



# Bridging Traditions

Alchemy, Chemistry,  
and Paracelsian  
Practices in the  
Early Modern Era

Edited by  
Karen Hunger Parshall,  
Michael T. Walton, and  
Bruce T. Moran

*Habent sua fata libelli*

## EARLY MODERN STUDIES SERIES

GENERAL EDITOR

MICHAEL WOLFE

*Queens College*

### EDITORIAL BOARD OF EARLY MODERN STUDIES

ELAINE BEILIN

*Framingham State College*

RAYMOND A. MENTZER

*University of Iowa*

CHRISTOPHER CELENZA

*Johns Hopkins University*

CHARLES G. NAUERT

*University of Missouri, Emeritus*

BARBARA B. DIEFENDORF

*Boston University*

ROBERT V. SCHNUCKER

*Truman State University, Emeritus*

PAULA FINDLEN

*Stanford University*

NICHOLAS TERPSTRA

*University of Toronto*

SCOTT H. HENDRIX

*Princeton Theological Seminary*

MARGO TODD

*University of Pennsylvania*

JANE CAMPBELL HUTCHISON

*University of Wisconsin–Madison*

JAMES TRACY

*University of Minnesota*

MARY B. MCKINLEY

*University of Virginia*

MERRY WIESNER-HANKS

*University of Wisconsin–Milwaukee*

# Bridging Traditions

Alchemy, Chemistry, and Paracelsian  
Practices in the Early Modern Era

Edited by  
Karen Hunger Parshall,  
Michael T. Walton, and  
Bruce T. Moran



Early Modern Studies 15  
Truman State University Press  
Kirksville, Missouri

Copyright © 2015 Truman State University Press, Kirksville, Missouri 63501  
All rights reserved  
tsup.truman.edu

Cover art: “The master and assistant distilling alcohol, a primitive form of reflex condenser,”  
from Conrad Gesner, *The newe jewell of health*, translated by George Baker (London: H. Denham,  
1576). M0012934, Wellcome Library, London.

Cover design: Teresa Wheeler

Library of Congress Cataloging-in-Publication Data

Bridging traditions : alchemy, chemistry, and Paracelsian practices in the early modern era :  
essays in honor of Allen G. Debus / edited by Karen Hunger Parshall, Michael T. Walton, and  
Bruce T. Moran.

pages cm.—(Early modern studies ; vol. 15)

Includes bibliographical references and index.

ISBN 978-1-61248-134-0 (library binding : alk. paper)—ISBN 978-1-61248-135-7 (e-book)

I. Chemistry--History. 2. Debus, Allen G. 3. Paracelsus, 1493-1541. I. Parshall, Karen Hunger,  
1955- II. Walton, Michael Thomson, 1945-2013 III. Moran, Bruce T. IV. Title: Alchemy, chemis-  
try, and Paracelsian practices in the early modern era.

QD14.B84 2015

540.9'031--dc23

2014016934

No part of this work may be reproduced or transmitted in any format by any means without  
written permission from the publisher.

The paper in this publication meets or exceeds the minimum requirements of the American Na-  
tional Standard for Information Sciences—Permanence of Paper for Printed Library Materials,  
ANSI Z39.48-1992.

To the memory of Allen G. Debus and  
Michael T. Walton.

# Contents

ILLUSTRATIONS .....	ix
INTRODUCTION.....	xiii
CHAPTER 1: Crafting the Chemical Interpretation of Nature: The Work of Allen G. Debus.....	1
Karen Hunger Parshall	
 PART ONE: Curious Practices and Practices of Curiosity	
CHAPTER 2: Johann Hayne and Paracelsian Praxis: Chemical Physiology as a Link between Semeiotics and Therapeutics .....	19
Jole Shackelford	
CHAPTER 3: Andreas Libavius and the Art of <i>Chymia</i> : Words, Works, Precepts, and Social Practices.....	59
Bruce T. Moran	
CHAPTER 4: Chymical Curiosities and Trusted Testimonials in the Journal of the Leopoldina Academy of Curiosi .....	79
Margaret D. Garber	
CHAPTER 5: Phlogiston and Chemical Principles: The Development and Formulation of Georg Ernst Stahl's Principle of Inflammability .....	101
Ku-ming (Kevin) Chang	

## PART TWO: Regional Contexts and Communities of Texts

CHAPTER 6: “If they are not pages that cure, they are pages that teach how to cure”: The Diffusion of Chemical Remedies in Early Modern Spain ..... 133  
 Mar Rey Bueno

CHAPTER 7: Prescriptions of Alchemy: Two Austrian Medical Doctors and Their Alchemical Manuscripts..... 159  
 Anke Timmermann

CHAPTER 8: The Chemical Philosophy and Kabbalah: Pantheus, Khunrath, Croll, and the Treasures of the Oratory and the Laboratory..... 186  
 Michael T. Walton

## PART THREE: Evaluations and Perceptions

CHAPTER 9: Paracelsus on the Sidereal Powers: Revisiting the Historiographical Debate between Walter Pagel and Kurt Goldammer ..... 209  
 Dane T. Daniel

CHAPTER 10: John Dee at 400: Still an Enigma ..... 226  
 Nicholas H. Clulee

CHAPTER 11: On the Imagery of Nature in the Late Medieval and Early Modern Periods ..... 250  
 Heinz Schott

CONTRIBUTORS ..... 294

INDEX ..... 297

# Illustrations

## CHAPTER 2

- Figure 2.1: Frontispiece, Johann Hayne, *Trifolium medicum*. . . 3rd ed.  
(Frankfurt am Main: George Heinrich Oehrling, 1683) ..... 22

## CHAPTER 3

- Figure 3.1: Detail from title page of Andreas Libavius, *Syntagma selectorum undiquaque et perspicue traditorum alchymiae arcanorum [tomus primus]*  
(Frankfurt, 1611–13)..... 62

## CHAPTER 10

- Figure 10.1: Title page from John Dee, *Monas hieroglyphica*, 1564..... 229

## CHAPTER 11

- Figure 11.1: “Nature,” from Jean Baptiste Boudard, *Iconologie tirée de divers auteurs* (Parme: Sebsterl.; [Drucker:] Carmignani, 1759)..... 255
- Figure 11.2: Emblem XVIII, from Guillaume de La Perrière, *Le Théâtre des bons engins* . . . (Paris: Janot, 1539)..... 256
- Figure 11.3: Emblem XVIII, from Guillaume de La Perrière, *Le Théâtre des bons engins* . . . (Paris: de Tournes, 1545)..... 258
- Figure 11.4: Emblem F 1, from Andrea Alciato [Andreas Alciatus], *Emblematum liber* (Augsburg, 1531. Reprint, Hildesheim; New York: Olms, 1977)..... 259

- Figure 11.5: Prudentia-Teppich (Prudentia Carpet). Kurpfälzisches Museum der Stadt Heidelberg..... 260
- Figure 11.6: Emblem 46, from Joachim Camerarius d. J., *Symbola et emblemata tam moralia quam sacra: Die handschriftlichen Embleme von 1587*, edited by Wolfgang Harms and Gilbert Heß (Tübingen: Niemeyer, 2009)..... 261
- Figure 11.7: Emblem 44, from Joachim Camerarius d. J., *Symbola et emblemata tam moralia quam sacra: Die handschriftlichen Embleme von 1587*, edited by Wolfgang Harms and Gilbert Heß (Tübingen: Niemeyer, 2009)..... 262
- Figure 11.8: Copper engraving, reproduced from Eduard B. Wüseke, *Freimaurerische Bezüge zur barocken Emblematis* (Münster: Bauhütten Verl., 1990). ..... 263
- Figure 11.9: “Cuncta refundit,” from Julius Wilhelm Zinckgraf, *Emblematum Ethico-Politicorum Centuria* (Heidelbergae: Ammonius, 1666) ..... 264
- Figure 11.10: “Serva Modum,” from Gabriel Rollenhagen, *Nucleus emblematum Selectissimorum . . .* (Utrecht: Passaeus; Arnhem: Iansonius, [1611]–1613), 2 Teil, Nr. 53 ..... 265
- Figure 11.11: “Scienza” from Jean Baptiste Boudard, *Iconologie tirée de divers auteurs* (Parme: Sebsterverl.; [Drucker]: Carmignani, 1759)..... 266
- Figure 11.12: “Theorie” from Jean Baptiste Boudard, *Iconologie tirée de divers auteurs* (Parme: Sebsterverl.; [Drucker]: Carmignani, 1759)..... 268
- Figure 11.13: “Éthique/Etica” from Jean Baptiste Boudard, *Iconologie tirée de divers auteurs* (Parme: Sebsterverl.; [Drucker]: Carmignani, 1759)..... 269
- Figure 11.14: “Calm consideration” from Jean Baptiste Boudard, *Iconologie tirée de divers auteurs* (Parme: Sebsterverl.; [Drucker]: Carmignani, 1759)..... 270
- Figure 11.15: Emblem 34, in Michael Maier, *Atalanta fugiens, hoc est, Emblemata nova de secretis naturae chymica . . .* (Oppenheim: de Bry, 1618)..... 273

- Figure 11.16: Title page, *Musæum Hermeticum, Omnes Sopho-Spagyricæ Artis Discipulos Fidelissime Erudiensn* (Frankfurt: Jennis, 1625). ..... 275
- Figure 11.17: Illustration from tract 1, Robert Fludd, *Utriusque cosmi maioris scilicet et minoris metaphysica, physica atque technica historia*. Vol. 1, *De microcosmi historia . . .* (Oppenheim: de Bry, 1617). ..... 277
- Figure 11.18: Title page, Robert Fludd, *Utriusque cosmi maioris scilicet et minoris metaphysica, physica atque technica historia . . .* Vol. 2, *De naturae simia seu technica macrocosmi historia* (Oppenheim: de Bry, 1618). .... 279
- Figure 11.19: Illustration from Cesare Ripa, *Iconologia* (ca. 1600), edited by Filippo Pistrucchi (1819). ..... 281
- Figure 11.20: Illustration from Cesare Ripa, *Iconologia* (ca. 1600), edited by Filippo Pistrucchi (1819). ..... 282
- Figure 11.21: Title page, Johann Georg Sulzer, *Unterredungen über die Schönheit der Natur nebst desselben moralischen Betrachtungen über besondere Gegenstände der Naturlehre*. Von neuem aufgelegt (Berlin: Haude und Spener, 1770)..... 284

# Introduction

Twenty men crossing a bridge,  
Into a village,  
Are twenty men crossing twenty bridges,  
Into twenty villages,  
Or one man  
Crossing a single bridge . . .

—Wallace Stevens, “Metaphors of a Magnifico”

**R**eference to Wallace Stevens’s early poem “Metaphors of a Magnifico” (1918) may seem an odd way to introduce a collection of essays related to early modern science and medicine and honoring Allen Debus (1926–2009). Yet there is a link between the poem and Debus’s historical research, namely, an awareness that in daily—as well as in historical—life, human beings are sometimes both in and out of the spheres in which others may perceive them. Debus was particularly concerned about making this distinction in regard to the traditions of knowing that shaped the contours of natural knowledge in the early modern era. Against those who sought to describe a single direction in the march toward modern science, he argued that those who seemed, from a historical distance, to be crossing the metaphorical bridge of the Scientific Revolution were not in lockstep. As actors in a scene yet to be written, they held differing views of what they were involved in and glimpsed various outlines of what they approached.

“[T]he Scientific Revolution was not,” Debus declared, “simply the forward march of a new experimental method coupled with the powerful tool of mathematical abstraction. For some the two were incompatible.”<sup>1</sup> Nevertheless, despite the differing intellectual traditions and ways of knowing that distinguished Renaissance thinking, Debus identified a certain intellectual posture

1. Debus, *Chemical Dream of the Renaissance*, 32.

in regard to uncovering nature's secrets that emerged from an interplay of practices described as mystical, artisanal, and experimental. Mixtures of method were essential to the process of inspiring new learning, and Debus had neither apprehension nor reluctance in joining together what some historians considered separate domains. In this way, he emphasized points of connection between apparently distinctive zones of comprehension and experience: magic and experiment, alchemy and mechanics, practical mathematics and geometrical mysticism, things earthly and heavenly, and especially, although it seems unnecessary from today's perspective, science and medicine. Such unions of apparent opposites came together for him in what he called the chemical philosophy, the chemical-Paracelsian approach to nature in which chemistry and chemical processes gained "divine significance," while also leading, through analytical methods and material experience, to the "fundamentals of nature." The book of creation was a chemistry book, and Debus seemed to share something of the religious awe of chemical philosophers when reading it. At the end of one of his earliest works, an essay published as the short pamphlet entitled *The Chemical Dream of the Renaissance* (1968), he revealed what may have been a private thought: "I would close by saying that I do believe that there was a chemical dream in the Renaissance—it was a search for our Creator through his created work by chemical investigations and analogies."<sup>2</sup>

Most of the essays collected in this volume introduce individual perspectives relating to the chemical and/or Paracelsian understanding of nature in the sixteenth and seventeenth centuries. Karen Parshall introduces Allen Debus's intellectual place within the history of early modern science highlighting, in the context of an intellectual biography, the historiographic circumstances for the emergence of a vision of Renaissance science in which the esoteric and the practical, the organic and the mechanical, the philosophical and the religious combined to characterize a quest for natural knowledge. Debus's vision and his approach to historical sources were not uncontroversial, especially as both problematized the "grand narrative" of the Scientific Revolution. His emphasis upon printed as opposed to manuscript sources was criticized as doing too little. At the same time, his contentions for the relevance of vernacular works were castigated as claiming too much. Debus did more than scratch the surface, and

2. *Ibid.*, 32–33.

his major work, *The Chemical Philosophy*,<sup>3</sup> although introductory, was groundbreaking as a result. Yet even here there were detractors, and one openly hostile review rebuked a perceived attempt to distance a Latinate elite from the social and intellectual settings of Renaissance alchemy and natural philosophy. Debus himself stepped both in and out of vernacular and Latinate traditions, and combining the two by means of renewed attention to manuscript and printed sources has become a major current among contemporary methods in the history of science and medicine, and underscores many of the approaches reflected in papers collected for this volume.

The title of this volume refers also to combining subjects that otherwise might be held distinct, and here too contemporary approaches continue the direction explored in introductory, but nevertheless pioneering, ways in Debus's accounts of "chemical philosophy." In that regard, the essays in this volume's first section, "Curious Practices and Practices of Curiosity," introduce an array of practices—some material, some textual, some public, some personal, some emerging from institutions—that reflect the variety of approaches and processes that gave shape to a knowledge of nature and the body in the early modern world.

Debus had referred to an "Elizabethan compromise" as a way of describing how certain altered features of Paracelsian theory and pharmaceutical practice came to be incorporated within a philosophically broadened Galenic system of medicine. Jole Shackelford expands and further targets this notion by focusing upon examples of physicians who, rather than compromising original Paracelsian ideas, remodeled and restructured them as practical chymical therapies. Bringing an abundance of new historical material to light from vernacular and Latin sources, he explores, in particular, the development of chemical uroscopy in the medical practice of the seventeenth-century German physician Johann Hayne (fl. 1620). While some viewed uroscopy as a disadvantage to blending chemical and Galenic practice, others presented it as a positive and practical therapy and diagnostic tool. In bringing together his own training and experience as a practitioner with traditional elements of medical theory and Paracelsian notions of astral disease and chemical diagnosis, Hayne transformed an apparently disordered and numinous system (based in Paracelsian notions) into therapies that influenced later therapeutic practices accommodating materialist and even corpuscularian views of matter.

