

Taape, Tillmann, "Distilling Reliable Remedies: Hieronymus Brunschwig's *Liber de arte distillandi* (1500) Between Alchemical Learning and Craft Practice." *Ambix* 61 (2014): 236–256.

### Abstract

Hieronymus Brunschwig's *Liber de arte distillandi*, written in German and first published in Strasbourg in 1500, was the first printed manual on the distillation of medicinal waters. Although influential among early modern audiences and well-known to modern scholars, its intriguing blend of intellectual and practical traditions has thus far received little attention. This paper identifies these strands in Brunschwig's technical instructions and shows how they intertwine in the production of reliable remedies. Exploring the intellectual dimension of Brunschwig's work, I argue that his concept of distillation is shaped by an alchemical understanding of matter, especially by the writings on 'quintessence' of the fourteenth-century alchemist John of Rupescissa. To realise this concept in the workshop, Brunschwig emphasises the central importance of the body and its senses to ensure true craftsmanship. Brunschwig's printed manual was as much a product of skilled artisanal practices as the distilled waters it describes, and I argue that it was shaped by the same concerns about technical precision and reliability.

### Introduction

Distilled waters were widely used as medical remedies during the early modern period, and by the end of the seventeenth century had become much-valued commodities.<sup>1</sup> The first printed book to reveal in any detail how these medicinal waters were made was Hieronymus Brunschwig's *Liber de arte distillandi de simplicibus* (1500), written in German despite its Latin title, and widely read even beyond German-speaking areas. Combining different traditions of making knowledge, it allows us to explore the historical identity of distilled waters. In this paper, I show how this identity was shaped by alchemical ideas about matter and the cosmos, and how these ideas translated into practical concerns about exacting

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<sup>1</sup> William Eamon, "Alchemy in Popular Culture: Leonardo Fioravanti and the Search for the Philosopher's Stone," *Early Science and Medicine* 5 (2000), 196–203; Bruce Moran, *Distilling Knowledge: Alchemy, Chemistry, and the Scientific Revolution* (Cambridge, MA: Harvard University Press, 2005), 54f.

craftsmanship, both in the manufacture of distilled waters in the workshop and their communication through the printed book.

As a surgeon and apothecary practicing chiefly in Strasbourg, Hieronymus Brunschwig (c.1450–c.1512) had little or no university education. Nevertheless he read widely and wrote prolifically in his native dialect,<sup>2</sup> including a well-known surgery manual called *Buch der Chirurgia* (1497), a plague treatise (1500) and a much larger volume on distillation confusingly named *Liber de arte distillandi de compositis* (1512) which discusses a greater range of remedies and preparation techniques than the *Liber ... de simplicibus* of 1500. To avoid confusion between the unwieldy and deceptively similar Latin titles of Brunschwig's books on distillation, I shall adopt the convention of referring to the latter as the *Small book of distillation*, and to the former as the *Large book of distillation*.<sup>3</sup>

The *Small book of distillation* is a highly significant work in many ways. First of all, its commercial success is striking: it went through sixteen editions between 1500 and 1568. In addition to its popularity with readers, it also had a major influence on medical chemistry and served as a model for subsequent publications such as Philip Ulstadt's alchemical treatise *Coelum philosophorum* (1526/28) and the herbals of two physicians, Eucharius Röblin (d. 1547) and Adam Lonicer (1528–1586).<sup>4</sup> One of the earliest printed works on natural knowledge to be translated into English, it was the first chemical text published in the English vernacular, and remained the only one for over two decades.<sup>5</sup> Given its seminal role as one of the earliest printed vernacular works on medicine and its wide distribution, the *Small book of distillation* has received surprisingly little attention, and what little scholarship there is has tended to focus on isolated technical aspects.<sup>6</sup> The book as a whole thus remains

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<sup>2</sup> Henry Sigerist, *Hieronymus Brunschwig and His Work: A Fifteenth Century Surgeon* (New York: Ben Abrahamson, 1946), 14–17; Pierre Bachoffner, "Jérôme Brunschwig, chirurgien et apothicaire Strasbourgeois, portraituré en 1512," *Revue d'histoire de la pharmacie* 81 (1993), 269–271; Gerhard Eis, "Brunschwig, Hieronymus," in *Neue Deutsche Biographie* (2005), <http://www.deutsche-biographie.de/pnd119238217.html>.

<sup>3</sup> Cf. Sigerist, *Hieronymus Brunschwig and His Work*.

<sup>4</sup> Reginald Bess, "Hieronymus Brunschwig's 'De Arte Distillandi' and the Technical Language of Distillation," *Fifteenth-Century Studies* 11 (1985), 18f.; Robert Multhauf, "The Significance of Distillation in Renaissance Medical Chemistry," *Bulletin of the History of Medicine* 30 (1956), 333–336; Alisha Rankin, "How to Cure the Golden Vein: Medical Remedies As Wissenschaft in Early Modern Germany," in *Ways of Making and Knowing*, ed. Pamela Smith, Harold Cook and Amy Meyers (Ann Arbor: University of Michigan Press, 2014). I am very grateful to Alisha Rankin for permitting me to read a draft of this chapter ahead of publication.

<sup>5</sup> According to Cooper's catalogue of 'chymical books' studied by Lauren Kassell, "Secrets Revealed: Alchemical Books in Early Modern England," *British Journal for the History of Science* 49 (2011). See also Charles Webster, "Alchemical and Paracelsian Medicine," in *Health, Medicine, and Mortality in the Sixteenth Century*, ed. Charles Webster (Cambridge, New York: Cambridge University Press, 1979), 303.

<sup>6</sup> Gustav Klein, *Das Buch der Chirurgia des Hieronymus Brunschwig* (Munich: Kuhn, 1911) and Sigerist, *Hieronymus Brunschwig and His Work*, mostly study Brunschwig's *Cirurgia* and hardly acknowledge the significance of his writings on medicine making. Bess, "Hieronymus Brunschwig's 'De Arte Distillandi'"

underestimated, especially with regard to its unique way of presenting the information needed to produce and administer distilled remedies.

The first part introduces the reader to the requisite craft practices – making bricks to build furnaces and setting up stills – as well as a variety of equipment and different methods of distillation. The second part of the *Small book* is an illustrated herbal, providing essential information about a variety of plants, such as their medicinal properties and how to find them. Making the book convenient as well as comprehensive, the third part is a register of diseases in head-to-toe order with an indication of appropriate remedies and corresponding folio numbers.

With its emphasis on technical procedures and its alchemical dimension, the *Small book* is a complex but rich historical source which affords insights into the nature of distilled waters as material products. In recent years, historians have paid increasing attention to materials and the skills and processes which shaped them.<sup>7</sup> Distilled waters are prime examples of such hard-won commodities: prised from recalcitrant matter by special techniques, they were set apart from ordinary objects and circulated between workshops and marketplaces. As highly constructed objects thought to encapsulate the elusive medicinal properties of natural matter, they are even further from being transhistorical entities than some other, more tangible early modern materials.<sup>8</sup> It is therefore especially necessary and enlightening to situate Brunschwig's distilled remedies in a context of artisanal practices shaped by an understanding of materials' alchemical meanings and hidden correspondences.<sup>9</sup> Tracing these connections

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analyses its contribution to the technical vocabulary of *Fachliteratur* on distillation, and Maria Roxo Beltran, "Sixteenth Century Books of Distillation," in *Between the Natural and the Artificial: Dyestuffs and Medicines*, ed. Gérard Emptos and Patricia Aceves Pastrana (Turnhout: Brepolis, 2000), 145–155, illustrates its role in disseminating technical processes in print. Robert J Forbes, *A Short History of the Art of Distillation: From the Beginnings Up to the Death of Cellier Blumenthal* (Leiden: E. J. Brill, 1970) acknowledges Brunschwig's importance as a compiler of a new way of making medicines, but the role of the *Small book* remains understated, partly because Forbes confuses it with the *Large book of distillation*. A notable exception is Rankin, "How to Cure the Golden Vein," which compellingly situates Brunschwig's book within the tradition of practical 'how-to' instructions increasingly popular with sixteenth-century readers.

