weight of composed medicines exposed for at least three days. Apothecary inspectors were also required to visit shops at least once a year. Two years later the office also announced a prohibition against apothecary associations with unapproved physicians, suggesting an intent to draw sharper lines between the apothecary trade and the growing numbers of unincorporated mountebanks practicing in the city.\textsuperscript{40} The penalties for transgressors were severe, ranging from a fine of one hundred ducats and the loss of medicines, to six months in prison and a permanent ban from the profession. If shop assistants (\textit{garzoni}) were found working without approval they would be fined 25 ducats and banned for two years.

During the initial sweep of the pharmacies in 1547 it appears that few were spared. Among the twenty shop owners condemned to the office in this year were Sabba di Franceschi at the Bear, Camillo at the Owl, Nicolo at the Pinecone, and a female “patrona,” Donna Catherina at the Cat. Their charged abuses almost all concern composed electuaries, antidotes, pills, and distilled concoctions, clear evidence of growing investments in commercial retailing, or \textit{vendere al minuto}, within the apothecary trade. Among the remedies taken from Battista at the sign of the Crocodile were his \textit{pillole Inde}, an Arab concoction made of black hellebore, the fern polypodium, the lavender aromatic \textit{sticados arabicum}, the precious blue stone \textit{lapis lazuli}, and the fruit of

\textsuperscript{39} ASV, \textit{Provv. Sanità}, Notatorio, b. 729, c.150, 30 jan 1547.

\textsuperscript{40} ASV, \textit{Provv. Sanità}, Capitolare I, b. 2, c.62, 29 jan 1549.
“bitter cucumber” (*citrullus colocynthis*), all carefully composed to produce an effective remedy for melancholy. The specific focus on such remedies also points to the agitations of the Venetian College of Physicians, which aimed to preserve its traditional jurisdiction over the practice of internal medicine. Indeed, the larger consequence of the new reforms and penalties was to place the apothecary’s art under the firm supervision of the College of Physicians.

It is during this decade that not only pharmacies, but also itinerant mountebanks and *ciarlatini* begin to make frequent appearances in the Health Office records. Such figures became permanent fixtures in the popular marketplaces of early modern Europe, loudly hawking their “secret” oils, plasters, unguents, and pills and even performing public demonstrations on their own bodies to prove the worth of their products. In 1549 Sebastiano Romano, who peddled an oil to help provoke urine (*far orinar*), was brought forward for not producing a written license, while the mountebank Antonio Napolitano sang songs “dishonesti in dissonor” of the magistrates. Two years later a certain Bernadin illegally prepared syrups and electuaries and ordered medicines from a pharmacy to sell again in the piazza. Yet, while these kinds of condemnations appear sporadically in the latter sixteenth century, they are far outweighed by the number of petitions made by supplicants and public licenses granted to them during this period. Indeed, as Roberto Bervelgieri and Sabrina Minuzzi have shown in their more comprehensive investigations of the Health Office’s minute books, the second half of the sixteenth century witnessed a considerable eruption of privileges awarded to a wide

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41 Berveglieri, *Tutela e brevettazione*, 108-10; and ASV, *Provv. Sanità*, Notatorio, b. 729, c.144r-149r.

42 Berveglieri, *Tutela*, 111.
social spectrum of persons invested in making and selling composed remedies. This coincided with a general expansion of the Republic’s activities – through multiple civic organs - in granting licenses and even personal patents (only through the Senate) to inventors in a wide range of practical arts, including manufacturing techniques, navigation, canal building, and hydraulics. Between 1551 and 1600 the Senate issued 471 patents, compared with only 126 during the first half of the century, and 283 for the first half of the seventeenth century. Sabrina Minuzzi reports a general dominance of the sixteenth-century petitions by physicians (17.8%), Surgeons (8.2%), and Charlatans (17.8%). Apothecaries make up only a small proportion (4.1%), with the largest share going unidentified (41.1%). The reasons for this, however, are clear from the precedents established by the regulatory laws in medieval and Renaissance Venice thus far discussed, which forbade physicians from engaging in medicinal commerce and had long attempted to limit these activities to publically licensed pharmacies. The impulse to take one’s medicinal secret to the Health Office to receive a license to sell it would thus be greatest among those groups outside of the public apothecary trade. Finally, a significant number of supplicants in Venice came from outside the city, including those claiming to be physicians licensed in other cities. Hence, while the numbers suggest apothecary inertia, closer consideration of individual petitions during this period also suggest how the urban pharmacy was practiced by all three groups – apothecaries, physicians, and charlatans – to pursue their commercial and medical interests in the latter sixteenth


44 Ibid., 177-78. Minuzzi notes, however, that compared with physicians and chiari latini, apothecaries grow steadily in the licensing records to 10% in the seventeenth century, and 22% in the eighteenth; virtually dominating the market during this period. By comparison physicians dropped to 5% by the eighteenth century and charlatans to 2%.
Evidence from the sixteenth-century petitions also allow us see how the pharmacy attracted both learned and popular experimenters, while lending its authority to their practices.

We might begin in January, 1576 with the petition of Gasparo Zolemino, “physician from Pisana,” to sell his powder (polvere) for the plague. As nothing energized the search for novel effective remedies like an epidemic outbreak, Gasparo arrived at an opportune moment during one of the most devastating episodes to ever hit the city. Informing the office of his remedy, Gasparo added that because of the suddenness of the recent outbreak he “had not made any provisions of any of the salubrious medicines that I have made on other occasions” and which “God has held true in this sort of infirmity.” As the medicine could only be prepared around the month of March he had decided to inform the office that the time was approaching “to find the things necessary for this medicine.” As with most petitions, Gasparo’s recorded proposal is brief and matter of fact, yet concludes with his request to have his remedy made available in a pharmacy and sold with its printed recipe. Finally, the powder was also to be dispensed from “four pious places” in the city so that the poor who could not afford the remedy could also receive its benefits.

Mixing piety and commercial opportunism, Gasparo’s petition demonstrates his acknowledgment of the city’s public pharmacies as both useful instruments to increase the circulation of his remedy, and as medical spaces that might offer legitimacy to his claims for its therapeutic utility. That the pharmacy might serve as a useful stage to demonstrate the effectiveness of experimented secrets also emerges from the petitions of

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45 ASV, Provv. Sanità, Notatorio, b. 733, c.96v-97v., 13 jan 1576. “voglio che la sia posta in una spicieria di questa città da esser venduta in le sue ricette stampate et conservarli danari…”
popular charlatans. In a pair of petitions from 1580 and 1583, the mountebank Bortholomeo Riccio from Lecce performed a series of experiments on his own body for an audience of physicians and apothecaries to demonstrate his remedies against the bites of poisonous serpents.\textsuperscript{46} The first petition records the gathering at the pharmacy of San Giacomo in Calle delle Acque, where Riccio placed viper venom on his tongue without being harmed. His aim, apparently, was to demonstrate his ability to identify the pregnant female vipers (preferred to make theriac) and how to dissect them in the proper way to compose the theriac concoction. In a second performance, Riccio also had a viper bite him on the arm which quickly became swollen, but was quickly healed with the application of his “Terra Malta,” presumably a healing plaster. Following the success of the experiment Riccio asked for the privilege “to kill vipers and other sorts of poisonous animals” and that no other mountebanks be allowed to sell his medicinal secrets against poisons. Three years later Riccio related the episodes of his successful performances to the Health Office in a request to extend his privilege for a further ten years.

Riccio’s fascinating petitions, in which he declares to have “made many experiences of my virtue in public and in private, and mostly in the making of Theriac,” draw our attention to the close cultural proximities of learned and popular medical traditions in the Renaissance pharmacy, where a mountebank’s performance earned him

\textsuperscript{46} ASV, \textit{Provveditori}, Notatorio, b. 735, c.135r-137r, 20 may 1583. “…che io posesse dar il rimedio per le morsicature d’ogni sorte di serpe et animali vellenosi come anco mi fu fatto fede dalli Ecc. Priore et consiglieri dell’Ecc. Collegio di Fisica et Spetiali del mio vallore, havendo fatto molte esperientie della mia virtu in pubblico et private, et massime nel far Theriaca ch’io con le proprie mani senza pigliarele con ferro alcuno, ho pigliate le vipere, et fatte morire senza alcun detriment mio, con maraviglia et stupor di tutti feci anco una esperienza Ecc. Intanti li predetti S. Prov. Facendomi in presentia loro moriscar da una vipera velenosa dove essi veddero gonfarmi, et con il mio remedio subito risanarmi il tutto si legge in esso privileggio concessoni da sue Sig. pero con fisso nella sua molta bonta et dementia (?) avanti li suoi benignissimi piedi humilmente et devotamente supplico la Signoria una si voglia deganr di concedermi Privileggio anni dieci…”
not only the privilege to sell his remedies, but a potentially lucrative role as an “expert” supplier and manipulator of one of the key ingredients (female vipers) for making Venetian Theriac.\textsuperscript{47} Riccio’s performance in the pharmacy is thus best seen as a professional audition for the officers of the College of Physicians and Apothecaries to evaluate his skills in identifying the vipers and rendering them into the preserved tablets (\textit{trochisci}) added to the final mixture. Indeed, with the growth of the theriac market in the latter sixteenth century, the procurers of vipers in the hills around Padua who supplied local apothecaries were described by Pietro Mattioli as \textit{ciurmadori di banca}, those who “make the profession of serpents.” The 1563 edition of his \textit{Discorsi} also displays a charming woodcut of one of these figures hunting and collecting snakes in the wilderness.\textsuperscript{48} A file in the \textit{Giustizia Vecchia} records hundreds of vipers killed between 1572-73 at the major manufacturing pharmacies of the Coral, the Anzolo, San Marco, and the San Giovanni. Orazio Zattabella, pharmacist at the San Girolamo, also made 170 pounds of theriac in 1580, 338 in 1586, 342 in 1589, 444 in 1592, and 510 pounds in 1595.\textsuperscript{49} These records reveal a rapidly growing theriac market in which the outsourcing of expertise to the margins of the medical community was also an important feature of its functioning. For the popular mountebank Riccio, a few snakebites in the pharmacy were clearly a small price to pay to get in on the lucrative production ring for Venetian Theriac. While medical authorities often ridiculed similar charlatan stunts in the public

\textsuperscript{47} David Gentilcore, “Was there a “popular medicine” in early modern Europe?” \textit{Folklore}, 115, no. 2 (2004): 151-166.

\textsuperscript{48} Pietro Andrea Mattioli, \textit{Discorsi} (1563), 201.

\textsuperscript{49} ASV, \textit{Giustizia Vecchia}, Arti, b. 211. The file contains a variety of unnumbered documents related to the apothecary trade, including letters by foreign diplomats praising the virtues of the Republic’s famed pharmaceutical commodity. This file is also discussed in Palmer, “Pharmacy in the Republic of Venice” (1985).
markets, Riccio’s enactment inside the pharmacy was apparently enough to win the approval of his medical audience.

![Figure 1: A ciurmadori di banca collecting snakes in the Paduan foothills for the production of Theriac depicted in the 1563 edition of Mattioli's “Discorsi”.](image)

Finally, the 1576 petition of Anzolo, apothecary at the Abraham, suggests the close business relations apothecaries sometimes developed with unincorporated practitioners. Upon the death of the mountebank Leone Herbolato, Anzolo requested that only he would be permitted to sell Herbolato’s medicinal “powder for worms,” and would dispense it freely to the city’s hospitals. Only a year before, Herbolato had complained to the office that others were selling “fake and simulated” versions of his powder and requested that his privilege be given for ten years. We do not have details

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50 ASV, Provv. Sanità, Notatorio, b. 733, c.77r-78v, 10 dec 1576.

51 Berveglieri, Tutela, 117.
on the relationship between Anzolo and Herbolato, but it was not uncommon for other apothecaries to offer their pharmacies as outlets for the experimented remedies of those outside their trade. The best known example is Sabba Di Franceschi, whose Bear pharmacy near Santa Maria Formosa was where clients could find Leonardo Fioravanti’s distilled secrets advertised in his numerous vernacular publications.\textsuperscript{52}

At the same time, medicinal inventions were also contested or transferred between apothecaries. Gabriel Marsilio, apothecary at the Colonna, refused to show inspectors his secret \textit{pillole}, which he claimed had been in his family for one hundred years. A year later Marsilio complained that Bernardin at the Three Columns was selling similar pills. The dispute was settled with Bernadin agreeing to make his pills silver (\textit{argentato}) and Marsilio’s gilded (\textit{dorato}), a happy arrangement suggestive of the power of packaging in the Renaissance marketplace for medicines.\textsuperscript{53} In a 1630 petition to the Venetian Senate, the apothecary Bernardin Moretti requested an exclusive privilege to take over Gentil Pontano’s “elettuario” against stomach worms licensed by the Health Office back in 1607. The petition records Moretti’s request to also make the drug in public piazzas:

\begin{quote}
…in the privilege that was conceded in 1607 to Gentil Pontano to make the most perfect electuary, that heals diverse diseases…fully confirmed by the college of physicians, with the attestation of which the Ecc. Sig. at the Health Office at that time gave him the license to sell it, with print (con la stampa) that attests to the many diseases treated with this antidote, that was from then always sold under the name of Electuary of Pontano…and has made salubrious operations, and because it has always been made in the pharmacies, so that none could doubt that it was made with all the ingredients declared in the bill described in the Public Health Office…[asks] to make the electuary in the public piazza, where he has a shop under the habitations and palazzi of the Ecc. Sig. Procuratori, with the assistance of the physicians who will be deputed by the Public Health Office…with all the observations that are made, and ingredients that are put into light; such that all will rest assured that the
\end{quote}

\textsuperscript{52} Eamon, \textit{Secrets of Nature}, 174. Fioravanti also praises de Franceschi and his Bear pharmacy in his \textit{Dello specchio di scientia} (1583), p. 43: “Inquato poi all’arte degli Aromatarij non la biasmo punto, anzi la laudo molto, quando ella però, e fatta da huomini dotti, & che la intendono, come in Venetia il Spettabile M. Saba de’Franceschi, Aromatario all’insegna dell’Orso, quale è reputato per uno de primi.”

\textsuperscript{53} Bervelgieri, \textit{Tutela}, 116-17.
ingredients are most perfect, and they are placed in that good rule that convenes to the health of human bodies.\textsuperscript{54}

Moretti’s request to prepare the patent remedy in the open piazza in a manner similar to the ritual production of the theriac remedy suggests the significance of the urban space in articulating the authority of pharmaceutical remedies. Because the drug was made in the pharmacies, “none could doubt” that it was made in conformity with the published recipe list. However, in bringing the production of the drug out into the piazza, Moretti suggested that the \emph{elletuario di Pontano} was at least as efficacious as the famed theriac antidote. Thus the petitions of the mountebank Benedetti and the apothecary Moretti, reveal the show the interchangeable authority of pharmacy and marketplace as practiced by incorporated medical practitioners and itinerant healers.

The efforts of the Venetian Public Health Office and the College of Physicians to discipline the practices of medicinal retailers thus contributed to the formation of a new licensing regime that lent a fair amount of official recognition to both the culture of medicinal novelties and to the relationships apothecaries sometimes cultivated with “irregular” practitioners. As an emerging center of experimental practice, the pharmacy was also a magnet encouraging other experimental activities on the edges of the official medical community. Pharmacies, moreover, were becoming important centers for a variety of economic, social and cultural exchanges in the early modern city that brought them within the purview of other institutional organs charged with “protecting” not just the medical health of subjects, but their spiritual health as well.\textsuperscript{55} As the Reformation in

\textsuperscript{54} ASV, \textit{Senato Terra}, reg. 104, c. 25; filza 317.

\textsuperscript{55} Filippo de Vivo has drawn attention the frequent appearance of pharmacies in Inquisition trials: “Pharmacies as centres of communication in early modern Venice,” \textit{Renaissance Studies} 21, no. 4 (2007): 505-521.
northern Europe intensified, fracturing local communities and establishing new ones in cities like the Calvinist stronghold of Geneva, the Papacy in Rome looked to prevent the spread of reformed ideas into Catholic Italy. Owing to Venice’s strong economic ties with the German lands, its role as a central clearinghouse of printed books, and the Republic’s traditional discord with Papal assertions of power in Italy, the city on the lagoon appeared to be the most vulnerable point of entry for the spread of contagious heresy. Finally, under pressure from Rome, the Venetian doge Francesco Dona therefore established in 1547 a new state tribunal, the Tre savi all’eresia, entrusted with prosecuting suspected heretics in the Republic. The magistracy, which came to be known as the Sant’Ufficio (Holy Office), was a hybrid compromise between ecclesiastical and secular authorities in which three Venetian nobleman cooperated with the local patriarch, papal legate, and local inquisitor. For scholars of Venetian society and culture, the thousands of inquisitorial cases preserved in often detailed notarial recordings are invaluable sources for reconstructing the street level interactions of the early modern city.

Recent studies of the Inquisition sources in Venice have examined the Holy Office’s relationships with medical practitioners from a variety of angles. Scholarship on witchcraft cases in Venice, which increasingly concerned authorities in the seventeenth century, has noted the frequent presence of physicians serving as expert witnesses to


determine the boundaries between medical illness and spiritual *maleficio*. Yet, physicians, particularly during the contentious sixteenth century, were just as likely to be called before the Holy Office to answer for their own heretical beliefs. Richard Palmer has established the significant participation of physicians in reformed circles connected to the medical school at Padua and its international composition of students and faculty. Paduan professors prosecuted included the anatomist Niccolo Buccella, and the professors Bernardino Tomitano and Fabio Nifo, who famously escaped imprisonment with the help of his students after descending from the Bishop’s residence in Padua on a rope of bedsheets. Venetian physicians included Agostino Gadalgin, Ludovico Abbioso, Teofilo Panarelli and Giuseppe Donzelli. The cases for these latter two were among the most extensive investigations undertaken by the court. Donzelli’s case – which tragically ended with his execution by drowning in 1587 - extended over several years and frequently centered on his reading of several prohibited books, including the writings of Erasmus and the most popular zoological work of the Renaissance, Conrad Gesner’s *Historia animalium* (1551-58). As physicians were intimately connected with the world of books and academic learning, it is not surprising that they often fell afoul of the Holy Office for their suspected contact with these potentially dangerous instruments. From the middle of the sixteenth century printers and the book trade were placed under heavy scrutiny as Inquisitors added titles to the Roman Index of Prohibited Books.

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The cases of Teofilo Panarelli in 1567 and 1568 – which also ended with his death by hanging in Rome in 1572 – suggest the importance of pharmacies as gathering places for reformed communities. Indeed, twentyfour cases were brought to the Holy Office involving apothecaries or their pharmacies in the sixteenth century. Troublesome pharmacies suspected of harboring heretical activities in the latter sixteenth century included the Elmo, Sperone, Moor, Saracen, Falcon, Medico and the Luna. As Joanna Kostylo has recently examined in fine detail, the pharmacy at the Two Doves was another lively center of activity, serving as a central meeting place for Panarelli’s secret reading groups involving several physicians, pharmacists and tradesmen. The group also held meetings in a garden on the island of the Giudecca, as well as at the German trading house in Venice, known as the Fondaco dei Tedeschi. Both sites were significant to Venice’s apothecaries who regularly conducted business with the Fondaco, exporting their theria and trading for spices, while the Giudecca was once the proposed site for a public botanical garden funded and managed by the city’s apothecaries as one of the first acts of their new Collegio. We have no evidence that the plan was put into action, yet it points to the close contacts many apothecaries maintained with this area of the city where Jewish brokers (sanseri), who were not allowed to join the broker’s guild, nevertheless helped supply pharmacies with expensive goods. The records of denunciations and disputes brought before the broker’s guild are littered with apothecaries acquiring goods from unlicensed dealers, such as the case in 1609 involving the apothecary Cesare Martin, *Venice’s Hidden Enemies*, 244, 151.

Amadio at the Pace who purchased a large quantity of wax from Jacob and Salomon Papo in a deal brokered by the Jewish factor David Faras.63 Located in Cannaregio, the pharmacy at the Two Doves was also situated adjacent to the Giudecca, and may have benefited, as did other pharmacies, from the connections the Jewish community maintained with family trading networks in the eastern Mediterranean.

The dense commercial relations apothecaries developed with the Giudecca and the German trading house in Cannaregio offer some insight into the reasons why pharmacies became such notorious sites of heterodox activities. At the Two Doves, the pharmacy’s owners Sylvestro and Helena Gemma, as well as their physician son Gian’Battista, were apparently known to hold religious discussions regularly in their pharmacy, where they read from scripture, played music while singing Protestant songs, and played chess with Paolo of Brescia, a preacher known for his heretical sermons. The denunciation was made by a local wine-seller, who sold his wares at the Clock pharmacy in San Giovanni e Paolo, and had heard from a fabric dyer - who worked with Gian’Battista at a local pigment factory (*tintoria*) - of the doctor’s blaspheming against the mass, confession, and penitence. Aside from revealing the close associations of apothecaries with various other retailing and manufacturing tradesmen, the 1565 case brought against Gian’Battista offers testimony in which the doctor and his wife are accused of denying the immortality of the soul. According to Battista’s own sister, the doctor claimed on occasions that “there is no soul, and that when the body is dead, so is the soul.” It is possible, as Kostylo has suggested, that Gian’Battista may have acquired such ideas from encounters with the nearby Jewish quarter, and with certain Hebraic

traditions that did not acknowledge the existence of the individual soul. However, as a Padua graduate, he would also have encountered the tradition of secular Aristotelian that flourished in the faculties of philosophy and medicine there. The school was already famous for the firestorm of controversy launched in 1516 by one of its professors, Pietro Pomponazzi in a tract asserting that Aristotle had denied the soul’s immortality in his *De anima*. He further explained his positions in the *Apologia* and the *Defensorium*, which argued for the separation of theology from philosophy (a separation that distinguished the Padua faculty from northern European universities). Pomponazzi’s legacy lived on well after his death, and his argument was revitalized in the early seventeenth century under the highly influential philosopher, Cesare Cremonini (discussed further in Chapter Four). Finally, similar convictions can be found among other tradesmen in the Inquisition sources, such as the printer Marco Amicio, brought before the tribunal in 1635 to answer for a litany of blasphemous statements. Purportedly overheard in Amicio’s shop were his statements that neither hell nor “paradisio” exist, that there is no soul, that one mass is enough for one year, that Quadregesima was invented by the Pope to unload all the barrels of salted sardines that he couldn’t get rid of, that man has no free will, that if there was no Inquisition it would be a good thing, and finally, that “when you die your soul exits the body through your ass” (*che quando si muore, l’anima esce per il culo*).64

Such heretical notions could have had many sources, and sweaty artisan workshops were not always known for polite philosophy, but what is significant is the frequency with which apothecaries, printers and booksellers found themselves sitting before the Inquisition during this period. As Fillipo di Vivo has demonstrated using Venetian

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64 ASV, *Sant’Ufficio*, b. 92, Contra Marco Amicio, stampator, 1635. Regarding Quadregesima: “per far esito di sardelle salate, de quali ne haveva molti barilli, per non poterle spazzar in altro modo.”
Inquisition trials, pharmacies in Venice were important sites of social mixing where notaries often concluded contracts, and clients could acquire news and information on local and international events. Less remarked upon, however, are the scattered traces of evidence suggesting that some apothecaries were themselves engaged in the print and book selling trades, offering services directly from their pharmacies. In 1581, for example, a certain Piero, bookseller (*libraro*) at the sign of the Luna, was denied entrance to the printer’s guild by a vote of 10-3. However, he was later admitted after agreeing to pay the higher fee of ten ducats reserved for foreigners. However, the sign of the Luna also appears as a pharmacy in the records of the *Giustizia Vecchia* for the first time in 1562, when Andrea Fontana, “spetier alla Luna,” applied to open his shop. In 1576, a case against another apothecary (*aromatarum*) named Piero at the same shop sign was processed before the Office of the Inquisition in Venice. The apothecary had apparently lived in Calvinist Geneva and was accused of performing a baptism on a poor man living in his neighborhood. However, this Piero was said to have passed away by the time of the trial, and it is possible that the Piero listed in the records of the printer’s guild five years later was his heir. These references in various archives in Venice suggest that the pharmacy at the Luna may have been a place where patrons could find both books and medicines for sale. In another case from the same year, a witness gave testimony about a bookseller who operated behind the Mondo pharmacy in San Bartolomeo and who had recently been cited for possession of prohibited titles.

One pharmacy that was clearly an active center of both publishing and medicinal manufacturing was the Golden Lion (*Leon d’oro*) located just off the Rialto Bridge. The Golden Lion first appeared on the roles of the College of Apothecaries in 1607 and
maintained an active business until 1715. For much of the seventeenth century the pharmacy was the center of operations for the printer Stefano Curti whose extensive output included several works on pharmacy, including the apothecary George Melich’s *Advice on the composition of medicines for use in the pharmacy*, Allesandro Venturini’s *Medicines yielded by animals for the benefit of man*, Pellegrini Bonaventura’s *Nobile secrets of the profumer’s art*, Marie Fouquet’s *Secrets*, three editions of Leonardo Fioravanti’s works, and finally, a translated edition of the French chemist Joseph DuChesne’s *Riches of the reformed pharmacopeia*. The Venetian edition of DuChesne’s important work was previously edited and published in 1646 by Giovanni Maria Ferro, apothecary at the sign of the Sanita in Venice. Ferro’s other editorial projects included an updated 1667 edition of Castor Durante’s *New Herbal* appended with his own commentaries, as well as a 1672 edition of the Neapolitan apothecary Ferrante Imperato’s *Natural History*. Other notable seventeenth-century printers who operated out of Venetian pharmacies were Antonio Tivani at the Redentor, Damian Zenaro and his heirs at the Salamander, and the brothers Bertoni at the Pelican. The Pelican pharmacy in San Marco – still in operation today – was particularly active in the printing of scientific and medical works such as Fillipo Fabbri’s *Natural Philosophy*, Girolamo Marafioti’s (1567-1626) *New Inventions and the arts of memory*, and a 1614 tract on theriac, the *Considerations*, composed by the Venetian apothecary Ottavio Campolongo.

From the records of Venice’s various regulatory tribunals then, we can detect various stages of the urban pharmacy’s gradual evolution from a wholesale magazine (apotheca) through which apothecaries acted as merchants in Venice’s maritime commercial networks, to a Renaissance center of theriac manufacturing, and finally, to a
complex retail space that served as a center of urban sociability and cultural exchange in the early modern city. Even by the latter sixteenth century, however, there still remained considerable diversity in terms of wealth and specialization within the apothecary trade, as well as overlaps with the services of grocers, pigment dealers, druggists, and confectioners. Nevertheless, it was during this period that seventy-one of the city’s medical apothecaries established a new set of rules for their art and successfully petitioned the Venetian Senate to establish their own Nobile Collegio degli Spetiali in 1565. The structures of this new organization and its struggles to resist the disciplinary authority of a civic pharmacopeia imposed by the College of Physicians take up the concluding section of this chapter.

2.4 Founding the College of Apothecaries

The decision made by Venice’s apothecaries to break with the grocer’s guild and found their own Collegio was enacted in a petition to the Council of Ten, the Republic’s highest magistracy, in March of 1565. The forty-two new rules drawn up by the apothecaries, and approved by the regulating councils of the guilds, went much further than the original rules from 1258 in addressing the training of apothecaries, guild matriculation, rules for foreigners, and standards for composed electuaries, syrups, pills and, most importantly, Theriac.65 As Richard Mackenney has noted, the apothecaries’ statutes reflect a greater concern for establishing rules in the areas of manufacturing and retailing that continued in their deliberations held afterwards. Central to this aim was the establishment of protocols and offices to manage the College’s revenue and establish a

65 The following discussion is based on the statutes reprinted in: Ordini e capitol del collegio de gli spetiali (1984), cit.
regime of internal regulation in the trade. The first sixteen rules therefore concern the office of the Prior, his two advisors (consiglieri), and the formation of a lower college (collegio minore) made up of twelve members. The Prior and his councilors served only one year terms and were nominated by members with the final selection made by the magistrates at the Giustizia Vecchia. Twice a year the Prior and his officers were to conduct inspections of the city’s pharmacies. Those found with “false” products faced the severe public penalty of having their goods burned at the Rialto “with a bill in large type attached above in view of all” indicating the materials burned and the name of the offending apothecary who would henceforth be banned from office in the College. Most importantly, the Prior and his officers were entrusted with protecting under lock and key the entrance fees of the College and could not spend funds without consulting the general and minor colleges.

Compared with the medieval apothecary statutes, the new sixteenth-century rules had much more to say about professional accreditation and shop management. Grocers and confectioners were forbidden from making and selling composed medicines, while all medicines sold in the pharmacy had to have been made there; an obvious effort to prevent commercial collusions with both physicians and popular mountebanks. Composed medicines also had to be tightly sealed in glass containers, while spices stored in boxes had to be officially stamped and displayed with their prices. Dangerous substances including opium and various arsenic compounds were to be kept under strict lock and key and only accessible to the shop patron. Those who wanted to open a shop and practice in the art had to have first spent five years as a shop assistant and a further three as an apprentice helping in the composition of medicines. Apothecaries who did not
sell their shops could only bequeath them to sons or nephews, who also had to 
demonstrate proficiency in the art through a lengthy exam. The only description we have 
of this procedure comes from the early eighteenth-century apothecary Giovanni Capello, 
who purported to describe a rite used since the inception of the College. Present were 
eight members of the College’s leading officers who first had the applicant read some 
(passages, mostly concerning the moral code of the apothecary, from the fourteenth- 
century pharmacopeia of Saladino d’Ascoli. Next, an urn was presented from which the 
applicant extracted three numbers corresponding to three compositions usually made in 
the pharmacy. After accounting for the contents of the recipes and their mode of 
preparation, he was then required to repeat the process with three more recipes for the 
Prior of the College. Following these interviews he was ceremonially admitted entrance 
while confirming several promises of faith to preserve the honor of the art. Capello’s 
description recreates the interview that would take place suggesting the level of detailed 
knowledge of materials and procedures applicants were required to know. However, the 
extended questions on distilling and the distinctions between Galenic and chemical 
pharmacy remind us that Capello’s account is firmly a product of his time when chemical 
remedies had firmly entrenched themselves into the apothecary’s practice. In the 1560’s 
such activities were only just appearing on the horizon and likely would not have been 
part of the apothecary’s exam.

The most interesting rules, however, are those pertaining to the College’s 
relationship with the College of Physicians and its authority in deciding the medicines 
permitted in the pharmacy. Not surprisingly, the lengthiest statutes concern the

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66 Giovanni Capello, Lessico farmaceutico-chimico (Venetia, 1728).
manufacturing of *theriac* and *mithridatum* which had to be composed according to the recipe provided by the College of Physicians. The steps of production were strictly supervised and each shop licensed to produce these antidotes was required to label their product with individual sigils of their pharmacies so that they could be compared to detect any alterations. As all of the more than sixty ingredients described in classical sources to make theriac had not been recovered, apothecary reputations depended upon how closely they were able to replicate the recipe with the fewest number of substitutions (*succedanea*). The theriac produced in 1566 by the Verona apothecary Francesco Calzolari was widely celebrated in the medical community for purporting to rely on only six substitutions. Thus rule twenty-six asserted that all theriacs could not use more substitutions than the best standard produced up to that year. However, rule twenty-eight went even further in declaring that “all apothecaries are obligated to compose all compositions that they make according to the guide that will be given or approved by the College of Physicians.” The rule appears to be a major concession to the physicians in Venice who had yet to institute a civic pharmacopeia to discipline medicinal preparations. At the same time, however, apothecaries were also to specify the specific ingredients that went into the various *magistrali* with “obscure names” made by “some inexpert physicians and foreigners” who sold them in apothecary shops. The statute seems to suggest that if physicians were going to use pharmacies to peddle their own concoctions, they were at least required to follow their own rules of public transparency.

The new statutes of 1565 thus walk a careful line deferring to the traditional jurisdiction of physicians over internal medicine and medicines taken by mouth, while asserting a new system of internal regulation that makes no mention of the physician’s
traditional weapon in the marketplace: the Venetian Public Health Office. Rather, the statutes reveal a close bond with the *Giustizia Vecchia*, which centrally regulated the theriac market and benefitted to collect upon a portion of the fines listed in the new statutes. In the fifty years following the *Collegio*’s founding in 1565, the College of Physicians increased its attempts to assert its authority over the growing marketplace of experimented remedies, placing it into conflict with the College of Apothecaries. In 1567 the Health Office issued another decree strictly forbidding the sale of any medicines by any kind of vendor if they had not first been approved and licensed by the College of Physicians.67 Similar declarations appeared again in 1574 and 1593, with a Health Office proposal in 1603 that with a two thirds vote they can reform the chapters of the College of Apothecaries to remove abuses in the composition and use of medicines. The apothecaries responded with a petition that among the judges selected for the Health Office should also be included representatives from the *Giustizia Vecchia*. The two magistracies had already been in a jurisdictional dispute since 1590 when the Vecchia demanded that the Health Office cease from interfering in its antique competency over apothecaries and other medical practitioners.68 In 1608 the Health Office issued its most comprehensive reforms since 1547. While broadly aimed at all medical practitioners, the decree specifically addressed a number of apothecary “abuses”. Most importantly, the apothecaries were to hold in their shops a public catalogue of accepted remedies authored

67 BNM, Ms. It. VII, 2362 (=9654-9659), *Collegio medico-fisico, Privilegi e leggi*, n. 9659, copied decree of the Health Office, 29 april 1567. “persona alcuna sii chi esser vogli, non ardischi ne presume di vender nelle piazza et altri luochi publici di questa citta, si in banco come fuor di banco o altramente ogli, polvere, unguenti, eletuarri, o alter cose sia di che sorte si vogli, che dicono esser per salute di corpi humani si semplici come composti, se prima quella non sara approbata per detto eccellentissimo Collegio de Medici.”

68 ASV, *Notatorio*, reg. 15, c. 146, 18 june 1603.
by the physicians. The Health Office would also elect three physicians each year to join
the three officers of the College of Apothecaries in conducting shop inspections.

The dispute between the apothecaries and physicians – enacted through the Health
Office and Giustizia Vechia – finally came to a head in 1617 with the publication of the
physician Curzio Marinelli’s *Pharmacopaea, sive de vera pharmaca conficiendi &
preparandi method, a prestantiss. et excel.mo medicorum Venetorum Collegio
comprobata, libri duo* (Venice, Robertum Meiettum, 1617). The text, made at the
instance of the College of Physicians, directly attacked the many errors made by
apothecaries who quickly mounted a campaign to prohibit its sale. The minute books of
the College of Apothecaries describe the new pharmacopeia as “full of invective, injuries
and false words against all apothecaries and our profession…”69 The case was brought to
one of the most powerful courts of appeals (*Avogaria di comun*), which ordered both the
printer and bookseller to cease all production and sale of the pharmacopeia or face a fine
of five hundred ducats.70 Finally, in 1619 the two sides appeared before the Venetian
Senate where their opposing lawyers passed five days disputing the law of 1608 and the
jurisdictions of the Health Office and Giustizia Vechia. For the apothecaries’ avvocato,
Marco Balarin, the Health Office had been established to prevent plague and therefore
had no place in the regulation of market activities. Tadeo Tirabosco, speaking for the
physicians, accused the *Vecchia* of “defending the avarice and pretense” of the
apothecaries under the guise of protecting their liberty. In the end the apothecaries and


70 ASV, Giustizia Vechia, b. 211. While the official pharmacopeia failed, Marinelli’s book was later
printed in the vernacular by the printer Evangelista Duechino in 1620: *Precetti necessari ad un perfetto
spetiale…Approvato dall’eccellentiss. Collegio delli signori medici fisici di Vinegia.*
the *Giustizia Vecchia* appear to have won their case which was settled in a vote of 12 to 4 to retract the terminations of 1608 and another of 1614. By the early seventeenth century then, the protracted efforts of the Venetian College of Physicians to place the city’s pharmacies under its direct supervision finally fizzled out, leaving the apothecary trade open to pursue its interests in the growing marketplace of experimental remedies and chemical cures.