3. Debus, *Chemical Philosophy*.

*Chapter 2*  
**Johann Hayne and  
Paracelsian Praxis**

**Chemical Physiology as a  
Link between Semeiotics and  
Therapeutics**

Jole Shackelford

**E**arly in his career as a Paracelsian scholar, Allen Debus developed the concept of an “Elizabethan compromise” to describe what he observed as the assimilation of Paracelsian drugs and select elements of Paracelsus’s chemical philosophy into an eclectic medicine that was fundamentally Galenic, but beginning to incorporate corpuscular ideas about matter. He found this assimilation to be especially characteristic of English medical publications in the late sixteenth and early seventeenth centuries, which were the subject of his first book, *The English Paracelsians*.<sup>1</sup> That chemical drugs, widely associated with Paracelsus and

1. Debus, *English Paracelsians*. “Elizabethan Compromise” is the title of chapter two and reflects the author’s use of this term in the final sentence of his earlier publication, “Paracelsian Compromise in Elizabethan England.” The concept earlier referred to Queen Elizabeth’s efforts to forge a religious compromise, as for example in Ross, “George Herbert and the Humanist Tradition,” 169, and Debus’s reference is clearly meant to place the reception of Paracelsian medicine into the cultural context of the English Reformation. Although Debus’s characterization has drawn criticism for oversimplifying English engagement with Paracelsian philosophy and

his followers, were taken into a Galenic polypharmacy is plain from the study of printed pharmacopoeias and physicians' records.<sup>2</sup> Debus's work also made it clear that Paracelsian theory was indeed compromised in salient published treatises of seventeenth-century European medicine, notably by the Helmontians. But the degree to which Paracelsian praxis—a theoretical system of diagnostics, prognostics, and therapeutics—was integrated into actual healing practices has remained obscure. It is perhaps a fitting tribute to Debus's leadership in this field to broaden his vision of the chemical philosophy in early modern science and medicine by illuminating those physicians who did not so much compromise the master's teaching as rework it and bring it into clearer connection with practical therapeutics.<sup>3</sup>

A number of published treatises suggest that such a praxis existed, but few have been studied extensively. Heinrich Nolle's *Hermetical Physick* is recognized as Paracelsian but has not received careful attention as a medical book,<sup>4</sup> and Friedrich Zobel's *Chymische Medicinische Perle*<sup>5</sup> and Johann Hayne's *Drey unterschiedliche neue Tractätlein*<sup>6</sup> are for the most part unknown to historians of science and medicine. Here, I will use Hayne's *Three Diverse New Treatises*, ostensibly separate tracts, but published together in a single pagination, as a tool for explicating the assimilation into a coherent approach to healing of what at first glance appears to be three diverse elements of Paracelsus's work: (1) his

---

religion and been to some extent revised, Debus's main idea that chemical drugs were incorporated into medical practice and that many of Paracelsus's philosophical and religious ideas were relegated to the intellectual backwater remains cogent, especially when applied to the age of Newton and the Enlightenment. A side effect of this historiography has been that historians have emphasized the assimilation of Paracelsus's ideas rather than investigating continuities in how his medicine was applied as a systematic therapeutic practice.

2. Pumfrey, "Spagyric Art," esp. 23–27, offers a thoughtful discussion of what considerations are useful for defining Paracelsians. He categorizes Paracelsians into three kinds: conscious followers of Paracelsus, promoters of chemical philosophy, and iatrochemists. He notes that the latter category includes medical writers and practitioners who adopt chemical remedies into an eclectic practice, without a commitment to a guiding chemical-philosophical pharmacology, with the result that Paracelsians and Galenists are lumped together. The eclectic nature of iatrochemistry in the seventeenth and eighteenth centuries is a consequence of the adaptation of chemical drugs to multiple kinds of therapeutic systems and the creation of a niche for them in printed pharmacopoeias.

3. The term "chemical philosophy" was not new with Debus's scholarship, which nevertheless did much to bring the term to the modern reader, but was an actor's concept or category in the early modern period.

4. Nolle, *Systema medicinae hermeticae generale*. Henry Vaugh translated Nolle's book into English, which I use for convenience, called *Hermetical Physick*. Here, as elsewhere, all spellings reflect the original sources.

5. Zobel, *Chymische Medicinische Perle*.

6. Hayne, *Drey unterschiedliche neue Tractätlein*. The book was published in three later editions—1663, 1683, and 1700—the last two with the title *Trifolium medicum* . . .

insistence on the spiritual origin of many of the most intractable diseases of this age, (2) the chemical and astral nature of these spirits and their manifestations, and (3) his adaptation of traditional medieval and Renaissance uroscopy and physiology to fit his chemical philosophy. Hayne's treatises can in this way serve as an introduction to how Paracelsian medicine, which seems chaotic and dysfunctional to the modern eye, functioned as a practical therapeutic system that incorporated salient features of traditional practices. This would have made his chemical medicine appealing to both patients and healers, even as it exposed them to novel ideas about chemical composition and analysis.<sup>7</sup> Although Hayne is ignored in modern historiography, his book was published in four editions in the seventeenth century and was a major source for the eclectic medical practice of the colonial Pennsylvania physician and religious leader George de Benneville in the eighteenth century. De Benneville is well known to American colonial historians as one of the founders of Unitarian Universalism, but his role as an immigrant colonial healer has only recently received scholarly attention. Given its prominent place in de Benneville's medical manual, Hayne's medicine may have been a more widely known and influential early modern application of Paracelsian chemical physiology to medical practice than the near absence of modern references implies.<sup>8</sup>

The 1663 and later printings of Hayne's *Three Diverse New Treatises* bear a title page and *ad lectorem* written by the well-known seventeenth-century chemical pharmacist and editor Johann Schröder, who identified Hayne's text as a German translation of a Latin original that was undertaken by the editor of the first edition, Georg Faber.<sup>9</sup> This first edition was printed in Frankfurt am

7. The chaotic nature of Paracelsus's writings is commonplace to his readers and attributed in part to the irregular nature of the sources and the contexts in which they were written and preserved. However, an assumption among historians of medicine is that providers of medicine often appeal to their patients on the basis of theory or explanation (rationalization)—this is one of the great strengths of the Hippocratic-Galenic system—and the connection between Paracelsus's chemical philosophy and his medical practice has not seemed sufficiently elaborated to me. The findings reported here are part of an attempt to reconstruct such a system, by looking at how Paracelsus's followers construed his ideas and practices.

8. I claim in "Paracelsian Uroscopy," 32, that Hayne's treatise and its use by George de Benneville are evidence for the existence of a practical Paracelsian therapeutics in the German-speaking world of the seventeenth and eighteenth centuries.

9. This is the account given by Schröder, the editor of the second edition, in the *ad lectorem*, last two pages (unpaginated): "Diese mit andern ihren Kranckheiten / neben auch einem sonderbahren *Iudicio Vrinae*, hatt vor etliche Jahren unternommen zubeschreiben und in Lateinischer Sprache aussgehen zulassen / der Vornehme *D. Iohan Hayne & c.* welches *Tractatlein* also angenehm gewest / dass es folgens *D. Faber* in die Teutsche Sprache zuübersetzen / und in Truck zu geben bewogen hatt."

*Chapter 3*  
**Andreas Libavius and  
the Art of *Chymia***

*Words, Works, Precepts, and  
Social Practices\**

Bruce T. Moran

*W*hen composing letters intended for publication addressed to Zacharius Brendel (the elder) (1553–1626), the sometimes-cantankerous school-teacher, alchemical author, and physician Andreas Libavius (d. 1616) adopted an attitude of notable humility and respect. After all, Brendel was at that time a professor of philosophy and medicine at the University of Jena. Libavius, by contrast, was a city physician and school superintendent in the more obscure town of Rothenburg ob der Tauber. Libavius recognized the social distance that separated him from his correspondent, and in his letters to Brendel, as well as to others, he began to focus as much upon the social world as upon the material and textual worlds in thinking about the necessary practices that would give artistic shape to the formless business that many people called *chymia*.

\*I wish to express my gratitude to Dr. J. Mark Sugars for help with difficult Libavian passages in Latin and Greek.

Brendel, he acknowledged, was an outstanding philosopher who had expanded medical knowledge and had improved the study of chemical medicines. In letters to the Jena professor, part of a publication project in which the letters may or may not have actually been sent, Libavius was clear about his purpose. He wanted to start a discussion about chemical essences, and, especially, to determine more precisely to what the term referred. Brendel, he thought, could offer insight, but he was adamant that a discussion of essences should not be a conversation about metaphysics. A chemical essence, he insisted, had to be discussed as something “chemical,” that is, as something in the physical, elementary world. “I keep myself in the chemical marketplace,” and “I do not wander about abstractly, nor am I tricked by a concern for phantasms and visions,”<sup>1</sup> he observed. Libavius intended to keep the focus upon the terrestrial realm, moving nature by means of nature, not by means of what was beyond nature,<sup>2</sup> as did some “chymists,” who considered essences to be tied to the heavens. At the same time, however, he rejected the popular, street-vendor opinions of those he called “parachymists,” who called anything that was only slightly altered an “essence,” including the waters, oils, powders, and salts that they then offered for sale. Clearly, some chymists were different from others, and Libavius looked to Brendel to help sort out not only what a chemical essence was but also what the essence of the art of true *chymia* ought to be.<sup>3</sup>

## MULTIPLE USES, MULTIPLE MEANINGS

Sometimes we are too quick to impose general meanings upon the terms we use. The early modern era referred to *chymia*, *alchymia*, *Hermetica*, *physica*, and *magia* in various ways dependent upon specific contexts and accepted views of nature. Competing definitions within a mixture of contexts have especially made identifying *chymia* the kind of effort that requires hitting a moving target.<sup>4</sup> Both Libavius and the Paracelsian writer and publisher of Paracelsian

1. “In foro chymico me contineo” and “Abstracte non vagor neque phantasmatum et specierum cura tangor”; Libavius, *Rerum chymicarum . . . liber primus*, 92–93.

2. “Naturam mouet per naturam, sicut agricola et hortulanus ex pomo producit pyra”; *ibid.*, 31.

3. *Ibid.*, “Epist. IX. De Essentiae vocabulo,” 92–97. See also Moran, “Essences and Mostly Clean Hands.”

4. See Park and Daston, “Introduction: Age of the New.” On further historiographic problems, see Newman and Principe, “Alchemy vs. Chemistry”; and Principe and Newman, “Some Problems with the Historiography of Alchemy.”

texts Gerhard Dorn (ca. 1530–84), for instance, thought that *chymia* was the means by which hidden powers could be extracted or separated from material substances, and both employed similar procedures, like distillation and sublimation, in their specific operations. Nevertheless, they could not have been further apart in defining what those hidden powers were, where they came from, and what chemical knowledge was actually the knowledge of. And it is not just the word *chymia* that was understood so differently. Alchemy too had its various definitions. Some had assigned the art of *alchymia* solely to the preparation and transmutation of metals. Some thought of it in terms of making medicines. Some limited it further to making a single medicine, an elixir. For some, it was *halchymia*, or the knowledge of preparing (mineral) salts.<sup>5</sup> Some thought of alchemy in purely mystical terms, following Hermes. Some, like Girolamo Cardano (1501–76) and Hieronymus Rubeus (that is, Girolamo Rossi, ca. 1539–1607), wanted to separate the art of distillation from alchemy. Others, like the medieval thinkers Geber and Avicenna, thought that alchemy produced waters and oils by means of distillation and sublimated a mercurial elixir for purposes of transmutation. Interpretive traditions also varied. Some followed Aristotle; some also connected their ideas to medieval authors. Some thought that Paracelsus (1493–1541) was alchemy’s true inventor.

As he made clear in one of his most imposing texts, Libavius considered *alchymia* to be a reference to an entire art, part of a category of knowledge called *ergalikos*, which offered explanations or precepts for things taken in hand (*egcheireseon*). Its practices included the extraction of *magisteria* and essences and required proficiency in the use of instruments and procedural know-how.<sup>6</sup> In its entirety, the art of *alchymia* comprised two parts. One part was *manuarius*, related to those things belonging to the hand, which were mechanic. The other part he called *ousiodes*, or essential. The former described specific kinds of physical labors, while the latter was both didactic, explanatory, and methodical, laying open to the eyes, and by means of precepts also to the mind, the rationale for special processes, natural powers, and varieties of practice.<sup>7</sup> *Alchymia*

5. Libavius, *Syntagmatis . . . tomus primus*, 4.

6. Ibid., 2. Müller-Jahncke, “Andreas Libavius im Lichte der Geschichte der Chemie”; Debus, *Chemical Philosophy*, 169ff.; Debus, “Guintherius, Libavius, and Sennert.” See also Meitzner, *Die Gerätschaft der chymischen Kunst*; Newman, “Alchemical Symbolism and Concealment”; Newman, *Atoms and Alchemy*, 68ff.; Moran, *Andreas Libavius and the Transformation of Alchemy*; Moran, “Less Well-Known Libavius: Spirits, Powers, and Metaphors in the Practice of Knowing Nature”; and Forshaw, “Paradoxes, Absurdities, and Madness.”

7. Libavius, *Syntagmatis . . . tomus primus*, 3.

Chapter 4  
**Chymical Curiosities and  
Trusted Testimonials  
in the Journal of the  
Leopoldina Academy of  
Curiosi**

Margaret D. Garber\*

Alchemy was once an integral part of medicine. Central European medical practitioners had been infusing bodies with mineral, metal, and curious chemical medicaments since the Middle Ages.<sup>1</sup> However, as the standard account goes, historical actors unfastened alchemy from its medical moorings in the eighteenth century, and chemistry set sail on its own as a discipline based upon manual procedures, standardized language, and useful symbols. The history of this conjunction and decoupling gave rise to debates that motivated much of Allen

\*I thank Bruce Moran and Karen Parshall for their helpful comments and suggestions. I am also grateful to Mary Fuller, Marcy Norton, Tara Nummedal, and the volume's editors and anonymous readers for their excellent recommendations. Any remaining errors are my own.

1. Chemical and medical interests crosscut both medical theory and productions of medicaments, and were called either *chymiatría*—pioneered through the writings of sixteenth-century authors as dissimilar as Paracelsus and Libavius—or iatrochemistry through the seventeenth-century works of authors such as van Helmont and de la Boe. See Moran, “Survey of Chemical Medicine in the 17th Century.”

Debus's scholarship during his long and productive career.<sup>2</sup> At odds with Butterfield's persistent "delayed chemical revolution," which claimed that Enlightenment rationalists created chemistry by shearing away its medico-alchemical past, Debus insisted that chemistry's academic acceptance depended upon its pharmaceutical value to schools of medicine—a move that established chemistry's university footing once physicians rejected chemical philosophy as a viable explanatory source for physiology. Pushing Debus's claim further, I argue that physicians and chemists received far more from alchemy than philosophy and pharmaceuticals. The rise of the "expert chemist" was linked to an earlier transformation of alchemical adept to physician adept, one whose chemical experience was measured by chemical productions. It was the gold-making transmutation believers themselves who initiated these efforts to standardize language and agree upon procedures and symbols.

In late seventeenth-century central Europe, physicians in the Leopoldina Academy of *Curiosi* illustrated their prominence in more than medical theory or pharmaceuticals, portraying additionally their dominance in skills involving ovens, fires, acids, minerals, and metallic salts, evidence of proficiencies that etched a design of legitimacy onto the pages of their embryonic medical journal, the *Miscellanea curiosi*.<sup>3</sup> This demonstration of proficiency issued in part from some members' apparent competence with transmutation, the transformation of baser metals such as lead into more noble metals such as gold or silver, a process known to historical actors as *chrysopoeia* or *argyropoeia*, respectively. The *Curiosi*, as a first society of physicians in the German territories, were not shy in seeking the status of *adepti*, those who excelled in the making of the most sought after of arcana, by actively engaging in chemical productions and appropriating alchemical recipes. Social legitimacy for physicians of the Academy of *Curiosi* rested heavily on their self-portrait as purveyors of curiosities and conveyors of medical authority, an identity that included practice in alchemical activities in their journal of curiosities.

2. Indicative of Debus's thesis, throughout a massive corpus, is notably *Chemical Philosophy*, 2 vols.; *Chemistry and Medical Debate*; and "Iatrochemistry and the Chemical Revolution."

3. Initially known from 1652 as the *Academia Naturae Curiosorum*, after 1687 upon imperial patronage, they renamed themselves *Leopoldina Academia Naturae Curiosorum*. Their journal was initially entitled *Miscellanea curiosa sive ephemeridum medico-physicarum germanicarum curiosarum*. With the exception of Büchner and Barnett (noted below), references to this society are contained within broader topics (listed chronologically): Büchner, *Academia Naturae Curiosorum Historia*; Ornstein, *Rôle of Scientific Societies in the Seventeenth Century*, 169–75; Thorndike, *History of Magic and Experimental Science*; Evans, *Making of the Habsburg Monarchy, 1550–1700*; and Barnett, "Medical Authority and Princely Patronage."

To amplify the Curiosi's practice with these activities, the term "chymica" figured prominently on the title page of the periodical's first thirty annual ephemerides (each of which contained some two hundred observations of singular, bizarre, or novel recipes, procedures, or events), even as it comprised only a small fraction of the journal's multiple curiosities. *Chymica's* prominence in the Curiosi's journal begs the question of exactly what its members meant by the term. Did it signify chemical medicine (*chymiatría*), alchemy, early chemistry, or all three? Recent scholarship has demonstrated the ahistoricity of defining alchemy and chemistry as related, but oppositional binaries, in such examples as vitalist/mechanist, irrational/rational, obscure/clear, occult/open (where alchemy occupies the former of the dualisms and chemistry the latter), leading to a positivistic *terminus ad quem*, pseudo-science/science.<sup>4</sup> Deploying such dichotomies retroactively onto the respective Latin derivations (namely, *alchymia/chemia*) distorts seventeenth-century authors' uses of these terms. As Lawrence Principe and William Newman have demonstrated, such divisions emerged partly as the result of an error that unreflectively continued to be cited and partly as useful metaphors for Enlightenment authors who portrayed chemistry as the illuminated path out of the darkness of alchemy.<sup>5</sup> Since late sixteenth- and seventeenth-century historical actors used the terms "alchymia" and "chymia" interchangeably, historians employ the term "chymistry" to prevent importing false binaries between alchemy and chemistry that have been enshrined in the historical literature of this science, especially that of the so-called "delayed scientific revolution."<sup>6</sup> Despite the laudability of the etymological correction, such a move should not obstruct historians from locating contexts in which historical actors *did* make other distinctions between these Latin terms. While "alchymia" and "chymia" were used interchangeably in many contexts, the Curiosi distinguished *chymia* or *chymica* (hereinafter *chymia*) by using this as a subset of *alchymia* or *alchimia* (hereinafter alchemy), without entertaining the aforementioned oppositional dichotomies.