<sup>7</sup> Particularly pertinent to this study is the approach set out in *Materials and Expertise in Early Modern Europe: Between Market and Laboratory*, ed. Ursula Klein and Emma Spary (Chicago: University of Chicago Press, 2010), esp. 1–19. See also *The Mindful Hand: Inquiry and Invention From the Late Renaissance to Early Industrialisation*, ed. Lissa Roberts and Simon Schaffer (Amsterdam: Royal Netherlands Academy of Arts and Sciences, 2007).

<sup>8</sup> If the materials discussed in *Materials and Expertise* can be viewed in the light of Gaston Bachelard's and Lorraine Daston's notion of 'scientific objects' despite their lack of characteristic elusiveness (pp. 1–19), distilled waters fit this category rather more neatly.

<sup>9</sup> Pamela Smith, "Vermilion, Mercury, Blood, and Lizards: Matter and Meaning in Metalworking," in *Materials and Expertise in Early Modern Europe: Between Market and Laboratory*, ed. Ursula Klein and Emma Spary (Chicago: University of Chicago Press, 2010), 29–48. On alchemy as a "vernacular science of matter" see also Pamela Smith, *The Body of the Artisan* (Chicago: University of Chicago Press, 2004), 129–151.

will allow us to illuminate the significance of distillation in the early modern cosmos, particularly in relation to natural matter, the human body, and the heavens.

Exploring Brunschwig's intellectual background, the first part of this paper shows how medical concerns about the human body were shaped by an early modern scholarly understanding of nature in which matter was constantly changing and decomposing. To make sense of Brunschwig's distilled waters as a response to this challenge, I trace the influence of the fourteenth-century alchemist John of Rupescissa on Brunschwig's concept of distillation, as a process capable of restoring some degree of stability to earthly matter, and to human health. Combining this kind of philosophical learning with artisanal techniques was the rule rather than the exception in early modern alchemical practice, but the *Small book* provides an unprecedented level of technical detail. As I show in the second part of the essay, Brunschwig stresses the value of practical experience, and the importance of physically engaging with the practices and materials one seeks to master, especially if the materials in question are as elusive as the distilled medicinal properties of corruptible natural things. Rather than forcing an unhelpful division between the 'theoretical' and 'practical' parts of Brunschwig's project, I propose to treat it as a hybrid activity, situated on a continuum of early modern forms of knowledge ranging from the learned to the artisanal.<sup>10</sup> Finally, in order to fully comprehend Brunschwig's project, we need to investigate not only how distilled waters were conceptualised and manufactured, but also how they were communicated in printed form. This acknowledges that we are exploring these remedies through the lens of another type of hard-won material product which reflects Brunschwig's concern with technical precision and reliability: the printed book. Brunschwig's distilled waters were shaped by a particular blend of intellectual and practical traditions: clearly influenced by alchemical thought but foregrounding artisanal practices, it represents Brunschwig's own perspective on what it meant to do alchemy in the early modern period.

### **Natural matter, human health, and the alchemy of quintessence**

Brunschwig's approach to distilling remedies is deeply rooted in an understanding of contemporary cosmology, especially the material world of nature and the place of the human

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<sup>10</sup> There is considerable scholarly precedence for studying ways of making knowledge at the intersection of book learning and artisanal practices, cobining manipulation and contemplation. *The Mindful Hand*, esp. XIII–XXIV, 1–7; *Materials and Expertise*, 1–5.

body within it. This is spelled out quite clearly in a passage ‘on the four elements’ included in the second edition of the *Small book of distillation*. The reader is told that sublunar matter, including the human body, is in a constant turmoil of generation and decay.<sup>11</sup> This is due to the corruptibility of the four elements which make up all earthly things: fire, water, earth and air. Their associated qualities—hot or cold, wet or dry—are individually destructive, and if one is present in excess, it accelerates the corruption of matter by drying out, burning up or freezing. Stability and prosperity are only possible if the elements and their qualities are in perfect balance, “as you can see in May when it is neither too dry nor too humid, neither too warm nor too cold.”<sup>12</sup> Similarly, human health is dependent upon an equal balance of the four qualities. This is in keeping with learned medical theory which maintained that a healthy body was one in which the four bodily humours, acting as the vehicles of the elemental qualities, were balanced according to the individual’s particular ‘complexion.’ The comparison of a perfect balance of qualities to those few precious weeks in May, when things are just right, marks it as virtually unattainable, since it was constantly threatened by the fluctuation and uncertainty of all earthly matter.<sup>13</sup> In the face of these concerns, alchemy offered a way of combatting physical corruption through the investigation, imitation and manipulation of natural processes such as material transmutation and decomposition.

Distillation was an essential means to such alchemical ends. From the beginnings of Western alchemy in the twelfth century, distilled elixirs and *aqua vitae* played an important part in the quest for purification and longevity.<sup>14</sup> Brunschwig makes relatively few explicit connections between distillation and alchemy, for example in the third chapter of the *Small book* where he states that the processes and equipment he is about to describe are “well known to the alchemists.”<sup>15</sup> Nevertheless, his works reveal a distinctly alchemical understanding of the way in which natural knowledge should be gathered and used. On the one hand, he emphasises how much he has learnt from his own practical experience as well as from that of

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<sup>11</sup> Hieronymus Brunschwig, *Small book of distillation* (Strasbourg: Grüninger, 1500 [1509]), 36v. Folio numbers for the *Small book* refer to the second edition (1509) unless otherwise indicated.

<sup>12</sup> “Wan du sichst in dem mayen so es zuo Druckenn noch zuo fucht noch zuo kalt noch zuo warm ist” (Brunschwig, *Small book*, 36v). Translations are my own unless otherwise indicated.

<sup>13</sup> Leah DeVun, *Prophecy, Alchemy, and the End of Time: John of Rupescissa in the Late Middle Ages* (New York: Columbia University Press, 2009), 68. On the concept of complexion in learned medicine, see Nancy Siraisi, *Medieval & Early Renaissance Medicine* (Chicago: University of Chicago Press, 1990), 101–104.

<sup>14</sup> Moran, *Distilling Knowledge*, 11f. On distillation between medicine and alchemy in fifteenth-century England, see Linda Ehrsam Voigts, “The Master of the King’s Stillatories,” in *The Lancastrian Court: Proceedings of the 2001 Harlaxton Symposium*, ed. Jenny Stratford (Donington, 2003), 233–52.

<sup>15</sup> “Den alchymisten vast wol bekant” (Brunschwig, *Small book*, 7r).

others.<sup>16</sup> On the other hand, he also aligns himself with the scholarly tradition of gaining knowledge from texts, claiming that he has read no fewer than three thousand "large and small books [...] of good masters,"<sup>17</sup> including well-known authorities of scholastic and Arab medicine – Hippocrates, Galen and Avicenna, to name but a few – as well as medieval alchemical writers.<sup>18</sup> While we should not take such claims at face value, especially since it is not clear how well Brunschwig understood Latin,<sup>19</sup> his works do suggest that he was familiar with Galenic and Arab medicine, perhaps through German translations circulating at the time.<sup>20</sup> This productive fusion of craft skills and book learning was crucial to alchemical knowledge-making in the early modern period. The great majority of practitioners, from scholarly types to those mainly interested in material products, engaged in both textual work and technical processes to some extent.<sup>21</sup> Brunschwig, as I will show, does his best to stretch towards both ends of this spectrum, but while he draws on alchemical authors, he also defines his own work in opposition to certain kinds of alchemy. When describing potable gold, for instance, he hastens to distance himself from chrysopoeic alchemy, stating that his focus is "purely medical, and not alchemical."<sup>22</sup> To illuminate Brunschwig's own brand of medical alchemy, the following section sketches the intellectual framework which guided his practice. In particular, I show how the alchemical writings of John of Rupescissa shaped Brunschwig's understanding of distillation and thus inspired his quest for reliable medicines.