**Conclusion**

This chapter has presented a broad overview of the evolution of the urban pharmacy in Venice between the thirteenth and early seventeenth centuries. In the diverse records of Venice’s complex web of regulatory organs charged with overseeing the commercial, sanitary, and spiritual health of the urban community we can appreciate the pharmacy’s importance as a site of diverse interests and competing dialogue that made it into arena of innovation by the early modern period. Indeed, it is striking that in the same moment that Venice’s pharmacists began to stake their claims to a place of official importance in the public life of the city in the 1560’s, many pharmacies also found themselves at the center of investigations to clarify the heterodox margins lurking within the social body of the urban community. The double face of the apothecary as dispenser of regenerative health, or deadly poison, is thus mirrored in the medical literature of the period on antidotes and poisons, in which opium or poisonous vipers, when properly manipulated, can be transformed from destructive natural substances to crafted medicines bearing healing virtues of immense value. The remaining chapters of this study explore

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some of the ways apothecaries understood and represented this skilled practice of transformation in their published promotions and marketed remedies.
3.1 Introduction: Tricksters in the Marketplace

In 1572 in Brescia, a city in the westernmost reaches of the Venetian Republic, a local physician named Giovanni Antonio Lodetti published a book with a title that left few doubts about its contents: the “Dialogue on the Deceptions of Certain Wicked Apothecaries.” Fashioned as an appeal to the civic authorities of Brescia, Lodetto’s book begins with the author’s personal testimony of his many years of practice in the city where he had seen with his own eyes “many strange and nefarious schemes, and even express assassinations, committed by many apothecaries with serious prejudice to the lives of the sick, and with little honor to the Excellent Physicians.”¹ Chief among the many frauds perpetrated in the pharmacies were the adulterations of medicinal simples in the preparation of decoctions, as well as undercutting the proper measurements of ingredients. However, in the case of aloe wood, for example, an expensive commodity described by Dioscorides, Lodetto’s fictional apothecary details how merchant suppliers often substituted “poisonous Olivastro, and other black parts of the holy wood” to

produce a boiled concoction that resembled the odor of aloe wood. When the merchants in Venice sold their goods to apothecaries “they open their containers with great solemnity” allowing only a brief scent so that they are “ignorantly purchased by apothecaries.” Thus proclaiming an Italian-wide epidemic of apothecary incompetence, Lodetto praises other cities for introducing “many worthy provisions” to address such disorders and restore the apothecaries to their proper place under the traditional authority of university-trained physicians. In Lodetto’s opinion, the civic authorities would do well to prohibit apothecaries from the composition of any concoctions without the immediate supervision and approval of the physicians. In order to prevent the secret tricks of the trade from continuing, the apothecary’s art and his materials required the medical discipline of the physicians and the enforcement of civic authorities.

In the latter sixteenth century, Lodetto was not alone in his opinion that local apothecaries in Italy were employing practices that fell outside of the standards outlined in the public pharmacopeias typically authored by physicians. However, while civic pharmacopeias such as the *Ricettario fiorentino*, perhaps the most widely reprinted pharmacopeia of the sixteenth century, compiled numerous recipes for a variety of approved drugs, they often presented little more than ingredient lists and dosages, leaving much of the technical execution of drug preparation open to interpretation. Though the *Ricettario* was constantly updated over the course of the century, the technical instructions offered in the 1574 edition published shortly after Lodetto’s dialogue, generally consist of only a few lines, and rarely invoke procedures more sophisticated

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2 Ibid., 39-40.
than grinding, boiling or mixing. For physicians like Lodetto, the apothecary’s worth thus resided primarily in their labors to keep their shelves stocked with the purest ingredients to fill physician prescriptions. As the medicinal virtues of simples were understood to reside in their whole substance, technical operations for isolating their virtues and manipulating them into medicines were thus less important to physicians - who were legally prohibited from making medicines - than the procurement and empirical identification of ‘true’ ingredients.

As we have seen in previous chapters, a handful of sixteenth-century apothecaries such as Francesco Calzolari in Verona, were widely esteemed in humanist circles for their experience and learning as botanists. In Venice, the apothecary Marco Fenari at the Saracen maintained a constant correspondence on materia medica with the university botanists Ulisse Aldrovandi at Bologna and Luca Ghina, rector of the botanical garden at Pisa. The Anzolo pharmacy as well, run by the Martinelli family was also an important source for Pietro Mattioli in the composition of his Commentaries. Finally, at the Struzzo pharmacy the German émigré apothecary Georg Melich cultivated a positive reputation among Mattioli’s circle of humanist physicians for his botanical knowledge. In his Fabric of the Apothecary (1566), the Venetian physician Prospero Borgharucci regarded Melich as a “most accurate botanist” and published his exchange with the apothecary concerning a rare specimen. However, Melich also remains an important figure not for what the medical humanists had to say about his botanical knowledge, but for what he had to convey about the apothecary’s technical practice in his widely read, Avvertimenti nelle

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3 For the earliest public pharmacopeias in Italy, see: Alfonso Corradi, Le prime farmacopee italiane ed in particolare dei ricettari fiorentini (Rechiedei, 1887).

4 Palmer, “Pharmacy in the Republic of Venice”.
compositioni de’ medicamenti per uso della spetiaria (Advice for the composition of medicines for use in the pharmacy, 1575). Melich’s work joins a number of other vernacular trade manuals composed by Italian apothecaries between the 1560’s and the first decades of the seventeenth century outlining the ideal of a “rational practitioner” joining head and hand in the attainment of skilled ability. This represented an important shift in the tradition of pharmaceutical encyclopedias and commentaries on Arab polypharmacy (compound remedies) that dominated the Venetian print market from the 1490’s. As Venice established itself early on as Europe’s leading producer of pharmacy related publications, it is fitting that the city’s print market also nurtured the two successful publications most responsible for promoting the new discourse on the rational apothecary practitioner: Girolamo Calestani’s Delle osservationi (Observations on Composing Antidotes and Medicines, 1562) and Melich’s already mentioned Avvertimenti. As we shall see, both books established a new, experimental dialogue with the traditions of Arab polypharmacy that did not always sit well with physician reviewers who saw in this rhetoric the pretensions of artisans to discourse on natural philosophy. Nevertheless, both titles achieved enormous success in the Venetian print market, and inspired similar publications elsewhere in Italy as they were continually republished and updated until the eighteenth century.

In what follows, I explore the sixteenth-century appearance and contents of this new genre of apothecary trade manuals that did much to elevate the image of the

5 Girolamo Calestani, Delle osservationi di Girolamo Calestani (Venice, 1562); Filipo Costa, Discorsi di Filippo Costa Mantovano sopra le compositioni de gli Antidoti, che piu si costumano di dar per bocca (Mantua, 1576); Salvatore Francioni, De’discorsi Salvatore Francione Speziale Palermitano (Palermo, 1635); Ferrante Imperato, Historia naturale (Naples, 1599).

6 See note 15, below.
apothecary as a practitioner of ‘physick’ employing both his reason and experience to develop therapies. Significantly, these apothecary works also present marked contrasts with the popular “books of secrets” traditionally studied as rich sources of artisan experimental culture and vernacular science in the early modern period. In his numerous studies devoted to this genre of Renaissance “how to” guides, William Eamon notes that the authors of books of secrets - known as “professors of secrets” - generally operated outside of the academic and guild establishments. In their vernacular works, figures publishing in Venice, such as Leonardo Fioravanti, Girolamo Ruscelli and Isabella Cortese, advertised their experimented recipes for making medicines, perfumes, oils, essences, and soaps. Fashioning themselves as knowing adepts schooled in esoteric philosophies and alchemical traditions, the professors of secrets promised readers access to nature’s arcane secrets through their own experiments made available for the public benefit of mankind. Venice’s apothecaries were certainly familiar with these works that began to appear early in the sixteenth century. However, the apothecary manuals are almost completely purged of the language of “secrets”, esoteric philosophies, occult sympathies, and the hermetic traditions often found in the works of Leonardo Fioravanti and others. Neither do they advocate a radical empiricism pitted against Greek rational medicine and philosophical reasoning. Rather, what we find are references to Aristotle and Galen, and attempts to articulate notions of expert experience not merely as a simple

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8 Isabela Cortese, I secreti de la Signora Isabella Cortese (Venice, 1561); and Girolamo Ruscelli, who published his enormously popular book under the name “Alessio Piemontese”: De secreti del reverendo donno Alessio Piemontese (Venice, 1555).

sensory exposure to nature, but as the accumulation of repeated experiences actively made and disciplined by reason. Indeed, as we shall see later in this chapter, this stress on technical skill as both the result of repeated experiences made, and as the ultimate guide in learning how to make medical judgments, bears striking similarities with later discourses on experience developed by the Paduan anatomists Fabricius Aquapendente and his pupil, William Harvey, the anatomist credited with discovering the circulation of the blood.\textsuperscript{10} While avoiding any claims for a direct line of influence from the apothecary trade manuals to the natural philosophy of one of the towering emblems of the “Scientific Revolution,” I nevertheless draw attention to their similarities to stress William Harvey’s own acknowledgements of artisan practitioners and their methods of cultivating skill in his writings on anatomy and natural philosophy. Thus, in the overlooked writings of Italian apothecaries designed to advertise their shops and particular skills towards the close of the sixteenth century, we can detect early efforts to outline an alternative profile of experimental practitioner operating in the public guild arena between the popular professors of secrets and the libraries of the medical humanists.

3.2 Arab Polypharmacy and Calestani’s ‘Osservazioni’

Well before the sixteenth century, apothecaries and physicians in Italy had generally relied upon a long tradition of pharmaceutical manuscript circulation and publishing to learn about the composition of medicines. While the classical Greek physicians had largely preferred the use of mild botanical simples to supplement their regimen therapies, later Arab physicians who encountered and translated their works

developed an expanded tradition of compound remedies, concoctions, infusions, syrups, and electuaries. The important figures in this field were the eighth and ninth-century physicians Yahya ibn Sarafyun, Muhammed ibn Zakariya Razi, Abu Musa Jabir, and Yuhunna ibn Masawaih, known respectively in the West by their Latin names Serapion the Elder, Rhazis, Geber, and Johannes Mesue.\(^\text{11}\) First composed in the flourishing Baghdad court and other cities of the Eastern Mediterranean, Arab pharmaceutical writings quickly filtered into the hybrid contact zones of southern Italy and Spain in the early Middle Ages. In the wake of Papal expansion and the Christian reconquest of Spain, Latin scholars in the eleventh and twelfth centuries translated Arab writings on alchemy, polypharmacy and Greek medicine in the cities of Toledo and Salerno. During this period Salerno emerged as the leading center of medical and scientific study in Latin Christendom, producing widely influential manuscripts on medical and pharmaceutical topics.\(^\text{12}\) Two of the most important “Salerno School” translators of Arab knowledge were Nicolo Salernitano and Matteo Silvatico.\(^\text{13}\) By the close of the fifteenth century, Nicolo’s “Antidotario” served as the basis for new civic pharmacopeias, such as the *Ricettario Fiorentino* published by the Florentine guild of physicians and apothecaries in

\(^{11}\) For the significance of Mesue in Western medicine, see: Paula de Vos, “The ‘Prince of Medicine’: Yuhunna ibn Masawayh and the Foundations of the Western Pharmaceutical Tradition,” *Isis* 104, no. 4 (2013): 667-712. Works by, or at least attributed to Mesue were among the first incunabula to be printed in the fifteenth century. These works also constitute some of the earliest vernacular medical publications. A work entitled *Il libro della consolation delle medicine semplici, solutive* was published under Mesue’s name in Modena in 1475, and in Venice in 1487.

\(^{12}\) On the medical school at Salerno and the spread of its influence in manuscript texts during the late Middle Ages, see: Luis Garcia Ballester, *Practical medicine from Salerno to the Black Death* (Cambridge: Cambridge University Press, 1994).

\(^{13}\) Little is known of Salernitano who lived around 1100. His *Antidotarium* was widely influential as a manual devoted to the composition and dispensing of medicines. For the Pandects of Silvatico see Chapter One, note 47.
For most apothecaries, however, Silvatico’s edited 1317 compilation of Greek botany and Arab pharmacy known as the “Pandectae medicinae” (vernacular ‘Pandette’) stood as the most reliable guide to the materials and procedures of their art. This work largely transcribed the ideas of Mesue, as well as several other ancient and medieval authors. Mesue’s works were also among the first medical writings to be reproduced in the vernacular by the early fourteenth-century Florentine notary Zuccherio Bencivenni (fl. 1300-1313).  

With the onset of print from the mid fifteenth century, both physicians and apothecaries adapted the medieval manuscripts on pharmacy into new published editions that served as encyclopedic guides to practitioners. An important work composed during this time was the *Compendium aromitariorum* by Saladin d’Ascoli (d. 1165), physician to the Prince of Taranto. Among a list of required apothecary reading Saladin included books two and five from Avicenna’s “Canon”, Serapion’s work on simples, Mesue’s “Grabadin, de consolatione” and Nicolaus of Salerno’s “Antidotarium”. Owing to its important position in the spice trade, the medical school at Padua, and its flourishing print trade, Venice quickly emerged as a leading center of publishing for the new pharmaceutical compendia in the latter fifteenth century. Perhaps the most widely reprinted pharmaceutical compendium of the sixteenth century was the *Luminare maius* (Greater Luminary) first published in 1494 by an apothecary in Pavia named Giovanni Giacomo Manlio. Another important tract was the *Thesaurus aromatariorum* (1496) by

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14 The Florentine Ricettario was reprinted and updated several times during the early modern period. The first edition was in 1498: *Ricettario fiorentino* (Firenze: Compagna del Dragho, 1498).
15 On Bencivenni, see Christopher Kleinhenz, ed., *Medieval Italy: An Encyclopedia* (New York: Routledge, 2004), 101-102. Bencivenni translated from French into Italian works by Rhazis and Mesue that were among the first vernacular works to be printed in the fifteenth century: *Mesue vulgare: libro della consolation delle medicine* (Modena: Vurster, 1475); *Mesue vulgare* (Venice: Zohanni, 1493).
the apothecary Paolo Suardo, who dedicated his work to the pharmacists of Milan.

Throughout the sixteenth century these two works were bound with a third – the *Lumen apothecariorum* (Light of the Apothecary) by the physician Quiricus di Augustis – and printed under the title of Manlio’s *Luminare maius* (Greater Light) with Venetian publications under this title appearing in no less than fourteen editions. In 1559 a vernacular edition of Manlio’s *Luminare* appeared in Venice, as well as a vernacular version of several of Mesue’s books edited by Giacomo Rossetti.\(^\text{16}\)

It is difficult to assess how much of a role these publications played in the everyday practice of ordinary apothecaries, many of whom likely did not read Latin. While extremely little information is available on apothecary practices prior to the latter sixteenth century, it is possible to see how these texts would have been greatly valued by physicians who requested apothecary remedies for patients but had little experience in their fabrication. Brasavola’s dialogues, discussed in the last chapter, suggest that apothecaries kept editions of Matteo Silvatico’s “Pandects of medicine” which likely circulated in vernacular manuscripts. Nevertheless, the writings of Mesue, which formed such a crucial component of the apothecary’s craft, had long been available in Zucchero Bencivenni’s “Mesue vulgare”, which appeared in printed editions in 1475, 1487, 1493,

\(^{16}\) For Saldin d’Ascoli, see: A.M. Carmona Cornet, A. Corvi, and T. Huguet Termes, “La farmacologia pratica nell’opera di Saladino d’Ascoli e la sua ripercussione nella farmacologia europea (1400-1499),” *Atti e memoria della Accademia Italiana di Storia della Farmacia* 12, no. 2 (1995): 132-136. The first edition of Manlio was produced in Pavia: Giacomo Manlio, *Luminare maius super Mesue Antidotarium et Practicam* (Pavia: Antonius de Carcano, 1494). The first Venetian edition was in 1496 by Bonetus Locatellus. In 1520 the Venetian printing house of Leredes Octaviani Scoti produced a combined volume including Manlio’s *Luminare*, Suardo’s *Thesaurus*, and the *Lumen apothecariorum* of Quiricus. The 1559 vernacular edition of this encyclopedia was issued by the printing house of Giovanni Bariletto: *Luminare maggiore, utile et necessario a tutti li medici & speciali* (Venice: Bariletto, 1559). It is very likely that this edition served the authors in the 1560’s discussed in this chapter, and may even have inspired the spate of vernacular publications on the apothecary trade that appeared during this decade.
and 1521.\textsuperscript{17} Clearly, by the time new vernacular edition of the \textit{Luminare} appeared in Venice in 1559, the Arab pharmacists were hardly newcomers and had long represented a veritable standard of authoritative tradition within the apothecary trade. The Latin compendia that emerged with the printing press presented a learned counterpart to the popular books of secrets, and no doubt encouraged physician prescriptions and transactions with pharmacists. Pharmacies that offered sophisticated electuaries like the ‘Rose water of Mesue’ or the ‘Imperial Cathartic’ were likely to attract physicians to their shops.

In the 1560’s the Latin commentaries of Suardo, Manlio and Quiricus were quickly replaced by new vernacular texts expressing a more experimental orientation towards the Arab authorities. An early example that achieved enormous success was Girolamo Calestani’s \textit{Observations} published in Venice in 1562. A native of Parma, Calestani had learned the apothecary’s art in Rome at the pharmacy of Angelo Manzino, and does not appear to have ever practiced in Venice. Nevertheless, his work was an enormous success in the city and all sixteen editions between 1562 and 1673 appear to have been published there.\textsuperscript{18} That Venice should have served as the primary publishing site for Calestani’s text testifies to the broad audience for pharmacy in the city and the openness of the Venetian publishing industry to books that claimed to offer new knowledge gained by experience. At the same time, Calestani’s chapter on ‘Electuraries’ also delivers a rather lengthy advertisement in praise of Venice’s stature as the authoritative center of theriac production. Calestani’s inclusion of this lengthy discourse

\textsuperscript{17} See note 54.

\textsuperscript{18} For Venetian editions, see Appendix A.
in praise of Venetian theriaec thus gives us some insight into Calestani’s marketing strategy to ensure that his text reached the largest public audience through the broadly connected Venetian print industry. For Venetian apothecaries, and the printing houses that benefited from the success of their trade, Calestani’s book was clearly a piece of advertising gold.

In his opening discourse Calestani gives a sense of his “observations” as a collective enterprise, citing a broad network of physician and apothecary collaborators mostly from Parma.\(^\text{19}\) Recalling the many disputes he witnessed while in Rome between the physicians and apothecaries in the making of antidotes, Calestani presents his book as an investigation into these disparities through practical investigations. Thus, “we do not want to be held to the declaration of every simple, being today much revealed and made clear by many so that nothing obscure remains in their cognition…however, not wanting to be imputed as arrogant and taking unconceded license: because what we say does not take sides or reprove any, but only to declare many things that have been left without interpretation or have been interpreted obscurely.”\(^\text{20}\) For those who might take issue with the views presented in his book, Calestani cites the utility of his exercise before adding that there “is no scripture (except the sacred and divine) that is also written as accurately

\(^{19}\) I have not been able to find available publications by these figures with the exception of the physician Scipione Cassola: Scipionis Cassolae medici Parmensis cum Ioanne Francisco Boccalino medico asulano disceptatio (Parma, 1565). The names include the Parma noblemen Giovanni M. Tiberio Tagliaferri and M. Galeazzo Calcaferri. Accompanying him at the Rome pharmacy of Angelo Manzino was Hermete Pagani Narnese. Calestani also makes reference to the expert opinions of the physicians Cesare Delfini, his sons Giafone and Tiberio, one a doctor and the other a surgeon; Camillo Bertachini, Pietro Lenati, “tutto nostril parenti & amici”. Others include Filippo Selva, Filippo Banzola, Antonio Massera, Battista Balestra, and Sigismondo Baruffi.

\(^{20}\) Calestani, Osservatoni. Dedication. “Nel che pero non vogliamo essere imputati d’arrogantia & di licentia non concessa: perche, cio che ne diremo, non fara’ per tassare, o riprendere alcuno, ma solo per dichiar molte cose, che, overo sono state lasciate senza interpretation.”
as one wants, that might not have any need of correction, improvement, and of limitation.” To those detractors who “give to believe that they still have science” Calestani advises that he will offer no further response if they are unwilling to offer their own observations and “judge which might be better” so that others must observe their authority.\(^\text{21}\)

Calestani was thus clearly aware that his experimental observations of the composed remedies of the Arab pharmacists would not sit well with everyone in the medical community. One such figure was the Venetian humanist physician Prospero Borgarucci, who published in 1566 his *La fabrica degli speziale* (Fabric of the Apothecary), a vernacular work that proposed to describe in over a thousand pages the practice of the ideal apothecary. If Borgarucci’s work is devoted to his notion of the ideal apothecary, Girolamo Calestani apparently stands as his model of apothecary hubris and incompetency. In one instance Borgarucci calls attention to Calestani’s errors in “acerbically reproving” the reverend fathers of the Franciscan monastery of the Zoccolanti in their composition of an important electuary. In another, concerning a powder used to provoke the menses in women, Borgarucci sarcastically attacks the philosophical pretensions of Calestani and apothecary collaborators: “These are the remedies that Calestani has instructed on the provocation of the uterus, by observation and experience made not by our physicians but by apothecaries, who then become truly natural philosophers without letters.”\(^\text{22}\) For Borgarucci, Calestani’s experimented

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\(^{21}\) Ibid., “Per aventura si leveranno ancora alcuni de la nostra arte & vorranno pur dire & mostrare, che non essendo il modo nostro simile al loro nel comporre gli istessi Antidoti, non possono credere, che sia buono & forse ancora l’accuseranno per licentioso. Noi a costoro non vogliamo fare altra risposta, se non che mostrino il loro, & poi che giudichino qual sia migliore & esso si debba osservare.”

\(^{22}\) Borgarucci, *Fabrica*, 711.
observations were at worst, fictions, and at best the impertinent conclusions of unlettered practitioners.

Another illuminating disagreement concerning the ‘Elettuario rosato di Mesue’ reveals the different attitudes of Borgarucci and Calestani towards the authority of the Arab physicians as well as the perceived validity of experimented modifications.23 The use of rose petals to make a variety of liquors, concoctions, powders and plasters was widely practiced by the Arab physicians and thus comprised a sizable portion of the apothecary’s cabinet in Renaissance Italy. According to Borgarucci, the ‘succo di rose’ and the ‘Eletuarrio rosato’ were consumed more frequently as medicines in Italy than anywhere else in the world. According to Mesue the medicine was good for resolving and purging the choleric humors, for arthritic pains, and headaches and poor vision. The remedy began by reducing rose flowers, white sugar, and the herbs manna and scamonea to a syrup over an open candle flame followed by the final addition of pulverized ginger and the ashen remains of the privet species, known as ‘spodio’. Noting that Mesue had been unaware during his time of the use of coal, Calestani followed the new apothecary practice of using this material instead of wax to produce his medicinal reduction. He then removes the pot from the flame to add the scamonea and manna until they are tempered with the juice. He relates that in Rome, a certain Araceli had taken issue with his procedure of boiling the scamonea rather than adding it as a powder to harden the mixture. After two attempts to compose the remedy in this manner Calestani notes that

23 Ibid., 448-9.
the results were defective, though he ultimately attributes them to false scamonea and adds little explanation for why the two procedures were incompatible.\(^\text{24}\)

In the end, such debates of procedures were not resolved by experimental trials on patients. Nevertheless, they do offer insight into the ways apothecaries related to scribal authorities and treated their recipes as invitations to experiment and modification. Indeed, Mesue’s own descriptions often went little further than to name the medicinal uses of his remedies and the quantities of the ingredients that went into them. The procedures by which they were brought together was often left to practitioners to intuit for themselves. For Borgarucci, however, Calestani’s discourse on the rose electuary was proof that he had not read Mesue or his commenters extensively and thus introduced the use of coal burning flames and “lambicci” (distilleries) in the production of remedies: “But little, in my opinion, has Calestani demonstrated having understood the will of Mesue, and even less having read the writings of the ancients, because if he had read them he would have found in a thousand places the use of coal up to the time of Noah, and others of those times, and with no less art or industry did those men have at the time of Mesue, than they make now.”\(^\text{25}\) Instead, Borgarucci insists, Mesue had deliberately proposed the use of a wax candle so that “the flame might be clear, bright, and liberated of the smoke and any other bad qualities” so that the composition does not receive any damage. Though a somewhat doubtful imputation of Mesue’s intentions, Borgarucci’s stance is primarily directed at what he viewed as the presumptuousness of apothecaries in his day to take liberties with textual authorities in the practice of their art. Whereas Calestani views

\(^{24}\) Calestani, Osservazioni, 125-126.

\(^{25}\) Borgarucci, Fabrica, 449.
inherited recipes as invitations to replicate them in practice and learn from the experience, the humanist physician Borgarucci treats them as completed medical statements that offer little room for negotiation.

3.3 Skill and Innovation at the Sign of the Ostrich

Superseding both these works, however, was Georg Melich’s *Advice on the composition of medicine for use in the pharmacy* first published in Venice in 1575. A native of Augsburg, Melich claimed to have passed time in Rome, Lombardy, Padua, Dalmatia, and Greece before arriving in Venice to open his pharmacy under the sign of the Ostrich in the city’s busy commercial district, the ‘merceria’. Melich thus followed in the footsteps of countless other tradesmen in seeking out opportunities in the commercially vibrant and relatively liberal openness to new ideas and experimented novelties that Venice offered. Unlike Calestani’s *Observations*, which was dedicated to the Duchess of Parma, Melich’s work was dedicated to the newly formed Venetian College of Apothecaries to which he belonged as an esteemed member. His work therefore stands as a statement of his loyalty to his adopted city rather than to any particular noble patron.

Compared with Borgarucci’s one thousand page treatise, Melich presented a modest three hundred and seventy-five. Perhaps for this reason Melich’s work enjoyed a much longer lifespan than Borgarucci’s tome, going through several editions in Italian,

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27 Melich’s name is listed among the seventy-one apothecaries who formed the College in 1565. BMC, *Mariegole*, 209, v.1, c. 24v.
German, Latin, and French until 1688.\(^{28}\) However, aside from its smaller size, the
*Avvertimenti* was also a highly accessible guide that carried readers more directly into the
practical terrain of the apothecary’s shop. In his opening dedication Melich conveys the
public stature of his own profession:

> Of great excellency and importance, Messer Nicolo worthy Prior, is the art of the Apothecary,
which one can easily see by the cognition that it holds with the most sacred field of medicine.
The Apothecary being the minister and sole preparer of medicines, without which the divine
art of medicine cannot demonstrate its worth, nor discover that great benefit that blessed God
consecrated to it for the health of human nature, is a most clear thing, being so noble and
necessary this our profession…\(^{29}\)

Later on, in his “Discourse on what makes a Good Apothecary,” Melich continued the
theme of medicine’s dependency on the apothecary’s art by turning to the authority of
none other than Homer, “Prince of poets, who said that the Physician is worthy of being
esteemed and honored as much as all other [professions] together, perhaps because in
those days they themselves prepared medicines with ease. Now, because of human vanity
or for other reasons, the Physicians have need of others help, being the Apothecaries.”\(^{30}\)
After laying claim to the apothecary’s status as a practitioner of medicine according to its
ancient standards, Melich then gets down to specifics:

> Two things are required and very necessary for the perfection and competency of the
effective apothecary: both the ideas that they have in the mind, and their application. The
first subject is the material that he has to work with, and the instruments (*instrumenti*) after,
with which he has to reduce his craft (*arteficio*) to its due completion…And seeing as the
instruments with which he works in this worthy art were created by divine labors; the way,
however, of preparing them and putting them into execution was done by experience and
human industry. And therefore, as Aristotle writes in book ten of the *Ethics*: medicine is not
exercised with books, nor with words, but with experiments accompanied by reason. Hence,
it is necessary that the Physician has ready the instruments to cure diseases, and therefore it
is damaging to the art and make it seem defective if he lacks them. And this, as Hippocrates
wrote, is the principle means and end of medicine. And for this reason the art of preparing
medicines was not divided (as it is today) from that of medicating: so that both require those

\(^{28}\) For the editions of Melich’s text see Appendix A.

\(^{29}\) Ibid., Dedication.

\(^{30}\) Ibid., Discorso qual debba essere il buon spetiale.
who possess a natural prudence, a most expert cognition, and great kindness, just as our ancient Physicians followed…

In this fascinating passage, Melich opened a persuasive pathway for the apothecary to translate his manual experience – what traditionally relegated him to secondary status in the medical community - into a sturdy foundation for his new status as an intellectual practitioner. The medicines he crafted were not simply the products of rote learning, but were instead, philosophical instruments enabling physicians to actually apply the guiding principles of health and healing learned from their studies of natural philosophy and Galen. Without the apothecary’s medicines, physicians were therefore like soldiers without weaponry, left to contemplate their art without any effective means of ever executing it.

The task of composing medicines then, required more than mere familiarity with ancient texts and their seemingly endless interpreters; it also demanded the cultivation of a repertoire of skills disciplined by experience and reason. This commitment to practice appears readily in nearly all of Melich’s appended commentaries on the same Arab remedies discussed by Calestani and Borgarucci. However, where these authors filled space with the discussion of ingredients or speculative medical applications for various humors, Melich’s lively commentaries are brimming with active verbs – boil, mix, add, rub, break strain, cut, crush, dissolve, and so forth. An excellent example is Melich’s section on making the ‘Elettuario hamech’, a well-known remedy from Mesue:

In composing this electuary mash the mirabolani (cherry plum) until they are purged from their pits, break apart the fern, the rhubarb, and the agarico (mushroom) and cut into small pieces…deflesh

Ibid., f. 1v. - Avertimenti allo spetiale di Giorgio Melichio Augustano. “…oltre l’idea, che si ritruova nelle menti, de’ fattori di quelle. Il soggetto prima & la material nella qual si ha da oprare: a gli instrumenti dopo, con li quali s’ha da ridur l’artificio al debito compimento…E ben che gli instromenti con li quali s’opra in questa si degna arte, siano stati create per opra divina: il modo pero di prepararli e’ di metterli in esecutine, e’ stato dall’esperienza & industria humana ritrovato.”
with a knife the prunes from their pits; and then with extracted and purged fero caprino, that is, water of cheese, put all of the said things in a glass vase, and add enough cheese water to the place of two fingers above the other things, then seal the vase well and leave for five days. Later bring it to a boil and take from the fire, and before they are cold rub them well with the hands, and afterwards make a shape with the torchio (traditional pasta making instrument), from this shape make two parts; dissolve one with cassia, manna, and tamarind…with the other part mix sugar and boil to a consistency, remove from the fire and add pulverized scamonnea mixing well with the mescola; and when it is tepid add the first part of the spices and the electuary will be made…

In this rich example it is possible to appreciate the degree to which Melich’s text exceeds all those that proceeded it in providing readers with a direct view over the apothecary’s shoulder as he worked to prepare his remedies. In such detailed accounts of skilled labor Melich establishes his own authority in a space situated between the popular “professors of secrets” who peddled scarcely detailed recipes in the marketplace, and the humanist medical botanists that Mattioli and Borgarucci approved of. Borgarucci approved of Melich’s botanical knowledge highly enough that he even reprinted Melich’s response to him in his Fabrica regarding the identification of a plant known as “Been”. Yet, in fashioning his own expertise in the Avvertimenti Melich began his work directly with compound remedies, and his own commentaries highlighted his practiced skill in exceptional detail, leaving ingredient lists and medical speculations to others. With respect to the use of coal flames in making the ‘Elettuario rosato’ that had so annoyed Borgarucci, Melich simply adds that Mesue, in suggesting a wax candle, “had meant nothing except that the fire must be uniform from the beginning to the end of the boiling.” In focusing on experienced skill as the apothecary’s most important tool in making medicines, Melich’s Avvertimenti left open considerable room for adaptation and experiment in the pharmacy.

32 Ibid., f. 25r.
33 Ibid., f. 26r.
Interestingly, Melich’s experimental sensibilities are most visibly on display in his discourse on the classical theriac remedy that formed the centerpiece of the Ostrich pharmacy’s commercial enterprise. After describing the various procedures involved in his composition of theria, Melich offers a fascinating concluding paragraph in which he takes issue with some of the technical procedures employed by Galen and classical authorities often taken as universal rules beyond criticism:

I will say that as far as the universal rules of the art dictate me, that it would be more praiseworthy work to pestle the *trochisci* of vipers by themselves, and not with the *hedicroi* as Galen teaches…nor is it convenient to pestle the *iriōs*, extremely hard roots…and it is not necessary that the *Turbit* is dissolved with *Galbano* as [Galen] affirms, because it is more convenient to put with the *Stirace* and other resinous things, and the *Galbano* with humid things. Experiment has found a better way, as said above, that the Ancients have not written about, and which serve good Apothecaries with faith more to the general rules of the art and to experience than to the authority of Galen. The practice, therefore, of expert Apothecaries of our times in the composition of the said Antidote has surpassed the writings of Galen by being a thing easy to harness to the other inventions.34

Hence, for Melich, the recipe passed down by Galen was clearly not a commandement written in stone, as other medical humanists certainly believed, but an invitation to test its propositions by experience. This attitude was clearly passed on to the Ostrich’s successors who often looked back to Melich as one of the true masters of the apothecary’s art.

Following his death in 1585 Melich’s pupil, Paolo Romani, took over operation of the pharmacy and reissued the *Avertimenti* in 1596 with an appended treatise on theriac composed by the physician Orazio Guarguente. Romani appears to have been highly esteemed for his skills, particularly for his personal invention of a new technique for making syrups into a solid form. We know little about the technique in its application, but the invention appears to have solicited some dispute among the members of the

34 Georg Melich, *Avertimenti* (1605), 35r.
College after Romani obtained a public privilege in Padua and Venice. In the end Romani conceded to permitting the other apothecaries to market his solid syrups in the city, on the condition that he be given exclusive rights to market his remedy on the Venetian mainland. Following Romani’s apparently brief tenure the Ostrich was taken over by Alberto Stecchini who printed the *Avertimenti* two more times in 1605 and 1627. In the 1627 edition Stecchini took the opportunity to include a fascinating discourse of his own which proposed to outline the “Name, Office, and Nobility of the Apothecary.”

Aside from accusing his apothecary colleague Giuseppi Santini at the sign of the Coral of plagiarizing Melich’s book in his *Ricetario medicinale* (1604), Stecchini offered an engaging elaboration of Melich’s ideas on the nature of the apothecary’s expertise: “To the Physician belongs the cognition of infirmity and of the remedies that are necessary for curing it, and to the Apothecary belongs the knowledge of knowing the substance, quality, and nature of those things.” However, there were also those who believed that it was the physician’s job “to teach how to manipulate, choose, prepare, compose, and conserve medicines.” For Stecchini, however, the physician’s province lay in knowing only the effects of remedies, while “the separations of this Art” were best left to those who practiced it, since: “one cannot deny that the practice is the principle: and that in the long run, one will be esteemed who composes his remedies by hand than the other, who

35 BMC, *Mariegola* 209, I, c. 44r.

36 Melich, *Avertimenti* (1688), 8. Stecchini produced two versions of Melich’s book. His own discourse does not appear in the 1605 edition. I have consulted the 1688 edition and concluded that his discourse must have appeared in the 1627 edition. Stecchini also suggested that Santini’s book simply reproduced the contents of the *Ricettario fiorentino* which had been reissued in 1561. A brief perusal of the two texts suggests that Santini’s accusations were not without merit.