4. Newman and Principe, "Alchemy vs. Chemistry"; and Principe and Newman, "Some Problems with the Historiography of Alchemy."

5. Principe and Newman describe Enlightenment writers' use of light/dark metaphors to distinguish chemistry/alchemy in "Some Problems with the Historiography," 386.

6. Newman and Principe note that the distinction between *alchymia* and *chymia* resides in the definitive Arabic article "al." To avoid presentist sensibilities when using the terms, they advise employing the archaic "chymistry." See "Alchemy vs. Chemistry."

*Chapter 5*  
**Phlogiston and  
Chemical Principles**

*The Development and  
Formulation of Georg Ernst  
Stahl's Principle of Inflammability*

Ku-ming (Kevin) Chang\*

The foundation of modern chemistry has traditionally been viewed as arising out of the debunking, first, of alchemy and, then, of the phlogistic chemistry of Georg Ernst Stahl (1659–1734). That historical narrative considers alchemical practitioners as credulous and unscientific, and interprets Stahl's chemistry as erroneous and detrimental to the development of what ultimately became “modern” chemistry. Trained to resist the received view of their subject, historians of alchemy, among them the students of Allen Debus, look past the branding as an obstruction of the work of Stahl by mainstream history of science.<sup>1</sup> Indeed,

\* I wish to thank Karen Parshall for her careful reading of several versions of this article and for her advice for revision.

1. There is another reason why students of Allen Debus would be interested in Stahl. In the many books he published and in the courses he taught on the history of Paracelsianism, Debus almost always closed briefly with two early eighteenth-century chemists, Hermann Boerhaave (1668–1738) and Stahl. While Boerhaave is, relatively speaking, well studied, many questions about Stahl remain. As Allen Debus's student at the University of Chicago, I had the privilege to ask him about Stahl. He always very modestly replied that he did not know enough to say more than he had written. It was clear to me that this was his way of telling me to begin on

this chapter aims to elucidate why historians of science *should* move beyond this branding of Stahl's work and take a serious look at, for example, his place in the history of chemical principles.

If Stahl has not been viewed as one of the major contributors to the history of modern chemistry, neither has his work been totally dismissed nor ignored by historians. Hélène Metzger, for instance, credited Stahl with two contributions. First, she judged that Stahl "transformed and broadened [the] concept of combustion by ranging calcination amongst the combustion phenomena: the calcination of metals was the same as the combustion of organic bodies and sulfur." Second, she held that Stahl was able "to prove his contention experimentally by causing 'combustibility' to pass from charcoal and pitch into both the metallic limes (reviving the metals) and vitriolic acid (restoring sulfur), as it were reversing the process of combustion."<sup>2</sup> This nicely highlights Stahl's two main contributions at the same time that it omits his by-now notorious notion of phlogiston. Many eighteenth-century chemists and savants, however, were happy to acknowledge both of Stahl's contributions by connecting them to phlogiston.

Thus, instead of avoiding phlogiston, this chapter analyzes Stahl's formulation of it in the context of the history of chemical principles. Unlike previous studies on the history of phlogiston,<sup>3</sup> however, it does not focus solely on historical discussions of combustion, a phenomenon with which phlogiston has long been associated. Rather it examines the development of the sulfurous principle in terms of what the chemical community expected of the chemical principle. Such a study requires an examination of several phases in the development of chemical principles from the late sixteenth to the eighteenth centuries. That development began with the three principles, or *tria prima*, that Paracelsus and his followers championed. It continued with the early acceptance of the principles in the first half of the seventeenth century, was met by criticisms of the *tria prima* at mid-century, and was followed by chemists who, unwilling to give up the three principles completely, adjusted their formulations of chemical principles in response to such criticisms. These formed the background for Stahl's knowledge of the sulfurous principle.

---

a research agenda of my own.

2. Metzger, *Newton, Stahl, Boerhaave, and Chemical Doctrine*, 213. The metallic limes in this sentence would be better translated as "metallic calces."

3. See, for example, White, *History of the Phlogiston Theory*; and Coleby, "Studies in the Chemical Work of Stahl."

The chapter next explores the interpretations of chemical principles at different points of Stahl's career, analyzes his formulation of phlogiston, and addresses his importance in carrying the principle of sulfur into the eighteenth century. The analysis of Stahl's work focuses on his definitive formulation of the sulfurous principle or phlogiston in *Zufällige Gedancken und nützliche Bedencken über den Streit, von dem so genannten Sulphure* of 1718 (hereinafter *Treatise on Sulfur*). It also addresses his theoretical generalization and experimental observations of that principle and highlights his effort to assess the adequacy and material consistency of chemical principles. This chapter thus elucidates the historical significance of Stahl's formulation of phlogiston by contextualizing his work within both his own intellectual development and the broader development of chemical thinking in Europe.

## THE PARACELSIAN *TRIA PRIMA*: EARLY DEBATES

The *tria prima* is often traced to the work of Paracelsus (1493–1541). He built his doctrine, on the one hand, on the Geberian theory of sulfur and mercury and, on the other, on Aristotle's elemental theory of earth, air, fire, and water. The Geberian corpus had taught that mercury and sulfur were the constituent materials of metals, although they were each a product of the four elements.<sup>4</sup> Paracelsus added salt to mercury and sulfur, made them the *tria prima*, and viewed them as present not only in metals but also in all natural substances. As in Geberian chemistry, sulfur denoted the substance that lent gold its distinctive yellow color and accounted for the inflammability of substances, like common sulfur, that caught fire easily. Mercury continued to signify the lustrous and malleable material nature that all metals shared, while it also became known as the principle of spirit, representing volatile "spirits" (vapors) that easily evaporated upon heating and condensed as distillates when cooled. Salt signified the quality of natural material that resisted fire or that coagulated as a solid. The *tria prima* can be said to have reflected observations of chemical operations with fire such as distillation and calcination. In a very general sense, these principles, like the Aristotelian elements, accounted for material qualities by their presence.

Paracelsus and his early followers presented a somewhat complicated framework in which the four elements and the three principles coexisted. For Paracelsus,

4. For Geberian matter theory, consult Newman, *Summa Perfectionis of Pseudo-Geber*.

*Chapter 6*  
**“If they are not pages  
that cure, they are  
pages that teach how  
to cure.”**

*The Diffusion of Chemical  
Remedies in Early Modern Spain*

Mar Rey Bueno

When Allen G. Debus published his article on the diffusion of Paracelsianism in Spain in 1998, it marked the first attempt within the international community of historians of science to discuss chemical medicine in early modern Spain.<sup>1</sup> Relying on earlier work of José María López Piñero,<sup>2</sup> Debus noted the absence of a Paracelsian tradition proper to Spain and attributed it primarily to the famous royal order promulgated by Philip II (1527–98) in 1559 that prohibited Castilian students from leaving Spain to further their education at European universi-

1. Debus, “Paracelsus and the Delayed Scientific Revolution in Spain.”

2. López Piñero, “Química y medicina en la España de los siglos XVI y XVII”; and López Piñero, “Paracelsus and His Work in the 16th and 17th Century Spain.” Compare, too, López Piñero, *Ciencia y técnica en la sociedad española de los siglos XVI y XVII*.

ties. It had been assumed that this order had the immediate effect of rendering Spanish science backward, therefore absenting Spain from the Scientific Revolution,<sup>3</sup> and of effecting more than a century-long retardation of the field in Spain. In this light, if, as Debus maintained, Paracelsus had at some point prevailed in Spain, it had been right when the rest of Europe was abandoning his ideas, that is to say, at the end of the seventeenth century. It was then that the supposed birth of Spanish chemical discourse took place within a group known as the *novatores*. In addition to defending the use of chemical remedies and practices for the treatment of illnesses, the *novatores* were also given to denouncing the backwardness of Spanish science and calling for the creation of new institutions where the doctrines of a new science could take hold.<sup>4</sup>

This was the narrative I encountered two decades ago when I began my research on the therapeutics practiced in Spanish courts during the sixteenth and seventeenth centuries, research based on archival documentation that, little by little, brought to light a completely different interpretation from the one prevailing when Debus wrote his important article.<sup>5</sup> The archives began to reveal a Philip II (who ruled from 1556 to 1598) significantly different from the historical figure portrayed by hostile contemporaries as a Catholic at all costs, who persecuted anything resembling modernity. Documents associated with his reign, in fact, showed him to be an enthusiast of the *ars separatoria*.<sup>6</sup> This passion led him, among others things, to establish as many as three distillation laboratories at three of his residences—the one at the Escorial becoming perhaps the most lavish in all of Europe<sup>7</sup>—and to institutionalize the profession of distiller (specialist in making chemical remedies)—by integrating it into the group of the physicians, surgeons, and pharmacists charged with maintaining his health.<sup>8</sup> Philip had, among his *protomédicos*, outstanding experts in the *ars separatoria* such as Francisco de Valles (1524–92), author of a treatise intended to teach the most appropriate methods of this art,<sup>9</sup> and Lorenzo Cózar (ca. 1540–ca. 1592),

3. See Padgen, “Reception of the ‘New Philosophy’ in Eighteenth-Century Spain”; and Goodman, “Scientific Revolution in Spain and Portugal.”

4. López Piñero, *Introducción de la ciencia moderna en España*.

5. Rey Bueno, *Señores del fuego*.

6. Rey Bueno and Alegre, “Renovación de la terapéutica real”; and Rey Bueno and Alegre, “Destiladores de Su Majestad.”

7. Rey Bueno, “*Mayson pour distiller des eaues*,” 26–39.

8. Rey Bueno and Alegre, “La ordenación normativa de la asistencia sanitaria.”

9. Valles, *Tratado de las aguas destiladas*.

author of the unique Paracelsian treatise published in sixteenth-century Spain<sup>10</sup> and creator of the chair *De remediis secretis* at the University of Valencia.<sup>11</sup> Philip also saw to it that pharmacists followed procedures in preparing distilled waters that prevented poisonings associated with the use of lead alembics.<sup>12</sup>

If this research resulted in the need to revise our understanding of science during Philip's reign, then an analogous revision is in order regarding the apparent resurgence of chemistry during the reign of Charles II (1665–1700), a resurgence, contrary to what Debus posited, that appears to have had nothing to do with a delayed reception of Paracelsus's doctrines. The *novatores* were not, *sensu stricto*, Paracelsians. To so characterize them reduces too severely the scope of their philosophico-scientific interests. It is true that they shared with the Paracelsians both a discourse in defense of applying chemical remedies to the treatment of disease and a denunciation of those whom they called traditionalist physicians. The latter had won university chairs, were the primary physicians of illustrious patients, and were viewed as having largely ignored the chemical literature of the preceding century and a half.<sup>13</sup> However, a reading of the hundreds of *opúsculos* exchanged between traditionalists and *novatores* over a forty-year period reveals that the charge of ignorance levied against the traditionalists was not as accurate as their detractors would have had us believe. Moreover, each side used the same information to attack the other. This paradox suggests that perhaps the *novatores* were not as advanced nor were the traditionalists as stagnant as conventional wisdom would have had it. In fact, it seems evident that the *novatores* decided to embrace chemical medicine in order to achieve one clear objective: to accede to the positions of power held by the traditionalists.<sup>14</sup>

Falling within two different centuries, the reigns of Philip II and Charles II point simply to two stages characterized by a greater *visibility* of chemical practice in early modern Spain. In contrast to the apparent lack of interest in the subject that seemed to characterize the first part of the seventeenth century, the second

10. Cózar, *Dialogus veros medicinae fontes indicans*. Cózar was initially studied by López Piñero in *El Dialogus (1589) del paracelsista Llorenç Cózar*.

11. López Terrada, "Llorenç Coçar."

12. Rey Bueno, "El informe Valles."

13. López Piñero, "Juan de Cabriada"; and López Piñero, "*Carta filosófica, médico-chymica*."

14. López Pérez and Rey Bueno, "Instrumentalización de la espagiería." Recently, John Slater has revisited the constituent document of the *novator* movement, the *Carta filosófica, médico-chymica* (Valencia, 1687) written by the physician Juan de Cabriada. In his masterful article, "Rereading Cabriada's *Carta*," Slater stressed the rhetoric of the *Carta*, an aspect fundamental to understanding the true interests that motivated Cabriada and, similarly, the majority of the writings of the *novatores*.

*Chapter 7*  
**Prescriptions of  
Alchemy**

*Two Austrian Medical  
Doctors and Their Alchemical  
Manuscripts*

Anke Timmermann\*

Allen G. Debus once summarized his motivations for working in the history of alchemy and medicine with a logic reminiscent of a syllogism. “[D]ebates over chemistry and chemical medicine in the sixteenth and seventeenth centuries,” he said, “played a very important role in the development of a new science. Science is an essential part of the world we live in. We cannot understand where we are today without a knowledge of the history of science.”<sup>1</sup> Debus’s oeuvre not only put Paracelsian iatrochemistry on the map in the history of science—and back in its place in early modern history—but also set a precedent for current

\* I would like to thank Karen Parshall, one of the editors of this volume, for her excellent suggestions for and kind assistance with the polishing of this chapter. The research for this publication has received funding from the European Union Seventh Framework Programme (FP7-PEOPLE-2009-IIF Marie Curie Action), project “AlchemVienna,” project number 252918.

1. Debus, interview by Bohning. See also Debus, “Essay Review: Alchemy and the Historian of Science: Elias Ashmole.”

scholarly debates about Paracelsian influences. Today, the history of alchemy/chemistry and medicine has intermingled and moved into periods and areas beyond Paracelsus and his followers.

The geographical region now covered by Austria provides a particularly interesting yet little-known example of the interaction between early modern alchemy and medicine. A central part of the Holy Roman Empire in the early modern period, the region—divided into various dukedoms—enjoyed autonomy in many public and legal sectors but in others fell under the authority of the imperial court in Vienna. It also experienced intellectual, linguistic, and cultural exchange with its immediate geographical neighbors. Most important for medical professionalization was the University of Vienna, which had been founded in 1365 both to surpass the rival universities in Prague and Krakow and to supersede the Italian universities. It regulated not only the examination of medical doctors but also the practice of pharmacies long before similar developments took place in other parts of Europe. Alchemy formed a natural part of the pharmaceutical and intellectual interests of doctors in Central Europe thanks to its highly developed mining industry, sophisticated practical crafts, flourishing trade along the Danube, and active circulation of alchemical knowledge through books, materials, and equipment. The history of alchemy and medicine in the archduchy of Austria and the Habsburg territories thus presents a rich combination of institutional and national factors, academia and craft, experimentation and regulation.<sup>2</sup>

This chapter investigates the lives and works of two doctors: Wolfgang Kappler (1493–1567), an apothecary doctor at Krems on the Danube in the archduchy of Austria, and Nicolaus Pol (ca. 1470–1532), a physician at the imperial court of Innsbruck in the Tyrol. Both showed a keen interest in alchemy and its medical uses. Their surviving books—substantial remnants of an extensive library in the case of Pol and a single manuscript reflective of Pol's influence in the case of Kappler—not only provide evidence of their practice and experiences as writers, readers, and practitioners of medicine but also inform our growing knowledge about the relationship between alchemy and medicine in the early modern period.

2. There has been some recent work on these themes. See, for example, Soukup, *Chemie in Österreich*; and Soukup and Mayer, *Alchemistisches Gold, Paracelsistische Pharmaka*. The history of the Medical Faculty of Vienna has not been fully realized. See, however, Horn, "Examiniert und Approbiert."

## WOLFGANG KAPPLER (1493–FEBRUARY 1567)

At the age of thirty-four, Wolfgang Kappler settled as a physician and apothecary in the town of Krems on the Danube, about fifteen leagues (seventy kilometers) outside of Vienna. Krems had a population of some four thousand at the time, comprised mostly of craftsmen whose work was closely connected with trading along the Danube. Kappler had received his medical education at the philosophical-medical Collegium artium liberalium et physicorum in San Giovanni/Bragora and in Venice, and subsequently held appointments as municipal physician (*Stadtphysicus*) in Brno and physician in Znojmo (both now in the Czech Republic), about 130 and 90 kilometers north of Vienna, respectively. He had thus gained extensive experience in different parts of Central Europe—both as a medical practitioner and in the manufacture of remedies—by the time he arrived in Krems. There, he soon became an influential physician, held positions on the town council, and generally showed a forceful disposition reminiscent of another physician born in 1493, Paracelsus. It is Kappler's personality that has largely determined his historical image.<sup>3</sup>

Three prominent episodes in Kappler's life particularly tie in with his interest in alchemy. First, on being offered the position in Krems, he demanded that from that moment on his pharmacy would be the only one authorized to sell medical remedies to physicians and the public. Not surprisingly, his blatant attempt to control the local medical marketplace did not sit well with other medical practitioners in the city.<sup>4</sup> Both Kappler and the city of Krems referred to and called upon Viennese experts—as well as their regulations of pharmaceutical practice—in the ensuing, extensive quarrel about the details of this arrangement.<sup>5</sup> Fundamentally a clash between money and power on the one hand, and the safety and quality of remedies on the other, this episode brought Kappler's experience in writing prescriptions and producing remedies, alchemical ones included, to bear in establishing professional standards in Krems.