<sup>16</sup> "Durch mein teglich hantwürckung selber erkundet hon" (Brunschwig, *Small book*, 6r). Also see Rankin, "How to Cure the Golden Vein."

<sup>17</sup> "Bücher groß vnnd clein die ich gesehen vnnd gelesen hab [...] von guotenn meystern mit worheit ich wol sprechen mag ob drei tusent" (Brunschwig, *Small book*, 2v).

<sup>18</sup> The *Small book* mentions e.g. "ypocras. Rasis Galienus Serapio Avicenna vnnd annder" (fol. 2v), and "Mesue / Arnoldus de villanoua vnn mancher mer" (fol. 6v.). The *Large book* gives a more extensive enumeration of authors (fol. 2v). On Brunschwig's wide reading see Sigerist, *Hieronymus Brunschwig and His Work*; for a list of authors quoted in Brunschwig's *Cirurgia* of 1492, see Klein, *Das Buch der Chirurgia*, vi.

<sup>19</sup> It has been suggested that Brunschwig's Latin was poor (Klein, *Das Buch der Chirurgia*, vii; Sigerist, *Hieronymus Brunschwig and His Work*, 17), but he demonstrates the basic familiarity with Latin medical and pharmaceutical terms which would have been expected of an apothecary.

<sup>20</sup> Klein, *Das Buch der Chirurgia*, notes that numerous manuscript surgical treatises on surgery would have been available to Brunschwig (vi).

<sup>21</sup> Recent scholarship has increasingly shown that reading and practical experience intertwine in early modern alchemical practice. See, in particular, Lauren Kassell, "Reading for the Philosopher's Stone," in *Books and the Sciences in History*, ed. Marina Frasca-Spada and Nicholas Jardine (Cambridge: Cambridge University Press, 2000), 132–150; Moran, *Distilling Knowledge*; Tara Nummedal, *Alchemy and Authority in the Holy Roman Empire* (Chicago: University of Chicago Press, 2007), esp. Ch. 1, and Jennifer M. Rampling, "Establishing the Canon: George Ripley and His Alchemical Sources," *Ambix* 55 (2008), 189–208. In-depth studies of note-taking practices have shown the similarity of textual and experimental practices: Deborah Harkness, *The Jewel House: Elizabethan London and the Scientific Revolution* (New Haven: Yale University Press, 2007), Ch. 5; Anke Timmermann, "Doctor's Order: An Early Modern Doctor's Alchemical Notebooks," *Early science and medicine* 13 (2008), 25–52. For a very useful overview see Tara Nummedal, "Words and Works in the History of Alchemy," *Isis* 102 (2011), 330–337.

<sup>22</sup> "Allein artzenysch vnn nit alchamysch" (Brunschwig, *Large book*, 25v).

## John of Rupescissa and the concept of quintessence

Although at a cursory glance the *Small book* reads mainly like a technical manual, the very first chapter makes it clear that Brunschwig’s enterprise of distilling medicines has a distinct theoretical dimension. The claim that distillation can “make the fragile indestructible” and turn terrestrial matter into something “like a heavenly thing” intimates that Brunschwig conceives of the process as one of cosmological relevance.<sup>23</sup> For a more explicit exposition of the concepts underpinning Brunschwig’s practical instructions, we can turn to his later work, the *Large book of distillation*. Although this, too, was a popular book, spawning numerous imitations,<sup>24</sup> thus far little attention has been paid to its contents which, as it turns out, reveal how Brunschwig positions himself with respect to different traditions.<sup>25</sup> This intellectual background provides useful context for the concept of distilled remedies articulated in the *Small book*.

The fourteenth-century alchemist John of Rupescissa is cited at least seven times throughout the first part of the *Large book* as an authority on distilling ‘quintessence,’ a subject he discussed extensively in his *Liber de consideratione quintae essentiae*.<sup>26</sup> Although Brunschwig may not have been fully Latinate, he could very plausibly have had access to Rupescissa’s work through a number of German translations circulating at the time.<sup>27</sup> The extent of Brunschwig’s borrowing from Rupescissa is striking, although of course not unusual for the time.<sup>28</sup> Udo Benzenhöfer has noted that over a third of the 36 chapters in the first part of the *Large book* are concerned with quintessence and at least in part derived from Rupescissa’s *De consideratione*.<sup>29</sup> However, it has not been determined what kind of ideas

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<sup>23</sup> “Ein elementisch ding zuo machen gleich dem hymelischen” (Brunschwig, *Small book*, 6r). On Rupescissa’s notion of quintessence as ‘heaven,’ see DeVun, *Prophecy, Alchemy, and the End of Time*, 66–69.

<sup>24</sup> I have thus far identified five editions with some confidence. Another five editions, up to 1614, are likely candidates but require verification.

<sup>25</sup> Alisha Rankin, “How to Cure the Golden Vein” is a recent exception; her analysis of Brunschwig as a provider of practical medical knowledge includes prefatory material of the *Large book*.

<sup>26</sup> For example, “Johannes rubiciscus” is counted among Brunschwig’s authorities (Hieronymus Brunschwig, *Large book of distillation*, Strasbourg: Grüninger, 1512, 2v).

<sup>27</sup> Udo Benzenhöfer, *Johannes De Rupescissa Liber De consideratione quintae essentiae omnium rerum, deutsch: Studien Zur Alchemia Medica des 15. Bis 17. Jahrhunderts* (Stuttgart: Steiner Verlag Wiesbaden, 1989) lists ten fifteenth-century German manuscripts containing material from *De consideratione*; which he judges to be the most likely source of Brunschwig’s borrowing. (26ff., 62).

<sup>28</sup> In the emerging print trade at the beginning of the sixteenth century, standards of ownership were ambiguous and plagiarism considered legitimate practice. Cf. William Eamon, *Science and the Secrets of Nature : Books of Secrets in Medieval and Early Modern Culture* (Princeton: Princeton University Press, 1994), 97. For a list of printed works containing *Consideratione*-material, see Benzenhöfer, *Johannes De Rupescissa*, 43ff.

<sup>29</sup> Benzenhöfer, *Johannes De Rupescissa*, 60–62.

Brunschwig extracted from Rupescissa’s work or how he incorporated them into his understanding of the distillation process. In order to do this, it will be useful to investigate Rupescissa’s notion of quintessence here in some detail.

Haunted by visions of the apocalypse, Rupescissa wrote his *Liber de consideratione quintae essentiae* in the 1350s.<sup>30</sup> It describes the quest for a universal alchemical medicine which would comfort and strengthen worthy evangelical men—most likely Rupescissa’s Franciscan brethren—in their imminent battle against the Antichrist. Rupescissa believed that he had found this panacea in repeatedly-distilled alcohol and called it the ‘fifth substance’ or *quinta essentia* as an analogy for the Aristotelian fifth element which made up the substance of the heavens. Transcending the four sublunar elements, the celestial fifth element possessed none of their corruptible qualities and thus maintained the heavenly spheres in changeless perfection.<sup>31</sup> Like heaven, quintessence had no elemental qualities and was therefore itself incorruptible as well as halting the corruption of terrestrial matter, including the human body. Furthermore, it could redress any complexional imbalance as it “sometimes provides a wet quality, sometimes hot, sometimes cold, and sometimes dry.”<sup>32</sup> Rupescissa’s frequent reference to quintessence as ‘man’s heaven’ or ‘our heaven’ reflects its marvellous preservative properties and tempering effect, but also indicates that it is a sublunar version of the fifth element, and not in fact a piece of celestial matter. Leah DeVun has argued that quintessence could thus be thought of as ‘perfected nature,’ subjecting earthly things to heaven’s perfectly regular and predictable course to exempt them from corruption.<sup>33</sup>

Such earthly perfection was hard-won through complex alchemical processes. Rupescissa maintains that even the best distilled wine one can find is still mingled with earthly qualities, and thus requires circular distillation, such that “by continuous rising and falling the

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<sup>30</sup> On the dating of Rupescissa’s writings, see Robert Halleux, *Les ouvrages alchimiques de Jean de Rupescissa* (Paris: Imprimerie Nationale, 1981).