37 Ibid., 8.
with reason, only discourses about them, and thus, one must believe that the expert
Apothecaries in their Art have worked in it, and that one cannot wait for help from those
who have not exercised it; therefore the great poet from the Guazzo sang it well when he
said: It is for pilots to discuss the winds, plowmen their beasts, the soldier to count his
wounds, and the shepherd to count his sheep.”

At the same time, both Melich and Stecchini made it clear that the apothecary’s
expertise also lay in much more than his cognition of materials and the numerous
processes by which they were separated into remedies, for what ultimately sanctioned
their rare familiarity with nature’s plants, minerals, and animals was the Divine Creator,
“the protomedico God our Lord.” For Melich, a good Christian conscience was essential
to the competent and faithful practice of the apothecary’s craft which brought glory to
God and his creation when performed well. Avarice was thus among the most sinful
motives that ultimately led to the endangerment of public health. Stecchini went furthest
in linking Christian conscience, the practice of good science, and the pursuit of
commerce. In a clever breakdown of the word “CONSCIENTIA” Stecchini asserted that
the perfect apothecary is composed of three things: CONSCIENTIA, SCIENTIA,
ENTIA. To obtain good science “it is necessary to know all of those things that
theoretically and practically belong to our Art, so as to know how it works, and what
works, not incurring any errors; and taking away the SCI and leaving the ENTIA, which
is the ease (comodita) and ability of having all of those most perfect ingredients that one
can find not sparing any expense of any sort…therefore it is necessary that the good

38 Ibid., 8.
apothecary have CONSCIENTIA, SCIENTIA, & ENTIA.” With Stecchini, an apothecary with extensive skills in the new chemical pharmacy, words were thus as easily separated and reunited as the substances he kept in his shop at the sign of the Ostrich.

By the latter sixteenth century the apothecary’s expertise lay increasingly in their abilities to manipulate both - letters and materials. Where early medical humanists, like Antonio Musa Brasavola, aimed to introduce classical letters to the apothecary’s repertoire and subject his art to universal principles, Georg Melich towards the end of the sixteenth century explicitly pointed out the folly of such ambitions in the introduction to his *Avvertimenti*: “This guide will also describe all of the syrups of Mesue, and you will see that the rule of Brasavola is not universal, nor can one rightly approve it; we therefore hold by firm opinion that certain and general rules cannot be given in the quantities of sugars or waters that enter into decoctions. Instead one must benefit from the advice of the expert and judicious Apothecary who has considered the quality and quantity of things.” In Melich’s rendering then, repeated, personal experiences disciplined by reason, and not erudite principles borrowed from classical sources, ultimately informed the apothecary’s expert judgment on medical matters. As we shall see in the concluding section of this chapter, this artisanal understanding of “reasoned experience” advertised in Georg Melich’s trade manual appears to foreground similar academic renderings at the University of Padua in the early seventeenth century. One area where the development of technical skill was increasingly seen as an important pathway to natural philosophical

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39 Ibid., 9.

40 Melich, *Avvertimenti* (1596), f. 3v.
knowledge was in the field of anatomy and in the writings of its two most influential practitioners: Fabricius Aquapendente and William Harvey.

3.4 Artisans, Anatomists and Experience

To enter into a discussion of anatomy at Padua, I return once again to Prospero Borgarucci, Calestani’s critic in his Fabric of the Apothecary. Both Prospero and his brother Borgaruccio (whose advertisement of Calzolari’s pharmacy museum we encountered in chapter one) had taken degrees in medicine from Padua and were prolific publishers and editors of vernacular medical works in the 1560’s and 70’s. Prospero had apparently served briefly on the faculty at Padua and taken an abiding interest in the study of anatomy made famous there by Andreas Vesalius. In 1564 he published a vernacular work on anatomy, the Anatomical contemplations, which makes frequent

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41 Biographical information on Prospero can be found in S. De Renzi, Storia della medicina in Italia, III (Napoli, 1845), 172, 464, 600, 612, 624; as well as in Borgarucci’s introduction in his tract, Trattato di peste (Venice, 1565). In this treatise Borgarucci recounts his education and travels. Born in Canziano around 1540, Prospero began his medical studies in 1560. Only four years later he was named a professor of anatomy at Padua and dedicated his first work on the subject, Delle contemplatione anatomica, to Alfonso I d’Este. A year later Calzolari dedicated his Viaggio di Monte Baldo to Borgarucci. During his travels he stayed in Paris for a brief period meeting with noted physicians there, followed by a stint in London to visit his older brother Giulio. In 1567 he published a Latin tract on the mal francese, Methodus de morbo Gallica (Venice, 1567), in which he maintained the American origins theory and advocated the use of the mercury treatment. The work was dedicated to the mathematician Francesco Maria Del Monte. The same year he was called to Paris to serve in the royal court, but after a year he returned to Padua with a manuscript of the Chirugia magna spuriously attributed to Vesalius and dedicated to the third prefect of the botanical garden, Giacomo Antonio Cortuso. It was published in 1568 in Venice with the book introducing Borgarucci as “philosopher and royal physician”. He appears to have also authored a Latin manual on practical therapeutics, now lost: Empirica rationalis, hoc est de mendendis humani corporis morbis a centum et ultra authoribus Graecis, Arabis et Latinus selecta. His younger brother Borgaruccio, published, translated and edited several works in Venice between 1565 and 1589. His only original treatise is his book on the plague of 1576, L’afflizione di Venezia, nella quale si ragiona di tutti gli accidenti occorsi l’anno 1576 per cagion di peste. He also edited a book of secrets spuriously attributed to the famed Padua anatomist Gabrielle Fallopio, Secret diversi e miracolosi (1565). His other projects include editions of Cicero and his writings on rhetoric, Ferrari’s Le rime burlesche (1570) and Rossettini’s Compendio di tutta la cirugia (1568). Both brothers were thus important figures in the world of vernacular medical publishing in the 1560’s. For Prospero, who seemed eager to win the attention of several noble patrons after his early release from Padua for lack of faculty space, such works provided a source of income and the possibility for advancement.
references to Vesalius. In 1568 he added another Latin work on surgery attributed to Vesalius, but which has since been revealed to be an edited compilation of recorded lecture notes and pasted passages from other anatomical works. Nevertheless, Borgarucci’s fascination with anatomy gives a sense of his project to provide a detailed outline of the ideally disciplined apothecary: “Therefore, as already in other times having given opinions on Anatomy, writing on the form of a good Anatomist; so in this present material are views given to prove with all effort if we can also isolate a good and competent Apothecary.”

What, in Borgarucci’s view, made a good anatomist and how did this figure compare with his perfect apothecary? There is little evidence to suggest that Borgarucci had extensive experience as a practicing anatomist, and his vernacular *Contemplations* is primarily a student text, rather than an original investigation. In his opening discourse on the things a “future anatomist” must consider, Borgarucci first defines his investigator by his subject matter: the human body. The body must be of a certain build and age, that is, “well fleshed, of medium stature, and young.” The elderly, or bodies that were too fat or thin were not suitable to allow proper visual access to all the parts and their structure. It was preferable, moreover, to have a body that had been suffocated in water, rather than “strangled, or hung, or decapitated, or killed by wounds or similar sorts” since drowning left all the parts whole, while strangulation left the “parts of the neck corrupted, the head

42 P. Borgarucci, *Della contemplatione anatomica, sopra tutte le parti del corpo humano, libri cinque* (Venice: Valgrisi, 1564).

43 Prospero Borgarucci, *Chirurgia magna* (Venice, 1569). The publication of works attributed posthumously to famous authors was not unusual. See, Harvey Cushing, *A bio-bibliography of Andreas Vesalius* (New York: Schuman, 1943), 216-217.

44 Borgarucci, *Fabrica*, 3.
and ribs filled with blood, which nature had not done before.” As for the definition of anatomy, Borgarucci asserts that it is “none other than the correct division and determination of any part of the human body made by art, as the Greek vocabulary itself demonstrates, saying ‘Ana’, that which is rendered to us, and ‘tomos’, which means division…”. Furthermore, the utility of anatomy is divided into four parts: in seeing God’s omnipotence, in knowing the particulars of the members subject to sickness, in presenting the dispositions of bodies, and finally, in curing illnesses. The human body – the subject and instrument of the science of anatomy – is thus “that which reasons about itself in the entire art of medicine; that is, that which is a machine of reason adorned, composed of various diverse members, of which openly we all reason to its necessity (sia una machine di ragione adorna, coposta di varij & diversi membri, de quai tutti apertamente a’ suo bisogno ragionaremos.)”

Rather than an adjunct to medicine then, anatomy for Borgarucci defines the entire methodological orientation of medicine, treating the body as its subject matter and the art of dissection (or division) as its mode of operational reasoning. With respect to the apothecary trade, Borgarucci follows a similar method of anatomization to propose general rules for the ideal apothecary. In his dedication to Catherine de Medici of France, in whose court he briefly served, Borgarucci follows standard tradition in providing a humanist history of medicine’s invention gifted to humanity by Apollo and stabilized in the figure of Hippocrates. Through the writings of Galen the teachings of Hippocrates were broadly disseminated and followed by Dioscorides, who wrote on medicinal herbs,


46 Ibid., 13.
and then to the Roman and barbarian writers Pliny and Celsus. Finally, “no less rare were the Arabs Avicenna, Serapion and Mesue and infinite others who can truly be called masters by those who make this art, as those very approved authors have been, and are still followed by the majority of living physicians.” However, Borgarucci continues, since medicine “is still subject to many defects and errors by some who are entrusted with the preparation of antidotes, because of avarice, or ignorance, or ineptitude, lacking those habits of physicians to bring order to experimented discipline” it is thus a worthy exercise “to reduce into one body the rules and prescriptions that could make a perfect Apothecary.”

In order to reduce the disorder of the apothecary trade to a coherent structure, Borgarucci introduces twelve “distinctions” that organize his chapters beginning in chapter one with the cognition and conservation of unadulterated medicinal simples. Like the prepared body for the anatomist, these materials constitute the subject ground of the apothecary’s art and require both broad erudition and experience to be properly comprehended. This chapter on identifying medicinal substances is then followed by procedures for extracting their essences, beginning with syrups, boiling plants to render and preserve their froth (lambitivi), and making decoctions and infusions. Chapters five, six and seven then turn to internally consumed compound remedies: electuaries, compressed pills, and preserved cake-like lozenges known as “trochisci”. Finally the remaining five chapters deal with externally applied remedies such as creams, oils, and plasters which physicians had traditionally left to surgeons and apothecaries to administer with little supervision.

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47 Borgarucci, *Fabrica*, Dedication: “Alla Christianiss Reina Caterina, Reina di Francia”.
In the middling chapter on pills Borgarucci develops the most detailed discussion on the disciplining of the apothecary’s sensory reasoning. In order to make effective composite remedies like pills the apothecary needed more than expert skills in manipulating materials, he needed also to consider two principle things: the material and the form of his ingredients. Borgarucci adds, however, that “the search for the philosophical causes…is an investigation belonging more to the physician than to the apothecary.” Nevertheless, it “is not without importance to know how to render the reasons of the composition,” hence, the apothecary must know how to deploy his senses effectively in determining the nature of his materials. The first things to consider are the qualities of substance (solid, liquid, dry, hard, soft, light, dense, transparent, opaque, etc.), followed by taste (sweet, sour, acidic, salty, oily), then odor and color. From this Borgarucci extracts a “general rule, that all sweet things, as far as their sweetness extends, are excellent; and all aromatics, the greater the odor, are pleasing. And in sum the greater the impressions of the qualities the healthier are the medicines, as they are closest to their peak goodness.”

For Borgarucci then, the apothecary’s jurisdiction lay not in reasoning the causes of a medicine’s effectiveness in evacuating or altering morbid humors, but in cultivating a disciplined sensory apparatus to distinguish between substances that retained their medicinal powers and those that had lost them through general decay or poor conservation. Whereas Borgarucci’s apothecary merely senses and identifies nature’s

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48 Ibid. 493.

49 Ibid., 499. “Et cosi faremo una certa general regola, che tutte le cose dolci, quanto maggiore dolcezza porgono, tanto piu eccelenti; & tutte le cose aromatiche, quanto piu sono odorate, tanto piu sono prestanti & in somma quanto piu le impressioni delle qualita sono gagliarde nei medicamenti, tanto piu sono vicini alla loro ultima bonta.”
substances, his anatomist directly *dissects* nature, where this term denotes both a manual and intellectual exercise. In performing his dissection, the rational anatomist thus contemplates the body in its parts, hence the title of Borgarucci’s text: *Anatomical contemplations*. Largely grounded in his readings of Vesalius’ writings and lectures, Borgarucci’s treatise on anatomy ultimately follows a Galenist model in its explicit focus upon describing and naming the material and structure of the body. Its discourse is thus more concerned with the humanist art of rhetoric, than with the need for anatomists to develop technical skills through repeated dissections so that they could draw on an extensive repertoire of experience to make judgements of the *causes* of the body’s parts.

By the turn of the seventeenth century, this analytic model of anatomy drawn from Aristotle quickly gained steam at Padua under the famed anatomist Fabricius Aquapendente. In Fabricius’ view Vesalius had remained largely content to merely describe the body’s structures without developing a more philosophical study of the functional ends of each part. In Aristotelian terms, this involved knowing not just the material cause of the heart or lungs (their structure and material), but also their *final* cause, that is, the functional end to which nature had put them. Drawing heavily upon Aristotle’s treatise, *On the parts of animals*, Fabricius asserted that the causes of the parts of living beings “are of such consequence that the person who knows these exactly can claim unhesitatingly that he has now learnt the whole anatomic business and that he is master of it…”

its action (vision), and finally the usefulness of the eye and its parts. As one can imagine, Fabricius’ demonstrations sometimes took months, much to the chagrin of some in attendance. However, Fabricius’ approach remains significant for offering a definition of dissection that collapses the distinction between the rational anatomist and the technical dissector that had persisted even after Vesalius initially called upon physicians to take over the roles of surgeons and conduct their own dissections. Until Fabricius, many anatomists had made explicit the distinction between the practical art of dissection, and the science of theoretical anatomy. However, with Fabricius’ Aristotelian program to deduce the final causes of the eye, the manual art of dissection is construed as an essential part of the reasoning process. Through his student Harvey, Fabricius’ understanding of dissection appears to have caught on, so that in 1654, Francis Glisson (1597-1677) defined anatomy in the following manner:

*Anatome and Anatomia:* the words signify as much as a dissection. But being taken for an art and applied to a certain object, they signify an artificial dissection of that object in such a manner as may most conduce to the perfect knowledge of the same and all its parts...Now this artificial dissection implies not the manual dissection only, but in especial manner the mental. For though the manual dissection be first in regards it leads us to the mental, yet the mental is that which mainly denominates the artist an Anatomist...  

In Glisson’s definition then, we can appreciate the full closure of the manual and mental duality of anatomy by the mid seventeenth century. Only through experiences made in the practice of “artificial dissections” can the anatomist arrive at a theoretical understanding of the body and its parts.

While these developments are certainly due to the re-evaluation of Aristotle’s works on comparative anatomy at Padua, there is also sufficient evidence to credit the

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close proximity of the scholarly and artisan worlds during this period. In Fabricius’ brilliant pupil, William Harvey, we can see how artisanal notions of the body as the authoritative touchstone of knowledge penetrated his anatomical studies which repeatedly intone against those anatomists who do not maintain constant, and “intimate converse with Nature herself…” In his De circulatione sanguinis (On the Circulation of the Blood, 1628), Harvey repeatedly chastises those who place theory before experience, even invoking the authority of his philosophical hero, Aristotle:

> Whilst in the mean time there are not wanting persons, who for their unskillfulness and little experience in anatomie, having nothing agreeable to sense to oppose it, they cavail at it with some vain assertions…If nothing should be admitted by sense without the testimony of reason, or sometimes against the dictate of reason, there should be no question now to be controverted…If our most certain Authors were not our senses, and these things were to be established by reasoning, as the Geometricians do in their frames, we should truly admit of no Science, for it is the rationall demonstration of Geometrie from things sensible to demonstrate things to the sense, according to which example, things abstruse, and hid from the sense, grow more manifest by things which are easier, and better known. Aristotle advises as much better…disputing the generation of Bees, says he, you must give credit to your senses: if those things which are demonstrated to you are agreeable to those things which are perceptible by sense, which as they shall then be better known, so you may better trust your sense than your reason.\(^52\)

Passages such as this have contributed to Harvey’s heroic celebration in the history of science as a revolutionary empiricist who placed his own observations over and above the authority of antique authors. However, more recent scholarship has clearly demonstrated Harvey’s sustained commitment to Aristotle well after his discovery of the blood, a project that he originally undertook in an effort to emulate the philosopher’s teachings. What is noteworthy in this passage is Harvey’s railing against the “unskillfulness and little experience” of his opponents. For Harvey, the essence of an expert anatomist lay in his continuous execution of numerous dissections so that the anatomist’s experience was not simply perceptual exposure, but repeated dialogue with the body in order to develop

the observational **skills** an anatomist needed to know how to make reasoned judgements. Hence, those “who think they that they have revealed all on the basis of a few observations only” may have had some experiences, but they are not skilled in Harvey’s understanding, and certainly not prepared to arrive at reasoned judgments.

Indeed, Harvey’s position is reminiscent of the general tenor of Georg Melich’s *Avvertimenti*, where the apothecary also invokes the Philosopher: “[for] as Aristotle writes in book ten of the *Ethics*: medicine is not exercised with books, nor with words, but with experiments accompanied by reason.” For Melich, as with Harvey, continual practice taught apothecaries and anatomists what to look for and to be able to intuit particulars unrecognizable to the unskilled. That Harvey greatly admired the observational skills of artisans is evident in his many references to the skills of butchers, midwives, shepherds and painters. Alan Salter has recently drawn attention to this aspect of Harvey’s writings in his *De Generatione Animalium* (On the Generation of Animals, 1651). There, Harvey takes note of game keepers and their remarkable ability to know immediately which buck antlers found shed in the woods belonged to; and the ability of a shepherd, unable to count, but nevertheless instantly aware of a missing sheep and able to tell “straightaway which one it was, from whom it was bought and whence it came”. As Salter observes, such figures “display the same characteristics that we observe in Harvey: the narrowness of the skill domain, the necessity of dwelling in the object world, the emphasis on the individual animal in its herd or flock and the same insistence on long years of learning to build technical and intuitive skills and to perfect practice...Harvey
sought this same greatness of experience and the skill of intuition that it offered; what he learnt from artisans was the pathway to its possession.”

Conclusion

Though generally overlooked sources, the apothecary manuals that emerged in Venice in the latter sixteenth century are significant for what they reveal regarding the participation of apothecaries in cultural discussions on the meanings of experience and experimentation with inherited medical traditions. While the bulk of scholarship on Italian apothecaries has centered on the very small number of virtuosi apothecary collectors of nature and their museums, the vast majority of apothecaries were engaged in the lucrative commerce for composed electuaries, pills, tablets, distilled oils and syrups that incited some physicians to rail against the growing commercialization of health. Pharmacies in Venice, moreover, generally did not cultivate the kinds of museums and collecting practices that took place in Verona, where apothecaries like Francesco Calzolari and Giovanni Pona immersed themselves in a culture of courtly patronage.

Operating between the growing population of distillers and retailers of “secrets” on the one hand, and the College of Physicians on the other, elite apothecaries in Venice like Georg Melich promoted both their grounding in the authoritative medical tradition of Arab polypharmacy, as well as their experimental credentials rooted in long-cultivated technical skill. Renowned for carrying out “experiments accompanied with reason,” the apothecaries at the Ostrich closely resembled the model of the diligent artist-anatomist developed by Fabricius and Harvey at Padua, which stated the need for frequent and

repeated observation and experiment. As Harvey noted in a telling comparison of art and science: “Each has its origin in sense and experience, and it is impossible that there can rightly be either art or science, without visible instance or example […] for things perceived by sense are more assured and manifest than matters inferred by reason, inasmuch as the latter proceed from and are illustrated by the former.” Harvey’s sentiments thus provide a suitable transition to the following chapter, which carries us into the cultural world of the Baroque pharmacy in Venice where anatomical observation and artistic invention converged to mirror the image of the apothecary as an experimental investigator of nature.

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FOUR

The Satyr in the Pharmacy:
Dissection and Invention at the Sign of the San Liberale

4.1 Introduction: Baconian Naturalists on the Lido

In 1631 an image depicting the dissected remains of an unusual marine mollusk appeared in Venice at the end of Antonio Donati’s *Trattato de’ semplici, pietre, et pesci marini, che nascono nel lito di Venetia, la maggiore parte non conosciuti da Teofrasto, Dioscoride, Plinio, Galeno, & altri Scrittori* (Tract on medicinal simples, stones, and fish that grow in the Lido of Venice, the greater part unknown to Theophrastus, Dioscorides, Pliny, Galen and other Writers). As the apothecary owner of the San Liberale pharmacy in Venice’s commercial district, Donati had commissioned an unidentified artist to produce more than twenty copperplate engravings illustrating the various plants he had studied on expeditions to the Venetian Lido. However, none of his botanical specimens were quite as spectacular as the detailed depiction of the so-called “Satiro Marino” (*marine satyr*) which Donati reported finding on a botanical excursion conducted with three other apothecaries in 1627:

> While we traversed through the Lido we continually pulled near the waves of the sea, discovering those things that were of great delight to us, we came across by chance some fishermen taking up their nets and we stopped to see the load they had brought up, to which there were many sorts of fish that one can see every day in the fish stalls in Venice, among them they found this fish which, as useless to them they were throwing
away, and we considering its form and beauty, it seemed to us worthy of a picture and inclusion in this our second book.¹

After comparing its form to the “head of a satyr” with a beard like “icicles that form from walls in the height of winter” and larges eyes and nostrils “like those of a bull,” Donati took special note of the animal’s transparency that made it appear to glow from within and change colors “like a piece of ice”. While the picture of the animal was being prepared “a sudden appearance was made by the Excellent Signor Johannes Vesling, most expert anatomist and botanist who showed its worth to the College of Physicians of Venice in 1627, and also present was the most worthy poet and doctor Alessandro Bigarotti where they took occasion to cut open the fish and see what it was that made it so transparent.” However, upon opening the animal the apothecaries and physicians in attendance saw only an empty cavity “running from the mouth under the nostrils to the eyes, never finding there any sort of interior.” Unable to preserve the specimen, Donati’s narrative abruptly concludes with a quick prescription for its use against tumors and an expressed desire that at some point in the future he and his compatriots may yet find “another specimen of the said fish, still so greatly mysterious.”

Almost completely forgotten to modern scholarship, Antonio Donati’s medical flora containing his account of the marine satyr is noteworthy as the first published investigation specifically devoted to the medicinal materials of a regional locale in Italy.²

¹ Antonio Donati, Trattato de’ semplici, pietre, et pesci marini, che nascono nel lito di Venetia, la maggiore parte non conosciuti da Teofrasto, Dioscoride, Plinio, Galeno, & altri Scrittori (Venetia: Pietro Maria Bertano, 1631), 119-20. We know little of Antonio Donati or his apothecary collaborators mentioned below. From the minute books of the Venetian College of Apothecaries it appears that the San Liberale joined the roles of the College in 1601 under the ownership of a certain Bortolomeo: ASV, Mariegole 209, v. I, c. 54r. On November 27, 1631 Donati makes his first appearance in the roles in a discussion of his ownership of the San Liberale and the Montagna, which he inherited. Donati asked to be licensed as the apothecary at the San Liberale and remain as “patron” of the Montagna.

² See note 4, below.
The work appears to have been of interest first to the Anglo-Scottish botanical community in the latter seventeenth-century, with the English botanist John Ray citing it in his *Stirpium Europaearum* (Plants of Europe, 1694); while the Scottish botanist Andrew Balfour (1630-94), implored his botanical collaborator and countryman, Patrick Murray, to seek out Donati’s book and visit the apothecary’s brother to inquire about purchasing the rest of the engraved plates during his visit to Venice in 1671.³

![Figure 2: Antonio Donati's "Marine Satyr" depicted at the conclusion of his Trattato de' semplice in 1631.](image)

Among the first Italians to take serious note of the book was the Venetian apothecary Girolamo Zannichelli (1661-1729). Inspired by its contents, Zannichelli

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composed an updated botanical study of the Venetian Lido, published posthumously by his son without images (nor marine satyrs) in 1735. The marine satyr received mention in the Paduan professor, Antonio Vallisneri’s *Istoria della generazione dell’uomo, e degli animali* (History of the Generation of Man and other animals, 1721) as a *zoophyte*, or “plant-animal”; a category including insects and various mollusks that appeared at the center of eighteenth-century debates on spontaneous generation. Both Zannichelli and Vallisneri maintained a friendly correspondence on scientific matters, and ultimately looked to the *Trattato* as a worthy, early example of faithful observations made in the Lido. Yet, while Enlightenment naturalists made their own uses of Donati’s *Trattato*, the apothecary’s colorful depiction of the Baroque pharmacy as a site where the knowledge producing skills of apothecaries, artists, poet physicians and anatomists converged around nature’s novel forms, invites a deeper investigation into the early seventeenth-century context of natural historical investigations that Donati’s text appears to have been addressed to. Who was the *Trattato*’s intended audience and what might they have gleaned from his visual and descriptive representation of the Venetian Lido? What published models preceded Donati’s text that may shed important light on his reading practices and sources? Finally, what does this unusual text reveal to us about the values and practices of an informal scientific community of shopkeepers in Venice during a

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4 Gian Girolamo Zannichelli was the famed apothecary at the Golden Hercules in Venice, and is discussed in greater detail in the following chapter. His updated study of the Lido published by his son was titled, *Istoria delle piante che nascono ne’ lidi intorno a Venezia* (Bologna, 1735). Antonio Vallisneri was professor of theoretical medicine at Padua and a member of the London Royal Society. He published an enormous volume, but was best known for his vernacular natural history on generation: *Istoria della generazione dell’uomo, e degli animali, se sia da’vermicelli* (Padua, 1721). A brief account of Donati and the various mentions of his book is given by Antonio Cicogna, *Delle inscrizioni veneziane* (Venice, 1842), 192-93. Both Zannichelli’s account and Cicogna’s credit Donati’s book as the first medical flora of a local patria in Italy. While the works of the Verona apothecaries on Mount Baldo preceded Donati’s work, their concerns were not primarily medical.
crucial period when influential scholars in Europe were busy imagining the public goals and interests of a new science of nature?

In pursuing these kinds of questions, this chapter moves in a different direction from recent studies of Italian apothecaries that have focused primarily upon their roles as brokers of specimens and information in the networks of leading physician naturalists in Europe.⁵ These studies have concentrated heavily on the well-known Verona apothecaries Francesco Calzolari and Giovanni Pona, both of whom maintained epistolary contacts with two of the most influential physician naturalists of the period: Ullisse Aldrovandi at Bologna, and Carolius Clusius in Antwerp.⁶ Calzolari’s pharmacy and museum, as we saw in chapter one, were known throughout Europe and attracted numerous important participants in the “botanical republic” of Pietro Mattioli. His brief, vernacular treatise The Voyage to Mount Baldo (1566) established his fame and made the mountain outside Verona the symbolic center of the Italian community of naturalists. Following Calzolari, Giovanni Pona established his own reputation as a collector of nature and expert botanist in his Plantae quae in Baldo Monte reperiuntur (Of the Plants Recovered on Monte Baldo) published in Basel in 1608. In 1617 an Italian edition was published at Venice as Monte Baldo descritto da Giovanni Pona veronese, in cui si figurano & descrivono molte rare piante de gli antichi da’moderni sin’hora non


⁶ Francesco Calzolari, Il viaggio de monte baldo (Venice, 1566); Giovanni Pona, Plantae, seu, Simplicia ut vocant, que in Baldo monte (Basel, 1608); Monte Baldo descritto da Giovanni Pona veronese (Venice, 1617).
conosciute (Mount Baldo Described by Giovanni Pona, in which they Figure and Describe many Rare Plants of the Ancients until now Unknown by Moderns, 1617). The vernacular edition of Pona’s book published in Venice thus added illustrations of rare plants, but added no advice for their medicinal applications.

Both books were known to Antonio Donati who referred to Calzolari and Pona as “the Dioscorides of the celebrated Mountain” near Verona.⁷ Hoping to do the same for the Venetian Lido, Donati explains that because of “the number of natural things and marvels that we have seen in Venice, it seems to us that the Venetian Lido must count itself worthy in the first place both for the quantity and quality of plants that it produces, which were not described and perhaps were not all known to Theophrastus, Dioscorides, Pliny and Galen and many other sublime authors who have until now treated of this material.”⁸ Donati’s project makes a stronger claim for the novelty of the plants described in his text, and thus moves in a decidedly new direction from the investigations of the Verona apothecaries whose works were primarily addressed to local nobilities and patricians. Pona’s book, for example, was dedicated to the Venetian doge Nicolo Contarini and describes many rare specimens observed in Contarini’s private garden, as

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⁷ Donati, Trattato, 2.

⁸ Ibid., 1-2. “Onde parendoci convenuole che cosa di si grande importanza non passi sotto silentio, habbiamo perciò preso carico di farne almeno qualche breve menzione per mostrar alli studiosi Simplicisti quanto il famoso Lido di questo Serenissimo Dominio sia arrichito di piante peregrine, salutisere, & addotate di mirabili virtue, ma per esser di presere molto difficile, per dir impossibile impresa il narrarle tutte, habbiamo voluto elegger per hora il palesar in succinto quelle solamente, che sono stimate le principali, riservandoci con maggior comodita far poi altro discorso, il quale intieramente contenga cio, che di notabile, e vago puo in detto Lido ritrovarsì, e quando questo no ci riesca, altri ad esempio nostro forse prenderan occasione d’impiegare ogni loro studio per formarne compiti trattati a fine, che questo célebre locho habbia il suo scrittore, si come altri inferiori hanno ottenuto fra quali se ne va glorioso Monte Baldo, immortalato dalla famosa penna del Signor Francesco Calzolari Farmacopeo all Campana d’oro in Verona…. e poi dal Signor Giovanni Pona medemamente Farmacopeo in detta Citta al Pomo d’oro.”
well as the garden of the elite Verona collector and religious cleric, Cesare Nichesola.\(^9\) Moreover, Pona dedicates very little attention to the medicinal virtues of the plants described, placing his text within the popular seventeenth-century genre of illustrated botanical catalogues known as *florilegia*, typically dedicated to the private gardens of notable elites.\(^10\) By contrast, the *Trattato de’ semplici* displays the same dedicatory letter addressed in separate copies to no less than three Padua educated physicians: the Venetian physician Pietro Benzon (of whom we have little documentation), Massimiliano Monteverde (physician son of the pioneering composer of Venetian opera, Claudio Monterverde), and the physician Giuseffo Aromatario.\(^11\) Aromatario achieved fame for his influential tract on his theory of plant generation from fertilized eggs, and was cited by William Harvey as an important inspiration for his *Exercitationes de generatione animalium* (*Excercises on Animal Generation, 1651*).\(^12\) Aromatario was also the student of the most influential and popular professor at Padua in the early seventeenth century, Cesare Cremonini (1550-1631), who encouraged Aromatario in an extended publishing

\(^9\) Ibid., 20. “Et questa piante fino alla villa di Pontino ritrovano, nel qual luogo altre volte erano coltivati con mirabil diligenza alcuni Giardini per ordine di Monsignor Cesare Nichesola Canonico di Verona, ne quali notammo nell’impressioni latine il numero delle piane seguenti, le quali in gran parte così dall’Illustissimo Sig. Vicenzo Pinelli…”


\(^11\) The various dedications are discussed in the published correspondence of the 19\(^{th}\) century Bolognese botanist Antonio Bertolini: *Nuovi annali delle scienze naturali e rendicoto delle sessioni della societa agrarian, e dell’accademia delle scienze dell’istituto di Bologna*, ser. II, vol. VIII (July, 1847), 290-94. The recipients named are Pietro Benzon, Giuseppe degli Aromatari, and Massimiliano Monteverde, discussed further below.

\(^12\) Giuseppe degli Aromatari, *Disputatio de rabie contagiosa, cui praeposita est epistola de generatione plantarum ex seminibus* (Venice, 1625). For Harvey’s encounter with Aromatari, see: Peter J. Bowler, “Preformation and pre-existence in the seventeenth century: A brief analysis,” *Journal of the History of Biology* 4 (2): 221-244.
war with Alessandro Tassoni (1565-1635) to defend the poetic works of Petrarch.\textsuperscript{13} Cremonini, a committed Aristotelian philosopher, remained convinced that only philosophical demonstration, not anatomical observation, could lead to epistemological certainty. Nevertheless, both he and his colleague Fabricius Aquapendente, the pioneer of philosophical anatomy at Padua, participated in an academic climate of experimental dialogue between poetic mimesis and philosophical demonstration. Cremonini published several vernacular satyr fables and poems that aimed to reconcile Aristotle’s distinction between poetic imitation and philosophical exposition.\textsuperscript{14} Finally, the anatomist Johann Vesling, who entered Donati’s pharmacy and performed the dissection on the “marine satyr,” was the popular director of the Padua botanical garden and anatomical theater in the 1630’s and 40’s. His anatomical textbook \textit{Syntagma anatomica} (Anatomical Syntax, 1641) replaced Vesalius’s \textit{De Fabrica} (1543) as the most widely reproduced and

\textsuperscript{13} Cremonini was perhaps the most influential personality at Padua with more than four hundred students at the time of his death in 1631. He is best known today, however, as the Aristotelian philosopher who refused to look through Galileo’s telescope to see the craters on the moon which would refute Aristotle’s notion of celestial perfection. His major work in defense of Aristotle and against his friend and colleague Galileo is, \textit{Disputatio De Coelo in tres partes divisa} (Venice: Thomam Balionum, 1613). He also composed several vernacular poems and fables that we will encounter later in this chapter. As a defender of Aristotle’s ideas on the mortality of the soul Cremonini has acquired the reputation as a leading skeptic and possible atheist who came to symbolize the culture of 17\textsuperscript{th} century Venetian libertinism. For more on Cremonini and libertine politics, see Edward Muir, \textit{The Culture Wars of the Late Renaissance: Skeptics, Libertines, and} \textit{Opera} (Cambridge: Harvard University Press, 2007).