3. Ottner, "Die Streitbare Natur des Doktor Wolfgang Kappler," esp. 79. Kappler's vita is outlined in Kühnel, "Kremser Apotheker," esp. 16–22.

4. Ottner, "Die Streitbare Natur des Doktor Wolfgang Kappler," 79–80; and Kühnel, "Kremser Apotheker," 17.

5. Ottner, "Die Streitbare Natur des Doktor Wolfgang Kappler," 80ff. For a more detailed discussion of medical and pharmaceutical regulations at Krems, see *ibid.*, 82ff.; and Ottner, *Dem gemeinen wesen zum besten* (on Kappler, see esp. 84–89). For Kappler's use of Viennese experts in the evaluation of his pharmacy, see Kühnel, "Kremser Apotheker," 19.

*Chapter 8*  
**The Chemical  
Philosophy and  
Kabbalah**

*Pantheus, Khunrath, Croll, and  
the Treasures of the Oratory and  
the Laboratory*

Michael T. Walton\*

Although the majority of Plato's works were unavailable in the Latin Christian West prior to the later fifteenth century, his ideas were not completely unknown.<sup>1</sup> Augustine, Boethius, and Macrobius had transmitted knowledge of his doctrines, especially those of the soul and one god, which seemed to presage Christian dogma. Plato was regarded as the exemplar of the virtuous pagan, and medieval philosophers referred to him as Moses Atticus. His ideas

\* Michael Walton died in 2013, before the publication of this volume and his chapter in it could be realized.

1. This study grows out of the work of Walter Pagel and Allen G. Debus, who demonstrated the need to broaden our understanding of the context of the development of early modern natural philosophy. It is also an elaboration of the themes raised in my book, Walton, *Genesis and the Chemical Philosophy*. I thank Dane Daniel for reading this essay and suggesting improvements.

had also been developed in the Hellenistic world into the philosophical religion of Neoplatonism. Influenced by the mystery cults, Neoplatonism purported to offer true seekers of wisdom and knowledge a way to move beyond the symbols in the temples of worship to soul-knowledge of the essence of Being.<sup>2</sup>

The works of Plato and the philosophical mystics became widely available in Greek and Latin in western Europe in the fifteenth and sixteenth century. Their study created Renaissance Neoplatonists, who viewed the ancient wisdom traditions—including Neopythagoreanism, gnosticism, and hermeticism, no matter how much they had been adulterated—as forming a coherent whole. Taken together with Christian scripture, those traditions revealed how God formed and sustained the world. Such knowledge conferred upon its possessors not only intellectual understanding but also the power to influence nature, that is, to practice white magic or to obtain the philosopher's stone.

Jewish mysticism, which purported to have been revealed to Moses at Sinai, also had roots in the Hellenistic world. Hidden knowledge and secret words gave the “kabbalist” access to mystical experience and power over nature. The word “kabbalah” appears frequently in sixteenth- and seventeenth-century texts, where it is usually spelled “Cabala.” Kabbalah complemented the Renaissance Neoplatonic tradition, and it was soon adopted and Christianized. Although most Christian kabbalists were primarily concerned with learning hidden religious truths, some believed they could find material truths as well. As these Christian Neoplatonists moved from textual studies to the laboratory, kabbalah became part of the chemical philosophical tradition.

This chapter will explore the use of the Christianized kabbalah in the chemical understanding of nature. Chemical kabbalah will be seen to be a subcategory of Christian kabbalah. This fact is best appreciated by analyzing aspects of the Christian kabbalah that were taken into chemical thought.

2. Ancient Neoplatonism reached its apex with the work of Plotinus, Porphyry, and Iamblichus in the third and fourth centuries of the Christian era.

## GIOVANNI PICO DELLA MIRANDOLA, JOHANNES REUHLIN, AND CORNELIUS AGRIPPA

The Renaissance iteration of Christian kabbalah, adopting and adapting Jewish ideas into the service of magic and Christian theology, was initiated by Giovanni Pico della Mirandola (Pico) (1463–94) and taken up by Johannes Reuchlin (1455–1522). In the kabbalah, Pico believed he had found the origin of the wisdom transmitted by Pythagoras and Plato; the Jewish texts, however, also revealed the incomplete nature of the Neoplatonic tradition. Although his own study was based on relatively few Jewish sources, translated into Latin, he had access in these to quotations from the primary kabbalistic works of *Zohar* and *Sefer Bahir* and from treatises by the mystics Menachem Recanati (1250–1310) and Abraham Abulafia (1240–91).<sup>3</sup> Among the quotations was Recanati’s statement that the divine names and attributes revealed by kabbalah were for the worshipper “the tools an artisan uses to fulfill his task.”<sup>4</sup> Kabbalistic tools were useful, if not essential, in gaining a proper understanding of scripture and restoring the pure knowledge given to Moses at Sinai.

Pico read the translations of Jewish texts through the lens of Christian tradition. He was especially attracted to magical doctrines involving the divine name, which, properly understood, supported the truth of the doctrine of the Trinity. Multiples of three, therefore, were preferable to other numerical configurations. For example, he preferred the *nine* angelic hierarchies of Dionysius Areopagite to the *ten* mentioned in his Latin copy of the *Corona nominis boni* by Abraham Axelrod of Cologne (fl. 1240).<sup>5</sup> Divine names, including the ineffable name (*nomen ineffabile*), were keys to understanding the creation, holy emanations (*sefiroth*), and Christian theology. Moreover, knowledge of divine names conferred power on religious adepts.<sup>6</sup>

In Pico’s work, prophecy and its clear perception of reality and the future depend on divine illumination. The twentieth “Cabalistic Conclusion” of 900

3. Wirszubski, *Pico della Mirandola’s Encounter*. Wirszubski has identified four Latin manuscripts of Jewish texts, translated by Flavius Mithridates, as the probable sources for Pico’s kabbalistic theses. Wirszubski’s study remains a fundamental source on Pico’s kabbalah. For a modern edition, with an English translation and commentary see Farmer, *Syncretism in the West*.

4. Recanati, *Commentary on the Daily Prayers*, 2:388.

5. Wirszubski, *Pico della Mirandola’s Encounter*, 22–23.

6. *Ibid.*, 23. See Pico della Mirandola, *900 Theses*, in *Syncretism in the West*, trans. Farmer, 346–47.

*Chapter 9*  
**Paracelsus on the  
Sidereal Powers**

*Revisiting the Historiographical  
Debate between Walter Pagel and  
Kurt Goldammer*

Dane T. Daniel

THE PAGEL VS. GOLDAMMER DISPUTE

The powers of the stars, and their relationship to humans, were clearly a principal concern of Theophrastus Bombastus von Hohenheim, or Paracelsus (1493–1541), the Swiss-German alchemist, medical practitioner, philosopher, and lay theologian. When reading of Paracelsus’s belief that the human spirit consists of sidereal matter and that the human can draw knowledge and magical powers from raining stardust, one is tempted quickly to tie him to Renaissance Neoplatonism and natural magic rather than to the religious milieu of the early Reformation. A number of scholars have indeed seen in Paracelsus’s discussion of the stars a direct tie to Marsilio Ficino’s (1433–99) concept of the *spiritus mundi*, the subtle material substance that functions as a medium between the heavenly and sublunar world; such “spirit bodies” and their magical and medicinal powers can

be attracted and employed.<sup>1</sup> Paracelsus did refer to Ficino on several occasions, even calling him the “best Italian physician,” and he probably knew Ficino’s *De vita* in German translation.<sup>2</sup> As we shall see, with regard to their respective views on magic and the sidereal bodies, there are striking parallels between Paracelsus on the one hand, and such Renaissance luminaries as Ficino and Giovanni Pico della Mirandola (1463–94) on the other. The characterization of Paracelsus as a Renaissance Neoplatonist is exceptionally problematic, however, and has evoked considerable debate.<sup>3</sup>

On this subject, the present chapter revisits an old quarrel regarding the sources of Paracelsus and focuses on Paracelsus’s concept of the stars, which exist both in the world (macrocosm) and human being (microcosm). On one side of the debate, Walter Pagel strongly linked Paracelsus to Renaissance Neoplatonism and gnosticism, emphasizing commonalities with Ficino and Pico della Mirandola.<sup>4</sup> On the other, Kurt Goldammer, who edited dozens of Paracelsus’s explicitly theological tracts, distanced Paracelsus from the Italian Renaissance and focused instead on the religious context, particularly that of the early Reformation in German-speaking areas.<sup>5</sup>

Opinions in the pertinent scholarship certainly tend to the extremes. (This is no surprise considering the exceptional difficulties in general that await the modern scholar who attempts to translate the early modern German while navigating Paracelsus’s unique and often misunderstood terminology and concepts,

1. See Hirai, “Concepts of Seeds and Nature,” esp. 274–76.

2. See Ficino, *Three Books on Life*, ed. Kaske and Clark, 12: “A German translation of *De vita* 1 and 2 was done by Johannes Adelphus Müling and published at Strassburg in 1505. Wilhelm Kahl and Dieter Benesch have identified seven more editions of the translation, *Das buoch des lebens*, between 1507 and 1537.” See also the manuscripts that have parts of the work in German translation: Heidelberg University Library, *Codex palatinus germanicus* 730, fols. 1–35v, and *Codex palatinus germanicus* 452. See also Paracelsus’s letter to Christoph Clauer (1527) in Paracelsus, *Sämtliche Werke I*, 4:71, in which he called Ficino the “Italorum medicorum optimus.” The fourteen-volume first division of the modern edition of Paracelsus’s collected works (treating medical, natural philosophical, and philosophical works) was edited by Karl Sudhoff and the seven-volume second division (theological writings) was edited by Wilhelm Matthiessen and Kurt Goldammer (with Matthiessen editing just the first volume and Goldammer the remaining editions).

3. Schütze argued that Ficino had no direct—if any substantial—influence on Paracelsus. See Schütze, “Zur Ficino Rezeption bei Paracelsus.” Clearly, Renaissance Neoplatonism is a difficult category to delimit. Here, it encompasses, in general, such famous Italian thinkers as Ficino and Pico and their influential invocation and transformation of ancient theories concerning magic and sidereal powers.

4. Two representative books are Pagel, *Medizinische Weltbild des Paracelsus*; and Pagel, *Paracelsus: Introduction to Philosophical Medicine*.

5. For example, see Goldammer, *Paracelsus in neuen Horizonten*; and Goldammer, *Paracelsus: Natur und Offenbarung*. Regarding the theological tracts, see Paracelsus, *Sämtliche Werke II*.

ranging from *archeus* to *nectromantia*, and from *Limbus* to *chirurgia coelestis*.) Pagel, a pioneering scholar in the history of medicine and science—who boldly examined fresh intellectual contexts with a willingness to evaluate and incorporate such hitherto fringe topics as alchemy and natural magic and their sources and significance—at one point even wrote that “Paracelsus’ whole life and work seems to be an attempt at implementing the ideal of Ficino’s priest-physician,” adding that Paracelsus derived his philosophical inspiration from “Ficino as the exponent of Neo-Platonism.”<sup>6</sup> Pagel was not looking at the explicitly theological tracts by Paracelsus (of which dozens of volumes exist, half of which are still not available in printed form), and given what he could examine, he deemphasized how the religious texts and Reformation context influenced Paracelsus’s natural philosophy. Some of this is attributable to Karl Sudhoff’s decision to present the modern edition of Paracelsus’s collected works in two divisions: (1) *Medizinische, naturwissenschaftliche, und philosophische Schriften*; and (2) *Theologische und Religionsphilosophische Schriften* (the second division of which became available only to a post-Pagel generation of scholars).<sup>7</sup> Another brilliant and trail blazing scholar, Allen G. Debus, echoed this sentiment in his book *The French Paracelsians*, wherein he added that the religious issues surrounding Paracelsus’s thought should be relegated to a “sociological study,” for they are extraneous to “intellectual history.”<sup>8</sup> Debus was, of course, focusing on the explicitly chemical thought of Paracelsus and his followers, a monumental task in itself, and in his amazing contributions to *Paracelsica*—even without access to the *theologica* within Paracelsian studies—Debus gave some of the most lucid commentaries on Paracelsian cosmogony.<sup>9</sup>

Goldammer, in contrast (and with access to the entirety of Paracelsus’s manuscripts), devoted nearly fifty years to the study of Paracelsus’s biblical exegeses, their significance within his natural philosophy, and their Reformation context. With regard to the relationship between Paracelsus and Renaissance Neoplatonists, he often whittled the connection down to mostly just a common thought world and common sources, for example, the Augustin-

6. Pagel, *Paracelsus: Introduction to Philosophical Medicine*, 223. Andrew Weeks pointed to Pagel’s thoughts on this subject in *Paracelsus: Speculative Theory*, 57.

7. See note 2 above. Sudhoff’s work on the collected edition was restricted to the first division.

8. Debus, *French Paracelsians*, xv, 6. Weeks notes Debus’s point in *Paracelsus: Speculative Theory*, 23.

9. It is well known that biblical cosmogony is an essential tenet of Paracelsianism, but it remains an underdeveloped topic in Paracelsus studies. Debus gave inspiring attention to the subject in several works, including *English Paracelsians*.

# Chapter 10

## John Dee at 400

### *Still an Enigma*

Nicholas H. Clulee

The year 2009 marked the four hundredth anniversary of the death of John Dee (1527–1609),<sup>1</sup> yet scholarly studies of this enigmatic figure’s life and work continue to seek a fuller understanding of his place in Renaissance history. In fact, something of a John Dee “industry” has blossomed in the last few decades. There have been three John Dee colloquia spurred first by a two-day meeting in London in 1995 and, most recently, the 2009 Quartercentenary Conference at St. John’s College, Cambridge, both of which generated published proceedings.<sup>2</sup> Besides a number of scholarly articles, there have appeared Benjamin Woolley’s popular biography, Michael Wilding’s account of the adventures of Dee and Edward Kelley (1581–97), James Fenton’s edition of Dee’s diaries, and a host of occultist editions and studies of Dee’s magic.<sup>3</sup> Dee has also figured as a subject or character in modern literature and film.<sup>4</sup> Most recently, Robert Barone has

1. It also marked the death of Allen Debus, to whom the present study is dedicated. See also note 27 below.

2. Clucas, *John Dee*; and Rampling, “John Dee and the Sciences,” respectively.

3. Woolley, *Queen’s Conjurer*; Wilding, *Raising Spirits*; and Dee, *Diaries of John Dee*. Occultist editions and studies related to Dee are too extensive to list here. Searching for “john dee” in the online catalogues of the British Library and the Library of Congress will yield most of what is available.

4. Szönyi and Wymer, “John Dee as a Cultural Hero”; and Wymer, “Dr. Dee and Derek Jarman.”

published a history of Dee that traces Dee's reputation from negative to warranting serious attention.<sup>5</sup> There have also been six major scholarly monographs that represent substantial and creative contributions to understanding Dee and his relation both to the social and political worlds in which he sought patronage and to sixteenth-century currents in scholarship, the sciences and mathematics, occultism, and religion. Yet, despite my monograph (1988) and the rich contributions of William H. Sherman (1995), Deborah E. Harkness (1999), Håkan Håkansson (2001), György Szönyi (2004), and Glyn Parry (2011), there is still no consensus on a comprehensive understanding of Dee.<sup>6</sup> He remains an enigma.

What follows, after an overview of earlier studies of Dee, is a review of these major monographs. The aim is not to provide a thorough survey of their contributions but to highlight the continued problematic of Dee. One fundamental issue that underlies Dee's modern historiography is the diversity and apparent contradictions among his many writings and activities. Was Dee of one or many minds, dividing a Dee embodying a continuous coherent vision throughout his career and a Dee who dynamically rethought positions as his career evolved? This dichotomy is not necessarily absolute—there may be a spectrum between the poles—but it continues to map the terrain of Dee scholarship. How those studying Dee have presented him is entwined with two other divisions: one involving historical methodology, the other involving the nature of the Renaissance as an intellectual and cultural phenomenon.

Modern scholarship on Dee started in the past century with Charlotte Fell-Smith's *John Dee (1527–1608)*, prompted by the previous centenary of Dee's death and exemplifying a central challenge of Dee.<sup>7</sup> Claiming to replace centuries of misjudgment and slander by presenting the "facts" of Dee's life "calmly and impartially in the light of reason and science," Fell-Smith drew upon a variety of Dee's autobiographical material published in the nineteenth century as well as writing published in his lifetime and in the seventeenth century.<sup>8</sup> The result is a summary of Dee's biographical record with some romantic effusions but little probing inquiry into controversial episodes—such as Dee's arrest during Mary's

5. Barone, *A Reputation History of John Dee*.

6. Clulee, *John Dee's Natural Philosophy*; Sherman, *John Dee*; Harkness, *John Dee's Conversations with Angels*; Håkansson, *Seeing the Word*; Szönyi, *John Dee's Occultism*; and Parry, *Arch-Conjuror of England*.