<sup>31</sup> DeVun, *Prophecy, Alchemy, and the End of Time*, 9, 52–73. On the importance of the heavens in alchemy, see Michela Pereira, “Heavens on Earth. From the Tabula Smaragdina to the Alchemical Fifth Essence,” *Early Science and Medicine* 5 (2000): 131–144, and Jennifer M. Rampling, “Depicting the Medieval Alchemical Cosmos: George Ripley’s Wheel of Inferior Astronomy,” *Early Science and Medicine* 18 (2013), 45–86.

<sup>32</sup> “Quando necesse est, influit qualitatem humidam, aliquando calidam, aliquando frigidam, aliquando siccam” (John of Rupescissa, *De consideratione quintae essentiae*, 31). I quote from the 1561 printed edition, *Ioannis de Rupescissa, De consideratione quintae essentiae rerum omnium, opus sanè egregium* [...] (Basileae: [s.n., 1561]), held at Cambridge University Library. Translations are my own unless otherwise indicated. On the effect of quintessence on the humoral body, also see DeVun, *Prophecy, Alchemy, and the End of Time*, 67–70.

<sup>33</sup> DeVun, *Prophecy, Alchemy, and the End of Time*, 73. See also Michela Pereira, “Heavens on Earth. From the Tabula Smaragdina to the Alchemical Fifth Essence,” *Early Science and Medicine* 5 (2000), 144.



desired quintessence shall be separated from the corruptibility of the four elements."<sup>34</sup> The circular rising of vapours and falling of condensed liquid is thus framed as a special alchemical operation which confers to earthly matter a distinct cosmological status and mode of action on the human body.

While the main purpose of Rupescissa's book is to draw this particular quintessence of *aqua ardens* which he touts as the ultimate panacea and 'our heaven,'<sup>35</sup> he also tells us that "quintessence is in all things."<sup>36</sup> In particular, the properties of *materia medica* can be amplified by distilling their quintessence which "produces stupendous effects believed to be impossible."<sup>37</sup> This means that we need to distinguish between the general concept of quintessence drawn from any material substance (alcoholic or not) by eliminating the four elements, and the special case of the miraculous panacea which is the quintessence of wine. While the former has the specific medicinal properties of its material of origin, the latter has the power to indiscriminately cure any disease through its tempering effect and its touch of incorruptibility. This underscores the significance Rupescissa ascribes to the process of distillation: independent of the material of origin, the circular rising and falling constitutes a special process of purification, creating what Multhauf has termed a "superior chemical species" of quintessences.<sup>38</sup>

To complicate matters, Rupescissa describes a different way of harnessing the medicinal properties of natural things. Quintessence of wine has the power to "extract from [...] any medicine all its virtues and properties,"<sup>39</sup> and can even draw out the (non-alcoholic) quintessence of other simples. Instructing the reader on the extraction of laxatives, for example, Rupescissa writes, "put as many of these as you like in your heaven [i.e. quintessence of wine] and in three hours it draws to itself their quintessence with all their virtues."<sup>40</sup> In a rather charming extension of his celestial analogy of the fifth substance, Rupescissa describes this

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<sup>34</sup> "Per continuas ascensiones & descensiones separetur quinta Essentia, quam quaerimus, a corruptibili compositione quatuor elementorum" (Rupescissa, *De consideratione*, 31).

<sup>35</sup> "Haec aqua [ardens] est materia de qua extrahitur quinta essentia, quam intendimus principaliter in hoc libro" (Rupescissa, *De consideratione*, 29).

<sup>36</sup> "In omni re quinta essentia est" (Rupescissa, *De consideratione*, 40). The term quintessence was in fact coined in the 13<sup>th</sup> century treatise *De generatione stellarum* as a substance residing in every natural object, drawing on the earlier Stoic idea of an all-pervading pneuma or *anima mundi*. Cf. Pereira, "Heavens on Earth," 139.

<sup>37</sup> "Ex his quinte Essentia extracta tant & talis erit, vt in ictu oculi effectus stupendissimos, & qui creduntur impossibiles, operetur" (Rupescissa, *De consideratione*, 44.)

<sup>38</sup> Robert P Multhauf, "John of Rupescissa and the Origin of Medical Chemistry," *Isis* 45 (1954), 367.

<sup>39</sup> "Deus caeli talem virtutem contulit quintae Essentiae, vt extrahat ab [...] quacunqua medicinali re, omnes virtutes & proprietates" (Rupescissa, *De consideratione*, 58).

<sup>40</sup> "Pone ex his quantum volueris in caelo tuo & trahet in tres horas ad se quintam Essentiam cum omnibus virtutibus eius" (Rupescissa, *De consideratione*, 60).

process as adorning ‘our heaven’ with stars.<sup>41</sup> Just as the influence of heaven on the sublunary world is increased by the virtues of the heavenly bodies, the effect of quintessence may be modified by the properties of metals or herbs. The former are cosmologically linked to the planets, and the latter are under the influence of specific zodiac signs and thus represent the stars in the sublunar world.

The first three chapters on quintessence in Brunschwig’s *Large book* describe Rupescissa’s notion of alcoholic quintessence as an incorruptible panacea. Most passages are quite close to the original *Liber de consideratione*, and some are strikingly similar, although most likely borrowed via a translation.<sup>42</sup> Consider, for example, the following two passages explaining the medicinal effect of quintessence.

Rupescissa, <i>De consideratione</i>	Brunschwig, <i>Large book</i>
“Oportet rem quaerere, quae sic se habeat respectu quatuor qualitatum, quibus compositum est corpus nostrum, sicut se habet caelum respectu quatuor elementorum” (p. 19).	“Wie sich halt der hymel gegen den fier qualiteten / also halt sich quinta essentia unser hymel / gegen dem menschen / der da gemacht is vß den fier Elementischen qualiteten / mit dem zuosamen gesetzt ist unser leib” (fol. 11v.).
[A thing must be sought which should be situated with respect to the four qualities of which our body is composed, as heaven is situated with respect to the four elements.]	[As heaven is situated with respect to the four qualities, so quinta essentia, our heaven, is situated with respect to man who is made of the four elemental qualities of which our body is composed.]

<sup>41</sup> “Inquiram naturam stellarum necessarium ad ornatum caeli nostri” (Rupescissa, *De consideratione*, 25).

<sup>42</sup> Judging from the style of the borrowed passages and Brunschwig’s limited Latin, Benzenhöfer surmises that Brunschwig was drawing on one of the circulating German translations rather than the original (62).

<p>“Omnem excessum cuiuscunque qualitatis amputet, &amp; quamcunque qualitatem deperditam restauret: humidum naturale faciat abundare, &amp; ignem naturale debilem inflammare procuret” (p. 18).</p> <p>[It shall cut off any excess of whichever quality, and whichever quality is lacking it shall restore; it shall make natural moisture abound and set alight the weak natural fire.]</p>	<p>“Schneidet ab alle vberflüssigkeit der vier qualitet [...] vnnd widerbringet ein iegliche verlorende qualitet / machet genuogsam natürlich fücht / schafft wider zuo entzündendz geschwachte natürlich für als da spricht Johannes Rubicissi” (fols 10v.–11r.).</p> <p>[It cuts off any excess of the four qualities, brings back any lost quality, generates sufficient natural moisture, and rekindles weakened natural heat, as John of Rupescissa says.]</p>
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As these passages show, Brunschwig was inspired not only by the tempering and restorative effect of quintessence, but also by Rupescissa’s cosmological interpretation of the distillation process. It is reiterated many times throughout the *Large book*, to emphasise the importance of repeated distillations and circulation. Interestingly, Brunschwig points out that

one can *see* how through the rising and falling of distillation the gross and impure is separated and made more subtle, and cleared of the destructive elemental complexion.<sup>43</sup>

Brunschwig thus combines Rupescissa’s theoretical goal of making things more indestructible with his artisanal approach to distillation, based on practical experience and close observation of what is going on in the flask. While Brunschwig deems the terms ‘quintessence’ and ‘our heaven’ most appropriate for the quintessence of wine owing to its subtlety, he also maintains that “apart from wine many other things may also be extracted through distillation,” such as

<sup>43</sup> “So man sehen ist durch ein vff und ab stygen der distillation das grob vnd vnlauter so vast gescheiden vnd gesubtiliert / vnd gelütert von der groben elementischen zerstörliehen complexion,” Brunschwig, *Large book*, 18r.

the juice of herbs, fruit and animal matter.<sup>44</sup> This idea that distillation could extract the (non-alcoholic) quintessences from virtually anything was crucial in shaping Brunschwig’s theoretical understanding of distilled waters, as well as his artisanal practice.