\textsuperscript{14} Cynthia Klestinec, \textit{Theaters of Anatomy: Students, Teachers, and Traditions of Dissection Renaissance Padua} (Baltimore: Johns Hopkins, 2011), 107-109. Cremonini’s most important poetic work is the \textit{Il Nascimento di Venezia} (1617) discussed later.
translated anatomical work of the seventeenth century, and offered early support for Harvey’s demonstration of the circulation of the blood.\(^{15}\)

Hence, upon closer examination, Donati’s forgotten natural history of Venice exhibits fascinating connections with the more rarified intellectual world of scientific and cultural debates that perculated in the famed Palazzo Bo (Bull Palace), site of the anatomical theater at the University of Padua. Indeed, Donati’s poetic description of the marine satyr as bearing “eyes like a Bull” hints that he may have had this audience in mind in his rhetorical construction of the specimen in his *Trattato.*\(^{16}\) These important clues thus invite a much deeper investigation into the sources that likely informed Donati’s discourse on a marine novelty plucked from local fisherman’s nets; and suggest how one network of commercial apothecaries in Venice creatively engaged with a world of circulating texts and representations to fashion a new genre of natural historical exposition in the early seventeenth century.\(^{17}\) While the earlier botanical works of the Verona apothecaries Calzolari and Pona were clearly addressed to the elite audiences of courtly collectors and private patrons, the *Trattato* instead presents itself as a collaborative undertaking for the public utility of scholars by a network of Venice’s apothecaries: Donati at the San Liberale, Horatio Brescianini at the Santo Spirito,

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\(^{17}\) This reading habits of apothecaries remains uncharted territory in studies of early modern science and medicine. For an initial investigation restricted to traditional pharmaceutical texts, see Marina Garbellotti, “Libri e letture di speziali: Cultura farmaceutica trentina tra fine Seicento ed inizio Settecento,” *Medicina & Storia* 8, n. 15 (2011): 103-126.
Domenico Valle at the Mondo, and Marchioro Brochini at the Calice (Chalice). Though we possess little further information on all of these Venetian apothecaries, their medical book nevertheless presents nature in Venice as a public patrimony to its physician audience, and thus stands as a fascinating example of Francis Bacon’s ideals for the New Science as a collaborative and useful enterprise aimed at advancing the interests of the public good.\(^\text{18}\) Indeed, it is worth recalling Bacon’s description of “Solomon’s House” in 1627 – his utopian figuration of the new experimental sciences – which contained “parks and enclosures of all sorts of beasts and birds, which we use not only for view or rareness, but likewise for dissection and trials,” as well as “dispensatories, or shops of medicines” filled with a “variety of plants and living creatures […] And for their preparations, we have not only all manner of exquisite distillations and separations […] but also exact forms of compostition, whereby they incorporate almost, as they were natural simples.”\(^\text{19}\) At the heart of Bacon’s utopian representation of the New Science then, was the articulation of experimental spaces - nature parks and pharmacies – where nature could be transformed by art to render new knowledge of its hidden secrets.\(^\text{20}\)

In what follows I examine how Antonio Donati’s apothecary network in Venice represents their natural historical investigations in similar terms, rendering their pharmacy shops and the Venetian Lido as spaces of experimental demonstration

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\(^{\text{18}}\) For a useful introduction of Bacon’s attitudes on the public utility and openness of the New Science, see W. Eamon, “From the secrets of nature to public knowledge: The origins of the concept of openness in science,” Minerva 23, n. 23 (1985): 321-347. I have also benefited from the study of Perez Zagorin, Francis Bacon (Princeton: Princeton University Press, 1998).

\(^{\text{19}}\) Three Early Modern Utopias: Utopia, The New Atlantis, The Isle of Pines, edited and translated by Ralph Robinson (Oxford Press, 1999), 180. Bacon’s utopian tract was published in 1627, the same year as Donati’s recovery of the marine satyr.

reflecting back on their expertise in summoning nature’s healing powers. I argue, moreover, that this “Baconian” reading of the Trattato’s discourse also places us in a position to appreciate the marine satyr’s significance, not merely as a curious marvel, but as a multi-layered emblematic commentary on the difficult task of distinguishing truth from appearances – or the face of Minerva from the reflection of Narcissus - in the study of nature’s forms. This, of course, was an issue that occupied much of Bacon’s writings on the various “Idols” that could prevent investigators from arriving at natural knowledge capable of benefitting the public weal. Bacon’s “Idol of the Marketplace,” for example, arose from “the intercourse and association of men with each other” to produce words that “either name things that do not exist” or produce faulty and vague names for things that do exist. The latter referred to the fantastical names often given to unique natural “marvels” preventing understanding of their broader classifications in nature. At first glance the emblematic marine satyr would appear to be just such an “Idol of the Marketplace” in Bacon’s terms. Several historians, moreover, have asserted that Bacon’s program introduced a thoroughly “non-symbolic” approach to natural history that placed him at odds with the tradition of humanist natural history and emblematics that preceded him. However, as James A. T. Lancaster has recently argued, Bacon’s understanding of natural history “did not entail the rejection of allegorical interpretations in toto” since “Bacon also felt that the interpretation of fabulae was a key resource for the discernment


of a deeper reality.”

Grounded in latter sixteenth-century notions of natural history as a “medicine of the mind,” Bacon’s outlook supported a natural history that “leads to human utility only insofar as it cultivates a charitable disposition of the mind towards the benefit and relief of man.”

A similar point has been made by Brian Vickers who has traced Bacon’s notion of “utility” to a mixture of Christian traditions of “charity” and humanist ideals of the *vita activa* (active life).

Natural history, as a remedy for the mind, thus becomes in Baconian terms the cultivation of a charitable disposition towards knowledge to counteract the illness of personal vanity and the unhinging of the imagination from the material facts of nature. At the same time, it is precisely through the adoption of imaginative literary discourse, particularly in his utopian *New Atlantis*, that Bacon articulates the new goals of natural history to emancipate itself from the “Idols of the Marketplace” (i.e. private opinions and cultural fantasies), and thus serve as a true, charitable medicine for the public benefit and advancement of society.

When we turn our attention to the reception of Bacon’s writings in early seventeenth-century Italy, we find extensive interest in only one treatise first published in 1597, the *Essays, or, Counsels Civil and Moral of Francis Bacon*. The work - which

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24 Ibid., 194. For the tradition of *medicina mentis* (medicine of the mind) in Bacon’s rendering of natural history’s true aims, see chapter two in the fascinating new study by Dana Jalobeanu, *The art of experimental natural history: Francis Bacon in context* (Bucharest: Zeta Books, 2015), 68-98. Jalobeanu traces the overlapping meanings of *medicina mentis, medicina animorum,* ‘spiritual physic,’ *emendation intellectus, expurgation mentis* in early modern medical works and suggests their similarities to “the Neo-Stoicism of the sixteenth-century French Protestants.” An important tract is also John Abernathy’s *A Christian and Heavenly Treatise Concerning, Physicke for the Soule* (said to have been published in 1615, but not confirmed), which may have strongly influenced Richard Burton for his *Anatomy of Melancholy* (1621).

eventually presented fifty-nine short essays on themes including Anger, Vain-Glory, Gardens, Honor and Reputation, Atheism, Revenge, Masques and Triumphs, Truth, Death, and Wisdom of Man’s Self – follows in the tradition of the French essayist Michel de Montaigne in referencing various classical fables, poets, and animal figures to contemplate moral themes. The book was first translated into Italian by Tobias Matthew in a 1617 London edition later reproduced in Florence, Milan and Venice where it was particularly appreciated going through three editions by 1639. While one can only speculate that the apothecaries read available Venetian editions of Bacon’s Counsels, the general tenor of the work - in which Bacon depicts “wisdom for oneself…[as] the wisdom of rats, that will be sure to leave a house, somewhat before it fall” - clearly found a receptive audience in the Venetian Republic. Bacon’s fascination with the artisan trades and insistence that private knowledge was not only useless, but antithetical to the public good, reflected the general celebration of commerce, urban associations and civic ideals that scholars such as Phil Withington have noted as specific developments in the latter sixteenth and early seventeenth centuries in London. The Venetian interest in Bacon’s writings on civic themes also speaks to the shared experiences of London and Venice as internationally connected urban communities in which guild-organized trades and

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26 The first edition of 1597 contained 21 essays with a further 38 added in 1612. The first Italian edition of Bacon’s writings appears to have been printed in London by Giovanni Bilio: *Saggi morali del signore Francesco Bacano, cavaglie inglese: Con un altro trattato della Sapienza de gli antichi* (1617). The tract was translated by Dr. Tobias Matthew (1546-1628), Archbishop of York. This same tract then appeared in 1618 and 1619 in Florence, 1620 in Milan, and in Venice in 1621, 1626, 1639. The Venetian edition bears the name of the printing house of Pietro Dusinelli. In 1650 the *Il fabro di fortuna: overo ammaestramento per la vita civile, con nuova aggiunta alli Saggi Morali di Francesco Bacconi* also appeared in Venice.

professions strongly participated in the civic, festive, and commercial activities of both cities.\textsuperscript{28}

In the remaining sections of this chapter I employ the \textit{Trattato} as a source demonstrating some of the ways medicinal retailing in Venice, rather than simply pitting apothecaries in market competition with one another, also nurtured many of the values and practices generally associated with modern scientific communities: collaboration, openness and publicity, and the development of experimental products to serve the public good.\textsuperscript{29} I begin with episodes of collaborative investigation represented in Donati’s text. Along with the marine satyr, the examples of the \textit{Atriplex marina} plant and the American “Sharkstone” offer unique instances in which Donati turns away from his normal descriptive discourse to present narratives of collaborative investigations of natural specimens. Throughout the pages of the \textit{Trattato} difficult specimens and critical opinions are typically framed as the outcome of joint discussions between the participating members of Donati’s network. I then turn to the strange “marine satyr” specimen to examine its fabrication from natural historical and literary texts as an emblematic, and satirical discourse on the perils of vanity and the values of openness and disclosure. I do so by tracing earlier traditions of representing poisonous marine mollusks and cuttlefish in medical and natural historical works from antiquity to the Renaissance. My discussion centers on the significance of a purportedly poisonous, red ink dispelling specimen know as the \textit{leporis marinus} (sea hare) in pharmacological writings dating back to Dioscorides.


\textsuperscript{29} Sandra Cavallo has recently made a significant contribution complicating the medical marketplace model by demonstrating the social and professional bonds between various artisan trades in early modern Turin: \textit{Artisans of the Body in Early Modern Italy: Identities, Families, and Masculinities} (Manchester University Press, 2007).
and Galen’s influential *Theriaca ad Pisonem*. The first visual representation of the specimen appeared in Guillaume Rondelet’s *Libri de piscibus marinis* (Books on Marine Fish, 1554), which presented three separate observed species and a description of Rondelet’s dissections. These later circulated in combined volumes with Conrad Gesner’s *Historia animalum* (History of Animals, 1551-8) that also depicted a fantastical half-goat man, half-fish creature labeled the “Satyrus Marinus”. Finally, further renderings were given in Fabio Colonna’s *Ekphrasis, sturpium minus cognitarum rariorumque* (Ekphrasis of lesser known and rare plants, 1606, 1616) published in Naples. From these descriptions and visual representations we can appreciate some of the existing natural historical sources that enabled Donati to fabricate his own rendering of his unusual mollusk in the *Trattato*. Renaissance natural histories were not the only likely sources for Donati’s marine satyr, however. In this section, I also turn to several literary sources, including works by Francois Rabelais and Desiderius Erasmus. In the satires of these widely read authors the hybrid anatomies of satyr figures serve as instructive reminders that philosophical truth and wisdom were often to be found hidden in the unlikeliest of material containers. Indeed, in Bacon’s *Counsels* as well, satirical imitation is proposed as a useful tool of dissection to distinguish truth from dissimulation.\(^30\)

From the *Trattato’s* discourse on self-knowledge and humility in the face of nature, I then turn to its connections with the Paduan intellectual scene and the cultural debates that helped valorize new experimental practices. These concerns bring my discussion to the writings of Cesare Cremonini and the marine satyr’s dissector, Johann Vesling. Cremonini’s reflections on poetics and philosophy in his numerous satyr fables present

\[^{30}\text{Each of these works will be cited below as they are introduced.}\]
another important set of sources for Donati’s *Trattato* that I examine before turning to Vesling’s poetic articulation of the relationships between the botanical garden and the anatomical theater at Padua. In his 1638 oration upon accepting the position as director of both the Padua garden and anatomical theater, Vesling recites a by then common theme in new chemical treatises regarding the possibility of experimentally regenerating plant forms from their burnt ashes in glass vials.\(^{31}\) The hypothetical experiment had been popularized in a poem by the French physician Joseph Du Chesne whose works on chemical pharmacy were highly influential in Venice. Here, we can assess the significance of dissection for Donati’s discourse on medical botany in the *Trattato*, which goes further than earlier botanical works by offering not just empirical descriptions of plants in the Lido, but also chemical recipes for the technical dissection of plants to extract and preserve their essential virtues in concentrated salt extracts. Donati’s discourse on plants in the Lido thus also serves as an advertisement for novel remedies to be found in his pharmacy; and most importantly, offers an early glimpse of the introduction of new chemical procedures and remedies in the Venetian marketplace taken up more fully in the concluding chapter of this dissertation.

Hence, while scholarship has generally overlooked the *Trattato* as a mere curiosity among numerous other natural histories produced by learned scholars in early modern Italy, I interpret Donati’s natural history as a significant witness to the Venetian apothecary trade’s promotion of scientific investigation as a collaborative, experimental, and civic enterprise decades before similar ideals were formally instituted in public

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\(^{31}\) The process, known as palingenesis, was widely discussed in early modern medicine. For an introduction, see Francois Secret, “Palingenesis, Alchemy, and Metempsychosis in Renaissance Medicine,” *ambix* 26, n. 2 (1979): 81-92.
bodies such as the Royal Society of London in 1662, or the Académie des sciences in Paris in 1666.

4.2 The Shopkeepers’ Academy: Apothecaries and Collaborative Learning in Venice

As Paula Findlen has demonstrated in several publications on scientific culture in early modern Italy, the sixteenth-century revival of the discipline of natural history on the peninsula was strongly dependent upon broadly dispersed networks of correspondence and collaboration between physicians, apothecaries, university professors, humanists, and botanical enthusiasts. Hence, the formation of the Renaissance discipline of natural history was ultimately grounded in the formation of new communities of learning and modes of communication during this period. As we saw in chapter one, the new enthusiasm for directly experiencing nature in an effort to recover the classical Greek pharmacy was nurtured by the development of print and expanded Atlantic and Indian Ocean trade networks. We may add to this the greater reliability of inter-regional transport and communications networks in Europe that enabled extensive epistolary exchanges between scholars. Scholars, such as Pietro Mattioli, were ultimately able to rely on these extensive networks to produce novel botanical and natural historical

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34 For an important collection of essays on natural history during the era of early modern commercial and colonial expansion, see Londa Schiebinger and Claudia Swan, eds. Colonial botany: science, commerce, and politics in the early modern world (University of Pennsylvania Press, 2007).

publications in which authors reported not just their own observations, but also those of other “credible” witnesses, implying men with university training or elite social status. Nevertheless, apothecaries in the Venetian Republic such as Calzolari, Pona, Georg Melich and Marco Fennari also cultivated positive reputations as expert botanists in Mattioli’s circle resulting from their remarkable productions of Theriac with the fewest material substitutes.\(^{36}\)

In Italy between roughly 1550 and 1650 temporary private academies founded by aristocrats were among the first formalized scientific communities in Europe. In Naples the Accademia dei Segreti devoted to the recovery of nature’s arcane “secrets” was founded by the humanist polymath Giambattista della Porta in 1560. However, in 1578 Della Porta’s academy was closed by Papal order on suspicion of sorcery. Following this short-lived society the Accademia dei Lincei (Academy of the Lynx) founded in 1603 by the Umbrian aristocrat Federico Cesi in Rome became the leading scientific society in Italy.\(^{37}\) In 1611 the Lincei welcomed Galileo Galilei into their ranks and brought to publication his famous Il Saggiatore (The Assayer) in 1623. The members of the academy in Rome were also among the first to deploy the microscope to make new observations of nature recorded in a collection of recently recovered micrograph drawings.\(^{38}\) However, the academy’s most expensive and exhausting project drawing on

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\(^{37}\) David Freedberg, The Eye of the Lynx: Galileo, his friends, and the beginnings of modern natural history (Chicago: University of Chicago, 2002). The academy adopted the lynx from Della Porta’s Magia naturalis which depicted a lynx with the motto: with lynx like eyes examining those things which manifest themselves so that having observed them he may zealously use them.

\(^{38}\) The drawings of Cassiano dal Pozzo (1588-1657) were recently discovered in England and are now part of the Royal Collection in Windsor Castle. See, Antony Griffiths, “The print collection of Cassiano dal Pozzo,” Print Quarterly 6, n. 1 (1989): 3-9.
the contributions of several members was the production of the *Nova plantarum, animalium et mineralium mexicanorum historia* (History of the New Plants, Animals and Minerals of Mexico) in 1651.\(^{39}\) Undertaken over three decades, this editorial task brought to light the massive collection of manuscripts descriptions and drawings left behind by the Spanish royal physician Francisco Hernandez (1514-1587). Under orders from Philip II, Hernandez had passed seven years from 1570 to 1577 conducting the first scientific mission to the New World gathering medicinal specimens and interviewing local native healers. His original manuscripts were not published in Spain and many were later destroyed in a palace fire in 1671. However, copies of the collection had been made by an Italian physician, Nardo Antonio Recchi, who brought them to Naples. In 1628 Federico Cesi published portions of the Hernandez corpus in Rome, followed by the much larger *Nova plantarum* of 1651 compiled by the academy members Johann Schreck (1576-1630) and Fabio Colonna (1567-1640).\(^ {40}\)

In Venice the most important learned society of the seventeenth century was the *Accademia degli Incogniti* (Academy of the Unknowns) founded by Giovanni Francesco Loredan and Guido Casoni around 1623.\(^ {41}\) The academy was strongly inspired by the philosophical outlook of the reputed libertine and Aristotelian professor of philosophy at Padua, Cesare Cremonini, who died in 1631. Cremonini’s reputation as an aetheist, along with other professors at Padua, had been sealed by his student Gabriele Naude (1600-53)

\(^{39}\) For Hernandez and his expedition see, Simon Varey and Rafael Chabran, eds., *Searching for the Secrets of Nature: the life and works of Dr. Francisco Hernandez* (Stanford University Press, 2000).

\(^{40}\) The 1628 text of Cesi was titled, *Rerum medicarum Novae Hispaniae thesaurus* (Treasury of Medicinal Things of New Spain).

in his 1703 published memoires that strongly influenced French skeptics and libertines in the eighteenth century. More so than the *Lincei* in Rome, the Venetian academy developed a strong interest in lyric poetry, history, musical theater and the new genre of opera. In 1630 the *Incogniti* founded their own public theater, the *Novissimo*, and included the pioneering operatic composer Claudio Monteverde among their ranks. The dedication of copies of the *Trattato* to Monteverde’s physician son Massimiliano tempts speculation that Donati may have been in contact with this intellectual community. What is certain is that the *Incogniti* exhibited strong interests in experimenting with the boundaries between poetic discourse, philosophy and natural history. While the *Incogniti* produced no medical or scientific works comparable to the *Lincei*, the literary collections published under the academy’s name display a penchant for satirical play, coded emblems, a celebration of the senses and the body’s passions often delving into the sexually explicit, and fierce patriotic loyalty to the aristocratic Republic of Venice. The academy functioned as an influential arbiter of taste among Venice’s patrician elite and learned figures in the mid-seventeenth century, and it is entirely possible that some may have frequented Antonio Donati’s San Liberale pharmacy.

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42 Gabriele Naude, *Naudaena et Patiniana ou singlaritez remarquables prises des* (1703).


44 *Discorsi academici de’signori Incogniti, Havuit in Venetia* (1635); *Novelle amorose de’signori Academici Incogniti* (1642); *Le glorie de gli Incogniti* (1647). Loredan was likely behind all of these productions as well as numerous others in mid-seventeenth century Venice. The members were also drawn from across Italy who composed tracts on a variety of topics, often frivolous and playfully explicit considering themes on Human Misery, Old Age, On Prostitutes, The Color Grey, On Ugliness, and In Praise of Ugliness.

45 Filipo de Vivo has shown how seventeenth-century pharmacies were sites of sociability for all levels of Venetian society, especially elite gentlemen: “Pharmacies as Centres of Communication in early modern Venice,” *Renaissance Studies* 21, n. 4 (2007): 505-521.
Yet, despite its significant influence in Venice the Accademia degli Incogniti is best characterized as a literary society whose interests did not inspire members to engage in collaborative experimental investigations of nature or scientific publishing projects like their counterparts in Rome and the later Accademia del Cimento in Florence.\(^{46}\) Instead, the contents of the Trattato suggest that informal communities centered on natural historical investigation were cultivated through Venice’s dense network of shops and pharmacies specializing in exotic or medicinal materials. Exchanges and demonstrations of specimens between shopkeepers occur often in the Trattato. This is particularly so in the second book on rare objects found locally or imported from abroad. In the case of the Lapis Tiburonis, or “Shark Stone,” Donati reports that the specimen had “been demonstrated by Signor Melchior Zettele, druggist (droghier) in Venice at the sign of the Pozzo which delights greatly in rare things and those that have benefit to human bodies, and he tells me that the said stone was sent to him from Spain because it is good for making urine…”\(^{47}\) The stone, Donati continued, had originally been described by the Spanish physician Nicolas Monardes in his New World pharmacopeia without an image: “we have thus put here the said figure with its faculties and the mode of taking it so that every scholar (studiosi), and those who may have need of such a stone, can see the


\(^{47}\) Donati, Trattato, 117. “We present the figure of this stone for having been demonstrated to us by Signor Melchior Zettele, Droghier in Venice at the sign of the pozzo who delights in [peregrine] things that might be of benefit to the human body, and he tells me that the stone has been sent from Spain because it might be good for provoking urine without another name, having been shown to some, there have been many names, and since the stone for its beauty and its quality was likely generated in the sea like other mysterious stones it came to our memory that it is the stone of the Tiburone fish that originates in the Indies which Nicolo Monardes mentions without effigy and says he has never seen but only relates what he heard from others; and since it has been our desire to reveal those natural things that until now have been hidden, we have therefore chosen to present the figure of it with its faculties…”
The calcified deposit was dissected from the heads of giant sharks encountered in the Americas and reportedly possessed healing properties for the treatment of kidney diseases, a common affliction during this period. It has been suggested that the Spanish term for a large shark – *tiburón* – is in fact an adaptation from the language of Carib Indians first encountered by the Spanish in the West Indies. Indeed, the first printed appearance of the term comes from the Gonzalo Fernandez de Oviedo’s *Historia general de las Indias* (Seville, 1535). There Oviedo proposed to describe three fish he had encountered: *tortuga, tiburón* and *manati*. Oviedo continued: “The second fish of the three mentioned above, is called a *tiburón*, this is a great fish, very quick in the water, and very much a carnivore.”

![Figure 3: The Lapis Tiburonis, or Shark Stone, depicted in Donati's Trattato.](image)

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48 Ibid., 117. It is very possible that Donati’s artist made the image from that depicted in Carolius Clusius’ 1605 *Exoticorum*, an image originally produced by the English apothecary John Garret. See, Sachiko Kusukawa, “The uses of Images in the Works of Carolus Clusius,” in *Carolus Clusius: towards a cultural history of a Renaissance naturalist*, Florike Egmond, ed. (Amsterdam: 2007), 224-250.

Another depicted specimen is the “Fuco” described as spongy like bread. Pulverized and boiled with various liquids it was good for the eyesight, for treating certain fungal poisons, and for purging “viscous humors”. This specimen, along with the other rarities described, Donati and his collaborators apparently sent to a noted local apothecary: “The said Fucho, along with the others, we sent to Signor Dominico Valle, Farmacopeo most expert at the Mondo in this City, who as a worthy scholar of plants would be able to consider the rare and most worthy plants found in this Lido.”

We possess no further information regarding Valle’s thoughts on these matters, yet the two examples of the shark stone and the marine sponge reveal the circulations and mutual exchanges of local and trans-Atlantic substances between Venice’s pharmacies and drugstores. The apothecaries in Donati’s network clearly sought each other’s opinions on unusual specimens and gathered together to demonstrate newly acquired objects that arrived from afar through their commercial connections.

Along with exchanging and demonstrating materials with one another, Donati’s text also provides testimony of the apothecary’s clinical practice administering medicines found in the Lido to afflicted patients. One case concerns the so-called “Musco Marino” (moss) found growing on stones and wood in the Lido. The substance was similar to the algae “that serves for fixing the glass that of this City they usually send out to all the world.” After describing the substance’s many medicinal uses and its preparation in a decoction, Donati relates a successful clinical trial:

…we put here the following case of a Venetian Gentlemen who had the inflammation of the neck of the bladder, who could not urinate, so that we taught him its cure, that he must

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50 Trattato, 119.

51 Ibid., 108. “per agiustar vetri che di questa Citta si sogliono mandar fuori per tutto il mondo…”
In the case of another plant known as the *Atriplex marina*, Donati notes that neither “Dioscorides, nor Galen made any mention of this plant” which acquired its name from its dramatic color mutations over the course of the year. The plant’s faculties, Donati tells us, “are infinite” and is most effective against the swelling in the limbs associated with hydropsy (Edema). In his descriptions, Donati narrates an account similar to the marine satyr in which he and his companions “conducted a boat out of the Port of Malamocho” towards the Island of the Lido. There they found an ailing *contadinio* (peasant or rustic) holding himself up with a cane watching the ships pass into the port: “we conducted him step by step until we found the said Atriplex and we instructed him on how he must take the seed, the weight of a bean in the morning, at least two times a week until he is healed; and we taught him that he must take the roots of the *Cocomero Silvestre*, which one finds in great quantities in the gardens of the Lido, and to cook it with the leaves of our *Brassica marina*, and cooked into a plaster, applying it to the body once every day…” Following these instructions, which continue in further steps, Donati relates that “this man then came to our shop (*bottega*) and he was all healed, having a face very flushed and jovial saying that for you I have my life back, when I believed myself to be dying.”

What is significant in this and other episodes throughout the *Trattato* is Donati’s representation of these investigations and trials as collective undertakings by the

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52 Ibid., 108.
53 Ibid., 8
54 Ibid., 8.
55 Ibid., 9.
contributing members of his apothecary network. The discovery of new specimens, their
demonstrations in shops, and their clinical trials upon patients are all represented not as
the particular acts of any single apothecary, but always as acts undertaken by all members
of this extraordinary apothecary accademia. Thus, the singular message that emerges
from the Trattato’s discourse is that the production of natural knowledge is not the
preserve of any individual virtuoso with access to private collections, but a community
enterprise undertaken in the Venetian Lido: a truly public garden open to the eyes of the
world. In the following section we shall see how the values of charitable discourse and
the cultivation of humility in the face of nature are further figured in the emblematic
discourse of the marine satyr

4.3 Dissecting Emblems: Poisonous Mollusks and Satirical Truth-Tellers

As noted earlier, the marine satyr makes its appearance in the second book of
Donati’s Trattato devoted to “peregrine” medicinal objects found in Venice. The term
peregrine, often used in catalogues of natural marvels, generally denoted objects that
defied the traditional boundaries between the plant, animal, and mineral kingdoms, and
were thus valued for their rarity. In Renaissance Italy, collectors and naturalists often
classified them as scherzi della natura, literally “jokes of nature” that demonstrated
nature’s abundant capacity for inventive play and mimesis. Such objects included
corals, sponges, fossils, various insects, seahorses, and marine mollusks that appeared as
unformed fish with plant-like morphologies. The primary classical sources for such
creatures were Dioscorides’ Materia medica and Pliny the Elder’s Natural History, in

56 Paula Findlen, “Jokes of nature and jokes of knowledge: The playfulness of scientific discourse in early
which the Roman naturalist discussed their uses as remedies for the bites of poisonous animals. In the thirty-second book of his *Natural history*, Pliny offers a description of a highly poisonous marine mollusk known as the “sea hare” (*lepus marinus*) capable of inducing abortions in pregnant women just by its odor. Those poisoned by the mollusk tend to take on the mollusk’s strong stench, with death taking place “at the end of as many days as the fish has lived.” At the opposite end of the world, however, the fish grows much larger in India, yet suffers instant death at the touch of man. In Italy the male sea hare can be dried and worn on a bracelet to ward off the poison of the female. Animals that neutralize the poison of the sea hare are the sea horse taken in drink, boiled crabs, and oysters. The fish was also only poisonous when contacted out of the sea; in the water its effects were neutralized.\(^57\) In his own discussion on poisons, Dioscorides divided them into three categories: animal, plant, and mineral. The sea hare figures among the most poisonous of animals, and was supposedly used by Domitian to poison the Emperor Titus.\(^58\)

Transmitted without illustrations, the texts of Pliny and Dioscorides offered only descriptions of the sea hare and its faculties. In the middle of the sixteenth century, however, the French physicians Pierre Belon (1517-1561) and Guillaume Rondelet (1507-1566) provided separate works devoted to marine animals in which they discussed the sea hare. The sudden interest in the animal in the sixteenth century can be attributed to Galen’s references to the creature in his widely esteemed *On Theriac to Piso*, the standard reference source for his theriac recipe. According to Galen, the theriac of


Andromachus was powerful enough to counter the poison of the mollusk. While Belon’s 1551 *L’histoire naturelle des estranges poisons marins* (History of strange marine fish) did not offer a visual depiction of the animal, the Montpellier professor Rondelet came through with illustrations of three separate species of *leporis marini*. The first two images very accurately describe a species of ink ejecting animals belonging to the genus *Aplysia* displaying two extended horns (*rhinophores*). Rondelet’s third species of sea hare, however, illustrates the top and underside of a carnivorous, bottom dwelling gastropod now identified as *Tethys fimbria* lying outside of the *Aplysia* genus. According to Rondelet, “the whole body of this creature is splendid, crystal or doughy sludge, concrete and gelatinous…the odor is very thankless and fishy, and moves one to nausea.”

Tellingly, Rondelet relates that a dissection of the creature reveals “a little black brain, an esophagus without digestive cavity, from which run intestines like the twisted horns of a wild goat (*instar capreolorum vitis convolute*).”

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60 “Toto corpore est splendido, crystallum vel pituitae massam concretam congelatumque esse dicas, raro admodum capitur…Odore est valde ingrate & pisculento, nauseam movet…Intus cerebri nigri parum est, excipit vetriculus, ex quo oritur intestinum instar capreolorum vitis convolute.”
Rondelet’s description and two sided image of his third species of “sea hare” was reproduced several times in the sixteenth century bound together with Pierre Belon’s book on fish and Conrad Gesner’s *History of Animals* (1551-58), which famously reproduced a picture of a monstrous hybrid labeled *Satyrus marinus.*61 Gesner’s

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61 *Conr. Gesneri tigurini medicinae et philoph. Professoris...continetur in hoc volumine Gulielmi Rondeletii* (1620), 477. Other editions appeared in 1551, 1558, 1604.
description was lifted directly from Battista Fregoso’s (1450-1505) account of its supposed sighting published in 1508. The image, however, depicts a fantastically improbable horned goat-man with a fish tail for his lower extremity. Multiple editions of the combined volume containing both Rondelet’s sea hare description and Gesner’s marine satyr were printed in Zurich and Frankfurt between 1551 and 1620, cities that were intimately connected with the Venetian print market. Another work of particular significance is the Neapolitan naturalist Fabio Colonna’s (1567-1640) *Ekphrasis of some lesser known and rare plants* (1606, 1616). Colonna had also spent considerable time in the pharmacy of the Neapolitan apothecary Ferrante Imperato studying specimens first hand in the apothecary’s famed natural history museum. In his publications Colonna typically rendered his own illustrations and was among the first naturalists to employ copperplate engravings in his texts. While promising plants in his title, Colonna’s *Ekphrasis* in fact displays a range of accurately depicted zoological wonders including caterpillars, beetles, salamanders, various sea shells, and even a hippopotamus. The term *ekphrasis* also refers to the book’s method, employing the Greek word for a rhetorical description of a work of art. Thus, as with a book of emblems, the images do not illustrate the text in the *Ekphrasis*, so much as the text is deployed to illustrate the image. An exceptionally learned scholar, Colonna was not trained in medicine, but law, and put

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62 Battista Fregoso’s description “De Syrenibus, & aliis monstros marinis,” first appeared in his *De dictis factisque memorabilibus collectanea*, first published in 1509. The book was reproduced throughout the sixteenth century.

63 See note 60, above.

64 Very little has been published on this important figure. For a biographical introduction, see Edward Lee Greene, *Landmarks of Botanical History, Part 2* (Stanford, 1983), 832-846. For his contributions to the Academy of the Lynx, see Davi Freedberg, *The Eye of the Lynx* (2003).

his extensive humanist scholarship to use in his text, often quoting sources directly in Greek.

Figure 6: Conrad Gesner's famous "marine satyr" recycled in numerous natural history texts in the early modern period.

In his depiction of the sea hare Colonna made his own images, yet repeated Rondelet’s standard of depicting the third species from the top and bottom. However, rather than display this specimen with the other species of sea hares, Colonna situates it next to a new “marine worm” called the Pudendum Regale Piscatorum, colloquially known to Neapolitan fishermen as Cazzo Reale – the royal cock. The sea hare itself is certainly the same animal as that pictured by Rondelet, yet with an exaggerated rendering of the mollusk’s body that - considering its placement next to the cazzo reale - appears to go out of its way to associate the animal with the male organ. Indeed, while he claims to have rendered his image from life, Colonna repeats none of Rondelet’s remarks concerning the animal’s crystal-like transparency and simply adds: “of the interior we give no memorable observations.” Following the rhetorical practice of ekphrasis, Colonna’s description merely describes what viewers see in the image, nothing more.

Figure 7: Fabio Colonna’s rendition of the two sided "sea hare" displayed next to the cazzo reale, or "royal cock".

Turning back to Antonio Donati’s marine satyr produced in 1631, it is possible to see how the apothecary likely crafted together his satyr-mollusk from the descriptions and images present in the works of Gesner, Rondelet and Colonna. What is important is the creature’s complete reinvention in the Trattato, not as a species of the sea hare, but as a mythical marine satyr that naturalists and collectors would have perhaps recognized as a reference to Gesner’s dubious satyr/merman. Yet, where Gesner’s image is clearly a fantastical rendering, Donati’s depicts a recognizable mollusk specimen which appears to be the same animal described by Rondelet and Colonna, and later identified by Linnaeus as the Tethys leporina.  

While previous authors aligned the mollusk with classical sources, Donati presents the creature as a genuine novelty, offering a narrative account of  

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67 Carl von Linne, known as Linnaeus, relied upon the descriptions of Rondelet and Colonna to identify the first species of Rondelet’s sea hare as Tethys leporina in 1758. In later editions of his works he more clearly labeled the third species under the name Tethys fimbria, which conformed to Rondelet’s use of the Latin term “fimbria” – fringe – to describe the third species. See, Henry A. Pilsbry, “On the Status of the Names Aplysia and Tethys,” Proceedings of the Academy of Natural Sciences of Philadelphia, 47 (1895): 347-350.
the events of its discovery by Donati and his boat crew of apothecaries, followed by its examination and dissection by the learned poet-physicians from Padua. However, as we saw at the beginning of this chapter, this dissection ends somewhat anti-climactically for the gathering of observers at the Venetian College of Physicians who find that upon opening the mysteriously luminescent fish with the face of a man, there is actually nothing there to report.

The comedic import of this scene has perhaps diminished over the centuries, yet contemporary readers may have been reminded of similar events from Francios Rabelais’ *The Fourth Book* (1552), which describes the comical wanderings of Pantagruel and his companions through a fictional archipelago and their dissections of two monstrous beings. Riding in their small boat, the companions pass the “Sneaking Island, where Queresmeneprant reigned,” a satirical arrow aimed at the pretensions of Lenten piety. Rather than pull ashore, the crewmember Xenomanes instead offers to provide a full rhetorical anatomy of the island’s sovereign, proceeding to deliver several pages worth of increasingly incoherent analogies describing Lent’s anatomy so that by the end the audience cannot even picture the monstrous form revealed through Xenomanes’ testimony:

His navel, like a cymbal  
His groin, like a minced pie  
His member, like a slipper  
His purse, like an oil cruet  
His genitals, like a joiner’s planer  
Their erecting muscles, like a racket  
The perineum, like a flageolet  
His asshole, like a crystal looking glass

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On one level a severe skewering of fanatical piety, Rabelais’ anatomy of Queresmenprant’s monstrous body also pokes fun at the procedures of anatomical demonstrators in his day and their penchant for obtuse descriptive details that sometimes lasted for months. In the very next chapter the crew go from listening to an anatomy delivered, to performing a dissection on an enormous sea creature encountered near the Wild Island. The creature, a “physeter, or whirlpool,” invokes the image of the ancient monster Charybdis, and is finally killed by Pantagruel in a sea battle. The boat’s crew then “towed the physeter ashore on the neighboring shore, which happened to be the Wild Island, to make an anatomical dissection of its body and save the fat of its kidneys, which, they said, was very useful and necessary for the cure of a certain distemper, which they called Lack of Money.”

The jab, directed at the cult of academic stardom and fortune that physician-anatomists like Vesalius consciously cultivated, derives its satirical edge from Rabelais’ standard tactic of reducing all that seemed noble and pious to the popular marketplace and its economy of bodily appetites.