7. Fell-Smith, *John Dee*.

8. *Ibid.*, 1–5.

reign—or deep intellectual analysis of his writings to support claims for his “solid achievements in science” and “thought too advanced for his own age.”<sup>9</sup> Most notably, the emphasis of Fell-Smith’s account is skewed by the character of Dee’s *Nachlass*: the large bulk of the records of his scrying activities—known variously as the “spiritual diaries” or “conversations with angels”—serves as a “great attractor” drawing attention to a limited part of Dee’s career at the expense of his other activities. Over half of Fell-Smith’s account is devoted to the single decade from 1580 to 1590, out of a complete life of eight decades.

The challenge of this imbalance in the records for the study of Dee is how to recapture sufficiently the other periods of his career and to integrate the “actions with spirits” with his other intellectual production. Are these “actions,” in Meric Casaubon’s seventeenth-century expression of the continuity of Dee’s mind, that “Dr. Dee, of himself, long before any Apparition, was a Cabalistical man, up to his ears, as I may say: as may appear to any man by his *Monas Hieroglyphica*,” from which he could “extract no sense or reason”?<sup>10</sup> Or are they a “new phase,” as Fell-Smith would have it and a departure from his “sound” pursuits?<sup>11</sup> If so, how do we explain and assess this departure? Fell-Smith does not see it as consistent with “solid achievements in science” and suggests that Dee was duped and manipulated under the inordinate sway of Edward Kelley, his principal scryer.<sup>12</sup>

The inclination to give most attention to the 1580s in Dee’s career has characterized most of the subsequent popular biographies. The sensationalism certainly sells, and these activities have resonated with currents of interest in the occult and the psychic. Gertrude M. Hort’s brief biography basically follows Fell-Smith, but more positively recommends Dee’s contribution to modern psychological research.<sup>13</sup> Resonating with a different cultural milieu, Richard Deacon presents Dee as a founder of extrasensory perception and telepathy with kinship to the psychedelic interests of the 1960s.<sup>14</sup> His solution to interpreting Dee’s scrying activities is to resurrect Robert Hooke’s seventeenth-century contention, dismissed by Fell-Smith and Hort, that the angelic revelations were a form of cryptography, so that, for Deacon, Dee was an Elizabethan 007 engaged in

9. *Ibid.*, 2.

10. Dee, *True and Faithful Relation*.

11. Fell-Smith, *John Dee*, 60–61.

12. *Ibid.*, 124.

13. Hort, *Dr. John Dee*. This is listed as part of Rider’s *Mystics and Occultists* series.

14. Deacon, *John Dee*.

*Chapter 11*  
**On the Imagery of  
Nature in the Late  
Medieval and Early  
Modern Periods\***

Heinz Schott

*Dedicated to the memory of Michael Walton.\*\**

**T**he misogynic legacy is well known in the medical and cultural historiography. Women, deemed physically and morally weaker and less healthy than men, were characterized in the terms of ancient Greek humoral pathology as being cold and wet, having less life energy, and associated with the moon and the dark earth. Men, on the other hand, were understood as being warm and dry, relatively powerful, and associated with the sun. While this assessment was differently

\*Allen G. Debus, one of the greatest adepts of Paracelsianism in the historiography of science and medicine, continued and completed the “vast studies” of Walter Pagel, whom he considered “the doyen of Paracelsian scholars” and who “served as the solid bedrock” for Debus’s interpretations of the history of Renaissance and early modern chymistry. (See Debus, *Chemical Philosophy*, xvi.) Walter Pagel’s analyses were also quite fundamental for my own understanding of Paracelsus and Jan Baptist van Helmont, but the present contribution is embedded in a perspective that goes beyond the early modern history of Paracelsian alchemy and natural magic. This chapter stresses the learned imagery of the (female) Nature and its sources in the early modern age as a whole. See also note 2 below.

\*\*Mike Walton kindly invited me to contribute to this volume on the intellectual legacy of Allen Debus. Without Mike’s patient and friendly insistence I would not have accomplished it. In 2012, he chaired the session at the SCSC Annual Meeting in Cincinnati, where both of us spoke. My paper was, in some sense, an abstract of the present chapter. It was our last meeting.

articulated throughout the modern era,<sup>1</sup> it is remarkable that historiographically the other side of the coin was often neglected, namely, the explicit gynephilic attitude of distinguished Renaissance and early modern scholars in regard to the personification of nature as a cosmological female figure. This chapter explores that alternate attitude.<sup>2</sup>

Renaissance scholars intensively discussed two important traits of Nature, or what they termed “Natura” in Latin: first, Natura as a sort of Holy Scripture, which had to be studied and deciphered in order to learn “her” secret language and, second, Natura as a divine female figure, a goddess, who would only communicate her secrets when she was gently and reverently handled and not violently unveiled. The traits were essentially inseparable. It was the endeavor of natural magic (or *magia naturalis*) to find out the secrets of nature.<sup>3</sup> Those secrets, however, were not only to be admired; Nature had also to be analyzed and scientifically investigated as well as imitated and completed. In the early modern period, the newly established scientific academies committed themselves to such an approach. For example, the Italian physician Giambattista della Porta (1535?–1615), who worked in Naples and published his groundbreaking work *Magia naturalis* in 1558, founded one of the first natural scientific academies in Europe, namely, the *Academia Secretorum Naturae* (or the *Accademia dei Segreti*) in 1560.<sup>4</sup> Its sole mission was the exploration of Nature, and members were accepted only when they “could present a hitherto unknown secret in the field of medicine or the mechanical arts.”<sup>5</sup> So-called encyclopedias of secrets were thus composed, and natural research was explicitly seen as a hunt.<sup>6</sup> The final task, however, was the rational explanation of those natural secrets, a task that the Italian physician and polymath Girolamo Cardano (1501–76) tried to make more acceptable through his concept of subtlety (*subtilitas*).

1. These differences are reflected in the contrast between the early modern witch hunt and the views expressed by the renowned twentieth-century German psychiatrist Paul Möbius, who proclaimed the “physiological mental deficiency of the woman.” See Möbius, *Ueber den physiologischen*, title page.

2. These ideas are explored further in my recent book *Magie der Natur*. The present chapter, however, focuses on the imagery of Nature and the corresponding gynephilic ideas as they were propagated by Agrippa von Nettesheim. It does not consider, as does my book, Paracelsus’s appreciation of Nature as a female magician (*maga*) nor does it treat the Paracelsians who also adopted this idea.

3. Compare Eamon, *Science and the Secrets of Nature*.

4. *Ibid.*, 194–233.

5. “wer ein bisher unbekanntes Geheimnis auf dem Gebiet der Medizin oder der mechanischen Künste präsentieren konnte”; Gronemeyer, *Optische Magie*, 87 (my translation).

6. *Ibid.*, 273–85.

In the occidental tradition, there was a certain ambivalence about making natural science a central theme, especially in the early modern period. On the one hand, it was not the custom to promote research activities freely; on the other hand, it was held that when they were carried out, such activities should be pursued humbly. Insofar as God originally chose to hide Nature's secrets, natural science and research (*curiositas*) seemed to be a criminal act, in which scientists violated Nature's integrity by forcible experimentation. The biblical narrative of God's interdiction to eat the fruits of the tree of knowledge corresponded to the Greek legend reported by Plutarch that it was prohibited to wrest the veil from the statue of the Goddess Isis in Sais. Moreover, the church father Lactantius (ca. 240–ca. 320) had stressed that God had created Adam in a final step so that Adam, the prototypic man, would not acquire knowledge of the act of creation. "In confirmation of this, the popular image of the goddess Natura implied that nature covers herself with a veil in order to hide her secrets from mortals."<sup>7</sup> Thus, mortals should be excluded from the secrets of divine Nature.

It is remarkable that the historiography of religion—and of culture more generally—ignores the concept of Natura. Even handbooks like that edited by Mircea Eliade and Ioan Culianu fail to mention it.<sup>8</sup> And whereas the images of goddesses—and of godlike women such as Sophia and Mary—were repeatedly discussed in Jewish studies and theology, their importance for the history of science and medicine per se were overlooked. It is thus a crucial question whether Natura was already perceived in the early kabbalah of the eleventh and twelfth centuries. Such ideas contributed to later natural philosophy and science, especially in regard to Mary and the Shekhina.<sup>9</sup> This chapter will explore some of the early modern iconography and emblematics that personified "veiled nature" in feminine form.

## NATURA AS NOURISHING MOTHER

The German teacher of Romance languages, Ernst Robert Curtius, addressed the "Goddess Natura" in a special chapter of his book *Europäische Literatur und*

7. Eamon, *Science and the Secrets of Nature*, 59.

8. See Eliade and Culianu, *Handbuch der Religionen*.

9. Schäfer, *Mirror of His Beauty*.

## About the Contributors

KU-MING (KEVIN) CHANG is associate professor at the Institute of History and Philology of the Academia Sinica, Taipei, Taiwan. He works on early modern science, especially the chymical and medical work of Georg Ernst Stahl. He is a coeditor (with Sheldon Pollock and Benjamin A. Elman) of *World Philology* (2014), a collection of essays that compare philological traditions in major civilizations. He is also revising a book manuscript on the history of the dissertation as a genre of academic writing and publication.

NICHOLAS H. CLULEE is emeritus professor of history at Frostburg State University, where he taught for forty-two years and was department chair for eleven. He is author of *John Dee's Natural Philosophy: Between Science and Religion* (1988, 2012), and numerous articles on John Dee and late sixteenth-century natural philosophy, alchemy, and magic. He was a National Endowment for the Humanities Fellow in 1984/85.

DANE T. DANIEL is associate professor of history at Wright State University, where he teaches courses in European history and the history and philosophy of science. His research focuses on early modern science and religion, especially the natural philosophical and theological writings of Theophrastus Bombastus von Hohenheim, or Paracelsus (1493/94–1541). He has published over a dozen articles on Paracelsus and the Paracelsians, including the Partington Prize-winning “Invisible Wombs: Rethinking Paracelsus’s Concept of Body and Matter” (*Ambix*, 2006) and “Paracelsus on the ‘New Creation’ and Demonic Magic: Misunderstandings, Oversights, and False Accusations in His Early Reception,” in *World-Building and the Early Modern Imagination* (2010).

MARGARET D. GARBER is associate professor of history of science at California State University, Fullerton. She has published articles on intersections of optics, medicine, and alchemy (*chymia*) and is currently working on a manuscript of

the medico-chymical correspondences of physician members of the Academia Naturae Curiosorum (also known as the Leopoldina Academy). She was a Dibner Research Fellow at the Huntington Library in 2010/11.

BRUCE MORAN is professor of history at the University of Nevada, Reno, where he teaches courses in the history of science and early medicine. His general research interest is in the intersection of cultures, learned and lay, scribal and artisanal, Latinate and vernacular as they relate to the investigation of nature and the body in early modern Europe. Among many articles and books are *Distilling Knowledge: Alchemy, Chemistry, and the Scientific Revolution* (2005) and *Andreas Libavius and the Transformation of Alchemy: Separating Chemical Cultures with Polemical Fire* (2007). He has been a Dibner Distinguished Fellow in the history of science and technology at the Huntington Library (2010/11), and, most recently, a Gordon Cain Distinguished Fellow at the Chemical Heritage Foundation (2014).

KAREN HUNGER PARSHALL is professor of history and mathematics at the University of Virginia. In addition to numerous articles and chapters, she is the author, among other books and editions, of *James Joseph Sylvester: Jewish Mathematician in a Victorian World* (2006), *Taming the Unknown: A History of Algebra from Antiquity to the Early Twentieth Century* (with Victor J. Katz, 2014), and *Experiencing Nature: Proceedings of a Conference in Honor of Allen G. Debus* (coedited with Paul H. Theerman, 1997). She was a John Simon Guggenheim Fellow in 1996/97 and served from 1996 to 1999 as the editor-in-chief of *Historia Mathematica*.

MAR REY BUENO is coeditor of *Azogue*, the journal for the historical-critical study of alchemy ([www.revistaazogue.com](http://www.revistaazogue.com)). She is author of, among other books and editions, *El Hechizado: Medicina, alquimia y superstición en la corte de Carlos II (1661–1700)* (1998); *Los señores del fuego: Destiladores y espagíricos en la Corte de los Austrias* (2002); *Lastanosa: Art and Science in Baroque* (coedited with Miguel López Pérez, 2008); and *Chymia: Science and Nature in Medieval and Early Modern Europe* (coedited with Miguel López Pérez and Didier Kahn, 2010).

HEINZ SCHOTT is emeritus professor of the history of medicine at the University of Bonn (Germany). He is author of, among other books and editions, *Zauberspiegel der Seele: Sigmund Freud und die Geschichte der Selbstanalyse* [Magic Mirror of the Mind: Sigmund Freud and the History of Self-analysis] (1985);

*Die Chronik der Medizin* [The Chronicle of Medicine] (1993); *Geschichte der Psychiatrie: Krankheitslehren—Irrwege—Behandlungsformen* [History of Psychiatry: Nosology—Meanders—Forms of Treatment] (with Rainer Tölle, 2006); and *Magie der Natur: Historische Variationen über ein Motiv der Heilkunst* [Magic of Nature: Historical Variations on a Motif of the Healing Art] (2 vols., 2014). From 1987 to 2014, he was director of the Institute of the History of Medicine at the University of Bonn.

JOLE SHACKELFORD is assistant professor in the Program for the History of Science, Technology, and Medicine at the University of Minnesota. Recent scholarship includes the 2013 monograph *Northern Light and Northern Times: Swedish Leadership in the Foundation of Biological Rhythms Research*. His book *A Philosophical Path for Paracelsian Medicine: The Ideas, Intellectual Context, and Influence of Petrus Severinus* (2004) received the George Urdang Medal from the American Institute for the History of Pharmacy in 2007.

ANKE TIMMERMANN was EU Marie Curie postdoctoral fellow at the Medical University of Vienna, Austria (2011–13), and subsequently Munby Fellow in bibliography at the University of Cambridge, England. She is the author of *Verse and Transmutation: A Corpus of Middle English Alchemical Poetry (Critical Editions and Studies)* (2013); “Scientific and Encyclopaedic Verse” in A. S. G. Edwards and Julia Boffey, eds., *Companion to Fifteenth-Century English Poetry* (2013); “Doctor’s Order: An Early Modern Doctor’s Alchemical Notebooks,” *Early Science and Medicine* (2008), and other articles on manuscript studies and the history of the book, the history of science, and especially the history of alchemy and medicine.

MICHAEL THOMSON WALTON took his PhD at the University of Chicago in 1979. He coedited, with Allen G. Debus, *Reading the Book of Nature: The Other Side of the Scientific Revolution* (1998). He is the author of *Medical Practitioners and Law in Fifteenth Century London* (with Phyllis J. Walton, 2003); *Genesis and the Chemical Philosophy: True Christian Science in the Sixteenth and Seventeenth Centuries* (2011); and *Anthonius Margaritha and the Jewish Faith: Jewish Life and Conversion in Sixteenth Century Germany* (2012). Two of his articles, “John Dee’s *Monas Hieroglyphica*: Geometrical Cabala” and “Boyle and Newton on the Transmutation of Water and Air,” were reprinted in *Alchemy and Early Modern Chemistry: Papers from Ambix* (edited by Allen G. Debus, 2004). Michael Walton died in August 2013.

# Index

Page references in *italics* indicate illustrations.