### **Brunschwig’s distilled waters**

The influence of Rupescissan alchemy, so clear in the *Large book*, is less immediately obvious in the *Small book*. The distilled waters are never advertised as ‘quintessences,’ let alone as a panacea deserving to be called ‘our heaven,’ and the instructions for their manufacture do not seem to be geared towards such an elaborate product. Although Brunschwig does recommend distilling multiple times to make the waters stronger,<sup>45</sup> the processes and equipment described in the *Small book* are much less technical than those for the extraction of quintessences which appear in his later work. Nevertheless, at a closer look, a concept of distilled waters as extraordinary remedies can be discerned among Brunschwig’s theoretical claims about distillation and his instructions for the management and use of the waters in the *Small book*. The *Large book* was of course published twelve years later, and one might object that Brunschwig’s ideas may have changed during that time, which would call into question their projection onto Brunschwig’s earlier work. However, in the first edition of the *Small book* Brunschwig refers readers to his “large book” for more information on individual topics, suggesting that he was already writing or at least planning his *magnum opus*.<sup>46</sup>

In the first chapter of the *Small book*, Brunschwig defines distillation as the separation of subtle qualities from their material dross, which makes distillates “less material,” even “indestructible” and “like a heavenly thing.”<sup>47</sup> This is strongly reminiscent of Rupescissa’s idea of perfecting nature by separating out the four elements through distillation. It is important to note, though, that Brunschwig’s claims about the celestial and incorruptible nature of his remedies are fairly low-key: distillation makes them “less material” and more “like a heavenly thing,” it does not purport to actually produce heavenly perfection on earth. This qualification

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<sup>44</sup> “On den wein vil ander ding ouch vßgezogen werden mag durch die distillierung,” Brunschwig, *Large book*, 11v.

<sup>45</sup> “Und zum ander mal gedistiliert [...] vnd ie öfter dz geschicht ye edler das wasser würt.” (Brunschwig, *Small book*, 15r).

<sup>46</sup> “In mynem grossen buoch” (Brunschwig, *Small book* [1500], 1r).

<sup>47</sup> “Unmaterialischer,” “gleich dem hymelischen” (Brunschwig, *Small book*, 6r).

is even more evident in the description of the manufacture, management and application of the distilled waters in the *Small book*. First, the waters deviate from the ideal of the ‘quintessence’ in that they are not free of elemental qualities. On the contrary, they are divided into categories depending on whether they were made from “hot and dry herbs” or “roots of a moist and phlegmatic complexion,” for example.<sup>48</sup> These qualities of the plant are present in the distilled water, and Brunschwig cautions his readers that their effect on the body can be harmful as well as beneficial. Water of *Nenufar* (water lily), for example, can be “half poisonous through its great” if administered internally.<sup>49</sup> Secondly, it is evident that these distilled remedies are far from incorruptible; in fact, Brunschwig spends the entirety of the last chapter discussing the limited shelf-life of different waters.<sup>50</sup> Their corruptible nature becomes even clearer when Brunschwig insists that they need to be appropriately stored in well-sealed flasks and in a place which is “neither too hot nor too cold” — if the waters freeze, for example, they are instantly ruined.<sup>51</sup>

Even if such damage is avoided, their complexional properties are not stable over time. Water of wild roses, for example, can be used as a cooling remedy for the first two years, “but in the third year its cooling virtue is tempered and it is good for comforting.”<sup>52</sup> While water distilled from ‘cooling’ plants such as mandrake or water-lily is initially dangerously powerful, after one year it can safely be taken internally, and “in the third year its cooling effect is tempered.”<sup>53</sup> Although these practical considerations reveal that distilled remedies are not unaffected by decay and change, Brunschwig tells us that they can be salvaged. A water which is about to become corrupt can “prevail against its time” if it is re-infused with fresh herbs and then distilled, but this “may happen no more than twice.”<sup>54</sup> While the relatively simple distillations of the *Small book* do not produce near-celestial quintessence, they still achieve two important feats. First, the impure and potentially poisonous ‘corpus’ of the distilled matter is discarded and its healing virtues retained, in a form which is more durable than fresh plant matter, if ultimately corruptible. Secondly, the process of distillation can stave off this corruption, at least temporarily.

<sup>48</sup> “Von den krütern die da seint heisser vnd trückner substantz;” “wurtzeln die einer grossen oder fuchten oder schlymigen substantz seint” (Brunschwig, *Small book*, 17v–18r).

<sup>49</sup> “Wan es halber gift is durch ir große kelte” (Brunschwig, *Small book*, 17r).

<sup>50</sup> Brunschwig, *Small book*, 16v–18v.

<sup>51</sup> “Ein bequeme stat / die not zuo vil hitz kelte noch fuchte habe;” “so ein wasser gefürt oder geforen ist / so ist dan gegenwertig sein zerstörung” (Brunschwig, *Small book*, 16v).

<sup>52</sup> “Aber im dritten iar im sein küelung gemindert vnn ist guot zuo confortieren” (Brunschwig, *Small book*, 17r).

<sup>53</sup> “Im dritten iar im sein külung getemperiert ist” (Brunschwig, *Small book*, 17r).

<sup>54</sup> “So weret es wider sein zeit das mag geschehen zwei mal vnn nit darüber” (Brunschwig, *Small book*, 18v).

How, then, are the distilled remedies of the *Small book* situated with respect to Rupescissa's idea of quintessence? Where do they fit into the alchemical view of the cosmos? We can perhaps best answer these questions by making sense of Brunschwig's comparison of distilled waters to heavenly bodies. This is reminiscent of Rupescissa's metaphor of 'adorning our heaven with stars,' where 'heaven' represents quintessence of wine and the stars symbolise the properties or quintessences of medicinal simples. The role of 'stars' in this analogy seems applicable to Brunschwig's distilled remedies. Their action on the human body is not like the miraculous tempering effect of quintessence of wine which can redress any complexional imbalance. Instead, they retain the hot or cold, wet or dry qualities of their original material and thus have a definite directional effect on the patient's complexional balance, irrespective of its current state. Specific rather than tempering, this mode of action is similar to that of planetary constellations which incline the humoural body in a defined way, with an outcome which is just as likely to be harmful as it is to heal. In the same way that one might consult an astrologer to determine propitious times for medical treatments or important events and avoid detrimental sidereal influences, Brunschwig recommends that the administration of the distilled waters be supervised by an "experienced doctor" to avoid further upsetting the patient's complexion.<sup>55</sup>

As we have seen, Brunschwig conceived of distilled waters as fundamentally sublunar entities with a finite lifespan. They possessed nothing like the preservative powers of quintessence, which, as DeVun puts it, "relied upon predictable and regular processes [...] that were celestial and perfect."<sup>56</sup> However, the distillation processes in the *Small book* do confer a substantial degree of superlunary regularity and predictability to distilled remedies. By leaving behind the plants' sublunary dregs, distillation prevents their potentially harmful 'side-effects.' Since the complexional qualities of each plant are known from ancient pharmacopoeia, the water containing these extracted properties is thus much more predictable in its effect on the human body than, say, a simple decoction. While the material decay of the waters and the fading of their properties are ultimately inevitable, Brunschwig thinks of these processes as highly predictable on the basis of the qualities of the original material. Provided that they are stored and maintained in the right way, Brunschwig seems confident that they will last for a

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<sup>55</sup> "Durch ein erfarennden artzet" (Brunschwig, *Small book*, 6r). On astrology in medicine, see Allan Chapman, "Astrological Medicine," in *Health, Medicine, and Mortality in the Sixteenth Century*, ed. Charles Webster (Cambridge: Cambridge University Press, 1979), 275–300; and Lauren Kassell, *Medicine and Magic in Elizabethan England: Simon Forman—Astrologer, Alchemist, and Physician* (Oxford University Press, 2005), esp. Ch. 2.