In the exceptionally tolerant and internationally connected Venetian marketplace for books in the early modern period, it seems impossible that a highly literate artisan like Antonio Donati would not have been familiar with Rabelais and his carnivalesque satires. Indeed, Rabelais’ own metaphorical rendering of his satires as truth-bearing medicines would certainly have resonated with apothecaries. In his opening prologue to the first book of Gargantua and Pantagruel, Rabelais alludes to Plato’s Symposium and Alcibiades’ comparison of his philosopher teacher Socrates with the so-called ‘Silenes’:

…little boxes, like those we may now see in the shops of the apothecaries, painted on the outside with wonton toyish figures, as harpies, satyrs, bridles geese, horned hares, saddled ducks, flying Goats, Thriller harts, and other such-like counterfeited pictures at discretion, to

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69 Ibid., 511.
excite people unto laughter, as Silenus himself, who was the foster-father of good Bacchus, was wont to do: but within those capricious caskets were carefully preserved and kept many rich jewels and fine drugs...with other things of great price. Just such another thing was Socrates. For to have eyed his outside, and esteemed of him by his exterior appearance, you would not have given the peel of an onion for him, so deformed he was in body and so ridiculous in gesture...always laughing, tippling, and merrily carousing to everyone, with continual jibes and jeers, the better by those means to conceal his divine knowledge. Now opening this box you would have found within a heavenly and inestimable drug, a more than human understanding, an admirable virtue, matchless learning, invincible courage, unimitable sobriety, certain contentment of mind, perfect assurance, and an incredible misregard for all that for which men commonly do so much watch, run, sail, fight, travel, toil and turmoil themselves.70

The Dutch humanist Desiderius Erasmus also took up the Sileni of Alcibiades to comment on the Christian faith, describing the Holy Scriptures as being “like the Silenus of Alcibiades, [they] conceal their real identity beneath a surface that is almost crude and laughable” while the figure of Christ is elsewhere labeled “a marvelous Sileni.”71 Erasmus’ fascination with Silenus ultimately influenced one of the leading satirical poets of the sixteenth century, Pietro Aretino, who spent most of his career in Venice.

Raymond Waddington has called attention to Aretino’s adoption of the satyr emblem on several medals, suggesting that in its marked sexuality the satyr figured Aretino’s desire to be seen, not as a courtly chameleon, but as inventive poet and rustically unvarnished truth-teller.72 In the satyr, Aretino adopted a counter-image to the rehearsed sincerity of the courtier, ultimately performing his own highly crafted sprezzatura as inspired artist whose sexuality suggested nature as the generative wellspring of his truth-bearing art.

70 Ibid., 3.


Throughout the sixteenth century, the *Sileni* continued to be a popular device for articulating the fraught relations between truth and appearances in Renaissance culture. However, it is difficult to judge the significance of Donati’s empty marine satyr which suggests many readings as possibly an allusion to Aristotle’s controversial doctrine on the soul that his physician audience would have understood; a satirical dissection of those alchemists who claimed knowledge of occult powers in nature; a winking jest at his own status as an apothecary investigator addressing himself to esteemed university philosophers; or a rehearsal of Aretino’s satyr, simultaneously dissecting the pretensions of academic courtiers while aligning his pharmacy with the unvarnished sincerity of the artist’s *studiolo*. One, or all of these readings could be simultaneously true, yet from one final important source much closer to Venice, we can appreciate how apothecaries and their shops could simultaneously figure both “sincerity” and “hypocrisy” in popular literature. The work is the *Alfabeto essemplare* (Exemplary alphabet) published by the physician and religious cleric Vincenzo Ferrini in Venice in 1616. An unusual book containing hundreds of compiled analogies alphabetically organized by subject, the *Alfabeto* offers several interesting analogies for apothecaries. The first is under the heading “Christ, to Apothecary”: “Just as the Apothecary gathers the rinds of apples tossed on the ground and cooks them in sugar to make a preserve that is worth more than ten thousand ordinary oranges, so does Christ our Redeemer gather the idiots and poor sinners who were like bark and the discarded of the World, and cooking them in the fire of tribulations with the sweetness of his divine love he makes of them such a preserve, so that one foot of an Apostle or Disciple of Christ is worth more than the witnesses of the
Kings and Emperors of the World.” As for the “Vases of Apothecaries,” Ferrini writes that just as the vases found in pharmacies are written with names of ingredients said to heal, but in truth contain deadly substances: “So too do the Hypocrites who arrive with credentials, shows, words, and the appearances of virtue have souls full of malignity and deceits.” However, the most fascinating analogy does not concern apothecaries, but the “polipo pesce” – the color changing octopus, for “Just as the Octopus and the Chameleon often change their colors, so the sycophant (adulatore) often changes his words to the desire of the listener.”

From these circulating images of marine mollusks, apothecary jars, and satyrs in medical, natural historical and satirical literature we get a clear sense of the sources that lent themselves to Antonio Donati’s visual and verbal construction of the marine satyr as an emblematic commentary on truth and appearances; philosophical wisdom and vainglorious rhetoric; scientific knowledge and commercial packaging. We may assume then, that educated readers of the Trattato would have understood the terms of this “serious joke” which could only enhance the status of the Trattato’s authors as men fully capable of discerning substance from artifice. As Francis Bacon put it in his essay, “Of Seeming Wise,” regarding the pretensions of wisdom among certain men of his time: “It is a ridiculous thing, and fit for a satire to persons of judgment, to see what shifts these formalists have…” Moreover, to decipher the truth of men, Bacon proposes observing them outside of their accustomed settings and states – in private, in passion, and “in a

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73 Vincenzo Ferrini, *Alfabeto esemplare diviso in tre parti* (Venice, 1616), 40.
74 Ibid., 74, 5.
75 Francis Bacon, *The Essays of Francis Bacon* (Houghton Mifflin, 1908), 79-81.
new case or experiment, for there custom leaveth him.” Thus, by means of imitating the affects of men, satire placed subjects in new observational and experimental settings to render more clearly the interior truth of their nature invisible to the naked eye. In Bacon’s moral writings, at least, the poetic imitations of satire are proposed as one useful method of dissecting truth. In performing their own satirical play with the marine satyr, Antonio Donati and his apothecary collaborators invite “persons of judgement” to evaluate their own humble motives for producing their medical natural history of the Venetian Lido.

In the concluding section we shall see how poetic imitation also emerged as an important concern for philosophers and anatomists at Padua who grappled with Aristotle’s controversial doctrine on the mortality of the soul with the death of material bodies. At the center of the debate was the influential philosopher Cesare Cremonini, most famous for his defense of Aristotle against his colleague Galileo Galilei. Cremonini’s poetic satyr fables suggest a further set of literary sources for Donati’s Trattato that I will first explore before turning to the anatomist Johann Vesling who conducted the dissection on the marine satyr. Vesling’s thoughts on the experimental spaces of anatomy and botany surprisingly suggest the influence of the French physician Joseph Du Chesne whose poetic and chemical works popularized hypothetical experiments to artificially regenerate plants from decayed matter. In Venice, Du Chesne’s texts also exerted considerable influence upon the apothecary trade which quickly embraced new chemical remedies, particularly for producing botanical salt extracts that can be found advertised in Donati’s Trattato de’ semplici. Hence, along with the messages of collaborative investigation and the cultivation of humility in the face of nature, the

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76 Ibid., 76.
Trattato also develops a promotional rhetoric for the utility of new technical procedures for extracting and preserving nature’s medicinal virtues in proprietary remedies that readers could find available in the pharmacies of its apothecary authors.

4.4 Transmutational Poetics: Experiment and Chemical Remedies

In his separate treatises on Rhetoric and Poetics, Aristotle had distinguished between discourse that relies on mimesis (tragedy and comedy), and non-mimetic discourse (oratory, dialectic, history, science, and philosophy). However, as Cynthia Klestinec has noted, scholars in Padua and Venice towards the close of the sixteenth century increasingly played with these divisions and “blurred the boundary between logical disputation and dramatic narrativisation, between the subject of Aristotle’s Rhetoric and that of his Poetics.”

In the newly constructed anatomical theater at Padua, public demonstrations were routinely conducted against a backdrop of processions and music, bearing witness to the event as both dramatic theater and medical demonstration. In his writings on generation, Fabricius, the great promoter of Aristotelian anatomy at Padua, even promised to deal with “the first beginnings of human life” in his anatomies, asking his readers if one “could invent a tale more magnificent, more mysterious, or more wonderful than this?”

Among Europe’s universities, Padua was also the most important center of philosophical debate on Aristotel’s De Anima, which some Paduan professors held to be a clear articulation of the philosopher’s rejection of the immortality of the soul. The

77 Cynthia Klestinec, Theaters of Anatomy, 108.

78 Quoted from the translation of Klestinec, Theaters, 109.
argument was made famous by the Paduan professor Pietro Pomponazzi (1462-1525) in the early sixteenth century in his *De immortalitate animae* (On the Immortality of the Soul, 1516). The ensuing controversy led to Pomponazzi’s assertion in later writings that a thinker may hold simultaneously to the separate truths of theology and philosophy, often referred to as the “double-truth”. By the close of the sixteenth-century the issue arose again at Padua with the arrival of Cesare Cremonini, who became a firm adversary of the powerful Jesuit influence over education in Venice. On multiple occasions in the early seventeenth century, Cremonini was hauled before the Inquisition and protected by his Venetian connections each time. Though highly critical of astrology and occult philosophies in medicine, Cremonini also famously disregarded the conclusions of his friend and colleague at Padua, Galileo Galilei, in a staunch defense of Aristotle’s cosmology. Most important, however, is Cremonini’s traditional identification with currents of religious skepticism and libertine thought in early modern Italy. Most recently, Elena Bergonzi has returned to the debated issue of Cremonini’s possible atheism by setting aside his works on medicine and natural philosophy to address his mature works of poetry, drama and satire.

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80 For the trials against Cremonini, see Thomas F. Mayer, *The Roman Inquisition on the Stage of Italy, 1590-1640* (University of Pennsylvania, 2013), 115-152.


publications suggest Cremonini continually searched for ways to reconcile philosophy with Christian doctrines on the soul. For our purposes, these works are also significant for the steady stream of satyr imagery they employ to explore themes of education, natural philosophy, and poetic invention. Moreover, as vernacular publications they would have been widely accessible to Venetian readers and middling groups that likely did not engage often with weighty Latin tomes. In Cremonini’s literary output we are thus presented with another set of likely sources for Antonio Donati’s representation of his investigative excursions into the Venetian lagoon.

Two works of particular relevance are *Il Nascimento di Venezia* (The Birth of Venice, 1617) and the *Ritorno di Damone* (Return of Damone, 1622). The latter is one of a pair of woodland fables (*favole sylvestre*) that Cremonini composed in which satyr figures, traditionally identified with natural impulses and sexual desire, instead figure strongly as instructors and natural philosophers. A central character in the *Return of Damone* then, is the wise elder Silvano, who dedicates himself to the study of nature. Though not explicitly represented as a satyr, Silvano (whose name invokes the woodlands where satyrs live) is positioned as the teacher of two youthful satyrs, Cromi and Laurente. In the scene of his oration to the two students, Silvano narrates the creation of the world and original sin in a manner consistent with the story of Genesis. The central lesson Silvano offers is that through the study of plants, animals, and insects, natural investigators could contemplate “the divinity of Nature”. This strategy linking satyr figures with natural investigators takes on an expanded form in the panegyric poem, *The Birth of Venice*. Cremonini introduces his work as a discourse on the relationship between philosophy and poetry, asking if “Euripides nor Sophocles were not
Philosophers? Nor is Homer lacking in Philosophy, the authority of which Aristotle often praised.”

Modeled on Virgil’s Aeneid, Cremonini’s poem describes the mythic founding of Venice by the Trojan Naulo and the people of Eneti from the Black Sea region who were said to have founded Padua. In Cremonini’s account, however, Naulo is told in a dream that he should not stop at Padua but continue on to the marshes of the Adriatic and found a new city. In the land where Venice would later be founded, the satyr Silenus (mythical father and teacher of the satyrs) and his satyr companions have been taken prisoner while searching for Bacchus by the monstrous sea divinities who reside there, including Triton, Scylla, Charybdis, and Phorcys. Upon arriving at the site, Naulo and his companions kill a sacred tuna and incite the wrath of Neptune. However, when he sees the belt that Naulo has used to hold the fish, Neptune recognizes it as having belonged to the young and beautiful Amimone, Naulo’s mother and Neptune’s lover. It thus becomes clear that Naulo is Neptune’s son and the play concludes with the sea God bestowing the lagoon to Naulo to found his city. Leading up to this conclusion, however, is the scene of war between Bacchus and the marine monsters who strive to destroy the licentious God’s pavilion constructed on the beach. Bacchus envelops their armada in a cloud of monstrous larvae, inciting the monster divinities to seek the help of Neptune. However, Neptune has already recognized his son’s claim to the lagoon and appoints Bacchus and the goddess of agriculture, Ceres, to watch over Venice for the centuries to

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come. With this pronouncement, Silenus and his satyrs are also released from their imprisonment at the hands of the hybrid monster divinities.\textsuperscript{84}

Filled with classical allusions, especially to Euripides’ *The Cyclops*, the only Greek satyr play to survive the centuries, Cremonini’s *Birth of Venice* invents a story of Venice’s origins that depicts the victory of Bacchus and his followers over the uncontained power of the sea figured in the monstrous deities who held sway over the lagoon. In placing Venice under the protection of Bacchus and Ceres, Cremonini’s poem appears to highlight the themes of fertility and sensual pleasure at the heart of Venice’s founding. Yet, it is significant that Ceres, while certainly a fertility goddess, was also the patron of the plebian laws in Republican Rome. These laws, known as the *Lex sacrata*, were established in the fifth century B.C. to protect the sacred authority of the plebian tribunes and were later placed in the temple devoted to Ceres in Rome. Ceres was thus an appropriate figure to re-invoke Venice’s cultivated self-image as a Republic founded upon a perfect *ricetto* of its public laws guaranteeing justice to its inhabitants. Concerning Bacchus, a detail of particular importance in Cremonini’s poem is the fertility God’s arsenal of monstrous “vermi” thrown against the armada of the monster deity Phorcys. This can be read as a clear allusion to the appearance of lower order *insetti* – including worms and plants - in Greek philosophical accounts of the origins of mankind. For Aristotle, such life forms were products of spontaneous generation as evidenced by their emergence from corpses and putrefying substances. Democritus even surmised that the human species had in fact evolved from worms generated in a primordial soup of water and mud. For this, early Christian commentators such as Lactantius, chastised the

\textsuperscript{84} Much of this is analyzed in Bergonzi, see note 82, above.
philosopher’s notion that “human beings were generated from the earth like worms, without any design or creator.” Yet according to Aristotle, Plato went further in suggesting that “plants have sensation and desire” while Democritus, Anaxagoras and Empedocles even “declared that they possessed intellect and intelligence.” As Aristotle’s De Anima taught that the senses comprised the soul-in-action (and thus without this material matrix the soul could not achieve conscious awareness), Paduan philosophers like Cremonini took significant interest in pursuing poetic discourse as a kind of intervention into the key issues of early seventeenth-century natural philosophy.

These concerns were further taken up by Johan Vesling who received his first position at Padua shortly after Cremonini’s death in 1631. Vesling cast a long shadow at Padua as the renowned professor of anatomy and director of the public botanical garden there between 1632 and 1649. Though he wrote extensively on botanical topics and travelled to Egypt and the Near East to examine specimens, the German-born Vesling is best known for his anatomical textbook, the Syntagma anatomicum, publicis dissectionibus, in auditorium usum, diligenter aptatum (1641), which achieved considerable success in numerous translations across Europe. The text reveals Vesling’s commitment to the tradition of Aristotelian anatomy at Padua initially advanced by Fabricius Aquapendente and carried on by his pupil William Harvey. Of particular concern for my discussion here, however, is Vesling’s participation in the dialogue between poetics and philosophy developed at Padua. Like his famed predecessor Fabricius, whose program of philosophical anatomy Vesling adapted, Vesling also

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85 C.C.W. Taylor, ed. The Atomists, Leucippus and Democritus: Fragments: A text and translation with a commentary (University of Toronto Press, 2010), 133.

86 Ibid., 133.
fashioned a strong penchant for poetic analogy in his discussions of botany and anatomy. In 1638, upon receiving a new position as prefect of the botanical garden to add to his position as demonstrator in the anatomical theater, Vesling composed an extended oration – the *Plantarum, et Humane Naturae, Affinitas* (On the Affinity of Plants and Human Nature, 1638) - that represented the two theaters as connected poles with the botanical garden representing generation, life and light; while the anatomical theater was a space for reflection on death, decay, and mortality. Claiming to derive a further analogy from Homer, Vesling suggests that plants and men bear striking similarities, for just as philosophers hold that man’s intellect is divinely given, so too did the ancients believe that the sap of plants derived directly from the Gods. By the same token, just as the forms of plants could be seen arising from their own ashes, students should rejoice in the notion that the dead will also obtain an eternal presence after their material bodies decay.\(^87\)

Vesling’s assertion regarding the resurrection of plants from their ashes was most likely inspired by the poetic and chemical writings of the French physician Joseph Du Chesne (1544-1609), often cited as Quercetanus.\(^88\) Du Chesne was among the early supporters of the chemical ideas and remedies proposed by the radical Swiss physician Paracelsus discussed in greater detail in the following chapter. Paracelsus was largely responsible for promoting the idea that once living plants could be regenerated by heating

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\(^88\) The most extensive treatment of Du Chesne in English is by Allen Debus, *The French Paracelsians: The Chemical Challenge to Medical and Scientific Tradition in Early Modern France* (Cambridge University Press, 2002). Du Chesne’s *Ad veritatem hermeticae medicinae ex Hippocratis* in 1604 made his earliest outright appeal to chemical medicine. In 1612 an Italian translation of his *Pharmacopeia dogmaticorum* (1607) was translated into Italian by the Mantuan physician Giacomo Ferrari in 1619 as *Le riechezze della riformata Farmacopea del Sig. G. Quercetano* (Venice, 1619).
their ashes in a hermetically sealed glass vial, a process known as *palingenesis*. Though he himself had never seen it done, Paracelsus went so far as to suggest that other living beings, including men and women, could be artificially generated to produce what he called the *homunculi*. These ideas invited accusations of necromancy and surely contributed to the Catholic Church’s policy forbidding the publication of Paracelsus’ writings in Italy. Putting aside the issue of the *humonculus*, Du Chesne, in his *Le grand miroir du monde* (Great Mirror of the World, 1593), offered a poetic account of the experiment on the reproduction of plant images from their salt-ash:

> Many the witnesses have I still full of life  
> Who, of nettle upon nettle, have observed their shapes  
> Within the salty lye which from their ashes flowed,  
> Lyes which, one day, at the bottom being set  
> Into a crystal shape thus to resemble  
> Root, leaf, stem and flower of that plant,  
> That the eye, all-seeing, takes cognizance at once,  
> The tongue gives it name, only the hand  
> Is deceiving when picking it up, not feeling  
> Those needlessmarting when piercing the tender skin.  
> I am not the contriver of this: no, de Luynes, thou it is  
> Who found the secret when lodging by my side.  
> The secret of which tis known that  
> Although the body shall die,  
> In its ashes make the images their resting place\(^\text{89}\)

In his later *Ad veritatem hermeticae medicinae* (The Truth of Hermetical Medicine, 1605), Du Chesne presented a narrative account of the experiment he claimed to have witnessed performed by an unnamed Krakow physician:

> He…knew to make ashes appear in such an elegant and philosophical way, made out all parts of a plant, and to conserve their spirits, the producers of all their faculties, in such a knowledgeable way, that he had more than thirty such plants that were artfully prepared from ashes, and preserved them in various hermetically sealed glass vessels…From the bottom of such a vessel, when brought to the fire of a lamp and heated a bit, the most thin and ungraspable ashes emitted out of themselves an obvious image of the rose, which slowly began to grow, live, and to express the entire form of the stem and the leaves, then the

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\(^{89}\) Quoted from the translation of Francois Secret, “Palingenesis, Alchemy and Metempsychosis in Renaissance Medicine,” *Ambix* 26, n. 2 (1979): 81. For Du Chesne’s work, see: J. Du Chesne, *Le grand miroir du monde* (Lyon, 1593), 89.
The possibility that one could experimentally demonstrate that the living images of plants lay dormant in their decayed ashes clearly held important implications for natural philosophers interested in the resurrection of the soul upon the death of the body. Throughout the seventeenth century palingenesis was discussed by leading figures such as Gottfreid Leibniz, Daniel Sennert and the Italian Jesuit polymath, Athanasius Kircher. For the chemical physician Du Chesne, the experiment illustrated that the salt-ashes of plants contained within them the essential virtues and potencies that rendered them highly valuable medicines in the pharmacy.

Du Chesne’s promotion of the new chemical medicine as an extension of the authoritative foundations of Greek rational medicine found a receptive audience in Venice where his works were republished several times over the seventeenth century. The initial Italian translation was produced by the Mantuan physician Giacomo Ferrari in 1619, who introduced his edition with an “Apology to all the Apothecaries of Italy” for the presence of sometimes difficult terms and novelties: “but you know studious apothecaries that with industry, with labors, and with long practice you will become masters, because labor guards against all wickedness.”


apothecary Giovanni Maria Ferro at the Sanità appended his own translations of several
of Du Chesne’s chemical recipes. In the Italian translation of Du Chesne, apothecaries
found a wealth of practical instruction as well as a clear definition of the “Arte Chimica”
as the teaching “of the compositions, separations, preparations, alterations, and finally the
exaltation of all mixed bodies.” The practice of distilling, moreover, “gives perfection to
all transmutations. By transmutations we intend when a thing loses its form and is altered
so that it no longer resembles its first form and natural substance, but changes to a new
form and takes another essence, another color, and finally coverts to another nature and
acquires properties diverse from the first…” The impact of these ideas on the
apothecary trade in Venice can be discerned from their publications in the early
seventeenth century. In Alberto Stecchini’s 1627 updated edition of Georg Melich’s
Avvertimenti, the apothecary at the Ostrich defined the office of the Apothecary as having
“the cognition of the nature of things” and the special operations of performing “coctions,
preparations, riddling (crivellazione), dissolutions, softening, hardening, liquefaction,
calcifying, cooling, drying, humidifying, infusing, extracting of juices, distillations,
defrothing, fracturing, sealing…” and so on. These operations would later become
distinct chapters in the Theatro Farmaceutico (1667) of Stecchini’s successor at the
Ostrich, Antonio de Sgobbis discussed in the following chapter.

Antonio Donati’s natural history of the Lido also reveals his commitments to the
new arts of chemical “transmutations”. In his section on the Seriphium marinum (sea

92 “Spagyric Preparations of minerals, animals, & vegetables and their use, with a list of medicines
pertaining to surgery.”

93 Du Chesne, Le ricchezze (1655), 6.
wormwood), for example, Donati offers no image or description, and instead begins immediately with his recipe for producing a medicinal salt extraction of the plant:

Make the salt of this plant in the same way as they make them from other similar sorts of plants (like the Ruta Capraria & others) and because many Ecc. Physicians have put such salts in use it seems to us a thing of no little benefit to place here the method of preparing the said salt, which will be more intelligible and easier than those described by others. Therefore, the composer will take that plant from which he desires to extract the salt and pestle and extract from it the water by using the distillery (lambico), and then he will put it in an earthen vase well sealed and put in the furnace to calcify, leaving in the end only the material that has been reduced in ash (and when it is white it will be better and produce more salt) then he will take the pulverization of the plant and for every eight libbre (approx. 8 lbs.) of the remains he will add forty libbre (approx. 40 lbs.) of water distilled from the plant, and boil together until it is reduced by half, then leave for three days and skim from it the clear water, by inclination, and reduce over a slow fire; and in the end will remain the salt. We use in our Farmacopea to put two dramme (approx. 2.5 tbsp.) of salt for every one libbra (36 ounces) of water distilled from the plant.94

Immediately following this recipe Donati also introduces his method of preparing a more costly remedy: the “Theriac Salt of Galen”. In his Theriaca ad Pisonem Galen had discussed his method for preparing a similar boiled “salt” made of viper flesh and herbs diluted in water. The remedy was widely popularized by Du Chesne and lent credibility to the promotion of salt extractions as more efficacious and powerful remedies. As we shall see in the following chapter, Venice’s apothecaries developed a lucrative market for this remedy which they adapted and modified using more complex technical procedures. Already in the early decades of the seventeenth century, however, we can see such remedies being marketed in Antonio Donati’s natural history of Venice. Guiding these introductions was a developing sense of the apothecary’s special expertise in effecting useful transformations of matter in order to better serve the interests of public health in

94 Trattato, 97. Other advertised recipes made from plants found on the Lido include “Balsamo Elyxi Farmaco Nostro” made from the Bubonium plant (24-6); an electuary made of the “Cucumer Agrestis” (31-2); the “Vessicante” made from Clematis Maritima Repens (34-5); a powerful remedy for “exciting coitus” made from the Eringium Marinum (41-2); and “la nostra aqua Cordiale per febre maligna” made from the Lapatinium plant composed with gold, silver, Theriac, and the Bezoar Stone (59). The plant known as “Kali Magnum” Donati tells us is the source of a salt known as “alkali” (54).
Venice. Looking back to the color changing marine satyr, we can perhaps find no more appropriate natural emblem of this special apothecary skill mirrored in nature’s capacity for artful imitation and transmutational displays.

**Conclusion**

Through the lens of Antonio Donati’s little-known natural history of Venice we can trace some of the values and practices that shaped apothecary investigations of nature during a period of significant debate in Europe on the proper procedures and goals of the New Sciences. Historians have traditionally looked to Francis Bacon’s works as being among the first to fully articulate a new experimental philosophy founded upon the ideals of collaboration, experimental utility, and open publicity aimed at servicing the practical needs of the community. In Italy, Bacon’s earlier writings on civic virtues and moral precepts found a receptive audience in Venice, while his more philosophical writings on experimental method did not fully arrive there until the latter half of the century. Elsewhere in Italy, experimental investigations flourished well before the formation of the Royal Society in the career of Galileo Galilei during his stays in Padua and Florence, and in the famed Accademia del Cimento under the Medici Grand Dukes. As numerous studies have demonstrated, princely courts clearly nourished the careers of Italy’s two leading experimental practitioners, Galileo and Francesco Redi, whose works were read enthusiastically by founding members of public scientific institutions in England and France.

However, the evidence presented in this chapter, also suggests that outside of these courtly settings Venice’s apothecary guildsmen and shopkeepers also cultivated
many of the values and practices typically associated with the new public institutions of science in northern Europe. In the absence of a princely court, the apothecaries in Venice’s urban marketplace drew upon the resources of the Republic’s thriving print market and prestigious university to fashion the Lido and their pharmacies in Venice as public patrimonies and collection sites for both local and global medicinal materials. The paper trail left behind by these “shopkeeper naturalists” in the early seventeenth century is admittedly quite small. However, rich sources like the Trattato de’ semplici stand as testimony to the culture of intellectual collaboration that could exist among commercial tradesmen often represented as competing nodes in a “medical marketplace”.

Commercial medicinal retailing, in other words, could serve as an inducement in the seventeenth century to many of the community practices associated with the values, practices and organization of “modern science”. In the concluding chapter of this study, we shall see how apothecaries built on these foundations to perform important roles in shaping the introduction of chemical remedies in seventeenth-century Venice, developing sophisticated workshop laboratories that were instrumental in placing chemical medicine at the center of medical debates and reforms in the latter seventeenth century. By the turn of the eighteenth century, the material culture and practices developed in these spaces became a matter of important discussions among university scholars at Padua who looked to the Venetian marketplace as a ready source of invaluable expertise to institute a new school of Medicina Chimica Esperimentale in the Republic of Venice.
5.1 Introduction: Apothecaries and Alchemical Marketing

On March 29, 1624, the apothecary Ghirardo Ghiradi at the sign of the Lemon in the Venetian mainland town of Salò, approached the Senate of the Republic of Venice with a petition to obtain an exclusive patent right for his “quintessence of mechoacan”. After “long vigilance and indefatigable labours” Ghirardi claimed to have isolated the essential medicinal virtues of the purgative root only recently imported to Italy from the New World, the land “of silver and gold”. The drug was said to work miraculous effects for a variety of ailments, including stomach pains, arthritis, gout, malign and pestilential fevers, headaches, stomach worms and the venereal contagion syphilis (mal francese) believed to have originated in the Americas. What seems to have pushed Ghiradi to seek a protective patent were the numerous other retailers who claimed his “invention” as their own and thus profited off of his labors. In their own investigations the Venetian magistrates gathered information from the protomedico in Salò as well as the resident

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1 ASV, Senato Terra, reg. 94, c. 51v. Ghirardi initially brought his case to the Provveditori di Comun where it was remitted to the Provveditori alla Sanita which approved the remedy as Ghiradi’s invention. While the Sanita could issue licenses to make and sell remedies it could not issue a personal patent on a specific invention. This authority was reserved to the Senate alone. Over the course of the early modern period the Senate issued only twenty-two patents for pharmaceutical inventions, while the Sanita and other civic authorities heard hundreds of cases for licenses. See, R. Berveglieri, Tutela e brevettazione (2006).
Venetian authority in Brescia, Andrea Dolfin. Both attested to Ghiradi’s reputation as “most expert in his profession and very competent in surgery as well as medicine [fisica]”. His remedy, moreover, had been approved by “more physicians and many others examined; as well as infinite others who have made experience of it, and it was found miraculous in all of the infirmities described…” At the end of his case, Ghiradi’s request for a fifty year patent was reduced to twenty, with a fine of three hundred ducats imposed on any counterfeiters of his invention throughout Venetian dominions.

Though not a member of the Venetian College of Apothecaries, Ghiradi’s petition nevertheless offers a striking example of some of the ways Veneto apothecaries made use of alchemical traditions to market new drugs in the early seventeenth century. Indeed, the notion of the quintessence, or “fifth essence” traced its roots to the learned alchemical literature of late medieval Europe, particularly John of Rupecissa’s De quinta essentia, which described the quintessence as a distilled medicinal elixir – in Rupecissa’s case, pure alcohol (aqua ardens). Strongly inflected with religious and philosophical concerns, the literature of late medieval alchemy described such essences as materializations of the incorruptible celestial realm within the earthly order of growth and decay. The extractions took place in a closed vessel where the application of heat produced a continuous circulation (ascensio et descensio). Different objects derived from the plant, animal and mineral kingdoms were of particular value as sources of this heavenly principle capable of preserving bodies. Important minerals were mercury, antimony, vitriol and gold. As gold merely entered a fluid state and did not separate or burn when subjected to heat, it was considered to have strong affiliations with the celestial realm and

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2 Ibid., “da piu medici chirughichi et altri molti essaminati; come da infiniti altri che ne hanno fatta l’esperienza, è stato ritrovato mirabile in tutte le infermita descritte…”
with the life-regenerating rays of the sun. The use of potable gold as a highly prized medicine can thus be found in a number of alchemical texts. In Rupicsessa’s writings on the *quintessence*, gold circulated in pure alcohol offered a powerful preservative.³

From this perspective we can appreciate Ghirardi’s linking of this tradition with the exotic *mechoacan* root imported from the “land of gold and silver” across the Atlantic. The plant was already known in the medical community as an exceptionally powerful botanical purgative, and thus accorded well with prevailing understandings of illness as an excess of morbid humors requiring forceful expulsion.⁴ Over the previous century American gold and silver had flowed into Europe through Spain, supplying Venetian gold and silversmiths with abundant material to further their craft. At the same time, Venetian readers had also been treated to a wealth of printed reports on the New World that described the continent as a fecund paradise where plants known in the Old World multiplied into a vast panorama of new species. This was not limited to American nature, but also included the continent’s inhabitants whose libertine sexuality was a matter of commentary in numerous accounts. As Aristotle and the alchemists had further taught that minerals were “generated” from the union of opposing principles in a like manner as plants and animals, the enormous quantities of gold and silver found in the Americas could thus easily symbolize the regenerative power of American nature as a

³ For traditions on potable gold and Rupissessa’s pursuit of the remedy, see Leah DeVun, *Prophecy, Alchemy, and the End of Time: John of Rupescissa in the Late Middle Ages* (Columbia University Press, 2013), 75-78.

⁴ The “Flor de Mechoacan” had already appeared in the editions of the Spanish physician Nicolas Monardes’ *Historia medicinal* in the early 1570’s. By the early seventeenth century it began to appear regularly in Italian pharmaceutical books: *La farmacopea o antidotario dell’eccellentissimo collegio de’ signori medici di Bergamo* (Brescia, 1628), 279.
source not just of commercial wealth, but also of life preserving medicines. Hence, in linking alchemical traditions with widely circulating popular images of American nature, the apothecary Ghirardi can be credited for articulating a persuasive marketing strategy that earned him a personal patent to manufacture and sell his “essence of mechoacan” in Venetian territories.

Ghirardi’s chemical reinvention of an American commodity was not an isolated episode in the Republic of Venice, which witnessed – as did other parts of Western Europe - the rapid integration of both new remedies imported from abroad, and others chemically manufactured locally during the seventeenth century. While the sixteenth-century medical humanists invested their energies in recovering the materials of the Greek pharmacy, medical practitioners in the seventeenth century developed a more explicit interest in exotic medicinal simples and novel chemical drugs. In recent years the historical dialogue between alchemical traditions of experimentation and the practices of the artisan crafts has emerged as an important subject of debate in the history of early modern science. Long dismissed as a colorful misstep on the path to modern analytic

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7 The recent exchange between William Newman and Ursula Klein provides a good introduction into the current state of the field: Ursula Klein, “Styles of experimentation and alchemical matter theory in the scientific revolution,” *Metascience* 16, n. 2 (2007): 247-256; and William R. Newman, “Alchemical atoms or artisanal building blocks? A response to Klein,” *Perspectives on Science* 17, n. 2 (2009): 212-231. For Klein the artisan workshops of metal workers and pharmacists are the best places to look for the origins of analytic chemistry in the eighteenth century. Newman contends that this approach neglects the intellectual traditions of alchemy inherited from the late middle ages, and traces a line of intellectual influence from the Arab alchemist Geber through Daniel Sennert and on to Robert Boyle. For Klein, however, the revolutionary movers who first came up with tables of chemical affinities and reversible operations grounded in notions of irreducible particles were not philosophers, but the late seventeenth-century French apothecaries Nicolas Lemery and Ettien Geoffrey. See, Ursula Klein, “The chemical workshop tradition
chemistry, alchemy has been recast by William Newman and Lawrence Principe as an important source of modern chemical practices and concepts that continued to engage scientists such as Robert Boyle and Isaac Newton.\(^8\) According to Newman, the roots of the corpuscular theory of matter in Boyle’s writings are in fact traceable to the Medieval Latin renderings of the Arab alchemist Geber, whose ideas later reached Boyle through the work of the German chemist Daniel Sennert.\(^9\) Ursula Klein, on the other hand, has insisted upon the primacy of artisan workshop traditions developed during the early modern period that informed the practical contents of influential seventeenth-century chemical “textbooks” composed by the French apothecaries Nicolas Lemery and Etienne Geoffrey. In their works, which were highly critical of alchemy, Klein contends that we can see the development of the important concepts of chemical compounds and affinities worked out not through philosophical reflection, but continuous practical applications made in workshop laboratories.\(^10\)

A third perspective, occupying a position somewhere between the poles staked out by Newman and Klein, can be found in the works of William Eamon, Pamela Smith, and Tara Nummedal on alchemical practitioners in the sixteenth and seventeenth

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centuries who promoted the practical and commercial benefits of their art.\textsuperscript{11} While steering clear of the contentious debates on the origins of “modern” chemical concepts, these authors have nevertheless shed light on the broad diffusion of alchemical ideas and practices outside of the universities in vernacular “how to” books that largely downplayed the more esoteric philosophical elements of learned alchemy. Eamon notes that as a result of the editorial practices of printers who directed their books of secrets towards broad audiences, “philosophical traditions such as alchemy were given a new relevance by being placed within the reach of general readers.”\textsuperscript{12} Hence, the growing commercialization of knowledge in the early modern period wrought by the print marketplace for cheap books helped dissolve traditional boundaries between philosophical and craft traditions.