## A

- Abulafia, Abraham, 188
- Academia naturae curiosorum, 270
- Academia Secretorum Naturae (or the Accademia dei Segreti), 251
- acids, 114–16, 120, 125
- Actuarius, Johannes Zacharius, 26, 26–27nn20–22, 46n88
- Adam (biblical figure), 217–18, 252
- æther, 110–11, 117, 126
- Agrippa von Nettesheim, Cornelius, xx, 222, 232, 289–90
- on kabbalah, 191, 199
- works: *De incertitudine et vanitate scientiarum*, 274; *De nobilitate et praecellentia foemine sexus*, 285–88; *De occulta philosophia*, 191; *Praise of the Donkey*, 272, 276
- Agustín, Miguel: *Book of the Prior*, 148–50
- Alanus ab Insulis, 277
- Anticlaudian*, 253, 257–58, 268–69
- Complaint of Nature*, 271
- alchemical manuscripts, 159–85
- on apparatus, 174
- Kappler's collecting/use for medical preparations, 172, 174, 176
- Kappler's manuscript ÖNB MS 11410, 163–64, 163–64nn12–13, 176
- overview of, 160, 176–77
- plague treatments in, 172–73
- Pol's collecting/use for medical preparations, 172–74
- Pol's library, and historiography of alchemy/medicine, 171–76, 171n38
- Pol's library, books/manuscripts in, 166–67nn20–21, 166–71, 167–68nn26–29
- Pol's library, classification in, 168–71, 173–74
- Pol's library, generally, 163–66
- Pol's manuscript copied by Kappler, 163, 165, 172–73, 176
- Pol's manuscripts at Austrian National Library, 178–82, 178n54
- alchemy
- Butterfield on, 13
- vs. chemistry, 81, 81nn5–6
- vs. *chymia*, 63–64, 92–93
- by Curiosi, 80–81
- definitions/uses of, 61–62
- vs. distillation, 61
- fraudulent vs. true, 87–88, 9
- history of, 159–60
- kabbalah merged with, xviii–xix, 192, 194–96, 200
- Libavius on, 61–63, 69
- manaurius* (mechanical), 61
- as medicine, 79, 79n1
- ousiodes* (essential), 61
- overview of, xviii
- Philosophers' Stone, 91, 95, 187
- standardization of experimental practice, 82
- See also* spagyrist friars
- Alciato, Andrea
- Emblematum liber*, 257
- Mulierum famam non formam vulgatam esse oportere*, 257, 259
- Alderete y Soto, Luis de, 138–39, 143
- Alemano, Johannes, 189
- Alexis of Piedmont, 141
- Algarotti, Vittorio, 137
- alkalis, 115–16
- Allgemeine Theorie der Schönen Künste* (Sulzer), 283

- Amphitheatrum sapientia aeternae* (Khunrath), 195, 201–2, 202n62
- Andreae, Johann Valentin, 86
- Angeleres, Buenaventura, 138–39
- Angenot, Marc, 289
- Anticlaudian* (Alanus), 253, 257–58, 268–69
- apes, 277–78, 280
- Apollo, 190
- Aquinas, Thomas, 180–81
- arcane (remedy), 138–39
- The Arch-Conjuror of England* (Parry), 242–45
- arista bovis* (herb used to treat bladder/kidney stones), 41, 41n76
- argentopoeia*, 75
- Aristotelian-Scholastic cosmography, 1, 216
- Aristotle, 69
- on apes, 280
- on the elements, 7–8, 34n45, 103–5
- on *experientia*, 91
- Arndts, John, 201–2, 202n62
- Arnold of Villanova, 87, 97, 164–65, 178, 180–82, 213
- ars separatoria*, 134–35
- astrological diseases/medicine, 32n36
- Hayne on, 21, 31, 33–35, 39–40
- in Paracelsian praxis, 31–35
- See also sidereal powers
- Astronomia magna* (Paracelsus), 214–16, 220–21, 220n37
- Atalanta fugiens* (Maier), 272–74, 273, 289
- Augustine, Saint, 186, 211–12
- autopsia* (firsthand knowledge), 90–93
- Avicenna, 61, 170
- Canon*, 44–45
- B**
- Bacon, Francis, 83
- Bacon, Roger, 69, 213
- Balduin, Christian Adolph, 85–86n17
- Balsam, Giuseppe, 138–39, 139n26
- Barone, Robert, 226–27
- Baronio, Nadal, 140
- Barrera, Antonio, 151
- Barrionuevo, Gervasio de, 138n25
- Basilica chymica* (Croll), 197n51, 198–99, 203
- Bausch, Johann, 83
- Bausch, Lorenz, 270
- Becher, Johann Joachim, 106, 110, 112, 114–16, 114n55, 121, 124–25
- Physica subteranea*, 108–9, 108–9n26, 111
- Béguin, Jean, 104–5, 140
- Beinza, Matías de, 138–39, 143n48
- Benesch, Dieter, 210n2
- Benneville, George de, 21, 21n8, 53
- Medicina Pennsylvania*, 31, 50
- Bensaude-Vincent, Bernadette, 127
- Bercebal, Diego de, 140
- Berlin, 24–25
- Bild, Veit, 165–67
- Bleichmar, Daniela, 151
- Bleker, Johanna, 24n12, 27n21
- blood, diseases associated with, 38–39
- Boccaccio, Giovanni, 289
- Decameron*, 288
- De mulieribus claris*, 288
- Bodenstein, Adam von, 213
- Boehme, Jacob, 24, 24n13
- Boerhaave, Hermann, xvi, 101n1, 121–22, 126
- Boethius, 186
- Book of Influential Diseases*, 40, 40n72
- Book of the Prior* (Agustín), 148–50
- Borbón, Felipe: *Medicina doméstica*, 147, 147n65
- Bostocke, Richard, 4, 4n16
- Boudard, Jean Baptiste: *Iconologie*, 254, 255, 266, 267, 268–70
- Boyle, Robert, 108
- chemistry before, 12–13
- on fire analysis, 124
- on mercury, 126
- Sceptical Chymist*, 8, 105–6
- sulfur produced by, 114
- Braid, James, 267
- Brendel, Zacharius (the elder), xvi, 59–60, 73–75, 83, 95
- Brendel, Zacharius (the younger), 83
- Chimia in artis formam redacta*, 75–76
- Brian, Thomas: *The Pisse-Prophet*, 52
- Brytanici imperii limites* (Dee), 236, 237n34
- Brytannicae reipublicae synopsis* (Dee), 235–36
- Bucer, Martin, 222
- Das Buch von der tartarischen Krankheiten* (Paracelsus), 44
- Burt, Edwin, 1, 4, 233n27
- Butterfield, Herbert, 1, 12–13, 80

## C

- Cabriada, Juan de: *Carta filosófica*, 135n14
- Calder, Ian R. F., 231–33
- Calle, Juan José de la, 143
- Camerarius, Joachim, 261, 261–62
- Cañizares, Jorge, 151
- Canon* (Avicenna), 44–45
- Cardano, Girolamo, 61, 64–65, 65n20, 251
- Carta filosófica* (Cabriada), 135n14
- Cartari, Vincenzo: *Imagini*, 278
- Casaubon, Meric, 228, 238
- Castillo, Juan del, 143n48
- Castro Medinilla, Juan de, 146
- Cathars, 269
- Catherine of Aragon, 149
- Cecil, William, 230
- Champier, Symphorien, 191
- Chang, Ku-ming (Kevin), xvii
- Chaos, Baron von (Conrad von Richthausen), 87, 87n24
- Charles II, King, 135–36, 143
- The Chemical Dream of the Renaissance* (Debus), xiv
- The Chemical Philosophy* (Debus), xv, 6–10, 6n25, 35n52
- chemical philosophy, 7–8, 20n3. *See also* kabbalah
- chemical principles
- affinity (element) tables, 121, 126
  - Becher's system of, 106, 108–12, 114–16, 121, 124–25
  - corpuscular model of, 107, 109, 116–17, 116n66, 120, 124–25
  - Lémery's system of, 106–9, 121, 121n77, 124–25
  - materializing trend of, 106
  - sulfurous (*see* phlogiston)
  - tria prima* (salt, sulfur, and mercury), xvii, 43, 102–5, 120–21, 123–26
  - Willis's system of, 106–9, 121, 124–25
- See also* elements
- chemistry, 10, 12–13
- Chemistry and Medical Debate* (Debus), 11–12
- Chimia in artis formam redacta* (Brendel the younger), 75–76
- Chodowiecki, Daniel, 283
- Christian kabbalah. *See* kabbalah
- chrysopoeia*, xvi, 75, 80, 82, 85–90, 125, 171–72
- chymia*, 59–78
- vs. alchemy, 63–64, 92–93
  - as an art, xvi, 60, 63–67, 74–76
  - as artisanal creation, 64–65
  - and *chrysopoeia*, 75, 85–90
  - definitions/uses of, xvi, 59–65, 69, 75–76
  - as firsthand knowledge/experience, 82, 90–93
  - as fraud, 69–70
  - good practice regarding, 70–74
  - history of, 64
  - and medicine, 75–76
  - natural vs. supernatural, 60, 67–70
  - obscure vs. standardized language of, 93–95
  - as *physica*, 63–64, 72, 74
  - secretiveness of, xvi, 62, 86, 92–93
  - as social practice, 82, 93–96
  - in Spain, xvii–xviii
  - transmutation via, 75, 82
  - as witnessed histories, 82
- See also* under *Miscellanea curiosi*
- chymiatría* (chemical medicine), 69, 79, 79n1, 81, 85, 95–96
- Chymische Medicinische Perle* (Zobell), 20
- Clauder, Gabriel, 88–93, 88n29, 97
- Clucas, Stephen, 241, 241n50
- Clulee, Nicholas, xix–xx, 12, 241
- John Dee's Natural Philosophy*, 233–34
- Cohen, Floris H., 12
- Cohen, I. Bernard, 2–4
- Collins, Harry, 91n40
- Complaint of Nature* (Alanus), 271
- Confessio de chao physico-chemicorum catholico* (Khunrath), 195–96
- Copernican worldview, 1
- 1 Corinthians (Bible), 219
- Cortavilla, Phelipe de, 142, 142n44
- Cours de chymie* (N. Lémery), 107–8, 108n25
- Cózar, Lorenzo, 134–35
- Critique of Pure Reason* (Kant), 124
- Croll, Oswald, xviii–xix, 194, 198n53, 202
- Basilica chymica*, 196–99, 197n51, 203
- on kabbalah, 196–201, 197n51
- Culianu, Ioan, 252

## Curiosi (Leopoldina Academy of Curiosi)

- alchemy by, 80–81
- associated with Jason and the Argonauts, 86
- as chymical adepts, 93, 96–97
- establishment of, 82–83
- headquarters at Halle, 85n14
- journal of (see *Miscellanea curiosi*)
- as a literary medical society, 83
- membership of, 83, 83n10, 85, 85–86n17
- naming of, 80n3
- overview of, xvi, 96–97
- proficiencies of, 80
- social legitimacy via, xvi

Curtius, Ernst Robert: *Europäische Literatur und lateinisches Mittelalter*, 252–54, 253n11

## D

Daniel, Dane, xix

Deacon, Richard, 228, 230

Debus, Allen G., 1–16

- at Abbott Laboratories, 2
- on Butterfield, 13
- on chemistry's academic acceptance, 80
- at Churchill College, Cambridge, 6
- criticisms of, xiv, 5–6, 8–9
- death of, 13
- education of, 2–3, 12–13
- focus on debates in chemistry, 11–12
- goals of his research, 13
- at Harvard, 1–3
- on importance of history of science, 159
- marriage of, 2
- mentoring by, 233–34n27
- Page's relationship with, 4
- on Paracelsian cosmogony, 211
- patents held by, 2n5
- Sarton Medal received by, 12
- on Stahl, 101–2n1
- on the union of opposites in Scientific Revolution, xiii–xiv (see also chemical philosophy)
- on vitalism vs. mechanism, xvi–xvii, 10–11
- works: *The Chemical Dream of the Renaissance*, xiv; *The Chemical Philosophy*, xv, 6–10, 6n25, 35n52; *Chemistry and Medical Debate*, 11–12; *The English Paracelsians*, 4–6, 8, 19, 19–20n1; *The French Para-*

*celsians*, 10–11, 211; *Man and Nature in the Renaissance*, 9–10; *Reading the Book of Nature*, xx; “Robert Boyle and Chemistry in England,” 2; “Robert Boyle and His Sceptical Chymist,” 2

*Decamerone* (Boccaccio), 288

Dee, John, 226–49

- angelic conversations of, 228, 230–34, 237–41, 244–45
- arrest of, 243
- biographies of, 228, 230–31, 238, 242–45
- calendar reform proposed by, 244
- Catholic allegiances of, 243–45
- conjuring/scrying by, 228, 243, 245
- Copernicanism of, 230
- at court, 242–44
- on divine language, 238–39
- financial difficulties of, 238, 243
- kabbalism of, 191, 193
- and Kelley, 226, 230–31, 238, 241, 244–46
- and Laski, 244
- library of, 166, 237
- Nachlass*, 228
- Neoplatonism of, 231–32
- occultism of, 233–36, 238, 240–42
- overview of, xix–xx
- political writings of, 235–37, 241–45
- renewed interest in, 226–27
- and the School of Night, 230
- as a scientist, 231, 234–35
- and the Sidney group, 230, 233, 236
- Voarchadumia*'s influence on, 193, 239–40
- works: *Brytanici imperii limites*, 236, 237n34; *Brytannicae reipublicae synopsis*, 235–36; *General and Rare Memorials*, 236; *Monas hieroglyphica*, 193, 228, 229, 230–32, 233n27, 238–40, 242; *Of Famous and Rich Discoveries*, 236; *Propaedeumata aphoristica*, 230–32, 234, 239; *THALAT-TOKRATIA BRETTANIKI*, 236

*De fermentatione* (Willis), 107

deflagration, 114

*De incertitudine et vanitate scientiarum* (Agrippa von Nettesheim), 274

*De Institutione foeminae christiana* (Vives), 149

*De mulieribus claris* (Boccaccio), 288

- De nobilitate et praecellentia foeminei sexus* (Agrippa von Nettesheim), 285–88
- De occulta philosophia* (Agrippa von Nettesheim), 191
- De operationibus pharmaceuticis* (Núñez), 145, 145n58
- De peste* (Hayne), 39
- De secretis naturae liber* (Llull), 142, 142–43n46
- Desnos, Ernest, 26n20, 30n31, 32n37, 51n101, 52n106
- De tartaro* (Paracelsus), 35, 37, 39
- Deuteronomy (Bible), 201
- De verbo mirifico* (Reuchlin), 189, 191
- De vita* (Ficino), 210, 210n2
- De vita longa* (Paracelsus), 37, 213
- Diderot, Denis, 122
- Dienheim, Johann Wolfgang, 75
- Dijksterhuis, Eduard, 1, 4
- Dionysus, 190
- diseases
- of the brain, uroscopy for diagnosing, 41
  - of humors, 38, 42
  - mercurial, 43
  - of organs vs. homoeomerous parts, 38, 38n64
  - Pagel on, 32n39, 35n52
  - planets as causing, 34
  - sulfurous, 43, 49
  - tartar, 28, 35–41, 35n52, 36n54, 44
  - transmutation of, 40, 40n72
  - See also under Paracelsian praxis; *Three Diverse New Treatises*
- divine names/illumination, 188–89
- Dorn, Gerhard, 23n12, 60–61, 67–69, 193, 194n39
- Physica genesis*, 194–95
- Duchesne, Joseph, 104, 104n9, 145
- E**
- Eamon, William, 151
- Science and the Secrets of Nature*, 137n18
- Eklund, Jon Bledge, 114
- elements (earth, air, water, and fire)
- in Aristotelian and Galenic philosophy, 7–8, 34n45, 103–5
  - Boerhaave on, 121
  - Hebrew letters corresponding to, 193, 203
- Elements of the Theory and Practice of Chemistry* (Macquer), 122
- Eliade, Mircea, 252
- Elizabeth, Queen, 19n1
- Elizabethan compromise, xv, 5, 19, 19–20n1
- Emblematum liber* (Alciato), 257
- Emerald Table, 192
- emuntoria (outlets for wastes), 36, 40
- enchirises, 90–91
- encyclopedias of secrets, 251
- The English Paracelsians* (Debus), 4–6, 8, 19, 19–20n1
- Enlightenment, 50, 80, 81, 81n5
- Epiphanie medicorum* (Pindar), 26
- Erasmus of Rotterdam: *The Praise of Folly*, 271–72
- Erastus, Thomas, 195
- Estienne, Charles: *L'agriculture*, 148–49
- Etaples, Jacques Lefèvre d', 167, 191
- Europäische Literatur und lateinisches Mittelalter* (Curtius), 252–54, 253n11
- F**
- Faber, Georg, 21, 23, 32–33, 32n39, 41–42, 41n77, 53n107
- Faivre, Antoine, 86
- Fasciculus medicinae* (Ketham), 26
- Fechner, Gustav Theodor: *Nanna oder über das Seelenleben der Pflanzen*, 270–71
- Fehr, Johann Michael, 83
- Fell-Smith, Charlotte: *John Dee*, 227–28
- Fenton, James, 226, 238
- Ferdinand III, Emperor, 87, 89
- fevers, 38–39, 43, 49
- fiat, 194–95, 196n49, 197–98, 200
- Ficino, Marsilio, xix, 209–13, 217–18, 218n25, 220–22, 232, 241
- De vita*, 210, 210n2
- Filiatro, Evónimo, 144
- De remediis secretis*, 135
- fire
- analysis by, 105–6, 120–21, 124
  - and fluidity/solidity, 123
  - as non-element, 7–8, 104n9
  - and phlogiston, 116–17, 126
- firmamental virtues, 218
- Fisch, Max H., 168n27