<sup>56</sup> DeVun, *Prophecy, Alchemy, and the End of Time*, 73.

defined period of time, and that their potency decreases by a defined amount each year. In fact, he explains that it can be difficult to assess whether a distilled water has become corrupt unless the date of its distillation has been noted.<sup>57</sup> Brunschwig’s remedies thus appear to behave with a clockwork regularity, similar to that of the heavenly bodies to which he compares them. The capacity to bottle this kind of medical reliability must be seen as a significant achievement in a world which was perceived to threaten the human body, and in fact all matter, with constant corruption.

This excursion into the intellectual realm of Brunschwig’s alchemical reading highlights the medical challenges he perceived in nature, and how he thought his remedies might stand up to them. These more theoretical aspects have been discussed separately for convenience, and not because they represent one of two distinct halves of Brunschwig’s project. His discussion of Rupescissa’s ideas in the *Large book*, for example, alternates with advice for hands-on practice and continuous assessment and improvement. To improve the quality of distilled wine for making quintessence, for instance, Brunschwig recommends adding a water cooling system to the still and includes a lengthy discussion of different furnaces and their coal dispensing mechanisms, air holes and water baths.<sup>58</sup> Furthermore, he displays a good deal of experience with equipment of different quality and provenance. He recommends glassware from Bohemian or Venetian glassblowers for its heat resistance, and earthenware jugs made from the dense clay found around Syburg (near Dortmund), or from the Alsatian town of Haguenau.<sup>59</sup> Considering the detailed description of these materials, which were produced not too far from Brunschwig’s hometown, Strasbourg, it is likely that he was using and testing them. Even the more theoretical parts of the *Large book*, then, are intercalated with methods and materials from Brunschwig’s own practical experience.

### **The ‘handwork’ of making distilled waters**

Brunschwig’s project of producing reliable remedies which could withstand and prevent material decay was, of course, in large part a practical undertaking. In the workshop, he struggled not only with ideas about matter, but with the stuff of nature itself, with plants and

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<sup>57</sup> “Aber schwerlich ist zu erkennen ein waß wen es zerstört ist das man es hin schuetten soll / so mann nit wissen ist die zeit seiner distillierung” (Brunschwig, *Small book*, 18v).

<sup>58</sup> “Das die rören des vßtragenden winß durch ein wasser gond’ (Brunschwig, *Large book*, 21r).

<sup>59</sup> “ein cucurbit von erden gemacht / als Hagenower oder Syburger” (Brunschwig, *Large book*, 32v).

minerals, and the elusive materiality of their medicinal properties. In what follows, I show how the struggle of extracting some degree of stability from the ever-changing sublunar world translated into very practical concerns about appropriate equipment, stable conditions and reproducible technical procedures

In the preface to the *Small book*, Brunschwig makes it clear that his approach to medicinal knowledge is firmly grounded in craft practice. He tells us that the project of writing the book originated in the context of his practice, as he was “often asked [...] how to prepare, use and store the waters.”<sup>60</sup> His instructions show that he was familiar with the necessary manual tasks such as making bricks and building furnaces. But he also refers to other artisans who employ similar equipment or materials, and tells his readers to use the heat of a baker’s oven for certain types of distillation, or to have pots made from the same “white clay from which goldsmiths’ and assayers’ crucibles are made.”<sup>61</sup> This sought-after practical knowledge was mainly gained not through the study of texts, but through personal experience—most importantly, Brunschwig’s own “diligent practice and use of the handwork” and what he had “seen with [his] own eyes and heard with [his] ears.”<sup>62</sup> In addition to his own observations, Brunschwig also learned from the experience of others, including “learned and lay men and women”<sup>63</sup>—without, it seems, judging the value of his sources by their gender or education. It is important to note here that Brunschwig, unlike many contemporary authors, seems to see no *a priori* difference in importance or validity between learned and lay forms of knowledge, notably between text-based scholarship and artisanal knowledge gleaned from quotidian manual practices. This emphasis on physical experience of nature as an important source of knowledge, next to textual and oral traditions, is at the core of the ‘artisanal epistemology’ which Smith identifies in later accounts of early modern artists and craftsmen.<sup>64</sup>

The title pages of Brunschwig’s works make it quite clear that his project of distillation will involve a good deal of physical ‘handwork.’ The *Small book* opens with the image of an idyllic garden with people digging up herbs, stoking fires, and decanting liquids (see figure 1).

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<sup>60</sup> “Da ich off vnd viel gefragt bin / so ich gehandelt hab in meiner practica wie man dye wasser brennen distillieren bruchen und behalten soll.” (Brunschwig, *Small book*, 2v).

<sup>61</sup> “Von weisser erden da von man den goltschmidten oder müntz meistern schmeltz digel macht” (Brunschwig, *Small book*, 7r).

<sup>62</sup> “Durch mein reglich vbung / bruch / vnn practica der hantwirckung,” “mit meinen augen gesehen vnd mit meinen oren gehört hab” (Brunschwig, *Large book* 2r–2v).

<sup>63</sup> “Von manchen gelerten vnnd leyen man vnnd frowen” (Brunschwig, *Small book*, 2v).

<sup>64</sup> Smith, *The Body of the Artisan*, esp. 59–89. Alisha Rankin, “How to Cure the Golden Vein,” has pointed out that Brunschwig, with his emphasis on experiential knowledge as well as book learning and his focus on distillation, is a prime example of this artisanal approach to natural knowledge.



The stills in the frontispiece of the *Large book* are entwined to form a caduceus, the staff of Hermes, and hence a symbol of alchemy rather than an existing piece of apparatus. The depicted practitioners, however, are touching it with their hands to check and adjust the temperature, reminding readers that the success of the loftiest alchemical pursuits hinges first and foremost on physical work (see figure 2). The instructions reflect this injunction to use one’s body and its senses to ensure that technical processes are reproduced as precisely and consistently as possible. The temperature of a water bath, for example, should be checked regularly by touch, and must not get so hot that one cannot “bear to keep a finger in it.”<sup>65</sup> The practitioner’s senses should also be attuned to detecting the transition between different stages of the distillation process. When distilling quintessence of wine, it is important to determine when the ‘spirit’ has been distilled off:

you may recognise this, for when the streaks in the alembic begin to branch,  
and thick broad drops form in the helmet as if it were sweating on the inside,  
then the spirits are gone.<sup>66</sup>

To be quite sure, though, this should be confirmed using the sense of taste:

if you really want to know if the spirits are gone, recognise the aforementioned  
signs, open the receptacle, catch some of the distilled wine from the helmet in  
a glass and taste it on the tongue. Thus you will sense whether it is watery or  
whether it still has more power and spirit.<sup>67</sup>

Once the carefully controlled manufacturing process was accomplished, proper storage and management of the medicinal waters was just as important for their successful application. It was, for example, essential to be able to tell when a water was nearing the end of its shelf life, at which point it could do more harm than good, and should no longer be used. Waters of rose

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<sup>65</sup> “Dan dz du ein finger darin geleiden magst” (Brunschwig, *Smal book*, 13v).

<sup>66</sup> “Das magstu mercken dar by / wann die strich in dem helm / oder alembich gabelen gewinnen / vnd grob breit tropffen in dem helm werden als schwitzet der helm inwenig / so synt die spiritus als die geist heruß” (Brunschwig, *Large book*, 22v).