While recent scholarship has done much to improve our understanding of “vernacular science” practiced in early modern craft workshops and among the numerous itinerant alchemists and distillers who traversed Europe’s cities and courts, tracing the consequences of their manufacturing and marketing activities for important seventeenth-century developments in the classification and theory of matter remains an elusive project.\textsuperscript{13} In this concluding chapter I argue that a closer analysis of the development of laboratory practices in the guild-regulated Venetian apothecary trade during the


\textsuperscript{12} William Eamon, \textit{Secrets of Nature}, 126.

\textsuperscript{13} The most explicit attempt to link the literature of medicinal marketing and theoretical developments is by Harold Cook, “Markets and cultures: medical specifics and the reconfiguration of the body in early modern Europe,” \textit{Transactions of the Royal Historical Society} 21 (2011): 123-145.
seventeenth century presents a unique opportunity to trace direct lines of influence from the public marketplace of experimented medicines in Venice to the research of several important natural philosophers and chemists in latter seventeenth-century Europe, including Franciscus Sylvius (1614-1672), Otto Tachenius (1610-1680), Robert Boyle (1627-1691), and Nicolas Lemery (1645-1715). The central thread linking these figures was the important debate on volatile salts and Otto Tachenius’ acid-alkali theory of matter. Though born in Germany and trained there as an apothecary, Tachenius spent most of his life as a resident in Venice and published tracts on the extraction of volatile salts from viper flesh which he used to develop his broader acid-alkali theory in his influential *Hippocrates chimicus* (Chemical Hippocrates, 1666). His work exhibits an exceptional familiarity with the arts of apothecaries, perfumers, and metal workers that he would have easily encountered in Venetian workshops. His own commercial remedy, *sal viperine*, sometimes known in Venice as “theriac salt” was already marketed in 1655 as a proprietary invention of the owner of the Ostrich pharmacy, Antonio de Sgobbis, who also published his own nine-hundred page encyclopedia of chemical remedies in 1667, the *Universal Pharmaceutical Theater*. Both men appear to share a particular regard for the figure of Hippocrates as a founder of chemical medicine, as well as a conviction that there are no new ideas in medicine, only new applications to matter to actualize the medical principles outlined by ancient authorities. The 1677 English translation of Tachenius’ work was carefully read and reputed by Robert Boyle, one of the key founders of the modern discipline of chemistry. However, Boyle’s criticisms did little to quell support for Tachenius’ theory which was taken up by several supporters, most notably the influential French pharmacist Nicolas Lemery. Lemery’s mechanical
explanation of acid-alkali reactions as stemming from the pointed shape of acid particles, and the receiving pores of alkalis, was vigorously accepted by physicians at the University of Padua around the turn of the eighteenth century who pursued translations of Lemery’s practical textbook, the *Cours de chymie* (Course in Chemistry, 1675). As several scholars have noted, Lemery’s polemic against alchemy - defined as the pursuit of metallic transmutation – was a key source of the Enlightenment banishment from chemical discourse of the long-used term *alchimia*; restrictively defined in the eighteenth century as the fruitless effort to find the “philosopher’s stone” for transforming base metals into gold.¹⁴

While Lemery’s mechanical explanation was eventually discarded by Newtonian chemists who offered explanations in terms of quantifiable forces, the important acid-alkali debate largely prompted by Tachenius’ publications on the viper salt and Hippocrates’ “chemical philosophy” in the 1660’s, was a crucial episode leading to the full acceptance of iatrochemistry and laboratory practice not merely as adjunct parts of medicine, but as the fundamental ground of medical investigation and practice among academic physicians. In Padua, Vallisneri, who was a member of the London Royal Society, became an instrumental advocate for the establishment of a university laboratory to serve the first school of “Experimental Chemical Medicine” in the university. His first choice to serve as public demonstrator was the Prior of the Venetian College of Apothecaries, Gian Girolamo Zannichelli, a native of Modena who ran a successful laboratory-shop at the Golden Hercules in Santa Fosca. A man of broad learning who published texts in Latin, Zannichelli established his wealth with a patented remedy

¹⁴ See the introduction by Lawrence Principe to *New Narratives in Eighteenth-Century Chemistry* (2007), cit. Lemery is discussed in greater detail later in this chapter.
known as *pillole di piovano*, and engaged in a wide range of scientific investigations on chemical medicine, fossils, geology and botany. Zannichelli also maintained a broad correspondence with university figures in Europe and Italy. Archival records of the discussions for the new school reveal an explicit effort to translate the material culture of Venice’s commercial laboratories to the university. Owing to financial constraints, however, the new school was not founded until 1749 and a laboratory established only much later. Yet already by the turn of the eighteenth century it is clear that a number of professors at Padua understood the importance of a chemical laboratory to keep up with northern European universities. Thus, the long development of chemical practices in seventeenth-century Venetian pharmacies came to establish a model for the academic community to conceive of a space in the university where a new natural philosophy grounded in experimental practice could take place.

My discussion of the ways apothecary chemical practices in Venice conditioned some of the more important efforts to experimentally identify and theorize material substances in the late seventeenth and early eighteenth centuries is thus not restricted to the Venetian-Paduan environment, and carries us through important sites of chemical study in London and Paris before circulating back to the university at Padua. Apothecaries in Venice were also important translators and editors of French chemical texts in the seventeenth century, while the figure of Zannichelli in the early eighteenth century reveals their participation as interlocutors in the broader Republic of Letters that bound the scientific community in Europe. However, as no discussion of early modern medical chemistry can be conducted without mention of the sixteenth-century alchemist and reputed “father of iatrochemistry,” Paracelsus von Hohenheim (1493-1541), I begin
with a review of some of his influential ideas regarding the application of alchemical distilling to medical practice. As we shall see, however, Paracelsus’ violent rejection of Galen and Aristotle in his writings, which were banned in Italy, did little to diminish the authority of ancient and medieval medical writers in Italy, and may have helped reorient them as founders of iatrochemistry. At the same time, Paracelsus and other German writers on the art of distilling in the early sixteenth century had spent their formative years in Padua and Venice, and would have easily encountered both Venice’s dyers and glassmakers – who used distilling techniques – as well as the influential Neo-Platonist writings on distilling composed by the Florentine humanist, Marsilio Ficino (1433-1499). After establishing this important ground in the sixteenth century, I then turn to the urban scene of medicinal distilling in seventeenth-century Venice through the lens of the pharmacy at the sign of the Ostrich, which became Venice’s most important chemical laboratory. Finally, after considering the viper salt remedy in Venice and its connections with the broader acid-alkali debate in Europe, I conclude with Zannichelli and his famed laboratory at the Golden Hercules. Through his preserved laboratory notebooks and correspondence with various academic physicians, we can appreciate how the urban pharmacy in Venice offered reformers at Padua with a model to propose a new university laboratory so that – in the apt phrase of the professor Makop – students of nature at Padua may “go philosophizing with their hands.”

5.2 Alchemical Medicine and Distilling in Europe and Venice

The period between roughly 1550 and 1650 has long been recognized as a moment of significant controversies over the use of mineral substances as pharmaceutical
remedies. Within the learned medical community physicians debated whether substances known to be poisonous such as mercury and antimony could be made safe for internal consumption to treat diseases that traditional Galenic pharmacology appeared to have little answers for. While metallic and mineral substances could be found in ancient sources as external applications in ointments and plasters, the Greek physicians had little say about their internal use. In Galen’s pharmacology all substances were categorized by their manifest qualities of hot, cold, wet, and dry that corresponded with the elemental principles they were composed of, fire, air, water and earth. According to Galenic physiology the body’s vital functions were activated by its internally generated heat originating in the heart. An excess or lack of heat could lead the body to a state of illness observable particularly in fevers. Hence, being composed, according to Aristotle, of the generative union of mercury and sulphur, metals were far too hot and dry for the body to process normally, thus explaining their destructive effects when consumed internally.

In the early sixteenth-century, however, these fundamental principles of Galenic pharmacology were directly challenged by a Swiss physician often crowned as the father of modern chemical medicine (known as iatrochemistry in the early modern): Theophrastus Bombastus von Hohenheim, better known as Paracelsus. The son of a German physician father and Swiss mother, Paracelsus received his medical degree from the University of Ferrara before following the path tread by many medical practitioners in his day wandering between cities and court patrons. During his time in Italy it is likely that Paracelsus encountered the occult interests of the court humanist Marsilio Ficino and his Neo-Platonist teachings. Ficino is notable among fifteenth-century humanists for taking an interest in alchemical literature, a subject largely frowned upon by other Italian
humanists. Ficino produced an important translation in 1471 of a collection of Greek documents on alchemy known as the “Corpus Hermeticum”. Supposedly written by an ancient Egyptian *magi* known as Hermes Trismegistus (an invention of the Renaissance), the Hermetic Corpus exerted significant influence upon Renaissance alchemy and writings on natural magic in the sixteenth century. For Paracelsus the alchemical teachings of Hermes remained a constant point of reference in his reform of medicine.

We can get a sense of the importance of alchemy to Paracelsus as a necessary preparation for the practice of medicine from his book “Paragranum” written in 1530:

> Now to proceed on to the third foundation on which medicine rests, it is alchemy. If the physician is not practiced and experienced in this [art], which is the highest and greatest that there is, then his entire art is in vain. For nature is so subtle and sensitive in its [substances] that it does not lend itself to use without great art. For nature brings nothing to light that is complete as it stands. Rather, the human being must perfect its [substances]. This completion is called *alchimia*. For the alchemist is the baker in the baking of bread, the vinter in making the wine, the weaver in weaving cloth. Thus, whatever arises out of nature for human use is brought to that condition ordained by nature by the alchemist…when something is taken directly from nature and not processed, it is not serviceable and all the more crude and inept. The same applies to health, to the body, and to life…

Yet in offering these analogies Paracelsus was not proposing alchemy as a way to reduce the physician to the status of craft practitioners, particularly the apothecaries: “for nothing could be cruder than their cooking and mixing of everything together, their slopping and slicing whatever they have.” Rather, the art of alchemy was a means of harnessing the incorruptible and generative powers of the celestial realm by materializing them in the sub-lunar world of becoming and decay. Conceiving of the body as standing in microcosmic relation to the macrocosm of the larger universe, Paracelsus invoked the

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16 Ibid., 213.
causal agency of the *astra*, shaping powers emanating from the celestial realm that were responsible for processes of generation and corruption on earth. By extension the preparation of medicines was also to be guided by these *astra*: “for it is they that perfect the work of the physician. Therefore, since they are the ones, medicine must be understood in accordance with them, [and thus] varied and conditioned. Do not speak in terms of cold and hot, moist and dry. Instead it should be in terms of *Saturnus*, in terms of *Mars*, or *Venus*, or the *Polus*. With that the physician is on the right track.” Yet, while the physician was to conduct his practice in accordance with these *astra*, accepting nature as his guide and teacher, it was also important that he should know how to subject those astral powers “to his own will and how to bring them into conjunction and assimilate them. For in this lies the kernel which no physician from the first down to me has bitten into.”

Hence, as the stars were the causes of illness and health, the task of alchemical medicine was to apply art to the purification of their material analogues on earth, which included the metallic substances mercury, antinomy, gold, etc.

In dismissing the manifest qualities of hot, cold, wet and dry, as well as their elemental analogues fire, air, water and earth, Paracelsus launched a sustained attack on Galen and Aristotle, the twin pillars of the academic medical establishment in the early sixteenth century. Whereas Galenic pharmacology insisted that the qualities of diseases bearing hot and dry symptoms required remedies bearing contrary qualities (cold and wet) and vice versa, Paracelsus argued instead that “like cures like” basing his idea on the alchemical notion of sympathies between various substances in nature. Hence, rather than reasoning out the contrary qualities of medicines and diseases, which Paracelsus claimed

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17 Ibid., 215.
most physicians had only encountered in books, physicians should be learning about plants and minerals through their own experimental practice since the body and its sensory apparatus offered the only sure epistemological authority. As for Aristotle, Paracelsus dismissed his four elements and replaced them with the vital principles of Mercury, Sulphur and Salt. As Aristotle had already stated in his *Meteorology* that all metals were formed of the union in the earth of mercury and sulphur, Paracelsus took these together and added salt, the primary agent long used by alchemists in the sublimation of metals. Salts in the fifteenth and sixteenth centuries were also increasingly important substances in the growing urban industries. Saltpeter (*potassium nitrate*) was a key ingredient in the production of gunpowder, while salts were also used as fertilizers and preservative agents, further suggesting their value as medicines. Paracelsus’s diverse writings in the early sixteenth century blending alchemical, medical and even scriptural traditions thus presented an extended justification for the use of known poisonous minerals in the pharmacy, pending they were properly transformed through art to separate their impurities and administered in proper doses.

The spread and influence of Paracelsus’ ideas in northern Europe has been the subject of numerous historical studies which have demonstrated how his writings were appropriated in a variety of ways. While Paracelsus died in 1541, his writings were not

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officially published until 1560 in Basel by the physician Adam von Bodenstein (1528-1577) whose publications did much to spread Paracelsus’ teachings. Late sixteenth-century printings of Paracelsus’ works culminated in the 1590’s with Johan Huser’s edited collection *Bücher und Schrifften* (Books and Writings). German princes interested in alchemy, and whose courts hosted laboratories to investigate Paracelsian remedies, included Ernst von Bayern (1554-1612) and the elector Palatine Ottheinrich (1502-1559). A crucial center of debate in the latter sixteenth century was the Paris Medical Faculty, which witnessed a bitter war over the use of antimony. By the turn of the seventeenth century French chemists there produced a new genre of chemical textbooks that achieved wide circulation well into the eighteenth century. Two important figures were Joseph Du Chesne (c.1544-1609), known as Quercetanus, and Jean Beguin (c.1550-1620), whose *Tyrocinium chymicum* (Chemical Training) published in 1610, distinguished “chymia” from physics and defined it as the art of separating and coagulating substances. As we shall see later, apothecaries were important mediators of these works into the Republic of Venice.

It is important to note, however, that the so-called “Paracelsians” who advanced the cause of iatrochemistry in the latter sixteenth and early seventeenth centuries were often highly critical of Paracelsus’ writings. The Wittenberg professor Daniel Sennert (1572-1637), who has recently been revived as a key influence upon the atomic theory of Robert Boyle, defended chemistry while distancing himself from the figure of Paracelsus.

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Du Chesne, on the other hand, accepted the Paracelsian three principles, but denied Paracelsus’ originality, arguing that Hippocrates had already established these ideas centuries earlier. Finally, the Rothenberg teacher Andreas Libavius, who’s textbook *Alchemia* (1597) achieved broad influence, nevertheless remained critical of what he perceived to be the presence of magical and unorthodox religious elements of the Paracelsian corpus. This criticism echoed the attacks of the Heidelberg professor Thomas Erastus (1524-1583) in his *Disputationes de nova Philippi Paracelsi medicina* (Disputations Concerning the New Medicine of Philip Paracelsus, 1571-73). In Erastus’ view: “The teaching of Paracelsus is not only harmful in Philosophy and monstrous in medicine, but also impious and blasphemous in theology […] He derives a vision of our futures from I know not what demon.”

Such views were apparently shared by the Roman Catholic Church which quickly placed Paracelsus’ writings on the Index of Forbidden Books and prohibited all printers and booksellers in Italy from circulating them. Italian discussions of Paracelsus thus went underground, preventing the kinds of public disputes that took place in northern Europe. For this reason, scholarship on the rise of medical chemistry has traditionally bypassed the Catholic Mediterranean, contributing to long-held portraits of intellectual stagnation and religious reaction in seventeenth-century Italy. However, as scholars such as

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23 For this view, see Jonathan Israel, “Counter-Reformation, economic decline, and the delayed impact of the Medical Revolution in Catholic Europe, 1550-1750,” in *Health care and poor relief in Counter-Reformation Europe*, ed. Jon Arizzabalaga (Routledge, 2005), 40-56.
Andrea Clericuzio and Richard Palmer have demonstrated, chemical remedies flourished on the peninsula from at least the mid-sixteenth century despite public proscriptions against Paracelsus’ works. An important explanation for this can be found in the Italian humanist fascination with distilling, a technology long used in the production of alcohol and increasingly adapted by herbalists. The key apparatus in this art was the *alembic* (deriving from the Arabic *al-ambīq*, or “still”), a simple device of two vessels, one placed over a heat source, and the other placed above with a tube extension to collect the condensed vapors and ending in a receiving flask. The technique had been used by the medieval triumvirate of Catalan monks, Arnald of Villanova (c. 1240-1311), Raymond Lull (c. 1232-1315), and John of Rupescissa (d. 1366) in their various writings on alchemical medicines that continued to be read by chemical practitioners until the eighteenth century. In the latter fifteenth century, the Florentine humanist Ficino took a special interest, not so much in the practical aspects of distilling, but in its worth as an aid to articulating his Neo-Platonist metaphysics. Ficino’s metaphysics, in which bodies were hierarchically arranged by their degrees of refinement from solidity to subtle form (a quantifiable measure), posed an alternative to the Aristotelian model that distinguished bodies by their elemental composition deducible from their manifest qualities. As Sergius Kodera observes, Ficino was well aware of the medieval alchemists noted above, and “identified the *spiritus mundi*, the vehicle of the world-soul, with the quintessence of the alchemists. In this way, the art of distillation acquired a genuinely cosmic importance, for

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it mirrored the workings of the heavens, and at the same time accounted for the change of all things in the sublunar sphere.”

Similar philosophical-alchemical notions privileging the virtues of the more rarified forms of earthly matter produced through distilling can be found in perhaps the most influential book on medicinal distilling produced in the Renaissance, Hieronymous Brunschwig’s (c.1440-c.1512) *Liber de arte distillandi de simplicibus* (Book Concerning the Art of Distilling) first published in Strasbourg in 1500. According to Brunschwig: “distilling is nothing other than the purifying of the gross from the subtle and the subtle from the gross…with the intent that the corruptible shall be made incorruptible…and the subtle spirit be made more subtle so that it can better pierce and pass through the body…[and can be]…conveyed to the place most needful of health and comfort.”

These ideas and publications circulated well before Paracelsus wrote his first treatise and are the likely sources of his own enthusiasm for the art of distilling as a way to render mineral substances pure for internal consumption. Brunschwig, moreover, was a surgeon who had conducted studies at Paris, Bologna and Padua. In his discussion of distilling vessels to be used in the art, Brunschwig further recommended Venetian glass “because they should better withstand the heat of the fire.”

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26 Brunschwig’s book appeared in German in the first edition: *Liber de arte distillandi de simplicibus: Das Buch der rechten Kunst zu distilieren die eintzigē Ding* (Strassburg: J. Gruniger, 1500). The modern translation of Harold J Abrahams (1971 I have not been able to consult and relied on the passage taken from this text provided in B. Moran, *Distilling Knowledge: Alchemy, Chemistry and the Scientific Revolution* (Harvard: Harvard University Press, 2009), 15. The 1527 English edition, *The vertuose boke of distyllacyon of the waters of all maner of herbes*, adds that distilling is to make “the material immaterial”.

27 Seth C, Rasmussen, *Quest for Aqua Vitae: The History and Chemistry of Alcohol from Antiquity to the Middle Ages* (Springer, 2014), 88.
distilled medicinal remedies in the early sixteenth century had passed some of their formative years in important northern Italian centers of medicine and industry: Ferrara, Padua and Venice. At the turn of the sixteenth century, distilling in Italy was as much a philosophical fascination for humanists like Ficino as it was a practical art for urban tradesmen who relied upon it to produce dyes, glassware, and various alcohol spirits.

Printed texts on the art of medicinal distilling began to appear in Venice from the middle of the sixteenth century. A work that seems to have been of significant interest was the Swiss physician Conrad Gesner’s *Thesaurus Euonymi Philiatri* (Treasure of Euonymus, 1552), which appeared in a Latin and Italian version. In 1565 Pietro Andrea Mattioli, who’s *Discorsi* on Dioscorides was the standard text of Greek medical botany, mentioned Paracelsus’ use of antimony and produced his own tract, *Del modo di distillare le acque da tutte le piante* (The Way to Distill Waters from all Plants, 1565), with five illustrations of elaborate distilling furnaces. Other noted members of Mattioli’s botanical circle appear to have shared his enthusiasm for distilling techniques traditionally associated with alchemists. These included the Venetian physician Prospero Borgarucci, the rector of the Padua botanical garden Giacopo Cortuso, and the apothecary Francesco Calzolari in Verona. Cortuso went so far as to cite Paracelsus in claiming that the best way to obtain knowledge of the virtues of medicinal materials was to proceed “not empirically, but (as wrote Theophrastus Paracelsus) spagyrically and judiciously.”

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28 The tract on distilling was published in 1565, but also added as an appendix to the 1585 Venetian edition of his *Discorsi*. As for Paracelsus and antimony, Mattioli states: “non e memoria alcuna appresso agli antichi scrittori, ne manco appresso ai moderni, eccettuando un certo Theophrasto Paracelso, il quale e stato il primo, che habbi scritto dell’uso dell Antimonio per solver il corpo e per far vomitare in certo suo libro di medicina in lingua Tedesca…” (Venice, 1585), 1406.
Paracelsus had identified spagyria with alchimia, and spagyrici with the hidden “quintessences” of natural bodies. In Paracelsian terms, then, the art of spagyria “teaches how to separate the false from the just” – or less dramatically, how to separate the gross matter of substances from their more subtle medicinal virtues. This was ultimately performed through the application of fire: “For medicine should not deign to believe anything that has not been proven by fire.”

Thus, by the end of the sixteenth-century a handful of humanist physicians in Venice had begun to embrace distilling as a way to move past the empirical identification of medicinal materials that had occupied the medical humanists for most of the century. However, as we shall see in the following section, it was in the city’s emerging pharmacy laboratories that the spagyrical arts of dissection by fire were most fully developed to analyze a broad range of botanical, mineral and animal specimens. Moreover, in their publications on these matters, Venetian apothecaries avoided the rhetoric of confrontation with traditional Greek and Arab medical authorities, and traced the roots of their practice as much to Hippocrates, Galen and Mesue, as to the modern practitioners Paracelsus, Quercetanus, Andreas Libavius and Oswald Croll. This set them apart from popular distillers like Leonardo Fioravanti, and reflected their stronger ties with academically trained physicians. By enshrouding their chemical practices within established traditions, apothecaries lent credibility to spagyrically prepared remedies and avoided affiliations with the practice of gold making that by the close of the seventeenth century became negatively identified with the term “alchemy”. As we shall see, the established apothecary trade in theriac, sanctioned by the highest authorities of the Venetian

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Republic, provided ready source materials for chemical extractions that could be legitimized through the writings of Galen himself on *sal theriacale*, or the extracted salt of one of theriac’s key ingredients: the flesh of poisonous vipers.

5.3 Venetian Laboratories and Chemical Debate in the Seventeenth Century

As discussed at the end of chapter two, Venice’s apothecaries had largely succeeded by the first two decades of the seventeenth century in resisting the efforts of the Venetian College of Apothecaries to subject their trade to a public pharmacopeia. This established a unique local situation with respect to other Italian cities regarding the freedom of apothecaries to introduce commercial remedies into the marketplace. In Milan, for instance, chemical remedies had been prohibited in Milan for their associations with alchemy. This remained the norm until the 1670’s when two pharmacies were given permission to manufacture chemical drugs under heavy supervision.30 While chemical remedies were not so strictly forbidden in Florence or Rome, apothecaries in both cities were subject to two continuously updated public pharmacopeias, the *Antidotario Romano* and the *Ricettario fiorentino*. Venice’s leading role in developing Europe’s earliest system of patent licensing for new inventions also contributed to the culture of medicinal novelties that emerged by the end of the sixteenth century. As William Eamon has shown, distillers operating outside of the regulated guild trades set up shop in private homes and religious houses throughout the city. Over the course of the seventeenth century the College of Apothecaries made efforts to address both distillers operating

outside of their trade and religious houses that also turned profits from the sale of chemical remedies. In 1640 the College declared that:

…finding at present in this city many who hold open shops as distillers and makers of medicines that pertain to the pharmacy, being today used the spagyric medicine, as well as not having from us the above said any burden, nor being obligated so that they enjoy similar utilities without paying debts to our [Prencipe]…all the heads of the above said shops must pay an annual tax for the relief of our university…

The following chapter further proposed that “all those who sell medicines under the name of _magistrali_ or _secrets_ in this city must pay” annual dues to the college. The minutes then go on to list the fines imposed on specific individuals, the majority of whom were distillers of waters, but also lists three apothecaries who had to pay an annual tax of three ducats for their proprietary medicines. The college’s efforts to tax those apothecaries who sold proprietary secrets (sometimes known as _magistrali_) must not be seen as an attempt to reign in medicinal inventions and discipline practice, but rather, to ensure that a small portion of the profits of such remedies return to the college’s coffers used to pay for legal representatives to defend the rights of the trade in any public disputes with physicians, other trades or magistracies. Through these measures, then, the apothecaries finally incorporated the city’s distillers as a particular body (_colonello_) within their art and enlarged their resources to maintain the relatively liberal urban marketplace for chemical remedies. Nevertheless, repeated decrees throughout the latter seventeenth and early eighteenth centuries detail the efforts of the College of Apothecaries to restrict the manufacture and sale of internal medicines to “legitimate pharmacies” operated by “Public Professors”. A Health Office decree of 1712 refers back to repeated

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31 BMC, _Mariegola 209_, I, c. 144r. (text continues from c. 80r.). “Ritrovandosi al presente in questa città molti che tengono botteghe aperte come distillatory, et fabricano medicamenti ch’haspettano alla spezieria medicinale, essendo al tempo d’hoggi usata la medicina spagirica…”
proclamations in 1677, 1693 and 1698 stating that “it is resolutely prohibited to any person not excepting convents, monasteries and similar places to compose or sell under any title or pretext, medicines, or others under the name and appearance of medicine, leaving such operations and functions to the Public Professors in the legitimate Pharmacies and ordinary seculars…”32 The decree acknowledges the many monastic pharmacies that had long serviced the populace in Venice, yet also demands that such places be serviced by an expert apothecary. It is not clear if monastic apothecaries were to be examined by the College of Apothecaries or perhaps the Health Office, yet their repeated inclusion in the decrees with the grocers and private distillers of medicines suggests that the College increasingly viewed them as less competent than themselves in the new pharmacy.

The language employed in a decree of 1723 and referring back to proclamations given in 1688 references the “frequency of more violent deaths taking place and procured in these recent times” as a result of the “detestable abuse of selling with too much facility and imprudence arsenics, sublimates, and other such poisonous things to any sort of person without distinction and caution.” In 1729 the Prior of the College of Apothecaries appeared before the Health Office renouncing the “maximum damage that arises from the liberty with which medicines are manipulated and sold by those who are not Public

32 ASV, Proveditori alla sanità, terminazioni, proclami a stampa, b. 155, (4 feb 1712). “…rissolutamente prohibitato a qual si sia persona niuna eccettuata conventi, monastery, e luoghi simili il componere e vendere sotto qual si voglia titolo, o pretest, medicine, o altro, sotto nome, e colore di medicamento, lasciando tali operationi, e fontioni alli Publici Professori nelle legittime Spetierie, & ordinary secolari…et per la fabrica delle medicine, come material importantissima, che richiede l’intiera esperienza, e cognition de provette Spetiali, non continui negli abusi introdott, non solo da Droghieri, che si cimentano di preparare medicinali, e spedire Ricette, con tanto rischio della universal salute per loro inesperienza, e pregiuditio delle publiche specierie, ma ancora da private persone che contra la forma delle leggi si fanno lecito componere, e dispensare diverse qualita di cose, con titolo di medicamenti, perciò inherendo anco al decreto 10 marzo 1642.”
Professors and outside of the legitimate pharmacies…” Such statements, repeated between the 1660’s and the early eighteenth century, reflect the diffusion of chemical remedies in Venetian society during this period that also seems to be behind the new language of apothecary expertise and the renewed efforts to restrict pharmaceutical practice to the city’s “Public Professors”.

Scattered seventeenth-century inventories of pharmacies also indicate a number of shops equipped with furnaces, alembics, and numerous glass receptacles to go along with a variety of metallic substances, distilled oils and waters. Important centers of chemical medicine were the pharmacies at the Vecchia, Mondo, Due Occhiali (Two Eyes), Golden Lion, Abraham, Sun, and the Golden Hercules. The 1629 inventory of Sebastion Fredrici at the Golden Hercules – which under Zannichelli would become the center of chemical medicine in Venice by 1700 - lists a pair of furnaces and a distilling apparatus. While the remedies are not listed in detail, the inventory still reports eighty-two vases of electuaries and forty-four bottles of distilled waters to go along with “a head of Hercules,” a painting of the Madonna, numerous fine porcelain vases and expensive bronze mortars, and over one hundred “books of medicine”. With the 1641 inventory of Antonio Raspi at the Vecchia, however, we can see the outlines of a much larger pharmacy operation fully invested in the expanded pharmacopeia of spagyric remedies. The listings of Raspi’s medicinal materials go on for thirty-four pages and include a number of mineral distillations such as oil of vitriol, spirit of sulphur, oil of tartar, mercury, antimony, litharge, and other remedies prefixed as “quintessence” or “elixir”. Finally, the inventory of Bartolomeo Gastaldi at the Golden Lion in 1689 reveals a virtual museum of more

33 ASV, Giudici de petizion, b. 351, n. 63 (28 jan 1629).
than seven-hundred medicinal objects, including rare American bezoar stones and distilled oils of mechoacan and tabacco. As with many other apothecaries, the inventory of Gastaldi’s home located above his shop is a testament to the considerable wealth of Venice’s apothecaries. Along with two dozen gold-framed paintings found in Gastaldi’s home, the apothecary who oversaw the inventory, Carlo Francesco at the Adam, also noted a small collection of exotic medicinal objects typically found in the museums of early modern collectors: tobacco, amber, and corno di cervo filosofico, or, unicorn horn. That apothecaries were typically called in to assist with the execution of pharmacy inventories testifies to the complex material culture of the trade and the specialized expertise required to render it legible for public notaries.

To get a sense of how apothecaries understood their own practice in their workshop laboratories there is perhaps no better source to turn to than Antonio de Sgobbis’s encyclopedic Nuovo et Universale Theatro Farmaceutico (New and Universal Pharmaceutical Theater), first published in Venice in 1667 and dedicated to the Venetian Senate.34 A native of Montagna in the northern province of South Tyrol, de Sgobbis took

34 Antonio de Sgobbis, Nuovo et Universale theatro farmaceutico: fondato sopra le preparationi farmaceutiche scritte da’medici antichi, greci, & arabi, principalmente da Galeno, e Mesue: appoggiato sopra le preparation dette spagiriche, gia da gli antichi, in parte, abbozzate ma da piu moderni medici illustrate...scritte dal Beguino, Crollio, Hartmanno, Libavio, Minsicht, Paracelso, Quercetanno, Sennerto & altri...(Venezia: iuliana, a spese dell’autore, si vende Gio. Giacomo Hertz, libraro all’isegna della Nave, 1667). A second and final edition of 1682 was produced by the printer Paolo Baglioni. Along with De Sgobbis’ Theatro Baglioni also produced four editions of the Neapolitan physician Giuseppe Donzelli’s Teatro farmaceutico dogmatico e spagirico, originally published in Naples in 1667, the same year as de Sgobbis’ Theatro. Donzelli’s text is far less comprehensive than de Sgobbis’ and is organized by spagyric remedies rather than de Sgobbis’ much more thorough attention to technical procedures, instruments and materials. Nevertheless, Donzelli’s appears to have enjoyed a longer printer run, perhaps owing to its reduced expense lacking illustrations and the author’s status as a physician. From an inventory preserved in Venice (ASV, Giudici del proprio, testimoni, b. 42, reg. 105, cc.53r-61r, 1693) we know that the production of the Theatro took several years beginning with a contract between de Sgobbis and the printer Giuliani on 19 july 1663. De Sgobbis paid 15 lire for every foglio arriving at a sum of 3410 lire, a considerable expense demonstrating de Sgobbis’ personal wealth.
over the famed Ostrich pharmacy in Venice following the death of its previous owner Alberto Stecchini in 1631. By that time the Ostrich was already an established center of experiment and scientific exchanges between learned naturalists and apothecaries. Under Georg Melich in the latter sixteenth century, several notable physicians were associated with his shop, including Andrea Marini and Giovanni Paolo Mongio, both of whom edited works on Mesue and Avicenna. Another physician was Decio Bellebuono, who got into trouble with the Inquisition for the distillery he owned at the Frari church which contradicted the rules against physicians engaging in commercial pharmacy. In the early seventeenth century the Padua graduate Zaccaria dal Pozzo mentioned his apothecary friends at the Ostrich and Griffen pharmacies in his Clavis Medica Rationalis, Spagyrica et Chyrugica (1612), a work clearly influenced by the Paracelsan writers Joseph Du Chesne and Andreas Libavius. Alberto Stecchini at the Ostrich had apparently prepared a number of chemical remedies for Dal Pozzo, including the powerful opiate concoction Laudanum praised by Paracelsus. In his 1627 reprinting of Melich’s Avvertimenti (see chapter three), Stecchini noted his intention produce his own work devoted to the new


36 I have not consulted this work. Palmer relates that Dal Pozzo graduated from Padua in 1593 and acknowledges Girolamo Brochino, pharmacist at the Griffo as an expert chemist along with Alberto Stecchini. Palmer, “Pharmacy”, 116.

37 In antiquity the laudanum had been little more than a type of gum. With Paracelsus, however, it was given a new meaning as an arcane remedy made also with gold and pearls. Paracelsus gave no specific directions on how to make the drug, which he treated more as metaphysical principle. It thus became an object of interest among chemical pharmacists, including Du Chesne whose works were influential in Venice. See, Philip Ball, The Devil’s Doctor: Paracelsus and the World of Renaissance Magic and Science (Macmillan, 2006), 182-83.
spagyric medicine. However, this appears to have gone unfinished before his death in 1631.

In his introduction de Sgobbis acknowledges the labors of his apothecary predecessors as the inspiration for his work: “The first foundations were therefore established by Melich; the design, although varied, and proposed but not undertaken, was by Stecchini.” Aiming to impose order upon Stecchini’s design de Sgobbis proposes “to add to it fully the teachings of the most credited Antique Physicians, and the new well-regulated inventions and curious doctrines of Moderns worthy of imitation.” In the added frontispiece to the 1682 edition of de Sgobbis’s encyclopedia we are treated to some of the important figures associated with spagyric medicine. The depicted scene represents an unlikely gathering of classical Greek, alchemical, and modern Paracelsan physicians confronting one another in two rows. On the left are the established authorities, Galen, Hippocrates, Dioscorides and Mesue, while opposite them are the medieval alchemists Raimond Lull and Arnaud of Villanova, and the sixteenth-century writers Paracelsus and Du Chesne. Framing them are miners busily extracting minerals in a cave, and an apothecary placing composed remedies in their sealed jars on the shelves of a pharmacy. Supporting the scene from below are six allegorical figures representing Theory, Reason and Physic on the side of the ancient authorities, and Nature, Experience, and Practice on the side of the chemical physicians. Finally, moving upward around the frame are six more figures representing on the side of the ancient physicians, Science, Knowledge, and

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38 I have consulted the 1688 edition of Stecchini’s updated publication: Avvertimenti nelle compositioni de’ medicamneti per uso della spetiaria (Venice, 1688), 6-12.