- Fludd, Robert, xix, 4, 8–9, 276  
*Utriusque cosmi*, 277, 277–78, 279, 280
- Forestus, Petrus: *On the Uncertainty and Fallacy of the Judgements of Urines*, 51
- Franck, Sebastian, 274, 276
- Franco de Guzmán, Manuel, 142
- Frankfurt, 24–25, 28–29
- Freemasons, 262
- French, Peter, 230  
*John Dee: The World of an Elizabethan Magus*, 232–33, 241, 245
- French, Roger, 32n37  
*The French Paracelsians* (Debus), 10–11, 211
- fundus*, 46, 46n88
- G**
- Galen, 29, 38n64
- Galenism, 8, 10–11, 36n56, 46, 49, 53  
*The Galeno-Spagyric Anatomy of the Urine* (Martinius), 29–31, 53
- Galileo, 2, 13, 124
- Garber, Margaret, xvi, 74
- gases, 37n61, 61
- Geber, 61, 103, 108, 120, 125
- gender discussions, 288
- General and Rare Memorials* (Dee), 236
- Genesis (Bible), 194, 216, 218–19, 286
- Geoffrey of Vinsauf, 163
- Geoffroy, Etienne-François, 121, 122n81
- germania* oil, 138–39
- Gesner, Conrad, 145, 148n69
- gnosticism, 187, 210, 312
- God  
 creation of Adam, 216–18, 252  
 letters instilled with powers by, 199  
 Reuchlin on, 190  
 as source of knowledge, 203  
*See also fiat*; Tetragrammaton
- gold  
 color of, 103  
 tincture of, 40–41, 117  
 transmutation of metals into, 80, 86–87, 91, 117, 126
- Goldammer, Kurt, xix, 209–13, 210n2, 215, 217–23  
*Göttliche Magier und die Magierin Natur*, 212
- Gonzaga, Vicente, Prince, 143
- Goodrick-Clarke, Nicholas, 44n82
- Göttliche Magier und die Magierin Natur* (Goldammer), 212
- Grashofer, Johann, 196n49
- Grimm, Wilhelm, 254
- Griselda (legendary figure), 288
- Gutiérrez de Arevalo, Pedro, 147
- Guybert, Philibert, 147
- H**
- Håkansson, Håkan, 227, 241n50  
*Seeing the Word: John Dee and Renaissance Occultism*, 238–41, 245
- halchymia*, 61
- Hall, A. Rupert, 1, 4, 4n14
- Harkness, Deborah E., 227  
*John Dee's Conversations with Angels*, 238–41, 245
- Hartmann, Johannes, 83
- Hayne, Johann, xv, 24–25, 25n15  
*De peste*, 39.  
*See also Three Diverse New Treatises*
- Hebberden, William, 51n101
- Hebrew language/letters, 189, 193, 195, 203. *See also Tetragrammaton*
- Helmont, Jean Baptiste van, 87, 121  
 on fire analysis, 124  
 on quantitative uroscopy, 49n97  
 on tartar diseases, 35n52  
 on the *tria prima*, 105–6  
 vitalistic/chemical/medical paradigm in work of, 8
- Helvetius, 87
- Henry VIII, King, 149
- Hermetical Physick* (Nolle), 20, 20n4
- hermeticism, 187, 232–33
- Hermetic Medicine* (Nolle), 31
- Hermogenes, 27n22
- Hippocrates, 11, 29, 72
- Hispanus, Petrus: *Thesaurus pauperum*, 146
- historiography  
 characterization of men vs. women in, 250–51
- Great Tradition, 2–4  
 on manuscripts vs. practice, 171–72, 171n38  
 of uroscopy, 50–54, 51n100–101, 52n106
- Hogelände, Theobald von, 75

- Hohenheim, Theophrastus Bombastus von. *See* Paracelsus
- Hohlweg, Armin, 26n20
- Holbach, Paul-Henri Thiry, Baron d', 116n66, 123–24, 127
- Hooke, Robert, 228, 230
- Hort, Gertrude M., 228
- Hospital of San Juan de Burgos pharmacy (Castile), 143–45, 144nn51–52
- housewifery, 150
- humanists, 26, 140–41, 222, 237, 239, 271, 312
- humors (blood, phlegm, yellow bile, and black bile), 7–8, 38, 42
- hypostasis*, 46, 46n88
- I**
- Iamblichus, 187n2
- iatrochemistry, 20n2, 79n1, 159–60
- iatrophysicists (medical mechanists), xvi–xvii, 11
- Iconologia* (Ripa), 280, 281–82
- Iconologie* (Boudard), 254, 255, 266, 267, 268–70
- Imagini* (Cartari), 278
- inflammability, Stahl on, xvii, 103–4, 109, 111, 113–14, 117, 119. *See also* phlogiston
- Innsbruck, 167
- inquisitorial court, 138, 141–42
- Introductio alchimiam* (Wedel), 94–95
- Isis, 254, 255, 278
- Isserles, Moses, 198n53
- J**
- Jason and the Argonauts, 86
- Jehovah. *See* Tetragrammaton
- Jesus, Tetragrammaton identified with, 194, 201
- John (Bible), 194, 198, 219–20
- John Dee* (Fell-Smith), 227–28
- John Dee's Conversations with Angels* (Harkness), 238–41, 245
- John Dee's Natural Philosophy* (Clulee), 233–34
- John Dee's Occultism* (Szönyi), 238–41, 245
- John Dee: The Politics of Reading and Writing in the English Renaissance* (Sherman), 236–38, 241
- John Dee: The World of an Elizabethan Magus* (P. French), 232–33, 241
- John of Damascus, 167
- John of Rupescissa, 213
- Johnson, Francis R., 231, 234–35
- Jones, Peter Murray, 32n37
- Jordan, Wilbur, 2
- Jorden, Edward, 4
- Josten, Conrad, 5–6
- Jupiter, 34
- K**
- kabbalah, 187–206
- Agrippa on, 191, 199
- Christian tradition of, xviii–xix
- Croll on, 196–201, 197n51
- Khunrath on, 201–3, 202n62
- overview of, 186–87, 203
- Pantheus on, 192–94, 203
- Pico della Mirandola on, 188–89, 188n3, 191–92
- Reuchlin on, 188–92, 190n12, 195, 198
- of transmutation (alchemy merged with kabbalah), xviii–xix, 192, 194–96, 200
- Zoharic, 188–89, 198n53
- Kahl, Wilhelm, 210n2
- Kahn, Didier, 213
- Kant, Immanuel, 127
- Critique of Pure Reason*, 124
- Kappler, Wolfgang, xviii, 160–62, 172, 177. *See also* under alchemical manuscripts
- Kelley, Edward, 226, 230–31, 238, 241, 244–46
- Kemp, Wolfgang, 278
- Kepler, Johannes, 9
- Ketham, Thomas: *Fasciculus medicinae*, 26
- Khunrath, Heinrich, xviii–xix, 203
- Amphitheatrum sapientia aeternae*, 195, 201–2, 202n62
- Confessio de chao physico-chemicorum catholico*, 195–96
- Kiefer, Joseph H., 51n101
- Kieser, Franz, 196n49
- Kim, Mi Gyung, 120–21, 121n77, 122n81
- Kircher, Athanasius, 86, 88–89, 91, 97, 280
- Kirchmaier, J., 85–86n17
- Kirchweger, Anton Joseph, 274
- Koch, Matthias, 162, 164
- Koyré, Alexandre, 1–4
- Krems (Austria), 161–62, 177
- Kühnel, Harry, 177

Kunckel, Johann, 85–86n17, 113, 117–18, 120, 125  
*Laboratorium chymica*, 112

## L

*Laboratorium chymica* (Kunckel), 112  
 Lactantius, 252  
*L'agriculture* (Estienne and Liebault), 148–49  
 language in the arts, 72–73  
 La Perrière, Guillaume de: *Le Théâtre des bons engins*, 256, 257, 258  
 Laski, Albert, 244  
 Lastanosa, Vincencio Juan de, 140  
 Lavoisier, Antoine-Laurent, 11, 122–23, 127  
 Lehrich, Christopher, 241–42  
 Lémery, Louis, 120  
 Lémery, Nicolas, 106, 109, 121, 121n77, 124–25  
*Cours de chymie*, 107–8, 108n25  
 Leopoldina Academy of Curiosi. *See* Curiosi  
 leprosy, 40n72, 48  
 Libavius, Andreas, 59–78  
   on academies' decline, 73  
   on *alchymia*, 61–63, 69  
   on *chymia* as an art, xvi, 60, 65–66, 74–76  
   on *chymia*'s definition, 60–61, 63–64  
   on *chymia*'s practice/appearance, 70–74  
   on *chymicus*, 69–70  
   on Dorn, 68  
   letters to Brendel (the elder), 59–60  
   overview of, xvi  
   Paracelsus criticized by, xvi, 195  
   *Syntagma selectorum undiquaque*, 62  
   on the *tria prima*, 104  
   on words, 67, 73, 95  
*Liber medicinae orinalibus* (attrib. Hermogenes), 27n22  
 libraries, 169, 171n37. *See also* under alchemical manuscripts  
 Liebault, Jean, 148n69  
*L'agriculture*, 148–49  
 Linacre, Thomas, 51n101  
 Llull, Ramón, 86–87, 97, 167, 178–81  
*De secretis naturae liber*, 142, 142–43n46  
 López Pérez, Miguel, 136–37, 137n20, 140n31, 144n51  
 López Piñero, José María, 133  
 López Rodríguez, Brunilda, 2  
 Luke (Bible), 221n41

## M

MacMillan, Kenneth, 237n34  
 Macquer, Pierre-Joseph, 123, 127  
*Elements of the Theory and Practice of Chemistry*, 122  
 Macrobius, 186  
 Madrid, 137  
 Magi, 221  
*magia*, xvii, 72  
*Magia naturalis* (della Porta), 251  
 Maier, Michael, 86  
*Atalanta fugiens*, 272–74, 273, 289  
*Man and Nature in the Renaissance* (Debus), 9–10  
*manna solutivo*, 138  
 Mark (Bible), 220n35  
 Mars, 34  
 Martinius, Heinrich: *The Galeno-Spagyric Anatomy of the Urine*, 29–31, 53  
 Mary, mother of God, 254, 290  
*materia medica*, 162, 164, 176  
 Matthew (Bible), 220  
 Matthiessen, Wilhelm, 210n2  
 Mattioli, Pietro, 145  
*matula*. *See* urine flasks  
 Mauskopf, Seymour, 11–12  
 Maximilian I, Holy Roman Emperor, 165  
*Medicina doméstica* (Borbón), 147, 147n65  
*Medicina Pensylvania* (de Benneville), 31, 50  
 medicine  
   alchemy as, 79, 79n1  
   and *chymia*, 75–76  
   *chymiatría* (chemical medicine), 69, 79, 79n1, 81, 85, 95–96  
   mercury's use in, 70  
   modernization of, 50–51  
   and natural history, 85  
   *See also* astrological diseases/medicine  
 Meißen, Heinrich von, 288  
 mercury (element)  
   chymists' use in medicines, 70  
   diseases associated with, 43  
   principle of mercury/spirit, 103, 108, 118–19, 123, 125–26  
   rarity of, 118  
   *See also* *tria prima*  
 Mercury (planet), 34  
 Merian, Matthäus, the Elder, 272–73, 273

- mesaraic veins, 36–37
- metallurgy, 64, 89. *See also* alchemy
- “Metaphors of a Magnifico” (Stevens), xiii
- metaphysics, 68
- Metzger, Georg Balthasar, 83
- Metzger, Hélène, 102
- Minerva, 288
- Miropolio* (Núñez), 145
- mirrors and divine illumination, 188–89
- Miscellanea curiosi* (journal), 79–100
  - chymia*, use of term, 82, 84–85, 96–97
  - on *chymia* as firsthand knowledge/experience, 82, 90–93, 97
  - on *chymia* as social practice, 82, 93–96
  - on *chymia* in chrysopoetic contexts, 85–90
  - on *chymica*, 81, 84–85
  - community created via, 82
  - establishment of, 83
  - naming of, 80n3
  - observationes* in, 84, 84n11, 91–92, 97
  - practice over theory in, 84, 97
  - on proficiencies, 80
  - standardized language used in, 93–95, 97
  - translation into English, 85, 85n15
- Möbius, Paul, 251n1
- Moffett, Thomas, 4, 75
- Monas hieroglyphica* (Dee), 193, 228, 229, 230–32, 233n27, 238–40, 242
- Moon, 34, 250, 264, 264
- Moran, Bruce, xvi, 10–11
- Moses (biblical figure), 187–90, 196
- Motherby, George, 51n101
- Mulierum famam non formam vulgatam esse oportere* (Alciato), 257, 259
- Müling, Johannes Adelphus, 210n2
- Murphy, Leonard J. T., 51n101
- Murray, John, 2
- Musæum Hermeticum*, 274, 275
- N**
- Nachlass* (Dee), 228
- name magic, 191
- Nanna oder über das Seelenleben der Pflanzen* (Fechner), 270–71
- natural astronomy (natural magic), 215–18
- nature imagery (late medieval and early modern periods), 250–93
- art as nature’s ape, 274–85, 275, 277, 279, 281–82, 284
- emblems, 256, 257–67, 258–66
- natural philosophy and gynephilia, 285–90
- nature as nourishing mother, 252–54, 255
- nature as teacher, 267–74, 268–70, 273, 289
- and occultism, 285
- overview of, xx, 250–52
- Navarre, Marguerite de, 287–88
- Neoplatonism
  - ancient, 187–89, 187n2, 217
  - of Dee, 231–32
  - Paracelsian, 211–13, 215, 218, 220
  - Renaissance, 187, 209–13, 210n3, 215, 220, 231–32, 312
- Neopythagorianism, 187
- Newman, William R., 49n97, 81, 81nn5–6
- Newton, Isaac, 9, 13, 20n1, 233n27
- Nicholas of Cusa, 49n97
- 900 Theses* (Pico della Mirandola), 188–89
- nitric acid, 115
- Nolle, Heinrich, 50, 53n10
  - Hermetical Physick*, 20, 20n4
  - Hermetic Medicine*, 31
- novatores* movement, 134–35, 135n14
- Novella, Cosme, 138–39
- Nucleus emblematum selectissimorum* (Rollenhagen), 265, 266–67
- Nummedal, Tara, 87–88
- Núñez, Esteban, 144
  - De operationibus pharmaceuticis*, 145, 145n58
  - Miropolio*, 145
- O**
- Of Famous and Rich Discoveries* (Dee), 236
- O’Malley, C. Donald, 6
- On the Uncertainty and Fallacy of the Judgements of Urines* (Forestus), 51
- Opiologia* (Wedel), 94
- opposites, primary (hot/cold and wet/dry), 7–8
- opúsculos* (medical duels), 139
- Opus paramirum* (Paracelsus), 44
- Oration on the Dignity of Man* (Pico della Mirandola), 214n19, 220
- oxygen, discovery of, 127

## P

- Pabst, Georg W.: *Paracelsus*, 44n82
- Pagel, Walter  
 approach to history of sciences, 3–4, 12  
 death of, 4  
 Debus influenced by, xix, 3  
 Debus's relationship with, 4  
 on disease entities, 32n39  
 vs. Goldammer, xix, 209–13, 215, 217–22  
 on Paracelsus's lectures, 44n82  
 Paracelsus tied to Renaissance Neoplatonism/gnosticism by, xix  
 on tartar diseases, 35n52  
 Thurneisser's influence on, 23n12  
 on uroscopy, 30n31, 49n97  
 works: *Paracelsus: An Introduction to Philosophical Medicine in the Era of the Renaissance*, 3–4, 49n97; "Religious Motives in the Medical Biology of the XVIIth Century," 3–4; "The Vindication of Rubbish," 4
- Palacios, Bernardino de, 144, 144n52
- Partheus, Giovanni Agostino, 192–94, 200–201, 203  
*Transmutation*, 192  
*Voarchadumia*, xix, 192–93, 239–40
- Paracelsianism  
 chemical drugs associated with, 19–20, 19–20n1, 29n26  
 debates over, 8  
 Elizabethan compromise in, xv, 5, 19, 19–20n1  
 iatrochemistry, 20n2, 79n1, 159–60  
 like-cures-like principle, 37n59  
 on microcosm (man) vs. macrocosm (universe), xix  
 salt/sulfur/mercury's central role in, xvii, 27  
 in Spain (see Spain, early modern chemical remedies in)  
*tria prima* (salt, sulfur, and mercury), xvii, 43, 102–5, 120–21, 123–26  
 types of, 20n2  
 See also chemical philosophy
- Paracelsian *praxis*, 19–58  
 astrological medicine, 31–35  
 centers of, 24–25, 28–29  
 disease entities, 32–33, 32n39  
 in healing practices, 19–20  
 historiographical impact of, 50–54  
 mercurial diseases, 28  
 overview of, xv, 19–21, 23–24  
 studies of, 20–21, 23–24  
 sulfurous diseases, 28  
 tartar diseases, 28, 35–41, 35n52, 44  
 uroscopy, xv, 24–32, 26–27nn20–22, 28n25, 41n77, 53  
 See also *Three Diverse New Treatises* (Hayne)
- Paracelsus  
 Basel episode, 44–45, 44nn81–82  
 chaotic writings of, 21n7  
 dismissal of, 4  
 on the elements, 103–4  
 on Ficino, 210n2  
 on the human as center, 214n19  
 on individual potential, 215n19  
 and Kappler, 162  
 lectures by, 44–48, 44n82, 46–47n91, 52, 53n107  
 on magic, 220–21  
 on medicines/poisons, 35n49  
 parabolic chymiatry taught by, 69  
 on physiognomy, 47–48  
 on pulses, 47–48  
 reputation as a healer, 44  
 reputation as a reformer of medicine, 50, 50n99  
 on resurrection, 219–20  
 on the soul, 219–20  
 on tartar diseases, 44  
 on uroscopy, 30, 30n31, 45–48, 50, 52  
 works: *Astronomia magna*, 214–16, 220–21, 220n37; *Das Buch von der tartarischen Krankheiten*, 44; *De tartaro*, 35, 37, 39; *De vita longa*, 37, 213; *Opus paramirum*, 44; *Philosophia de generationibus*, 218
- Paracelsus* (film; Pabst), 44n82
- Paracelsus: An Introduction to Philosophical Medicine in the Era of the Renaissance* (Pagel), 3–4, 49n97
- Paris, Giraldo, 141–42, 141n41
- Parry, Glyn, 227  
*The Arch-Conjuror of England*, 242–45
- Parshall, Karen, xiv
- Paul, Saint, 189