<sup>67</sup> “Vnd so du eigentlichen wissen wilt wann die sp[irit]us heruß seint / so merck die vorgeantten zeichen vnd mach dz fürsatz glaß auff / vnd enpfach von dem helme des gebranten weiß in ein glaß ein wenig / vnd versuoch dz vff der zungen / so entpfindestu ob es sy wasserecht / oder me krafft vnn geist darinnen seint oder nit” (Ibid., 23r).

or lavender, for example, were considered past their use-by date when their distinctive "taste and scent have diminished noticeably or entirely disappeared."<sup>68</sup> Cloudy material at the bottom of the flask and a reddish tint to the liquid were also sure signs of impending corruption, as was a change in the water's viscosity. More elusive to the senses, this property was made visible through pouring tests, or by placing a drop on a thumb nail: "if it does not run off soon, [the water] should be discarded."<sup>69</sup>

While the hand and the eye figure prominently in histories of art and science, other senses such as smell and taste have recently also begun to attract scholarly attention, and have been shown to play a productive and authoritative role in artisanal and chemical enterprises.<sup>70</sup> As Brunschwig's instructions show, taste and smell are an important part of the distiller's physical engagement with such elusive things as plants' medicinal properties, rendering them more tangible and manoeuvrable. By emphasising the involvement of the body and its senses, Brunschwig exemplifies a crucial tool for making craft knowledge.<sup>71</sup> It should be noted, though, that this tool acquires an additional function for Brunschwig's readers as a means of reproducing his hard-won processes and remedies as accurately as possible. Furthermore, Brunschwig was one of the earliest authors to disseminate this hands-on approach in print. While Smith identifies Paracelsus as the earliest writer to fully articulate 'artisanal epistemology' in the 1530s, Brunschwig's works of 1500 and 1512 are probably an important part of this story. After all, as Charles Webster has pointed out, Brunschwig's influence on Paracelsus is clear, if not yet fully understood.<sup>72</sup> Much remains to be done to fully elucidate Brunschwig's influence on other writers, and the place of medicine in the development of empirical approaches to natural knowledge.

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<sup>68</sup> "Als dann der geschmack vnn geruch merklich gemindert vnd geschwechert oder gantz verloren ist" (Brunschwig, *Small book*, 18v).

<sup>69</sup> "Ob er nit bald vberabfliessen ist/so ist es vß zuo schütten" (Brunschwig, *Small book*, 18v).

<sup>70</sup> On the role of smell, and taste in seventeenth-century chymistry, see Evan Ragland, "Chymistry and Taste in the Seventeenth Century: Franciscus Dele Boe Sylvius As a Chymical Physician Between Galenism and Cartesianism," *Ambix* 59 (2012), 1–21; for a brief discussion of how the senses were involved in pigment manufacture, also see Smith, "Vermilion, Mercury, Blood, and Lizards," 31–33. On the importance of the senses in early modern medicine, see William F. Bynum and Roy S. Porter (eds), *Medicine and the Five Senses* (Cambridge: Cambridge University Press, 1993).

<sup>71</sup> Smith, *The Body of the Artisan*, 93–112.

<sup>72</sup> Charles Webster, *Paracelsus: Medicine, Magic and Mission at the End of Time* (New Haven: Yale University Press, 2008), 55.

## Communicating distilled waters

While learned and artisanal attitudes towards matter were crucial in shaping distilled waters as reliable remedies against the instability of the sublunar world, our understanding of these products remains incomplete if we treat the medium through which they are communicated—the printed book—merely as a primary source which allows us to identify those attitudes. After all, given the popularity of the *Small book*, it seems likely that Brunschwig’s distilled medicines travelled far more widely in this printed form than they ever did as physical liquids in jars or bottles. As we have seen, the procedures required to produce remedies of near-celestial reliability were elaborate and technically complex. Communicating them in a clear and reproducible form was a crucial element of the project’s success, and by no means the least challenging one, since it was a matter of articulating precise technicalities, unfamiliar equipment and embodied practical skills. The printed book was in many ways the ideal medium for the task in hand. More than any other form of communication, it stood for accurate replication of both text and image across thousands of copies. Indeed, Brunschwig and his publisher made full use of the medium’s potential for consistency and accuracy.

Despite the difficulties of the subject matter, Brunschwig seems confident that his instructions could serve to teach “those who wish to learn the ways and the art of distillation to begin this work.”<sup>73</sup> This ambition is underscored by several woodcuts depicting a teacher lecturing to students, as well as in his choice of words in the table of contents, which lists what each chapter is going to teach (*leren*) the reader, and the chapter headings in the body of the book. Chapter five, for instance, promises to “teach and instruct how to make the bricks and mortar.”<sup>74</sup> As this particular title indicates, Brunschwig’s technical instructions really start from scratch. Assuming little prior knowledge, he covers the most fundamental preliminaries, such as building a round distillation furnace. This includes the correct preparation of the clay and even a life-size figure of the mould which should be used to shape the bricks, complete with a poem summarising the key points (see figure 3). Numerous illustrations accompany the descriptions of stills and glassware in various shapes which would have been unfamiliar to most laypeople, and there are detailed instructions on how to assemble them, complete with a recipe for the lute used to seal the connection between alembic and receptacle. Straightforward

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<sup>73</sup> “Die da begeren zuo leren dye maß vnn kunst der distillierung diß werck anzuofahren” (Brunschwig, *Small book*, 2v).

<sup>74</sup> “Das .v. capitel ist leren vnnd vnder weisen zuo machen die stein vnnd leimen” (Brunschwig, *Small book*, 9r).

and meticulous at the same time, Brunschwig anticipates pitfalls such as the glass vessels cracking if they are not cooled down slowly and carefully.<sup>75</sup> From the alchemical literature, Brunschwig picks a number of techniques employing readily available heat sources which could be expected to yield a fairly constant temperature, such as fermenting horse dung, an anthill or a baker’s oven. In the purpose-built furnaces he describes, the temperature can be adjusted by regulating the air supply or by distilling in sand, ashes or a water bath.<sup>76</sup>

The integration of images and text, no doubt the work of Brunschwig’s publisher, Johann Grüninger, deserves particular attention. For his very successful edition of a popular vernacular herbal called the *Gart der Gesundheit* (‘Garden of Health’) Grüninger had devised a two-column page layout which not only made his version of the *Gart* much more economical by saving paper, but also allowed woodcut images to be embedded at the appropriate place in the text.<sup>77</sup> The same layout was used for the *Small book*, ensuring that readers never had to look far for the picture of, say, a particular shape of distilling flask described in the text. More often than not, the description of such an item concludes “and this is its form,” directly followed by the relevant woodcut integrated into the text column.<sup>78</sup> Where a particular piece of equipment is mentioned in more than one place, the image is often printed again, saving the reader the bother of turning to a previous chapter. By telling his readers exactly what equipment to use, how to set it up, and how to achieve constant temperatures, Brunschwig shows his concern for technical precision and consistent replication of his hard-won craft experience.

The organisation of the material is no less purposeful, both within the individual sections and by means of indices and registers which allow the reader to navigate between them. The technical tract begins by introducing the concept and purpose of distillation before moving on to the different techniques and required equipment, ending with instructions on how to label, store and manage the distilled waters. Read front to back, it thus provides something of a beginners’ guide to the craft. Rather than haphazardly running through the “many ways of distilling known to the alchemists,” Brunschwig selects a useful subset and ranks them in a logical order, according to complexity and cost. He describes ten key processes, five “without a cost” as they do not require a special furnace, and five which can only be performed “at a

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<sup>75</sup> “So gebürt sich lasse zuo ston dz glaß vber nacht zuo kalten” (Brunschwig, *Small book* 13v).

<sup>76</sup> Brunschwig, *Small book*, 10r, 12v–14r.

<sup>77</sup> On Grüninger’s reprint of the *Gart der Gesundheit*, see Brigitte Baumann, *Die Mainzer Kräuterbuch-Inkunabeln Herbarius Moguntinus* (1484), *Gart Der Gesundheit* (1485), *Hortus Sanitatis* (1491) (Stuttgart: Hiersemann, 2010), 223–225.