Serenity (Quiete Dell’Anima); and on the side of the chemical practitioners, Art, Prudence, and Health. The frontispiece thus makes a clear case for the natural compromise of Greek rational medicine and the new instrumental and experimental techniques of medicinal composition. In de Sgobbis’ *Theatro Farmaceutico* past and present were not at odds, but conjoined through the mutual rapport of head and hand in the pursuit of a new universal medicine.
Figure 8: The 1682 frontispiece from Antonio de Sgobbs’ Theatro Farmaceutico depicting the mutual accord of Greek and Spagyric medicine.
Figure 9: Portrait plates of the Ostrich pharmacy's owners, Georg Melich, Alberto Stecchini, and Antonio de Sgobbis taken from the 1667 edition of the Theatro Farmaceutico.
Figure 10: One of three plates depicting various distilling instruments and furnaces taken from the 1667 edition of the Theatro Farmaceutico.
Despite the Theatro’s homage to the Greek authorities, its contents are overwhelmingly devoted to the new art of spagyric practice in nearly nine-hundred pages. Book one is divided into thirty-five chapters each devoted to an extraordinary range of procedures for spagyrically dissecting natural materials to isolate their inner “virtues” before recomposing them into usable remedies. Book two is then divided into three parts, devoted first to the categories of plant, mineral and animal extractions; second, to composed remedies, and third to mineral and metallic substances. These latter include oil of vitriol, sal ammoniac, nitre, antimony, mineral sulphur, bitumen, arsenic, gems, corals, silver and potable gold. In the beginning of book one de Sgobbis traces the origins of spagyric remedies to “the Art of Chimia” which he discusses in relation to pharmacy.40 Pharmacy is “the art of dissolving, altering, arranging, uniting or composing natural bodies for medicinal use,” while the objects of pharmacy are not restricted to natural bodies, but also to “things artificial”.41 Turning to the art of chimia, de Sgobbis separates it into two categories: the transmutation and enoblement of metals, and the spagyric preparation of medicines. The former, long associated with the aims of alchemists, de Sgobbis doubtfully asserts may be achievable. However, being an endeavor “far from the ends of Pharmacy” he chooses to bypass the subject and nowhere in his discourse employs the term alchimia. Both the arts of “Farmacopeia” and “Chimia” – de Sgobbis concludes – are concerned with the dissolving and artificial recomposition of materials, with pharmacy employing these same ends and materials for medical ends.

40 Ibid., 6.

41 Ibid., 5. “La Farmacopeia è l’Arte di scielgiere, alterare, disponere, unire, o componere i corpi naturali, atti a gli usi Medicinali…”
In the concluding book devoted to the extractions of various mineral objects, de Sgobbis gives several preparations for potable gold. The notion that gold might be used as a powerful internal remedy can be found in the works of Avicenna and numerous tracts on alchemical medicine. In the alchemical literature gold was identified with the sun in the celestial realm, and the heart on the terrestrial plane as the vital power of the human body. It was therefore deemed appropriate for ailments related to the heart, as well as melancholy affecting “those who are taken with a contunual sadness without cause.”

According to the English natural philosopher Francis Bacon in 1638: “Gold is exhibited and used in three ways: in potable Gold, Gold quenched in Wine, or substantial Gold, as Leafe Gold, and powder Gold. Potable Gold was given first in dangerous Desperate Diseases, for an excellent powerful Cordiall receiving the virtuall effect from the spirit of Salt wherein it is dissolved…” De Sgobbis recites these traditions, yet also delivers an extraordinary explanation of the substance’s pharmacological powers in terms of its corpuscular composition:

All of the preparations of gold are directed to this end, which is a Metal most liquefiable (saldissimo), and perfectly united by Nature, it can be opened, disunited or resolved in parts, and reduced in the most subtle parts, & in the minutest atoms, so that more easily it can be absorbed by our heat…

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42 Ibid., 570.

43 Francis Bacon, The historie of life and death with observations natural and experimentall for the prolonging of life (London, 1638), 132.

44 Ibid., 570. “Tutte le preparation dell’Oro sono dirette a questo fine, accio l’Oro, il qual è Metallo saldissimo…& ridotto in parte sottilissime, & in munitissimi atomi…” The use of the term “atomi” was already in circulation in Italy and cannot be traced to any singular source or immediately identified with modern notions of atoms. Most recently, William Newman has looked to the German chemist Daniel Sennert and his discussions of atoms in the early seventeenth century as important influences upon Robert Boyle. Indeed, De Sgobbis appears to have been familia with Sennert and lists him among the authors cited in his book. On Sennert, see: William R. Newman, Atoms and Alchemy: Chymistry and the Experimental Origins of the Scientific Revolution (Chicago: University of Chicago Press, 2006).
What distinguished gold from the other metals was the ease with which it could be made into a liquid, suggesting its easy absorbancy, while maintaining its integrity without separating. The need to separate the pure from the impure was not applicable in the case of pure gold, hence the metal’s continued approved use in medicine over several centuries. However, as de Sgobbis explains, it was not enough to simply consume gold in any old fashion as the potable gold had to be administered with other medicines. One substance that appears in several of de Sgobbis’ remedies for potable gold is salt. Indeed, de Sgobbis’ remarks on the fabrication of various salt extractions elsewhere in his text enable us to appreciate how he traced spagyric medicine to the classical physicians Galen and Hippocrates. As salts were known to dissolve easily in liquids, they were considered to be a particularly effective means of quickly delivering the extracted virtues of materials to the entirety of the ailing body. This was certainly the argument de Sgobbis offered in a brief 1655 pamphlet advertising his own proprietary remedy, *sal viperine*, or viper salt. The short tract gives little information on how de Sgobbis prepared his version of this remedy briefly discussed in Galen’s *Theriaca ad Pisonem*, but offers an analogy of salt with the sun suggesting the drug’s status as an elite panacea. De Sgobbis also relates that assisting him in his preparation was also the physician Arnold Blanckenbach, a graduate of Padua in 1655. Already in 1631, Antonio Donati at the San

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45 Antonio de Sgobbis, *Succinta, e vera relatione del sincere e legittimo sale viperino spagirico, candidamente con ogni diligenza preparato e dispensator contutta realta fedelmente nella spezieria all’insegna del Struzzo da me Antonio de Sgobbis spetiale medicinale in Vinetia sopra il ponte di Baretteri* (Venice: Giuliani, 1655). The text is eight pages in length in quarto and displays the insignia of the Struzzo on its opening page.

46 The only publication by Blackenbach is his brief tract composed with the physician Alexander Columbus on the faculties of acid and dedicated to a Giovanni Gasparo Migato: *De admirando dei dono sive de facultatibus acidularum in valle solis episcopatus Tridenti repertarum: dedicatum per illustri Dno. Ioanni Gasparo Migato* (Tridenti: Zanettus, 1666).
Liberale, included two of his own distilled recipes for the preparation of Galen’s *sale theriacale*, which included cooked vipers and various spices.\(^{47}\) However, while Galen used the term “salt” to describe his remedy, his concoction consisted merely of chopped vipers cooked in a closed vessel with wine or liquid and other spices and left for a day to cool and dry before the cooked parts were mashed into a fine powder and reconstituted forty days later in water to be consumed. As a “salt,” Galen intended that the cooked parts were hot, salty and acidic; all medicinally active properties imparted to the water which masked these distasteful qualities when consumed.

However, the modern spagyric method, as de Sgobbis explained, submitted this final diluted solution to further technical procedures to evaporate the liquid until all that was left was a crystalline white residue more resembling common salt. The spagyric viper salt was classified as a volatile salt to go along with similar extractions made from human blood, urine, “corno di cervo,” amber, American guaiacum wood, and the “craneo humano” (human cranium).\(^{48}\) The extraction of medicinal salts extended also to minerals which were understood to be among the most highly esteemed of the medicinal salts for their subtle powers to penetrate the body. Finally, both volatile and fixed salts, according to de Sgobbis, were the principle parts of all natural bodies:

Salt principally is the undoubted foundation of the constitution of all things; therefore necessarily in just about any natural material, by means of the teachings of Spagyric Preparations, one can recover the salt, while wanting to deny that in each natural body there is not a truly perfect natural Salt, which one can extract by means of the [spagyric] Art, would be to put into doubt the certainty of our senses. They contain in themselves the natural medicinal bodies a volatile salt, which cannot endure the fire [and] flies away…and become

\(^{47}\) Antonio Donati, *Trattato de’ semplici* (Venice, 1631), 90-93.

\(^{48}\) Antonio de Sgobbis, *Theatro*, 566. It is highly doubtful that *craneo humano* was used often in pharmacies, as with many of the other more exotic and expensive remedies such as potable gold. However, their addition in published works were testimony to the witer’s knowledge of more arcane substances and traditions. A recipe for human cranium can be found in Georg Melich’s *Avvertimenti* which advises its use for mental illnesses and melancholy.
subject to Calcination; and as well as the volatile there is the fixed salt, which endures the fire and becomes ash, or lime (calci). 49

To this, de Sgobbis also adds an “essential salt, which is none other than a portion of salt sufficiently perfected…both salts, the fixed and the essential, can be extracted from plants.” 50 As we shall see later, this tripart distinction significantly appears to predate Nicolas Lemery’s model a decade later. For the moment, however, the extensive discussions of salts, their extractions, and purifications in de Sgobbis’ Theatro offer significant insight into the ways old and new were blended together in the apothecary laboratory at the Ostrich pharmacy. Drawing authority for their practices from classical sources - including Aristotle, who de Sgobbis claims advocated a method similar to his own 51 - the apothecaries from Melich to de Sgobbis made the pharmacy’s major commercial product, vipers used in the making of theriac, into an object of experimental discourse eventually buttressing new views on the essential composition of matter composed of volatile, fixed and essential salts.

Significantly, this important notion that all matter is composed of salts found its fullest philosophical articulation in the publications of a German physician living in Venice at the same time as de Sgobbis. His name was Otto Tachenius (fl. 1644-1699), a native of Westphalia who trained as an apothecary in Germany before arriving at Padua in 1644 to take a degree in medicine. Upon taking his doctorate in 1652 Tachenius stayed

49 Ibid., 68.

50 Ibid., 68.

51 De Sgobbis quotes Aristotle as saying in the second book of Meteorology, Chapter 3: “Accade una simile cosa all’Ombri; poiche è un luogo, nel quale naturalmente sonno prodotte canne, & ghiunchi; questi s’abbruggiano, & mettendo la cenere nell’acqua la cuocono, quando hanno separate qualche portione dell’acqua, questa essedo raffreddata si fa una quantita di sale.”
on in Venice and was reported to still be alive there in 1699.\(^{52}\) In 1666, only a year before de Sgobbi’s *Theatro*, Tachenius published in Venice his *Hippocrates chimicus, qui novissimi vipherini salis antiquissima fundamenta ostendit* (Chemical Hippocrates, Showing the Ancient Foundations of the Late Viperine Salt). Two years later he added another work repeating much of his original publication: *Antiquissimae Hippocratieae medicinae clavis* (Key to the Antique Medicine of Hippocrates).\(^{53}\) An avid follower of the Flemish chemist Jan Baptist van Helmont (1580-1644) and his protégé Franciscus Sylvius (1614-1672), Tachenius was heavily influenced by their discussions on the nature of aqueous acids and alkalis in the early seventeenth century. Sylvius asserted that all diseases could be explained in terms of this duality, and suggested that all material compositions were made of acids, fixed salts, and alkalis (volatile salts). From this, Sylvius proposed that physicians could develop rational pharmaceutical therapies. Sylvius’ own discussions had been influenced by emerging discussions on color testing developed within the dyeing industry.\(^{54}\) An important early text was the Padua-trained physician Edward Jorden’s *A Discourse of natural baths and mineral waters* (London, 1666).

\(^{52}\) We know very little of Tachenius’ biography other than his handful of publications which exerted considerable influence in Europe. His publications are as follows: Otto Tachenius, *Epistola de famoso liquore Alkahest* (Hamburg, 1652); *Ottonis Tackenii echo ad vindicias chirophi: in qua, de liquore Alcaest, Paracelsi & Helmotij, veterum vestigial prequiruntur* (Venetiis: Typis Euforbianis, 1656); *Hippocrates chimicus, qui novissimi vipherini salis antiquissima fundamenta ostendit* (Venetiis: Combi & La Nou, 1666). This last publication established his European reputation and was quickly reproduced in Venice in 1669, 1678 and 1697; in Braunschweig (1668); Augsburg (1678, 1679); Frankfurt (1669, 1673, 1693, 1696); Paris (1669, 1673); London (1671, and in English in 1677, 1690, 1696, 1697). The only monograph study is by Heinz-Herbert Take, *Otto Tachenius, 1610-1680: ein Wegbereiter der Chemie zwischen Herford und Venedig* (Bielefeld: Verlag für Regionalgeschichte, 2002). In English the best discussion is found in Allen G. Debus, *Chemistry and Medical Debate: Van Helmont to Boerhaave* (Canton, MA: Science History, 2001), 114-25.

\(^{53}\) The English translation of 1677 combining both works: *Otto Tachenius his Hippocrates chymicus, which discovers the ancient foundations of the late vipherine salt and his clavis thereunto* (London: 1677, Thomas James trans., 1677).

\(^{54}\) Harold Cook, *Matters of Exchange*, 298.
Clearly familiar with the thriving cloth dyeing trade in Venice, Jorden noted that bases turned scarlet cloth blue, with acids reversing the color back again to red. In 1664 Robert Boyle observed the techniques of local dyers in his Experimental History of Colours on the way to his experimental procedure demonstrating that the blue syrup of violets were always turned red by acids, and green by alkalis. Those that produced no color change Boyle labeled “base”.

Tachenius was certainly no stranger to these discussions, asserting in his Chemical Hippocrates that: “Chymists have directed themselves through the path of every Science, to enter into all Experience by Art, according to the course of Nature in her univocal Principles…But why do I spend time in mentioning these things, there is not an Old Woman in Italy, but will inveigh against the opposers of this Art? For without It, it is impossible for them to find out anything to Colour and Dye their Hair.” Throughout his text Tachenius continually refers back to Venice’s various industries: “Glass-men of Murano have observed…,” “Soap-men add to the Calx a factitious Alcaly…,” “Dyers, for want of Sweet Vitriol do add filelings of Iron…,” and so on. He also mentions by name the “diligent Apothecary” at the sign of the Sanita, “Johannes Maria Fero, of this City, who, with Singular Care and Study, gathered together all sorts of Vegetables, to whose Industry I do owe very much, and accordingly I render him my real and hearty thanks.”

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56 Tachenius, Hippocrates chymicus (London, 1690), 11.

57 Ibid., 71.
appended several of the French Paracelsian’s spagyric remedies in the 1646 Italian edition of his *Pharmacopea dogmaticorum restitute* (1608).\(^{58}\)

But what did Hippocrates have to do with viper salts and the art of Chymia? The occasion for writing the *Chemical Hippocrates* appears to have been a dispute over the worth of Tachenius’ own viper salt remedy. In his *Pharmacopoeia Augustana* (1657) the German apothecary Johann Zwelfer asserted that the drug was nothing new and of doubtful medicinal use anyways. In response, Tachenius pointed to Hippocrates’ *Regimen* which stated that all matter is made of the two opposing principles fire and water.\(^{59}\) Tachenius also took note of Galen’s *Theriaca ad Pisonem* where he speaks of the use of fire to produce his sal theriacale discussed earlier. As Hippocrates had reduced Aristotle’s three causes to two – fire and water – Tachenius merely identifies fire and water with acids and alkalis. Through their interactions matter is “generated” with the hot and dry acid serving as the masculine principle, and the cold and wet alkali, the feminine. Tachenius’ “Hippocratic Chemistry” quickly elicited considerable debate in Europe on the extent to which acid/alkali principles could explain the qualities of natural phenomena.

The most important detractor was Robert Boyle who had already established the method for identifying acids, alkalis and bases using his color tests. Tachenius’ book had

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\(^{58}\) Du Chesne’s work was first translated into Italian by the Mantua physician Giacomo Ferrari in 1612 and printed in Venice as *Le ricchezze della riformata farmacopea*. The work went through several Venetian editions (1612, 1619, 1638, 1646, 1655, 1665, 1677, 1684). In 1646 Ferro added his translation of recipes and edited the new edition. Ferro also edited editions of Ferrante Imperato’s *Storia natural* (Venice: Combi & La Nou, 1672) and Castor Durante’s *Herbario nuovo* (Venice: Hertz, 1667).

already been reviewed in the *Philosophical Transactions* in 1669, while a manuscript of
the John Warr’s English translation of 1677 has been found among Boyle’s personal
papers. However, with respect to the “universal principles” of acids and alkalis as
explanations of chemical actions, Boyle was unconvinced. Without mentioning anyone by
name, he accused the “Duelists” of arbitrarily assigning actions to principles without
“sufficient proof”:

…it seems precarious to affirm, that in all bodies, or even in all the sensible parts of mixts,
*Acid and Alkalize* parts are found; there not having been that I know, any Experimental
Induction made of particulars any thing near numerous enough to make out so great an
assertion […] AND this leads me to another Exception against the hypothesis of the
Duellists, which is, that the framers of it seem arbitrarily to have assigned Provinces or
Offices to each of their two Principles, as the Chymists do to each of their tria prima, and the
Peripateticks to each of their Four Elements.

Despite Boyle’s reservations, a pair of influential French chemists adopted Tachenius’
theory, while discarding some of his more occult doctrines regarding the microcosm-
macrocosm nexus, and the the description of acid-alkali reactions in terms of “strife” or
“antipathy”. The first was the Caen professor Francois de Saint-Andre who rebuked
Boyle’s assertions that the presence of acid and alkali in all bodies had not been proven.
An advocate of corpuscular atoms, Saint-Andre answered Boyle’s charge that different
acids and alkalis produced inconsistent effects with the idea that different acids and
alkalis possessed different corpuscular shapes. The idea was that acids possessed sharp

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60 *Philosophical Transactions* 4 (1669): 1019-21.

61 Robert Boyle, “Reflections Upon the Hypothesis of Alcali and Acidum” in *Experiments, notes, &c. about the mechanical origine or production of divers particular qualities among which is inferred a discourse of the imperfection of the chymist’s doctrine of qualities: together with some reflections upon the hypothesis of alkali and acidum* (London, 1676), 5, 10.

62 Tachenius’ theory also had an important French detractor in F. Bertrand at Marseilles, who argued that Tachenius had no foundation to equate Hippocrates’ fire and water with acids and alkalis. Bertrand is identified only as “Docteur en Medecine” in his *Reflexions nouvelles sur l’acide et sur l’alcali* (Lyon 1683).
points, while alkalis exhibited open pores that could lock together to varying degrees, thus explaining different reactions.\textsuperscript{63} Moreover, as Allen Debus has noted, Saint-Andre appears to have borrowed Tachenius’ notion of digestion as an acid-alkali fermentation. As Tachenius had observed: “It is the office of the Stomach to change one thing into another by the help of the two faculties, the innate Acid, and the acquired Alcaly…”\textsuperscript{64}

Saint-Andre’s idea of interlocking points and pores was most fully developed by the French apothecary Nicolas Lemery (1645-1715). The updated editions of Lemery’s influential \textit{Cours de chymie} (1675) have been credited by several scholars with ushering in the final break of the discipline of chemistry from its associations with alchemy.\textsuperscript{65} As Lemery put it in his third edition of the \textit{Course}: “…to work at making gold is to work in shadows, and I find that alchymie has been defined very well [as follows]: \textit{Ars sine arte, cujus principium mentiri, medium laborare, & finis mendicare}, an Art without art, whose beginning is lying, whose middle is labor, and whose end is beggary.”\textsuperscript{66} However, Ursula Klein has also proposed Lemery’s importance in “the creation of a new epistemic object, namely the formation of salts.”\textsuperscript{67} For Lemery, the principles of chemistry were not abstract qualities, but concrete substances that could be demonstrated through chemical

\textsuperscript{63} For Saint-Andre I have relied on the discussion by Debus: \textit{Chemistry and Medical Debate}, 120-22.

\textsuperscript{64} Tachenius, \textit{Hippocrates Chymicus}, 38. This idea of digestion as a chemical process was also taken up by the French chemist Francios Aignan (1644-1709) who stated that the process due to a natural ferment “is a corrosive vitriol and coagulant that \textit{Hippocrates} knew well.” Quoted in Debus, \textit{Chemistry and Medical Debate}, 125.


\textsuperscript{67} Ursula Klein, “The Chemical Workshop Tradition,” 265.
operations. 68 These substance-principles were divided between active Spirit, Oil, and Salt, and passive Water and Earth. Developing Saint-Andre’s corpuscular model, Lemery asserts that the former active substances are comprised of pointed particles variously shaped depending on the substance in rapid motion, while the latter contain particles with variously shaped, slow-moving receptive pores. Turning to salt, Lemery states that: “There are three different Salts, as the Fixt, Volatile, and Essential. The Fixt Salt is that which remains after Calcination: the Volatile is that which easily riseth […] And Essential Salt is that which is obtained from the Juyce of Plants by Crystallization….This last is between Fixt and Volatile.”69 This is strikingly similar to de Sgobbis’ tripartite classification in 1667 already discussed. However, Lemery goes further by stating that the only “natural” component of materials is the Essential acid salt. As the other two salts – volatile and fixed - are composed by the use of fire which transforms the material, they are considered “artificial”. Hence, Lemery’s chemical program developed a fully mechanical explanation of acid-alkali reactions built on a classification of salts already clearly evident in de Sgobbis’ pharmacy in Venice. Finally, in his section on the distillation of vipers to produce a volatile alkali salt, Lemery describes the pharmacological action of the remedy in rarifying “the humors of the body, both by reason of their piercing nature, and also in that being Alkalis they do dull the strength of Acids, which keeps the humors condensed, after which the blood being in greater motion than before, doth the more easily purifie itself…”70

68 Nicolas Lemery, A course of chemistry containing an easy method of preparing those chymical medicins which are used in physic (London, 1686), 6. “The word Principle in Chymistry must not be understood in too nice a sense: for the substances which are so called, are only Principles in respect of us…”

69 Ibid., 5.

70 Ibid., 516.
Hence, while Lemery does not mention de Sgobbis’ *Theatro* or even Tachenius for that matter, the acid-alkali debate that stemmed from Otto Tachenius’ attempts to defend his version of the *sal viperine* - a Galenic remedy experimented with and revived by Venice’s apothecary theriac producers – did much to stabilize iatrochemistry as the dominant mode of medical discourse by the end of the seventeenth century. In 1700 the first Italian edition of Lemery’s *Cours de chymie* appeared in Venice. The text, incidentally, was issued by the publishing house of Giacomo Hertz at the sign of the Nave, the same operation that Antonio de Sgobbis had contracted to sell copies of his *Theatro Farmaceutico*. Only three years earlier, the Hertz printing house also delivered for the first time in Venice the *Opera omnia* (Complete Works) of Robert Boyle, famous for, among other things, his development of acid-alkali color tests.\(^{71}\) That the ideas of Lemery and Boyle had a significant impact on medicine at Padua can be discerned from a published account of an experiment on the *Aloè Americana* conducted by the Professor of Theoretical Medicine Antonio Vallisneri (1661-1730).\(^{72}\) The 1715 account, *Osservazioni intorno al Fiore dell’Aloe Americana, ed al sugo stillante dalla medisima* (Observations on the American Aloe Flower and the juice distilled from it), describes a scene taking place in 1709 in the private garden of a Paduan nobleman who owned a large plant “truly curious, which continuous distills, as one says, spontaneously from the flowers, generating from them drop by drop a sweet water, mixed upon tasting it with some gentle

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\(^{71}\) Robert Boyle, *Roberti Boyle, nobilissimi Angli, et Societatis Regiae dignissimi Socii, Opera omnia* (Venice: Hertz, 1697).

\(^{72}\) Antonio Vallisneri, *Opere diverse del sig. Antonio Vallisneri* (Padua, 1715), 180
After gathering some of the naturally distilled liquid into a phial Vallisneri first noted the sweet taste of the juice followed by an acidic bite. The more juice that was collected the more acidic it became turning to a calcified white color. After delivering some conjectures on the circulation of the liquid through the plant’s various parts, Vallisneri then divided the collected liquid in separate vessels and added to one, spirit of vitriol, sulphur, salt, nitre, and alcohol (acqua forte), all of which produced no mutations. In another he added “corno di cervo”, human urine, sal ammoniac, which also produced no alterations: “Thinking then, that it was an a most gentle acid, or differently figured, that the points and pores, or empty spaces of said alkalis, could not meet, he turned to turnsole, judged an alkali so delicate and subtle, and pores so receptive and easy, that it would immediately take in any particle of acid.” Upon adding the turnsole (a dyestuff prepared from the *Chrozophora tinctoria*), the liquid turned very dark red. After another quarter hour it turned violet, and then back to a lighter rose red after the addition of more powder: “form that one deduces to have been born the mutations in the colors from the acid in the [aloe flower] liquor and the alkali of the turnsole.”

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73 Ibid., 180, “…non osservate da altri, una si è veramente curiosa, cioè un continuo stillicidio, com’egli dice, che spontaneamente usciva de’fiori, germendo da essi, a goccia a goccia un’acqua dolce, mescolata in fine dell’assaporarla con qualche gentile acidita.”
Figure 11: The Aloe Americana depicted in the 1715 account of Vallisneri’s acid-alkali tests on its mysteriously distilled liquid.
The account carries on explaining the various colors produced in the aloe plant’s liquid in terms of acid-alkali reactions between tiny spores and points. However, the point has been made regarding the circulation back to Padua of chemical debates that arose from the university’s own backyard in the commercial laboratories of the Venetian apothecary trade in the second half of the seventeenth century. In the following section we will look to one final pharmacy, the Golden Hercules in Santa Fosca, to trace the first efforts to translate the material culture of Venice’s pharmacy-laboratories to the university studio at Padua.

5.4 Between Marketplace and University: The Golden Hercules Pharmacy and the Republic of Letters

Located in the parish of Santa Fosca in Venice, the pharmacy at the Golden Hercules still remains today as one of the few fully preserved early modern pharmacies left in Venice. While the pharmacy’s operations have moved to a more modern setting next door, patrons can still enter the original space and appreciate the craftwork that went into the spectacle of the public pharmacy around the turn of the eighteenth century. Near the entrance are the massive, decorated bronze mortars used to pestle spices and compose theria. Lining the walls are beautifully carved shelves and large busts of a shop assistant measuring materials with a balance, another grinding them in a mortar, and finally at the back of the shop, a bust of the bearded apothecary philosopher contemplating an open book. Finally, the wooden banco with an antique scale where transactions were made stands before a wall of painted porcelain jars each labled in Latin signifying their contents.
While the elaborate front portion of the pharmacy still remains, the workshop laboratory of its most famous owner, Gian Girolamo Zannichelli (1662-1729), is no longer existent. As we shall see, it was through this space that Zannichelli not only conducted a variety of experimental investigations, but also engaged a network of European intellectuals with whom he exchanged both materials and ideas. His interests directed him to the study of fossils, geology botany, biology, and chemical medicine. He also left behind a small library of his own publications, personal correspondence, and a small file of laboratory notebooks now preserved at the archive of the public botanical garden in Padua.\textsuperscript{74} The source of Zannichelli’s wealth enabling him to freely carry out

\textsuperscript{74} I begin with the published works attributed to Zannichelli in order of publication from the earliest: *Promptuarium remediorum chymicorum* (1701); *De ferro ejusque nivis preparatione: dissertatio physico-chymica, in qua varia de ipso metallo explicantur* (1713, 1719); *De Myriophyllo pelagico aliaque marina plantula anonyma* (1714); *Variorum fossilium apparatus ex collectaneis* (1720); *De lithographia duorum montium Veronensium* (1721); *De Rusco ejusque medicamentosa praeparatione* (1727); and
these investigations came from his famous patented remedy, the *pillole di piovano*, which continued to be sold in Venice for two centuries after his death. The career of Zannichelli thus neatly draws together the many scientific activities and commercial practices that have been discussed in other chapters of this dissertation. On the cusp of the Enlightenment in Italy, Zannichelli’s pharmacy ultimately became a model space for a new generation of medical reformers at Padua to ground their art in the practices of the chemical laboratory.

Born in 1662 in the northern Italian city of Modena, Zannichelli moved to Venice early to learn the apothecary’s trade. By 1687 he had entered the Venetian College of Apothecaries and taken over the Golden Hercules pharmacy. In 1700 we have the first news of his efforts to obtain a license for the *pillole di piovano* at the Public Health Office. The drug had already been sold at the pharmacy, and as the new owner, Zannichelli requested the exclusive privilege to produce and sell the pills. In 1713, he also asked for the exclusive rights to sell his chemically prepared *pillole per la gonorrhea*, apparently made from various vegetable salt extracts. In his chemical publications, such as the *De ferro eiusque nivis praeparatione* (On the preparations of iron and its sublimate, 1713), Zannichelli added to a long medical tradition of using iron as a therapeutic by discussing his sublimations of iron with antimony to produce snow-

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finally, an Italian local natural history of the Lido published posthumously by Zannichelli’s son: *Istoria delle piante che nascono ne’ lidi intorno a Venezia* (1735). The the Orto Botanico library there is also a manuscript collection: Biblioteca dell’Orto Botanico di Padova (BOBP), *Mss. Zannichelli, Ar.* 12. Forty-four brief letters, some directed to Antonio Vallisneri, are also held in the Biblioteca Accademia dei Concordi dei Rovigo (BACR), *Ms. Concordiano 364/39.1-44*. At the Biblioteca Nazionale Marciana (BNM) there are also two more letters that I have consulted: It X, 148 (=6685), n. 80-81.


76 I have not seen this petition and cite from S. Minuzzi, “Sul filo di segreti,” 213.
like crystalizations. In a letter to the Padua physician Antonio Vallisneri in 1715, Zannichelli also discusses his “book on iron, which in truth in no way was ever directed to offend […] but only to defend the name of those who love chemical things against certain badly founded Galenists…”\textsuperscript{77} Chemistry, Zannichelli continues, “is a sublime, and necessary Art.”

We can fully appreciate Zannichelli’s passion for chemical inventions from an extraordinary series of exchanges with Giangirolamo dal Formigeri, prior of a monastery in Mantua, who had hoped to realize a way to produced a universal distilled remedy by capturing the sun’s rays (\textit{De sole aereque capiendo}, On Capturing the Solar Air).\textsuperscript{78} The files contain a number of clumsy, yet fascinating attempts to design a machine capable of harnessing the sun’s rays with mirrors. In Zannichelli’s rendering, the rays are refracted from a small mirror back to a kind of glass still that then concentrates the heat downward to fuse Sulphur and mercury in a mortar. The process thus replaces the artificial alchemical fire produced in a furnace with the sun itself, distilling downwards to produce a chemical super-drug. As Zannichelli notes next to his drawing, the process would not make the philosophr’s stone, “but believe it would make a good medicine.”\textsuperscript{79}

\textsuperscript{77} BACR, \textit{Ma. Concordiano}, 364/39.19, (aug., 1715). “…del mio libretto de ferro l quale in verita ne in alcun modo é mai stata diretta al offesa ne dal S. Sancassani ne il qualunque altro, ma solo per difesa del nome di chi Ama la cose Chimiche contro certi anco mal fondato Galenisti…” The reference to the Sancassani appears to be directed at a pharmacy possible at the San Cassiano church. I have not pursued this possibility.

\textsuperscript{78} BOBP, \textit{Mss. Zannichelli}, Ar. 12, n. 6.

\textsuperscript{79} Ibid., “non si farebbe la famosa pietra ma crede che verrebbe un buon medicamento.”
In another letter to Vallisneri of the same year, Zannichelli relates to the professor that he had just read his “worthy reflections” in an unnamed book: “there is not a page on which I have not rested and documented for my own satisfaction and for utility have reread, an evident sign of the perfection of the work.”\textsuperscript{80} However, in order to be of better

\textsuperscript{80} BNM, It. X, 148 (=6685), n. 80.
“advantage to the Literary Republic,” Zannichelli wondered if perhaps Vallisneri should have composed his book in Latin and not Italian. The book Zannichelli refers to is very likely Vallisneri’s *Istoria del camaleonte affricano, e di vari altri animali d’Italia* (History of the African Chameleon and various other animals of Italy, 1715). The animal had long resided at the center of Renaissance natural history collections for its remarkable capacity to adapt to the colors of its immediate surroundings. For Vallisneri, it was but one of numerous natural marvels that he critically investigated by experiment throughout his career to demonstrate nature’s uniform laws and rid science of the language of occultism. Through his enormous epistolary network and as a member of the Royal Society, moreover, he remained up to date on wider publications throughout Europe. With respect to the chameleon he cites “the newest thoughts of Sig. Isaac Newton” on light refractions to explain its color changes, asking his readers to tolerate his presentation that may seem to them “bizarre and foreign” since in Italy the news still may not have reached readers.

Vallisneri, who was also a native of Modena, also appears to have held Zannichelli in high esteem, referencing the apothecary’s observations in his own publications whenever possible. In an essay considering the longstanding problem of the viper’s mode of birth, Vallisneri reprinted “an observation made by the celebrated Signor Girolamo Zannichelli, well versed in Natural and Medical History and a Discoverer of many new things.” In another essay on the nature of fossils, Vallisneri cites the

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81 Ibid., “…per avantaggi della Repubbliche Literaria…”
82 Antonio Vallisneri, *Opere diverse* (Venice, 1715), 16.
apothecary’s own book on the subject, praising his “exact figures” describing the the structures of the fossil stones. This concern for exact precision in empirical description as a necessary ground for experimental practice is a constant theme in the writings of both men in the early eighteenth century. This is the general tenor of Zannichelli’s posthumously published *Istoria delle piante che nascono ne’lidi intorno a Venezia* (History of the plants that grow in the beaches around Venice, 1735). The work was clearly inspired by Antonio Donati’s *Trattato de’ semplici* of 1631, which Zannichelli and his son Giacomo who edited the work, refers to frequently. In the opening discourse Giacomo relates how his father had gathered materials to produce an updated version of Donati’s project which he describes as “a history of the virtues and the uses that could be made [of the plants] in medicine.” Donati, however, had “no idea” that his work would be the first local study of medicinal plants in Italy, a sentiment that leads Giacomo to recite a century’s worth of local studies from the Americas to Europe. His father, Girolamo, had apparently considered republishing Donati’s book, but decided to produce another that would be “deprived of the imperfections and defects that one finds in that of Donati.” The main defect of Donati’s work was the imprecise nomenclature, and most certainly, the marine satyr that makes no reappearance in Zannichelli’s version.

In manuscript volumes kept in Padua, Zannichelli also lists the sources of the materials found in his natural history collection, published as a catalogue in 1720.

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85 Ibid., “Prefazione”.

Among them were several pieces acquired from the Lucern physician Karl Nikolaus Lang (1670-1741), the Zurich physician Johann Jakob Scheuchzer (1672-1733), the famous Dutch anatomist and botanist Frederik Ruysch (1638-1731), and the English botanist and geologist John Woodward (1665-1728).87 Ruysch is known for developing his secret preserving fluid, *liquor balsamicum*, perhaps the first arterial embalming fluid to appear in European medicine. Woodward was a member of the Royal Society whose first book was entitled, *An Essay toward a Natural History of the Earth and Terrestrial Bodies, especially Minerals* (1695).88 The names listed in this manuscript and the materials circulating between them, thus testify to the truly international connections that bound the Golden Hercules pharmacy to the larger Republic of Letters in Europe. Closer to home, Venice’s pharmacies were also sites of renewed encounters between learned natural philosophers and apothecaries. With support of figures like Antonio Vallisneri, a new debate began in the early eighteenth century to add a third “chemical theater” at Padua to go along with the botanical garden and anatomical theater.