- Petrarch, 288–89
- Peuckert, Will-Erich, 221
- Philip II, King, 133–36, 141–42
- Philosophers' Stone, 91, 95, 187
- Philosophia de generationibus* (Paracelsus), 218
- Philosophical Principles of Universal Chemistry* (Stahl), 110
- Philosophical Transactions of the Royal Society of London*, 85, 85n15
- phlogiston (sulfurous principle)
- Becher on, 114, 114n55
  - continuation into eighteenth century, 120–24, 122n81
  - debunking of, 101, 127–28
  - development/formulation of, 110–20
  - and fire, 116–17, 126
  - in the history of chemical principles, 102–3, 116, 124–28
  - influence of, 120–24
  - overview of, xvii
- physica*, 63–64, 72, 74
- Physica genesis* (Dorn), 194–95
- Physica subteranea* (Becher), 108–9, 108–9n26, 111
- Pico della Mirandola, Giovanni, xix, 86, 210, 214, 215n, 222, 232, 241
- 900 *Theses*, 188–89
  - Oration on the Dignity of Man*, 214n19, 220
  - See also under kabbalah
- Pindar, Ulrich: *Epiphanie medicorum*, 26
- pink sugar (*azúcar rosado solutivo*), 138–39, 139n28
- The Pisse-Prophet* (Brian), 52
- planets, diseases caused by, 34
- Plato, 69, 189, 217
- on division of the soul, 48–49
  - influence/reputation of, 186–87
  - Timæus*, 27, 49–50, 267–68
  - See also Neoplatonism
- plethora (too much blood in the veins), 39
- Pliny, 280
- Plotinus, 187n2
- Plutarch, 252
- Pol, Johann, 163
- Pol, Nicolaus, xviii, 160, 165–66, 177. See also under alchemical manuscripts
- Polizzi, Antonino, 138–39
- polvos blancos solutivos* (white dust solution), 137–38
- Polyani, Michael, 91n40
- Pomata, Gianna, 84, 84n11, 91
- Porphyrus, 187n2
- Porta, Giambattista della, 145
- Magia naturalis*, 251
- Portuondo, Maria, 151
- positivism, 3–4, 81
- Præoccupatio* (Thurneisser), 24, 28–31
- The Praise of Folly* (Erasmus), 271–72
- Praise of the Donkey* (Agrippa), 272, 276
- Priesner, Claus, 91
- Primera parte de medicina y cirugia* (Vidós), 145–46
- Principe, Lawrence M., 49n97, 81, 81nn5–6
- printing presses, 165
- Propaedeutama aphoristica* (Dee), 230–32, 234, 239
- Proverbs (Bible), 198
- Prudentia-Teppich (tapestry), 259–60, 260
- pseudo-Llull, 213
- pseudo-Paracelsus, 213
- Three Books of Philosophy Written to the Athenians*, 196, 196–97n49
- Pumfrey, Stephen, 20n2
- Pythagoras, 188, 190
- ## Q
- The Queen's Conjurer* (Woolley), 230–31, 238
- Quercetanus, 69
- quintessence of the chemical sun, 138–39
- Quintilio, Alessandro, 137, 137nn19–20
- ## R
- Radcliffe, John, 51n100
- Raleigh, Sir Walter, 230
- rashes, 38, 43
- Rath, Wilhelm, 253
- Reading the Book of Nature* (Debus and Walton), xx
- Recanati, Menachem, 188, 190n20
- recipe collections, 150–51, 150n75
- Regiomontanus, Johannes, 34
- “Religious Motives in the Medical Biology of the XVIIth Century” (Pagel), 3–4

- Reuchlin, Johannes, 188–92, 195, 198, 220, 241  
*De arte cabalistica*, 190n12  
*De verbo mirifico*, 189, 191
- Reusner, Hieronymus, 25–30, 26n18, 28n25, 53
- Rey Bueno, Mar, xvii–xviii
- Ripa, Cesare: *Iconologia*, 280, 281–82
- Rivière, Jean Davach de la: *Mirror of Urines*, 52n106
- “Robert Boyle and His Sceptical Chymist” (Debus), 2
- Roberts, Julian, 234, 237
- Rodríguez Guerrero, José, 136–37, 138n23
- Rolfink, Werner, 75, 93–96
- Rollenhagen, Gabriel: *Nucleus emblematum selectissimorum*, 265, 266–67
- rosemary balsam, 138–39
- Rossi, Girolamo (*pseud.* Hieronymus Rubeus), 61
- Rossi, Paolo, 12
- Rouelle, Guillaume François, 122–23
- Rousseau, Jean-Jacques, 122
- Royal Academy of Sciences (Paris), 105, 121–22
- Royal College of Physicians (London), 51n101
- Royal Court of the *Protomedicato* (Spain), 137
- Rudolph, Hartmut, 222–23
- Ruiz Zapata, Francisco, 138–39, 139n28
- S**
- Sachs von Lewenheimb, Philipp J., 83, 86–87, 89, 92, 97
- Sala, Angelo, 145
- salts  
 color changes caused by, 117  
 diseases associated with, 43 (*see also* tartar diseases)  
 from metals, 90, 92  
 as resisting fire, 103  
 types of, 43, 119–20  
 See also *tria prima*
- San Jerónimo, Fermín de, 143n48
- San Lorenzo de El Escorial, 143, 143n48
- Santiago, Diego de, 144
- Sarton, George, 2
- Saturn, 34
- Sceptical Chymist* (Boyle), 8, 105–6
- Schaffner, Christoff, 162
- Schöner, Johannes, 178
- School of Chartres, 253, 269
- School of Night, 230
- Schott, Heinz, xx
- Schröder, Johann, 21, 23, 145
- Schütze, Ingo, 210n3
- Schwenckfeld, Caspar von, 222
- Science and the Secrets of Nature* (Eamon), 137n18
- Scientific Revolution  
 delayed, 81  
 Great Tradition in historiography of, 2–4  
 Hermeticist reinterpretation of, 12  
 mathematization/mechanization of, 1  
 vs. occult sciences, 234–35  
 reshaping of, generally, 12  
 union of opposites in, xiii–xiv (*see also* chemical philosophy)
- Scultetus, Bartholomæus, 24n13
- scurvy, 38
- Seeing the Word: John Dee and Renaissance Occultism* (Håkansson), 238–41, 245
- Sefer Bahir*, 188
- Semhamaphoras, 190
- semina*, 88–89
- Sennert, Daniel, 104
- sephiroth* (divine emanations), 190
- Severinus, Petrus, 34n45, 69, 104, 194–95
- Shackelford, Jole, xv
- Shakespeare, William, 51
- Sharpe, Richard, 169–70
- Shaw, Peter, 110
- Sherman, William H., 227, 235  
*John Dee: The Politics of Reading and Writing in the English Renaissance*, 236–38, 241
- sidereal powers, 209–25  
 a middle path in the dispute, 212, 221–23  
 Pagel vs. Goldammer dispute, 209–13  
 Pagel vs. Goldammer on Paracelsus’s cosmological components, 217–21  
 Paracelsus on, 213–17
- Sidney group, 230, 233, 236
- Sigismund, Duke, 165
- Silvestris, Bernard, 269
- Simeon bar Yohai, 189
- Sinnbildkunst*, 257
- Siraisi, Nancy, 32n37
- Slater, John, 135n14

Spain, early modern chemical remedies in, 133–58  
 as amusements of idle men, 139–42, 141n41, 142n44  
*chymia*, xvii–xviii  
*chymica/chimica*, use of terms, 135n16  
*novatores* movement, 134–35, 135n14  
 overview of, xvii–xviii, 133–36, 135n14, 136n16, 151  
 for the poor, 146–47, 147n65  
 scholars of, 151  
 secret panaceas, 137–39, 137n18, 137n20, 138n23, 138n25, 139n26, 139n28  
 by spagyrist friars, 143–45, 144nn51–52, 145n58  
 by women, 148–51, 150n75  
*Specimen beccherianum* (Stahl), 111, 125–26  
 Speer, Andreas, 267–68  
*spiritus mundi* (spirit bodies), 209–10  
 Stahl, Georg Ernst, 101–30  
 on æther, 110–11, 117, 126  
 on *Asche* (rust), 113, 113n47  
 on calcination/combustion, 102, 117, 127  
 Debus on, 101–2n1  
 importance of, 101–2  
 on inflammability, xvii, 103–4, 109, 111, 113–14, 117, 119 (*see also* phlogiston)  
 overview of, 101–3  
 on salts, 119–20  
 vitalism of, xvi  
 works: *Philosophical Principles of Universal Chemistry*, 110; *Specimen beccherianum*, 111, 125–26; *Treatise on Sulfur*, 103, 109, 111–12, 115, 120–26; *Zymotechnia fundamentalis*, 110, 125–26  
 stars, powers of, 34, 222–23. *See also* sidereal powers  
 Stein, Claudia L'Engle, 40n72  
 Steneck, Nicholas, 10  
 Stengers, Isabelle, 127  
 Stevens, Wallace: “Metaphors of a Magnifico,” xiii  
 Stoics, 217  
 Stolbert, Michael, 32n36, 51–54  
 Suchten, Alexander von, 67  
 Sudhoff, Karl, 45, 52, 210n2, 211, 219  
*Sukkah*, 189

sulfur  
 diseases associated with, 43, 49  
*hepar sulphuris* (liver of sulfur), 115, 115n61, 121  
 inflammability of, 103, 107  
 metallic, 117–18  
 metals's color due to, 103, 126  
*See also tria prima*  
 sulfur dioxide, 119  
 sulfurous principle. *See* phlogiston  
 sulfur trioxide, 119  
 Sulzer, Johann Georg  
*Allgemeine Theorie der Schönen Künste*, 283  
*Unterredungen über die Schönheit der Natur*, 281–82, 284  
 Sun, 34, 250, 257, 264, 264, 283  
 symbolic exegesis, 240  
 syphilis, 40n72, 166  
 Szönyi, György, 227  
*John Dee's Occultism*, 238–41, 245

**T**

tacit knowledge, 91n40  
 Talmud, 189  
 tartar diseases, 28, 35–41, 35n52, 36n54, 44  
 Taylor, Charles, 2  
 Taylor, Eva G. R., 231, 234  
 Teich, Mikulas, 114, 114n55  
 Tetragrammaton (YHVH), 189–92, 194, 201, 286  
*THALAT- TOKRATIA BREITANIKI* (Dee), 236  
*Le Théâtre des bons engins* (La Perrière), 256, 257, 258  
*Thesaurus pauperum* (Hispanus), 146  
*Three Books of Philosophy Written to the Athenians* (pseudo-Paracelsus), 196, 196–97n49  
*Three Diverse New Treatises* (Hayne), 22, 30–33  
 on arsenical diseases, 37  
 on astrological diseases, 21, 31, 33–35, 39–40  
 on body (elemental earth and water), 41  
 on chemical uroscopy, 21, 30, 41–50  
 composition of, 21, 23  
 on digestion, 36, 36n56, 40  
 frontispiece, 22, 53  
 as an introduction to Paracelsian medicine, 20–21

*Three Diverse New Treatises* (Hayne) *continued*  
 overview of, 30–31  
 Paracelsus's direct influence on, 53n107  
 publication of, 20n6, 21, 23  
 on seeds (salt, sulphur, and mercury), 42  
 significance of, 50  
 on spirit (elemental fire and air), 41–42  
 on spiritual origin of diseases, 20–21  
 on stars, 34–35  
 on tartar diseases, 35–41, 36n54  
 on uroscopy, 40–43, 49–50, 52–53  
 vernacular (German) used in, 23

Thurneisser, Leonhard, 23–24n12, 23–26,  
 27n21, 30n31, 36n54, 48, 49n97, 52–53,  
 53n107

*Præoccupatio*, 24, 28–31

*Timæus* (Plato), 27, 49–50, 267–68

Timmermann, Anke, xviii

Torricelli, Evangelista, 124

Toxites, Michael, 68–69

*Transmutation* (Pantheus), 192

*Treatise on Sulfur* (Stahl), 103, 109, 111–12, 115,  
 120–26

Trenbach, Christoph von, 162

*tria prima* (salt, sulfur, and mercury), xvii, 43,  
 102–5, 120–21, 123–26

Trinity College Library (Cambridge), 171n37

Tubal-Cain (biblical figure), 64, 193

Tudor politics, 242

*Turba philosophorum*, 192

Turner, William, 4

Tymme, Thomas, 4

*tzimzum*, 198

## U

Ulstad, Philip, 142, 144

University of Chicago, 6

University of Jena, 83, 93

University of Marburg, 83

University of Valencia, 135

University of Vienna, 160

*Unterredungen über die Schönheit der Natur* (Sulzer), 281–82, 284

urine flasks (*matulae*), 25–27, 27nn21–22, 32,  
 32n37, 42–43, 53

uroscopy  
 decline of, 50–54, 51nn100–101, 52n106

Hayne on, 40–43, 49–50, 52–53  
 healthy-state urine, 42, 42n79, 46  
 historiography of, 50–54, 51nn100–101,  
 52n106  
 in Paracelsian praxis, xv, 24–32, 26–27nn20–  
 22, 28n25, 41n77, 53  
 Paracelsus on, 30, 30n31, 45–48, 50, 52  
 patients' expectations of, 32n36  
 quantitative vs. qualitative, 49, 49n97, 52  
 Shakespeare's references to, 51

*Utriusque cosmi* (Fludd), 277, 277–78, 279, 280

## V

Valles, Francisco de, 134–35

Vázquez de Mármol, Juan, 140–41

Venel, Gabriel François, 122–23

Venus (god), 190, 256, 257, 258–59

Venus (planet), 34

Vidós y Miró, Juan de, 147  
*Primera parte de medicina y cirugia*, 145–46

Villa, Esteban, 143–44

Villacastín, Andrés de, 143

“The Vindication of Rubbish” (Pagel), 4

*virtuosi* societies, 82

vitriolated tartar, 114–15, 121, 123

vitriolic acid, 114–15, 119, 121

Vives, Juan Luis: *De Institutione foeminae christianae*, 149

*Voarchadumia* (Pantheus), xix, 192–93, 239–40

## W

Wallis, Faith, 27n22, 42n79

Walton, Michael, xviii, xx–xxi  
*Reading the Book of Nature*, xx

Warburg school, 234–35

water of life, 138–39, 143

Watson, Andrew G., 234, 237

Webster, Charles, 8–10, 12, 212

Wecker, Johannes Jacob, 144

Wedel, Georg Wolfgang, 93, 96  
*Introductio alchimiam*, 94–95  
*Opiologia*, 94

Weinstein (calcined wine dregs), 37, 37n59

Wellcome, Henry S., 26n18, 49n97, 51nn100–  
 101

Wershub, Leonard Paul, 52n106

Whitby, Christopher, 238

white dust solution (*polvos blancos solutivos*),  
137–38

Wilding, Michael, 226, 238, 246

Willichius, Jodocus, 25–26, 28–30

Willis, Thomas, 106, 108–9, 121, 124–25

*De fermentatione*, 107

Wirszubski, Chaim, 188n3

Wohlfarth, Georg Balthasar, 83

Wolf, Gaspar, 148n69

women

chemical remedies by, 148–51, 150n75

education of, 149

famous, texts about, 288

superiority of, 285–90

Woolley, Benjamin, 226

*The Queen's Conjurer*, 230–31, 238

Word (*Logos*), 194

word-magic, xviii, 195–99. *See also* fiat

*World's Who's Who in Science*, 6

Würzburg, Konrad von, 254

## Y

Yates, Frances, 12, 230, 232–33, 235–36, 240–41,  
244–45

Yewbrey, Graham, 235–36, 241–42, 244–45

YHVH. *See* Tetragrammaton

Yom Kippur, 191

## Z

Zimmerman, Hans-Joachim, 280, 280n77, 281

Zobell, Friedrich, 31, 31n35, 50

*Chymische Medicinische Perle*, 20

Zohar, 188–89, 198n53

Zwingli, Ulrich, 222

*Zymotechnia fundamentalis* (Stahl), 110, 125–26