<sup>78</sup> E.g. “des form also ist” (Brunschwig, *Small book*, 18r).

cost and with a fire.”<sup>79</sup> While the book thus satisfies the needs of fairly committed adepts, it keeps accessible the relevant information for those less willing or able to invest much time and money.

Indices and registers are perhaps the most crucial features of knowledge organisation, as they allow the reader to connect information from the different parts of the book.<sup>80</sup> They, too, are probably owed to Johann Grüninger’s inventiveness in terms of layout and organisation. The first edition of the *Small book* contained over two hundred pages’ worth of navigation devices, from an alphabetical list of all plants to two cross-referencing head-to-toe registers of diseases and remedies. For all their good intent, these were initially somewhat cumbersome—a flaw which was remedied in the second edition. As the preface emphasises,

the previously printed book of distillation had a register at the back, which took up nearly the whole book and was unnecessarily printed twice; and then referred back into the book proper. This has now been left out and a new register made, easier to understand and faster to find.<sup>81</sup>

Looking up ‘headache’ in this revised register, for example, one reads a list of entries such as ‘xliiii A,’ referring the reader to fol. 44 where, under letter A of the ‘remedy’ section of *Betonica* water, its use against headache is explained. The foliation and cue letters allow the reader to use the book as a reference work to quickly locate information on relevant treatments. The *Small book* thus not only presents a comprehensive and structured account of making and using distilled waters; it also keeps it at the readers’ fingertips. This would have been especially helpful for practitioners who, like Brunschwig, were makers as well as knowers, going back and forth between books and stills, but whose spare time and polymathic education were more limited.<sup>82</sup>

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<sup>79</sup> “Vil sein noch der weg vnd modi der distillierung den alchymisten vast wol bekant,” “on kosten,” “mit kosten vnn durch das feür” (Brunschwig, *Small book*, 6v–7r).

<sup>80</sup> On navigation devices in German herbals in this period, see Mechthild Habermann, *Deutsche Fachtexte der frühen Neuzeit: Naturkundlich-medizinische Wissensvermittlung im Spannungsfeld von Latein und Volkssprache* (Berlin: de Gruyter, 2001), 132–137.

<sup>81</sup> “Das vor gedruckt distillier buoch hat gehebt ein hinder register / gar nahe so weit begriffen als dz buoch / vnn das zwei mal vßgelegt on not. Vnd hat dan wider gewisen in das recht buoch. Das selbig ist hie erspart vnn ein nūw register gemacht leichtlicher zuo verston vnn behender zuo finden” (Brunschwig, *Small book*, 1v).

<sup>82</sup> Pamela Smith, *The Business of Alchemy: Science and Culture in the Holy Roman Empire* (Princeton: Princeton University Press, 1997) has observed the emergence of a new type of reader who valued quick access to practical information during the early modern period, exemplified by encyclopaedic works (11).

This type of practical knowledge associated with crafts and materials gained in status in the early modern period,<sup>83</sup> and increasing literacy rates, in combination with the development of relatively cheap print, gave rise to a new kind of practical literature. This was not so much characterised by a common set of subjects – which ranged from craft secrets to cookery – as by their use of the vernacular and their step-by-step instructions which guided the reader towards useful knowledge or material products, often by trial and error.<sup>84</sup> Published in 1500, Brunschwig's *Small book* is one of the earliest exemplars of this emerging 'How-to' tradition which proved increasingly popular with literate (but not necessarily Latinate) laypeople such as artisans.<sup>85</sup> William Eamon has argued that these widely distributed and accessible books of secrets and recipes came to promote the standardisation of craft practices across the German-speaking area.<sup>86</sup> As we have seen, Brunschwig's manual is uniquely geared towards this aim of teaching even those with little experience how to replicate distillation procedures as consistently and accurately as possible.

The sheer effort that must have gone into implementing such rigorous structure and ample navigation devices shows that both author and publisher were acutely aware that the successful replication of procedures for channelling near-celestial reliability hinged on the clarity and reliability of the printed instructions themselves. In that sense, the *Small book* was as much a product of Brunschwig's practice as his distilled waters, shaped by attention to technical detail and a concern for precision and accurate replication. Bringing the printed book back into the narrative allows us to understand it not only as a vehicle of communicating technical knowledge, but also as a hard-won product in itself, much like the remedies it describes. Books were shaped by the same intellectual and artisanal concerns about the alchemy of material decay.

## Conclusion

In the fleeting material world of the sublunar sphere, human health was fragile and under constant threat from decay, corruption and the vicissitudes of the four elements. Alchemy, with its focus on controlling such natural processes, was a promising framework for fashioning a

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<sup>83</sup> Eric Ash, *Power, Knowledge, and Expertise in Elizabethan England* (Baltimore: Johns Hopkins University Press, 2004), 10; Klein and Spary, *Materials and Expertise*, 4.

<sup>84</sup> Eamon, *Science and the Secrets of Nature*, 121–131.

<sup>85</sup> Brunschwig's surgery manual (1497), intended to bolster the skills of apprentices, is another example of his practical focus. Cf. Sigerist, *Hieronymus Brunschwig and His Work*, 17–19; Klein, *Das Buch der Chirurgia*. On Brunschwig as an author of 'How-to' literature, see also Rankin, "How to Cure the Golden Vein."

<sup>86</sup> Eamon, *Science and the Secrets of Nature*, 131.

type of material product which was more resistant to the permutations of natural matter, and more predictable in its effect on the human body. To achieve this kind of material stability, Brunschwig draws extensively on both learned and artisanal traditions of alchemy by complementing intellectual concepts about transforming matter with confidently-articulated technical skills derived from his own experience. He abstracts from Rupescissa’s writings a concept of distillation as a way of achieving some degree of celestial regularity on earth. While the corruption of physical matter at the whim of the four elements is ultimately unavoidable, the distilling procedures in the *Small book* ensure that the complexional effects of *materia medica* are stabilised, standardised and made predictable. In the workshop, these ideas translate into concerns about adequate equipment, technical precision and consistent manual practice. These processes, by which reliable distilled waters are prised from temperamental natural matter, and thus set apart from ordinary corruptible medicines, required the investment of the practitioner’s body and its senses. But as we have seen, Brunschwig also viewed this direct physical engagement as a process which yields valuable knowledge about technical processes and natural materials, making their elusive properties more manoeuvrable in practice. This was no less crucial than scholarly learning, and it underscores the hybrid character of Brunschwig’s project. Moving back and forth between books and stills, he constructed his distilled waters as much in the study as in the workshop.

Brunschwig’s focus on distillation, backlit by alchemical thought, leaves us with a strong sense that his works are about ‘doing alchemy.’ They also show, however, that the meaning of this category was not self-evident. Although borrowing from authors and works that were, by Brunschwig’s time, generally recognised as “alchemical,” he defines his own approach to alchemy largely in terms of medical purposes, realised through artisanal precision and hands-on work. Given the popularity of Brunschwig’s works, his stance on alchemy is likely to have influenced practitioners in the sixteenth century and beyond. To the modern historian, it is a potent reminder that alchemy in the early modern period was a colourful landscape of overlapping interests and practices rather than a single monolithic tradition.

## Figures

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Figure 1. Title page illustration from Brunswig, *Small book of distillation*, 1500 (Bayerische Staatsbibliothek).

[http://daten.digital-sammlungen.de/bsb00031146/image\\_5](http://daten.digital-sammlungen.de/bsb00031146/image_5)

Figure 2. Title page illustration from Brunswig, *Large book of distillation*, 1512 (Bayerische Staatsbibliothek).

[http://daten.digital-sammlungen.de/bsb00005369/image\\_5](http://daten.digital-sammlungen.de/bsb00005369/image_5)

Figure 3. Double-page illustration of a brick mould from Brunswig, *Small book of distillation*, 1500 (Bayerische Staatsbibliothek).

[http://daten.digital-sammlungen.de/bsb00031146/image\\_44](http://daten.digital-sammlungen.de/bsb00031146/image_44)

[http://daten.digital-sammlungen.de/bsb00031146/image\\_45](http://daten.digital-sammlungen.de/bsb00031146/image_45)

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## Notes on Contributor

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