By the latter seventeenth century the university at Padua had lost some of its previous luster, yet an appreciation for novel developments in the empirical study of nature continued to shape university courses.89 The leading medical figure in Italy during this period was Bernardino Ramazzini (1633-1714) who transferred to Padua from

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88 | Another important figure closer to home was Louis Bourguet (1678-1742), teacher of philosophy, mathematics at Neuchatel and correspondent with Gottfried Leibniz.

Modena in 1700. His novel studies in clinical medicine led to his groundbreaking work in occupational medicine, *On the Diseases of Workers* (1700). In the field of pharmacy Ramazzini’s investigations of the bark of the Peruvian *cinchona* tree, recently imported into Europe, were among the earliest to lend medical support to the use of the substance to combat malaria. Venetian inventories show that the bark had already been circulating in apothecary shops well before Ramazzini’s studies, suggesting that *cinchona* was an established commercial commodity before it emerged as an object of intense scholarly scrutiny in the early eighteenth century. By the end of the century the active substance in the bark was revealed to be *quinine*, still used today in artificial form as a standard anti-malarial.

In the early eighteenth century chemical medicine began to emerge as a serious topic of investigation in Italian universities. At Padua, Domenico Guglielmini (1655-1710) published important books on the chemical composition of bodily fluids, including his *De Salibus*, one of the earliest discussions of salt crystallizations in the blood. The anatomist Giambattista Morgagni had also noted the presence of weak acids in his studies of vitreous humors. An enthusiastic student of chemistry, Morgagni had once spent nearly a year learning the practical rudiments of the new science in the apothecary shops of Girolamo Zannichelli and Domenico Offi.  

90 The chemical distilling of plants to understand how they “are composed, and the faculties that they have” was already an established part of the teaching of medicinal simples at Padua.  

91 However, serious efforts

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91 Padova, Biblioteca Universitaria (=B.U.P.), ms. 2224: *Carte relative all’Università di Padova*, f. 276. According to Giacomo Antonio Cortusio in his 1591 *L’orto de i semplici di Padova*, the new garden was already equipped with distilling facilities., f.4v.5r. Giornani in citation above, has also drawn attention to
to form new institutions dedicated to experimental physics and chemistry were not fully articulated until 1713 when Scipione Maffei revisited Guglielmini’s earlier proposal to establish a school of experimental physics. In Maffei’s view the school should also include courses in chemistry. However, the proposed “academia” was to be outside of the university – as had already happened at Bologna in 1714 – and thus generated significant opposition in Venice and Padua.

The long, tangled process of administrative delays and struggles for precedence at Padua leading to the new chair of chemistry has already been narrated by Giornani. I will concentrate here on a selection of opinions offered by medical professors at Padua regarding the nature of *chimica experimentale* and its proper mode of instruction. Opinions clearly differed on the reduction of chemistry to medicine, as well as the role accorded to the laboratory instructor. In a letter to the *Riformatori* dated February 13, 1727, the professor of practical medicine Allessandro Macoppi contended that when chemistry “is only restricted to medicine, it would not be distinct from the reading of simples” already undertaken in the botanical garden. He continued:

If however by chemistry you mean an experimental “philosophy by fire” and an experimental physics that requires a great number of instruments, then there will come the necessity to erect a laboratory in a form similar to the anatomical theater…chemistry being an anatomy not of iron, but of fire, in which one shows, as in public anatomy, the operations and the effects of the art, carrying away the physic-mechanical reasons that result from them; such that the professor would be an operator demonstrating chemical philosophy, as it is practiced in the academies beyond the Alps.

The chemical teachings and book of a German graduate from Padua, Jacob Barner in the 1670’s. His book is titled: *Excercitium chymiae delineatum* (Patavii, 1670).

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92 See, cit. 57.

At the University in Montpellier, Macoppi claimed to have witnessed instructors “with their own hands raise the fire and go philosophizing above the mutations that happened to the materials closed in the glass vases.”94 Returning to his original thoughts on the reading of simples, Macoppi reminded the superintendents that “the chair of chemistry is not the reasoning and demonstration of simples, but rather of facts derived from laborious operations, and as the chemists feel, it is an art of the mind and of the hand, of the eye and of the fire, and of Minerva and of Vulcan.”95

In his own letter to the Riformatori only two days later, the chair of theoretical medicine Antonio Vallisneri instead suggested that the new school should restrict itself to “the most necessary, healthy, useful, and plausible of chemical activities,” which in Vallisneri’s view concerned the production of “remedies most efficacious from the three kingdoms of nature to conserve the health of man.”96 The school, moreover, should take care to avoid the transmutation of metals and the manufacture of universal medicines often associated with “certain visionary philosophers or by supposed adepts full of mysteries and impostures.” Like his colleague Macoppi, Vallisneri insisted on the need for practical demonstrations in an accommodating laboratory: “this is one of those arts, similar to anatomy, or to botany, of products and operations that one cannot make a good memory of or preserve it faithfully in memory by the voice alone if one cannot see.”97

94 Ibid.
95 Ibid.
96 ASV, Riformatori dello studio, b. 442. Vallisneri to Riformatori, Padua 15 febbraio 1727.
97 Ibid., “Questa e’ una di quelli Arti, simile alla anatomia, o alla botanica, de prodotti, e operazioni delle quali non si puo fare una giusta idea, ne conservarla fedelmente nella memoria sulla sola voce, se non si vede.”
The expenses for the laboratory Vallisneri estimated at 545 ducats, 350 for the new
teacher, and the rest for burners, ovens, glass vases, and materials. As for the potential
instructors who might work on the new laboratory, Vallisneri suggested his apothecary
friends Zannichelli or Giuseppe Offi:

I still believe that any good chemical apothecary would embrace with a discrete salary
these tasks to always work in the laboratory, conceding a license of some useful profit to
him which chemical apothecaries have in Venice, like Signor Zannichelli, and
others…you will also find a certain Sig. Offi…who now is an excellent apothecary,
resourceful, very ingenious, and practiced in all of the chemical operations, some of
which he has shown me that are most perfect.98

To drive home his point regarding the necessity of a chemical laboratory with good
instructors Vallisneri added that a school of chemistry “without experiments, is like a
body without a head, or like a tree full of foliage, but bearing no fruit.”99

Finally in a separate letter in the same file undated and unsigned but bearing the
heading, “Reflections on the Chair of Chemistry and the Erection of a Chemical
Laboratory,” the author (possibly Vallisneri?) suggests that chemistry is “the husband of
medicine” and is divided into two main parts: teorico-prattica and farmaco-chimica. The
first he explains belongs to the professor of medicine, the second to the worker (operaio):

These two parts which compose one are, however, in themselves distinct. The office of
the first is to investigate the nature of mixed bodies and to examine their forces, so that
they may be purified and put to positive use in medicine for the health of human bodies.
The office of the worker is to work the ovens, to ferment, to distill, to crystalize, to do in
sum all that is prescribed by teoria-prattica…because of this difference I consider that
every pharmaceutical shop is in a certain way a laboratory of chemistry: that there are
many expert workers in this art who are in Venice and in other cities of the state…thus, to
erect a Chemical Laboratory one could interpret it as being the same as opening a new
shop of medicines, when [shops] lack neither medicines, nor makers. What they lack is
science [italics mine].100

98 Ibid.
99 “…una cattedre senza esperimenti, come un corpo senza il capo, o come un albero pieno di frondi, e
senza frutti.”
100 ASV, Riformatori, b. 442. “Posta questa differenza io considerare che ogni bottega farmaceutica è in
certo modo un laboratorio di chimica…l’eregere un Chimico Laboratorio si potrebbe interpretare lo stesso
The passage thus serves to preserve the traditional authority of university trained physicians in the same moment that the apothecary’s workshop skills, materials, and commercial spaces are appropriated for the advancement of science. In a strange twist, the learned apothecary represented in Zannichelli’s Venetian pharmacy with open book in hand, was again reduced to the position of shop assistant in the university. The debates in Padua thus mirrored those taking place in the rest of Europe, whereby learned scholars frequently discussed the ideas and systems they had to offer the artisan’s world, rather than what the artisan world had to offer them.101

Though the teaching of laboratory chemistry was not fully instituted until the second half of the century, the sampling of opinions covered here shows that chemistry was already accepted as an important new science despite the financial restraints that prevented the Riformatori from immediately building the planned laboratory. The ideas proposed by scholars like Vallisneri, moreover, did not emerge fully formed from the reading of chemical texts imported from northern Europe. Rather, the letters to the Riformatori in the 1720’s reveal that Venetian pharmacies, organized and regulated by the College of Apothecaries, provided learned scholars with their most concrete models for conceptualizing the new school of chemical medicine. Despite the physician’s well-practiced rhetoric denigrating the apothecary’s avarice and ignorance of philosophy, it was largely the apothecary’s cultivation of medicinal remedies and experimental investigations that radically transformed therapeutics over the course of the early modern

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101 Smith, *Body of the Artisan*, 237. According to Thomas Sprat in his *History of the Royal Society* (1667): “The weak minds of the Artists themselves will be strengthen’d, their low conceptions advance’d, and the obscurity of their shops inlighten’d”.

period. By the eighteenth century the new standard of public credibility - as Voltaire’s Professor Pangloss reminds us - no longer accepted the university professor’s grandiose philosophical webs and dubious natural causes. Rather, the new men of learning, including Vallisneri and his apothecary friend Zannichelli, recited the values of sobriety, plain speech, dispassionate observation, precise empirical description, and open public discourse in the study of nature.\(^\text{102}\) The Baroque fascination with natural resemblances, sympathies, natural \textit{secrets}, and objects that appeared to play games with the borders of the three natural kingdoms, slowly disappeared from medical books and natural histories in the eighteenth century.\(^\text{103}\) In their place readers found a heightened fascination with classificatory schemes culminating in Linnaeus’ project to organize all living organisms by their reproductive characteristics. By the mid-eighteenth century, the playful spectacle of Nature had emerged from behind its Renaissance and Baroque masks to reveal a more rigidly scripted performance of natural laws appreciated by ever smaller circles of learned adepts.

Chemistry’s fundamental concern with understanding the compositional “nature” of natural bodies thus had strong appeal for eighteenth century naturalists in Italy and elsewhere in Europe. The truly expert practitioners, as the Paduan professors argued, did not begin their labors with elaborate philosophical systems, but with the empirical evaluation of natural objects. Perhaps more than any other discipline of knowledge, the new chemistry rode forward on the confident belief that Nature could be improved upon,


and even perfected by the combination of intellectual and manual labors in the laboratory. As we have seen in this chapter, such notions found their clearest illustration in the commercial workshops of artisans that had long engaged in the practice of imitating nature’s forms and processes in their works of art, crafts, and medicines. In Venice the apothecary trade benefited from the Republic’s support of artisan activities, publishing networks, and commercial connections to achieve levels of independence and material sophistication unseen in many other European cities. The evidence presented in this chapter makes it clear that their contributions extended well beyond the medical profession to include significant and lasting transformations in the ways learned European culture investigated and understood the natural world.
Conclusion: Guildsmen and Early Modern Science

Throughout this dissertation I have endeavored to characterize Venice’s community of apothecaries as active participants and contributors to the scientific culture of the early modern Republic of Venice. Doing so has required situating these little studied figures on a shared stage with the learned scholars and university intellectuals whose statements on the structure and meaning of nature have constituted the canonical literature of early modern science. This stage, I have argued, was the urban pharmacy - the central instrument through which apothecaries developed a dialogue with scholars whose expertise over nature was sanctioned by their formal university training in classical traditions of natural philosophy. The chapters of this study have therefore focused on the evolution of the pharmacy and the various ways in which it was practiced and represented in the Venetian urban environment.

As several recent studies have shown, pharmacies were crucial elements in the urban economies of late medieval and Renaissance cities, while medicinal manufacturing and retailing emerged as activities broadly diffused across all social levels in early modern society. However, the manufacturing and marketing activities of apothecary guildsmen in the period between 1550 and 1700, when a new experimental discourse rapidly transformed natural philosophy, have received less attention. While we now possess important new studies of apothecary commercial practices in late medieval and Renaissance Florence and Rome, sixteenth-century apothecaries have only been studied in isolated cases as virtuosi collectors of nature and museum curators. As for the seventeenth century, we know even less about their activities, both commercial and scientific. The sum result is a curious bifurcation of the apothecary trade in historical
scholarship that has demonstrated their importance to late medieval urban economies, while thoroughly ignoring their commercial practices in the later early modern period to better demonstrate the natural historical practices of a few noted figures at the end of the Renaissance.

While drawing lessons from these approaches, this study has departed from them in important ways by presenting an account of Venice’s apothecaries in the early modern period that overcomes traditional representations of their marketing and scientific activities as distinctly separate enterprises. In the sixteenth century, Venice’s apothecaries adapted to the changing dynamics of the Republic’s medieval primacy in long-distance commerce to remain key contributors in the new urban economy of manufacturing, services and retail distribution. During this period they also made efforts to take control of their trade through their Nobile Collegio, a title that served to distance their profession from the guild community of mechanical arts. The title also suggested – at least in name - their equivalent status with the university-trained members of the Venetian College of Physicians. However, in its statutes and daily functions, the College of Apothecaries differed little from the guilds in establishing quality control standards, rules for accreditation, and funds to take care of members in times of need. Aside from these obligations, the purpose of the College seems clear from the sources: to protect their manufacturing monopoly in theriac, and to reserve their autonomy from the controlling mechanisms of the physicians who aimed to subject them to a public pharmacopeia. On both accounts, the guild was largely successful until the end of the eighteenth century. By the second half of the seventeenth century, we find Health Office statutes referring to the College’s members as “Public Professors,” a title that reflected their growing expertise
over the increasingly technical procedures and material complexity of the new medical chemistry.

Hence, even in the founding of the College of Apothecaries in 1565 we can trace the converging interests to consolidate retail liberties and monopolies on the one hand; and claims to an elevated status as learned medical practitioners (and thus, investigators of nature) on the other. In their publications, petitions and shop practices marketing their medical expertise and knowledge of physic, apothecaries were also marketing commodities. This point has already been made with respect to the numerous distillers, mountebanks and alchemists who operated on the margins of the incorporated medical community. However, guild-incorporated apothecaries present a crucial difference from these figures that allow us to more directly address the influence of medicinal retailing upon the birth of a new natural philosophy in the seventeenth century grounded in experimental practice. As we have seen throughout this dissertation, Venice’s apothecaries articulated their own claims to medical authority from a unique space sandwiched between the traditions of Greek rational medicine developed in the university, and the radical empiricism found in the mobile undercurrents of popular medicine practiced in the public square. In the formative period of the latter sixteenth century, apothecaries utilized their pharmacies to develop close relationships with both groups. The success of a pharmacy depended to a significant degree upon the cultivation of professional ties with practicing physicians, while itinerant healers relied upon pharmacies for material supplies to pursue their “secret” inventions. Often the remedies of apothecaries and charlatans were indistinguishable, placing pressure on apothecaries to invest in the retail displays of pharmacies to convey their status as sites of learning akin
to the scholar’s library. At other times, pharmacies served as important channels for the empirics to retail their own concoctions. The inventories and publications of apothecaries, moreover, strongly point to pharmacies as important processing centers for both medical books and novel materials in early modern Venice. As a result, pharmacies became important sites for the experimental melding of head and hand in the investigation of nature in a period when natural philosophers increasingly viewed scientia as knowledge actively produced through experimental interventions. By the close of the seventeenth century, the material culture of apothecary laboratories in Venice – which also must be seen as important retail investments – became the dominant model for university scholars in the Veneto to institute new experimental spaces enabling them to “go philosophizing with their hands”.

In tracing the roots of this important development I have cast a skeptical eye towards traditional dichotomies in the history of science between “Aristotelianism and Experimentalism” or “Galenists and Paracelsians” which tend to reify triumphalist narratives in which the latter exposed the failures of the former on the path to a new, experimentally inductive science. As we saw in chapter one, one of the key consequences of print technology and the arrival of Greek manuscripts in fifteenth-century northern Italy was the development in the universities of a critical stance towards the translated Latin inheritance of Greek philosophy and medicine. In new printed editions and translations, the medical humanists at Ferrara and Padua recast Galen, not as a philosopher in the Arab tradition of Averroes and Avicenna, but as a practical investigator who wrote extensively on the empirical sciences of anatomy and botany. This lent weight to the new university botanical and anatomical theaters at Padua which
constituted important reforms in medical education. The desire to recover the materials of the Greek pharmacy – and its reigning pharmaceutical product, theriac – inspired academic reflections on contemporary pharmacies and the practices of apothecaries in the influential works of Brasavola. A handful of Veneto apothecaries by the latter sixteenth century raced to meet the challenge of reproducing Galen’s theriac and achieved broad esteem as knowledgeable and experienced botanists within the circle of Pietro Mattioli, whose *Discorsi* on Dioscorides’ *Materia medica* was the most commercially successful botanical work of the century. These same apothecaries, including Georg Melich in Venice, produced their own tracts on the practice of their trade that were republished until the end of the seventeenth century. These works came to replace the traditional Latin compendia on Arab polypharmacy and display a more explicit concern for experimenting with this tradition using new techniques. Melich, who was noted as a skilled distiller of medicines even by the likes of Leonardo Fioravanti, defined the apothecary’s cultivated skill as the result of continuous “experiments accompanied by reason.” Melich’s cited authority for this claim was none other than Aristotle. Though less developed in its literary articulation, Melich’s outlook on apothecary practice is virtually identical with the procedures later discussed by the experimental Aristotelian anatomists at the University of Padua: Fabricius and William Harvey. The creative participation of Venetian apothecaries in the rich literary and medical culture arising from the Padua anatomy theater was further discussed in chapter four on the San Liberale pharmacy of Antonio Donati.

When we turn to the important topic of the rise of chemical laboratories in seventeenth-century Venice, we detect a similar apothecary strategy of enshrouding
experimental procedures in the authoritative cloak of the Greek physicians Galen and Hippocrates. In Venice, the traditional theriac remedy bestowed by Galen’s *Theriaca ad Pisonem* provided a frame for marketing chemical salt extractions of vipers as *sal theriacale*. At the Ostrich pharmacy, which served a site of experimental collaborations between physicians and apothecaries since at least the latter sixteenth century, the apothecaries Alberto Stecchini and Antonio de Sgobbis built on the profits of the pharmacy’s renowned theriac recipe to develop one of the city’s largest operations for chemical remedies. In the concluding chapter we saw how the viper salt medicine became an object of debate in Europe over Otto Tachenius’ acid-alkali theory of matter in his *Chemical Hippocrates* first published in Venice in 1666. A year later de Sgobbis produced his chemical encyclopedia which argued for the origins of spagyric medicine in the Greek medical tradition of Hippocrates and Galen, carried forward by moderns like Paracelsus, who in his own writings had little good at all to say about the Greek physicians. The tradition of identifying the new iatrochemistry with Hippocrates had a long afterlife in the eighteenth century, particularly in the writings of perhaps the most influential iatrochemist of that era, Herman Boerhaave.

Attention to the members of the Venetian College of Apothecaries thus teaches us that outside of Italy’s princely courts and universities – the sites traditionally identified with the practice of science on the peninsula – the urban terrain of apothecary workshops in a merchant Republic also provided a fertile ground for novel investigations of nature in the early modern period. This was enabled by the Republic’s liberal patronage of both artisan industries and a leading university that served as a training ground for an international faculty of medical students and professors. In this environment apothecaries
took advantage of the city’s status as an important contact zone between both groups, cultivating their pharmacies as sites of commercial, cultural, and intellectual exchange that left lasting marks on the ways nature was investigated and represented between the sixteenth and eighteenth centuries.

A second important consequence of apothecary commerce in nature was the significant expansion of the material culture of early modern science. This is readily apparent from the scattered inventories of Venetian pharmacies as well as the printed books surveyed in this study. As early as the 1560’s we find a number of American remedies at the Golden Head pharmacy including Peruvian balsam, guaiacum wood, and sarsaparilla. Other pharmacies stocked Indian and American bezoar stones, mechoacan, tobacco, and Peruvian bark, known as *cinchona*; a substance that quickly became an object of chemical analysis by the end of the seventeenth century and now known to be the source of the antimalarial, *quinine*. These exotic substances were joined with an extraordinary range of mineral and animal substances in seventeenth-century workshop laboratories designed to dissect them by means of controlled heat sources to isolate their subtle virtues. As we saw in the last chapter, the material culture of these urban laboratories greatly enhanced the prestige of some apothecaries who used them as bases to engage in the broader Republic of Letters that linked the scientific community on the cusp of the Enlightenment.

Finally, a third important development of apothecary marketing from the sixteenth century onward was the articulation of nascent experimental profiles placing practiced skill at the heart of natural philosophical practice. As recent studies have shown, the writings of natural philosophers such as William Harvey, Francis Bacon and
Robert Boyle betray a significant fascination with artisan practices in the seventeenth century. In Bacon’s view, experimental philosophers would be well advised to “do as the apothecaries do” in using material substitutes, or succedanea, to reproduce nature’s effects by other means. ¹ Robert Boyle went out of his way to consult dyers to understand their techniques on the way towards developing his color experiments for identifying acids and alkalis. As the model representative of the new experimental natural philosopher in the latter seventeenth century, however, Boyle was not willing to suggest that artisan practices contained anything more than rote learning. Nevertheless, like Harvey before him, Boyle also believed in the need to cultivate practiced skill and extensive familiarity with materials in order to better make philosophical judgments of what he had seen. What was important was the cultivation of art. This attitude we can see as early as the sixteenth century in the work of the apothecary Georg Melich. Following Pamela Smith’s interpretation of the apothecary Johann Glauber in Amsterdam, Venetian apothecaries around the turn of the seventeenth century also worked to fashion themselves not as commercial dealers or mechanical tradesmen, but as skilled artists learned in textual traditions and capable of materially reinventing them in poetic forms. In Venice we have no better example of this emerging attitude than Antonio Donati in his natural history of the Lido.

In Girolamo Zannichelli, however, poetics and invention matter less in his discourse on the Lido than dispassionate accuracy. As we saw in the debates on the new

¹ Francis Bacon, The New Organon (2000), 212. “Besides, as nature supplies cold so infrequently, we must do as the apothecaries do. When some simple cannot be had, they may take a substitute for it, a quid pro quo, as they call it: as wood of aloes for balsam, and cassia for cinnamon. In a similar way, we must carefully inquire whether there are any substitutes for cold: i.e. in what ways condensation can be induced in substances other than cold, which causes them as its own proper effect.”
school of chemistry at Padua, alchemical poetics were to have no place in the new
laboratory and came to signify venality and ignorance in the pursuit of nature’s timeless
laws. Yet even in Zannichelli’s strange experiments to harness the sun’s rays through his
machine to distill a new medicinal panacea, we can detect the continued presence of the
alchemical tradition and the material associations that gave shape to the centuries-old
notion of potable gold. With this liminal figure this study arrives at its conclusion, yet the
period that followed deserves every bit as much attention as the early modern centuries in
Venice. For it was towards the end of the eighteenth century that Venice’s apothecaries
identifiable with their public College, finally gave way to pharmacists trained and
certified in the research spaces of the modern university.
Appendix – Apothecaries and Apothecary Publications in the Republic of Venice

Notes: The following annotated bibliography lists known apothecaries who practiced in the Republic of Venice between the sixteenth and eighteenth centuries, their publications, and available biographical details. Included in this list are also Venetian editions of important pharmaceutical works composed by other Italian apothecaries who undertook careers outside of Venice and its territorial mainland. Each entry contains names followed by lifespan and/or time period of activity, biographical notes, publications, editions and dates, and further bibliographic references.

Angelico, Michelangelo (17th century)

Born in Vicenza, Angelico was an apothecary in the neighborhood of the Vitture. He was widely celebrated in Vicenza for his theriac and well known as a poet with several publications.

Publications:

- L’antidotario di Claudio Galeno Pergameno interpretato da Michelangelo Angelico nel quale si contengono di due libri de gli Antidoti, quello della Theriaca a Panfiliano, il trattato dessa à Pisone, & il discorso de 'sali theriacali (Vicenza: Domenico Amadio, 1613).

Auda, Domenico (17th century)

Roman Franciscan apothecary at the hospital Santo Spirito in 1652, whose books were also published in several editions in Venice between 1670 and 1750. Both books were published in several cities and in Venice by several printers. The Pratica is a dialogue very simplified and likely of great popular appeal.

Publications:

- Breve compendio di maravigliosi secreti (orig. Rome 1652; Venice 1663, 1667, 1668, 1672, 1676, 1680, 1686, 1692, 1696, 1716, 1736, 1776).

- Pratica de’ spetiali che per modo di dialogo contiene gran parte anco di theorica: opera utile et necessaria per quelli che desiderano ben comporre li medicamenti...con un trattato delle confetizioni nostrane per uso di casa (Venice 1670, 1674, 1678, 1683, 1696, 1713, 1736, 1740).

Bevilacqua, Francesco (1668-1764)
Born in Padova in 1668, was the apothecary and owner at the sign of the Acqua at Crosara del Santo and then later at the sign of San Gaetano. Published a botanical work in which he added a tract on human embalming, fruit of his experiences as a surgeon at the Pio Ospedale di Padova. Died in Padova in 1764.

Publications:

- Raccolta di sinonimi delle piante medicinali con unito un trattato sull’imbalsamazione (Padova, 1734).

Brescianini, Orazio (17th century)

Venetian apothecary at the sign of Santo Spirito. Collaborator with Antonio Donato and gathered material for the Trattato de’ semplici (see, Donati, Antonio).

Brochini, Melchiorre (17th century)

Venetian apothecary at the sign of the Calice. Collaborator with Antonio Donati in gathering materials around the Lido di Venezia (see, Donati, Antonio).

Calestani, Girolamo (1510-1582?)

An apothecary from Parma who went to Rome to practice his trade. His Osservazioni (1562) was first printed in Venice and went through several editions over the next century. The book broke ground as one of the first composed by an apothecary that aimed to relate experiences made on traditional pharmaceutical compounds. No less than eleven editions in Venice between 1562 and 1673.

Publications:

Delle osservazioni

Calzolari, Francesco (1522-1609)

Campolongo (Campolonghi), Ottavio (17th century)

Venetian apothecary at the sign of the Forno, wrote a work on theriac. Astrubale (Asdrubale) Mostravero wrote another tract in response to Campolongo’s work, Risposta alle consideratione d’Ottavio Campolongo (Venice: 1614).
Publications:

- Considerazione sopra la teriaca (Venezia: G.B. Bertoni, 1614).

Capello, Giovanni Battista (d. 1764)

Born in Pozzolengo near the town of Salò possibly between 1690 and 1700. Managed the pharmacy at the sign of the Tre Monti at San Appolinare in Venice around 1725. His book, the Lessico Farmaceutico-Chimico, was first published in 1728 and advertises numerous chemical remedies and American raw materials. The work went through eleven updated editions and offers an interesting account of the exam procedures employed by the Venetian College of Apothecaries. Capello also offers the first historical treatment of pharmacy in the Republic of Venice and remains an essential starting point for the still unwritten history of pharmacy in the eighteenth-century Venetian Republic.

Publications:


Bibliography:

M. G. Levi, Ricordi intorno agli incliti medici, chirurghi e farmacisti che praticarono loro arte in Venezia dopo il 1740 (Venezia: 1835), 19.

Chiavenna, Nicolo; Nicolao Clavena; Nicolaus Clavena (16th century)

An apothecary in late sixteenth-century Belluno who engaged in botanical observations of his local commune and composed a work on his reported discovery of a species of absinthium. His 1590 manuscript is still preserved in the Museo Civico of Belluno, “Historia Scorsoneræ Italicae Nicolai Clavenæ.” The published 1610 work prompted a vigorous rebuttal from the Venetian apothecary Pompeo Sprecchis (see Sprecchis below). Chiavenna’s son Cristoforo was later the apothecary at the Gatta in Venice.

Publications:

- Historia absinthii umbelliferi Nicolai Clavenæ (Venice: L. Deuchinum, 1610).

Bibliography:

**Corradi, Nicolo (17th-18th centuries)**

Apothecary at the *Lupo* in S. Fillipo e Giacomo. His name appears on the frontispiece of the Venetian publication of the Roman apothecary Domenico Auda’s *Practica de’ spetiali*.

**Bibliography:**


**Donati (o), Antonio (1606-1659)**

Born in Venice July, 1606, Donati took over the San Liberale pharmacy in Venice in 1631. Was the first to compile a catalogue with illustrations of all the rare plants collected in the Venetian Lido and later credited as the first to produce an illustrated medical catalogue of a local Italian *patria* (see Zannichelli below). Donati died in Venice May 22, 1659. For more on Donati and his book see chapter four.

**Publications:**

- *Trattato de semplici, pietre e pesci marini che nascono nel lito di Venetia, la maggior parte non conosciuto in Teofrasto, Dioscorides, Galeno ed altri scrittori diviso in due libri* (Venice: Bertano, 1631).

**Ferro, Giovanni Maria (17th century)**

Venetian apothecary who made botanical excursions around the Lido c. 1600. Compiled a large herbal in three volumes dated 1574 which has unfortunately been lost. His known works consist of commentaries on Castor Durante, Ferrante Imparato, and a translation of an iatrochemical tract by Giosseffo Quercetano, better known as Joseph Du Chesne.

**Leonardi, Francesco (18th century)**
Apothecary in Verona who wrote several tracts on hydrology in which he often confuted
the analysis of another Veronese apothecary Vincenzo Bozza who practiced at the sign of
the Pavone.

Publications:
- Analisi idraulica e chimica di F. Leonardi speciere all’insegna del S.antonio
dell’acqua di Rovere di Velo ultimamente scoperte, per M. Moroni (Verona: 1766)
- Apologia di F. Leonardi contro il libro intitolato: La conferma analisi delle acque
marziali di Rovere di Velo di Vincenzo Bozza (Verona: 1769).

Mantovani, Girolamo (18th century)
Of Veneto origins the abbot Mantovardi was also a renowned pharmacist in Venice at the
sign of the Redentore “in calle larga S.Marco”. Celebrated for his theriac and had
exclusive rights to the sale of the “acqua sub-amara” and “sale catarchico” di Modena.

Publications:
- Index alphabetico ordine digestus medicinalium omnium semplicium
  sompositorium, Venice, 1735.

Bibliography:
Modo di usare l’acqua sub-amara e il sale catarchico amaro di Modena scoperto
nell’anno 1750 dal dottor C. P. Moreali quale in Venezia si vendera dal solo sig.
Girolamo Mantovani nella specieria posta in calle larga S. Marco all’insegna del
Redentor (Tozzi, 1761).

Martini, Bartolomeo (1676-1720)
Born in San Bonifacio in the province of Verona, was an apothecary but also practiced
surgery. Was a member of the Accademia dei Naturalisti in Verona founded in 1716.
Made numerous trips to Monte Baldo and published at least one botanical work.

Publications:
- Herbarium generale (Verona: 1701).
Bibliography:


Georg Melich; Melichio, Giorgio (d. 1585)

Born in Augsburg, Melich travelled widely before settling in Venice to open the Struzzo pharmacy near the Rialto bridge. Melich’s pharmacy became the most important pharmacy in Venice well into the eighteenth century as a center of experimental practice and publishing. Melich’s Avvertimenti first published in 1575 became one of the most reprinted Italian pharmaceutical texts of the early modern period. For more on Melich see chapter three.

Publications:

- Avvertimenti nelle compositioni de’ medicamneti per uso della speziaria (Venice: 1575).

Bibliography:


Nuti, Michele (17th century)

Venetian apothecary who possessed a small botanical garden of more than 1035 species. In 1678 he compiled them in a published list in 1678, now lost. Mentioned in the Osservazioni naturali of Paolo Baccone (1684).

Passera, Felice

Cappucin brother from Bergamo. His book on pharmacy, Nuovo tesoro degli arcani farmacologici, galenici, & chmici, o spagirici (1688) was published in Venice and dedicated to the “Principessa di Castiglione & Laura Pica Grande di Spagna.”

Pona, Giovanni (1565-1630)

Practiced in Verona at the sign of the Pomo d’oro and enjoyed a European-wide network of famous contacts including Carolius Clusius in Antwerp and Ulysse Aldrovandi in Bologna.
Publications:

- *Del vero balsamo degli antichi, commentario sopra l’istoria di Dioscoride. Nel quale si prova che solo l’Opobalsamo Arabico è il legittimo* (Venice: 1623).

- *Plantae, seu, Simplicita ut vocant, quae in Baldo Monte* (Basil: 1608).


Bibliography:


**Pozzo, Zaccaria dal (17th century)**

A Venetian doctor who published on pharmacy and American plants. Remains important for his contacts with pharmacists at the Struzzo and Griffò, both centers of chemical pharmacy. Zaccaria is an important figure who helped mediate chemical remedies and Paracelsian ideas into Venice.

Publications:

- *Officina chymica fornacium, vasorum ac instrumentorum ad destillationem pertinientium* (Venice: Leonis Aurati, 1611).

- *Calvis medica rationalis, spagyrica et chyrurgia quae in tractatu consultorio de stranguria, pruritus & herpete exedente varia ac selectissima recludit praesidia* (Venice: Leonis Aureati, 1612).

- *De gumma Indica, radice antasmathica, Mechoacan, et Zalapa* (Venice: 1628).

**Santini, Giuseppe**

Apothecary at the Coral whose single publication of 1604 plagiarized major sections of Georg Melich’s *Avvertimenti* and the illustrated 1574 edition of the *Ricettario fiorentino*. His work also reproduced the Florentine pharmacopea’s images of various distilleries and furnaces.
Sgobbis, Antonio (b. 1631)

Born in Montagnana in 1631, De Sgobbis was an apothecary and owner of the Struzzo. In 1669 he was also prior of the College of Apothecaries. For more on this important figure see chapter five.

Publications:

- *Succinta e vera relazione del vero e legittimo sale viperino spagarico* (Venezia: Giuliani, 1660).

Sprecchis, Pompeo (17th century)

Venetian apothecary at the Struzzo and author of a polemical work against “l’assenzio ombrellifero” discovered by Nicolo Chiavena (see above).

Publications:

- *Antabsinthium Clavenae* (Venice: 1611).

Stecchini, Alberto (17th century)

Apothecary at the Struzzo following the departure of Melich’s pupil Paolo Romani. His 1627 edition of Melich’s *Avvertimenti* was updated with chemical remedies. In his added discourse on the “office” of the apothecary, Stecchini promised to produce another work devoted solely to new chemical remedies that he never carried out. The project was later completed by his successor Antonio de Sgobbis in his *Theatro farmaceutico* (1662).

Publications:

- *Avvertimenti nel composizione de’ medicamenti* (Venice: Giovanni Gueriglì, 1627).
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Biography

Sean David Parrish was born and raised in Tampa, Florida and took his Bachelor of Arts in History from the University of South Florida in 2005, and a Masters Degree in Early Modern European History from the same institution in 2007. In 2008 he entered the Doctoral Program in the Department of History at Duke University, receiving his Phd in Early Modern European History in 2015. His primary academic interests concern the everyday lives of artisans, craftsmen and their guild organizations in Early Modern Europe, with a particular focus on the Italian peninsula. In 2007-8 he served as an adjunct instructor in European History at U.S.F. teaching broad survey courses to undergraduate students. He has also spent extended time living and researching in Siena, Florence and Venice. Aiming to understand how these urban actors contributed to the important historical developments of this period, Sean has explored their modes of political organization and negotiations with early modern state builders, their commercial activities, and their practical investigations of nature that left important imprints upon “modern” scientific ways of knowing and investigating the natural world. His doctoral dissertation, *Marketing Nature: Apothecaries, Medicinal Retailing, and Scientific Culture in Early Modern Venice, 1565-1720*, examines the mutually productive exchanges between artisans and scholars in the making of a new experimental philosophy in the seventeenth century. As well as history, Sean’s other passion is painting, and he has shown his work in several public venues in South Florida over the last fifteen years. His experiences in the studio-workshop have ultimately shaped his historical interests in the cultural and material world of early modern craftsmen.